MITIGATING CHALLENGES to ENVIRONMENTAL SUSTAINABILITY in MUSEUMS

Kelly Floyd

Department of Museum Studies

The University of the Arts

May 2011

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

MITIGATING CHALLENGES to ENVIRONMENTAL SUSTAINABILITY in MUSEUMS

Kelly Floyd

Department of Museum Studies

The University of the Arts

May 2011

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

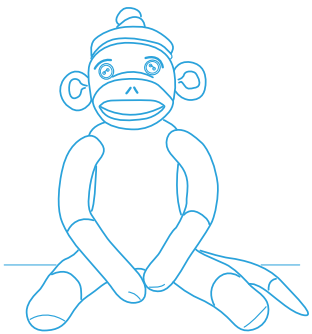
For more information contact:
Kelly Floyd
3417 Ivory Way
Indianapolis, IN
317.796.4954
floyd_kelly@yahoo.com

Abstract

If certain challenges can be mitigated, then a new museum quality aesthetic can be established focused around sustainability and green design. Through surveying and research, this paper examines the challenges to environmental sustainability and green design regarding exhibitions. Many conversations have been had on environmental sustainability in institutions and about green design for exhibitions through focus groups and interviews, but no statistics exist to confirm or deny the opinions presented in published articles. Statistics are provided in this paper confirming the real challenges encountered by exhibition teams. A resource application that's information architecture based on behavioral change theory is proposed to help mitigate these challenges with greater ease. Research also focuses on the concept of sustainability as a three-part structure which includes environmental sustainability as well as social and financial sustainability.

For Kasen, Gavin, Ella, Grant,

and the generations of my family to come.



To those of you who have supported me throughout this process, I sincerely say thank you.

Thank you to all those who spent time taking my survey, answering my front-end questions, and talking with me either through phone or e-mail conversations to strengthen my research.

To my committee members who patiently worked through the multiple revisions and gave of their time to meet with me, I appreciate your knowledge and experience that made me question my thoughts, motivations, and outcomes.

To Polly McKenna-Cress, thank you for pushing, prying, poking, and probing every decision, thought, and desire I presented to you. Because of you, I know it is ok to be the "animal in the room" and fight for what I believe is best. The fight only makes the World a better place.

To my classmates, the long hours and hard work have changed and shaped us in ways we never thought were possible. Thank you for the laughs and the memories. I now have smiles in the form of Hulk Hogan, "staying inside the box," and what the "F" truly means.

To Kim and Crawford, whether the long nights were intentional or unintended, I always felt I had a hand to hold along this journey because of you two. Thank you for your spirits, your insights, your joy and tears, and for being you when I needed it most.

To my girls back home, knowing I had a place to land where people were waiting with open arms made all the difference. Throughout these last two years, the anticipation of seeing your faces and knowing there were moments of happiness to come was indescribable. If the saying is true that we are only as strong as the friends we keep, I have biceps the size of watermelons. XOXO.

To my family, we may be small but we are mighty. Mason, you are an incredible father and the most amazing brother a sister could wish for. Thank you for the gift that is Kasen, and for persevering through the hard times. You are an inspiration to me more and more each day.

To my mom and dad, Jeanne and Cary, words cannot express the gratitude and admiration I have for you both. "Thank" and "you" don't seem like big enough words to acknowledge the amount of love and support I feel from you each and every day. I love you so much and would not be the woman I am today without you as my base.

TABLE OF

CONTENTS

As a member of the next generation of experiential designers, I acknowledge, accept and anticipate the world I am entering. I have been told by industry professionals designing for sustainability is possible and impossible, it is easy and it is complicated, it is happening and it is not happening, it is financially responsible but it is also costly. Most importantly I have been told it is the right thing to do for my children and the generations to come. How can I, as a new member of this community of designers, make a contribution to facilitate the ease in which my fellow designers and I make the right choices? Can making these choices move the museum industry toward a standard of design, encompassing expectations of safe, low-impact, environmentally conscious experiences that still engage and educate our audiences?

"But what can I do?" is always the question. "So what is it I can do?"

CHAPTER 1

INTRODUCTION

The slogans abound: Go Green! Reduce, Reuse, Recycle! Just Say No to Hummers! The studies on global warming, greenhouse gases, and the depletion of resources all relay the way we, as human beings, have abused the planet. The museum industry responded like the agricultural, manufacturing, service and technology industries by conducting a thorough assessment and responding with articles, seminars, and advocates all supporting the decision to "Go Green!"

Surprisingly, choosing environmentally friendly practices while designing exhibitions is still being met with difficulties. Lack of clear standards, cost, limited life spans, and durability were all examples of *frictions* cited as challenges in NAME's Spring 2010 *Exhibitionist* magazine. These challenges were seen as factors that could derail a project's intention to be stamped as *green*. These challenges are also delaying the museum industry from being consistently considered environmentally sustainable.

exhibition team: a group of individuals within an institution developing, designing, and fabricating new and existing exhibitions. Members could include, but are not limited to, content developers, designers, project managers, directors, and fabricators.

Two challenges stated in the article seem to be heavily influenced by the industry. The first was client expectations for aesthetics.[1] The expectations established by stakeholders, the public and previous exhibitions, call for a dramatic, overstated aesthetic within exhibitions. This aesthetic need consists of environmental experiences requiring large amounts of materials and unique exhibition-specific design elements. *When exhibitions lack these elements, are they considered by an audience to be of "museum quality?"* This aesthetic need also encourages exhibition teams to continue on established paths of designing that encourages a mentality of throwing out the old and bringing in all new.

1. Belew, Greg, Kathy Gustafson-Hilton, Sharon Handy, and Lyn Wood. "Splinters from Green Materials: Conversations about the Frictions of Green Exhibition Design." *Exhibitionist* Spring (2010): 58. Print.

institution: any organization, both for- or non-profit, providing educational services to the public. Institutions have a stated mission, at least one full-time staff member, are located on a physical site with a facility, and provide at least one exhibition for visitors per year.

sustainable design: thinking differently and working toward solutions in an institutions everyday design and operations that potentially have lasting effects on the environment.

The other challenge influenced by the industry was designer's level of confidence or perceived lack of knowledge in materials and fabrication processes. "Many wished for a more integrated approach that brought the fabricator's extensive knowledge and ability to source materials into the design process earlier as a way to make smarter, more ecologically sound choices for exhibitions."[2] The contributors to the magazine agreed the integrative process was a key in designing for sustainability, raising the question: *How can this "friction" be avoided?*

This question was then followed by two other questions. *How can the research on creating change in human behavior be utilized to facilitate this process? How can understanding the way designers make choices during the design process be used to move the industry towards environmentally friendly design?*

THE PROBLEM

How can the movement shifting the industry towards the buzzwords *green design* be pushed further so that designing for sustainability is what just happens? What do the next generation of designers need to help them move toward a natural habit of designing for sustainability? How can designers make this change happen? By mitigating some of the challenges discussed in the *Exhibitionist* article previously mentioned can a new standard in exhibition design be established with sustainability at its core?

HYPOTHESIS AND RESEARCH QUESTIONS

After identifying the problem, the hypothesis to be answered is: If certain challenges can be mitigated, then a new *museum quality* aesthetic can be established focused around environmental sustainability and *green design*. Providing exhibition teams with a sustainable design resource whose information architecture is based on behavioral change theory will present information to exhibition teams in a new way, possibly creating change. An understanding of the challenges to be eliminated and what resources are currently available to exhibition teams will be required. Investi-

2. Belew, Gustafson-Hilton, Handy, and Wood, 59.

gating the needs that must be met for exhibition design teams to change their current design practices must also occur. Key to the discussion is knowing if exhibition teams are willing to change their design process and aesthetic to accommodate limitations presented by sustainable design.

Other critical questions to be investigated include: *What are the concerns regarding sustainability affecting institutions today? Can a process be developed to better empower exhibition design teams to change the way exhibitions are designed and fabricated within their own institutions? What are the policies and practices that can be replicated from institutions currently practicing sustainable design? How can available resources be evaluated and possibly combined so they better function as a single tool available for exhibition teams? Could this resource allow exhibition teams to navigate through their own frustrations and not be deterred in finding solutions to their individual institutions immediate challenges?*

challenges: tangible obstacles identified by exhibition teams as reasons hindering decision making such as time, budgetary constraints, lack of awareness, or staff size.

museum quality exhibition: the design of an exhibition facilitating a proper learning environment that is aesthetically pleasing to the public. These types of exhibitions often are noted in design journals, receive reviews noting their aesthetic qualities, and are seen as leaders in the creative environment.

green design: a design aesthetic that encompasses the use of rapidly renewing materials, promotes locally harvested and manufactured resources, and economically stimulates the local economy. Green design also utilizes design practices that create reusable structures that can be reconfigured after the intended initial use, avoiding the disposal of a large amount of waste.

METHODOLOGY

To answer the questions put forth previously, and to successfully meet the goals of this study and application, observations, case studies, interviews, and exploration into current institutional procedures was required. Evaluations asking exhibition design teams how material selection and fabrication decisions are made, and what challenges these teams currently face in designing sustainably were also circulated.

Specific ways research was conducted included:

- A front-end survey to understand how change occurs within institutions today and what sustainable design practices are utilized within institutions.
- Surveys of exhibition design teams on the challenges preventing them from designing and fabricating exhibitions in a sustainable manner.
- Interviews with exhibition design team members at institutions

recognized for their ability to choose sustainable options for exhibitions.

- Site visits to these institutions to understand and communicate the aesthetics associated with sustainable design.
- Case studies of Web sites available to exhibition design teams that provide information about sustainable design, materials, fabrication processes, and that facilitate discussion within the design community. These included *The Green Museums Initiative*[3] sponsored by the California Association of Museums, *GreenExhibits.org*[4] published by the Madison Children's Museum, *Green Museums Wiki*[5] monitored by author Sarah Brophy, and the *Green Practices Toolbox*[6] maintained by the Association of Zoos and Aquariums.

The methodology applied to the research provided the following:

- A full understanding of the concept of sustainability for museums.
- An acknowledgment of the different challenges museums associate with *green design*, limiting their ability to achieve environmental sustainability.
- The utilization of a single change theory in creating a resource that allows designers to navigate the material selection and fabrication process throughout the different phases of an exhibition's creation.

Proposed is the foundation of a resource whose architectural structure is based on the analysis of these observations and research on facilitating behavioral change. Conclusions are drawn about the further challenges preventing institutions from establishing their own environmental sustainability. Finally, potential paths to explore the larger topic of sustainability are presented for further research. The museum industry can reduce the amount of waste it creates, and reverse the amount of resources it requires each time a new exhibition is built. Museums simply need to be willing to change.

---

3. *The Green Museums Initiative*. California Association of Museums. Web. <http://www.calmuseums.info/gmi/index.html>.
4. *GreenExhibits.org*. Madison Children's Museum, 2005-2011. Web. <http://www.greenexhibits.org/intro.shtml>.
5. *Green Museums Wiki*. Sarah Brophy, 2008-2011. Web. <http://www.greenmuseums.wetpaint.com>.
6. "Green Practices Toolbox." *Association of Zoos and Aquariums*, 1997-2009. <http://www.aza.org/green-practices>.

CHAPTER 2

CHALLENGES FACING A NEW SUSTAINABLE AESTHETIC

As new institutions are opened and as old institutions grow, sustainable decisions are considered earlier and often. These decisions effect internal and external programming, collection management processes, they are design-related and financial decisions, and are made in response to visitor's needs. The definition of sustainability, learning how sustainability occurs within an institution, and learning how exhibition team decisions affect an institution's environmental sustainability, develops a base of knowledge guiding decisions to enact sustainable changes.

There are many definitions of sustainability. The Merriam-Webster Dictionary defines sustainability in two ways: "of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged" and "of, or relating to a lifestyle involving the use of sustainable methods."[7] The U.N. World Commission on Environment and Development's 1987 report entitled *Our Common Future* defined sustainability as meeting the needs of the present without compromising the ability of future generations to meet their own needs.[8]

In 2005, Mike Jackson wrote a guest editorial for the APT Bulletin's special issue on sustainability and historic preservation. Jackson wrote, "Sustainability is based upon the three E's: environment, economy, and equity."[9] Jackson continues by describing sustainability as the ability of a community to create places of enduring value for future generations, by using resources wisely.

All three definitions contain two common themes, using resources wisely and being aware of future generations' needs. Jackson's definition contains a third theme, the ability to create value

7. "Sustainability - Definition and More from the Free Merriam-Webster Dictionary." *Merriam-Webster Online*. Web. <http://www.merriam-webster.com/dictionary/sustainability>.

8. "Our Common Future, Chapter 2: Towards Sustainable Development - A/42/427 Annex, Chapter 2 - UN Documents: Gathering a Body of Global Agreements." *A/RES/3/217 A - Universal Declaration of Human Rights - UN Documents Cooperation Circles*. <http://www.un-documents.net/ocf-02.htm>.

9. Jackson, Mike. "Building a Culture That Sustains Design." *APT Bulletin* 36.4 (2005): 2-3. Print.

within a community. As institutions begin moving forward into the future, the ability to create value becomes a vital component of sustainability. This value allows institutions to compete for resources and importance within their respective communities and society as a whole.

THE THREE E'S

Jackson conceptualized sustainability as a set of three E's: economy, equity, and environment. In relation to institutions, economic sustainability refers to the decisions made to ensure financial longevity for an institution. Stephen Bell and Mike Sarna make the argument that most funders today want to support sustainable projects, and to remain financially viable, institutions must push for sustainable practices. Bell and Sarna write, "… being recognized as an institution that promotes environmentally smart choices in construction, design and operation, may become a key factor in identifying and securing funds to complete a renovation or project."[10] Funders see institutions as primary vehicles for raising public awareness of *green* concepts and practices.

The second E, equity, is also known as communal or social sustainability. Social sustainability addresses how an institution interacts with the surrounding community. Sarah Brophy and Elizabeth Wylie explored how institutions can become part of the sustainable movement while advancing institutional mission for the American Association of Museum's *Museum News* in 2006. Brophy and Wylie acknowledge the financial benefits for an institution generally outweigh the opportunities for education and mission advancement when an institution is making the decision to improve it's sustainability. The pair write, "If our job is to teach and inspire, then we are perfectly situated to model green behavior both in pursuit of our missions and support of communities."[11] Brophy and Wylie put the ability to improve an institution's community relations into the forefront of the discussion as to why museums should

CASE STUDY: SOCIAL SUSTAINABILITY

The California Academy of Sciences utilized the expansion of their cafe as an opportunity to increase their social sustainability. The institution specified potential vendors had to provide support to the sustainable message throughout the institution by demonstrating and incorporating sustainable practices for visitors to see. This meant "… explaining food choices based on buying local and/or organic produce with no- to low-environmental impact from pesticides and transportation requirements."* The institution wanted visitors to learn about the different practices at the museum so they could implement these practices in their own daily routines.

*Brophy, Sarah, and Elizabeth Wylie. "It's Easy Being Green: Museums and the Green Movement." *Museum News* Sept.-Oct. (2006). 40. Print.

10. Bell, Stephen, Mike Sarna, and Notebaert Nature Museum. "Building Greener Exhibits." *greenexhibits.org*. Madison Children's Museum. Web. <www.greenexhibits.org/connect/building_greener_exhibits.shtml>.

11. Brophy, Sarah, and Elizabeth Wylie. "It's Easy Being Green: Museums and the Green Movement." *Museum News* Sept.-Oct. (2006): 39. Print.

investigate sustainability.

The impact an institution has on the surrounding environment is the third E. Research into sustainable design began consistently in the mid-1960s with R. Buckminster Fuller and Southern Illinois University launching the *World Design Science Decade*. In 1972, the writing of Richard Papanek's book Design for the Real World acknowledged the impact industrial design, and product and system development were beginning to have on the environment.[12]

During the 1980s, *green design* became trendy in both the public and private sector as "… public awareness of environmental problems spread and green parties became more prominent throughout Europe …"[13] The *green design* of products led the way to a broadening of scope which included the maintenance of products, greenhouse gas emissions, and the design of building's containing products. This wider scope became known as sustainable design.[14]

Even though the concept of sustainability began with environmental awareness, the three areas of sustainability work together to provide stability for an institution. "Sustainability is bigger than the environment. It's also financial sustainability and community sustainability. When we talk about sustainability, we mean the balance of all those areas," said Jane Werner, the Executive Director of the Children's Museum of Pittsburgh.[15]

"Being green is about how you operate your business," said Dr. Sally Montgomery, Executive Director of W5. "There's no point in being green in your exhibitions if you run your business in a non-sustainable way."[16] The conceptual tripod eventually balances itself, but finding the right mix to meet the expectations of each requirement entails time and patience.

DESIGNING FOR ENVIRONMENTAL SUSTAINABILITY

While exhibition design does reach across all three sustainable principles, environmental sustainability encompasses *green design* and is the leg of the tripod an institution's exhibition team has the most influence on. The baseline definition of sustainability used by most organizations and authors is the 1987 U.N. World Commission on Environment and Development definition found on page 5. In the Fall 2006 Lord Cultural Resources *Cultural Capital* newsletter, Catharine

12. Margolin, Victor. "Design for a Sustainable World." *Design Issues* 14.2 (1998): 83-84. Print.
13. Madge, Pauline. "Ecological Design: A New Critique." *Design Issues* 13.2 (1997): 51. Print.
14. Madge, 51.
15. Belew, Gustafson-Hilton, Handy, and Wood, 57.
16. Belew, Gustafson-Hilton, Handy, and Wood, 62.

Tanner, Ted Silberberg, and Liliana Da Silva wrote the report's intention was to bring attention to the need for a greater response to environmental issues like global warming and renewable energy use. However, the broad definition of the term *sustainability* has created ambiguity in applying it both professionally and personally.[17]

Exhibition team members working in the industry were asked what sustainable design meant to them through a front-end survey for this research. Answers to the question varied but had similar themes of awareness when using resources and how design can effect the future. Answers included, "design practices that do not strain the resources of the natural world," and "designing as if you care about the future."

Bryan Schultz, project manager at the Newseum in Washington, D.C., responded by saying:

> Sustainable design to me is a successful product that is conveyed to the audience. Whether it's a good way-finding sign or a good exhibit, it does not have to be changed in the course of its lifetime. If it does [have to be changed] then it was a waste and not sustainable. Green design is another matter.

Schultz recognizes sustainable design does not only represent the environmental considerations of an element, but also the consideration an element has for visitors and the financial burden replacing poor elements creates, decreasing the financial sustainability of the institution. Schultz also directly implies there is a difference between the environmental sustainability and *green design*.

In August of 2009, David Martin developed a "Sustainability Checklist" for the Museums Association of the United Kingdom. The checklist is based on the social, environmental, and economic considerations institutions should be aware of while designing. The checklist poses questions such as: "Have you set targets for reducing energy and water use, and reducing waste?" and "Do you try to source goods locally to reduce transport carbon emissions?"[18] The checklist is intended to be a starting point for institutions thinking about environmental sustainability.

"Exhibits, especially temporary installations, have a relatively short life expectancy and when demolished, many materials tend to go straight to the landfill," Bell and Sarna wrote.[19] These

17. Tanner, Catharine, Ted Silberberg, and Liliana Da Silva. "Museums and the Sustainability Movement." *Lord Cultural Resources* (Fall 2006): 1. Print.
18. Martin, David. "Sustainability Checklist." Sustainability Report. *Museums Association*, Aug. 2009. Web. <http://www.museumsassociation.org/sustainability/sustainability-report>.
19. Bell and Sarna.

words are motivation for any institution considering environmentally sustainable design. The words also support exhibition teams understanding materials, methods and the environmental impact creating and maintaining an exhibition requires.

Brophy and Wylie suggest design teams think about new projects in their entirety from the beginning to successfully integrate sustainable practices. They write, "The team considers the project from every angle to produce a healthy and safe, resource-efficient, flexible and durable, building and site …"[20] Institutions can design with *green* initiatives in mind by following the holistic lead of exhibition teams already thinking *green*.

Before delving into the logistics of *green design*, exhibition teams, institutions, and stakeholders need to question whether "… the environmental savings of substituting a few sheets of wheatboard for plywood come anywhere near the savings of putting the building's lights and electronic exhibits on motion activators or strictly-controlled timers, recycling their office paper waste, or offering school program packets online rather than as printed mailers."[21] Remembering environmental sustainability does not just include the materials used in exhibitions, but all the actions within an institution that contribute to an institution's environmental impact.

"Exhibition construction can account for up to 70% of a museum's consumption of materials, with typically only 25% of it recycled."

— Tim McNeil

Environmental sustainability and *green design* tend to be used interchangeably, but they are not the same thing. *Green design* is one component of environmental sustainability. "Green refers to the products and behaviors that are environmentally benign, while sustainable means practices that rely on renewable/reusable materials and processes that are green or environmentally benign."[22] The *green design* of exhibitions, the design and construction of the building envelope, and a building's operation and maintenance procedures are all pieces of the larger concept of environmental sustainability.

But We Used Plyboo®…

When looking at an array of museums designed over the last three decades, a common set of aesthetics have been utilized by architects for museum building envelopes, and the exhibitions within them. Think about your favorite museum. Does that museum contain a tall lobby made of glass or a beautiful stone facade? Are lots of computers contributing to the learning experi-

20. Brophy and Wylie, 41.
21. Belew, Gustafson-Hilton, Handy, and Wood, 62.
22. Brophy and Wylie, 39.

ence? "The museum boom of the '90s expanded existing museums and created new ones, many with vast numbers of space housed in star architect buildings clad with custom glass and exotic materials."[23]

Research has been conducted on the lack of restraint architects have shown in considering society's needs. Clipson wrote, "… there is much evidence to suggest that, as a profession, architects have ignored not only social but technological and economic concerns that are critical to the effective practice of architecture to meet society's needs."[24] An ideology leading some architects to focus only on the exterior of the building results in interior issues after the building is completed.

"There's this vocabulary of design, especially in the last decade, that dictates huge armatures and settings and surrounds with relatively small exhibits embedded in them."

— Eric Siegel, Director of Planning & Program Developing, New York Hall of Science.

Exhibition designers are then met with the challenge of designing an interior that is comparable with an exterior aesthetic based on this lack of restraint. Society and museum stakeholders have become accustomed to this aesthetic and now consider it *good design*. "Raising money for, designing, and constructing a building involves dozens or perhaps hundreds of vested interests, each with their own aims for the project."[25] This is true for exhibitions as well wrote Jacobsen. "We do it the old way because large-scale galleries and expensive, long-term exhibits are what many funders and perhaps the visiting public regard as *museum quality* …"[26]

Joe Wisne of Roto Studio said, "Clients have a lot to say about this through their preconceived expectations of what makes a *good* exhibition. They may be readily willing to enhance a particular green-sounding material but are often less prepared to take the more radical approach of building the same essential visitor experience with half the overall volume of *stuff*."[27]

To achieve this *museum quality* aesthetic, "big budgets, big egos, big buildings, [and] big exhibit contracts"[28] are required. Exhibition designers are expected to create full immersion experiences incorporating highly developed interactives. These aesthetic expectations can counteract any attempt a designer may make to incorporate *green design* into an exhibition by being "… overbuilt, with excessive materials, invested in furniture and custom environmental surrounds

23. Jacobsen, John W. "From Red Dinosaur to Green Exhibitions." *Exhibitionist* Spring (2009): 7. Print.
24. Clipson, Colin. "Contradictions and Challenges in Managing Design." *Journal of Architectural Education*. 45.4 (1992): 218. Print.
25. Clipson, 218.
26. Jacobsen, 7.
27. Belew, Gustafson-Hilton, Handy, and Wood, 59-60.
28. Jacobsen, 6.

that can't be renewed."[29] Exhibition teams also hire fabricators expecting them "… to use green materials but still desire something flashy and highly environmental."[30]

"When it comes to design and fabrication of interactive exhibits … what exactly is green?"[31] This question was posed by the authors of "Splinters from Green Materials." Charlie Shaw, fabricator at C.W. Shaw, Inc. responded with a question of his own. "If, he asked, you're designing an exhibition filled with plastic and toxic waste but surround them in Plyboo® (a laminated bamboo plywood), are you being green?"[32]

Even when exhibition teams desire to be environmentally conscious, the current design aesthetic of large temporary walls, highly designed casework, custom-made furniture, and one-time use graphics and interactives doesn't fit as *green design*. Just because the interactive housing is made from a sustainable material doesn't mean the exhibit component is *green*. Preparing stakeholders for the change in aesthetic is an important step when going *green*.

