Chasing the Odds
Post-Redesign Evaluation
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THIS IS A POST-REDESIGN EVALUATION REPORT

After an exhibit has been renovated, redesigned, or refurbished in preparation for the Exploratorium's move from the Palace of Fine Arts to Pier 15, an interview and observation study is conducted. The purpose of the study is to identify any major issues that would require immediate attention prior to the move. This collection of redesign evaluations will serve as a baseline of information for the Exploratorium's new exhibit set at Pier 15.

Post-redesign studies like this one **are conducted quickly,** which may mean:

- small sample sizes
- expedited analyses
- brief reports

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Study Goals

After an exhibit has been renovated, redesigned, or refurbished in preparation for the Exploratorium's move from the Palace of Fine Arts to Pier 15, an interview and observation study is conducted. The purpose of the study is to identify any major issues that would require immediate attention prior to the move. This collection of redesign evaluations will serve as a baseline of information for the Exploratorium's new exhibit set at Pier 15.

General goals:

- To confirm that visitors are able to access and use the exhibit
- To confirm that visitors can build a basic understanding of the exhibit's content
- To uncover visitors' frustrations and confusions
- To understand whether visitors move on from an exhibit for intrinsic or extrinsic reasons

Exhibit Description

Six bars of white race upward toward individual finish lines. The bars are part of a histogram that shows the number of times that a particular end result of an experiment has occurred. The visitor may choose one of three experiments. For example, in one experiment the computer "rolls" two dice and computes the sum. The visitor also chooses the total number of times that the dice will be rolled. Each time the computer "rolls" a 7, bar number 7 advances by one towards its goal. The finish line represents the average expected result. For example, if the visitor chooses 360 rolls of two dice, the sum would be 7 on the average of 60 times. The actual result of a single real experiment containing 360 rolls will seldom be sixty sevens.

This exhibit lets the visitor rapidly repeat dice rolling experiments so that they can compare the real result to the expected result over and over again. As the number of rolls in each experiment increases, the percentage difference between the average and the actual results will diminish.

Methods

Uncued observations and interviews were conducted. A researcher randomly selected visitors who crossed an imaginary line on the floor that stopped facing the exhibit with two feet planted and either looked at or touched the exhibit for approximately 15 or more seconds.

Uncued visitors do not know they are part of the study until after they finish using the exhibit so their behavior can be considered representative of normal use patterns. This means that some of the visitors in this study may have used the exhibit only briefly.

Visitors were approached after they left the exhibit and asked if they would be willing to participate in a 7-question interview about their experience at the exhibit.

Demographics

Gender	Count (N=12)
M	7
F	5

ESL	Count (N=12)
N	11
Y	1

Estimated Age	Count (N=12)
8-12	4
13-17	0
18-29	3
30s	4
40s	1
50s	0
60+	0

Group Composition	Count (N=12)
Adults-only	6
Adults with children	6
Adults w/ teens	0
Adults w/ teens and children	0

Findings

Holding Time

This is the time the visitor spent using or otherwise engaged with this exhibit. The amount of time a visitor spends at an exhibit is influenced by many factors and can indicate level of engagement or interest, but not as a measure on its own.

Time at exhibit	mm:ss (N=12)
Mean	3:04
Median	1:09
Minimum	0:31
Maximum	12:59

Visitor Behaviors

Visitors were observed as they used various parts of the exhibit.

Rolls 2 dice <100x?	Count (N=12)
Yes	6
No	6

Rolls 2 dice <1,000x?	Count (N=12)
Yes	5
No	7

Rolls 2 dice and 1 dice same # times to compare?	Count (N=12)
Yes	6
No	6

Does NOT stop to look at graph between rolls?	Count (N=12)
Yes	5
No	7

Visitor Interest

Visitors were asked about their interest in the exhibit and why they rated from "not interesting" to "very interesting" (1 – 7).

