Impact Planning, Evaluation & Audience Research

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Front-end Evaluation: Select Conservatory Rooms

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INTRODUCTION

The United States Botanic Garden (USBG) contracted Randi Korn & Associates, Inc. (RK&A) to explore visitors' interest in and understanding of the design and interpretation presented in four conservatory rooms—*Rare and Endangered Species, Plant Adaptations, Medicinal Plants*, and *Garden Primeval*. Twenty in-depth interviews were conducted in each room for a total of 80 interviews. After submitting a draft of findings, RK&A facilitated a Using Evaluation Results workshop; participants included USBG staff and Matt Kirchman, the Garden's consultant for interpretive planning. Matt's participation was purposeful: our work will inform his upcoming deliverable to the Garden and his deliverable will inform how we design Part II of the evaluation. The following summary and discussion is based on the conversation that took place during the workshop. We encourage readers to refer to the body of the report for detailed findings of each room.

The findings presented here are among the most salient. Please read the body of the report for a more comprehensive presentation of findings.

TRENDS IN VISITORS' EXPERIENCES

Visitors' collective experiences in the four rooms provide insight about how people see and respond to plants and installations in the USBG. While the rooms afforded visitors' different experiences depending on which room they were in, a few trends are worth noting. These trends, though presented separately, are not mutually exclusive and become connected through this presentation.

Visitors' first impressions are about the aesthetic elements of the rooms, including a room's sensory qualities.

In *Rare and Endangered Species* and *Plant Adaptations*, visitors notice that the spaces are small and between larger, seemingly more significant spaces, so they feel that the rooms are transitions from one area to another or "hallways." After sharing those initial impressions, visitors commented on what they see or do not see (such as the absence of color) or the atmosphere ("chilly" or "cozy"). The sensory, odoriferous experience of *Medical Plants* is instantaneous to visitors and so is the atmospheric experience of *Garden Primeval*. People are quick to know what they encounter through their senses and the Garden might think of ways to benefit from visitors' ability to take in and react to atmospheric and sensory conditions.

Visitors' experiences in *Rare and Endangered Species* and *Plant Adaptations* also remind us that visitors are adept at recognizing when a space is not adequate for what it is attempting to display; in fact, when we reported that visitors saw *Rare and Endangered Species* as a hallway, staff noted "that's because it *is* a hallway." During the meeting there was discussion about using small spaces in ways that are completely different from how large spaces are used. For example, small spaces can be used to support the interpretive function of the Garden by explicitly presenting themes that

appear throughout the Garden to help visitors recognize those themes in other display areas. RK&A noted that presenting visitors with an "advanced organizer"¹ is a useful strategy for introducing people to broad themes—a strategy that staff said they apply to tours. Using these smaller spaces for broad interpretation, in some ways, addresses the problem of conveying relevant information about how plants connect to people without overpopulating the Garden's rooms with signs, which would undermine the overall aesthetic quality of the spaces.

An individual's existing personal experiences with plants, though subjective and varied, determine how visitors will connect to plants and experience the USBG.

Visitors respond positively to colorful flowering plants, interesting-looking plants that they have never seen before, and plants they recognize. This trend is broad and inclusive and depending on the viewer, almost any plant has the chance of being familiar, unfamiliar, and/or interesting looking to someone. Not all plants are flowering plants and those that are flowering may not bloom year round. Visitors' immediate responses to the plants on display represent only part of their visitor experience—the top-of-mind, visceral response. Conveying content, as we will discuss next, is dependent on people reading the text that is presented. That aside, and given that the Garden is in the midst of reinventing its interpretive approach, an interpretive strategy can use all of the above characteristics—being familiar or unfamiliar, blooming or not blooming, and being unique—to bring visitors to a new understanding about a particular plant or grouping of plants. Interpretation, coupled with carefully selected graphics, help visitors see a familiar plant in a different way; it can help visitors imagine color when there is none; and it can explain why a plant's interesting look is vital to how it functions. Interpretation can connect visitors to familiar, unfamiliar, and colorless plants, as well as to the extraordinary qualities of plants so they can see plants anew, regardless of their initial impression.

Surprising and new information about plants can contribute to the visitor experience but gaining new information requires reading!

Presenting the right text—text that resonates with visitors and contributes to a meaningful experience—is often challenging. Presenting too much text may work against visitors' retention of content, and presenting the wrong text may reduce the time people spend reading. Finally, as we have learned from this study, the type of sign on which text appears also makes a difference in whether someone is inclined to read. There are two primary parts to interpretation—the "what" (referring to content) and the "how" (referring to delivery of content). Regarding the "what," visitors seem to be interested in basic plant information-its name, where is it from, why it is important, and how it is used. Important to staff is conveying the connection between plants and people-the essence of the impact statement. Inherent in the "why" and the "how" questions are visitors' curiosities about their connection to plants. However, in the audience research study², we found that, among three statements related to the impact statement, the lowest-rated statement was "My experience today helped me see how plants and people are connected." Visitors' questions and curiosities about plants suggest that they are interested in the plant/people connection, but the audience research suggests that this idea is not yet explicit enough in the Garden's interpretation. Moving from conveying basic plant identification information to valuing the connection between plants and people is a tall yet worthy pursuit that can be enhanced through the Garden's interpretation.

¹ Ausubel, D. P. (1968). Educational psychology: A cognitive view. New York: Holt, Rinehart, & Winston.

² Randi Korn & Associates, Inc. (2013). Audience Research: Whole Garden and West Gallery Experiences. Unpublished manuscript, United States Botanic Garden, Washington, D.C.

During our meeting we discussed two related options for content testing: moving visitors from "bloom to big idea" and balancing "aesthetics and information." Blooms (when they exist) already attract visitors' attention and even in the absence of blooms, graphic images of blooms can be presented to draw people into the content. These two related options for content testing are also strongly aligned with the Garden's previous impact-planning work, which reflects staff members' aspirations. In the audience research study, the highest-rated statement related to impact was "My experience today helped me appreciate how many different kinds of plants there are in the world," and visitors also rated "Seeing plants that I have never seen before" as very important to them. These results reinforce the importance of the aesthetic place from which visitors are beginning. Best-practice thinking about interpretation often includes starting where visitors are. Given that we know people start with how a plant looks (e.g., whether it has color, whether it is familiar, or whether it is unique), the challenge becomes how to move visitors beyond the visual experience, or how to create meaning from the visual experience. As noted above, visitors seek basic plant information, and while they may not visit the Garden expecting to learn about the medicinal qualities of plants, for example, they become excited when they are exposed to new information about plants.

