

Sea Urchin Embryos on the Axiovert200M

Joyce Ma and Jackie Wong

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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

Imaging Station - Formative Evaluation Sea Urchin Embryos on the Axiovert200M

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PURPOSE

To determine

- how interesting visitors found the sea urchin specimen
- what questions visitors had about the specimen
- what difficulties visitors had at the exhibit
- what visitors wanted to do but couldn't do at the exhibit

These results feed into an iterative process to develop the standalone exhibit and accompanying media piece for the sea urchin specimen.

METHOD

- Cued Interviews
- Interview Times

Date	Day
4/24/03	Thursday
4/27/03	Sunday

- Visitors were recruited individually from the Life Sciences Area on the Mezzanine of the Exploratorium
- Each visitor was asked to use the controls (the joystick and the focus knob) to find something to look at under the microscope and to ask the evaluator any questions s/he had.
- Each visitor was then asked a series of questions about the experience. These questions are in Appendix A.

PARTICIPANTS

- Gender

Gender	count
female	8
male	8
Total	16

- Age Group

Age Group	count
adult	13
teen	2
child	1
Total	16

RESULTS

How interesting visitors found the sea urchin specimen

- Tally

Interest Rating	count
Interesting	5
Somewhat interesting	7
Neutral	4
Somewhat not interesting	0
Not interesting	0

- Visitors found the urchins interesting for the following reasons:
 - Visitors were able to look at live organisms
 - [Interesting because they're] living organisms. Pre-embryo.
 - That it's alive.
 - Obviously alive.
 - The sea urchin is an interesting specimen
 - Just seeing them, interesting being able to see baby sea urchins
 - That they were little eggs, hatching. Once I found out what they were, it's really interesting.

- The sea urchins are pretty
 - I'm an artist. They are really pretty and amazing to look at.
 - They look pretty but that's it.
- Visitors could compare different developmental stages
 - To see how big they are to how small.
 - Like how things are different sizes, different things to look at.
 - [To] see the different stages
- Visitors enjoyed controlling the microscope
 - Fun to look at and to control the microscope.
 - It's still neat that you can control a microscope like this
 - Interesting to sit here and try to focus, try to see things in detail.
 - The ability to maneuver it
 - I like how you have to search. You have to find it.
- Visitors liked looking at something under the microscope
 - Interesting because I'm looking at something tiny.
 - You don't usually get the chance to see something like this.
 - Like that it's microscopic, seeing things what you don't usually see.
 - I love using microscopes and you've got a very nice one here.
 - Seeing something I haven't seen before
 - It's a lot easier to look at than the other microscope exhibits you have. Two people can look at it at the same time. I was trying to have him look at what I saw over there, but it's really hard to have both people look at the same thing and talk about it.
- Visitors complained about the following:
 - There was not enough information
 - [It] needs more explanations
 - You're telling me what I'm looking at. That's the most interesting part. Can't beat having someone explains things to you.
 - There were not enough instructions
 - I'm not sure exactly what I'm supposed to do.
 - It was not engaging enough
 - There's not a lot of entertainment in here. This is the type of thing that I usually lose interest in after a while.

What questions did visitors ask about the specimen?

To inform content development, we asked visitors what they would like to know about what they saw on the monitor. The following lists visitors' questions according to 4 broad categories:

- Identification questions
 - Identifying the specimen
 - What is that?
 - Are they all sea urchins?
 - Are these baby sea urchins?
 - Aren't they animals?
 - Are they larvae or something?
 - Tiny ones [sea urchins]?
 - Are they immature ones?
 - What are they exactly? Are they independent creatures at this point or just embryos?
 - Why are these ones so small?
 - What's the stuff in the background?
 - Identifying parts
 - Do they have a mouth or something? Is that the mouth on top?
 - I bet that's food inside. Those specks
 - How come you can see through them?
 - What are these things here? [pt to orange structure inside]
 - Are these eyes? [pt to bubble looking thing near top of pluteus]
 - Identifying developmental stages
 - Are they the same things?
 - Why do they look different from each other? [blastula and gastula]
 - How old are these ones?
 - These aren't very old are they?
 - [Is that] A newly born one?
 - This one has eggs it seems. [clump of dividing cells happen to be next to pluteus]
 - Is that an egg? [unfertilized]
 - What's that one? [clump of cells]
 - So is that one an egg? [blastula]
 - What's that? [pluteus] it looks very different from the others.
- Questions about what the specimen is doing
 - How do they move?
 - Are they moving on their own or just floating around?
 - Can you see the cilia moving? Actually getting the cilia in focus?
 - What's that one doing? It's not moving

Looks like it's sucking the water in. At least moving the stuff in the water if not actually sucking them in

Do they attract each other? They seem to gather over there.

