

Spinning Blackboard

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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 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

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Spinning Blackboard Cued Interviews

Goals of the interview

This study is a response to a request by exhibit developer, Charles Sowers, to investigate what visitors do at Spinning Blackboard and their response to a cued challenge.

Specific Goals:

- To find out how visitors use the exhibit.
- To discover the visitors response to the challenge of drawing a rectangle in the sand as well as some other shape of their choosing.
- To learn if attempting to draw a shape with straight lines changed the way the visitors viewed the exhibit and if it helped hi-light the idea of relative motion.

Methods

- 25 interviews total were conducted on weekdays and weekends.
- The third visitor aged 16 or older who passed an imaginary line was approached and asked to participate in the interview.
- The visitor played with the exhibit and then was interviewed afterwards.
- The exhibit was located on the mezzanine, in the middle of the floor, in between the Listening Vessels.
- The amount of time spent at the exhibit was recorded.
- The visitor was observed using the exhibit. (At times, it was very difficult to see what the visitor was actually doing at the exhibit because of traffic at the exhibit or other obstructions.)

Summary of the results

- The median time the visitors spent at the exhibit was 3 minutes 29 seconds.
- 15 males and 10 females were interviewed.
- 11 of 25 visitors were observed straining to read the label (either leaning in or squinting).
- Overwhelmingly the visitors seemed to know what they were supposed to do at the exhibit. Almost half the visitors said that they read the instructions and made the suggested patterns. A several visitors said that they played with the exhibit first, and then read the label.
- When using the exhibit, many of the visitors reported that they primarily made patterns in the sand. What is meant by “patterns” is the patterns or designs suggested on the label. Many visitors played and used the tools in the sand. “Play” is defined as patterns and designs not specifically mentioned on the label (see *Detailed Results Question 2*)
- If the goal of the exhibit was to help visitors understand the idea of circular motion, this did not come across to most visitors as the main point of the exhibit. Since the minimum age of the interviewees was 16, age should not be considered as a factor as to why it was not mentioned more often. Most visitors thought that the main point of the exhibit was to make patterns in the sand or to have fun and play (19 of 36). Some people said they didn’t know what the main point was (7 of 36). About a third of the responses mentioned something about the effects of circular motion or what it is like to experience a spinning wheel. (see *Detailed Results Question 3*)
- The visitors reported really liking the exhibit and thought it was a good tool for creation, as well as a fun exhibit.
- Many visitors could not think of anything that they didn’t like about the exhibit. Some visitors were frustrated by others visitors using the exhibit at the same time.
- When the visitors were given the challenge to make a rectangle in the sand, many visitors repeated the question back, as if to say, “really, are you asking me to make a rectangle, how do I do that?”

- When attempting to make a rectangle, several behaviors were common amongst visitors; many visitors hovered above the board to trying to get a sense of where they would start to make their mark on the spinning surface, many visitors made one line of the rectangle each time the board circled around, many visitors, after attempting and failed, moved to the center of the board and tried to create a small rectangle in the middle, visitors also found themselves reaching across the board trying to chase their shape.
- Most of the visitors thought that the challenge was hard or that it couldn't be done. Many of the comments were delivered in a tone of amusement or surprise. Many of the visitors seemed a little stumped about how to approach the challenge. They often laughed as they saw the results of their attempts on the board.
- Many visitors commented that in making the shapes, they realized that the fact the board was spinning changed what they drew. They also made some discoveries about straight lines vs. curved lines. Several visitors reported that the challenge they tried made them see and discover something new.

Detailed Results

N=25

Table 1. Age Demographics

| 16-21 | 22-29 | 30's | 40's | 50's |
|---------|---------|----------|--------|--------|
| 8 (32%) | 4 (16%) | 10 (40%) | 2 (8%) | 1 (4%) |

Question 1. Did you have a sense of what you were supposed to do at the exhibit?

| I read the instructions/ label | I figured it out quickly | I played, then read instructions | To make patterns & designs | It took me a little while | I observed others | Kids don't read, they play |
|--------------------------------|--------------------------|----------------------------------|----------------------------|---------------------------|-------------------|----------------------------|
| 10 (40%) | 4 (16%) | 4 (16%) | 4 (16%) | 1 (4%) | 1 (4%) | 1 (4%) |

Question 2. What are some of the things you did at the exhibit**?

| Make Patterns | Play | Use Tools | Frustrated by others | Reported that they did what the instruc. Said | Watched others |
|---------------|------|-----------|----------------------|---|----------------|
| 23 | 10 | 7 | 6 | 6 | 1 |

**Each visitor could give more than one response.

Patterns: The patterns or designs suggested on the label

- I smoothed it out. I made the circles.
- I leveled it. I tried making the circles clockwise and counter-clockwise. It makes a different shape. I used my fingers to make the spirals.

