

Exhibition Critiques

Hall of Human Life Museum of Science, Boston

by *Wilhelmina Crolius, Sara Smith and Greg Sprick, and David Michaud*

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We asked three professionals with varied expertise to write critiques using the following guideline: a critique is your individual viewpoint, shaped by your expertise and experience. Its audience is the profession. It involves your analysis of the exhibition, and your assessment of its strengths and weaknesses from your personal and professional viewpoint, whatever your area of expertise.

The Editor

The Role of User/Experts in Creating a Truly Inclusive Exhibition Environment by **Wilhelmina Crolius**

In 2001, the World Health Organization (WHO) redefined disability. This change occurred for a number of reasons. Through decades of experience with accessibility in developed nations, it was clear that a diagnosis did not predict functional ability. Moreover, in both developed and developing nations, lifespans were increasing as never before. As a result, growing numbers of people were experiencing “disability” at some point in their lives.

Through its revision, the WHO acknowledged functional limitation as a universal human experience. This new perspective viewed environments as disabling or enabling, with disability occurring at the intersection between a person with functional limitation and the environment with which he or she interacts. The WHO further defined “environment” in view of a wide variety of facets that comprise experience today—physical, information, communication, social, and policy.

The Institute for Human Centered Design has found this holistic understanding of environment useful when reviewing exhibitions and organizations that strive toward Universal Design. So when a colleague and I reviewed the *Hall of Human Life* at the Museum of Science in Boston, the varied environments comprising experience were the lens through which we evaluated the exhibition (fig. 1).



Fig 1. View of the entrance to the Hall of Human Life. Photo by Wilhelmina Crolius

As we entered the exhibition, we were given a wristband that allowed us to interact with a series of “Link Stations” scattered throughout the hall (fig. 2). The “Link Stations” have different interactive functions that measure and record particular body dimensions and responses. This data was then used to compare one’s own body with others who have attended the exhibition. Some of the exhibition team’s Universal Design decisions were apparent almost immediately. These included clear and simple graphics, a variety of stools and chairs where visitors could rest or make themselves more comfortable while using the different stations, and simultaneous open-captioning displayed on all video components. I couldn’t help but notice how the exhibition’s smart blend of technology and multisensory experience fully engaged the families and individuals around us.

However, several small details were not ideal. One problem lay with the legibility of certain displayed text. Some panels featured white text on a yellow background (fig. 3); on others, the font was too small to read given a typical visitor reading distance. Another issue involved interactive



Fig 2. A “Link Station.” Using a wristband, visitors can interact with the exhibition. Photo by Wilhelmina Crolius



Fig 3. Here, the use of white text on a light yellow background makes reading difficult for a person with low vision. A higher contrast between the text and the background would have made this more effective. Photo by Wilhelmina Crolius

elements that were somewhat difficult to operate. Attempting to operate it with a closed fist is the standard test employed to assess the usability of objects you manipulate with your hands. If one cannot interact with the controls with a closed fist, it’s likely that both children with small hands and adults with dexterity issues will have a hard time as well. An example of this potential operational difficulty was seen in written materials accompanying a station where one guesses how many stuffed animals are in a clear tube (fig. 4). While the tabs on the pages of the books are a good idea, longer tabs would have allowed visitors greater leverage when flipping up each page.

Finally, there was a problem common to museums that cater to young patrons and their families high noise levels. Excessive noise, or exhibits whose audio elements compete with each other, can be problematic for people on the autism spectrum, people with Attention Deficit Hyperactivity Disorder (ADHD), and people with a variety of mental health

issues. Such noisy environments may also be a problem for the 26.7 million Americans with a clinically significant hearing loss. There are a plethora of acoustical materials on the market that help alleviate some of the volume levels, but I’d also suggest that exhibitors consider wider spaces between stations that include loud audio components and,



Fig 4. While tabs on the pages of the books are a good idea, longer tabs would have given visitors—especially children or those with dexterity issues—greater leverage when flipping up each page. Photo by Wilhelmina Crolius

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where possible, offer volume controls for visitors to use.

Nevertheless, these are minor issues in my overall appraisal of the exhibition. The *Hall of Human Life* was very successful in delivering a consistent interactive and engaging environment for users of diverse age and ability.

My visit to the *Hall of Human Life* made me consider all that goes into creating an exhibition that incorporates principles of Universal Design to accommodate a variety of visitors. At the Institute for Human Centered Design, we have done a great deal of work reviewing museum and exhibition designs through our design research laboratory, the "User/Expert Lab." People at the edge of the ability spectrum who work with our lab provide valuable insights when we analyze when design fails and when it works. These experts have clarified the long list of elements and considerations that go into making a good exhibition. And we've found they hold true in every type of museum and in a wide range of countries.