The third option for content testing is about the varying identities of the USBG. For example, there is national identity, botanical/horticultural identity, conservation and biodiversity identity, and the leisure and relaxation identity, to name a few. While the previous visitor research did not explore the different perceptions people may have about the Garden, it is likely that one or more of the above fit with at least one of the ways visitors may see and experience the USBG.

Regarding the "how" or the delivery of content, the "ephemeral" signs that the Garden displays are eye-catching and more noticeable and appealing to visitors than signs that look mass-produced. It could be that visitors perceive blackboard signs as having more up-to-date information because people's experience with blackboards is that the information on them is temporary and eventually erased and updated. What matters is that visitors are reading the text on the blackboards.

If the ephemeral quality of a delivery system is an important consideration, are there other temporary-feeling products that could be introduced into the delivery system that we could test in Part II of the evaluation? Since aesthetics are important to visitors, high-quality design will need to be balanced with any interpretive devices' ephemeral feel.

The United States Botanic Garden (USBG) contracted Randi Korn & Associates, Inc. (RK&A) to explore visitors' interest in and understanding of the design and interpretation presented in four conservatory rooms—Rare and Endangered Species, Plant Adaptations, Medicinal Plants, and Garden Primeval.

The objectives of this evaluation are to explore:

- Visitors' understanding of the big idea or purpose of each room (*Medicinal Plants, Plant Adaptations, Garden Primeval,* and *Rare and Endangered*) and the elements that communicate these ideas or purposes;
- The feeling and/or understanding that visitors walk away with after experiencing each room and which elements contribute to that feeling and/or understanding;
- Which elements of each room visitors find most and least compelling (plants, interpretive materials, etc.) and why;
- To what extent visitors have a personal connection to what they experience in each room;
- Visitors' engagement with and understanding of the signage and interpretation in each room (ephemeral signs, permanent interpretive signs, plant labels, name of the room, etc.);
- Barriers to visitors' engagement in each room (physical or otherwise); and
- Visitors' natural curiosities and questions about the plants and interpretation in each room (i.e., what do they still want to know after experiencing the room?).

METHODOLOGY

Front-end studies typically employ methods that produce qualitative data, as the goal is to conduct an indepth exploration of visitors in the context of exhibit content and ideas. For this study, RK&A utilized in-depth interviews to explore visitors' interest in and understanding of the exhibit design and interpretation in four conservatory rooms, including *Rare and Endangered Species*, *Plant Adaptations*, *Medicinal Plants*, and *Garden Primeval*. In-depth interviews encourage and motivate interviewees to describe their experiences, express their opinions and thoughts, and share with the interviewer the meaning they construct about ideas, concepts, and experiences. Hence, they are useful for understanding ideas and concepts from the visitors' point of view and produce data rich in information. Interviews were paired with observations to provide data collectors with information about where visitors stopped so interviewers could probe more deeply about those elements. Interviews were audiorecorded with interviewees' permission and transcribed to facilitate analysis.

Interviewees were intercepted using a continuous random sampling method, such that the interviewer approached the first eligible visitor to cross an imaginary line near the entrance to the Garden. Eligible visitors included English-speaking adults (18 years and older) visiting alone or in social groups. If a visitor declined to participate in the interview, RK&A logged the visitor's gender, estimated age, and reason for declining. If the visitor was eligible and agreed to the interview, the interviewer asked the group to walk through one of the four conservatory rooms while the data collector observed them. Following their walk through, visitors then participated in an interview about their experience (see Appendix A for the interview guide). Once the interview was completed, interviewees completed a demographic questionnaire (see Appendix B).

DATA ANALYSIS AND REPORTING METHOD

In-depth interviews produce descriptive data that are analyzed qualitatively. This means that the evaluator studies the transcriptions for meaningful patterns and, as patterns and trends emerge, organizes similar ideas and responses together. Trends are in thematic sections, and within each section, findings are reported in descending order starting with the most-frequently occurring. Findings are reported in narrative, and verbatim quotations (edited for clarity) are included to illustrate interviewees' thoughts and ideas as fully as possible. Within the quotations, the interviewer's questions appear in parentheses and an asterisk (*) signifies the start of a different speaker's comments.

INTRODUCTION

RK&A conducted 80 in-depth visitor interviews—20 interviews in four conservatory rooms, including Rare and Endangered Species, Plant Adaptations, Medicinal Plants, and Garden Primeval. Findings are presented in sections by the individual room.

DESCRIPTION OF INTERVIEWEES

About two-thirds of interviewees are female, visiting with one other adult (the majority of whom are also female), and first-time visitors to the Garden. Interviewees range in age from 19 to 85 years, with a median age of 52 years. Companions' median age is 48 years. Most interviewees identified as Caucasian/White.

VISIT MOTIVATION

All interviewees were asked why they decided to visit the Garden that day. More than one-third of interviewees said that they were visiting because they liked plants, wanted to see plants, or identified as a gardener (see the first two quotations below). Less than one-quarter came to bring family or had someone recommend the Garden to them. Less than one-quarter said the Garden was one stop of a larger tour of the Mall or Capitol area or said they were walking by and decided to visit (see the third quotation). Less than one-fifth came to see the *Orchid Symphony* exhibit. A few gave miscellaneous reasons, such as coming to the Garden to relax or use the restroom.

It's the first thing I do when I arrive in Washington. And I would come many times just because of the plants and the beauty of them. Where else are you going to go to find all these different – the variety [of plants], especially when we have snow and cold in other places? [female 70]

I love plants. I grew up in Montana and we had our own garden, and everything was pretty natural. A lot of these exotic plants are very fascinating to me. I've had a chance to go to a lot of botanic gardens around the country and [I am] always fascinated with what is growing and the different variations of flowers. [female 68]

It was on the way to the Capitol and we thought that [the botanic garden] would be a nice thing to see. [female 70]

RARE AND ENDANGERED SPECIES

INITIAL IMPRESSIONS

When asked their initial impressions or feelings about *Rare and Endangered Species*, interviewees' responses varied widely but many (three-quarters) noticed something about the atmosphere or design of the space. For instance, one-quarter said the space felt small, almost like a hallway transitioning to another space in the Garden (see the first quotation below); a few of these interviewees said there probably are not many rare and endangered plants so it makes sense that the space is small. Another one-quarter said they noticed a lack of color or flowers. Another one-quarter described the space as quiet (few people),

serene, and chilly/dry. The remaining one-quarter described the intent of the room—displaying rare and endangered plants—as fascinating (see the second quotation).