Kids + Science = Environmental Sustainability

Brenda Baker, Director of Exhibits at the Madison Children's Museum, wrote an article for the Spring 2010 *Exhibitionist* about *green design* and sustainability in children's museums. Baker is the Director of Exhibits at The Madison Children's Museum. Baker wrote, "Children's museums have been paving the way in the green design field unwittingly since their inception over a hundred and ten years ago."[33] *Why is this?*

Baker noted both the Brooklyn Children's Museum and the Indianapolis Children's Museum began in a previously owned building with recycled collections donated by other museums in the area. The ability to adapt objects for a new context and the lack of finances for many children's museums encourage a reuse mentality.[34] The community within which children's museums exist generally press for exhibitions with content locally focused. Also, the primary audience of children's museums require safe, non-toxic environments.

The Madison Children's Museum opened its first *green exhibition* in 1999. *First Feats* was an award-winning exhibition that kept the primary audience's design needs in mind first. The exhi-

29. Belew, Gustafson-Hilton, Handy, and Wood, 59.
30. Belew, Gustafson-Hilton, Handy, and Wood, 59.
31. Belew, Gustafson-Hilton, Handy, and Wood, 56.
32. Belew, Gustafson-Hilton, Handy, and Wood, 56.
33. Baker, Brenda. "Green Exhibitions in Children's Museums: Setting the Bar Higher." *Exhibitionist* Spring (2010): 58. Print.
34. Baker, 59

bition was not intended to be a model for *green design* but was intended to be "… a healthy space for our youngest audience."[35] The exhibition team at the Madison Children's Museum examined each material they used during the design and fabrication process for inherent health dangers to children, and replaced these dangers with natural, local, sustainable materials.[36] Since this first exhibition the museum has been working to "… make green practices integral to our museum's exhibition program, identity, mission, and vision."[37]

Many advocates are still trying to dispel the attitude that going *green* is only for science, natural history, and children's museums, or other institutions whose missions include educating visitors about conservation. Art and history museums may not see environmental sustainability as part of their institutional missions.[38]

Starting New, Adding On, or Retrofitting? We Have An Idea for You …

Baker writes *green* thinking has not gone mainstream yet because it has only been part of the conversation for the last ten years, fully developing in the last four to five years. Baker states, "In 95% of the cases, the impetus for green thinking started with a new building project first, not with the exhibitions."[39] Whether or not this statistic is true, the argument that thinking about or making a commitment to *green design* is easier and more practical when building a new building is plausible, and sustainability is still being written about in this way.[40]

Green design is also easy to think about when a building requires retrofitting or when an expansion is being built. Expansions often incorporate "high-performance energy-efficient mechanical, ventilation and lighting systems"[41] due to building system demands. Using an integrative process with the construction team creating a new space can continue the efforts to be environmentally conscious by filling these new areas with *green* exhibitions.

Cradle-to-Cradle Mentality

In the museum industry, the first steps of *green design* are common knowledge. Simple adjustments in ordering procedures and basic materials exist and have been established. Choosing

35. Baker, 58.
36. Baker, 58.
37. Baker, 58.
38. Brophy and Wylie, 44.
39. Baker, 62.
40. In "From Red Dinosaurs to Green Exhibitions" Jacobsen writes: "The key lies in sustainable thinking at the start of museum planning, not just in green material and fabrication choices at the end." (Jacobsen, 6). The choice of words implies to the reader this type of thinking can only happen when building a new museum. Later Jacobsen writes this type of thinking is not in relation to new buildings only, but the reader has already been conditioned to think this way.
41. Brophy and Wylie, 44.

sustainable materials like fast-growing bamboo flooring and plywood to minimize environmental depletion of resources, or using carpet squares instead of single-piece installations to cut down on waste when reinstallation is required are both options.[42] Another common choice is choosing formaldehyde-free materials for children's exhibitions to be sure visitors are exploring in a safe and healthy environment.[43]

What are the next steps that push an institution over the "green design" basics hump and into an aesthetic that incorporates innovative "green" solutions? There are institutions who have embraced *green design* and who are committed to only *green* solutions to problems. These institutions have adopted a cradle-to-cradle mentality.

Cradle-to-cradle was a term coined by Swiss architect Walter R. Stahel in the 1970s during the evolution of the theory of sustainability. Cradle-to-cradle design develops systems from a *biometric* or nature-inspired approach and supports thinking about a materials life-cycle.[44] Designers consider a material's ability to reenter the ecosystem in a productive form after the initial purpose of the material has expired.

This mentality requires designers to select safe, natural materials and non-toxic fabrication processes that are locally based so "… benign, valuable, high-tech synthetics and mineral resources circulate in cycles of production, use, recovery, and remanufacture."[45] Glues, plastics, laminates, and procedures altering a material's chemical makeup do not support this design style. Therefore, a cradle-to-cradle aesthetic requires a shift in thinking from "huge, heavy, and exotic" to "… more intimate, airy, and familiar."[46]

CRADLE-TO-CRADLE MENTALITY AND THE THEATER INDUSTRY

The big budgets and large square footage of museum exhibitions are in sharp contrast to the small budgets, smaller stages, and quick turnover encountered in the theater industry. Former scenic turned exhibition designer John W. Jacobsen acknowledged he thought about how, "Every flat, platform, door frame and step unit [could be] re-used, re-painted with powdered paints mixed with animal hide glue (cheap!) and bolted back together overnight in new combinations …"* in his past experience. Jacobsen writes the empty, white-walled rooms most exhibitions begin as are not the most flexible. Built-in control systems like lighting and support grids, as well as long-standing relationships with audience members are what make a theater sustainable over time.

*Jacobsen, John W. "From Red Dinosaur to Green Exhibitions." *Exhibitionist* Spring (2009): 6. Print.

Madison Children's Museum, Madison, Wisconsin

The *First Feats* exhibition at the Madison Children's Museum, whether by intent or through

42. Brophy and Wylie, 41.
43. Tanner, Silberberg, and Da Silva, 2.
44. McDonough, William, Michael Braungart, Paul T. Anastas, and Julie B. Zimmerman. "Peer Reviewed: Applying the Principles of Green Engineering to Cradle-to-Cradle Design." *Environmental Science & Technology* 37.23 (2003): 435A. Print.
45. McDonough, Braungart, Anastas, and Zimmerman, 436A.
46. Jacobsen, 9.

CASE STUDY: CRADLE-TO-CRADLE MENTALITY

Opened in 1999, the Peggy Notebaert Nature Museum is located in Lincoln Park in Chicago. In 2003, it embarked on a $1.3 million greening project and in October of 2009 rededicated 17,000 sq.-ft. of exhibition space. The museum now includes rooftop gardens, solar panels, and an eco-friendly water distribution system. It recycles more than 37,000 lbs. of paper each year, sells only local and organic food in its cafe, and offers compostable utensils, straws and napkins.

In the *Hands-On Habitat* exhibition children learn about hidden animal habitats. The interactive seen above is included in this exhibition. The interactive is made of locally-harvested wood. Metals has been replaced by fabrics, and computer technology has been excluded, encouraging children to interact while mechanically manipulating the parts. The Peggy Notebaert Nature Museum has made a commitment to environmental sustainability and green design, and runs its everyday operations with a cradle-to-cradle mentality.

Golucki, Amanda. Marketing and Public Relations. *Nature Museum Fact Sheet*. Chicago: Peggy Notebaert Nature Museum, 2007. Print.

Green Fact Sheet. Chicago: Peggy Notebaert Nature Museum, 2008. Print.

default, employed simple material changes to create a safe, non-toxic environment for its primary audience. The museum chose not to use any plastics or carpeting within the exhibition, only used non-toxic paints and adhesives, and chose formaldehyde-free products.[47] The museum staff totally relied on their passion to keep the children visiting the museum safe.

The museum approached *green design* and environmental sustainability in three[48] ways:

1. Locally grown sustainable wood cultivated within 100 miles of the museum was used for building.
2. The museum salvaged materials from previous exhibitions and promoted community involvement in recycling materials, to implement reuse opportunities.
3. Materials and fabrication processes included green printing techniques, organic fabrics, recycled glass, stone, straw clay, and mechanical fasteners or little to no glue that allowed exhibit pieces to be taken apart and reused.

The museum's *Rooftop Ramble* is used as a teaching tool to educate museum visitors. The *green* roof has photovoltaic panels, rain barrels and wind generators to teach the young audience about alternative energy practices. A chicken coop, vegetable garden, stream, and native grasses disseminate information about sustainable agricultural practices.[49] The museum utilizes *green design* and environmentally sustainable features

47. Baker, 58.
48. Baker, 61.
49. Baker, 61.

providing an example of cradle-to-cradle design. The Madison Children's Museum cradle-to-cradle design aesthetic is supported by mission driven decisions.

Motivations for Green Design

Sustainability is being incorporated into museum missions, and short- and long-term strategic plans,[50] as museums face the issues of climate change, modeling environmental stewardship and responding to economic challenges. Other reasons *green design* is being adopted include funding possibilities and because morally green design is seen as the right thing to do.

Mission Based

The Madison Children's Museum's board of directors adopted a sustainability mission statement in 2004,[51] but this is not the only museum utilizing this motivation for *green design*. When the Pittsburgh Children's Museum opened its newly expanded building in 2004, the exhibition team leaned heavily on the LEED guidelines steering the exterior architectural decisions for the interior decisions. In an interview with Deputy Director Chris Siefert, the importance of having policy that supports and guides sustainable decisions was emphasized.

Siefert said the museum has a 25-point strategic policy that guides the decision making process. Each point addresses a department, belief, or expectation to refer to when questions of how the museum should handle different conflicts or unique situations arise. For example strategic point three addresses environmentally conscious exhibitions and supports the consistent use of *green* materials. Siefert said, "Having a strategic policy that is sustainably focused is a strong management tool."[52]

Funding Possibilities

The Pittsburgh Children's Museum strategic policy does not just support environmental decisions, it also addresses social and financial sustainability as well. As the Brooklyn Children's Museum found "… project funding and momentum were significantly catalyzed by the decision to go green."[53] Funders see opportunities to support *green design* as a chance for them to be a part of innovative measures. A funder's sense of identity can be recognized to make an emotional appeal as to why supporting *green* projects is important. Funders may think having their name

50. Baker, 58.
51. Baker, 58.
52. Siefert, Chris. Telephone interview. 13 Jan. 2011.
53, Brophy and Wylie, 42.

attached to an environmentally conscious project means they will be seen as environmentally conscious themselves.

Institutions should remember there are organizations predisposed to funding *green* projects because of their commitment to going *green*.[54] The Kresege Foundation, the David and Lucille Packard Foundation, and the Heinz Endowments all have grants designated for *green* projects. Each of these began making environmental commitments after building their own *green* buildings.

Financial funding for *green* initiatives from state and local governments has also increased. Massachusetts and Vermont both offer energy-efficient incentives. In 2006, Brophy and Wylie found 14 states had clean energy funds that encourage institutions to choose "… renewable energy from solar, wind or fuel-cell sources."[55]

Because Green Design is the Right Thing to Do

There is research that suggests, "Some businesses, institutions and people do it because they believe it's a moral issue …"[56] Brophy and Wylie found architects incorporate sustainable design because they "… see it as simply good design."[57] Peter Kuttner believes museums are natural leaders in *green design* and hold a special responsibility to achieve sustainability. But, Kuttner understands museum professionals use the financial gains of energy efficiency strategies and life-cycle rationales to justify *green design* choices. Kuttner writes, "it is really our belief about the inherent rightness of this position"[58] that motivates exhibition teams to continue exploring the issue. The amount of literature, seminars, and conversations being recorded about the issue of environmental sustainability relay that institutions also understand the importance of the topic.

Government, Regional, and Stakeholder Expectations

"In the U.S., the federal government's General Services Administration requires all new and substantial renovations to federal buildings to conform to sustainable design guidelines, and a growing list of states and cities have sustainable policies in place."[59] Today many government regulations regarding carbon emissions and energy use have to be met to receive permits to build a new building the size of most museums.

54. Brophy and Wylie, 42.
55. Brophy and Wylie, 42.
56. Brophy and Wylie, 40.
57. Brophy and Wylie, 44.
58. Kuttner, Peter. "Museums, Natural Leaders in Green Design." *Exhibitionist* Spring (2009): 22. Print.
59. Brophy and Wylie, 44.

This motivation for thinking about *green design* pertains more to the environmental sustainability of an institution's building structure. Architectural guidelines can be utilized when conceptualizing, designing, and fabricating the exhibitions within the building. *Why build an environmentally friendly structure if the components inside are not environmentally friendly?*

In June of 2005 nine Chicago museums formed the Green Museums Steering Committee. The committee is a collective effort among the institutions to "… promote green museum operations, exhibits and programs."[60] The committee is supported by the city's Office of the Environment and the mayor's office. By being a part of this committee, these institutions have agreed to hold each other accountable for their design practices and now place friendly peer pressure on each other.

HOLDING EACH OTHER ACCOUNTABLE

The nine museums included in the Green Museums Steering Committee of Chicago are: the Adler Planetarium, the Art Institute, the Chicago History Museum, the DuSable Museum of African American History, the Field Museum of Natural History, the Museum of Science and Industry, the Museum of Contemporary Art, the Mexican Fine Arts Museum, and the Shedd Aquarium.*

*Brophy, Sarah, and Elizabeth Wylie. "It's Easy Being Green: Museums and the Green Movement." *Museum News* Sept.-Oct. (2006). 45. Print.

How Is Environmental Sustainability Achieved or Measured?

In 1998 the U.S. Green Building Council (USGBC) established the Leadership in Energy and Environmental Design certification system, also known as LEED, in response to growing environmental concerns due to new construction. This internationally recognized, third party verification establishes parameters to lower greenhouse gas emissions, and improve energy efficiency and water use in new and repurposed buildings. The certification is marketed by the USGBC as "flexible enough to apply to all building types [and] works throughout the building lifecycle" but also "makes business sense."[61]

The LEED certification process has been widely used by museums in the last ten years to legitimize efforts in designing buildings for sustainability. Baker wrote, "… 10% of all children's museums have already attained or are working toward LEED certification."[62] In the spring of 2010, fourteen children's museums were LEED-certified and another twenty-six were beginning the LEED certification process.[63] Baker's own Madison Children's Museum is seeking LEED certification after moving into a repurposed Montgomery Ward building in August of 2010.

60. Brophy and Wylie, 43.
61. "USGBC: Intro - What LEED Is." *U.S. Green Building Council*. 2011. Web. <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988>.
62. Baker, 58.
63. Baker, 58.

The LEED certification works well for the architectural envelope, construction process and for securing energy efficient building systems within museums. Baker recommends exhibition designers utilize LEED guidelines when creating *green* exhibitions.[64] However, Baker does admit LEED standards do not directly transfer to exhibition design.[65] *Why is this?* Because LEED does not require the design of the exhibition space "… to follow the green guidelines employed in the rest of the building."[66]

Adapting the LEED criteria to smaller square footage and to temporary exhibitions may not be as easy or as efficient as it sounds because the criteria is designed to accommodate large construction processes such as building a new building. Also "… many of the green materials that show up in LEED-certified buildings aren't financially feasible for exhibitions because such small quantities are used."[67] The bulk discount available when ordering large quantities of material disappears for smaller uses.

Using LEED-certified museums as teaching tools is effective in promoting ways the public can integrate sustainable techniques into the visitor's own environment.[68] Many museums choose to do educational installations about this. LEED may not be as effective as hoped unless the USGBC can develop ways to address the details and smaller scale of exhibitions, both temporary and permanent, and move past the exterior and behind the scene systems of a building, to the interior, visitor-focused elements.

Besides LEED, other systems to measure environmental impact do exist. The International Standards Organization (ISO) maintains ISO14025 to measure environmental impacts and Stanford University also has a set of standards.[69] The issues with LEED still exist in that these standards mainly address the building envelope the exhibitions exist in, not the exhibitions. The lack of a formal body of standards was identified as a *friction* in *Exhibitionist* article.

LEED FOR COMMERCIAL INTERIORS

The LEED for Commercial Interiors certification addresses tenants who lease a space, or do not occupy an entire building. LEED-CI gives these residents the ability to be recognized for green efforts in the interior of these buildings. This applies to retail, office, and institutional buildings, and can be useful as another set of guidelines for exhibition teams. One possible fault of LEED-CI is that it does not recommend or give clear standards for materials and fabrication processes, it allocates points based on performance-based requirements.* The occupied space holistically is certified, but not the materials used to construct the space.

FAQ: LEED for Commercial Interiors. Washington, D.C.: U.S. Green Building Council, 2011. Print.

64. Baker, 59.
65. Baker, 63.
66. McNeil, Tim. "Adaptation, Mitigation, Innovation: Greening the Exhibition Experience." *Exhibitionist* Spring (2009): 29. Print.
67. Belew, Gustafson-Hilton, Handy, and Wood, 58.
68. Baker, 60.
69. Jacobsen, 8.

The Challenges of Green Design

The front-end survey asked what challenges were preventing institutions from consistently designing in a sustainable fashion. Time, budgets, and resources were consistently pointed to as the derailing factors. Investigating the challenges, or *frictions*, presented in the *Exhibitionist* article further, broader stories of why these factors are seen as challenges to *green design* emerge. Many of these challenges overlap or are intertwined with each other.

Financial Burden

Budgets, financial constraints, and previous commitments for income can quickly derail a *green* exhibition development process. At the beginning of the design process, exhibition teams must understand that *green* materials can cost more. The smaller square footage and fast turnover of exhibitions create smaller spaces requiring materials quicker. These three factors can increase the cost of *green design*. Developing relationships with fabricators and distributors willing to explore multiple options while making a commitment to time for research about materials, is key to mitigating this challenge.

"… it is important to note that LEED has been an enormous success in the past decade. It seems to have tapped into the public's competitive spirit."

— Peter Kuttner

Financial burdens are also incurred when exhibition elements do not meet the required lifespan for interactive exhibitions and therefore cannot be reused. Material constraints need to be analyzed early, and adjusted for, in exhibition budgets. This is particularly true in science and children's museums where materials are expected to outperform their typical specifications.

Lack of Agreement About What is Green

Belew, Gustafson-Hilton, Handy, and Wood found one of the most common complaints by exhibition team members was "… the grayness of the way materials are measured as green."[70] The lack of agreement and clear standards for exhibitions is a debilitating factor for most designers. The time and effort required to sift through material product information sheets, and researching the information contained in them, can sidetrack the design process, and cost money. "[Researching] adds a lot to the budget and schedule, you're still just hoping you got the information correct," said Diane Perlov, Senior Vice President for Exhibits at the California Science Center.[71] Unlike the architecture and engineering industries that can rely on the USGBC LEED parameters

70. Belew, Gustafson-Hilton, Handy, and Wood, 56.
71. Belew, Gustafson-Hilton, Handy, and Wood, 57.

when building the museums to house exhibitions, exhibition designers do not have set criteria to guide them in green endeavors.

Designers also face the issue of material *green washing* by suppliers. *Green washing* is the deceptive use of *green* marketing to promote a misleading perception that a product is environmentally friendly. "The green label now covers everything from the source of raw materials to carbon footprint, water use, human/social costs and the impact on the waste stream."[72] What sustainable criteria an institution expects a material to meet must be established for teams to know what to research when looking at new materials.

Knowledge of Materials and Material Constraints

Exhibition designers may possess a blindness when referencing materials during the fabrication process. Exhibition team members may lack the knowledge and are provided with too few resources about *green* materials available for use.[73] Concurrently a lack of local expertise in working with different materials may also pose an issue.

"[Green is a] convenient shorthand for describing a value judgment on a material without specifying what that value judgement really is."

— Scott Moulton, Exhibit Designer, Gyroscope, Inc.

One problem that also contributes to the challenge of financial burdens is that the *green* materials intended for use may not include a lifespan that can withstand the highly active environments associated with science and children's museums.[74] Mark Catton of Murphy Catton acknowledged this challenge when Catton said, "We simply don't have all of the green materials we need yet to build the kinds of exhibits that can take the beating they receive at children's museums."[75] Certain material applications are just not available yet. In addition, constraints on acquiring materials and limited material palettes available to fabricators encompass challenges posed by certain material requests.

Knowledge of Fabrication Processes

Belew, Gustafson-Hilton, Handy, and Wood also heard the lack of knowledge about materials and material's constraints present problems when fabrication begins.[76] Clipson wrote "The challenge is to find ways to unify the design-construction process so that dramatic improvements

72. Belew, Gustafson-Hilton, Handy, and Wood, 57.
73. Baker, 63.
74. Belew, Gustafson-Hilton, Handy, and Wood, 58.
75. Baker, 63..
76. Belew, Gustafson-Hilton, Handy, and Wood, 59.

can be made in project delivery, reduced costs, constructibility and quality …"[77]

Similar to architectural practices, exhibition teams often "… extract conceptual design and design development and construction documents from the building process …"[78] This extraction has removed the knowledge gained by a designer if they were to think of the fabrication phase of exhibition development as the final phase, not design development and construction document creation. Therefore, exhibition teams may not be aware of the latest advancements available or unavailable during fabrication.

Aesthetic Expectations

Previously mentioned the change in aesthetic from one based on a lack of restraint, to one based on a cradle-to-cradle mentality utilizing *green design*, could potentially shock or disappoint museum stakeholders. Exhibition teams have to be prepared for this and anticipate it. Scott Moulton, an exhibit designer at Gyroscope, Inc. said this: "Clients still have a tendency to want that unique, one-off look, but the trend is starting to go toward something simpler, something that can be taken apart and reused or transformed into something new."[79] Being sure stakeholders and clients understand the aesthetic they can expect when choosing to go *green* is a challenge.

The emphasis on materials is often the focus when designing exhibitions with a *green* mentality, but materials are not the only factor to creating a *green* exhibition. Designing cases, exhibit elements, and reusable structures that can have designated uses after an exhibition closes, or that can be intended for multiple exhibitions with minor changes, are practices expected in *green design*. Designing for modularity and the imagination to incorporate found materials are skills designers have to recognize as important, and then practice to perfect.

Designers have to think about topics like energy efficiency and incorporateing dimming lights or high performance LEDs into exhibits. A good example of energy efficiency in exhibition design can be found in The Alsdorf Hall of Northwest Coast and Arctic Peoples exhibition at The Field Museum in Chicago. Timers and motion sensors dim the lighting based on visitor activity. These challenges mean designers have to rethink how they are designing for *green design* to be successful.

The challenge exhibition teams face is overcoming the dominant social way of thinking the current aesthetic has established. Current aesthetics stick when a new design style appears un-

77. Clipson, 221.
78. Clipson, 222.
79. Belew, Gustafson-Hilton, Handy, and Wood, 60.

thinkable or does not fit into currently socially accepted norms.[80] Exhibition teams will continue to design exhibitions based on what is happening within the industry if they feel their own abilities will be questioned by a new design style.

Designers are "deeply identified with their products and designs" at times stimulating a level of narcissism.[81] Aesthetic dimensions can promote envy among designers because every exhibition is an extension of the designer's own creativity. A designer will be faced with alternative limitations associated with *green design*. Designers potentially have to curb their own creativity at times, "learn to protect their self-esteem in the face of criticism, fickle client tastes, a disregarding public"[82] and their own personal standards of excellence.

"With knowledge comes culpability. The more we know about what we do for a living and the impacts its having, the greater our responsibility is to act on it … Every project you undertake is an opportunity to foment change …" said Sandy Wiggins at the 2008 Greenbuild International Conference and Expo.[83] Many exhibition teams and institutions are utilizing *green design* practices. Many are not. Many see the *frictions* associated with *green design* as reasons not to continue exploring new innovations. Some push through the *frictions* even when met head-on by resistance.

