Raindrop Plotter

Joyce Ma

June 2005

THIS IS **NOT** A DEFINITIVE FINAL REPORT

FORMATIVE evaluation studies like this one often:

- **are conducted quickly**, which may mean
  - small sample sizes
  - expedited analyses
  - brief reports

- **look at an earlier version** of the exhibit/program, which may mean
  - a focus on problems and solutions, rather than successes
  - a change in form or title of the final exhibit/program

Outdoor Exploratorium: Formative Evaluation
Raindrop Plotter

Joyce Ma
June 2005

PURPOSE

To gauge

- What visitors noticed at the exhibit, in particular, how they interpreted the raindrop plots captured by the prototype
- What visitors found interesting/ not interesting about the exhibit
- What visitors became curious about at the prototype.

METHOD

- The prototype showing a plot of the last rain captured in San Francisco (at the Palace of Fine Arts) was set up at Rincon Park, as shown in Figure 1

Figure 1. Prototype Setup



- Note that the prototype was *not functioning* during this evaluation; the plotter was not powered nor was it raining.
- The prototype sat in two different locations during our evaluation. On Thursday, June 2 it was placed near *Lift,* the only other exhibit prototype on site that day, in order to help us draw visitors to our prototypes. See Figure 2. Then on Thursday, June 9 and Sunday, June 12, we placed Raindrop Plotter closer to Viewfinder (Figure 3), again to establish a cluster of exhibits to attract visitors.
- An evaluator sat and observed visitors as they used the exhibit and approached them for interviews as they were leaving the prototype. The interview can be found in Appendix A.
- We observed and interviewed people during these times

Thursday, June 2	12:15 pm – 3:00 pm
Thursday, June 9	11:00 am – 3:00 pm
Sunday, June 12	4:30 pm – 5:30 pm

Figure 2. Prototype Location on June 2

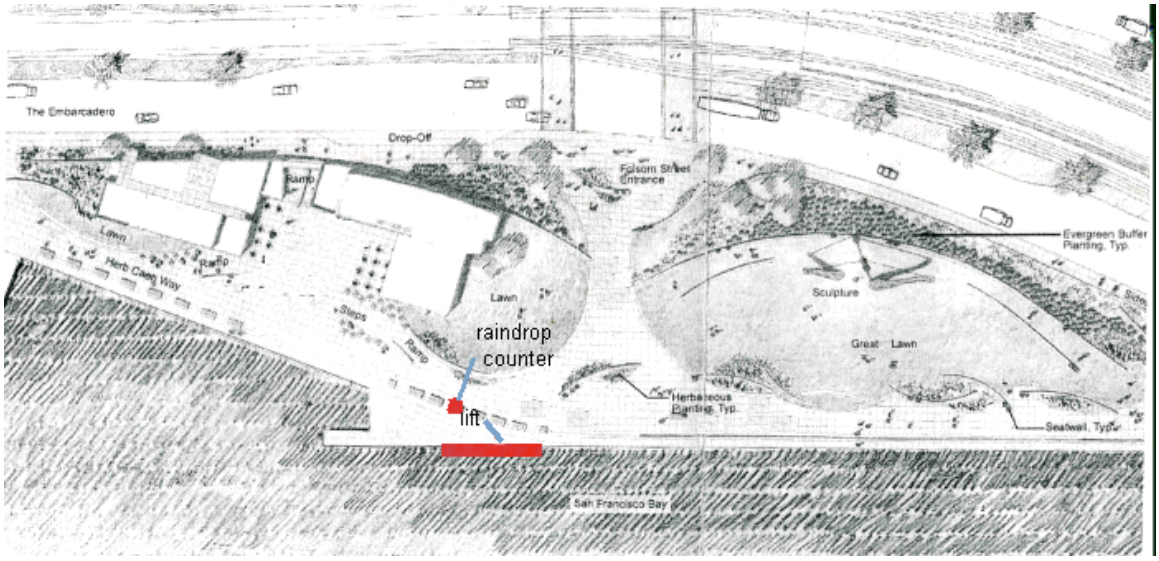
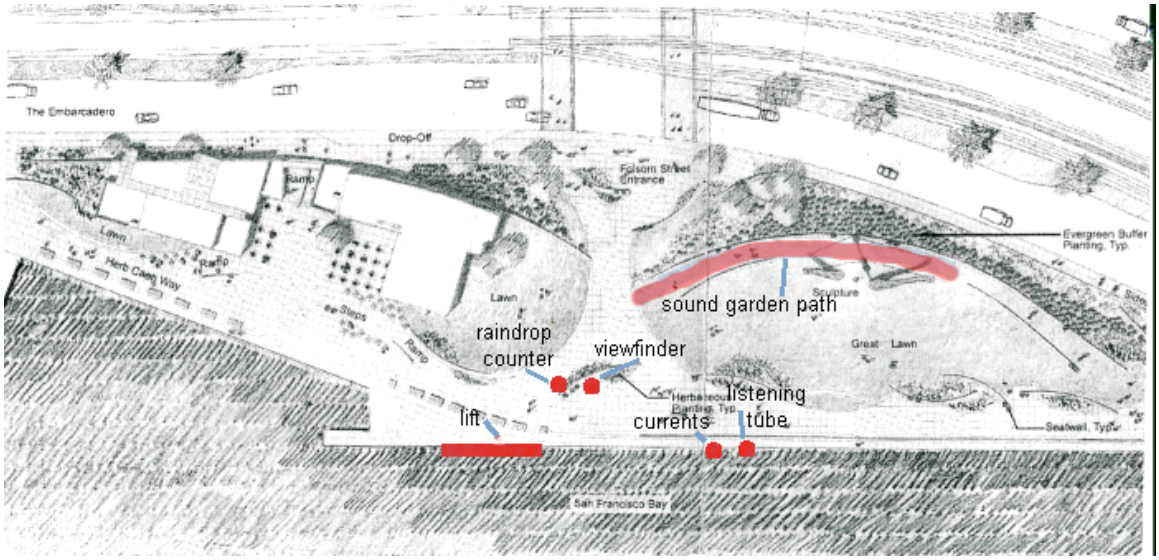