Interest level	Count (N=12)
High Interest (6-7)	3
Moderate Interest (4-5)	6
Low Interest (1-3)	3

Visitor responses:

H	Definitely a 7! It estimates…it shows how many it was before then it shakes. I dice is the exact same amount as twice. [Tell me more, what is twice?] It is the same amount but double the dice. You can tell because of the graph.
H	I play a lot of games that involve dice. It's interesting to understand the probability. It was not always equal, there was a lot of variety.
H	It took time to read and figure out what was going on. F2: It took us a couple of trials to understand the point.
M	It was interesting to turn it and try to get it to the red level. But it was kind of hard.
M	I work in computer graphics. I liked looking at the motion of the dice falling. When I saw the title, it was great. I knew it somewhat had to do with probability. The probability of hitting the same amount with one dice is to be expected--it's in the middle. I guess, if you were in Vegas, pick 6-8s. [Tell me more, why 6-8?] (Points to graph where white bars are highest on 6, 7 and 8 and are very close to red lines, he plays with exhibit again). I didn't try spinning this thing. It maxes at 10,000. I didn't read the instructions. It was on 10,000 when I started. If it is less, it probably won't be quite as clear because the sample size isn't quite as large.
M	It was cool having as many number of dice as you wanted.
M	The comparisons between 1 and 2 dice.
M	I always like statistics. I enjoyed watching it grow rather than just seeing the results (on the graph).
M	Because it was a little hard but a little fun. It was fun how many of these (points to dice) fell down.
L	There's a lot of reading at the top. I thought it would show something spectacular but that (graphic) just ended up something up. It needs light, something to pop out.
L	I like math a lot. I play card game and dice games but it is not very interactive.
L	On the plus side, it's electronic, it moves. I make the computer interface. It's interesting to see how it works. On the negative side, because it's electronic, you don't get the same hands on. You don't get to see what's going on. I've seen similar simulations with dropped beads so you see the up and downward (points to graph) distribution. You do it in a physical way. It's engaging.

Visitor Frustration or Confusion

Visitors were asked to tell us if there was anything confusing or frustrating, what the source of the frustration was, and whether or not it made them want to leave the exhibit and move on to another one.

Source of visitor frustration or confusion*	Count (N=12)	# that wanted to move on
Didn't read/too much text	4	2
It was hard to get to stay at the red level	1	1
Unclear	1	0
The chart	1	0
How to control it	1	0
Nothing Frustrating or Confusing	4	--

*Totals may add up to more than N = 12 because visitors gave more than one response.

Visitor Understanding

Visitors were asked what they think the exhibit was about with the goal to determine whether or not they have a basic understanding of the concepts presented and to identify possible areas of misunderstanding. We acknowledge that this study has a small sample size and that these findings illustrate trends and may not be representative.

It appears that visitors DO have a basic understanding of concepts presented.	X
It appears that visitors DO NOT have a basic understanding of concepts presented.	

Visitor responses:

- Just the probability of what dice...What odds are that a number comes up.
- Just about the probability of getting a certain number with a certain number of rolls. The results are more well defined with the more rolls there are.
- About dice. [Tell me more?] Not sure, I just came here for the first time for a birthday party.
- The odds.
- About getting to the red line and not going over the top or below.
- Showing how the predictability model works. The more you do something, the more you follow the model.
- Statistics.
- That eventually if you roll dice x amount of time, the probability will happen. One dice you have a 1 in 6 probably of getting a number. 2 dice increases it. Given enough rolls, everything is expected to hit the probability.
- Shows the probability of throwing dice.
- Probability… basically the greater number of events, the more you will see patterns.
- I don't know.
- Ummm...no.

Visitor Reasoning for Leaving the Exhibit

The goal of this question is to explore how open or closed-ended the exhibit seems to be for the visitor. Visitors tend to leave exhibits for intrinsic reasons, such as feeling bored, or finished with the experience, or for extrinsic reasons, like having to go to lunch or being distracted by another exhibit. Leaving for intrinsic reasons could suggest a more close-ended exhibit experience.