With the knowledge why current forms of exhibition design and fabrication are considered environmentally unconscious, is it our responsibility as an industry to reverse these processes to be more responsible? How can individuals and institutions be thinking, supported, and creating action plans to facilitate changes needing to occur? As Jacobsen wrote "… value engineering, entrenched expectations and established ways of doing things erode these [green] intentions. Why? How do we change?"[84]

80. Cherkasky, Todd. "Design Style: Changing Dominant Design Practice." *Design Issues* 20.3 (2004): 32. Print.
81. Hirschhorn, Larry. "Developing and Evaluating Talent in Architecture Firms." *Journal of Architectural Education*. 45.4 (1992): 228. Print.
82. Hirschhorn, 228.
83. National Charrette Institute, comp. "Sustainability Immersion: Community Change through Sustainable Design Charrettes." *GB2008 Presentation PL08*. Proc. of 2008 Greenbuild International Conference and Expo, Boston. U.S. Green Building Council, 2008. Web. 2011. <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=2156>.
84. Jacobsen, 7.

CHAPTER 3

CHANGE FOR A NEW AESTHETIC

When an institution or individual begins exploring *green design* as part of a campaign towards environmental sustainability, choosing the right change methods, practices, initiatives, and action plans involves forethought. Change is defined as the alteration of a behavior. Change dictates individuals, organizations, communities, and cultures consciously make new choices in their current pattern of behavior. This pattern can range from the way individuals choose to get to work, to whether or not an institution is willing to pay a waste management company to begin recycling. Both seem easy choices to promote environmental sustainability, but both may displace other resources like time and money.

Change effects individuals differently. Todd Cherkasky is an application engineer specializing in automation technologies. In the summer of 2004 he wrote an essay entitled "Design Style: Changing Dominant Design Practice" for *Design Issues*. Cherkasky traveled across the country researching different techniques to understand how his work as a designer not only changed the technical production of tools, but also the social atmosphere of the companies he worked for.

Cherkasky wrote that engineers often change the balance of power within working relationships based on the design of tools, machines, and processes. "We often changed everyday work life for people we never met. Our design decisions were decisions about who did what work, and

STRATEGIES TO IMPLEMENT CHANGE*

*U.S. Department of Health and Human Services. National Cancer Institute. *Theory at a Glance: A Guide For Health Promotion Practice*. By Karen Glanz and Barbara K. Rimer. 2nd ed. Bethesda, MD: National Cancer Institute, 2005. 45. Print.

how that work was done."[85]

Scott Fuson of Dow Corning talked to *Chemical Week* magazine about how the company developed and maintained a corporate culture encouraging innovation and change within its products and procedures. Fuson said, "… you don't change culture by setting out to change it. Instead you change the working environment and reward the very best people when they give everything they've got."[86] By holding employees accountable, empowering them with the right tools, and asking for their constant commitment to the company, Dow Corning has encouraged change to happen from within by energizing and rewarding employees for alterations in their behavior that create success.

In the same interview, Scott Anthony of Innosight, LLC, offered three suggestions to creating environments welcome to innovation and change. First, to "consider having their employee teams interact in ways they have not done before."[87] Anthony stated this gave different people a chance to look at different problems through a different set of lenses. Second, Anthony suggested having these new teams of employees look at ideas that were previously rejected to offer a new perspective that may reshape the original problem and develop new solutions.[88] Finally Anthony acknowledged that success is a large factor in driving innovation through a company.

How change occurs has been the topic of academic study since the 1970s. By studying habits, patterns and hesitations in subjects, social psychologists have learned why intentional change occurs and developed theories for implementation. Cherkasky, Anthony, Fuson, and Hirschhorn all gave examples of how change can be controlled in industrial settings. *How can change happen in the museum industry providing support for environmental sustainability and green design?*

The pre-existing, underlying conditions affecting individuals or institutions determine how effective a change campaign can be. Mitigating these conditions requires the use of appropriate and innovative planning and programming. Change theory offers insight into how exhibition teams learn to implement, plan and design for environmental sustainability.[89] Change theory also

85. Cherkasky, 25.
86. Anthony, Scott and Scott Fuson. "Instilling a Culture of Innovation." Interview. *Chemical Week* 29 Sept. 2004. 16. Print.
87. Anthony and Fuson, 16.
88. Anthony and Fuson, 16
89. U.S. Department of Health and Human Services. National Cancer Institute. *Theory at a Glance: A Guide For Health Promotion Practice*. By Karen Glanz and Barbara K.Rimer. 2nd ed. Bethesda, MD: National Cancer Institute, 2005. 5. Print.

provides framework for combatting external forces attempting to infiltrate the design decision process of exhibition teams.

YOU CAN DO IT!

The prevalent change theories distinguish themselves through constructs, phases, processes, and environmental influences. An overlap of elements common to several of the theories does occur.[90] Self-efficacy is one of these elements and understanding self-efficacy creates environments open to change in any form, small or large.

Self-efficacy is an individual's impression of their ability to perform a behavior or complete a challenging task set before them.[91] This instilled belief is based on prior success in similar tasks, physiological states, and outside forces of persuasion. Self-efficacy predicts the amount of effort willing to be exerted to initiate and maintain change. The United States Department of Health and Human Services advocates the importance of assessing, addressing and increasing self-efficacy before beginning any change campaign. "Strategies for increasing self-efficacy included: setting incremental goals, behavioral contracting, and monitoring and reinforcement."[92]

Being aware of self-efficacy allows institutions to better position themselves when enacting change campaigns. When exhibition teams are designing, selecting materials, and fabricating new exhibitions, the amount of decisions required on a daily basis grows exponentially as the opening date approaches. Decisions can be small, large, simple or difficult, and an exhibition team with a high collective self-efficacy will make decisions easily and quickly.

If sustainable practices and materials have become an objective for an exhibition team, and the team has not previously worked in this way, each new decision will require investigation and collective agreement. Designers and project managers with high self-efficacy will welcome these decisions and work to master solutions to the challenges presented to them. The confidence level of team members in their personal decision-making skills must be evaluated by exhibition team leaders to be certain learning to design for sustainability will be a welcomed challenge, not a struggle.

90. Ajzen, Icek. "From Intentions to Actions: A Theory of Planned Behavior." *Action Control: From Cognition to Behavior*. Ed. Julius Kuhl and Jurgen Beckmann. Berlin: Springer-Verlag, 1985. 11-39. Print.

91. Bandura, Albert. "Self-Efficacy: Toward a Unifying Theory of Behavioral Change." *Psychological Review* 84.2 (1977): 191-215. Print.

92. U.S.D.H.H.S. (2005), 21.

How can behavioral change theory be used to help exhibition teams mitigate the challenges of environmental sustainability? Suggestions on the use of change theory to develop resources and enact programs has been the topic of many self-help books. These books choose to strictly follow the basic framework of distinct theories, or are more liberal using a combination of theories. One adaptation was chosen to provide guidance in nullifying some of the *frictions* associated with *green design*.

SWITCH

In 2010, Chip and Dan Heath wrote Switch: How to Change Things When Change is Hard.[93] The book introduced a framework to facilitate the implementation of change. The three-part framework is based on combining different ideas from each of the change theories shown on page 31. The Heaths begin their discussion for creating change by recognizing a need to pacify the conflict between a person's emotional and rational minds.

Designers are innately controlled by their rational and emotional minds, two struggling forces, and make decisions based on the outcome of this struggle. When a designer makes a choice about a new material or fabrication process, they are choosing to alter their decision-making pattern, or create a change.[94] When this change happens, the struggle between the designer's emotional and rational mind is enacted.

Motivating the Elephant

The emotional mind is often what stands in the way of change because individuals "… are reluctant to alter habits that have been successful in the past,"[95] even if their rational mind is admitting change is required. The emotional mind appears as a large, overbearing obstacle in the way of change, or *the Elephant*. The Heaths believe the rational mind is easier to appeal to because individuals often recognize, understand and admit when change is necessary. The Heaths deem the rational mind as *the Rider*, and *the Rider* has to make an appeal to *the Elephant* to follow his lead. Institutions and exhibition teams wishing to enact *green design* standards must ask if they have emotionally appealed to their staff or institutional decision makers. The rational mind learning to control the emotional mind is the first piece of the Heaths' framework.

93, Heath, Chip, and Dan Heath. *Switch: How to Change Things When Change Is Hard*. New York: Broadway, 2010. Print.
94. Heath and Heath, 5.
95. Heath and Heath, 119.

Anger, hope, dismay, and enthusiasm all engage individual's in an emotional response, but the situation in which change is embraced often comes from the sudden appearance of a crisis.[96] The California Academy of Sciences faced a crisis in 1989 after the near destruction of the museum by an earthquake. The institution and its stakeholders found themselves in the unique position of redeveloping the museum. They realized the "existing spaces proved unsuitable for the new intellectual and organizational vision …"[97] In response to this crisis, the institution, stakeholders, and surrounding community had the opportunity to create a new building with sustainability as its guiding principle. Individuals rally together and initiate strategic plans when they feel their organization is faced with a major shift as a result of an outside force.

Larger, more ambiguous problems like sustainability do not require immediate action therefore, creating an emotional appeal is often more difficult. The Heaths write, "When we're interested, we want to get involved, to learn new things, to tackle new experiences. We become more open to new ideas … To solve bigger, more ambiguous problems, we need to encourage open minds, creativity, and hope."[98] When attempting to create change while entrenched in a long-term project, institutions must remember to encourage and allow time for individual's to explore new solutions to problems.

The *Rainforests of the World* exhibition at the California Academy of Sciences in San Francisco.

Another way to help motivate the emotional mind is by encouraging small goals that can be recognized within the institution. Creating the emotion of pride is motivation for individuals to attempt broader tasks and pursue even bigger goals in the future.[99] Achieving small successes reduces the demand felt by individuals when faced with larger changes. An individual's confidence is also increased. This sequence of events are all considered emotional appeals and make change easier to achieve while increasing it's long-run potential.

96. Heath and Heath, 119.
97. Brophy and Wylie, 41-42.
98. Heath and Heath, 123.
99. Heath and Heath, 144.

CASE STUDY: FAILURE DOES HAPPEN

In the Spring 2006 issue of the Association of Children's Museum *Hand to Hand* publication, Jane Werner, Executive Director of the Children's Museum of Pittsburgh, wrote a case study entry. In the entry Werner explained the latest "green" initiatives by the museum. Goals included reducing heat islands, supporting an 8´ by 12´ earth worm farm through composting of cafe waste, and encouraging carpooling.

Among the successes is a problem when the weather turns. Whenever it snows in Pittsburgh, Werner wrote she feels guilty about walking into the building. The museum staff learned the hard way that environmentally friendly salt, which costs five times more than regular salt, didn't do the job as well as it should.* The museum had to switch back to the regular salt, which cost less and melted the snow keeping visitors safe, but killing the *pachysandra* lining the sidewalk. Werner worries that sometimes the museum hasn't done enough towards improving its environmental sustainability, but then remembers the small gestures can add up. This helps Werner try to not feel guilty about the processes that aren't 100% environmentally friendly.

*Werner, Jane. "Case Study Updates: Go Green and Get Real." *Hands to Hands* 20 (Spring 2006): 6-7. Print.

These smaller goals, obtainable in weeks or months, provide destination points for the rational mind to reflect and congratulate itself on the hard work it has put in to control the emotional mind.[100] An example for an exhibition team could be committing to making one or two new *green* choices per exhibition. By spending the appropriate time on researching smaller sets of decisions, and allowing for reflection on what was learned, moving towards an overall *green design* approach can be broken into digestible pieces. Providing these destination points helps momentum to be regained and goals to be readjusted, while pacifying the emotional mind.

Preparing individuals for failure is a necessary step when promoting small successes.[101] Failure often occurs in the middle of a project, and only after a solution is found will momentum be regained. It is necessary to acknowledge the finding of a solution by an institution to create confidence in individuals.[102]

Exhibition teams have admitted using new materials and fabrication processes is a *friction* in *green design*. Exhibition teams cannot get discouraged because a material does not hold up as the team thought it would the first time they use it. Adjusting for the material, or researching a new material for the next exhibition will need to be incorporated into the next exhibition's schedule.

A final factor in motivating the emotional mind is to consider the way change will affect an individual's sense of self or their identity. If an individual does or does not agree with a change being asked of them will make a difference in whether or not the change occurs.[103] When an individual is asked to respond to a situation involving change, they will reflect on their own values, morals, and aspirations. *Do members of your*

100. Heath and Heath, 76.
101. Heath and Heath, 168.
102. Heath and Heath, 169.
103. Heath and Heath, 154.

exhibition team want to be seen as caring about the environment? Does the institution feel environmental sustainability is important? Most likely the answer is yes and appealing to one's sense of self should come easily.

The emotional appeal to design with environmental sustainability in mind is made every time a new article is written or a seminar is held on the topic. Exhibition teams are listening too. Belew, Gustafson-Hilton, Handy, and Wood were made aware of the desire exhibition team members do have to think *green*. Other *frictions* were seen as the culprits derailing exhibitions. The group wrote, "While they desire to make green choices for exhibitions, they often feel hampered by the higher cost and limited availability of those materials."[104] Price and material constraints are *frictions* specifically cited in this example.

Directing the Rider

The second piece of the Heaths change framework devotes itself to the rational mind. By developing clear strategies, goals, and outcomes for a project, institutions can better prepare individuals for change. Better preparation gives exhibition teams an expected outcome to focus on, allowing them to make decisions helping to achieve the end goal.

Directing *the Rider* means creating institution-wide expectations for environmentally sustainability and institution-focused *green design* goals for exhibition teams. "Solutions need to be rooted in place and a situation. Making an informed decision for your situation is more important than deciding for someone else that they're doing the right or wrong thing, because context in each case is unique," said Julie Bowen, Director of Science at TELUS World of Science in Calgary.[105] Bowen's statement directly supports individual institutions developing their own action plans for environmental sustainability and *green design*.

"When a process is designed for a specific locality, materials and energy are expended as needed …"

— McDonough, Braungart, Anastas, and Zimmerman

A solid foundation for succeeding in meeting these goals must be established before developing this criteria. Two steps should be taken to develop this foundation. First, an analysis of other institutions and how they implement and sustain their own criteria should be done. This will begin the change process with possibilities instead of problems. The Heaths refer to these instances and institutions as *Bright Spots*.[106] By learning to recognize, understand, and follow the

104. Belew, Gustafson-Hilton, Handy, and Wood, 57.
105. Belew, Gustafson-Hilton, Handy and Wood, 62.
106. Heath and Heath, 31.

Bright Spots, what needs to change within an institution can easily be seen.[107] *What institutions are leading the way in environmental sustainability and "green design" in different regions, and what can we learn from them?*

Next, looking inward and asking, "What are we doing right and how can we do more of it?" creates a solution-based mindset not a problem-based one. Finding where environmentally sustainable practices and *green design* decisions are already occurring in an institution give team members examples to begin with. These two vital foundations can be laid at any change campaign kick-off, retreat, or seminar institutions typically use to motivate individuals when change is about to occur.

Decision Paralysis

After making an emotional appeal and setting goals, institutions are now asking exhibition teams to make decisions that will directly effect whether a change will happen. Motivation and excitement will only carry individuals for so long, failure will occur and only solutions can help momentum be regained.[108] As designers begin making design decisions, failure may not be the first issue they encounter. Color choices, floor plan approvals, and font choices are tasks that can be tedious but not derailing. The options available as solutions to decisions that haven't been made before are what become derailment factors.

If designers are asked to reevaluate their typical aesthetic, or if fabrication material choices are to be made, designers may be entering a wide, black abyss containing difficult questions with multiple possibilities as answers. The Heaths write, "More options, even good ones, can freeze us and make us retreat to the default plan … The more choices *the Rider* is offered, the more exhausted *the Rider* gets."[109] This exhaustion causes what the Heaths deem *decision paralysis*.

When *decision paralysis* sets in, the rational mind is overwhelmed and the emotional mind begins to take over. The emotional mind answers by reverting to the habitual route or what it already knows. This familiar path is the status quo.[110] Exhibition teams tend to make decisions based on familiar paths.

Individual's who decide to lead a charge for *green design* within an institution must remember

107. Heath and Heath, 39.
108. Heath and Heath, 169.
109. Heath and Heath, 50.
110. Heath and Heath, 53.

clear cut moves are required to guide decisions away from the status quo. This path should deviate from ambiguity and provide clear guidelines for individual's to use when making decisions. "Big-picture, hands-off leadership isn't likely to work in a change situation, because the hardest part of change—the paralyzing part—is precisely in the details."[111] Strategic plans, goals, and mission statements help motivate individuals when beginning a change, but individuals need detailed criteria when making new choices. Exhibition teams must know their guidelines for making choices based on the institution's *green design* goals.

The first time change occurs it is exhausting to an individual. The more the change happens, the less exhausting and more instinctive it becomes.[112] This instinct moves the change towards becoming a behavior. Once a designer makes the initial *green* decision it will be easier to make again.

Shaping the Path

The final piece of the Heaths' framework promotes recognizing derailing factors within the internal, physical environment in which individuals are attempting change, and finding ways to mitigate these *frictions*. First, physically altering an environment to promote behavioral change is necessary. Change in the physical environment "… is about making the right behaviors a little bit easier and the wrong behaviors a little bit harder."[113] This may mean getting new computers or software or restructuring the office layout so individuals being asked to work together are closer.

Next, individuals willing to lead a change campaign must have physical space to coordinate. "If you want to change the culture or your organization, you've got to get the reformers together. They need a free space. They need time to coordinate outside the gaze of the resisters."[114] If a *green* committee has been formed to help establish and initiate environmental sustainability policies and procedures, this committee must have a place of its own for meetings, discussions, and for individual members to solicit emotional support away from other staff members.

Finally, any change situation requires persistence.[115] Holding kickoffs and being enthusiastic at the beginning will only be momentum for so long. Recognition of small goal accomplishment, reevaluation of criteria to meet short- and long-term expectations, and not allowing emotional appeals to expire are all required for behavioral change to occur.

111. Heath and Heath, 53.
112. Heath and Heath, 65.
113. Heath and Heath, 183.
114. Heath and Heath, 247.
115. Heath and Heath, 254.

"How does change happen within your organization?" was a question asked on the front-end survey. Answers ranged from "through opportunity" to "the partners simply decide as conditions require." Are conditions within the industry now supporting *green design* and institutions enacting environmental sustainability policies?

Institutions and managers must ask themselves: *Are we taking away the long-range options that could derail our exhibition team's attempts at designing "green"? Have we set clear parameters or expectations for our teams so it is aware which choices are options from the beginning of a decision-making opportunity? If we do not set these parameters, are we aware our teams may be overwhelmed by the amount of possibilities available?* These are all probable challenges institutions and exhibition teams must acknowledge before they can begin an attempt at *green design*.

Cherkasky wrote: "A design style is a legitimated institutionalized pattern for … prevailing design methods, practices, conventions, assumptions, principles, and objectives … I am interested in how one design style becomes dominant over others, and how a dominant design style might be disrupted, providing openings for change."[116] The Heaths framework for creating change can facilitate a new design style in museum aesthetics supporting environmental sustainability.

116. Cherkasky, 30.

CHAPTER 4

WHAT CHALLENGES ARE WE REALLY FACING?

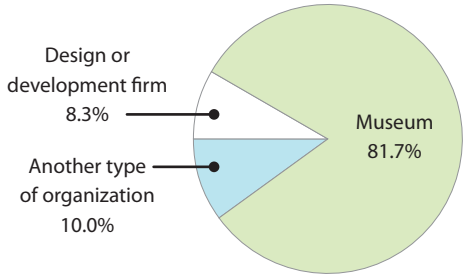
The current literature on environmental sustainability and institutions exists based on interviews and focus groups. The opinions of various members of the museum industry about the challenges facing exhibition teams regarding *green design* and environmental sustainability have not been a part of a survey or other scientific form of evaluation to determine if the speculations and opinions are true. To provide original research into the topic of environmental sustainability for institutions, a survey was conducted to see if these *frictions* are truly challenges and how the industry is focusing on environmental sustainability policies and procedures. Questions were also asked about the aesthetic of *green design* and if exhibition teams think the museum industry will ever informally adopt a *green design* aesthetic. Throughout this chapter, the term organization is used to refer to institutions, development or design firms, and other companies or groups that work with the museum industry.

organization: any institution, development or design firm, or company that works within the museum industry

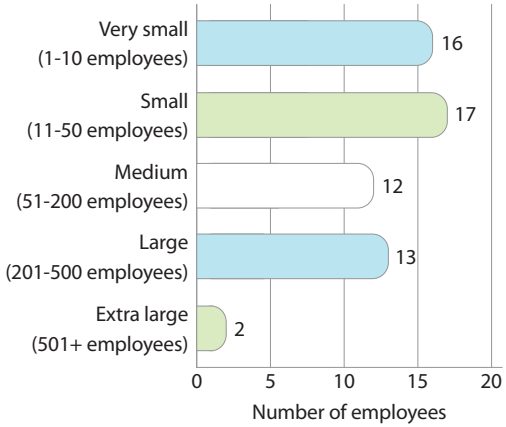
DEMOGRAPHICS

The survey was created using *Survey Monkey*. The second survey was distributed through an e-mail to participants of the front-end survey, as a posting to members of the Exhibition Design group on the social media networking site *LinkedIn*, and as part of a message to the NAME and Museum-L listservs. Over the course of the collection period, sixty participants answered the ten question on-line form. Demographic information was asked to identify who was taking the survey and included questions about the type of organization of which the participant was a member and the size of their respective organization.

I WORK AT A ...



MY MUSEUM, FIRM OR ORGANIZATION IS...



The majority of respondents to the survey work in museums. Of the sixty respondents, 49 work in museums, or 81.7%. Five (8.3%) of the respondents work at a development or design firm and six (10.0%) work at another type of organization. The participants who work in another type of organization are related to the museum industry or are related to exhibition design because of their inclusion in the surveyed groups.

The second question asked how many staff members work at the participant's affiliated organization. The numbers chosen as determinants for each category correspond to company size delineations found on *LinkedIn*. The participants were evenly spread between very small to large organizations. The most participants work at organizations that have eleven to fifty employees, designated as smaller in size. Seventeen (28.3%) participants work at these smaller organizations. Sixteen (26.7%) participants work at organizations having one to ten employees, or very small organizations, and two (3.3%) work at extra large organizations having more than 500 employees.

QUESTIONS ON ENVIRONMENTAL SUSTAINABILITY AND GREEN DESIGN

The second set of questions asked participants about their organizations. Questions on policies and practices give an insight into the current thinking and feeling about environmental sustainability and *green design* within the industry. *How are institutions handling the topic internally?*

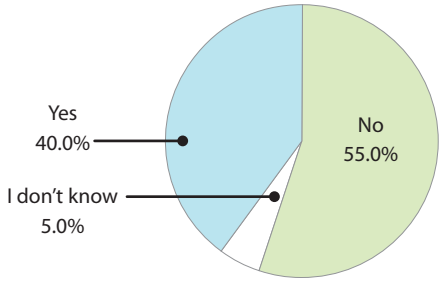
The question was asked: "In regards to operations as a whole, does your institution or organization have clear policies, practices, or strategic plans for achieving environmental sustainability?" This question also addresses the importance of providing clear direction for decisions to be made stated in the Heaths framework. Thirty-three (55.0%) of the participants answered their organization does not have a plan to address environmental sustainability. Twenty-four (40.0%) answered yes to the question, and three (5.0%) answered they did not know.

Next participants were asked: "How often does your institution or organization utilize green design practices when designing both temporary and permanent exhibitions?" Using metal fasteners and locally harvested wood were given as examples as to what *green design* is. The options available as answers were always, often, sometimes, never, and only for traveling exhibitions. No respondents chose the answer only for traveling exhibitions so this answer was omitted when analyzing the data.