It's like a pathway, like people just move through here.... I liked that they used [the] pathway instead of just getting from one place to another. I think they made good use of the space. (What about this space gave you that particular feeling?) Well, the fact that they have a lot of potted things makes me think that, normally, there's probably nothing there. [female 41]

The whole [Garden] is [aesthetically] amazing and that's my first impression. I didn't realize that these were all endangered species. I was reading all the tags, and I thought that was really interesting to learn about endangered species that are from all over the world and then the different reasons that they [are] endangered. [male 36]

NAME RECOGNITION

When asked whether they noticed the name of the room, about two-thirds of interviewees did not, and one-quarter mistook the name of the room for *Southern Exposure*. The remaining few interviewees noticed the name and said it set the expectation of seeing rare, one-of-a-kind plants.

MOST INTERESTING ASPECTS

When asked what part of *Rare and Endangered Species* they found most interesting, about two-thirds of interviewees said they enjoyed learning something new or surprising about the plants on display (specifically the rare and endangered status of the Wollemi Pine and Cabbage on a Stick) (see the first quotation below). About one-half also said they enjoyed aesthetic qualities of the cacti, describing them as interesting looking (see the second quotation). A few interviewees said they gravitated toward something that they had a personal connection to, such as plants that grow where they live.

The most interesting thing [was] the extinct Cabbage on a Stick. (Why is that?) Just because there's only one left in the wild, and we were commenting, if that's the only one left in the wild in Hawaii, what are they doing for that plant to protect it in Hawaii? [female 58]

Probably the cactus over there. (And what about that was so interesting to you?) It was so tall and unique. (The cactus in the corner?) This tall one there. [female 49]

LEAST INTERESTING OR CHALLENGING ASPECTS

When asked what they found least interesting or challenging, about one-half of interviewees described aspects of the physical space they found challenging, such as hard-to-read signs and the smallness of the space (i.e., visitors easily block things) (see the first quotation below). One-half said the areas without signage to explain why they should care about the plants on display were less interesting (e.g., the area between *Plant Exploration* and the *West Gallery*, Key West) (see the second quotation). One-quarter also named an aspect of the room they found less aesthetically pleasing, such as a lack of colorful plants or signs. Another almost one-quarter said they were not as interested in the plants that resembled those they see every day.

For me, it was the beginning, when I first walked in, the cacti down at the bottom. The labels on them are really small, and you couldn't really see what they said, [and] they are really down low to the ground. *Yes, because it was low, I agree with that. [female 42; female 47]

I think what's interesting is to have the large boards that are on the walls and attached to plants that give you [a reason] why I should care about this, why should I be interested in this. When I look over in this corner (Between the *West Gallery* and *Plant Exploration*?) Yes.... I see

plants, and they all have their scientific names, and I can say based on the context that there's some kind of reason all these plants are grouped here because they do well in this ecosystem and climate, but I don't know why I should be interested in them. What's their story? [male 59]

UNDERSTANDING OF INTERPRETATION

The most-frequently looked at signs were Cabbage on a Stick (two-thirds), Trade Barriers (two-thirds), and Wollemi Pine (one-half). When asked what they took away from reading the signs, about two-thirds of interviewees recalled specific information, such as the endangered status of plants like the Cabbage on a Stick and the Wollemi Pine (see the first quotation below). About one-quarter recalled more general information, such as where a plant is from or what it is called. About one-quarter also had suggestions for improving the signs, such as simplifying the language or highlighting why a particular plant is important (see the second quotation). A few interviewees did not look at the signs or could not articulate what they took away.

Well that one [Cabbage on a Stick] was just kind of shocking and disheartening that that's like the last one. It's pretty impactful. Actually, maybe something more could be done with that exhibit since that's pretty powerful, right? This [plant] is like the last one. [female 36]

So many of the names are in Latin, and I don't know what the common name is for them. . . . I think usually there's a common name after the Latin name, and maybe they don't all have a common name, but I look at the Latin name and go, 'Oh, okay, I can't pronounce that.' [female 58]

OVERALL PURPOSE OR INTENT

When asked the overall purpose or intent of the room, about two-thirds of interviewees said the room intends to display rare and engendered plants. The majority of these interviewees added that the room was meant to raise awareness of rare and endangered plants and illegal trade and transport of these plants (see the quotation below). The remaining minority did not elaborate on a conservation theme or message. These interviewees said they gleaned this purpose from reading the signs (and the Cabbage on a Stick sign in particular). The remaining one-third (most of whom skimmed/did not read signs) said the room is a transitional space (i.e., walkway) that displays a variety of plants (some specifically mentioned desert plants).

[The purpose is] to make people aware of endangered species. (And was there a specific sign or plant that makes you say that?) The cabbage tree [Cabbage on a Stick]; they said there was only one left in the world. [female 59]

PRIOR KNOWLEDGE OR PERSONAL EXPERIENCE

When asked whether they experienced anything that related to their prior knowledge or personal experience, about three-quarters of interviewees named something. About one-half said they recognized a plant as similar to one they had seen before where they live (e.g., cactus, pine, moss) (see the first quotation below). About one-quarter said the room or a particular plant (such as the Cabbage on a Stick) reminded them of other conservation-related experiences (see the second quotation). The remaining one-quarter said nothing related to their prior knowledge or personal experience.

