Zebrafish Stories

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March 2004

Imaging Station – Front-End Evaluation
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PURPOSE

Our content developer, Jen Frazier, had sketched 6 possible stories, each of which is intended to help visitors explore different aspects of the zebrafish specimen at the Axiovert standalone exhibit. Before developing the stories in detail, however, Jen asked for visitors' input to identify

- which zebrafish story visitors find most interesting
- what aspects of those stories visitors find interesting

These results will help determine which stories to develop and what these stories should offer the visitors.

SETUP

- The plasma screen, which hangs above the exhibit, was switched off to avoid attracting other visitors to the exhibit during the interviews.
- A black cloth was draped over the media piece to avoid distracting the visitors during their interview.

METHOD

- Cued Interviews
- N=17
- Visitors (either as individuals or in pairs) were recruited from the Life Sciences Area of the Exploratorium
- Before each interview, the evaluator made sure that either an embryo that had developed its heart or a hatched zebrafish was in view on the monitor
- Visitors were asked to look at the zebrafish on the monitor and to answer a few questions. These questions are in Appendix A.
- Data was collected on Saturday, March 13 and Sunday, March 14, 2004.

PARTICIPANTS

- Groups

Group Type	Count
Individuals	11
Adult	8
Teen	1
Child	2
Groups	6
Adult	3
Adult-children	2
Children	1
Total	17

RESULTS

The group is the unit of analysis in this study.

Which stories did visitors find interesting?

Which 'hooks', or headlines, attracted interest?

- We showed each visitor group the headlines for 6 alternative stories and asked which ones sounded interesting and which ones did not. At this point, we gave visitors no additional information about what they would get to do or what they might find out for each story. This was done to assess how effective the titles may be as hooks into each story and its activities. Visitors found the following interesting:

Headline	Count (out of 17)
What do you see?	
Find out what you are looking at on the microscope	6 (35%)
I spy…What can you find inside a zebrafish?	
Look for the heart, eye, and blood in a living zebrafish!	8 (47%)
What do you have in common with a zebrafish?	
Find out what you and a zebrafish have in common!	9 (53%)
How do we develop?	
See how you developed from a single cell by comparing human and zebrafish embryos	9 (53%)
Heart Explorer - Explore a zebrafish's beating heart	
Look at a zebrafish's beating heart, and find out how it's like yours!	**11 (65%)**
Healthier Humans	
Zebrafish are helping us cure human diseases - find out how!	4 (24%)

- We looked at the tally for different types of visitors: adults, children and teens, and family (cross-generational) groups. Because of the small number of data points for each group, we cannot determine if one group prefers different stories compared to another group.

Headline	Adults (out of 11)	Kids and teens (out of 4)	Family (out of 2)
What do you see?	4 (36%)	1 (25%)	1 (50%)
I spy…What can you find inside a zebrafish?	5 (45%)	1 (25%)	2 (100%)
What do you have in common with a zebrafish?	4 (36%)	3 (75%)	2 (100%)
How do we develop?	6 (55%)	3 (75%)	0 (0%)
Heart Explorer - Explore a zebrafish's beating heart	7 (64%)	2 (50%)	2 (100%)
Healthier Humans	3 (27%)	1 (25%)	0 (0%)

- We then asked visitors to rank the headlines they found interesting, from most to least interesting:

Headline	1st	2nd	3rd
What do you see?	1	4	1
I spy…What can you find inside a zebrafish?	**5**	1	2
What do you have in common with a zebrafish?	3	3	2
How do we develop?	2	4	3
Heart Explorer - Explore a zebrafish's beating heart	**5**	4	2
Healthier Humans	1	1	2

What made a story interesting?

What did visitors want to do and find out?

- We asked what visitors thought they would get to do and find out with each story that would make it interesting to them. We then looked at their responses ***across*** the different stories to help identify common characteristics of the stories and activities that visitors think would be interesting. (See Appendix B for visitors' responses listed by story.)