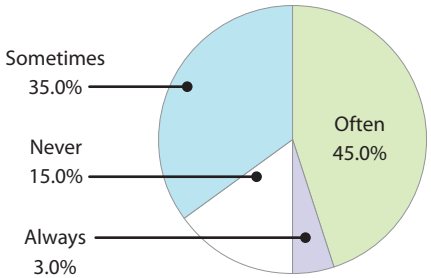
The largest response to this question was often with 27 (45.0%) participants choosing this answer. Nine (15.0%) participants answered never to the question. The admission by exhibition team members that organizations are not using simple *green design* practices within institutions should be noted. Only three (5.0%) of the sixty participants answered their organization always uses *green design* practices.

The fifth question specifically addressed the *frictions* presented in the Spring 2010 *Exhibitionist* article. Participants were to asked to identify any of the challenges put forth in the article as frustrations they may have encountered in attempting *green design* and were given the opportunity to add comments after answering the question. Fifty percent of the participants have encountered four of the frictions at least once. The four frictions are the lack of knowledge about material properties, the lack of time for research or to change decisions, the financial burden, and the lack of clarity about what is truly *green*.

DOES YOUR ORGANIZATION HAVE CLEAR POLICIES, PRACTICES, OR STRATEGIC PLANS FOR ACHIEVING ENVIRONMENTAL SUSTAINABILITY?



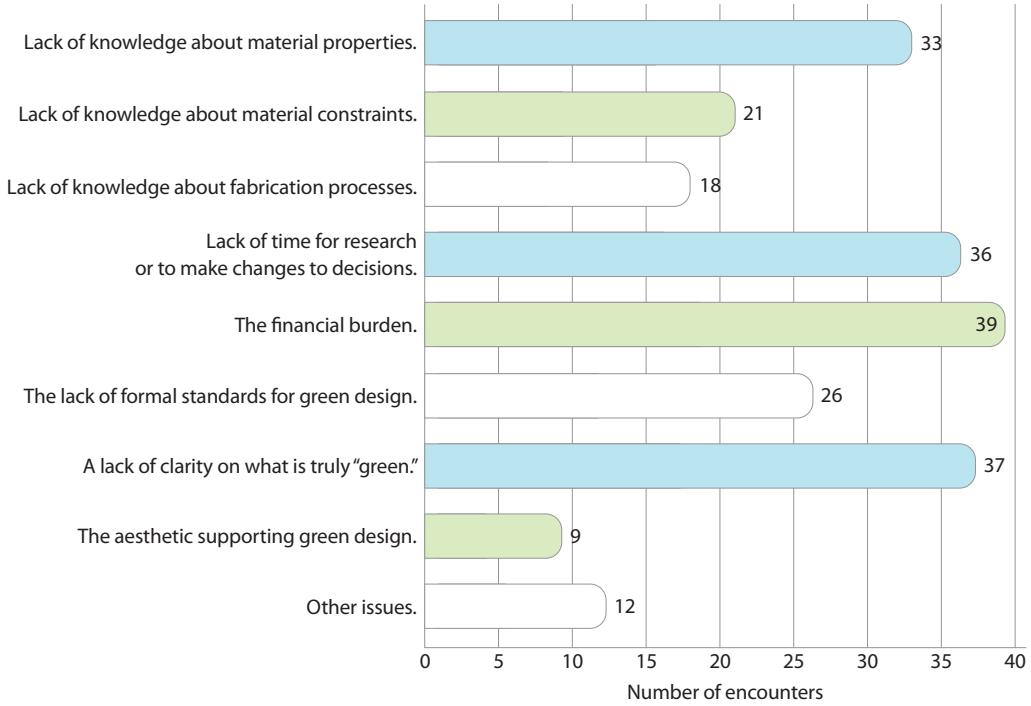
HOW OFTEN DOES YOUR ORGANIZATION USE GREEN DESIGN PRACTICES WHEN DESIGNING EXHIBITIONS?



Thirty-nine participants answered they had encountered a financial challenge. One participant commented, "[The organization's] old director was more green than [the] current director who is more cost-oriented." Another participant commented they preferred to use the terms "financial challenge" instead of financial burden.

The second highest response was the lack of clarity of what is truly *green*, with 37 participants having encountered this *friction*. However, only 26 participants answered a lack of formal standards addressing *green design* was an encountered *friction*. This indicates the industry must clarify

WHAT CHALLENGES HAVE YOU ENCOUNTERED IN REGARDS TO GREEN DESIGN? (CHECK ALL THAT APPLY.)



the criteria and definition of *green* before it can create standards.

The lack of resistance to the aesthetics supporting *green design* encountered by exhibition teams is encouraging. Only nine participants considered the aesthetic of *green design* as a *friction*. This statistic strengthens support for the hypothesis guiding this research.

When asked for feedback as to why "other issues" may have been chosen as a response, comments included:

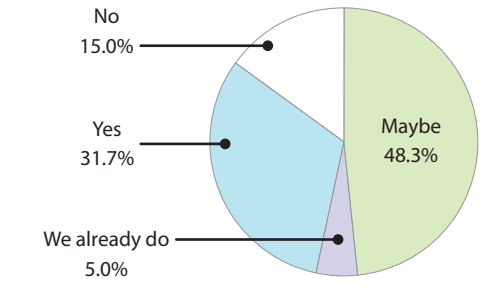
- "[There are] very few good substitutes for PVC substrates and foam core boards that are so commonly used in the graphics industry. Plastics distributors seem clueless when it comes to friendlier materials. Better lumber is also hard to get in rural areas where our

carpenters are working."

- "[The] availability of affordable products/ideas in a community that is far removed from an urban centre."
- "[We are] owned by a University, the politics surrounding a museum overhaul is immense."

Participants were asked to respond if they felt their organization will adopt *green design* standards for exhibitions in the future. Nineteen (31.7%) participants responded "yes," they did feel their organizations would adopt *green design* standards, nine (15.0%) said "no" they didn't feel this would happen, and three (5.0%) said their organization already had *green design* standards. Almost half of the respondents answered "maybe" to this question. Of these 29 (48.3%) participants, 14 left comments as to why they answered this way.

DO YOU THINK YOUR ORGANIZATION WILL ADOPT GREEN DESIGN STANDARDS IN THE FUTURE?



Comments included:

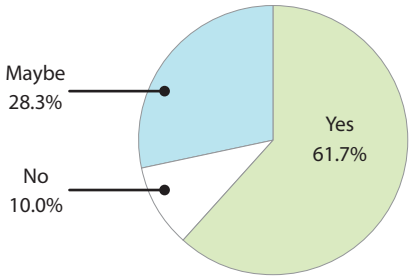
- "In state government cost is the biggest factor in materials choices - plus there is resistance in older workers to change to sustainable methods and materials."
- "We would like to but it there are several higher priorities."
- "We hope so. It is getting our clients to want to do it."
- "The current leadership does not make it a priority but future leadership might."

Leadership, clients, and other priorities stand in the way of organizations adopting *green design* standards. The most significant comment that directly related to this study was "… it is a matter of getting people to change habits." One respondent recognized that behavioral change by individuals is required for *green design* standards to be adopted.

QUESTIONS ON THE AESTHETICS OF GREEN DESIGN

Two questions were asked about the museum industry and the aesthetics of *green design*. First participants were asked, "Do you think the museum industry could ever adopt a *green design* standard of aesthetic?" Exhibition team members do think adoption is possible. Thirty-seven (61.7%) respondents replied "yes" to this question. Six (10.0%) answered "no," they did not be-

DO YOU THINK THE MUSEUM INDUSTRY COULD EVER ADOPT A GREEN DESIGN STANDARD OF AESTHETIC?

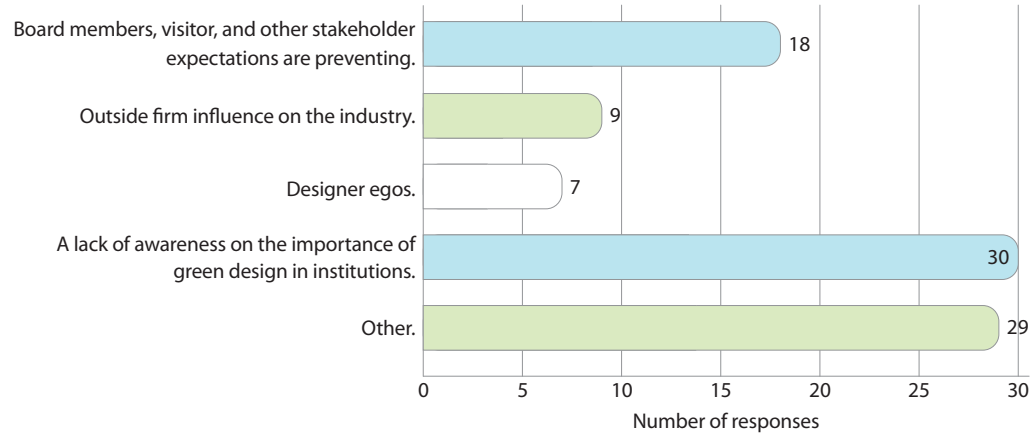


lieve *green design* standards were possible and 17 (28.3%) participants answered "maybe."

When asked to comment why a participant chose "maybe," 12 participants left thoughts. Comments ranged from the lack of support for the ideas, the ability to enforce any policies that are not legally required, and the ability for this to be possible as long as design firms operate under different standards. One particularly important comment addressed the importance of flexibility and institutions deciding for themselves what is responsible. The participant left the comment: "Yes, but with the variety of 'museums' out there, it would have to be customizable, or at least contextualized for different types of museums."

The second question asked, "What prevents a *green design* standard of aesthetic from being adopted by the museum industry?" The lack of awareness of the importance of *green design* was chosen as a prevention by half of the respondents. This answer directly states that an emotional appeal for *green design* has not been successfully made by the museum industry. Change agents

WHAT PREVENTS A GREEN DESIGN STANDARD OF AESTHETIC FROM BEING ADOPTED BY THE MUSEUM INDUSTRY? (CHECK ALL THAT APPLY.)



within the industry hoping to advance towards a *green design* aesthetic are going to have to re-evaluate their strategies of presenting the issue to successfully create an emotional appeal.

"Other" was the second highest prevention chosen and comments on these possibilities included the cost, the inability of small institutions to adopt new requirements, and the importance of understanding how green materials affect conservation efforts. "Designer egos" was the least chosen option, but was reacted to more than once. No responses in the comments area of the question responded to the issue of board member, visitor, and outside stakeholder expectations. This creates a question as to why this option would be chosen, but not acknowledged as an issue.

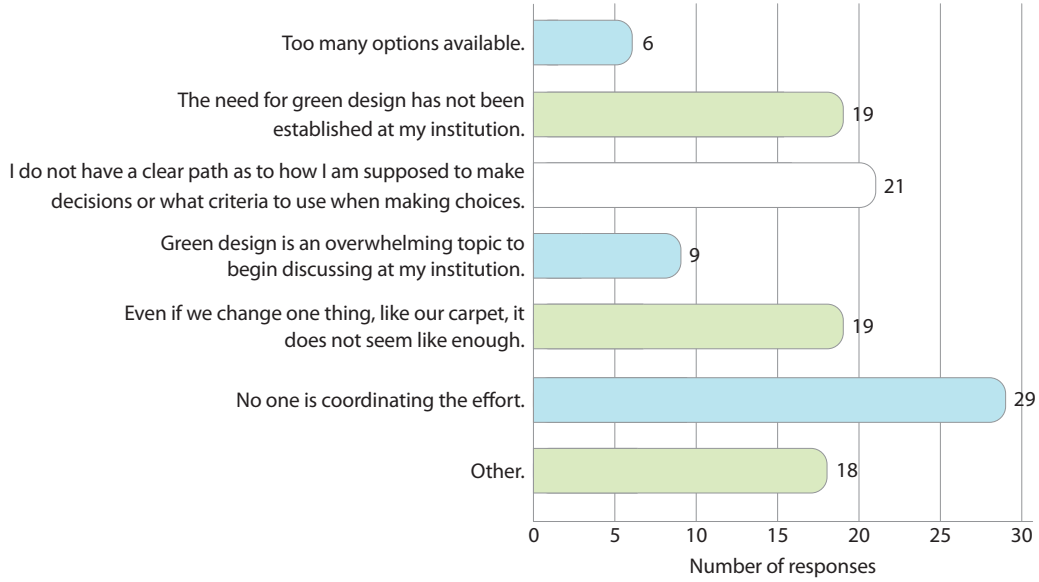
QUESTIONS ON GREEN DESIGN AND THE HEATHS FRAMEWORK FOR CHANGE

One question was asked to evaluate how green design decisions can be derailed in response to the Heath framework. Analyzing the data in terms of the framework shows where these factors occur. Before doing this, it should be noted that the largest response to this question was the answer "No one is coordinating the effort." Twenty-nine (48.3%) respondents said this was the case at their institution. This means half of the industry does not have leadership or staff members who see environmental sustainability as an issue important enough to pursue exploring ways to change operations.

After understanding only half the organizations represented have change agents willing to lead a change campaign, the Heaths framework shows what these change agents must be aware of to maintain campaigns. Nineteen respondents answered that the need for *green design* has not been established at their institution. The emotional appeal that a change needs to happen has not been successful in the 31.7% of organizations represented in the survey. The importance of creating and maintaining small goals to achieve a larger end-goal was represented by the option, "Even if we change one thing … it does not seem like enough." For 19 participants (31.7%) the ability for incremental steps to maintain motivation and momentum is not being utilized. Decision paralysis does not seem to effect many organizations. Only six (10.0%) respondents said this was an issue by choosing the answer, "Too many options available."

The second largest answer to this question addressed whether clear paths are being shaped for exhibition teams to follow. Twenty-one (35.0%) participants answered their organizations

ARE ANY OF THESE FRUSTRATIONS YOU ENCOUNTER THAT DETER YOU FROM MAKING GREEN DESIGN CHOICES? (CHECK ALL THAT APPLY.)



have not provided clear paths as to how they are to make decisions. However, the topic does not seem to be effected by self-efficacy. Only nine (15.0%) respondents seem to see *green design* as an overwhelming topic deterring them.

Two comments indirectly acknowledged issues change theory is expected to address when applied. These were

- "Time - we have little time for exhibition development. I fall back on using the materials that I understand all the properties of to save time."
- "I make green choices but not all staff do -- even though we have a policy. It is a matter of changing people's habits."

The importance of changing the status quo and the importance of being sure all parties involved are invested is acknowledged by these statements.

Clarifications and questions that arose through analyzing the data could strengthen the survey if conducted again. First, knowing who answered "never" to Question Two would supply information about which faction of the industry is not thinking about or encouraging *green design*. Is there a distinct group that does not see *green design* as relevant or important to them? Second clarifying the terms or finding a quantitative way to represent the options always, often, and sometimes will give definitive statistics into the use of *green design*. Finally the word "standard" should be preceded by the word "informal" when discussing aesthetics. The connotation of the word "standard" implies a formal, explicit, or mandated set of instructions. Placing the word "informal" before implies room for flexibility.

Utilizing the previous research discussed in Chapter 2 and Chapter 3, and the data collected through the survey help support the conclusion drawn in the next chapter. Is a *green design* aesthetic possible for the museum industry?

CHAPTER 5

IS A NEW AESTHETIC POSSIBLE?

Achieving and maintaining environmental sustainability is only one step to becoming sustainable for an institution. Change catalysts must be employed by institutions and exhibition teams to achieve environmental sustainability. Institutions and exhibition teams must recognize, when the decision occurs to make environmental sustainability and *green design* a commitment, a true commitment has to be made. Institutions and exhibition teams must be prepared for time, money, and other resources to be allocated toward research and products. Fuson touted the "power of commitment" while talking about creating a culture embracing innovative solutions at Dow Corning.[117] A strong commitment supports policies, procedures, and true *paths* shaped to create change.

The California Academy of Sciences board and staff made a "huge" commitment to sustainable practices when creating its new building. Important questions asked of the institution stakeholders and staff included: "What is a 21st century natural history museum? What should it be? What should it look like? What should it do?"[118]

The answer to these questions all led to an institution embracing sustainability at the highest level. The institution made a commitment to let sustainable financial, social, and environmental decisions guide the museum in the future. There was "… no point zealously focusing on green exhibit materials if the business itself was run in a non-sustainable way."[119]

In the essay *Moving the Museum*, about the Boston Children's Museum move to a new building in 1979, Elaine Heumann Gurian wrote about how the move affected the staff of the museum.

117. Anthony and Fuson, 16.
118. Brophy and Wylie, 42.
119. Belew, Gustafson-Hilton, Handy, and Wood, 62.

Gurian reminds the reader in her reflections that there are two distinct type of change, voluntary and involuntary. "Voluntary change is preferable because it can be planned for, while involuntary change … can only be reacted to."[120] An institution cannot stabilize its efforts to create sustainability if all three legs of the sustainability tripod are not balanced and this balance cannot occur if all staff members have not voluntarily agreed to change.

MITIGATING THE CHALLENGES

The *frictions* cited in Chapter 2 are reasons why exhibition teams get derailed when designing *green*. Conclusions on how these *frictions* can be dealt with reveal themselves when an institution agrees to make environmental sustainability a commitment. The institutions possessing specific guidelines that have developed from this type of commitment have found conclusions easier.

Financial Burdens

Based on analysis of the survey data, the anticipated financial burden of *green design* is the common challenge derailing change attempts. Sixty-five percent of the respondents said they had encountered this challenge, and the ability for small and rural institutions to acquire the resources to move to *green design* practices in a financially responsible manner was a common concern as well. Many participants seemed to reinforce their idea that *green design* is financially unattainable by leaving comments in the open forum areas of the survey.

However, conflicting viewpoints do exist. Financially, making a commitment to environmental sustainability and *green design* is similar to any new endeavor. Money must be spent initially to save money in the long-term. As Brenda Baker pointed out, "… the [Madison Children's Museum] paid for its green research and development costs with the first exhibition, and each subsequent exhibition has benefited from that initial research …"[121]

As museums increase demand for *green* materials, basic economic principles tell us supply will increase. Materials that are inefficient, hard to acquire, and unpredictable will slowly be phased out of the design process due to lack of demand for them. If museums were to challenge material suppliers for reliable information and demand products become readily available, the financial burden of acquiring materials may diminish. Also, building relationships with fabricators

120. Gurian, Elaine Heumann. "Moving the Museum." *Institutional Trauma: Major Change in Museums and Its Effect on Staff*. Ed. Elaine Heumann Gurian. Washington, D.C.: American Association of Museums, 1995. 49. Print..

121. Baker, 64.

by asking key questions and the development of consistent standards is important for designers to mitigate this challenge.

Exhibitions will eventually pay for themselves if other environmentally sustainable practices are in place. "By thinking, designing, and building with a reduction mentality and a reuse standard from the outset; by looking at the entire life cycle of components; and by using a local approach, museums could actually save money …"[122] wrote Baker. By anticipating future needs and designing new exhibitions with individual elements intended to be reused, institutions can reduce long-term financial commitments.

Creating reusable structures and exhibit components reduces waste and reduces the financial burden of building new. "Given the limitations on financial resources and the competing need to present new content continually, museum professionals felt [reuse] was not only a way to decrease material use and increase environmental sustainability of their exhibitions, but also a logical way to stretch their funding far beyond the initial outlay for a single exhibition."[123] Remembering start-up costs of going *green* in budgets and adjusting budgets based on past experience with *green* materials is important.

Lack of Agreement and Cohesion About What is Green

Case studies, checklists, and seminars provide a framework for institutions to begin exploring *green design*, but the lack of standards, incentives, and adoption of what is considered *green* by the museum industry creates ambiguity. Twenty-six (43.3%) respondents to the survey agreed the lack of formal standards was a challenge to *green design* and 37 (61.7%) respondents said the lack of clarity about what is truly *green* deterred them from making different choices.

Without a formal body of tested and marketed materials, and certified approvals, ambiguous *green design* will continue to happen. Engaging a third party to develop these standards is critical to establishing what *green design* is for exhibitions. These standards would eliminate this common *friction* halting the change process.

It is important for the museum industry to remember each institution will have "… its own context of mission, values, audience expectations, available finances, deadlines and local regulations. More importantly, each existed in a particular place with its own unique environment,

122. Baker, 60.
123. Belew, Gustafson-Hilton, Handy, and Wood, 60.

available local resources and access to materials from elsewhere."[124] When creating guidelines for materials and processes to use, an institution must decide what is best for itself.

Regional expectations, guidelines, and checklists could assist institutions in common parts of the country. Regional groups like MAAM and NEMA could develop strategies and realistic expectations for institutions within their region to follow when assessing how *green design* for an exhibition will be achieved. Similar to the Green Museums Steering Committee in Chicago, institutions within common regions can then lean on each other for support.

The LEED certification has worked to encourage and expand sustainably designed building envelopes. The "… LEED rating has proven to be a badge of achievement, and proof of a commitment to sustainable design. It is a metric important to board members, donors, and … our communities."[125] A similar certification for exhibitions utilizing basic *green design* principles.

This certification can be based on different parameters such as institutional size, audience, exhibition purpose, and longevity of an exhibition, and offer financial gains similar to LEED-certified buildings. Regional considerations can be included to be sure expectations are realistic. AAM, NAME, or ASTC should consider spearheading this in the future, possibly suggesting change to or expansion of the LEED-CI.

Knowledge of Materials and Material Constraints

Exhibition teams must make a commitment to learning about materials and their constraints before specifying them during fabrication. Material knowledge becomes just as important during the design process as it is during the fabrication process. Designers who understand materials will be less likely to stop a project's momentum because they have not made specifications for fabrication that will need to be reworked once their designs enter the fabrication phase.[126]

Mitigating the challenges posed by materials and fabrication will come easier if institutions develop a consistent relationship with a fabricator willing to explore new processes. Relationships such as these will help exhibition teams "consider an overall reduction in materials and an integrated approach to design and fabrication to reduce waste"[127] when developing and constructing exhibitions. Down time between exhibitions should incorporate reflection periods involving all

124. Belew, Gustafson-Hilton, Handy, and Wood, 63.
125. Kuttner, 23.
126. Belew, Gustafson-Hilton, Handy, and Wood, 59.
127. Belew, Gustafson-Hilton, Handy, and Wood, 63.

exhibition team members, including fabricators, to explore what has been learned about materials after each exhibition experience.

Exhibition team members must recognize working with new materials and fabrication processes will involve learning new skills and information. A resistance to change can come from the anxiety associated with new information.[128] Time has to be delegated to identify areas of inexperience and provide training where necessary. Team members must feel comfortable admitting when they don't know the answer to a question, and not hiding their lack of knowledge in fear of being seen as ignorant.

Knowledge of Fabrication Processes

Belew, Gustafson-Hilton, Handy, and Wood noted the one consensus idea among the individuals they interviewed was the importance of an integrative process between exhibition teams and fabricators. "… the closer aligned the design and fabrication processes, the more green the they felt their exhibitions were … Close communication between designers and fabricators from the start of exhibition conception and design was seen as particularly essential …"[129] Incorporating an innovative process and building a relationship with a fabricator willing to explore options is imperative for any exhibition team wishing to incorporate *green design*.

"The closer design and production are married, the greener you can be. You can think through all those issues of fabrication, floor life, reuse and recyclability."

— Ben Durrell, Exhibit Designer, Boston Children's Museum

For institutions that sometimes fabricate their own exhibitions, designating an area within the fabrication shop for materials that can be reused, and creating an inventory of these items will help establish a reuse mentality. If exhibition teams know what is on-site at the beginning of the project, designs can be created around these materials. Less material needs to be ordered by the end of the fabrication process, and bulk orders can be placed for materials to be on-hand. Enabling a "be prepared" mentality will only strengthen an institution's commitment to *green design*.

CREATING SMALL CHANGE

After an institution has made the commitment to incorporate *green design* into their exhibit development process, great care should be taken in planning for this change. As the Heaths write,

128. Gurian, 51.
129. Belew, Gustafson-Hilton, Handy, and Wood, 58.

creating small digestible goals that can be assessed are easier to complete and will keep a change campaign's momentum moving forward. The smaller goals will help avoid a head first jump into *green design* where many moments of failure and *decision paralysis* can occur.

Creating incremental goals and acknowledging these small successes will also help deter feelings of ambiguity for the entire change process. Nineteen (31.7%) participants of the survey felt even if small changes occurred, like choosing carpet squares when installing new flooring instead of carpet rolls, this change was not enough. Helping exhibition team members see the success in smaller advances, which eventually lead to the bigger goal, will reinforce the positive changes that are occurring and keep momentum up.