This brings me to my most important piece of advice for museums and designers looking to create welcoming experiences for all of visitors. The key to inclusive exhibits is to invest time to engage a diverse group of users while the exhibition is being developed. Focus groups won't deliver. Only in-situ engagement and observations—of representative exhibits and prototypes—generate the insights about the details that matter. Individuals with functional limitations help directly explain what facilitates and what impedes the multisensory and interactive experience the exhibition offers through

their bodies and brains. We have seen that solutions that work for people at the edges of the spectrum of ability will work better for everyone.

To improve exhibition design, we have to realize that the old idea of barrier removal/accessibility does not go far enough. Diversity of ability is ordinary and pervasive, and it is not limited to people who use wheelchairs and those who are blind, the familiar focus of standards. We are fortunate to live in a world where people are living longer and surviving more through remarkable advances in science, technology, and medicine. Such survival has increased the number of people with varied abilities. To make design decisions that minimize limitations and truly enhance everyone's experience, design must be directly informed by feedback from this new world of potential visitors. When Universal Design permeates our design decisions, it creates independence and a richer quality of life for everyone. This is what we should be striving for in the design and development of the exhibitions in our museums and cultural facilities. ✨

Using Media to Support Universal Design

by Sara Smith and Greg Sprick

Media and technology are key tools in the delivery of cutting-edge research and visitor engagement in the Museum of Science's new exhibition on human biology, the *Hall of Human Life*. They are also, as we found in recent visits, a creative means to incorporate the principles of Universal Design.



Fig. 1. Each of the five zones is anchored by an introductory panel that features text, a short, looping, ambient media piece that reinforces the topic presented, and audio labels. Photo courtesy of the Museum of Science



Figs. 2. Wristbands provide an individual barcode. Visitors use the code to activate each Link Station activity, collect their data, and access the data after their visit. Photo courtesy of the Museum of Science

Communicating the Big Idea in Multiple Formats

The exhibition has a concise, well-defined takeaway message—“humans are changing in a changing world”—that is communicated clearly for all types of learners, preferences, and abilities. It is expressed at five distinct exhibition zones, each of which addresses a specific changing environment: “Community,” “Physical,” “Food,” “Living,” and “Time.” While the exhibition does not have a central hub—which would seem to make it hard to orient visitors, or to provide any overarching takeaway—each of the five sections individually conveys the message and reinforces the other sections (fig. 1).

Media and technology play a big part in conveying the main message for each of the five zones. Beautiful, ambient videos (with no narration or onscreen text) loop continuously on the introductory walls for each zone (e.g. families and friends interacting in scenes across the world represent the Community environment). Without reading a single panel, a visitor would understand the theme presented. Those with no or limited sight can hear an audio label, accessed by easy-to-use “select” and “next” buttons. Within each zone, a consistent system of media helps visitors understand the topic: animations clearly visualize complex topics (for example, what elevates blood pressure, or

how targeted cancer therapies work), and videos feature individuals who tell stories about personal responses to their environment.

While there are a number of engaging types of media in the exhibition, the most compelling components are the “Link Stations” that appear in three different locations within each zone. The heart of the *Hall of Human Life*, they present data as an interpretive tool and engage visitors by making them part of the data research. To activate the Link Stations, visitors use a special wristband (fig. 2), which they obtain at the entrance to the exhibition. Scanners mounted at each of the Link Stations read a barcode on the band to recognize the individual. With the band, visitors can track how many stations they have completed via an onscreen, graphical checklist. It allows information—such as gender or age—to be shared with other stations. By using the barcode printed on the wristband, visitors can later access their data via the exhibition’s webpage.

Presenting Data in Simple and Intuitive Ways

Each Link Station asks visitors to input simple and anonymous data about themselves. For example, at a station in the Community zone that focuses on the importance of social environments, visitors construct a map of their social networks. They tally how many family

Without reading a single panel, a visitor would understand the theme presented.



Fig. 3. Link Stations are controlled by “next,” “back,” and “select” buttons. After visitors answer a few simple questions about themselves, they find out where they stand in relation to previous museum visitors (via graphs and an on-screen guide). Photo by Sara Smith

Choices are limited, and major content is supported by brief video discussions that play automatically, making the interactive accessible in different ways.

members, friends, coworkers, and other contacts they have communicated with in the previous two weeks, whether in person or by phone, email, or social media. Using the data the visitor enters, the station displays graphs comparing the visitor’s social network with those of the most recent 150 visitors. Given how consistently graphs were used in all Link Stations, using data was clearly a deliberate decision by the development team—and a somewhat courageous one. Greg’s natural aversion to graphs was easily ignored because the graphs were engaging and easy to use: they were personal, changed dynamically to compare age, gender, or other factors, and were supported by brief video explanations delivered by on-screen guides (fig. 3).