Visitors want to…	Count (out of 17 visitors)
Look at and identify parts e.g. Visitor3: See different parts - what they look like and where they are (in the organism) Visitor12: Guess what parts are, and maybe told if they are right.	10
Look at the heart and blood, in particular e.g. Visitor4: Focus in on heart - see how it works. Pick out individual parts, how blood is flowing. "Explore" maybe this means diving inside, like from the point of view of a blood cell. Visitor16: See their heart beating. Just thought that was so cool to see.	10

Visitors want to…	Count (out of 17 visitors)
Learn[1] about commonalities of Zebrafish to humans e.g. Visitor6: DNA - how people develop, how different we are from Zebrafish. I know we're only 3% different from Chimpanzees and [I] know that embryos look similar… technical information and how we've developed. Visitor15: To learn about a number of things - zebrafish and humans, commonalities, connections.	9
Compare human to Zebrafish e.g. Visitor2: [see] picture of selves and zebrafish Visitor14: How to read own heart rate - compare to zebrafish's. Who has higher heart rate - zebrafish or humans - questions and answers	8
Compare and see different stages of development e.g. Visitor16: See them be born and develop, see the stages Visitor4: shows the life cycle. Sperm and egg, compare picture of embryos in different stages and similarities and differences with our development and zebrafish.	7
Learn about how zebrafish can cure human disease e.g. Visitor9: Learn how they can cure humans Visitor16: Understand how they could help us - what in their makeup would help us understand diseases, medicines, or heart attacks.	5
Learn about the zebrafish as an animal e.g. Visitor8: Different species of fish - why they are here so long, what made them survive and adapt when others didn't. Where are they in food chain? Visitor10: How they survive on this earth.	4
Identify things, nothing specified e.g. Visitor1: Point something out, there might be a key or picture to identify things Visitor6: what you're looking at	4

[1] These categories draw a distinction between 'learn' and activities, such as comparing and identifying, that also leads to learning. 'Learn' is used to indicate information visitors are expecting to get.

Visitors want to…	Count (out of 17 visitors)
Find and see things, nothing specified e.g. Visitor5: to look - just to Visitor12: Looking for things	3
Play a game e.g. Visitor1: Identify parts in the egg/embryo - like the game "operation." Visitor11: I'd like to play "bumperfish" and make them run into each other. I guess that's a bad impulse, though	3
Learn about development e.g. Visitor11: About the process from fertilization to incarnation Visitor13: How they develop	3
Learn about the parts e.g. Visitor8: Parts - why it has the parts it does - tails, fins, why it's so transparent? Visitor17: knowledge about specific body parts.	2
Look at SMALL things e.g. Visitor1: Structure - the biological structures of small creatures. [would be really cool to see how tiny these are in real size.] Visitor17: here's the size of adult zebrafish, scale to show magnification	2

What happened after visitors found out more about a story?

- Finally, we gave visitors a short description of what they would get to do and find out for each of the 3 most interesting stories they selected. They were then asked, again, to put them in order from most to least interesting now that they knew more about each story. They were also asked to explain their decision.

Headline	1st Before description	1st After description[2]
What do you see?	1	0
I spy…What can you find inside a zebrafish?	5	3
What do you have in common with a zebrafish?	3	4
How do we develop?	2	4
Heart Explorer - Explore a zebrafish's beating heart	5	3
Healthier Humans	1	2

- The top preference is more evenly distributed among 5 stories. This may be because what visitors get to do and find out are similar among the different choices.
- "What do you see?" remained the least popular first choice. As a visitor explained:

  Visitor1: the activities for I spy inside and Develop would cover the info in See and more, so I'd pick the others

- We also found that a few visitors became more interested in stories with a more biomedical emphasis:

  Visitor14: I really want to know about the relevance of new medicines or heart attacks - how zebrafish relate to these issues

- Alternatively, one visitor was disappointed by the focus on biomedical relevance.

  Visitor7: I like the more abstract parts of this. Some of the descriptions seem PC to me. For instance, I don't think that looking at zebrafish would really help us with heart attacks, since fish don't have all the myriad factors that lead to heart disease (lack of exercise, smoking, cholesterol, drinking.) … [it] seems to smack of political correctness in reaching for practical applications. I'd rather see information for pure science rather than that. Talking about the practical application (how this relates to humans) seems unnecessary.

- A couple of visitors thought that "making parts of the Zebrafish glow' was particularly 'cool'.

[2] One group did not complete the interview.

SUMMARY

- Visitors were most likely to be 'hooked' by the Heart Explorer headline. Eleven out of 17 visitors (65%) found it interesting, and 5 visitors picked it as their top choice.

- However, visitors were not only interested in looking at the heart. They were also interested in understanding the commonalities between humans and the Zebrafish in general.

- A smaller number of visitors were initially interested in the biomedical relevance of the sample. Yet, as they learned more, some of the visitors became more intrigued. This suggests that we may want to develop the biomedical story as a story that visitors can explore after they have already become engaged at the exhibit.