Victor J. Danilov wrote "… exhibit development becomes an on-going activity with opportunities to present new information in exciting ways and/or use different techniques in telling old stories."[130] Exhibit rotation allows exhibition teams to try new techniques continuously, and can be utilized to create and adjust for smaller changes. It is better to gradually learn where resources will have to be allocated, and the material constraints and fabrication processes that do or do not work, instead of attempting every possible innovative solution at once, depleting budgets and creating moments of defeat.

Learning and acknowledging the proper time and place for the use of technology-based interactives, and when possible moving exhibits back to mechanical, visitor-activated, simple interactives, as the case with The Peggy Notebaert Nature Museum on page 14 is another incremental change that can occur over a long period of time. As Pauline Madge pointed out, "… the success of a technology comes about when it is taken-for-granted, when it would only become noticeable by its absence."[131] Computer-based interactives requiring screens, keyboards, energy, toxic chemicals, and the mining of minerals around the world contributing to the depletion of natural resources, have become expected of any *museum quality* exhibition. A slow removal of these types of interactives may be better and less overwhelming to stakeholders than an instance disappearance.

WHY GREEN DESIGN IS JUST GOOD DESIGN

What is good design? In 1992 a senior IBM executive described design to Clipson as follows:

130. Danilov, Victor J. *A Planning Guide for Corporate Museums, Galleries, and Visitor Centers*. New York: Greenwood, 1992: 175. Print.
131. Madge, 50.

> Design must solve the specific problems addressed without adding other problems. This can only be satisfactorily accomplished when the whole activity from the design sketch pad to the customer accepting delivery is reviewed realistically and managed as an integrated system.[132]

This definition could be used to ascertain good design solves problems. Good design does not add problems. Exhibition teams should agree adding to landfills and asking money to be spent unnecessarily on new exhibit components doesn't solve problems, it adds to larger, society-affecting problems. When adding to problems, exhibition teams are just "… ignoring completely some of the more pressing and obvious problems."[133]

An institution holds a unique educational position within the community it exists. A majority of the visitors to an institution are finished with their formal education and visiting a museum is a pause in their daily routine "… to look, to absorb, to assimilate and to learn."[134] Participating in *green design* practices is not only good for reducing the production of waste by museums, it also passes on new and innovative ways life can be changed outside the museum, as in the case of the California Academy of Sciences cafe.[135] Institutions should remember, "… relevant museum experiences go beyond fostering an intellectual appreciation of their subject matter to stimulating new behaviors in their visitors."[136]

Isn't part of good design engaging and enabling visitors? Does engaging and enabling a visitor mean only through an exhibition's content? Can it also mean through the physical components of the exhibition itself? As an industrial engineer who deals directly with processes enhancing the quality of life, Cherkasky wrote, "… the study of design is likely to reveal opportunities for creating better forms of life."[137] Museums have to acknowledge their responsibility as educational institutions in disseminating information that can improve the visitor's quality of life. Decisions to reuse and consume less, while spending time outdoors and making financially sustainable decisions at the institution, directly relate to visitors at home.

132. Clipson, 218.
133. Clipson, 219.
134. Elieli, Rina Bar-Lev and Laurence J. Gould. "Introduction." *Institutional Trauma: Major Change in Museums and Its Effect on Staff*. Ed. Elaine Heumann Gurian. Washington, D.C.: American Association of Museums, 1995: 24. Print.
135. See page 6.
136. Koster, Emlyn. "The Relevant Museum: A Reflection on Sustainability." *American Association of Museums*. Web. <http://www.aam-us.org/pubs/mn/MN_MJ06_RelevantMuseum.cfm>.
137. Cherkasky, 25.

Also, the connection environmental sustainability has to financial sustainability has been made and supported. "Green is just good business,"[138] wrote Jacobsen. This tipping point has allowed some community leaders to embrace the concept and is another reason *green design* is good design.

The cradle-to-cradle design aesthetic associated with *green design* translates to good design because it is environmentally, socially, and economically sustainable. "This cradle-to-cradle ethos needs to be adopted as the new standard for museum exhibition design,"[139] wrote Brenda Baker. This ethos will only be adopted when the industry has prepared itself and disrupted the current design style.

A NEW AESTHETIC FOR THE INDUSTRY

The current approach by society to *green* "has been about preserving rather than deeply examining our way of life"[140] and making changes. We are encouraged to buy hybrids instead of walk or bike, to build new LEED-certified buildings instead of repurposing old ones, and to change the type of light bulbs we buy not turn the lights off. If the definition of sustainability were truly used as the standard by which exhibition teams make design decisions, the current aesthetic of overbuilt, one-time use elements would cease to exist. *How does this change in aesthetic happen?*

As a member of an exhibition team, either institutional or firm-based, there is a responsibility to be sure the outcome of exhibition creation does not affect an institution's environmental sustainability. It is important the museum industry examine "how these prevailing modes of thought are sustained" so "we may learn how they can be disrupted"[141] according to Cherkasky. *Is it board members, stakeholders, exhibition teams within themselves, designer egos or outside firms challenging the importance of "green design" and environmental sustainability?* Creating exhibitions with components that cannot be reused, or that generate a large amount of waste do not support sustainable missions. Exhibition teams "… must find ways to overcome the tenacity of prevailing modes of thought."[142]

As Cherkasky found with his work, "… imagination and effort are required to disrupt a domi-

138. Jacobsen, 7.
139. Baker, 60.
140. Baker, 59.
141. Cherkasky, 30.
142. Cherkasky, 30.

nant design style, and to displace it with an alternative."[143] But disruption does not always require epic efforts. Disruption only requires "… systematic mobilization of material, social, and symbolic resources."[144]

To disrupt the current aesthetic, the tenacity of "the prevailing representations of design" must be questioned, "alternative institutions of design" must be established, and an intervention must occur in the dominant design style.[145] This disruption will create a change in the socially accepted norms previously discussed in Chapter 2 as a *friction* derailing current attempts at *green design*. Design journals, professional societies, and progressive design institutions and organizations can disseminate design ideas consistent with *green design*, helping shift the design style.[146]

Jacobsen wrote, "The starting point is the humility to think smaller, but longer and deeper, and then to re-define *museum quality* from this leaner and greener perspective."[147] For disruption in the current design style to occur, the industry has to embrace the modesty to resist narcissism within itself, allowing a new aesthetic to successfully develop. The survey provided an optimistic set of answers that provide support to the possibility a new aesthetic encompassing *green design* can occur.

Only nine (15.0%) respondents to the survey said the aesthetic commonly associated with green design is seen as a challenge for their institution in the future, and 37 (61.7%) participants believe a green design standard of aesthetic can be adopted for the industry. The combination of these two statistics creates support for the hypothesis of this research. Yes, a new museum quality standard can be created focused on *green design* and sustainability if the challenges to *green design* can be mitigated.

As product designer Alexander Manu believes "… responsible design must be shaped by an ideal."[148] The industry would have to believe all exhibition teams hold the same moral vision of wishing to improve institutional environmental sustainability. Realistically this may not be true due to either naivety or lack of cognizance. But understanding a design aesthetic focused on the

143. Cherkasky, 39.
144. Cherkasky, 39.
145. Cherkasky, 35.
146. Cherkasky, 37.
147. Jacobsen, 6.
148. Manu, Alexander. "Chasing Butterflies: Thoughts on the Big Idea of Design, Redefinitions and Responsibilities." *The Humane Village Journal* 2.1 (1995): 23. Print.

bigger and better, without considering the end-life of exhibit components, is an irresponsible ideal.

Madge made the persuasive argument that "… sustainability becomes really interesting only when it shifts from being an ethical and moral injunction … and becomes a way of imaginatively remaking ourselves through our relations with the world."[149] This should be the ultimate call to designers to rethink their own creativity and ability to be innovative. The call to action made by Annie Leonard and The Story of Stuff Project based at Allegheny College is to question the design and lifestyle precedent set for us in the previous century. In the popular video *The Story of Stuff* narrated by Leonard, her final words of wisdom are a push for a new way of thinking. "Remember that old way didn't just happen … people created it, and we're people too. So let's create something new."[150]

149. Madge, 50.

150. *The Story of Stuff*. By Annie Leonard. Dir. Louis Fox. Prod. Erica Priggen. Perf. Annie Leonard. Free Range Studios, 2007. *The Story of Stuff Project*. Allegheny College. Web. 2011.

CHAPTER 6

FACILITATING CHANGE FOR A NEW AESTHETIC

Utilizing the framework discussed by the Heaths is an effective way to plan, develop, and design resources supporting change for environmental sustainability. The framework for a new Web site was created for institutions and exhibition teams wishing to begin, continue, or re-evaluate their commitment to environmental sustainability and *green design*, based on the Heaths framework. To be effective, the following steps were taken to develop the content for the Web site:

1. The *frictions* associated with *green design* were evaluated for potential relief opportunities.
2. Four existing environmental sustainability supporting Web sites were evaluated for content and usability.
3. A content outline and information architecture was developed based on the Heaths framework.
4. Templates for pages supporting the information architecture were designed.

Beginning with the *frictions* described in Chapter 2, the main conflicts needing to be addressed by the content of the Web site were established.

What do we know? From the research we know the following things are wished for by exhibition teams to improve the green design process:

1. Exhibition design teams need to think "… about the materials from the start …"[151] Thinking about materials from the start allows exhibition teams to "… do things differently, and the result is an exhibition that is less wasteful and more authentically green …"[152]
2. Exhibition design teams wish for an integrative approach that brings the knowledge of the

151. Belew, Gustafson-Hilton, Handy, and Wood, 59.
152. Belew, Gustafson-Hilton, Handy, and Wood, 59.

fabricator into the design process earlier.[153]

3. Exhibit element reuse is important because "… even if we don't use a single green material, a reusable exhibit can have a far more positive impact than a single-purpose, fixed-use thing made with sustainable materials."[154]
4. A localized and institution specific approach to going green is the appropriate response to the challenge.[155]

We know materials, material constraints, fabricators knowledge, and the reuse potential of exhibit elements are important. We also know financially responsible decisions are the ones most likely to be considered and the lack of *green* standards upon which institutions can base their regional or individual guidelines is a hindrance. *How are the current Web sites available to exhibition teams providing information on these topics asked for, or recommended by, exhibition professionals? Are these Web sites easily navigated and providing information in a user-friendly manner?*

CASE STUDIES

The following criteria was developed to analyze the current resources available to exhibition teams.

Administration

- Who publishes or sponsors the site?
- Who maintains the site?
- Is this a blog, administered, or commercial site?
- Can users contribute information to the site?
- Who is the audience?
- Is there advertising?

Content

- What is the tone of voice, fact-based or opinion? How is the Web site written?
- What is the main purpose of the site? Is there a mission?
- Can users interact with the site? With each other?
- Does the content address any of the *frictions*?
- Is the information architecture of the site understandable? Are headings, subheadings and other information clearly recognizable?

153. Belew, Gustafson-Hilton, Handy, and Wood, 59.
154. Belew, Gustafson-Hilton, Handy, and Wood, 60.
155. Belew, Gustafson-Hilton, Handy, and Wood, 62.

Visitor Usability

- Does the page download quickly?
- Is it obvious what is clickable?
- What is the freedom of movement for the user?
- Can the user navigate through the pages easily?
- Is there a visual hierarchy?
- Is there a tagline or opening message?

Credibility

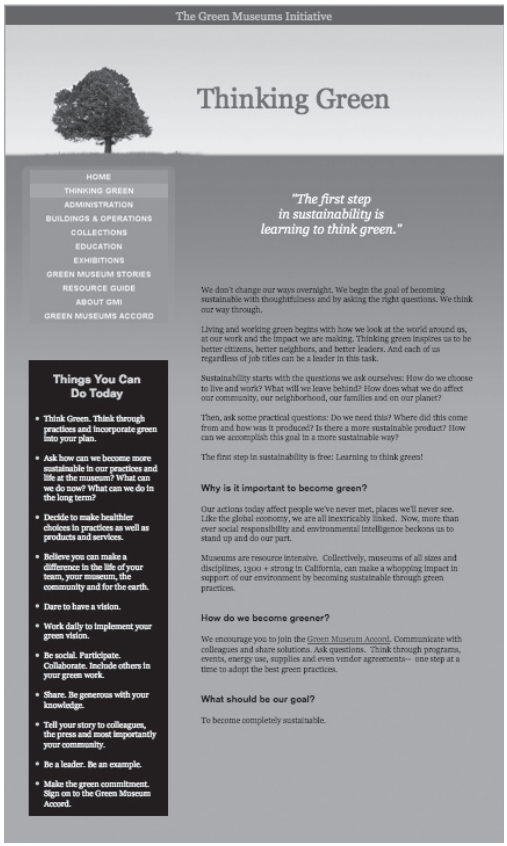
- Is the design appealing and professional?
- Does the writing appear to be thought-out and fact-based? Has the writing been proofread to avoid grammar and spelling errors?

Overall Impression

- Was this Web site created for the administrators of the site, or for the reader visiting the site?

CASE STUDY: THE GREEN MUSEUMS INITIATIVE

URL: *www.calmuseums.info/gmi/index.html*



ADMINISTRATION

- Who publishes or sponsors the site: California Association of Museums.
- Who maintains the site: The Green Museums Initiative Committee.
- Is this a blog, administered, or commercial site: Administered.
- Can users contribute information to the site: In one section users can submit their green stories, however the administrators do not appear to be rotating stories.
- Who is the audience: Primary - California museums. Secondary - museum professionals.
- Is there advertising: No.

CONTENT

- How is the Web site written? Is the tone of voice, fact-based or opinion: The Web site is written in a teacher tone, the visitor is being lectured. The site is persuasive and could be considered generic.
- Is there a mission? What is the main purpose of the site: "The Green Museums Initiative Committee has created this new website to inspire and offer practical ideas to help your institution become a 'green museum'. Whether you are just starting out or are already accomplished in your green practices, join us in the realization of a green and sustainable museum field."
- Can users interact with the site or each other: No.
- Does the content address any of the *frictions*?

  No, each section addresses a different department of the museum and has suggestions on how to become greener, but the suggestions are somewhat ambiguous. For instance: "Start by constructing exhibit components (walls, display cases, furnishings) from recycled or rapidly renewable materials. Then go beyond specifying products that are less bad." *Decision maker's need clear-cut paths. What are "less bad products?" What "recycled" materials?*

  The *Things You Can Do Today* sidebar gives specific examples but the contrasting type is hard to read and gets

lost in the other information. The option to sign the Green Museums Accord is available. It is a five principle agreement among museums in California, but no specific guidelines appear within it.

- Is the information architecture of the site understandable? Are headings, subheadings, and other information clearly recognizable: Yes, each section has three subsections, *Why is it important to be green?*, *How can we become greener?*, *What should be our goal?*, with the sidebar *Things You Can Do Today* consistently in the same spot.

USABILITY

- Does the page download quickly: Yes.
- Is it obvious what is clickable: Yes.
- What is the freedom of movement for the user: Easy, simple one-click options.
- Is there a visual hierarchy: Yes.
- Is there a tagline or opening message: Tagline, no. Opening message, yes.

CREDIBILITY

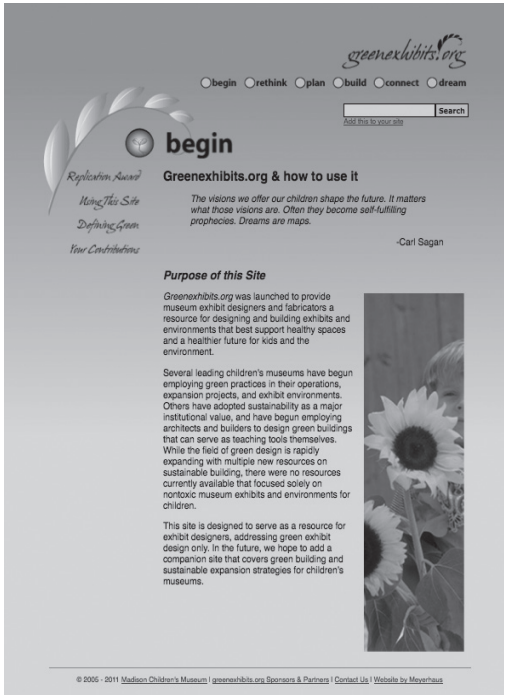
- Is the design appealing and professional: The design is adequate. The background color is harsh and caused eye strain after long periods of time. Fonts are well-chosen, but the most important content of the Web site, the *Things You Can Do Today* sidebar is lost by the contrasting colors.
- Does the writing appear to be thought-out and fact-based? Has the writing been proofread to avoid grammar and spelling errors: The Web site is content heavy. The visitor could read any professional article on environmental sustainability and get the same information. The Web site is a large call-to-action without suggestions for action. The suggestions that do exist are lost in poor color choices.

OVERALL IMPRESSION

Was this Web site created for the administrators of the site, or for the reader visiting the site? The Green Museums Initiative Web site seems to be advertising for the Green Museums Initiative Committee about their existence. There is nothing out-of-the ordinary about the site and it provides the same information that can be found in other places.

CASE STUDY: GREENEXHIBITS.ORG

URL: *www.greenexhibits.org/intro.shtml*



ADMINISTRATION

- Who publishes or sponsors the site:
  Madison Children's Museum.
- Who maintains the site:
  Madison Children's Museum.
- Is this a blog, administered, or commercial site:
  Administered.
- Can users contribute information to the site:
  Visitors can submit information about exhibits to the site to be considered as a case study, however no open dialog is encouraged.
- Who is the audience:
  Primary - exhibition teams and fabricators.
  Secondary - children's museums.
- Is there advertising: No.

CONTENT

- How is the Web site written? Is the tone of voice, fact-based or opinion: The Web site is an encouraging, do-it-yourself instruction manual. There is a lot of extra information, like quotes, statements, and persuasive arguments. It could be argued that if a designer has decided to look for this site, they do not need the persuasion. Overall, the tone is positive and written well, but the content could be edited down.
- Is there a mission? What is the main purpose of the site: "Greenexhibits.org was launched to provide museum exhibit designers and fabricators a resource for designing and building exhibits and environments that best support healthy spaces and a healthier future for kids and the environment."
- Can users interact with the site or each other: No.
- Does the content address any of the *frictions*?
  Materials and material constraints: Materials, yes, constraints, no. Finding this information does require searching.

  Fabrication: No, the page *Plan* is for contractors, not *Build* where you would expect to find it

  Forum for reuse of exhibit elements: Suggestions on places to look for repurposing, but no opportunity for visitors to interact with one another.

Localized or regional specific guidelines or examples: No, although starting points for institutions to begin review of their own policies are provided, and helpful examples are given, no suggestions are directed toward, or encourages localized or regional specific guidelines.

Green standards: The beginnings of standards, but not a comprehensive list. Sections have "ideas" but no real details.

Training: No, could quickly link to AAM or other groups giving training.

- Is the information architecture of the site understandable? Are headings, subheadings and other information clearly recognizable: The site uses "flashy" language. There are subheads but the language requires thought on the part of the visitor to navigate. Two clicks will never be enough to find what the visitor is looking for and rollover explanations would help to decipher each section heading.

USABILITY

- Does the page download quickly: Yes.
- Is it obvious what is clickable: Yes.
- What is the freedom of movement for the user: Easy, one can move efficiently.
- Is there a visual hierarchy: Yes.
- Is there a tagline or opening message: Tagline, no, opening message, no, unless the visitor clicks *Begin* first they will not understand how the Web site is to be utilized. Visually *Begin* looks like the last option to go to on the Home page, *Dream* looks like the first. The order needs to be reversed.

CREDIBILITY

- Is the design appealing and professional: Visually, the Web site is very generic. The site looks very blog-like, graphically it could use a redesign.
- Does the writing appear to be thought-out and fact-based? Has the writing been proofread to avoid grammar and spelling errors: The Web site is really content heavy. There is a lot to read through. Much of the information could be slimmed down to quick bullet points. It is hard to know what to read first and scrolling is required. The *Search* box doesn't work. The headers don't reveal much about the content contained on the pages, so the visitor ends up clicking through more than reading. Frustration sets in quickly and visitors left the site soon after landing on it.

OVERALL IMPRESSION

Was this Web site created for the administrators of the site, or for the reader visiting the site? The site was built for both. The museum wanted to showcase their ideas knowing they were innovative, but they also provide good resources as well. The mixture of the content is what makes the Web site questionable in its effectiveness. If the visitor wants to read feel good stories they should have that option, if the visitor wants just technical information they should have that option as well.

CASE STUDY: GREEN MUSEUMS WIKI

URL: *http://greenmuseums.wetpaint.com*

ADMINISTRATION

- Who publishes or sponsors the site: wetpaint.com.
- Who maintains the site: Sarah Brophy of bMuse.
- Is this a blog, administered, or commercial site: Blog.
- Can users contribute information to the site: Yes, readers can start "Discussions", but few have been successful. Blog content is provided by the administrator of the site.
- Who is the audience: The Web site doesn't appear to have a primary audience.
- Is there advertising: Yes, including unrelated products and services.

CONTENT

- How is the Web site written? Is the tone of voice, fact-based or opinion: It is journal-like, written in quick blurbs.
- Is there a mission? What is the main purpose of the site: No, the site is pieced together from the users contributing to it.
- Can users interact with the site or each other: Yes.
- Does the content address any of the *frictions*?
  Overall, no.

  Fabrication: Little, there are many questions started as "Discussions" wishing to be answered, but very little answers.

  Training: No, the heading has not been updated since May of 2010.
- Is the information architecture of the site understandable? Are headings, subheadings and other information clearly recognizable: No, other than page names there is no hierarchy.

USABILITY

- Does the page download quickly: Yes.
- Is it obvious what is clickable: Yes.
- What is the freedom of movement for the user: Little, there are many visual distractions.
- Is there a visual hierarchy: Yes.
- Is there a tagline or opening message: Tagline, no, opening message, no.

CREDIBILITY

- Is the design appealing and professional: The design is poor. The site is free, but it could be better maintained. The fonts are inconsistent, the lack of hierarchy requires effort by the visitor to find information and becomes frustrating easily. The site looks like a students site, set up for a class but never maintained. Visually the level of credibility is low.
- Does the writing appear to be thought-out and fact-based? Has the writing been proofread to avoid grammar and spelling errors: It is a journal for the administrator that is occasionally updated. It maintains Brophy's personal musings with contributions by others. It is a true blog and unless the visitor is wanting to know Brophy's direct opinions, it lacks any analytical or credible fact-based information.

OVERALL IMPRESSION

Was this Web site created for the administrators of the site, or for the reader visiting the site? This site was built for the administrator. Brophy wanted a site to share her knowledge. The intent was good, but was structured poorly, and the lack of upkeep is not helpful. It looks like a class project that stopped at some point.

CASE STUDY: GREEN PRACTICES TOOLBOX

URL: *www.aza.org/green-practices*

ADMINISTRATION

- Who publishes or sponsors the site: Association of Zoos & Aquariums.
- Who maintains the site: AZA Green Scientific Advisory Group.
- Is this a blog, administered, or commercial site: Administered.
- Can users contribute information to the site: No.
- Who is the audience: Zoos across the country.
- Is there advertising: No.

CONTENT

- How is the Web site written? Is the tone of voice, fact-based or opinion: The site is scientific with summaries of different linked sites.
- Is there a mission? What is the main purpose of the site: "Environmentally sustainable or 'green' practices are becoming an increasingly important focus of AZA-accredited institutions. The AZA Green Scientific Advisory Group has put together this Green Practices Toolbox full of great resources on a wide range of environmental topics".
- Can users interact with the site or each other: No.
- Does the content address any of the *frictions*? Overall, no.

  Materials and material constraints: Some, links to different articles and other sites, but the sites are not categorized by the type of material or region.

  Training: Links to other groups who may provide training, but no direct links to training possibilities.
- Is the information architecture of the site understandable? Are headings, subheadings and other information clearly recognizable: The visual hierarchy is color-based and dependent on the visitor's recognition level.

