

Map Table (v.2): Formative Evaluation

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THIS IS **NOT** A DEFINITIVE FINAL REPORT

FORMATIVE evaluation studies like this one often:

- **are conducted quickly**, which may mean
 - small sample sizes
 - expedited analysis
 - brief reports
- **look at an earlier version** of the exhibit, which may mean
 - a focus on problems and solutions, rather than successes
 - a change in form or title of the final exhibit

Key takeaways

- On average, visitors felt this was mostly a 'neutral' exhibit experience in terms of interest
- Visitor groups struggled to get their bearings to begin interacting with the exhibit
- About half the visitor groups did not realize the plant and story buttons were clickable
 - Most of them had to be told so by the evaluator
 - Once they realized, most visitors *did* spend time reading the stories
- Visitors expected clicking a plant button would highlight that plant on the map, rather than having it disappear from view
- Visitors were confused by the difference between the individual plant buttons and the 'other plant communities' buttons
- Most visitors struggled with the zoom
 - It was often not clear they could zoom at all
 - The lag on the zoom was especially frustrating to visitors
- Visitors struggled with the color contrast on the map
- Visitors wanted to know what some of the plants look like, especially the less common ones
- Visitors wanted to know what there was at the blank areas on the map (water and urban development)
- About half the visitor groups wanted to investigate plants specific locations of their choosing

Purpose

- To gauge whether visitors feel a connection to plants
- To determine whether visitors understand patterns of plant growth (which plants grow where)
- To determine whether visitors ask complex questions (e.g. "why" or "how") about the locations they're seeing, including but not limited to questions about geography, topography, climate, etc.
- To identify potential usability issues
 - Clickable buttons
 - Finger gestures (e.g. zoom in, zoom out, drag)
 - Stories covering up data
 - Map colors difficult to differentiate

Exhibit description

- New media exhibit presented on a large tabletop touchscreen
- Interactive map of California featuring plant-specific landcover data
 - Water and developed areas left blank
- Interactive buttons
 - Plant buttons (one-finger tap)
 - Located in 'legend' type box at bottom of screen
 - Visitors can select individual plants and plant communities to highlight on map
 - These can be turned on and off
 - The default is to be turned on
 - Story buttons (one-finger tap)
 - 3 icons located on the map
 - When clicked, visitors can read about a specific type of plant
 - Reset Zoom button (one-finger tap)
 - Resets map to view the entire state of California
- Interactive touchscreen gestures
 - Click on pixel (one-finger tap)
 - Reveals specific plant or plant community found within the selected pixel
 - Zoom in (pinch out & double-tap)
 - Zoom out (pinch in)
 - Move map (one-finger drag & two-finger drag)

Methods

- Evaluation took place on Saturday, October 22 and Sunday, October 23, 2022
- Visitors were asked to participate using cued recruitment
- If they agreed to participate once approached by the evaluator, visitors were led to the exhibit, asked to use it as they wished and for as long as they liked, and then led through a short series of interview questions about their experience

Selection criteria

- Visitor had not been recruited for another evaluation earlier that day (i.e. not wearing a sticker)
- Only individuals or pairs were recruited
- All participants had to be at least 8 years old
- Every participant had to be fluent in English and/or Spanish

Results

Note: The percentages mentioned in this section are the percentages of visitor groups out of a total of 17 groups, unless otherwise noted.