Figure 3. Prototype Location on June 9 and June 12



DATA CORPUS

- N=17

Group Type	Count (out of 17)
Individual adults	9
Adult peer group	8

RESULTS

What did visitors do at the exhibit prototype?

Did visitors look at the printout?

Looked at the printout	Count (out of 17)
Yes	15
No	2

What did they notice?

- We asked the visitors who looked at the printout what they noticed on the plot.
  - The drops or circles (9 groups)

Group3: I saw the drops very clearly.

Group4: (A) dots like raindrops (B) markings, maybe some are invisible

Group5: There are places with water spots and places with no spots, and places with very little spots

Group6: What I was looking for was the spots; how much rain fell in 15 seconds.

Group8: The raindrops.

Group9: That there's a light sprinkling here but basically there's very little rain. It's a way of mapping the rainfall.

Group10: 1.) Rain DNA 2.) It's a little pornographic!

Group16: (A) little drops. (B) Not sure what time frame it was.

Group17: The light dots where rain had... I understood that compared to the purple thing.

- Dark (and light) areas (4 groups)

  Group2: The burn, the dark patches

  Group7: Just the grey and white

  Group13: I'm seeing an uneven print

  Group14: Yeah, you could see an opaque pattern, which makes it seem like a graph…

- The progression of time (1 group)

  Group3: I did the 15 seconds, counted to 15 and moved to the next one. I saw the drops very clearly.

- A way to interact with the prototype (1 group)

  Group11: I was wondering if there was something I should crank. Something I could do. Is it interactive?

- Nothing in particular (1 group)

  Group1: not really- nothing specific, I didn't really see.

• These visitors interpreted the plot as a representation of:

- Rain, specifically raindrops (5 groups)

  Group3: the drops

  Group5: Actual rain drops

  Group6: just looked for the rain fall

  Group8: The droplets of water

  Group17: raindrops.