USABILITY

- Does the page download quickly: Yes.
- Is it obvious what is clickable: Yes.
- What is the freedom of movement for the user: Easy, but once a visitor clicks a link they leave the Web site, because the links do not open in new windows. To navigate back to the site requires back clicking.

- Is there a visual hierarchy: Yes.
- Is there a tagline or opening message: Tagline, no, opening message, yes.

CREDIBILITY

- Is the design appealing and professional: The design is professionally done and has been tested for usability. Visually the site is easy to handle.
- Does the writing appear to be thought-out and fact-based? Has the writing been proofread to avoid grammar and spelling errors: The writing is scientific, however nothing is AZA created. But, because AZA is linking to the different sites, a visitor could ascertain the association feels the link is credible.

OVERALL IMPRESSION

Was this Web site created for the administrators of the site, or for the reader visiting the site? The site was built for the visitor. Information is clearly laid out and not congratulatory, persuasive or opinion-based.

WEB SITE CONTENT

After evaluating the current environmental sustainability Web sites available to exhibition teams, the following content decisions were made for a new Web site titled *Decision Green*:

Big Idea

Green design decisions are region and institution specific.

Mission Statement

Decision Green facilitates *green design* changes for exhibition teams who have made a commitment to improving their institutions environmental sustainability.

Goals

- *Decision Green* will provide detailed, region specific options for visitors in a productive, change-focused way.
- *Decision Green* will provide tangible support for institutions wishing to initiate environmental sustainability policies and practices through resources, training, and forums for discussion.
- *Decision Green* will encourage interaction between visitors to create an engaging and educational experience.
- *Decision Green* will attempt to systematically address the *frictions* associated with *green design* for relief opportunities.

Audience

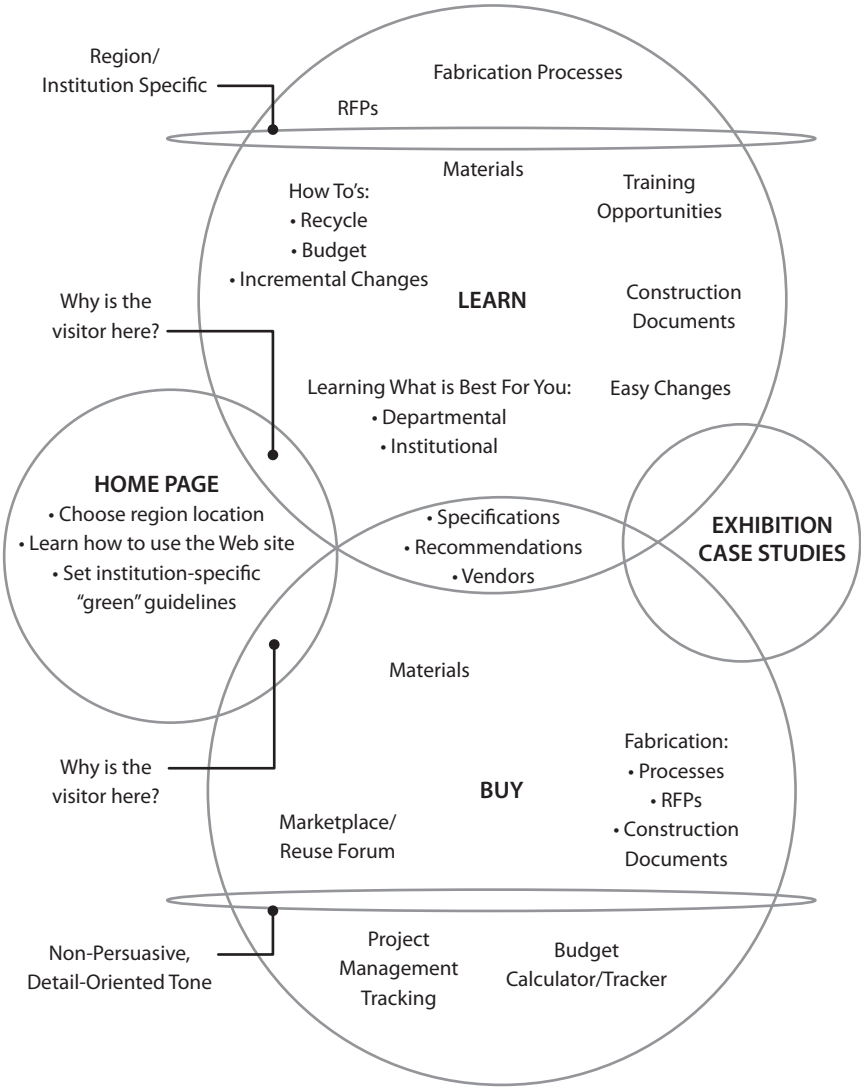
- Primary: Exhibition teams who have committed to *green design*.
- Secondary: Institutional stakeholders wanting to understand the environmental sustainability decisions of their respective exhibition teams.

Case Study Criteria

The case study criteria guided the tone of voice and usability, and change theory elements were considered to assist in the information architecture creation.

BUBBLE DIAGRAM

A bubble diagram addressing the needs, frictions and possible individual pathways of interaction is shown below. This bubble diagram was interpreted into an content outline.



PRELIMINARY CASE STUDY: DECISION GREEN

URL: *http://decisiongreen.squarespace.com*

ADMINISTRATION

- Is this a blog, administered, or commercial site: Administered.
- Can users contribute information to the site: Yes.
- Who is the audience: Primary - Exhibition teams who have committed to *green design*. Secondary - Institutional stakeholders wanting to understand the environmental sustainability decisions of their respective exhibition teams.
- Is there advertising: Yes, *green design* focused.

CONTENT

- How is the Web site written? Is the tone of voice, fact-based or opinion: *Decision Green* has a detail oriented, non-persuasive, fact-based tone.
- Is there a mission? What is the main purpose of the site: "*Decision Green* facilitates *green design* changes for exhibition teams who have made a firm commitment to improving their institutions environmental sustainability."
- Can users interact with the site or each other: Yes, forums for visitor-to-visitor interaction, review and recommendation sections for visitors to rate materials and fabrication processes, and visitors can contribute their own case studies.
- Does the content address any of the *frictions*?
  Materials and material constraints: Yes, region based options given to search related criteria. Visitors can interact by recommending materials, adding comments, and searching case studies for material options.

  Fabrication processes: Yes, visitors can interact in forums with fabrication professionals to understand processes, recommend choices, and explore case studies.

  Forum for exhibit element reuse: Yes, visitors can buy, sell, and trade with other visitors in their regional marketplace section. Visitors can also add suggestions for innovative reuse opportunities.

  Localized or region specific guidelines: Yes, the content is region specific to the visitor. There are pages to learn how to create institutional guidelines as well. What is best for the visitor's institution is the main focus of the message.

  Green standards: No, but visitors are encouraged to begin the discussion within their regions. This could be a possible function later.

  Training opportunities: Yes, there are both region specific and nationwide training opportunities listed.
- Is the information architecture of the site understandable? Are headings, subheadings and other information clearly recognizable: A visual hierarchy of both font and color combinations does exist. Sidebars remain consistent throughout the navigation and the most important content for each individual page is large and centered.

USABILITY

- Does the page download quickly: Yes.
- Is it obvious what is clickable: Yes.
- What is the freedom of movement for the user: Good, links to other sites open in different windows so the original site never leaves the visitor. After initial interaction and parameter setting by the visitor, region specific content is what can be found unless specified by the visitor.
- Is there a visual hierarchy: Yes.
- Is there a tagline or opening message: Tagline, yes, opening message, yes.

CREDIBILITY

- Is the design appealing and professional: Testing will be required to understand if the design is appealing.
- Does the writing appear to be thought-out and fact-based? The writing is both fact and opinion. Visitor contributed information is designated and disclaimed as opinion.

OVERALL IMPRESSION

Was this Web site created for the administrators of the site, or for the reader visiting the site? The Web site was created for the visitor to make choices based on the needs associated with their current project or institution. Incremental changes are encouraged and guided for small change opportunities. Materials, fabrication processes, and training are region specific to keep them relevant and feasible to the visitor. Exhibition case studies give visitors detailed opportunities to understand and learn from others in the industry currently designing *green*. Region, price, size of exhibition, and material constraints are all parameters that can be set by the visitors to find materials and fabrication processes. Choices can then be filtered based on price, ratings by other visitors, and location. Based on the filter, three choices are given to avoid *decision paralysis* by the visitor. The visitor does have the option to see more, but they must make this choice. Forums give visitors space to exchange information and express concerns, allowing a community for supporting both frustration and celebration.

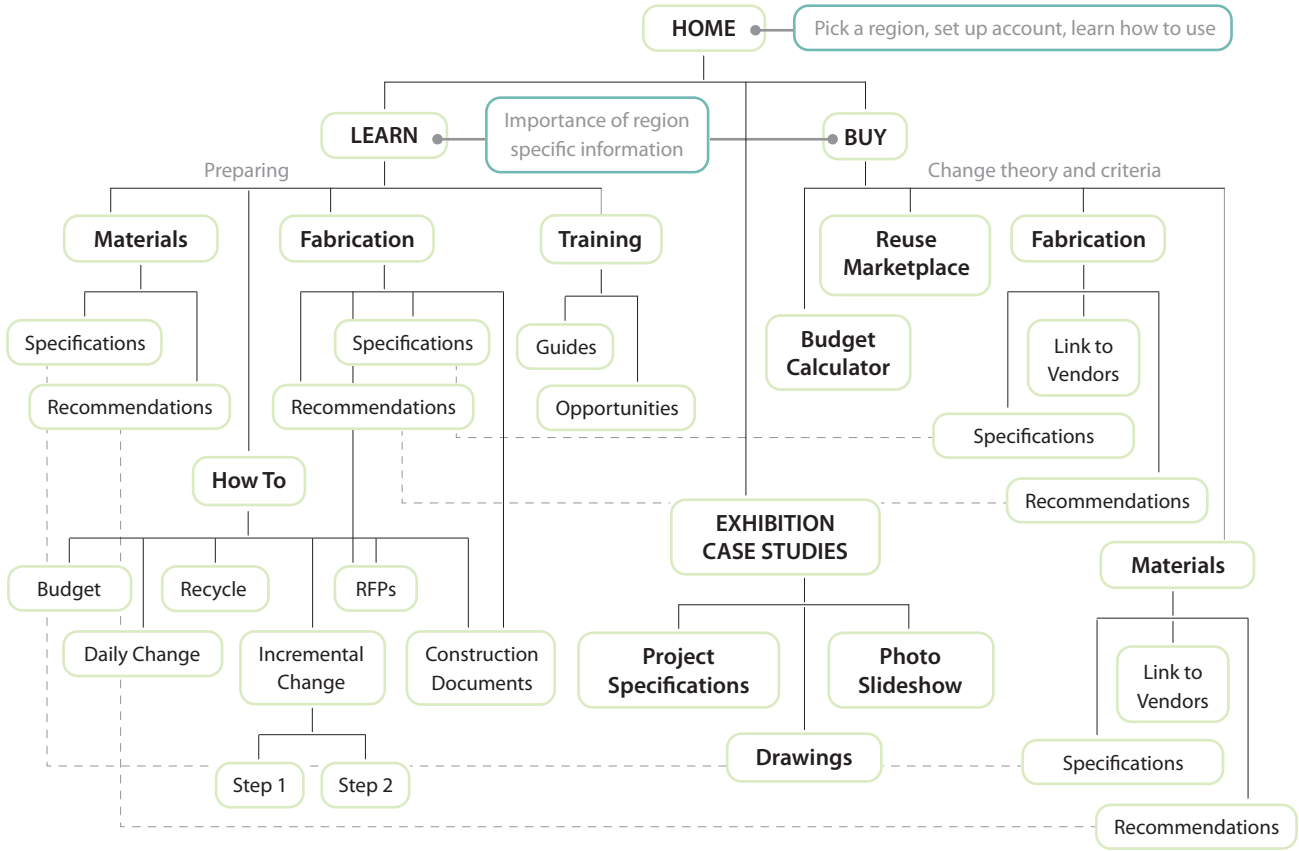
Information Architecture

A content outline and information architecture diagram were created to visually represent *Decision Green*'s on-line structure. The full information architecture diagram can be seen at right.

Content Outline

0. Home page
1. Learn
    - 1.1 Materials
        - 1.1.1 Specifications
        - 1.1.1 Recommendations
    - 1.2 Fabrication
        - 1.2.1 Specifications
        - 1.2.2 Recommendations
        - 1.2.3 Construction documents
        - 1.2.4 Request for proposals
    - 1.3 Training
        - 1.3.1 Opportunities
        - 1.3.2 Guides
    - 1.4 How To
        - 1.4.1 Construction documents
        - 1.4.2 Request for proposals
        - 1.4.3 Budget
        - 1.4.4 Recycle
        - 1.4.5 Daily changes
        - 1.4.6 Incremental changes
            - 1.4.6.1 Step 1
            - 1.4.6.2 Step 2
    - 1.5 Why Go Green?
    - 1.6 Resources

DECISION GREEN SITE ARCHITECTURE



2. Buy
    2.1 Materials
        2.1.1 Specifications
        2.1.2 Recommendations
        2.1.3 Link to buy
    2.2 Fabrication
        2.2.1 Specifications
        2.2.2 Recommendations
        2.2.3 Link to Vendors
    2.3 Reuse marketplace
    2.4 Budget calculator
3. Exhibition Case Studies
    3.1 Specifications
    3.2 Slideshow
    3.3 Drawings

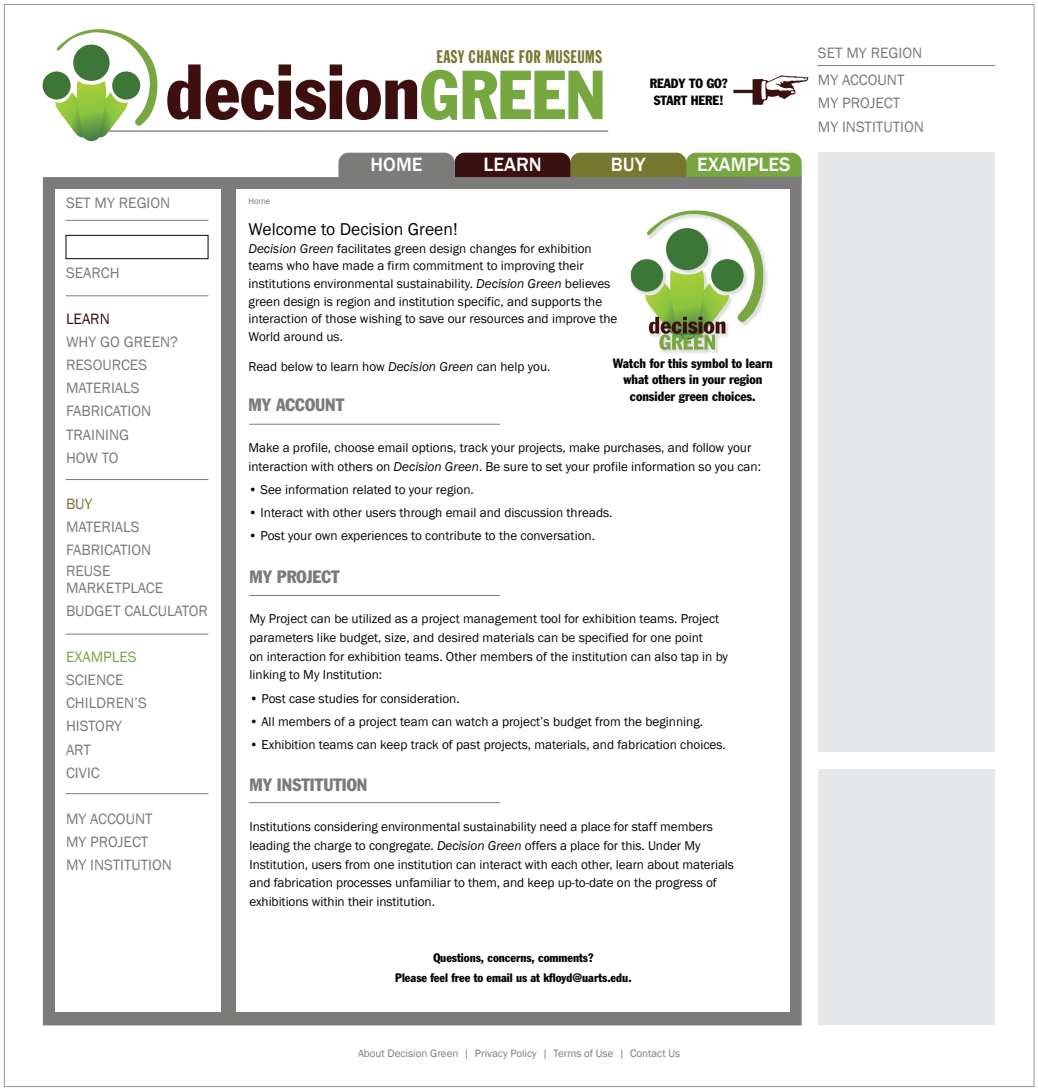
Wireframes

A template for pages was then designed. The design structure of each page is as follows:

1. A header with page name for visitor navigation.
2. Central area for content.
3. Left sidebar to be used for navigation.
4. Right sidebar to highlight exhibition case studies and for advertising. Information in this area will rotate.

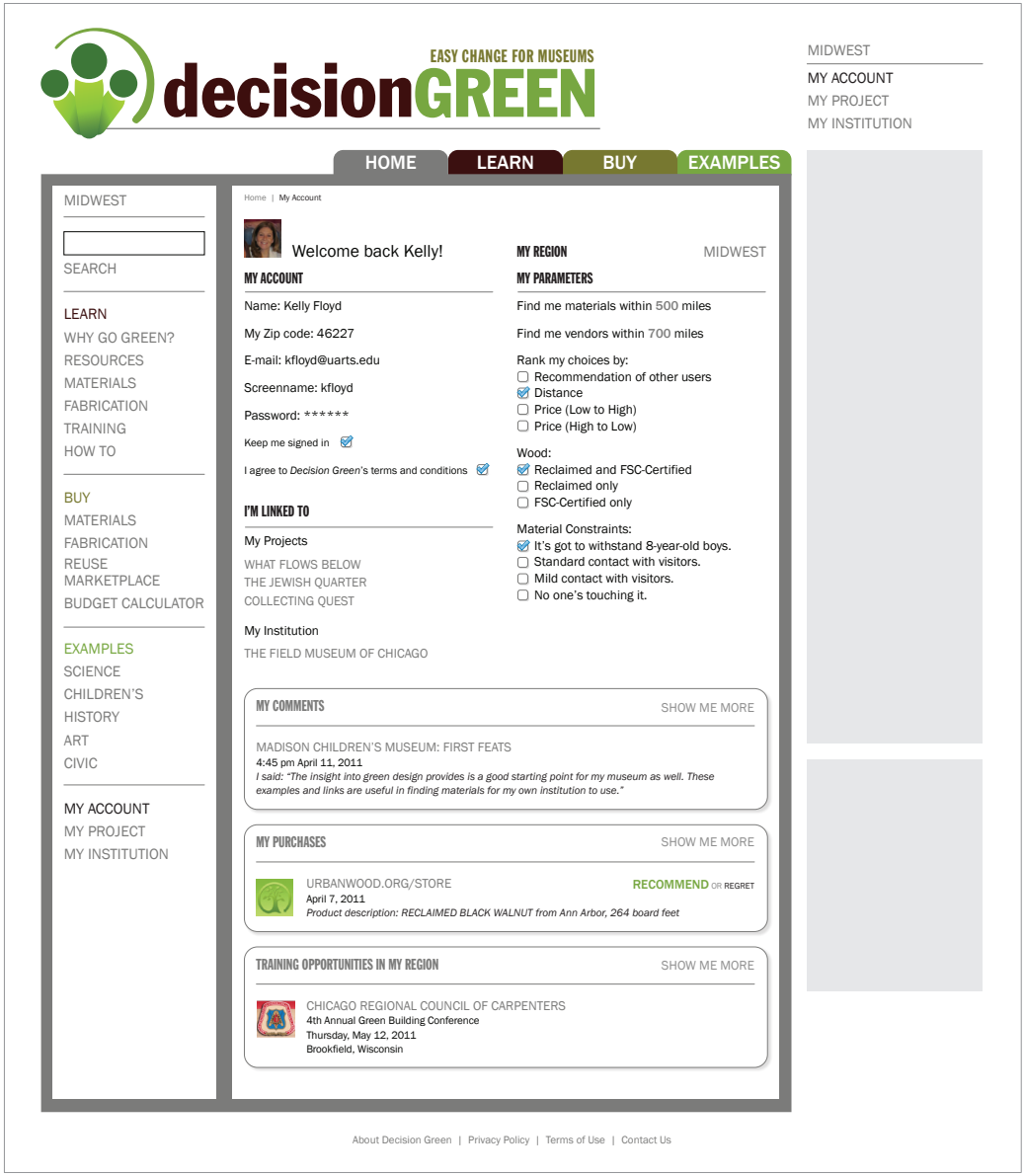
Sample pages follow.

Home Page


EASY CHANGE FOR MUSEUMS
decisionGREEN
READY TO GO?
START HERE!
SET MY REGION
MY ACCOUNT
MY PROJECT
MY INSTITUTION
HOME
LEARN
BUY
EXAMPLES
SET MY REGION
SEARCH
LEARN
WHY GO GREEN?
RESOURCES
MATERIALS
FABRICATION
TRAINING
HOW TO
BUY
MATERIALS
FABRICATION
REUSE MARKETPLACE
BUDGET CALCULATOR
EXAMPLES
SCIENCE
CHILDREN'S
HISTORY
ART
CIVIC
MY ACCOUNT
MY PROJECT
MY INSTITUTION
Home
Welcome to Decision Green!
Decision Green facilitates green design changes for exhibition teams who have made a firm commitment to improving their institutions environmental sustainability. Decision Green believes green design is region and institution specific, and supports the interaction of those wishing to save our resources and improve the World around us.
Read below to learn how Decision Green can help you.
decision GREEN
Watch for this symbol to learn what others in your region consider green choices.
MY ACCOUNT
Make a profile, choose email options, track your projects, make purchases, and follow your interaction with others on Decision Green. Be sure to set your profile information so you can:
• See information related to your region.
• Interact with other users through email and discussion threads.
• Post your own experiences to contribute to the conversation.
MY PROJECT
My Project can be utilized as a project management tool for exhibition teams. Project parameters like budget, size, and desired materials can be specified for one point on interaction for exhibition teams. Other members of the institution can also tap in by linking to My Institution:
• Post case studies for consideration.
• All members of a project team can watch a project's budget from the beginning.
• Exhibition teams can keep track of past projects, materials, and fabrication choices.
MY INSTITUTION
Institutions considering environmental sustainability need a place for staff members leading the charge to congregate. Decision Green offers a place for this. Under My Institution, users from one institution can interact with each other, learn about materials and fabrication processes unfamiliar to them, and keep up-to-date on the progress of exhibitions within their institution.
Questions, concerns, comments?
Please feel free to email us at kfloyd@uarts.edu.
About Decision Green | Privacy Policy | Terms of Use | Contact Us

Home Page: Learn More

My Account


EASY CHANGE FOR MUSEUMS
decisionGREEN
MIDWEST
MY ACCOUNT
MY PROJECT
MY INSTITUTION
HOME
LEARN
BUY
EXAMPLES
MIDWEST
SEARCH
LEARN
WHY GO GREEN?
RESOURCES
MATERIALS
FABRICATION
TRAINING
HOW TO
BUY
MATERIALS
FABRICATION
REUSE MARKETPLACE
BUDGET CALCULATOR
EXAMPLES
SCIENCE
CHILDREN'S
HISTORY
ART
CIVIC
MY ACCOUNT
MY PROJECT
MY INSTITUTION
Home | My Account
Welcome back Kelly!
MY ACCOUNT
Name: Kelly Floyd
My Zip code: 46227
E-mail: kfloyd@uarts.edu
Screenname: kfloyd
Password: ******
Keep me signed in
I agree to Decision Green's terms and conditions
I'M LINKED TO
My Projects
WHAT FLOWS BELOW
THE JEWISH QUARTER
COLLECTING QUEST
My Institution
THE FIELD MUSEUM OF CHICAGO
MY REGION
MIDWEST
MY PARAMETERS
Find me materials within 500 miles
Find me vendors within 700 miles
Rank my choices by:
Recommendation of other users
Distance
Price (Low to High)
Price (High to Low)
Wood:
Reclaimed and FSC-Certified
Reclaimed only
FSC-Certified only
Material Constraints:
It's got to withstand 8-year-old boys.
Standard contact with visitors.
Mild contact with visitors.
No one's touching it.
MY COMMENTS
SHOW ME MORE
MADISON CHILDREN'S MUSEUM: FIRST FEATS
4:45 pm April 11, 2011
I said: "The insight into green design provides is a good starting point for my museum as well. These examples and links are useful in finding materials for my own institution to use."
MY PURCHASES
SHOW ME MORE
URBANWOOD.ORG/STORE
RECOMMEND OR REGRET
April 7, 2011
Product description: RECLAIMED BLACK WALNUT from Ann Arbor, 264 board feet
TRAINING OPPORTUNITIES IN MY REGION
SHOW ME MORE
CHICAGO REGIONAL COUNCIL OF CARPENTERS
4th Annual Green Building Conference
Thursday, May 12, 2011
Brookfield, Wisconsin
About Decision Green | Privacy Policy | Terms of Use | Contact Us

Exhibition Case Study: Project Specifications Page

EASY CHANGE FOR MUSEUMS
decisionGREEN

MIDWEST
MY ACCOUNT
MY PROJECT
MY INSTITUTION

HOME | LEARN | BUY | EXAMPLES

MIDWEST

SEARCH

LEARN
WHY GO GREEN?
RESOURCES
MATERIALS
FABRICATION
TRAINING
HOW TO

BUY
MATERIALS
FABRICATION
REUSE MARKETPLACE
BUDGET CALCULATOR

EXAMPLES
SCIENCE
CHILDREN'S
Madison Children's Museum
Kohl's Children's Museum, Chicago
HISTORY
ART
CIVIC

MY ACCOUNT
MY PROJECT
MY INSTITUTION

Examples | Midwest | Children's | Madison Children's Museum

Madison Children's Museum: First Feats

Submitted by Sarah Crawford, Reviewed by Kelly Floyd

Project size: 1,000 sq.-ft.