Breakdown

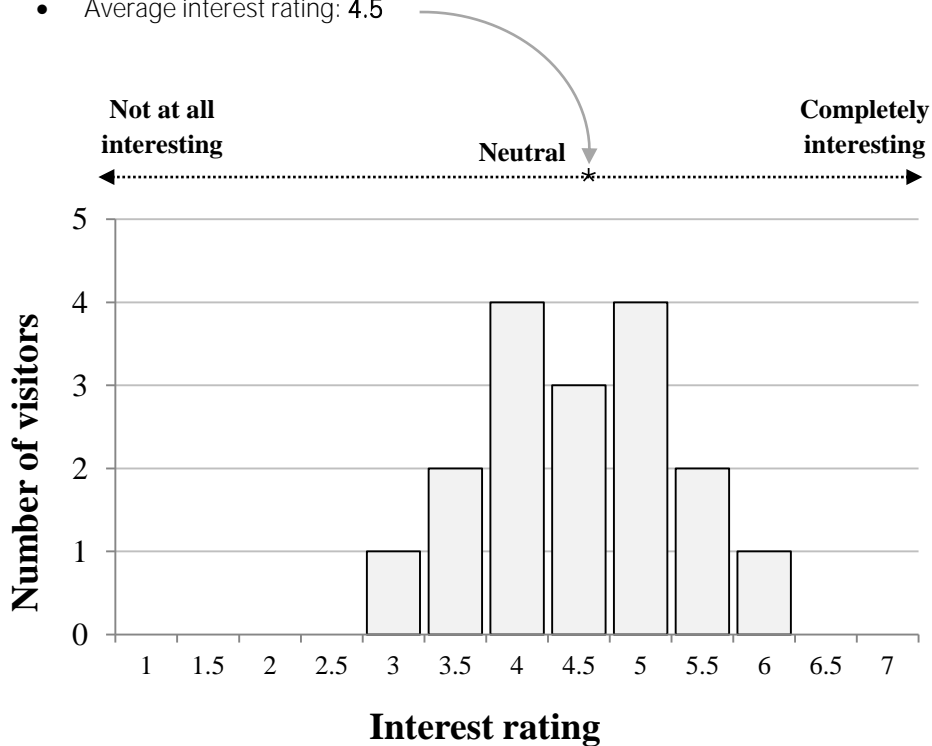
- 17 visitor groups were interviewed
- All groups consisted of 1–3 visitors at a time
 - Most visitor groups (76%) consisted of two visitors
- 65% of visitor groups consisted of adults only
 - The other 35% were multigenerational
 - None were minor-only groups
- The median holding time was **4 minutes and 10 seconds**

Where were visitors from?

- 2 visitors (12%) did not presently live in California
 - The other 88% did reside in California

How interesting was it?

- Average interest rating: 4.5



Framing and introduction

65% expressed being unsure what they were seeing or what there was to explore

(e.g. It's a map of California, the colors correspond to different types of plants, and their location on the map reflects where the plants grow within California)

- V01: I guess wondering what the goal is of the exhibit? What am I trying to learn?
V01: Um, like I, I guess I didn't have a specific thing to look at. It was kinda like here's a bunch of data.
V01: I guess what the messages it's trying to get across
- V02_M: So are these all the communities that have grapes in them? So when we press the other crops and plants it shows up on here. So when it says plants in California that's where they're grown?
- V03_F: Oh is this central valley?
V03_M: Its seems a little disconnected from this area [pt to gallery 4]
- V04_F: So what is it supposed to choose or do? What is it supposed to show?
- V07_F2: Oh so its color coded?
- V09_F1: Ok so its showing you the different colors?
- V11_M1: So it shows all the plants and where they are grown?
- V12_F1: So these are all the plants and are there other plant communities?
V12_F1: Maybe more guiding questions on what to look at specifically
- V14_F: I think the 5 is the fact walking past it I only saw a screen. So if there was something indicating what this was about. Otherwise I would've walked past it.
V14_F: The fact that I wasn't sure if there was a right way to interact with it. So maybe some suggestions on what to do
V14_F: Is there a right or intended was to interact with it?
- V16_M1: It tells us where it grows?
- V17_F2: At first you kinda have to understand how to use it
V17_F: Navigating the map. It was hard to understand what to do with it