Prior knowledge might be [that] I said to my daughter about the little round [cacti], I guess they're called bell cactuses, that where we live, we see them as about two inches in diameter so it's fun to see them in a habitat that allows them to grow and be much larger and stuff. [female 58]

Well, I thought that the [Cabbage on a Stick] sign, about how it lost its pollinator, I was watching this show about Yellowstone and how when they introduced the wolves, just the [impact] on the streams and all of the wild creatures, so with the increase of, I can't remember what it was, it ate the pollinators, and so now there [are] no more. It tied the two together. [female 58]

QUESTIONS OR CURIOSITIES

When asked whether they had any questions or curiosities after experiencing *Rare and Endangered Species*, about one-half of interviewees did. The majority had questions about the signs they read, such as wanting to know more about the status or conservation of the rare and endangered plants on display (e.g., Is anything being done to repopulate the plants?) (see the quotation below). Questions and curiosities from the remaining minority were idiosyncratic, such as whether any of the plants bloom or the proportion of evergreen to deciduous plants on display. The remaining one-half of interviewees said they had no questions or curiosities or that their questions or curiosities had been answered by reading the signs.

I think one big question that was only touched on a little bit in one of the exhibits is what is being done to replenish these species, and I think it might be interesting to see something that tells you about or shows you some project where they're reforesting these type of pine trees or something like that. [male 36]

SUGGESTIONS FOR IMPROVEMENT

When asked what might compel them to spend more time in *Rare and Endangered Species*, interviewees' responses varied widely. One-quarter said additional context about the plants, such as why a particular plant is important or about the conservation efforts underway, would compel them to stay longer. One-quarter said having colorful plants would compel them to stay longer, and another one-quarter said a larger room or benches would compel them to stay longer. One-quarter of interviewees said they felt they had spent enough time or that nothing would compel them to spend more time.

PLANT ADAPTATIONS

INITIAL IMPRESSIONS

When asked for their initial impressions of *Plant Adaptations*, more than one-third of interviewees described *Plant Adaptations* as a transitional space such as a hallway. Most of these interviewees pointed to the linear layout, small area for plants, and inconsistent signage and story as some of the reasons for this feeling (see the first two quotations below). More than one-third commented on the atmosphere or environment, describing the space as lush or tropical (citing the warmth, greenery and misting [see the third quotation]) or as "cozy" and "inviting." The remaining responses were idiosyncratic including impressions, such as the space is "interesting" or "kid-friendly."

It sort of seems like a transitional space, like it's just a pass through. I don't know that I would have even thought it was a destination. (And can you give me an example of what makes it feel like a pass through to you?) I guess because it's so linear. *The configuration. It's just a passageway from a more important place over there. [female 59; male 32]

My initial impressions [are] this is just a quick passage for me to get to the next display. (And how did you come to that feeling?) Because stuff here looks a bit transient. It's not as well established. And the pots, the area for the plants, aren't as big, so it looks like you can't have anything big on display here. [male 27]

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(What feeling did you get from the overall space?) Tropical. (And what about the space gave you the impression or feeling of a tropical space?) Just the plants and the misting, like the sort of humidity from the misting. [female 55]

NAME RECOGNITION

Many interviewees did not notice the *Plant Adaptations* sign above the door in the Garden Court prior to entering the room. Several of these interviewees talked about seeing the *Children's Garden* sign instead (see the first quotation below). The few interviewees who did remember the *Plant Adaptations* sign talked about their expectations for what they would experience. One said the name was misleading (see the second quotation); one said they expected fungus and found the prospect unappealing; and one said the room would be about how plants adapt to weather and climate.

I didn't [notice the sign before entering]. In fact, I got thrown off because I saw *Children's Garden* and I thought *Children's Garden* until I saw the arrows, so I was a little confused by that. [female 59]

I felt [the name] was a little misleading because, based on the sign over there (the *Plant Adaptations* sign), this room is about plants that have symbiotic relationships with other plants or fungi. I don't know the science behind botany, but it doesn't seem to go with plant adaptations to me.... I understand the theory [of plant adaptation], but it's hard to know, with each plant, what different adaptations do. [female 29]

MOST INTERESTING ASPECTS

When asked what they found most interesting or engaging, most interviewees discussed something they found aesthetically pleasing. Several of these interviewees discussed the bed near *Garden Primeval* and the *East Gallery*. The majority spoke of this bed generally, mentioning the different layers of plants and that the bed evoked a habitat (see the first quotation below). The minority specifically mentioned the tree in this bed that produces large orange blooms, saying they liked the color and wondering what kind of tree it is. A few enjoyed the orchids because of the color or their connection to the special exhibition in the *Garden Court*. A few also liked the large bed to the left when entering the room from the *Garden Court*, citing specific plants such as those in the terrarium or the pineapple plant. The remaining interviewees liked plants that had an interesting adaptation. A few said the pitcher plant was most interesting, either because they are familiar with the plant or because it is unique (see the second quotation). Two liked the *Plant Adaptation's* signage about the nitrogen process. One each liked the powder puff plant and the sensitive plant for their unique adaptations.

I suppose this end [near *Garden Primeval* is most interesting] where it's [denser] planting and [you] get a sense of the habitat or something.... It looks more natural, like the way it would be if you were just walking through a forest, which makes it feel a little more interesting. [female 62]

The pitcher plant [was most interesting]. (And why is that?) We heard about it in high school; we saw a picture. We have never seen the real thing. I've seen it before, but smaller. This one is bigger than the one I've seen. [male 31]

LEAST INTERESTING OR CHALLENGING ASPECTS

One-half of interviewees said nothing was least interesting or challenging. Those who identified less interesting aspects discussed aesthetic features: two talked about the south wall between the *Children's Garden* and *Garden Primeval* because it seemed like something that could be easily recreated (see the quotation below). Two talked about the opposite wall where the bench is located because the wall is

blank. Other interviewees' responses were idiosyncratic, mentioning, for example, the choppy arrangement, the terrarium bed, and the "weedier plants."

This area, on the south wall that's between the exterior door and the door leading to the fern area, [was less interesting]. Also, the north wall right across the way, there should be a tree right here where this fern is or something climbing up the wall. That's a lot of blank space. (So the blank space here and right here are the two least engaging, and why is that?) One, because it's blank and there's nothing going on, and the other because I could do that in my room. [male 27]

Several interviewees said nothing was challenging about the space and there were no barriers to exploring the room. Those who identified challenges or barriers mostly commented on the interpretation. Several said there was not enough plant identification signage (see the first quotation below). A few said the space did not have an overriding theme. Two talked about the fact that the space could get crowded, making it difficult to stop and look (see the second quotation). One mentioned that some of the signs were not visible and therefore difficult to read (see the third quotation).