Reasons for moving on to the next exhibit	N=12
Intrinsic	9
Extrinsic	3

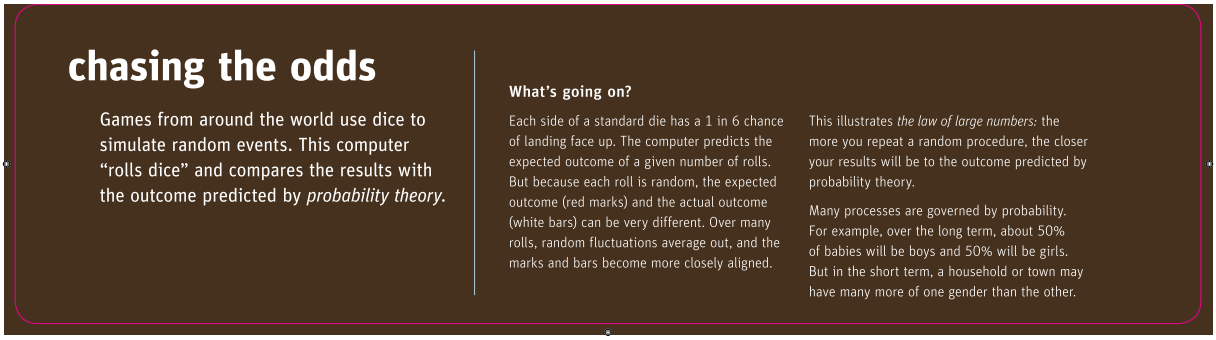
Visitor responses:

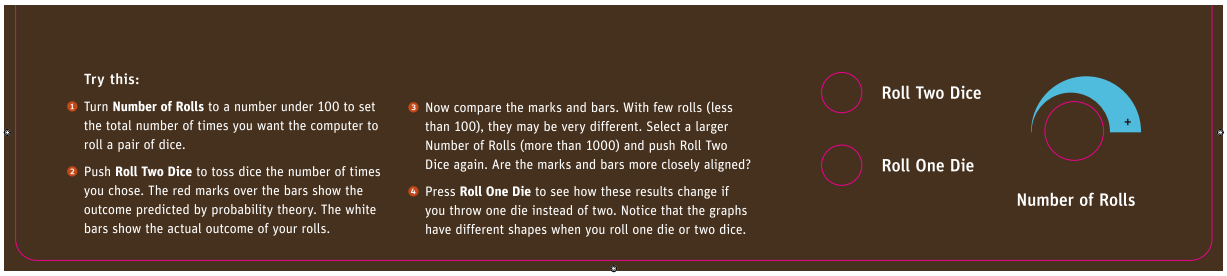
Intrinsic	It was kind of confusing and difficult.
Intrinsic	I finished. I already figured out what it was supposed to do.
Intrinsic	Played out all the questions I had. I found what I needed to find in it.
Intrinsic	Good questions -- some things are more tactile, more enticing for adults. They are noisier (someone dropped something behind us and then points to the Spindrift exhibit). The more text there is, the more easily I'm distracted. And the number of rolls was unclear. It was unclear that I was already at the max. (When he began exhibit, the knob was set to 10,000 and doesn't turn further to the right, once at that point.) I thought this didn't move.
Intrinsic	I pushed the button. I did what I thought you had to do and I moved on to play with the rings (Spindrift).
Intrinsic	I just finished it.
Intrinsic	No, the title is pretty clear.
Intrinsic	After seeing what it did. I would have to stay longer if it did more rolls -- 1, 2 dice…you see that your chances improve with a lot of rolls, even given the basic types of buttons.
Intrinsic	I had gotten the message. It only does a couple of things. There are 3 controls, there are a small number of variables. After a certain number you move on.
Extrinsic	I don't want to miss doing each one. So I'm doing them for a while to find the one I like the best. So far they are all pretty cool.
Extrinsic	I wanted to come to the next exhibit. I wanted to see more stuff.
Extrinsic	Lack of time, I wanted to see more. We've been here all day and only just got this far.

Conclusions

Based on this small sample, we conclude that the redesigned exhibit does not require immediate remediation. This evaluation did not identify sufficient impediments to visitor use, engagement or basic understanding.

APPENDIX: Graphic Panels





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