Project budget: $120,000 ($116.00/sq.-ft.)

First Feats is the Madison Children's Museum's award-winning early learning gallery and the museum's first space built entirely of non-synthetic, sustainable materials. The decision to "go green" was fueled by the project's primary goal: to create a truly safe, healthy and sensory-rich exploratory environment for young children. The project's green design and aesthetic appeal combine to reinforce the sort of healthy, open-ended learning we envisioned for the space. The gallery has proven exceptionally safe, durable and extremely popular with visitors.

WHO

ARCHITECT
HOFFMAN, LLC,
APPLETON, WISCONSIN

ENGINEER
Jerry Strojny, RD
IBC ENGINEERING SERVICES, INC.,
CHICAGO, ILLINOIS

CONTRACTOR
Terry Ellenbecker
HOFFMAN, LLC,
APPLETON, WISCONSIN

EXHIBITION DESIGN
Madison Children's Museum

EXHIBITION FABRICATION
ICON EXHIBITS,
FORT WAYNE, INDIANA

GRAPHIC DESIGN
Madison Children's Museum

PRINTING
UNIVERSAL LITHOGRAPHERS, INC.
SHEBOYGAN, WISCONSIN

WHAT

FLOORING
VOC-free sealed plywood subfloor:
ECO-FRIENDLY FLOORING
MADISON, WISCONSIN
Recycled Douglas fir:
ECO-FRIENDLY FLOORING,
MADISON, WISCONSIN

GLASS
Tempered glass:
PACKERLAND GLASS PRODUCTS,
GREEN BAY, WISCONSIN

WALLS
Straw/clay structural walls

WALL FINISH
Straw/clay structural walls

FABRIC
Organic cotton and wool:
COULEE ORGANIC KNITS,
HIXTON, WISCONSIN

TOYS
Handmade, wooden toys:
BAMBINO LAND, FOUNTAIN CITY, WISCONSIN

DISCUSS

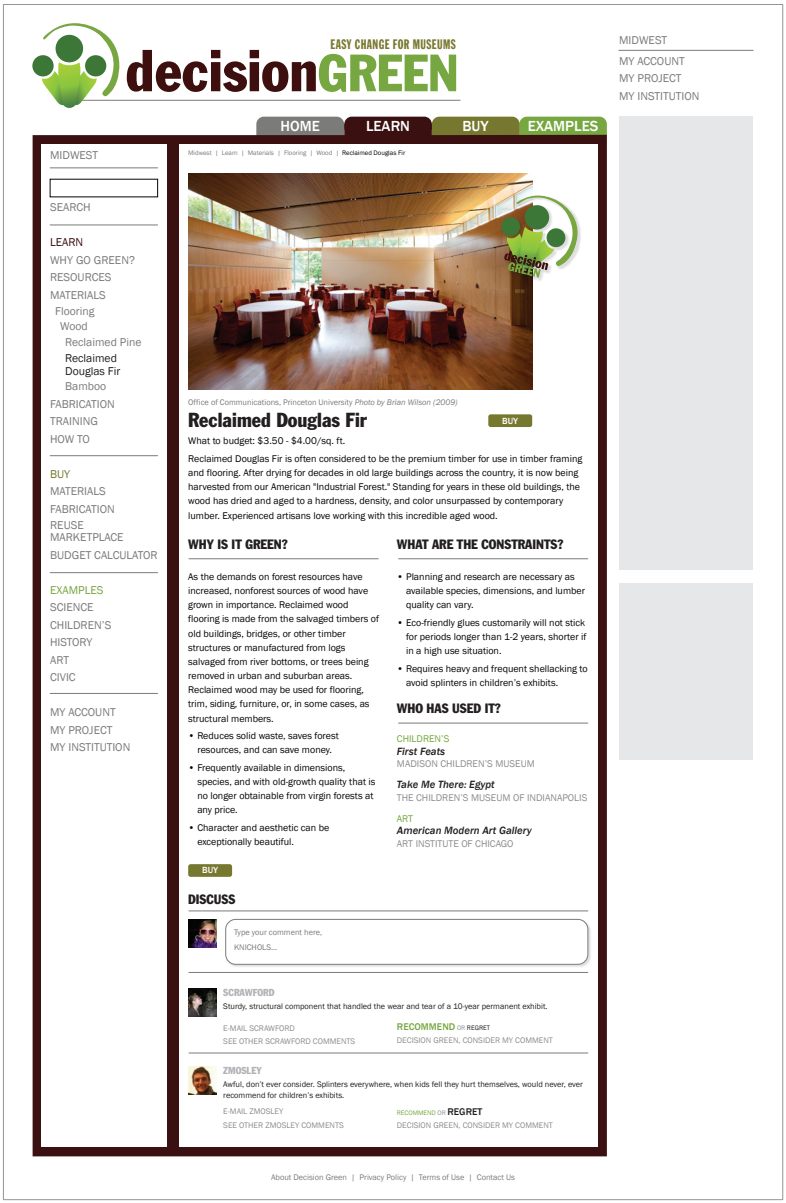
Type your comment here,
KNICHOLS...

KFLOYD
The insight into green design provides is a good starting point for my museum as well. These examples and links are useful in finding materials for my own institution to use.

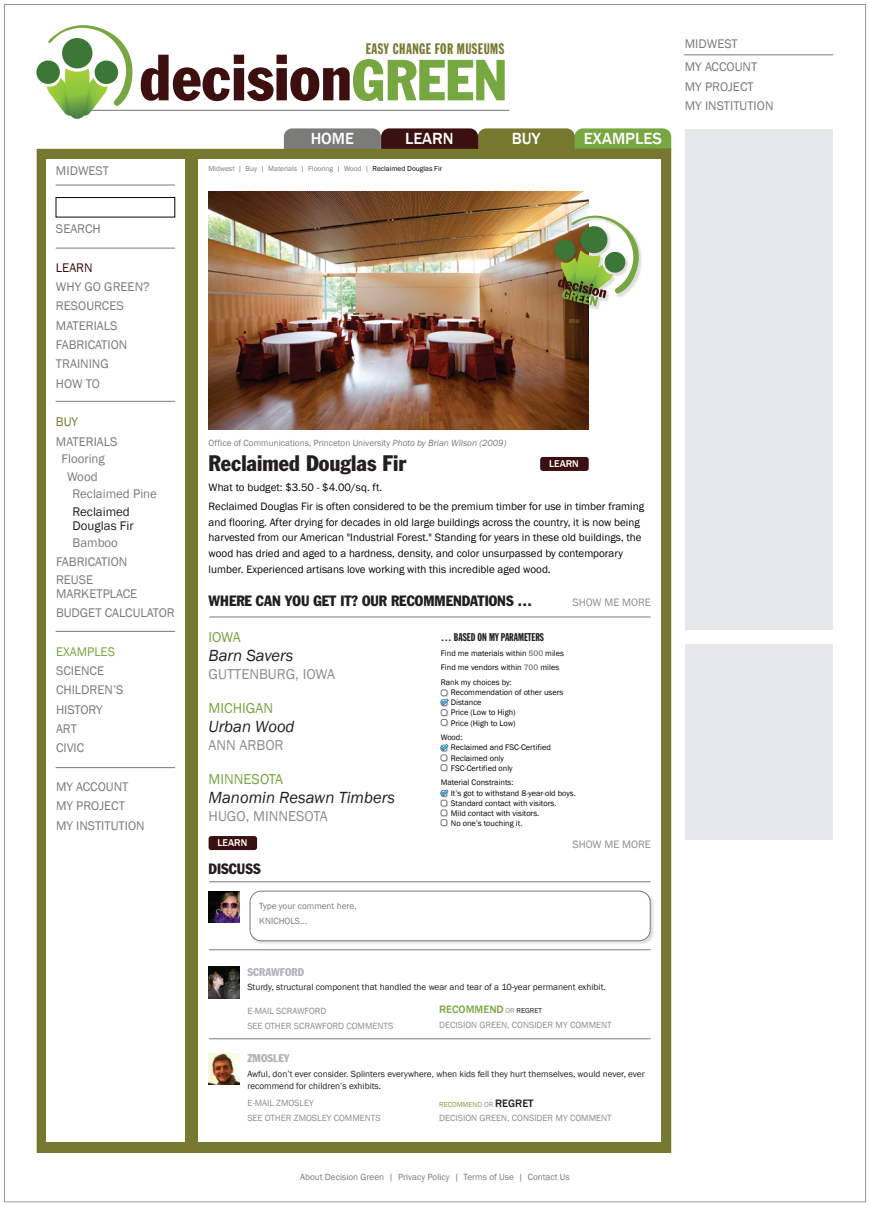
E-MAIL KFLOYD
SEE OTHER KFLOYD COMMENTS

About Decision Green | Privacy Policy | Terms of Use | Contact Us

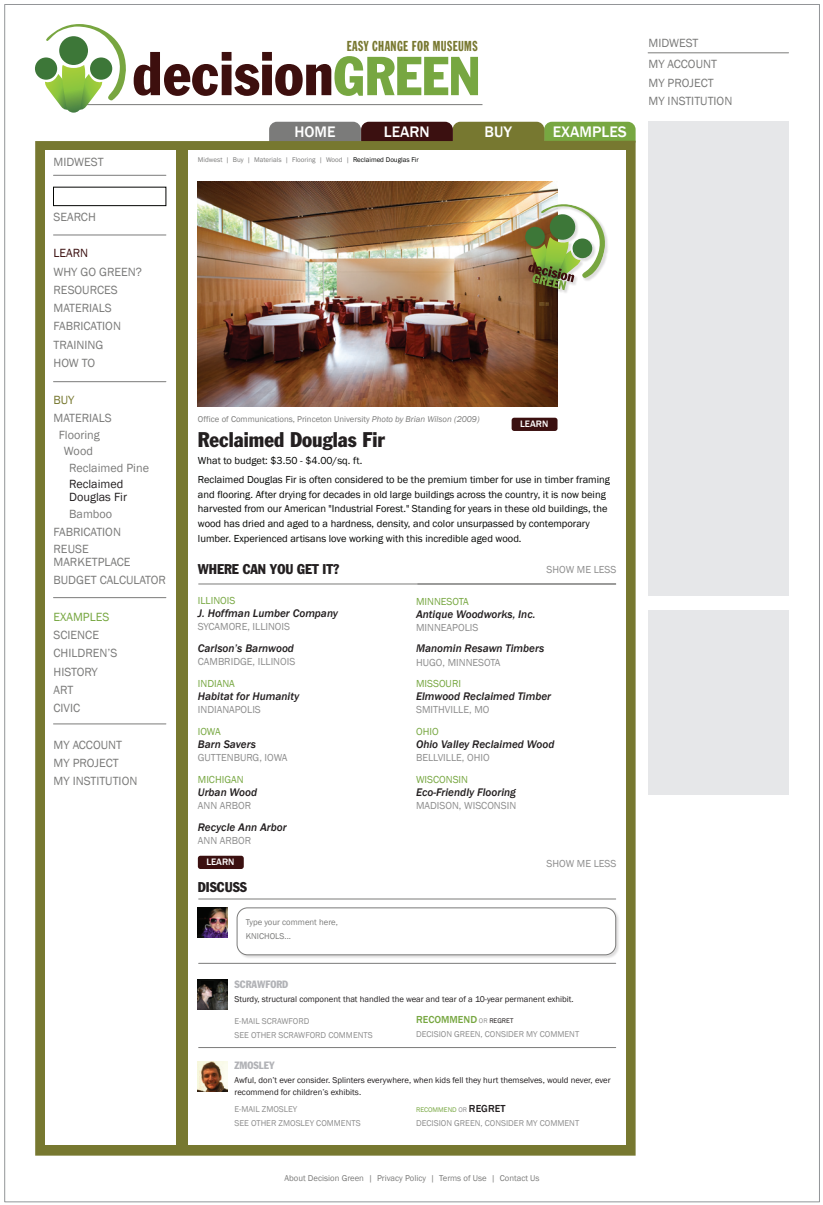
Learn: Materials or Fabrication



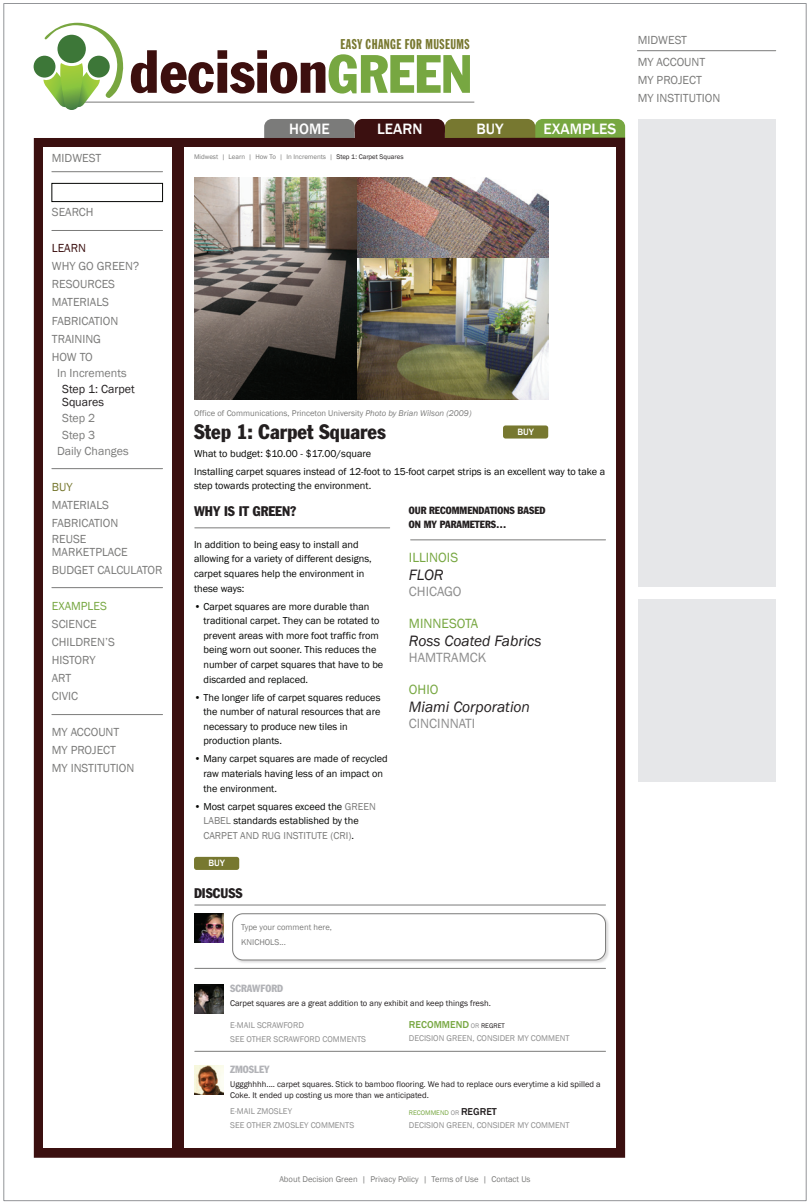
Buy: Materials or Fabrication: Use My Criteria & Show Me More



Buy: Materials or Fabrication: Show Me Less



How To: Incremental Change: Step 1



Decision Green and the Frictions of Green Design

Lacking in the architecture of the four case study examples was the stressed importance for region specific information and institution developed guidelines. This *friction* was acknowledged by being the overall theme throughout the *Decision Green*. When visitors enter the Web site they asked to share their Zip code. This action then enacts filtering of the information presented to the visitor. Materials, vendors, exhibition case studies, the reuse marketplace, as well as the discussion and recommendations of colleagues using the site, will be limited by regional specifications. These regions are to be modeled after the six regional associations of AAM.

The visitor can further tailor their experience by setting the parameters of individual exhibitions under the *My Project* feature in the *My Account* page, or set the parameters of their institution developed guidelines through the *My Institution* page. The *My Institution* and *My Project* pages can be set to allow multiple users to view and interact with these pages. The visitor will also have the option to further expand outside their region at any time through the *Show Me More* links.

Utilizing the information obtained through research and surveying, other *frictions* associated with *green design* were analyzed for relief opportunities within the Web site content and design.

Content Decisions

The *Reuse Marketplace* specifically addresses point three outlined at the beginning of the chapter. Within the *Reuse Marketplace*, exhibition teams can sell, buy, and trade used exhibit elements they no longer require but are still in working condition. The *Reuse Marketplace* also encourages the exchange of ideas on innovative ways to reuse different exhibit elements, or pieces of exhibits that have been disassembled. By keeping the interaction of the *Reuse Marketplace* limited to visitors within similar regions the third piece of the Heaths framework, *shaping the path*, is recognized as well. The detail of changing the physical layout and bringing people who need to work together closer, is bridged.

Visitors can keep an inventory of their current exhibit elements in use and in storage, under the *My Institution* page. This can be accessed by multiple users to allow institutions to know what they may have available at any given time. Being aware of materials and products already owned by the institution will promote financial sustainability as well.

Training under the *Learn* heading also addresses the multiple *frictions* cited in Chapter 2.

Manuals, Webinars, and training opportunities within a visitor's region will be posted and maintained. *Decision Green* sponsored Webinars by fabrication professionals can be uploaded for visitors to easily learn about processes and new innovations. Vendors and distributors can also upload commercial information about products and services they offer and all content will be region specific unless the visitor specifies otherwise.

Design Decisions

Design decisions based on the frictions cited in Chapter 2 include the recommendation and comment section for each page, and a direct link to fabricators, vendors, distributors, and product manufacturers. Each material, fabrication process, commercial user, and training opportunity will have a comments section enabled for visitors to share information and experiences with other users. This exchange of ideas will begin to disseminate knowledge about materials, their constraints, and fabrication experiences between users.

The direct link on the *Examples* pages to the people, companies, and material suppliers will put visitors into direct contact with the information they need. The materials used for projects will also be linked allowing visitors to learn about the materials they are seeing. Because the visitor's region has been specified, learning opportunities available for the visitors to learn about will be environmentally sustainable by being within a reasonable distance to the visitors own location.

Decision Green and the Switch Change Theory

Both content and design decisions were made based on the framework for implementing change presented by the Heaths. *Decision Green*'s primary audience is exhibition teams within institutions who have accepted the emotional appeal and who have made a commitment to environmental sustainability. Four content decisions and three design decisions were made based on the change theory presented in Switch.

Content Decisions

The *How To* page under the *Learn* heading gives explicit *green design* steps institutions can implement with each new exhibition. With the completion of each step, new information, such as budget considerations and time requirements, will be acquired and can be accounted for in following exhibitions. This avoids a feet first, all-in attempt at *green design* by promoting small successes and giving exhibition teams progressive destination points to reach. Each new exhibition will

hold small successes within itself, be a point of pride for the institution, and will be readjusting the status quo each time decisions are made.

As visitors contribute recommendations and comments about materials and fabrication processes, failure can be avoided and acknowledged. This open forum of discussion will potentially create a body of knowledge for exhibition teams to follow, avoiding the failure that could occur when blindly choosing new materials. This will also contribute, over time, to the knowledge of material constraints.

The *Examples* heading holds exhibition case studies from which others may learn. Each case study is not only an opportunity to discuss materials and fabrication processes, but also the recognition of a *bright spot*. The Heaths rely on *Bright Spots* to begin any change campaign with possibilities, not problems. By providing information on successful policies, practices, and change that has happened within other institutions, other exhibition teams will be able to access numerous opportunities for their own institutions.

Bright spots can also be found among the pages devoted to *Materials* and *Fabrication*. Each material and fabrication process will have a comments section in which visitors can discuss their experiences. Materials and processes that prove to be successful consistently over time will emerge and offer reliable possibilities for exhibition teams.

Exhibition teams can also celebrate their own successes and recharge their momentum by understanding what they are already doing correctly. The *Daily Change* options under the *How To* page will provide smaller, easily adjusted for changes institutions may not realize they have already implemented into their own habits. Combining these daily changes with the *Bright Spot* case studies lays the foundation needed for an institution to direct its riders and provide a path for the rational mind of its designers.

Design Decisions

To avoid *decision paralysis* for decision makers, the *Buy* heading affords users the option to select parameters in which they will see the materials to be shown to them. As an exhibition team member moves through these different parameters, only three material options will be shown at a time to avoid overwhelming the user. Users can see more by selecting the *Show Me More* link, but again, this option must be intentionally chosen by the visitor.

As each material is shown, the comments section will be visible allowing visitors to interact with the successes and frustrations provided by other users. Visitors can also see where materials and fabrication processes were used, as the case studies to which the options are linked will be shown. And, because the visitor's region has been chosen, and possibly the institution's own sustainable guidelines have been entered, the user will only see the options specifically available to them, avoiding the black abyss that could be the possible materials pool. The ability for a user to enter his or her institutions own guidelines is a second design decision based on Switch.

The third design decision based on the change theory are the forums available for exhibition teams to congregate and express their own frustrations. Allowing users to interact with each other, share stories, and offer or receive praise is a key charge of the Switch framework. *Decision Green* provides this space to exhibition teams and institutions in an on-line fashion.

Utilizing the plan put forth to create and develop a Web site could give exhibition teams a new resource to support and make decisions about *green design* with greater ease. The decision to use change theory principles when creating the information architecture and key properties of the Web site only strengthen the support ability for this resource. In the future, *Decision Green* could make the difference needed to see a significant change in the museum industry enabling it to embrace environmental sustainability.

POSTSCRIPT

This research began as an investigation into project management and organizational change. The turn it took towards sustainability came from the combination of articles I was reading simultaneously about project planning, organizational leadership, and the importance of environmental, economic, and community stewardship by institutions to remain sustainable in today's society. The economic growth experienced during the late 90s and at the beginning of the 20th century contributed to an underlying expectation for big, beautiful buildings, elaborate displays of donorship, and large exhibitions that can neither be reused or recycled in their present state because of their unique one-of-a-kind aesthetics and the materials from which they were made. During this time designers were given more power and less constraints than they could have ever wished for.