I thought I'd like to see just a little bit more information on the certain plants, instead of just the name and where they're from. [female 29]

I think it is narrow. It was a little bit difficult to navigate with people walking by, and I bumped into a couple of people. I think there were some people who were just passing through and so if you stopped to look at something it was a little bit of a pinch point. [female 59]

Sometimes the signs were buried, and so I couldn't really see them without moving the plants around, and I hate to touch the plants because who knows? There are some strange plants in the world. [female 29]

UNDERSTANDING OF INTERPRETATION

The most-frequently looked at signs were Plant Adaptations (two-thirds), Orchids in the Air (one-half), and Orchids Underfoot (one-half). When asked what, if anything, they learned or took away from the signs, most interviewees talked about plant adaptations. Several interviewees talked about learning something about how orchids adapt. The majority learned that orchids can grow in the air and have symbiotic relationships with different species of trees (see the quotations below). The minority shared idiosyncratic facts about orchids, such as the fact that orchids have spongy roots or that ants can live in the pods of orchids; these interviewees did not acknowledge that these were adaptations.

[I learned] that orchids can take nutrients from the humid air; they don't need dirt. [female 55]

I didn't know orchids could live in the air or grow in the air, so that's cool to know that their roots can be above ground. [female 36]

A few interviewees talked about the symbiotic relationship between plants in a general way, often citing the Plant Adaptations sign as providing this information (see the quotation below). A few visitors talked about the nitrogen cycle, also highlighted on the Plant Adaptations sign.

I think they were talking a little about symbiotic relationships and that was sort of interesting, so I was thinking a little bit about that and how we adapt. [female 59]

A few recalled isolated facts about the plants such as the names and growing locations of plants, referencing the plant ID signs. The remaining few interviewees did not read any signs as they explored the *Plant Adaptations* space.

OVERALL PURPOSE OR INTENT

When asked the overall purpose or intent of the room, several interviewees said the room highlighted a specific plant or region, such as bromeliads, orchids, or South American plants (see the first quotation below) citing either the orchid signs or plant ID signs. Several said that the purpose of the space was to display plants, serving as a hallway or a "warm up" space to other rooms in the Garden. A few said the purpose of the room was to teach about plant adaptations or the symbiotic relationship that exists between plants, citing signs they read (see the second quotation). Two interviewees said the space was designed to get children interested in gardening and nature, citing the *Children's Garden* sign as evidence of this. A few said the overall purpose or intent of the room was unclear.

[The purpose of the room is] to emphasize bromeliads growing in different parts of the world. [female 55]

Well, now I know it's about adaptations, about how orchids can grow in different environments. [female 68]

PRIOR KNOWLEDGE OR PERSONAL EXPERIENCE

When asked what, if anything, they saw or read related to their prior knowledge or personal experience, many interviewees talked about familiar plants, including orchids, bromeliads, and the Sensitive plant (see the first quotation below). A few said nothing in the space related to their prior knowledge or personal experience. Two said they were familiar with the nitrogen cycle or symbiotic relationships between species (see the second quotation).

I have orchids in my front hallway, and [I recognize] Phalaenopsis, the cycad there, because it's in the news because they're old and stolen. I have bromeliads, [although I have] not had them blossom quite as nice as that. [female 52]

As I said before, you hear [in] high school science that you have to rotate plants. I grew up in Vermont, so that's something that people there would be aware of. *The part that they adapt or work well with other sort[s] [of plants]. [female 55; male 54]

QUESTIONS OR CURIOSITIES

Many interviewees had questions or curiosities as they walked through the *Plant Adaptations* room. Most of these interviewees wanted more information about specific plants in the space. The majority wanted to know more about the pitcher plant or the tree with orange blooms in the bed near the entrance to *Garden Primeval* (see the first two quotations below). The minority wanted to know more about the powder puff plant, the hanging orchids, the Sensitive plant, and the spiked tree in the bed near the entrance to *Garden Primeval*. The remaining interviewees had idiosyncratic questions or curiosities, such as how often the displays are changed or how to grow certain plants.

I think there could be more explanation, more text to read about, what it is that we could learn from this. I don't know much about plants; if there was a bit more to learn that was written and easily accessible, I would have taken more out of the visit. Maybe even like, are any of these plants used in the native environment? Are the plants used for something? Do they generate food? That kind of thing would be interesting. [male 64]

I wished there was more information about plants, especially that one [the pitcher plant]. Is it an insect-eating plant or how does it work? Stuff like that would be nice to know more. [male 31]

SUGGESTIONS FOR IMPROVEMENT

Interviewees identified several things that might compel them to spend more time in the *Plant Adaptations* room. One-half of interviewees said the design of the space and the content within the space lacks cohesion. Of these interviewees, a few talked about wanting a space with a focal point to encourage directed and closer looking (see the first quotation below). A few said they would spend more time if there was more information to read about the plants or a more clearly articulated theme (see the second quotation). The other one-half of interviewees talked about aesthetic aspects that would compel them to spend more time. A few suggested more color or more flowers in the space. A few said the bench encouraged them to spend more time just sitting in the space (see the third quotation).

It doesn't feel as much like a room, and I feel like you could use something to draw [the eye]. It doesn't have a focal point. I don't know if any of them do, but I just wasn't drawn to anything. [female 19]

I think [what would compel me to spend more time in the space] would be just more signs and a bit more information about [the plants and] what is the message also that is intended with this particular space. [male 64]

I could spend forever sitting in here anyway, breathing. This is why I love the botanic gardens, to breathe and sit down. [female 63]

MEDICINAL PLANTS

INITIAL IMPRESSIONS

When asked about their initial impressions of *Medicinal Plants*, three-quarters of interviewees said they immediately noticed the smell of spices or herbs. The majority said these smells remind them of cooking; the minority said these smells remind them of medicinal plants or remedies (see the first two quotations below). One-third also noticed the way plants are displayed. Some of these interviewees praised the presentation of plants as beautiful and organized, while others said the presentation is challenging to enjoy (e.g., most plants are not at eye level). A few also said they knew it was a room about medicinal plants because of the photographs and signs.