- The rainfall in an allotted time (4 groups)

  Group2: A minute or a 5-minute expansion of time. The spots are where the rain hit in the opening in the box.

  Group9: time-lapse

  Group11: 15 seconds.

  Group16: (B) amount of raindrops. (A) Same.

- Others (1 group)

  Group7: like a Rorschach test. Like a piece of art.

- Nothing (1 group)

  Group1: I have no idea.

- We then asked visitors, who said they looked at the plot, specifically if they noticed the dots that were described in the text panel.

Noticed dots	Count (out of 15)
Yes	13
No	2

- The 13 visitor groups who noticed the dots thought the dots represented raindrops. One of these visitors also noticed a difference in the size of the drops:

  Group10: Intensity of the rain. The smaller spots are drizzle and the big ones are heavy rain.

- Some visitors were confused about how to interpret the plot (7 groups)

  Group3: These (dark spots here) I have no idea [pointing to the ends of each dark bar]

  Group4: (A) Sun, rain, spit? (B) Light

  Group7: But if you read this (the sign), you understand that it's not about the grey it's about the white. You know, you think the grey is what you're supposed to look at but it's actually the white parts that tell you what's going on, which is interesting.

  Group10: (A) My question is, "When did it rain today?"

  Group13: Well, there's the uneven printing here on the edges, but I don't know why. [NOTE: He, like other interviewees, seemed to be confused by the barbell-like shape of the grey background pattern; he also seemed to think that those uneven ends were the "white circles" mentioned in the sign.]

  Group14: ...And these dark opaque places here indicate heavy rain... But the thing about rain is that it's not really that neat. Unlike seismic movements.

  Group11: 15 seconds. IS the white part representation of time also? How does it work?

How interesting did people find the exhibit?

Interest Rating	Count (out of 17)
Interesting	4
Somewhat Interesting	3
Neutral	1
Somewhat Not Interesting	5
Not Interesting	4

What was interesting about the experience

- It was a way of looking at rainfall (5 groups)

  Group5: I think it's interesting to see a storm represented this way. To show how showers stop and start.

  Group6: I never thought of trying to measure rain on paper. How about having a tube to measure rain also and compare them?

  Group9: (B) Because I'm very intrigued, there's data spilling out, what does it say?

  Group11: Interesting o see how we perceive rainfall.

  Group17: The concept of the 15 seconds; where you see the raindrops; not much else to it.

- People were curious about the exhibit and what it does (3 groups)

  Group1: Everything interests me.

  Group2: Originally I thought it was photo-temp paper. Cause it was neat, different it caught my eye, I was curious.

  Group15: To see what it is

What was ***not*** interesting about the experience

- It doesn't do anything (5 groups)

  Group4: Because I'm not sure how it works.

  Group8: Unless there's something happening. Other wise it's boring.

  Group9: (A) I think there's a lot of potential, but it runs the risk of being a let down, because there's no rain.

Group10: (A): Because there's not a lot of rain happening. But it's nicer tat some of the art at MOMA we just saw!

Group12: It's not moving.

- It's hard to understand (4 groups)

  Group3: It's not clear, there's not enough in the explanation to make me visualize the lightning. Oh! A "light sprinkle" it says, well now it's all clear, forget that.

  Group7: I was hoping to see more, it doesn't explain clearly (Did you read the sign?) No, I didn't.

  Group13: It's hard to understand. Maybe it could be improved, but as it is now I don't really understand it.

  Group16: (A) Not impressing (B) Trying to figure it out; it's confusing.

- Not interested in the topic (1 group)

  Group14: Because at first I thought it was a seismograph, so it lost my interest. [NOTE: He meant, once he found out it WASN'T a seismograph, he lost interest. This guy was really, really into earthquakes. It took me a few minutes to bring him back to our topic.]

What did visitors think was the point of the exhibit?

- Seeing patterns in rainfall, particularly over time (8 groups)

  Group1: Something about patters in rainfall, that there is a regular patter maybe.

  Group2: I'd say, to see if there are patterns rain, or if it's total chaos. I'd say the latter.