Before her visit to the exhibition, Sara thought she was pretty socially connected, but according to the graphs that came up at the end of a social environments Link Station, she saw that she was slightly below average compared to recent visitors. Did the 150 middle-school field trippers visiting the exhibit that morning each have a much wider circle of social media friends, skewing the test in their favor? It was thought provoking. In each case, seeing our Link Station activity results in the context of other visitors’ results got our attention, and made us interested in the accompanying, contemporary research

(in this case, about how one’s social life affects one’s brain).

Other Link Stations engage visitors physically—for example, by measuring how they move down a 20-foot corridor to show calories (or grapes) burned per hour. The underlying message at each of the 15 stations is clear: although we may not perceive it, we are shaped by factors in the world around us, and our bodies are constantly responding to those influences.

Providing Accessible Push-button Interfaces

As with many of the computer stations developed by the Museum of Science over the last several decades, Universal Design appears to have been a strong driver. All of the Link Stations and audio labels rely on identical push-button interfaces for user input. Although the boxes appear somewhat complicated at first glance, the stations can generally be controlled using only two or three large, centrally placed push-buttons (“select” and “next” for the audio labels, with a “back” button added at the Link Stations). The software and the push-button interface work well together, and the approach is consistent and easy to use. Onscreen, the content is presented in a clear and uncluttered way. Choices are limited, and major content is supported by brief video discussions that play automatically, making the interactive accessible in different ways. Visitors, we observed, often stumbled a bit at the first station they approached but quickly mastered the task at hand. After engaging with several of the Link Stations, an unexpected, “regular” touchscreen station that we encountered felt awkward in comparison.



Fig. 4. A visitor accesses the Link Station by scanning a barcode on the wristband.
Photo courtesy of the Museum of Science

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Final Thoughts

If we had any concerns, they were about the wristband, whose primary purpose is to activate the Link Stations. A visitor must twist his or her wrist under a scanner until the barcode is read; depending on the user, this could be a slight impediment to beginning the activity (fig. 4). In addition, we observed that most visitors initially missed the dispensing stations for this key element. A number of individuals approached a Link Station and then had to backtrack to get a wristband, which was somewhat awkward. (The museum is aware of this problem and is implementing a number of mitigation solutions.)

Also, while the wristband was clearly effective, we found ourselves wondering if the personalization system could have been more deeply embedded in the exhibition narrative, and if the wristband could have felt a little more valuable. Could the identification system have been expressed as a personal health journal where visitors get a membership card, or a personal fitness tracker, to collect their information during their visit? We also wanted to have a compelling reason to check back in at the museum's website, beyond seeing our data again.

These were minor concerns, though, and most were not directly related to Universal

Design. Overall, the *Hall of Human Life* uses media and technology effectively, creating an engaging, comprehensible exhibition about a very complex topic—and one that is accessible to all. ✨

Next Question Please

by David Michaud

It's my opinion that good museum exhibitions present relevant information, entertain their visitors, and offer their virtues in ways that make them accessible to broad audiences. Great museum exhibitions should do all that *and* engage their audiences in thoughtful dialogue that leads to more questions. I believe this is especially true for science museums—after all, it's the “next question” that pushes science and exploration forward. For this review of the *Hall of Human Life* at Boston's Museum of Science, I was asked to think about Universal Design from an exhibit designer's perspective. I made an extended visit to the exhibition shortly after it opened, and revisited this summer. After both visits, I found myself with a few lingering questions . . . and I think that's great.

Entry

Universal Design goes by several names, and there are more than a few good definitions floating around in



Fig. 1. Exhibition entry and "Membrane Wall." Photo © Michael Malyszko

Few institutions have documented the relationship between an exhibit element's dimensions and a visitor's ability to access it more than the Museum of Science.

the literature about it. Most talk about accessibility, and I believe that access is a useful filter when evaluating design. To me, access is a very broad topic that involves physical design (dimensions, reach, contrast etc.), appreciating where visitors come from, and paying attention to how the particulars of a solution fit into their environment.