Spices. You get that scent right away. *Yeah, herbs for me. [I] recognize them. (Any feeling that came over you?) Comfort. *We know herbs very well. We cook a lot. So it's recognizing something like that. [female 37; male 46]

It was quickly apparent that it was herbs and things to eat, so I think that was the first impression that somebody had gone to a lot of trouble to pull together a lot of different kinds of edible plants. [female 83]

NAME RECOGNITION

When asked whether they noticed the name of the room, two-thirds of interviewees said they did not. The remaining one-third did notice the name of the room and expected to see information about how plants are used in medicine.

MOST INTERESTING ASPECTS

When asked what they found most interesting about *Medicinal Plants*, two-thirds of interviewees said they enjoy learning about the medicinal uses of unusual or familiar plants, such as periwinkles, Aloe Vera, and papaya (and several specifically mentioned the chalkboard signs and photographs, noting that they provide helpful information and connections) (see the first quotation below). One-third said they enjoy seeing what familiar spices or herbs look like in plant form (and seeing some of these plants with fruit growing) (see the second quotation). One-quarter also said they like the sensory aspects of the room—being able to smell and gently touch some of the plants.

I thought that [the periwinkles] were interesting. I used to have a lot of those in my yard, before we moved into a condo, and I didn't realize that some of [those were] used for [treatment of] types of cancer. I thought that was interesting. [female 54]

Definitely the spices. (Why was that so interesting to you?) We cook a lot, like he was saying, so it was kind of interesting—my family cooks with curry—to see what it actually looks like. I usually see it as a powder form.... So I'm like, 'that's what it actually looks like,' and realizing that someone had to, at some point, decide to pick it, grind it up, and make it this household seasoning. [female 28]

LEAST INTERESTING OR CHALLENGING ASPECTS

When asked what they found least interesting or challenging about *Medicinal Plants*, one-half of interviewees said there are plants they could not identify or signs they could not match to plants. These interviewees said they are interested in knowing the medicinal use of plants in the display or having plants identified by particular signs (especially the chalkboard signs) (see the quotations below). The remaining responses varied widely. A few said the crowds or warmth of the room were somewhat uncomfortable, a few named plants they found aesthetically unappealing, and a few responses were idiosyncratic, such as they do not like to read signs. Two said they were not interested in plants they had seen before, and two said nothing was uninteresting or challenging.

It wasn't always clear which of the signs went with which of the plants. So unless you knew which plants you were looking at.... In particular, the signs that were the chalkboard kind of signs with the green background often did not appear to be directed to any particular plant or object in the room. [female 63]

I guess I wish I had more ways to, like if there was a little pamphlet on ways to use these things. I mean besides the signage, it just seems that there's more herbs in here that could be used for numerous things. Just kind of more education to what they would be used for. [female 39]

UNDERSTANDING OF INTERPRETATION

The most-frequently looked at signs were Food as Medicine (three-quarters), Devil's Cotton (one-half), and Castor Bean (one-half). When asked what they took away from reading the signs, two-thirds of interviewees said they learned the medicinal use of a plant on display giving such examples as periwinkle's use in cancer treatment and castor oil's use in stomach remedies, etc. (see the first quotation below). One-quarter discussed learning something unrelated to medicine, such as plants' use in everyday life or what certain herbs or spices look like in plant form, etc. (see the second quotation). A few interviewees did not read the signs or could not articulate what they had learned, and two interviewees talked generally of learning the importance of plants in medicine but did not give examples.

Yeah, I didn't know orchids had medicinal value, other than vanilla. That's the only one. And it was the root, which was interesting, not the flower or the fruit. [female 37]

I'd never seen curry plants. I've heard about them. I've looked for them in the food market, and here they were. [female 83]

OVERALL PURPOSE OR INTENT

When asked to describe the overall purpose or intent of *Medicinal Plants*, two-thirds of interviewees said the purpose is to communicate the many medicinal uses of everyday plants (see the first quotation below). Several of these interviewees elaborated on the importance of conserving plants since humans have yet to discover their many uses. One-quarter said the purpose is to communicate the everyday use of plants, including their use in cooking and medicine (see the second quotation). Two interviewees said the purpose of the room is educational but did not elaborate further.

That there always has been and will be much more than we know about nature and what it can give us and why it's important to save. Because we may lose some plants, and there goes something that could help mankind cure God knows what because we haven't even discovered that [yet]. [female 70]

We use so many different herbs and spices in everyday cooking and what not. Not so much medicine anymore, because we're so worried about all the synthetics and how it can poison and kill people, instead of using herbs like they used to use. But the different types of plants, it's like you [have] several different types of oregano, several different types of thyme, and it's good to see what they look like. [female 50]

PERSONAL EXPERIENCE OR PRIOR KNOWLEDGE

When asked if anything relates to their personal experience or prior knowledge, three-quarters of interviewees discussed plants they have used in their daily lives, such as the herbs they use in cooking or fruits that grow where they live (see the quotations below). Several of these interviewees said they maintain an herb garden. One-quarter of interviewees talked more generally about having prior knowledge of the medicinal use of certain plants, such as quinine's use in malaria drugs.

When I see some of the tropical plants, I get interested, because I lived in West Africa, and so some of these were familiar and local, so it brings a lot of memories to me. I don't know as much about the medicinal uses of a lot of the plants but I definitely thought about all the culinary [uses], and then seeing what herbs come from different places and how they mutate into different cultures and what that does to the cuisine in those cultures. [female 56]

I love the lemongrass for tea, and we have to explain, we're from Rhode Island. Rhode Island has a pharmacy center—a small one—with herbs, medicine, so we just relate it to that. I would just say seeing things that I use every day and I think, 'okay, that grows from here.' [male 54]

QUESTIONS OR CURIOSITIES

When asked whether they had any questions or curiosities after experiencing *Medicinal Plants*, about three-quarters of interviewees did. The majority had questions about the medicinal properties of certain plants on display that do not have signs elaborating on their use. These interviewees also were curious about which part of the plant is used in medicine and where it grows (see the quotation below). The minority had questions or curiosities about how the Garden chooses and grows the plants it displays, such as why there was so much Aloe Vera or how staff are able to grow plants from different environments in the same room. The remaining one-quarter of interviewees said they had no questions or curiosities or that their questions or curiosities had been answered.