47% had questions or were curious about broader contexts

- V02_F: I guess how much crops we export to other states
V02_F: Maybe like zoom into different cities in California to show the breakdown. Like to see what specific crops grow in that city, its kinds small to see.
- V03_F: More information about California geographical area
- V04_F: I'm not from California, we just moved here. So it doesn't feel like home yet and I'm not familiar with the history of the plants here
- V06_F: [For it to have been a] 7 [completely interesting, it] could've been with pop-ups like if you click on cotton with information about cotton like how its harvesting, things like that
- V12_F1: I want to know how like waterways changed over time and the layout itself changed over time
- V15_F1: I guess I was craving more maybe more tangible reasons why.
- V16_M1: What do these buttons do [pt to plants in CA] like what is cotton used for things like that. What are almonds use for
V16_F: For me is Alfalfa I didn't know it was so water extensive
V16_F: I guess see what things are exported and imported on a wider scale
- V17_F1: There wasn't a lot of information aside from these [pt to story icons] that were more in depth

Zoom

59% of visitor groups did not realize they could zoom

- V01: *Oh I didn't know you can zoom*
- V04_F: *Oh I guess we didn't know it zoomed it*
- V10_F1: *Apparently you can like zoom in?*
- V12_M: *Oh you can zoom in right?*
- V13_F: *Oh wait you can zoom in and out?*
- V16_F: *Woah it zooms in?*

24 % were unsure how to zoom

- V07_F2: *How do I zoom in?*
- V08_M: *the zoom isn't clear like how to get it to zoom*
- V16_M: *I guess for me it's the navigation. I'm so use to my phone touch screen so this was different in the way it zooms I guess*
- V17_F1: *I think you just tap to zoom*

Only 18% wanted even more zoom

- V01: *I guess like I kinda wanna keep zooming in, maybe a street or city view of plants*
- V03_F: *Does it zoom any more?*
- V11_M1: *Zoom in a little bit more*

Interactive buttons

47% did not realize the story buttons were clickable

- V02_F: *and I didn't understand the little flower icon. Like if it had something to explain it.*
- V10_F2: *Oh you can press these buttons?*
V10_F1: *Are we only allowed to press these icons? [pt to story icons]*
- V16_F: *I guess why there are specific icons like the California poppies like what's the purpose of having these specific icons*

47% did not realize the plant buttons were clickable

- V02_F: *I think the only thing for me is that it didn't exactly say when I pressed it and un-pressed it [pt to buttons]*
- V07_F2: *Look at the screen does it unclick?*
- V09_F1: *you can click on all of them?*

35% expected the plant buttons to function the opposite way (i.e. clicking it should turn it on instead of off)

- V04_F: *I wish there was a way to turn off all the crops and then turn off all the plants to see each of them individually*
- V06_F: *I think when they are all turned on like cotton it was hard to see what it was doing*
- V09_F1: *if there was an obvious erase to all the plants button like something telling me to unclick all of them*
- V12_F2: *So if you unclick it, it does away? So you have to unclick the buttons I think?*
V12_F2: *I think its cool that you can [...] unclick to see them more specifically*
- V14_M: *Lets disable it all and go one by one*
- V17_F1: *so if I press on it the color goes away?*

35% were unsure what we meant by “other plant communities”

- V01: I guess what are other crops and other plants. I guess what else is included in each categories.
- V03_F: Probably that and the other category isn't descriptive enough like why is there other crops
- V04_F: What are other crops? I'm interested in what the other plants communities are. Not being able to separate the crops and plant communities
- V08_F: Its interesting seeing the plants but I thought there would be al little bit more but I guess that's what other plants means
- V09_F1: Is there somewhere where we can find out what other stuff is?
- V11_M1: It was all of these buttons but then there's 'other' so maybe specify more what 'other' is

35% wanted more variety of plant options to choose from

- V11_M1: I wanted to see more crops that are around and in California and more information about them
- V13_F: I needed it to be more interactive or highlight maybe more than just plants, maybe flowers
- V14_M: I guess one thing I thought there would be more plant selection
- V15_F2: Maybe more of these buttons [pt to plant buttons]
- V16_M1: For the buttons I would want to see more interesting options like avocados
V16_M1: Just see more popular things like strawberries and blueberries and see where's that at
- V17_F1: There wasn't a whole lot of options. There's more I want to know about this map, like different plants.