  Group3: Patterns of sprinkles

  Group5: Variation of a storm over time, the storm's intensity, I guess. It would be nice to label how much time is represented.

  Group10: (A) The way intensity and hardness of rain affect the ground. (B) That it comes in waves.

  Group13: The character of a rainstorm would be the their intention--the goal is worthy, but the goal isn't quite met I don't think.

  Group14: I guess that there's a certain pattern to rainfall and the weather that it perhaps depends on chronological factors, since it's a graph.

  Group17: It's like capturing a time capsule based around weather.

- Seeing the amount of rainfall (3 groups)

  Group4: (A) How much it's rained over the past time (B) I'm curious what the box is about, it seems...

  Group8: I assume the try to show me how much rain, actual drops, there is in 15 seconds. A 2 dimensional way of seeing rain. More like a dry version of rain.

  Group16: (A) The amount of rainfall of a given period/how much rainfall there is here. (B) Visualization of rainfall.

- Comparing rainfall in different places (2 groups)

  Group6: Oh no, I'm not sure. Though I think it should be about comparing different places.

  Group9: it's a graphic portrayal of the rain. So what if it was fed back into a film loop? If you show the sequence over a month maybe it would be more interesting.

- Something about rain (1 group)

  Group7: I would assume it's about rain, measuring rain.

- Something not necessarily about rain (1 group)

  Group15: Marine life and science environment.

What did visitors become curious about at the exhibit?

- The rain (8 groups)

  Group1: Always curious about things I don't know about- rain is one, meteorology.

  Group4: He: I studied acid rain, but I'd like to know more

  Group8: I'm always curious about when they say "half an inch of rain." What is that dependant on? Doesn't that depend on the area? They always talk about how many inches of rain, what does that mean?

  Group9: What if it actually collected the raindrops and analyzed it for acid rain and stuff?

  Group11: Yeah definitely. I can imagine a whole exhibit on rain. That would be great. Studies on patterns of rain, maybe translating it into music!

  Group13: This one doesn't make me more curious about RAIN. The actual images of the drops aren't so interesting. But depth of rain might be. Maybe show the other characteristics of rain.

  Group10: 1.) I'm always curious about rain. What they don't have thunderstorms in CA?

  Group11: How do we experience rain?

- Nothing (7 groups)
- The exhibit (6 groups)

  Group1: Just curious about what it is- curiosity

  Group4: (A) What it is?

  Group5: Yeah, what kind of paper that is; and what day it was taken, and how it would be used as a scientific tool

  Group7: I wonder what would happen if I actually saw rain coming down. If we were in a storm. What would happen to the paper?

  Group10: (A) How does the exposure happen? Does it get inked up?

  Group17: Yeah--by reading the thing it made me curious to look at it.

- The plot (4 groups)

  Group5: Yeah, what kind of paper that is; and what day it was taken, and how it would be used as a scientific tool

  Group7: How do you measure the dots? Is it actually the rain coming down? (Do you mean did the rain actually touch the paper?) Yeah. Is this a computer printout?

  Group10: 2.) What does the grey background actually represent?

  Group16: (A) Something marking the time of day; what does it mean? How long? (B) It's only like 30 minutes...

Did it remind them of anything else?

- Other representations (8 groups)

  Group2: It makes me think of those things where there are the circular things with pictures of the running horse (kinetoscope?) yes

  Group3: Yeah, a cardiogram; the earthquake seismographs

  Group8: The first thing that comes to me is the earthquake chart. A variable reading. And also it looks like a woodprint. I like things that repeat itself, but each one is different if you look closely.

  Group10: (A) I was at Ft. Mason art show and one artist's final project was a graph of rainfall and it was very different looking, but the same idea.

  Group11: Yeah it does seem familiar, like x-rays. A series of things, like medical EKG's. It also looks like a piano

  Group13: Reminds me of a seismograph; I thought maybe there'd be a needle here of some sort.

Group14: Just the seismograph

Group16: (A) I was chemistry minor; it reminds me of a spectragrapher seismic reader--which would be more interesting. (B) Same.