There are obviously some plants that, even with the name, you don't know what they are. But, like I said, that's where those chalkboards are nice for the more exotic ones, [explaining] this is where it is [from], etc. [male 54]

I think, if I'm reading the tag right, it was the cinnamon tree. I use cinnamon all the time and the root beer one. Those are interesting because we use that all the time. But the root beer plant, some information about it, like what part of it they use. That would probably be really interesting. [female 50]

SUGGESTIONS FOR IMPROVEMENT

When asked what might compel them to spend more time in *Medicinal Plants*, interviewees' responses varied widely. One-quarter said having additional context about the plants, such as the medicinal properties of specific plants and herbs, would compel them to stay longer (see the first quotation below). One-quarter named aspects of the design that would compel them to stay longer, such as an inviting seating area (see the second quotation). One-quarter said they would stay longer if there were demonstrations or sensory activities integrated into the experience, such as things to smell or taste (see the third quotation). The remaining one-quarter said they felt they had spent enough time or that nothing would compel them to spend more time.

I'd want some more information on the herbs that I can recognize. [female 39]

Something that would compel me to come back would be just a modest rethinking of this seating area. *I agree because I think a seating area is wonderful, but there's a limitation to how many people and what kind of seating can happen here. . . . Maybe more flexible seating in this space because having a seating area is great. *Actually when we walked in and I saw the [seating], I thought, 'well, that's just so people can rest' but that doesn't invite a family [to sit] and [have] a conversation about what they've seen or anything like that. . . . They're flat against the wall. [female 56; female 51]

I would look for recipes [and] how you use the plants. If there was like a little workstation where somebody was saying, 'well, here, we made this tea, with this thing, and it's going to help with your sore back.' [male 39]

GARDEN PRIMEVAL

INITIAL IMPRESSIONS

When asked their initial impressions or feelings about *Garden Primeval*, about one-half of interviewees said they immediately noticed the warmth and humidity; one-half said they noticed the uniform green color (or lack of other colors); and one-half noticed the ferns specifically. For many of these interviewees, these traits—warmth, humidity, and greenery—gave them the impression of being in a jungle or somewhere tropical. For those who noticed the ferns, their impression was also one of familiarity/their backyard or being active in nature (i.e., walking/hiking) (see the first two quotations below). About one-quarter said they had the impression of entering a prehistoric space because of their prior knowledge of spore plants and early plant life (see the third quotation).

Change in temperature and moisture probably. *Very green. *It is a lot of green and ferns and moss, and I feel like that's a lot of my backyard; I'm more interested in the exotic exhibits. [female 23; female 22]

First there was humidity. *Second thing, the green, and then seeing ferns that I rarely see in Arizona but they are there, and every time I find them, it's like, 'a fern!' *Same thing, all the different ferns; we have one [a fern], I don't know what the name of it is, when we lived in California; I love it. [male 60; female 60]

Well, the first thing I noticed [was] that there [are] no flowers, that it was all greenery. Then, [I noticed] just the different textures and the different stages of the different plants. Once I recognized that you had kind of a primeval feel to it, and we were talking about the flowers, that's when I realized that there probably wouldn't be any flowers in there because I know from just studying that flowers didn't appear until like 150 million years ago. [male 46]

NAME RECOGNITION

When asked whether they noticed the name of the room, about one-half of the primary interviewees did and one-half did not. Of those interviewees who noticed the name—*Garden Primeval*, many said it set the expectation of seeing old plants or early plant life, and two specifically mentioned expecting to see plants that were growing at the time of the dinosaurs (see the quotation below). A few of those who said they noticed the name said it did not set an expectation or they could not articulate what they expected.

No, I didn't look [at the name]. *Garden primeval. *Oh, you noticed that? (How, if at all, did that set your expectations for what you would experience in the room?) *It definitely made it seem a little more prehistoric, Mesozoic or the other eras mentioned there. It led me to expect something dinosaur related. [male 31; female 71]

MOST INTERESTING ASPECTS

When asked what part of *Garden Primeval* they found most interesting, about three-quarters of interviewees said they enjoy learning something new or surprising about the plants on display (e.g., where they are from, that there are different varieties of ferns, the lineage of plants) or seeing plants on display that they normally do not have the opportunity to see (e.g., giant ferns) (see the first two quotations below). About one-half also said they like aesthetic qualities of the room, such as seeing plants displayed at different angles and heights, plants with different textures (moss, ferns, etc.), and the water feature (see the third quotation). A few interviewees said they were particularly fascinated by how these ancient, seedless plants had survived for millions of years under varying environments.

I found the cycads most interesting because you don't get to see them very often. There were a lot of examples in various stages. Also, [I liked] the giant fern [Vessel Fern]. That was really exciting. [I like] the cycads just because I've heard of them, but I never get to see them. [I liked] the Vessel Fern because I did not know that giant ferns existed. [male 27]

I was taken by some of the plants that looked very old, with lineage [that goes] far back, and some of the signage said that some of the orchids were considered scientifically fairly recent, [but] that they've discovered that they are actually fairly old. That was interesting information, and then some of the ferns and how they evolved from all over the world, and they are all living in relatively the same area, which is kind of interesting. [male 53]

From my point of view, it's just some of the ones that have got different textures.... At one point, I touched one of them and then I thought to myself, 'Am I allowed to do that?' *That's one of the things I was going to say, that it would be lovely to have, perhaps a table or a case or something where you're actually able to feel them without running the risk of damaging because they're just so different to things that you see. [female 56; male 57]

LEAST INTERESTING OR CHALLENGING ASPECTS

When asked what they found least interesting or challenging about the space, about one-half of interviewees said the placement of some of the signs made the signs difficult to read (i.e., they were covered by plants) or to discern which plants they were describing (e.g., the plant identification labels). With regard to the latter, interviewees said the close proximity of the plants to one another makes it more difficult to match the sign with the correct plant (see the quotations below). About one-third named an aspect of the room they found less aesthetically pleasing, such as the lack of colorful plants or areas of the room that do not have as many plants (e.g., entering from *Plant Adaptations*, the back left corner). A few described a particular type of sign they found less appealing (e.g., non-chalkboard signs because they feel less personal); and a few said they were not as interested in the plants they see every day, such as the ferns.