Plant stories

76% of visitor groups spent time reading the stories

23% of those visitors mentioned wanting more than 3 stories to read

- V07_F2: I did like the little story icons about where things grow
- V10_F2: Maybe more stories about the plants
V10_F2: I wish I can have more information about different plants and stories, there's only three of them
- V14_F: maybe more built in stories

One visitor emphasized the “missing human component”

- V03_F: Its kinds missing a human component to it like the people who grow it
V03_F: [...] personally I am interested in where things grow and who makes our foods
V03_F: If you can click on it and instead of reading it, there's like a 30-second clip like interviewing a farmer

Map colors

65% struggled to tell the map colors apart

- V01: When the buttons aren't pressed it hard to read what they say.
- V06_F: What if we turn cotton off? Its hard to see the difference. Cotton is really hard to see.
- V10_F1: Some of the button colors are very similar
V10_F2: The colors. There's a lot of yellow so its hard to tell the difference
- V12_F2: Maybe more contrasting colors to tell the difference on the map
V12_F1: Yes the colors, there's a lot of yellows and blues
- V13_F: I couldn't find the rice so I guess highlight it more with color
- V14_F: Did you see where it changed color, I didn't see it?

12% were confused by the contextual choice of map colors

- V03_F: Maybe more color scheme. Some of it doesn't completely make sense
- V12_F2: Is there a reason these buttons have specific colors?

Usability**47% were frustrated by the lag of the touchscreen gestures**

- V01: I don't like touching the buttons there's a bit of a lag.
- V03_M: The lag and zooming
- V04_F: It lags when you press it and also not knowing what other is
- V07_F3: I like how you can zoom in and click on it but it was slow to use
V07_F2: Just how it was a little bit slow how it reacts
- V09_F2: Sometimes the touch didn't work
- V15_F1: The zoom is a little confusing, it's a little slow

29% of visitor groups mentioned that, when zoomed in, they wanted to know where they were located within California**18% of visitor groups mentioned wanting to see the map data under the story windows and wanting to see plant data related to the plants mentioned in the story****18% mentioned having a hard time seeing or reaching parts of the screen**

- V01: If you are kinda short it would be hard to see.
V01: Where I'm standing its hard to see the whole thing.
- V05_F: I guess that's its flat its hard to reach and its sideways so yea
- V07_F1: Just because its so big more people would want to touch but it only reacts to first person who touches it

12% struggled with the touchscreen usability

- V01: I feel like the buttons are kinda hard to press
- V16_M1: The concept is interesting but the navigation is hard to know and understand

More information**53% mentioned wanting to look at specific locations**

- V02_F: I think its interesting seeing all the places where I've been and what we grow there
V02_M: If we can tap on the city and zoom in as well
- V03_M: Press on the city and see if there's a distinct crop
- V04_M: My dad and I would do a lot of exploring in California like mountain climbing so seeing it all mapped out was familiar and seeing it all mapped out in my head is pretty sweet
- V15_F1: Maybe a you are here button would be cool too, to see what's around.
- V08_F: I guess it was fun looking at my hometown and seeing the different plants
- V09_F2: Tell us when you can click on certain stuff in cities and it showed more of the stuff. I don't know, like poppies. Like more information.
- V10_F1: Yes, like I wanted to know about Mountain View, so more descriptive information
- V14_M: I'm not from the area so I don't know the plants here very well but its cool to compare these plants to where we are from.
- V16_M2: is there anything in Hayward?