- Other devices and media (4 groups)

  Group4: (A) It reminds me of an old camera, back in the day. (B) Photo paper, cyanotypes.

  Group5: Only playing with blueprint paper in my dad's office as a kid. It was paper he'd let us put things on and lay it out in the sun to make prints.

  Group7: Like some kind of computer printout. Like a reading.

  Group9: It makes me think of crazy projects I did in architecture class, printouts

- Other museums or museum exhibits (2 groups)

  Group15: A similar thing at the Smithsonian

  Group17: Yes, in the Exploratorium where you jump up and get caught (Shadow Box exhibit).

SUMMARY

- A majority (15 out of 17) of the visitor groups who stopped at the exhibit looked closely at the printout and tried to interpret its meaning.
- Most of these visitors (13 out of 15) noticed the dots and recognized that the dots represented raindrops.
- However, close to half (7 out of 15) of the visitors who looked at the raindrop plot also found parts of the printout hard to interpret. Some people were confused by the residual grey bars at the beginning of the printout. Others were not sure whether to focus on the black or the white parts of the record, or what the white and black bars even mean. These findings suggest that visitors need more help interpreting the printout than that currently provided in text. For example, we may try to *point out what different parts of the printout (e.g. the black bars, the white spaces, the white dots) mean using an example plot on a graphics panel*.

  To help identify some other ways of improving the representations used in this prototype, we asked visitors in this study to tell us what the exhibit prototype, particularly the plot, reminded them of. These responses (e.g., seismograph, cardiogram) may give some clues as to the types of representations visitors are familiar with and may, therefore, have an easier time deciphering.

- On average, visitors found the exhibit *somewhat not interesting*. For some visitors, the exhibit did not do enough, if anything; they wanted to see it in action. Other visitors found the prototype and printout hard to understand. We note that the two are somewhat related: visitors may have an easier time understanding the exhibit if

they had a chance to see it work. But, developing a prototype that visitors can see work in real time may be particularly challenge for the Brannan Street site. It would need to be robust enough for that environment; we would need to find a way to power the exhibit. And, finally, it is not clear that visitors would be willing to stop and look closely at this or any other exhibit when it's raining. Given all these hurdles, we may want to *consider implementing this exhibit idea at the PFA*.

- Nonetheless, some visitors saw potential in the exhibit prototype. It provoked their curiosity about the rain. The fact that a large majority of the visitors took the time to look closely at the printout is an encouraging finding. However, some visitors seemed more intrigued by the exhibit design itself than the outdoor phenomenon it captured. *We should look for ways to capitalize on visitors' interests in reading the rain while downplaying the mechanisms of the contraption in future iterations.*

ACKNOWLEDGEMENTS

The author would like to thank Fay Dearborn, Mary Kidwell, and Heather Posner for collecting the data for this study. This material is based upon work supported by the National Science Foundation under Grant number 0104478. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.



APPENDIX A

Observations

Note anything of interest. In particular, make note of the following:

1. Did they look at the printout?
2. Did they look at the box?
3. Other observations…

Questions

1. How interesting did you find that experience? Would you say that was …

Uninteresting	Somewhat Uninteresting	Neutral	Somewhat Interesting	Interesting
1	2	3	4	5

2. What made it _____ for you?
3. Did you get a chance to look at the paper printout?
4. Can you tell me what you saw or noticed on the printout? [Probe: what type of pattern did you see? Was there anything different in the markings on the paper?]
    a. What do you think the markings and the patterns on the paper printout show or indicate?
    b. [If did not mention dots or circles] Did you see any white circles or dots on the black portions of the printout?
        i. [if YES] What do you think they indicate?
5. Did the exhibit make you curious about anything? Anything in particular about the rain? Anything you would like to know more about?
6. Does this exhibit remind you of anything else you've experienced or seen before?
7. I know that there's very little information about the exhibit, but can you make a guess as to what this exhibit is about? What do you think the exhibit designer is trying to show or tell you with this exhibit?