The only thing I [would] say as maybe an improvement is some of the signs. You're not sure which plant they're pointing to.... There are so many plants together, especially in the room, and I know it had to be that way, but you have a sign here and a sign here and [you are] like, 'okay, is it that plant or is it that plant that this is referencing?' So maybe an arrow or something could facilitate that [identifying the plants]. [male 53]

The only thing I noticed is coming out over here some of the labels for the plants in the back are more difficult to read, because they are so set back and they're small. [male 56]

UNDERSTANDING OF INTERPRETATION

The most-frequently looked at signs were Cloudy with a Chance of Spores (three-quarters), Drying Times (three-quarters), Rise of the Orchids (two-thirds), Flowering Advantage (two-thirds), and Cycas taiwaniana (one-half). When asked what they took away from reading the signs, about one-half of interviewees said they recalled general information, such as where a plant is from or what it is called (see the first quotation below). Another one-half recalled slightly more specific information, such as the connection between asparagus and orchids (and the older lineage of orchids), how seedless plants reproduce (through spores), and/or the resilience of early plants to drought (see the second quotation). Several did not recall specifics about the signs but offered suggestions, such as clarifying the purpose of the cell phone tour or Junior Botanist signs and using bullets for easier reading. A few said they were drawn to visual or text elements of the signs, such as catchy titles ("Cloudy with a Chance of Spores") or colorful signs among the "sea of green" (e.g., "Flowering Advantage") but did not recall any information from those signs.

Just understanding how these flowers, I mean how these plants came about and the habitat that they lived in, and [the signs] just gave you a little bit more information so you didn't walk through a room and just look at green stuff. You put it in context. [female 70]

I looked at the orchid sign because that's what we came down for, so that caught my eye. (What did you take away from that particular sign?) I was surprised that they were a relatively older species that had been around since the dinosaurs.... Some of the information that I [have] read [said] they were considered fairly recent, so that helped. [male 53]

OVERALL PURPOSE OR INTENT

When asked to describe the overall purpose or intent of the room, one-half of interviewees said *Garden Primeval* is about early plant life (see the first quotation below). The majority of these interviewees came to this conclusion based on signs and/or the warm and humid atmosphere of the room, while others had previous knowledge of spore plants and early plant life. About one-third said the purpose of the

room is to display a variety of ferns so that visitors can see plants they have never seen before (see the second quotation). A few interviewees said the purpose of the room is to educate children (citing the dinosaurs and Junior Botanist signs specifically as evidence of this).

To bring you back to the beginning, and not just in this era but everywhere. You're going back all the way to all various eras, and this is how plant life started in a warm, temperate, moist environment. [male 58]

People may come from climates where they don't have these types of plants to look at. I was really surprised [by] the amount of [and] different types of ferns they had in here, and so it was educational for me, because we have ferns where we're from, but they're nothing like some of these other ones. So it was really kind of neat to compare ours to that. [male 56]

PRIOR KNOWLEDGE OR PERSONAL EXPERIENCE

When asked whether they saw or experienced anything that relates to their prior knowledge or personal experiences, most interviewees said they did. Three-quarters said they recognized the ferns or moss from where they live or places they have visited; some of these interviewees elaborated on specific plants they recognized, while others spoke more generally (see the first two quotations below). One-quarter said they know a little about botany, spore plants, and/or plant genetics and applied this knowledge while experiencing *Garden Primeval* (see the third quotation).

Well, I think we recognized a couple of plants [that] we might have at home. [female 44]

I really liked the moss actually. When I was little, I would play in my garden with little miniature dolls, and I'd make little miniature houses with moss and twigs, and I remember [that] I would always use moss for carpets.... So that brought me back to when I was younger and being creative, associating moss with carpets and like a little fantasy secret garden. [female 23]

I know a little about the genetics of things, how they work. But the way that they related it a little bit more to the human aesthetic, calling it the egg and the sperm, which is not necessarily what they call it, it's usually pollen and other stuff, but having [it] a little more relatable was interesting, despite knowing the facts already, it was easier to follow. [female 20]

QUESTIONS OR CURIOSITIES

When asked whether they had any questions or curiosities after experiencing *Garden Primeval*, about twothirds of interviewees did. The majority had questions about the plants they saw, such as wanting to know a plant's name and where it is from; differences among the varieties of ferns, etc. (see the first quotation below). The minority had questions about the signs they read, such as wanting to know more about the orchid lineage and how spore plants reproduce (e.g., are there male and female versions of the plant?) (see the second quotation). The remaining interviewees said they had no questions or curiosities or that the signs had addressed their questions.

I would think if there was a docent there and they were to escort me, I'd be interested in learning the differences between the ones [ferns] that were very similar but then the docent could tell you 'well, but they're different because of this and this is how they adapted to their particular environment.' Because that's something I personally could go home and look for then with ferns that were at home. [male 60] Now that I've made the connection about the primeval plant, maybe I would have more questions about how the plant survived that long, which ones were first, how we knew they were first... where geographically they're found, like how we know they're that old. [female 41]

SUGGESTIONS FOR IMPROVEMENT

When asked what might compel them to spend more time in *Garden Primeval*, interviewees' responses varied widely. One-third of interviewees said they felt they had spent enough time or that nothing would compel them to spend more time. One-third said more facilitation or direction would compel them to stay longer, such as information to help them make connections (to their own experiences or humans in general), a clearly stated purpose or key message, and where to get more information about the plants they found interesting (such as the name of a plant—clearly marked, where it is from, and if it is used for some purpose) (see the quotations below). Another orientation-related suggestion included providing a timeline on the pathway to describe the evolution of plants. About one-quarter said adding color would compel them to stay longer, and another one-quarter said a larger room or benches would compel them to stay longer. Two interviewees would like to see more activity-based experiences for their children (such as searching for or drawing plants).

I think it would be kind of neat if you had like a guide, not just a personal guide or something, but someone from the botanical gardens that's studied the plants. Maybe you could get a tour or something. I don't know if you do tours of different rooms, but that would probably be a good thing to have. So you don't come out [saying], 'well, what did I just look at?' Because there are some things that you just don't know what they are, but maybe explain why some of the plants grow the way they do. [male 53]

It's just a matter of finding out what they [the plants on display] do or how we use them. I think that's always interesting. We hear about the Brazilian forest disappearing all the time and all the foliage down there, that it's just amazing for medical and other reasons, so [it] could be interesting to know if any of these [plants] have medical or other purposes. [male 62]

REMOVED FOR PROPRIETARY PURPOSES