ACKNOWLEDGEMENTS

This material is based upon work supported by the National Institutes of Health Grant R25 RR15627 and the David and Lucile Packard Foundation (Grant 4365).

Department of Health and Human Services • National Institutes of Health

Supported by a Science Education Partnership Award (SEPA) from the National Center for Research Resources

APPENDIX A: Interview Questions

1. I'd like you to look at a few ideas for different activities we're thinking of offering at this exhibit. I know I'm not telling you very much about these activities right now, but I would like you to tell me which ones sound interesting to you and which ones do not. [Show card and read]

Activity	Interesting?
What do you see?	
I Spy… What can you find inside a zebrafish?	
What do you have in common with a zebrafish?	
How do we develop?	
Heart Explorer Explore a zebrafish's beating heart	
Healthier Humans	

2. (Take the interesting pile) Will you put them in order, from most interesting to the least interesting?

3. (Pick top 3, for each of the 3) Can you tell me what you think you get to do with this activity that makes it interesting to you?

4. (Pick top 3, for each of the 3) Can you tell me what you think you get to find out from this activity that would be interesting to you?

5. (Pick top 3) We're still trying to figure out exactly what visitors will do and get to find out for each activity. This is our first guess. So at this one you get to [read] and you get to find out about [read]. And for this one… [read for each of the 3]

   Now that you know a little more about each activity, will you put them in order from most to least interesting?

6. Can you tell me a little bit about why you put them in that order? So, why was this the most interesting and this the least interesting of these three?

APPENDIX B: Visitors' Responses to Questions 3 and 4

Story: What do you see?

- Can you tell me what you think you get to do with this activity that makes it interesting to you?

  Visitor1: Point something out. There might be a key or picture to identify things. It would be interactive. [It would be cool to have options about what to pursue.]

  Visitor5: to look - just to look

  Visitor6: [see] Description of parts of zebrafish, and how the zebrafish are affecting others

  Visitor11: Be able to identify egg, fully hatched ones, and the differences in how they look.

  Visitor12: Guess what parts are, and maybe told if they are right.

  Visitor17: Just explanation of how to use the exhibit, what's going on - that it's live, etc

- Can you tell me what you think you get to find out from this activity that would be interesting to you?

  Visitor1: Structure - the biological structures of small creatures. [would be really cool to see how tiny these are in real size.] Structures at each stage.

  Visitor6: what you're looking at and why, why it's important.

  Visitor11: What kind of animal this is - at first I thought these were frogs

  Visitor12: Identify parts - more biology in general.

  Visitor17: How to use it. Here's the size of adult zebrafish, scale to show magnification

Story: What can you find inside a zebrafish?

- Can you tell me what you think you get to do with this activity that makes it interesting to you?

  Visitor1: Identify parts in the egg/embryo - like the game "operation." Or there could be a person there, interacting with the visitor, asking questions like "Can you see the ax?"

  Visitor3: have reference for different parts

  Visitor8: Looking at how many parts - a diagram of parts of Zebrafish

  Visitor9: Look for things - find the things listed.

Visitor11: Look around and see if there are any other fish. I'd like to play "bumperfish" and make them run into each other. I guess that's a bad impulse, though

Visitor12: Looking for things - some kind of drawing/diagram

Visitor14: Try to find parts - identify what we're looking at.

Visitor17: Find things, body parts off a list - with lift-up flaps for view or hint.

- Can you tell me what you think you get to find out from this activity that would be interesting to you?

Visitor1: Structure - the biological structures of small creatures. [would be really cool to see how tiny these are in real size.] Structures at each stage.

Visitor3: See different parts - what they look like and where they are (in the organism)

Visitor8: Parts - why it has the parts it does - tails, fins, why it's so transparent?

Visitor9: Learn about zebrafish

Visitor11: About the process from fertilization to incarnation.

Visitor12: Same as the others, you know - and also how the zebrafish is created.

Visitor17: knowledge about specific body parts.

Story: What do you have in common with a zebrafish?

- Can you tell me what you think you get to do with this activity that makes it interesting to you?

Visitor2: [see] picture of selves and zebrafish

Visitor3: Put picture of zebrafish/picture of person - put together? Take apart, see differences.

Visitor8: [see] Split screen with human development.

Visitor10: How they are described; what they eat, how they duplicate, how they breathe.

Visitor12: Kind of same as Heart - also showing side-by-side picture. [and I want to know about genes - how many, what we have in common for them]

Visitor13: Reading about it and seeing what we have in common with them.

Visitor14: Compare - no other idea. What are similar between zebrafish and humans - a graph or picture that's you'd push a button to light up parts.