41% had trouble finding plants they were interested in

- V06_F: Ok so I want to know where almonds live
- V07_F1: Oh where do they grow rice?
- V08_F: Do they have redwoods? What else do they have?
- V09_F2: Where is the rice?
- V13_F: Where's rice?
- V15_F1: You have poppies at home right?
V15_F1: So if you look for the color of redwoods where are they?
- V16_M1: Where does the rice grow?

29% mentioned wanting to see photos or drawings of the plants

- V06_F: it would be cool to have pictures of the plants
- V07_F2: I feel like if it add a few pictures about the crops it would be good like if you touch it, it shows a visual image
- V12_M: Probably provide more pictures and information about different crops like I didn't know anything about Chaparral. So thinks like that.
- V15_F1: Maybe when you zoom on grapes it has pictures.
- V16_F: Maybe pictures like showing a conifer forest because I don't know what that was

12% asked for the urban and water data (the blank areas on map)

- V10_F1: I think I would want to see more information about the distribution of the plants and highlight the popular areas like SF on the map.
- V12_M: I'm assuming the white is water
V12_F1: More differentiation between the lakes and city areas

Surprising aspects**53% were surprised by the variety of plants that grow in CA**

- V02_F: How much of each plant comprises of California or like how much of it is in California
- V04_M: A lot more conifer than I expected
- V07_F3: I'm surprised about the amount that grows here
- V08_M: Similar experience I liked seeing the diversity of crop that I didn't expect
- V10_F2: Learning about the distribution about plants and knowing what plants grow in certain areas
- V11_M1: There's not a lot of Joshua trees
V11_M2: There's a lot of redwoods
- V12_M: In terms of data seeing everything and how you guys put it on the map
- V15_F1: I guess how much of these crops and plants are scattered around California
- V16_M2: That there's a lot of redwoods and other crops here
V16_M1: That there's different crops so spread out in California and not just in one area

24% were surprised by where certain plants grow

- V02_M: The conifer forest I didn't know there was so much of it even in small places like Joshua Tree
- V03_F: Maybe that beans are grown at the coast
- V09_F2: Almond. I don't know they grow there.
- V13_F: Almonds come from Yuba city?
V13_M: I never know where crops grew in California so it was interesting to me

18% were surprised by the distribution of grapes

- V01: I guess I expected more grapes. I guess there was more in Fresno than I was expecting
- V08_M: that Fresno has a lot of grapes
- V12_F1: There's a lot of grapes and where they grow

Future Design Considerations

- Think about how we want to first welcome visitors to the experience
 - *What* are they looking at?
- Think about how to frame the visitor experience
 - *Why* are they looking at this?
 - But careful not to give too much away
 - Lean more **heavily into the 'human' aspect of the data** (perhaps through the stories)
 - Consider adding prompts
 - From Denise King, Exploratorium Exhibit Developer Group Manager:
I'm still wondering about the 'try this' of this exhibit - what if we had a way to choose your favorite/least favorite vegetable and then have just that color pop out - repeat with what crop takes the most water?, etc. Some prompts may help.
- Let's make it more obvious the plant and story buttons are interactive
- Rework when and how the plant buttons are turned on and off
 - Consider an on/off slider
 - May not be necessary with p-pops if main map is more muted than map under p-pops
- Address the lagging zoom function
- Strive to make it a multiuser experience
- Clarify or rethink the selection of plants and plant communities
 - In particular, the split between those categories
- Consider adding gesture suggestions (e.g. "To zoom, try pinching out")
- Use higher contrast colors on the map pixels
- Consider adding a mini map to help orient visitors when zoomed in
 - May not be necessary with p-pops if main map is static
- Consider adding photos of the plants shown on the map
- Move the story windows to the side (e.g. over Nevada)
- When a story is clicked, consider highlighting the plant data mentioned in it
- Add data for non-plant areas
 - For developed urban areas, mention there are still plants there, but fewer
 - For water, consider mentioning there are plants that live in water