Access to an exhibition as a whole starts before entering the physical space. The Museum of Science (MOS) intentionally created an entry that defines the boundaries of the *Hall of Human Life* (HHL), but also offers a tantalizing peek into the physical space, allowing potential visitors an opportunity to preview the types of experiences inside through cell-like window material that seems inspired by the structure of living tissue.

The hallway outside the gallery (fig. 1) obviously benefits from the light and activity seen through these windowed walls, but does the degree to which they reveal the exhibition add to, or take away from, the anticipation that might have been used to make the transition from circulation space to exhibition hall more exciting?

Dimensions and Structures

Few institutions have documented the relationship between an exhibit element's

dimensions and a visitor's ability to access it more than the Museum of Science. I have long been aware of the museum's pioneering efforts to create exhibit elements that work for visitors of varying sizes and abilities, and have been impressed with their tenacity and consistent application of Universal Design standards in their built environments. The exhibit structures, materials, graphics, and interfaces in HHL have all been informed by the institution's exhibit design guidelines, which have been developed and refined over many years.

A broad range of visitors with varying abilities are ensured access as a result of these guidelines, which offer suggestions and sage advice about many of the choices a designer is faced with when creating an exhibition. But does their consistent application (figs. 2 & 3) to design challenges temper the variety and possible creativeness of design solutions by creating an almost "cookie-cutter" approach to fixture design? As a designer and educator, I was left wondering; would a few "curve balls" that alter the look and feel of the exhibits keep visitors on their toes, and be useful in terms of orchestrating the physical design with variations that are a direct response to interactions and behaviors that are derived from the subject matter? In other words, would the experience be more powerful if something other than the content changes from exhibit to exhibit?

Media and User Interface

I found the museum's application of media in the *Hall of Human Life* quite successful in many ways, especially where physical hardware was incorporated into the exhibit structures. Many of us have



Figs. 2 & 3. Typical exhibit structures. Notice how the overall look and feel of these elements is so similar, except for the actual content. Are there slight variations that could have been made to the physical structures because of the content? Photos by Emily Marsh

become somewhat screen blind, and the sense of magic resulting from something being presented in an unexpected way (figs. 4 & 5) is a great example of a curve ball that keep visitors engaged.

The Human Body Theater's use of multiple layers of semitransparent screens is particularly successful in presenting media in innovative and often surprising ways, both of which help to maintain visitor interest by creating a multidimensional experience that changes throughout the sequence of media presentations. Encouraging visitors to have discussions, even if they are guided by on-screen prompts, is also a wonderful way to use media as a supplemental and surprising element (fig. 6), as in the "Opinion & Discussion" exhibit, which invites visitors to share their own thoughts on various relevant topics and encourages conversation among visitors by seating them face-to-face.

Would it have been possible to integrate more of the screens so that their content also presented itself in unexpected ways? And were there missed opportunities for encouraging discussion between visitors? In the instances when these techniques were applied, they are in my opinion very successful—why not use them more frequently?



Figs. 4 & 5. Monitors hidden within exhibit structures allow the technology to disappear and the presented material to be more seamless. Photos by Emily Marsh



Fig. 6. The Museum of Science has thoughtfully designed this element to promote dialogue between visitors, and it works, as this images shows. Photo by Emily Marsh



Fig. 7. The “Exploration Hub.” Is the solid counter with specialty lighting too much of a physical barrier? Would a less impermeable solution send a different message about the division between visitor and staff? Photo by Emily Marsh

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Facilitation and Visitor Interaction

Another long-standing tradition at MOS is the use of facilitated experiences within exhibitions. I am a fan of the discovery box model for in-depth exploration, and fully appreciate the ways in which a trained facilitator can scaffold a visitor’s experience—leading to deeper, richer learning experiences. The “Exploration Hub” in HHL (fig. 7), a diner-style counter for demonstrations, discovery boxes, and guided exploration, offers variety, personalization, and differentiated experiences that simply aren’t possible in an unfacilitated exhibit.

But is the “expert-behind-a-bar” setup the best approach? There are obvious operational benefits to this arrangement, which shouldn’t be overlooked. Might there be, though, a more inclusive physical

design that would act less like a barrier, and serve visitors in ways that are even more meaningful?

Conclusion

The Hall of Human Life at Boston’s Museum of Science meets *my* criteria for a great exhibition. During both of my visits, I witnessed visitors who were engaged, entertained, and asking questions. Through the application of lessons learned over many years, the MOS design and development team has created an accessible set of experiences that goes a long way in terms of meeting their visitors’ needs. Nevertheless, like any great exhibition, it leaves us with questions, not only about its content, but also about the best way to present it. That, I suggest, is part of what makes it great. ✨