Visitor15: See something - like some comparison. In format, I would think it would be more visual than tactile.

- Can you tell me what you think you get to find out from this activity that would be interesting to you?

  Visitor2: Picture of selves and zebrafish - find what they have in common.

  Visitor3: find out what you have in common.

  Visitor6: DNA - how people develop, how different we are from Zebrafish. I know we're only 3% different from Chimpanzees and [I] know that embryos look similar… technical information and how we've developed.

  Visitor12: Find out how similar we are, even though outwardly, we're very different. Do we have similar progressions of development?

  Visitor13: How zebrafish are similar to us.

  Visitor15: To learn about a number of things - zebrafish and humans, commonalities, connections. Too much to really list here for you in a linear manner.

Story: How do we develop?

- Can you tell me what you think you get to do with this activity that makes it interesting to you?

  Visitor1: Be able to trace back and forth, the developmental stages in the eggs. It would show things in common: spine, heart.

  Visitor2: Wind it back and see how they change from beginning to now.

  Visitor4: shows the life cycle. Sperm and egg, compare picture of embryos in different stages and similarities and differences with our development and zebrafish.

  Visitor5: Very little - mostly just like what you have here.

  Visitor6: Show similarities and show connections between us and zebrafish. Maybe show how we're conceived as well as development.

  Visitor7: is more for older folk, those who already understand concepts in reproduction. I think you see the stages of embryo development, from fertilization to neonatal.

  Visitor10: How they survive on this earth.

  Visitor13: Watching them grow their fins and stuff like that.

  Visitor16: See them be born and develop, see the stages

- Can you tell me what you think you get to find out from this activity that would be interesting to you?

  Visitor13: How they develop

  Visitor16: How we develop - similarity to zebrafish.

Story: Explore a zebrafish's beating heart

- Can you tell me what you think you get to do with this activity that makes it interesting to you?

Visitor2: Look at the zebrafish's heart maybe

Visitor3: Look at heart through microscope. Picture of human heart - list of similarities and differences.

Visitor4: Focus in on heart - see how it works. Pick out individual parts, how blood is flowing. "Explore" maybe this means diving inside, like from the point of view of a blood cell.

Visitor5: Very little - mostly just like what you have here.

Visitor7: More for little kids - it has the oooohhh factor. I think you'd look at the beating heart, it would explain to me how I'd see it. I'd also be encouraged to look at other things to see. This (see the beating heart) would be like the hook that would lead me to seeing lots of things in the zebrafish.

Visitor8: See all the parts, the heart beating. Maybe show a split screen with diff things on each half.

Visitor9: Compare zebrafish to our heart. See zebrafish heart beating.

Visitor12: Look at picture of parts of zebrafish and human hearts, compare them. Also compare a movie of a beating heart with the one onscreen.

Visitor14: How to read own heart rate - compare to zebrafish's. Who has higher heart rate - zebrafish or humans - questions and answers.

Visitor15: Similar, but not as much comparison, until I read the fine print here about comparing zebrafish heart to human heart.

Visitor16: See their heart beating. Just thought that was so cool to see.

- Can you tell me what you think you get to find out from this activity that would be interesting to you?

Visitor3: how it's similar/different to us

Visitor4: Picking out details, heart, learning body parts of zebrafish. More general description.

Visitor7: Learn about anatomy - learn more about vascular system, zebrafish's systems. This would lead to connections or similarities to other biological systems in mammals, reptiles.

Visitor8: Different species of fish - why they are here so long, what made them survive and adapt when others didn't. Where are they in food chain?

Visitor9: Learn about zebrafish

Visitor12: Functioning of heart - also measuring heart rate

Visitor15: Similar, but focused on information about hearts.

Visitor16: Learn about the human heart.

Story: Healthier Humans

- Can you tell me what you think you get to do with this activity that makes it interesting to you?

  Visitor4: More in-depth, higher level, how research is conducted on human diseases. I see this as more informational, less of an activity.

  Visitor9: Learn how they can cure humans

  Visitor16: See the similarities - what they're looking for in the zebrafish to help us.

- Can you tell me what you think you get to find out from this activity that would be interesting to you?

  Visitor4: what kind of research, which diseases, drugs? Is something taken from the zebrafish or are they looking at comparable processes?

  Visitor16: Understand how they could help us - what in their makeup would help us understand diseases, medicines, or heart attacks.

  Visitor17: Why do animal research and why on zebrafish? What animals are used for what traits, and what about zebrafish is used in relation to humans.