Is this the ground [point to edge of slide]? They seem to be standing on it. When they are sitting there [edge of slide], are they doing anything in particular?

Maybe they are eating or sleeping when they are doing that [being still].

Do they communicate with each other?

- Questions about how they develop

It's amazing that they are already this complex when they are so small. I wonder how they develop into full grown sea urchins.

How much will they grow like this? Will they actually develop into an adult?

Do they get big? You mean, these get that big? They're actually the same thing?

Wow. Now that's interesting. You should have a picture of that here.

How long does it take for them to get that big?

I didn't know that sea urchins go through this stage. I guess I never really thought about how they reproduce either.

When do they get their colors? I don't think they stay transparent, do they?

- Questions about the Sea Urchins on the Microscope at the Exploratorium

Where did you get these from?

Is this a drop of sea water?

Are they in salt water?

Are they on a piece of glass, a petri dish or something?

All under one plate on the scope?

There's a lot on one slide

Is that the scope behind right there?

What is the magnification?

Is there a zoom?

Maybe you should play with filters to highlight the colors a little bit

Are these alive still?

Are these actually going to grow to be adults?

Do they survive under the microscope?

How do these look like without the microscope?

Are they invisible to the human eyes?

How big are they actually?

What's that? [edge of slide]

It's neat how they still can swim up and down [in z-axis, in and out of focus.] It looks really flat.

Will this exhibit be just sea urchin or will there be other specimens to look at?

– Questions about the Sea Urchins in the Larger World

Where do they naturally live?

Are they from the bay?

Can you find these at the beaches around here?

Can you see them in the ocean?

Do they have an important part in bio system?

What they eat and what eats them?

What do the adults eat?

(when told humans eat sea urchins) I would never thought of that. I guess they remove all the spiny part and eat whatever's inside.

Is this what you eat at the sushi bar? This is uni?

So how long do they live?

Are they studied for some particular purpose?

What difficulties did visitors have with the exhibit?

Five out of 16 visitors had some difficulty using the exhibit, although none of these visitors thought the difficulty detracted too much from the experience. Two visitors complained that the specimen kept moving making it difficult to look at them closely. And, three visitors complained that it was difficult to focus on a specimen. This may be because the specimens are moving too quickly in the z-plane for visitors to quickly focus on them.

What did visitors want to do that they couldn't do at the exhibit?

We also asked visitors if there was anything they wanted to do at the exhibit that they could not do. Visitors mentioned the following:

- Visitors wanted a different magnification

Bigger view. Different magnification

Maybe to see them a little closer. So you can see more details.

Being able to change the magnification or filter.

It'll be nice to zoom in, but I imagine that would be very hard to do.

- Visitors wanted more information

Maybe more information.

It'll be nice to have a diagram to know what each of these is.

Just more info. Maybe some pictures describing what I'm supposed to look at, since

I don't think you'll have someone here answering questions all the time.

- Visitors wanted accompanying props

See the actual slide, so you understand how much they are magnified.

[You] should stick a big sea urchin here.

- Visitors wanted to stop or slow down the urchins
Maybe a way to stop one of the sea urchins and look at them better, especially for the kids.

SUMMARY

- Most (75%) visitors thought the experience was interesting or somewhat interesting. Visitors found the experience interesting because
 - They were able to look at live organisms
 - The sea urchin is an interesting specimen
 - The sea urchins are pretty
 - Visitors could compare different developmental stages
 - They could control the microscope
 - Visitors could look at something with the microscope
- Visitors asked questions about what they saw including what developmental stage the different embryos were in and the different parts of an embryo. They also asked questions about what the urchins were doing including the developmental process, as well as questions about the sea urchins specifically on the microscope and more general questions about urchins in the wild.
- A few visitors (2/16) had difficulty looking at the sea urchin because the specimen was moving too fast or because they (3/16) had trouble focusing on an urchin.
- When asked some visitors wanted the following to supplement their experience at the microscope
 - Visitors wanted a different magnification
 - Visitors wanted more information
 - Visitors wanted accompanying props (slides and adult sea urchins)
 - Visitors wanted to stop or slow down the urchins

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APPENDIX A**Interview Questions**

1. How interesting would you say that was to look at? Would you say that the specimen was ...

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

2. What made it _____ for you?

3. Did you have any trouble using the exhibit? What?

4. Do you have any questions about what you saw? What would you like to know about what you saw at that exhibit?

5. Is there anything you wanted to do at this exhibit but couldn't? What?

APPENDIX B

Equipment used for stand-alone

- Axiovert200M
 - Magnification 20x
- MCU28
- Display
 - Optronics DEI750D
 - Sony Trinitron 19inch CRT monitor
- Metamorph version 5.0
- Game pad control: joystick2002_11_21_limits_scaled