Play: patterns and designs not specifically mentioned on the label

- A star. Squiggling lines and various patterns.
- I made spirals, flowers, flattened the sand, and made ridges.

Question 3. Your sense of the main point of the exhibit**

| Make Patterns | Have fun/play | I don't know | Effects of circular motion | Experiencing a spinning wheel |
|---------------|---------------|--------------|----------------------------|-------------------------------|
| 12 | 7 | 7 | 7 | 3 |

**Each visitor could give more than one response.

Some responses for "Effects of circular motion" and "Experiencing a spinning wheel"

- To see how (pause) to see what spinning does. The forces involved when things spin.
- That the rotation speed is slower in the center and faster around the outside.
- It reminded me of a potter's wheel - a sense of creation with a rotating environment.
- A straight line isn't necessarily a straight line because of the motion from underneath.

- *Instructions wanted to bring home linear and circular motion can make geometric shapes. Spirals were clear, epicycles were more subtle, but they can be appreciated.*

Question 4a. *What did you like best about the exhibit?*

| Patterns/ shapes/ creation tool | It is fun | It is hands-on /tactile | Nothing | For more than one person | Unique sandbox | For all ages |
|---------------------------------------|-----------|----------------------------|---------|--------------------------------|-------------------|--------------|
| 13 | 8 | 5 | 5 | 3 | 2 | 1 |

**Each visitor could give more than one response.

Question 4b. *What did you like least about the exhibit?*

| Nothing | Frustrated by others | Issues with tools or exh. structure | It doesn't hold attention | Younger kids missed the point | No data |
|---------|-------------------------|---|---------------------------------|-------------------------------------|---------|
| 8 | 8 | 4 | 2 | 2 | 1 |

**Each visitor could give more than one response.

Question 5 and 6. *Comments made while attempting to make a rectangle and another shape***

| It is hard/ "you can't" | It makes a circle | Repeats the question | Easier in the middle | No audible comments | It takes practice |
|----------------------------|----------------------|-------------------------|-------------------------|------------------------|----------------------|
| 14 | 6 | 5 | 5 | 3 | 1 |

**Each visitor could give more than one response.

Question 7. *Did either activity get you thinking about the exhibit in a different way?*

| <i>yes</i> | <i>yes</i> | <i>yes</i> | <i>yes</i> | <i>no</i> | <i>n/a</i> | <i>n/a</i> |
|--------------------------------------|--|-----------------------------------|----------------------------------|--|-----------------------------|---------------------------|
| Straight lines vs. curved | Spinning changes things | You have to strategize | I liked the challenge | I didn't think about it differently | I was frustrated | Answer unclear |
| 8 | 5 | 4 | 3 | 4 | 3 | 1 |

**Each visitor could give more than one response.

- *Yes, it made me think about how to get a straight line rather than a curved line.*
- *A straight line is not a straight line.*
- *Yeah, it made me think about the nature of a circle - how it is difficult to make angled shapes - ones with sharp edges.*
- *It is harder to make straight lines.*
- *Yeah, it did. It helped to show movement more. When you try and do a straight line, you can't do it.*
- *Yeah, why circles work and rectangles don't feel right - it must be related to the spinning.*
- *You have to think about how you make the shape and the consequences of having a spinning wheel. You have to think ahead. It makes a simple exhibit much more complicated.*

*Question 8. Straight line and spinning board – these two motions add together or effect each other***

| This made me see something new | I already knew that | Straight lines are hard because of spin | Rectangle/ shape didn't work | You just get a curved line/circle | Answer unclear | Shapes are harder then lines | This didn't really show that |
|---------------------------------------|----------------------------|--|-------------------------------------|--|-----------------------|-------------------------------------|-------------------------------------|
| 5 | 4 | 4 | 4 | 3 | 2 | 1 | 1 |

**Each visitor could give more than one response.

Conclusions/Preliminary Recommendations

This exhibit has high initial engagement – whether visitors read the label or not, the exhibit is accessible to them.

It might be worthwhile to add the challenge of trying to make a rectangle in the sand and explore the level of frustration felt by the visitors. Since almost all of the visitors indicated that they didn't think they could make a rectangle, perhaps the label could alert the visitors to the fact that this might be difficult or give them a hint on how to approach it.

When the visitors were playing with the exhibit prior to the interview, it was observed that 11 of 25 people were squinting or leaning across the board to read the text on the label. In the next iteration, special consideration might be taken to ensure the images have good contrast and the type is large and bold.

Acknowledgments

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