Today however, because of the economic downturn that began in 2008 and continuing over the last several years, institutions have been forced to cut programming, downsize, and even close due to the loss of funding. The economic conditions have affected all aspects of institutions including exhibition teams. Regardless, one of the few things that hasn't changed is the industry's expectation for designers to continue creating extensive, elaborate, albeit beautiful exhibitions to fit the mold of precedent set by previous exhibitions, and that can continue to complement the over-the-top building envelopes in which they are held. These envelopes of course built when unlimited resources were available. What we now know is that under the radar and paralleling the economic prosperity and eventual downturn was a growing awareness of the environment, the amount of energy and resources required to run an institution, and the waste generated by the continued rotation of exhibitions.

Institutions are slowly regaining their footing economically, but the environmental concerns

focused on exhibitions that have been raised still remain. The creation of the LEED certification process, and the importance of responsible operation and maintenance procedures is easier and easier for institutions to adhere to. Architects, designers, engineers, and other stakeholders have become infatuated with the idea and recognition that comes with this certification. I admit, I too was star-struck and even studied, tested for, and became a certified LEED Green Associate while writing this paper. But I understand now the issue of environmental sustainability and *green design* are much larger than just the building itself, and because LEED doesn't address any aspect of the exhibitions inside the institution, the process doesn't regulate the exhibitions be created in a sustainable manner. This expectation has to come from the institution itself.

Thinking about how trends and fads come and go, I worry that *green design* and promoting environmental stewardship may just be another protest-worthy cause. My hope is this isn't true, but with all things society-driven, no one can know unless the conversation continues to sustain. I also worry that communities will begin to assume environmental measures are being taken innately, and the checks-and-balance system of peer pressure and community curiosity will go by the wayside.

As I wrote this paper I continued to read whatever I could get my hands on about environmental sustainability and *green design*, sometimes in preparation for my LEED exam, and sometimes because I see this becoming my cause in life, but always to grow in my own understanding of the problem and how to begin developing solutions. In the four months it took for me to finish this writing, my thinking, attitude, and understanding grew beyond these pages. Initially I was defensive, trying to understand why any designer wouldn't agree with the importance of the issue, and trying to grasp why the issues talked about as challenges, I only read as excuses. As I saw it, the resistance came simply from a lack of trying. Now, having stood in all corners of the whole picture, I see where the rips and tears creating the issues have occurred.

The survey I conducted showed only half of the institutions represented were aware that environmental sustainability needs to be an issue they were thinking about. Only half. If there are two museums in an area, only one is thinking about using compact fluorescent light bulbs, or possibly reusing temporary drywall partitions in their next exhibition to reduce the waste that has to go to the local landfill instead of tearing down these walls and reconfiguring the space. Now think if that area is actually a city like New York or Washington, D.C. *What happens then?*

Exhibit designers, project managers, graphic designers, and sometimes the education or marketing teams are aware of environmental issues because of the production-based nature of their end projects. But as a whole, it doesn't appear awareness of environmental sustainability is on the minds of all staff members at all institutions. Not only is it important for these other staff members to be aware of environmental sustainability issues, it is also critical they be supportive of sustainable policies and practices for these strategic measures to succeed. Stepping backward to look at how environmental sustainability is being addressed institution wide is not a topic that has been explored by many researchers and should be henceforth. As the Pittsburgh Children's Museum and The California Academy of Sciences can attest, success can happen when this becomes a institution issue, not just an exhibition team or operations and maintenance issue. The macro at this point becomes the important piece, not the micro.

The next step in the macro to micro also involves the ability for change agents to do the work they need to do. The combination of the overall lack of awareness and the acknowledgement by participants of my survey that no one is attempting to coordinate the effort, shows that environmental sustainability isn't being thought about in institutions and has no voice. Fostering, training, supporting, and guiding advocates in institutions willing to take up the environmental sustainability cause has to happen. *When environmental sustainability and green design become a society issue and government regulators want answers, how is the industry as a whole going to change or find support within themselves if no one is attempting to look at the problem now?*

The missing change agents directly flows into the next issue I found in my research. As I researched, I found myself reading the same authors again and again, and seeing the same names appear over and over. My hope is this isn't a sign that being aware of our environmental impact is only the priority of a few who happen to have their loyal followers. My skepticism lies in the lack of diversity in topics and soap boxes being stood on. The topics of articles seems to be consistent year-to-year. *Exhibition teams keep reading they should use low VOC paints, avoid anything with formaldehyde in it, use carpet squares as responsible flooring, and choose proper cleaning chemicals, but what's next?* Maybe the next generation of writers and advocates, like myself, are still growing and maturing to be able to take up the platform and provide these answers, but I hope the turnover to us legitimately happens, and happens soon, or others waiting and willing to learn may grow

tired of the stand still.

Another thought that worries me is the lack of acknowledgement about design firm influence on the industry. I interviewed representatives of institutions who are leading the way in the environmental cause, and these interviewees genuinely seemed concerned over the ability of design firms to create bigger and better exhibits as an issue. Unless specified by an institution, design firms aren't required to explore sustainable solutions. Some firms do make these suggestions, but some don't. Because the institutions who already participate in practices supporting environmental sustainability see this as an issue, I wonder if more institutions will recognize this as an issue in the future.

Finally, as an industry, we need to be willing to open our books, offer some transparency, and really evaluate the financial burden the shift to *green design* causes. One of the most important aspects of the LEED certification is life-cycle assessment. Project teams discuss not only the financial returns possible when integrating high performance systems into the building envelope, but also the life of a material or resource from the beginning of the project to the end. At the growing rate of pursuit by new and expanding institutions of LEED certification, we, as exhibition teams, need to become included in these conversations to truly understand how our choices fit into the bottom-line equation. Not just the financial bottom-line, but also economic and social bottom lines.

In 2007, construction consulting firm Davis Langdon compared the initial cost of building and operating a LEED-certified and a non-certified project. What the firm found was *green* buildings actually have an average marginal cost that is 2% less than a building not certified by LEED. Over the course of time, the LEED certified buildings also cost 30% less to operate.* *Why is this?* Because decisions about the buildings were made together by all members of the project team and synergies could be found to improve the performance of the building. It is now confirmed that *green* buildings cost less. Moving forward, it should be assessed whether *green* exhibits actually cost more, or if the financial burden is just an easy excuse to fall back on, allowing exhibition teams to halt exploring solutions further.

The most important and most immediate changes that have to happen include two points and both focus on how the industry is emphasizing the importance of materials in *green design*. First,

*Morris, Peter, and Lisa Fay Matthiessen. *Cost of Green Revisited: Reexamining the Feasibility and Cost Impact of Sustainable Design in the Light of Increased Market Adoption*. Tech. London: Davis Langdon, 2007. Print.

we have to stop litigating over what is *green*. The industry may not have a set standard of materials certified as *green*, but any good fabricator can tell an exhibition team what *green* materials are options available for any particular project. To do this, the industry has to collaborate and agree on informal body of standards based on regions. What is good for the East coast probably isn't going to work for the West coast, and what's good for Kansas may not be able to happen in Alaska.

Working together to embrace sustainable solutions not only involves agreeing on materials, but also *green design* practices, reuse opportunities, and design solutions, which the second point addresses. The thinking behind exhibitions has to move forward and designers need to push their own creativity to allow these solutions to organically evolve. Institutions have to remember *green design* isn't just about the materials, it's also about what happens to exhibition components after the exhibition closes. *Is there room to store the elements? Are components going to end up in a landfill because no one planned ahead?*

Sustainability requires an institution to recognize when to continue growing and when to contract. *Green design* requires exhibition teams to think about what can be designed with reuse in mind and what actually needs to be made new. *Green design* is about knowing when to include technology and when not to. *Green design* is about not letting the design get in the way of the visitors educational experience. *Green design* is about keeping the visitors needs first, not the institutions.

I want to thank my committee members for asking me to write this postscript to further show the evolution of my thinking. As the daughter of an environmentalist father and a creative mother who knew no limits when it came to the possible uses for pine cones, I have merged into a curious mixture of inquisitiveness and creativity, but also passion and drive. I hope, with a little encouragement, a lot of patience, and some charretting, a new wave of solutions can begin to emerge. We creative types have to come together to understand how we are going to make this happen. The institution was built to preserve culture and history, and someday we may look back at the big monstrosties that have been created and wonder why we thought it was all necessary to tell the stories we tell. But in the mean time, we should start setting those small goals, and case-by-case pat ourselves on the back for our small successes.

FRONT-END EVALUATION

Name: Title:

Organization:

The following questions refer to creating change within your organization's internal, professional culture, including policies and practices.

1. Within your organization, how much involvement does senior staff have in regards to policies and practice? (1= None, 5 = Always involved) 1 2 3 4 5

2. Does your organization currently have a plan for enacting change? Y N

3. Who do you think has the ability to create change within your organization?

_____

4. How does change happen within your organization? _____

_____

5. Do you believe senior staff can create change within your organization? Y N

5b. Why or Why Not? _____

The following questions refer to sustainable design practices within your organization.

6. What does sustainable design mean to you? _____

7. Does your organization currently use sustainable design practices? Y N

8. Is your organization interested in sustainable design? Y N

9. What are the challenges preventing your organization from consistently designing in a sustainable fashion? (Check all that apply)

O Time O Size of staff O No one's responsibility

O Resources O Budgets O Lack of awareness

O Other, _____

10. Please list any sustainable design resources or practices your organization currently uses:

_____

SURVEY QUESTIONS

1. In regards to operations as a whole, does your institution or organization have clear policies, practices, or strategic plans for achieving environmental sustainability?
   - ○ Yes.
   - ○ No.
   - ○ I don't know.

2. How often does your institution or organization utilize green design practices when designing both temporary and permanent exhibitions? Examples of green design practice include using metal fasteners instead of glue, reusing or designing for reusable cases and exhibit elements, and choosing locally grown and harvested wood.
   - ○ Always.
   - ○ Often.
   - ○ Sometimes.
   - ○ Never.
   - ○ Only for temporary exhibitions.

3. What challenges have you encountered in regards to green design? (Check all that apply.)
   - ○ Lack of knowledge about material properties.
   - ○ Lack of knowledge about material constraints, i.e. lifespan.
   - ○ Lack of knowledge about fabrication processes.
   - ○ Lack of time for research or to make changes to decisions.
   - ○ The financial burden.
   - ○ The lack of formal standards for green design, i.e. standards similar to LEED.
   - ○ A lack of clarity on what is truly "green".
   - ○ The aesthetic with green design.
   - ○ Other issues.

4. Do you think your institution or organization will adopt green design standards for all exhibitions in the future?
   - ○ Yes.
   - ○ No.
   - ○ Maybe.
   - ○ We already have green design standards for all exhibitions.

5. Do you think the museum industry could ever adopt a green design standard of aesthetic?
   - ○ Yes.
   - ○ No.
   - ○ Maybe.

6. What prevents a green design standard of aesthetic from being adopted by the museum industry? (Check all that apply.)
   - ○ Board members, visitor, and other stakeholder expectations are preventing.
   - ○ Outside firm influence on the industry.
   - ○ Designer egos.
   - ○ A lack of awareness on the importance of green design in institutions.
   - ○ Other.

7. Are any of these frustrations you encounter that deter you from making green design choices? (Check all that apply.)
   - ○ Too many options available.
   - ○ The need for green design has not been established at my institution.
   - ○ I do not have a clear path as to how I am supposed to make decisions or what criteria to use when making choices.
   - ○ Green design is an overwhelming topic to begin discussing at my institution.
   - ○ Even if we change one thing, like our carpet, it does not seem like enough.
   - ○ No one is coordinating the effort.
   - ○ Other.

8. I work at a ...
   - ○ Museum.
   - ○ Design or development firm.
   - ○ Other organization.

9. My museum, firm, or organization is ...
   - ○ Very small (1-10 employees).
   - ○ Small (11-50 employees).
   - ○ Medium (51-200 employees).
   - ○ Large (201-500 employees).
   - ○ Extra large (501+ employees).

BIBLIOGRAPHY

Ajzen, Icek. "From Intentions to Actions: A Theory of Planned Behavior." *Action Control: From Cognition to Behavior*. Ed. Julius Kuhl and Jurgen Beckmann. Berlin: Springer-Verlag, 1985. 11-39. Print.

Alter, Lloyd. "Madison Children's Museum Focuses on Sustainability from Inside Out." *Treehugger.com* 16 August 2010. Web. <http://www.treehugger.com/files/2010/08/madison-childrens-museum.php>.

Anthony, Scott and Scott Fuson. "Instilling a Culture of Innovation." Interview. *Chemical Week* 29 Sept. 2004. 16. Print.

Baker, Brenda. "Green Exhibitions in Children's Museums: Setting the Bar Higher." *Exhibitionist* Spring (2010): 58-64. Print.

Bandura, Albert. "Self-Efficacy: Toward a Unifying Theory of Behavioral Change." *Psychological Review* 84.2 (1977): 191-215. Print.

Belew, Greg, Kathy Gustafson-Hilton, Sharon Handy, and Lyn Wood. "Splinters from Green Materials: Conversations about the Frictions of Green Exhibition Design." *Exhibitionist* Spring (2010): 56-64. Print.

Bell, Stephen, Mike Sarna, and Notebaert Nature Museum. "Building Greener Exhibits." *greenexhibits.org*. Madison Children's Museum. Web. <www.greenexhibits.org/connect/building_greener_exhibits.shtml>.

Brophy, Sarah, and Elizabeth Wylie. "It's Easy Being Green: Museums and the Green Movement." *Museum News* Sept.-Oct. (2006). 38-45. Print.

"Carpet Tiles Are Green Even When They Are Different Colors." *Go Green Street: Green Living with Eco Friendly Advice on Living a Natural Lifestyle*. GoGreenStreet.com, 3 Apr. 2010. Web. <http://www.gogreenstreet.com/carpet-tiles-are-green-even-when-they-are-different-colors/>.

Cherkasky, Todd. "Design Style: Changing Dominant Design Practice." *Design Issues* 20.3 (2004): 25-39. Print.

Clipson, Colin. "Contradictions and Challenges in Managing Design." *Journal of Architectural Education*. 45.4 (1992): 218-24. Print.

Danilov, Victor J. *A Planning Guide for Corporate Museums, Galleries, and Visitor Centers*. New York: Greenwood, 1992. Print.

"Defining Green." *Begin*. Madison Children's Museum, 2010. Web. <http://www.greenexhibits.org/begin/defining_green.shtml>.

Elieli, Rina Bar-Lev and Laurence J. Gould. "Introduction." *Institutional Trauma: Major Change in Museums and Its Effect on Staff*. Ed. Elaine Heumann Gurian. Washington, D.C.: American Association of Museums, 1995: 24. Print.

"Exhibits Case Studies: Madison Children's Museum: First Feats - Celebrating The Early Years." *GreenExhibits.org*. Madison Children's Museum, 2005-2011. Web. <http://www.greenexhibits.org/dream/exhibits_mcm_first_feats.shtml>.

FAQ: LEED for Commercial Interiors. Washington, D.C.: U.S. Green Building Council, 2011. Print.

Golucki, Amanda. Marketing and Public Relations. *Nature Museum Fact Sheet*. Chicago: Peggy Notebaert Nature Museum, 2007. Print.

Green Fact Sheet. Chicago: Peggy Notebaert Nature Museum, 2008. Print.

GreenExhibits.org. Madison Children's Museum, 2005-2011. Web. <http://www.greenexhibits.org/intro.shtml>.

The Green Museums Initiative. California Association of Museums. Web. <http://www.calmuseums.info/gmi/index.html>.

Green Museums Wiki. Sarah Brophy, 2008-2011. Web. <http://www.greenmuseums.wetpaint.com>.

"Green Practices Toolbox." *Association of Zoos and Aquariums*, 1997-2009. <http://www.aza.org/green-practices>.

"Green Resources." *American Association of Museums*. American Association of Museums, 2010. Web. <http://www.aam-us.org/museumresources/lc/musref/gr.cfm>.

Gurian, Elaine Heumann. *Institutional Trauma: Major Change in Museums and Its Effect on Staff*. Washington, D.C.: American Association of Museums, 1995. Print.

Heath, Chip, and Dan Heath. *Switch: How to Change Things When Change Is Hard*. New York: Broadway, 2010. Print.

Hirschhorn, Larry. "Developing and Evaluating Talent in Architecture Firms." *Journal of Architectural Education*. 45.4 (1992): 225-29. Print.

Hooper, Barry, and Karsten Mueller. *Green Building: A Guide to Sustainable Building Materials and Methods in Santa Cruz County*. Ed. Jenny Shelton. Ecology Action of Santa Cruz, 2004. Print.

Ives, Cathy. *Green Eco Services*. Green Eco Services, 2009-2011. Web. <http://www.greenecoservices.com>.

Jackson, Mike. "Building a Culture That Sustains Design." *APT Bulletin* 36.4 (2005): 2-3. Print.

Jacobsen, John W. "From Red Dinosaur to Green Exhibitions." *Exhibitionist* Spring (2009): 6-12. Print.

Koster, Emlyn. "The Relevant Museum: A Reflection on Sustainability." *American Association of Museums*. Web. <http://www.aam-us.org/pubs/mn/MN_MJ06_RelevantMuseum.cfm>.

Krug, Steve. *Don't Make Me Think!: A Common Sense Approach to Web Usability*. Berkeley, Calif: New Riders Pub., 2006. Print.

Kuttner, Peter. "Museums, Natural Leaders in Green Design." *Exhibitionist* Spring (2009): 22-26. Print.

Madge, Pauline. "Ecological Design: A New Critique." *Design Issues* 13.2 (1997): 50-60. Print.

Manu, Alexander. "Chasing Butterflies: Thoughts on the Big Idea of Design, Redefinitions and Responsibilities." *The Humane Village Journal* 2.1 (1995): 23. Print.

Margolin, Victor. "Design for a Sustainable World." *Design Issues* 14.2 (1998): 83-92. Print.

Martin, David. "Sustainability Checklist." *Sustainability Report*. Museums Association, Aug. 2009. Web. <http://www.museumsassociation.org/sustainability/sustainability-report>.

McDonough, William, Michael Braungart, Paul T. Anastas, and Julie B. Zimmerman. "Peer Reviewed: Applying the Principles of Green Engineering to Cradle-to-Cradle Design." *Environmental Science & Technology* 37.23 (2003): 434A-41A. Print.

McNeil, Tim. "Adaptation, Mitigation, Innovation: Greening the Exhibition Experience." *Exhibitionist* Spring (2009): 29-35. Print.

National Charrette Institute, comp. "Sustainability Immersion: Community Change through Sustainable Design Charrettes." *GB2008 Presentation PL08*. Proc. of 2008 Greenbuild International Conference and Expo, Boston. U.S. Green Building Council, 2008. Web. 2011. <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=2156>.

Nielsen, Jakob. *Designing Web Usability*. Indianapolis, IN: New Riders, 2000. Print.

Orselli, Paul. "Nuts and Bolts: Green Design." *Exhibitionist* Spring (2010): 66-69. Print.

"Our Common Future, Chapter 2: Towards Sustainable Development - A/42/427 Annex, Chapter 2 - UN Documents: Gathering a Body of Global Agreements." *A/RES/3/217 A - Universal Declaration of Human Rights - UN Documents Cooperation Circles*. Web. <http://www.un-documents.net/ocf-02.htm>.

Porter, James E., Patricia Sullivan, Stuart Blythe, Jeffrey T. Grabill, and Libby Miles. "Institutional Critique: A Rhetorical Methodology for Change." *College Composition and Communication* 51.4 (2000): 610-42. Print.

"Reclaimed Douglas Fir, Recycled Timber Frame Beams and Salvaged Wood." *Reclaimed Timbers and Beams*. Great Lakes Company. Web. <http://www.reclaimed-timbers.com/reclaimed_douglas_fir.htm>.

Siefert, Chris. Telephone interview. 13 Jan. 2011.

The Story of Stuff. By Annie Leonard. Dir. Louis Fox. Prod. Erica Priggen. Perf. Annie Leonard. Free Range Studios, 2007. *The Story of Stuff Project*. Allegheny College. Web. 2011.

"Sustainability - Definition and More from the Free Merriam-Webster Dictionary." *Merriam-Webster Online*. Web. <http://www.merriam-webster.com/dictionary/sustainability>.

Tanner, Catharine, Ted Silberberg, and Liliana Da Silva. "Museums and the Sustainability Movement." *Lord Cultural Resources* (Fall 2006): 2-3. Print.

Trautmann, Charlie, and Maureen NcConnell. "Green Exhibitions Need Green Museums." *Exhibitionist* Spring (2009): 44-51. Print.

"USGBC: Intro - What LEED Is." *U.S. Green Building Council*. 2011. <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988>.

U.S. Department of Health and Human Services. National Cancer Institute. *Theory at a Glance: A Guide For Health Promotion Practice*. By Karen Glanz and Barbara K. Rimer. 2nd ed. Bethesda, MD: National Cancer Institute, 2005. Print.

Warden, Lea T.F. "Traveling Exhibitions and the Environment." *Exhibitionist* Spring (2010): 52-57. Print.

Werner, Jane. "Case Study Updates: Go Green and Get Real." *Hands to Hands* 20 (Spring 2006): 6-7. Print.

"What Is a Museum?" *American Association of Museums*. American Association of Museums, 2010. Web. <http://www.aam-us.org/aboutmuseums/whatis.cfm>.

Wildhagen, Fredrik. "The Challenge of the Green." *Design Issues* 11.3 (1995): 28-32. Print.

Worts, Douglas. "Fostering a Culture of Sustainability." *Museums & Social Issues* 1.2 Fall (2006): 151-172. Print.

Wylie, Elizabeth and Sarah S. Brophy. "The Greener Good: The Enviro-Active Museum." *American Association of Museums*. <http://www.aam-us.org/pubs/mn/green.cfm>.

Image Credits

California Academy of Sciences, page 27: 2008. Photograph. California Academy of Sciences, San Francisco. *Flickr*. Yahoo, 2010. Web. <http://www.flickr.com/photos/calacademy/2923258844/in/set-72157612913479470>.

First Feats exhibition, page 74: 2010. Photograph. *Design Coalition*. Design Coalition, 1995-2011. Web. <http://www.designcoalition.org/projects/Madison%20Children%27s%20Museum/MCM.htm>.

Reclaimed douglas fir, page 75-77: Photograph. *Fields Center and Community House*. Princeton University, 2011. Web. <http://www.princeton.edu/pr/pictures/a-f/fields_center/20090908_FieldC_231.jpg>.

Carpet samples, page 78: Photograph. *Carpet Options*. Matrix Web Intel, 2000-2010. Web. <http://www.carpetoptions.com.au/html/carpet-tiles-options-nambour.html>.

Photograph. *Carpet Tile and Carpet Cleaning Tips*. Carpet Tile and Carpet Cleaning Tips, 2011. Web. <http://www.carpet-tile.org/category/tile-carpets/>.

Photograph. *Building 9*. Building 9 Corp., 2011. Web. <http://www.building9.biz/carpetsquares.htm>.

Selected Quotes

Page 9: McNeil, Tim. "Adaptation, Mitigation, Innovation: Greening the Exhibition Experience." *Exhibitionist* Spring (2009): 32. Print.

Page 10: Belew, Greg, Kathy Gustafson-Hilton, Sharon Handy, and Lyn Wood. "Splinters from Green Materials: Conversations about the Frictions of Green Exhibition Design." *Exhibitionist* Spring (2010): 59. Print.

Page 19: Kuttner, Peter. "Museums, Natural Leaders in Green Design." *Exhibitionist* Spring (2009): 23. Print.

Page 20: Belew, Gustafson-Hilton, Handy, and Wood, 56.

Page 42: McDonough, William, Michael Braungart, Paul T. Anastas, and Julie B. Zimmerman. "Peer Reviewed: Applying the Principles of Green Engineering to Cradle-to-Cradle Design." *Environmental Science & Technology* 37.23 (2003): 432A. Print.

Page 47: Belew, Gustafson-Hilton, Handy, and Wood, 58.