

GFP Flies on the LEICA Dissecting Microscope - Usability and Interest

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April 2004

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 GFP Flies on the LEICA Dissecting Microscope: Usability and Interest

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PURPOSE

This study was conducted to:

- identify usability problems with the visitor controls including
 - joystick for stage control,
 - knob for focus control,
 - touchscreen slider for zoom control, and
 - touchscreen buttons for UV light control (on and off)
- gauge visitors' interest in looking at GFP flies
- collect visitors' questions about the specimen to inform content design

METHOD

- Cued Interviews
- Interview Times
 - Saturday, April 24, 2004
 - Sunday, April 25, 2004
- Visitors (8 years and older) were recruited from the Life Sciences Area on the Mezzanine of the Exploratorium.
- Before each interview, the evaluator zoomed out so that the entire search area was in view.
- Visitors were asked to control the microscope to try to find something to look at and to describe what they were doing during the process. If a visitor came with a group, the other members of the group were welcome to stay and watch but were asked to not use the controls.
- After finding a specimen, visitors were then asked to use the controls to try to take a closer look at the specimen.
- Each visitor was then asked a series of questions about what they saw under normal and UV light and under lower and higher magnification. These questions are in Appendix A.

PARTICIPANTS

- N = 16

| Gender | Count |
|--------|-------|
| Female | 6 |
| Male | 10 |
| Total | 16 |

| Age Group | Count |
|-----------|-------|
| Adult | 13 |
| Teen | 2 |
| Child | 1 |
| Total | 16 |

FINDINGS

Usability

How difficult was it to control the microscope? (Visitor's Self-Report)

| Difficulty Rating | Count |
|--------------------|-------|
| Easy | 6 |
| Somewhat easy | 8 |
| Neutral | 2 |
| Somewhat difficult | 0 |
| Difficult | 0 |
| Total | 16 |

Usability Problems (From Observations and Interviews)

- XY Stage Control
 - The xy controls are ‘backwards.’ That is, some visitors felt that the image movement was counterintuitive; they thought that pushing the joystick up should move the image up, not down. (7 out of 16 visitors)
- Focus Control
 - The focus knob on the visitor cart was not working during this evaluation study. The LEICA focus knob was used instead. This report, therefore, does not list issues with using the focus control.
- Zoom Control
 - Zooming requires visitors to look at the touchscreen and track their finger as they move the slider. This does not allow users to look at what's changing on the viewing monitor and can impact the feedback and the sense of control they have over this feature. (1 evaluator)

- The step size does not mimic continuous motion. The change appears ‘jerky’ which goes counter to the continuous representation (slider control) and the continuous variable (zoom) being controlled. Although no visitor complained about this, it may become more of an issue in future interfaces where the action (moving the slider) and the results (seeing the view zoom in / out) are more closely coupled. Currently, visitors cannot simultaneously move the slider and look at the main viewing monitor.
- Some visitors did not realize that the touchscreen was a touchscreen and that they could use the slider to control the zoom. (5 out of 16 visitors)
- Zoom was sometimes confused with focus since focusing also seemed to make the image larger. (2 visitors)
- Zooming all the way out would cause the microscope to zoom in. (1 visitor)
- Users had to be careful with how quickly they moved the slider. Otherwise, they ‘lose’ the slider. (1 visitor)
- It was difficult to look at the specimen when zoomed in because the flies were moving too quickly. (1 visitor)
- UV Light Control
 - Visitors were not sure how the UV light changed the image. (3 visitors)
 - Visitors could not tell whether the UV light was on or off from the touchscreen buttons. (2 visitors)
 - There is a noticeable delay in UV light control. (1 visitor)
- Additional comments
 - One visitor wanted physical controls instead of touchscreen controls.
 - One visitor asked for a way to control the contrast of the main image.

Visitors’ Interest

How interesting was the exhibit to visitors

| Interest Rating | Count |
|--------------------------|-------|
| Interesting | 5 |
| Somewhat interesting | 6 |
| Neutral | 4 |
| Somewhat not interesting | 1 |
| Not interesting | 0 |
| Total | 16 |

What made the exhibit interesting

- Looking at the flies (6 visitors)
 - Visitor6: neat to see up close the physical structure
 - Visitor7: their wings look really beautiful w/ the light reflecting. They're really colorful
 - Visitor9: Just the fact that they're fruit flies and they're interesting to look at. I just learned about them in genetics class. That they're interacting with each other.
 - Visitor11: The ability to observe the insects close up.
 - Visitor14: I like the glowing body parts.
 - Visitor15: There were bugs and you can see them moving around, and I like to follow them.
- See things up close (5 visitors)
 - Visitor1: interesting how close up you get and that too [zoom] like magnification
 - Visitor4: just seeing it you get to see that close.
 - Visitor7: it's neat to look close-up.
 - Visitor11: The ability to observe the insects close up.
 - Visitor13: Because you could zoom in and see them close up.
- Controlling the scope (2 visitors)
 - Visitor2: playing with the controls
 - Visitor8: it's really interesting using the scope. The flies themselves aren't too exciting

What made the exhibit not interesting

- Too ordinary (2 visitors)
 - Visitor1: not interesting because something I see everyday like normal flies.
 - Visitor12: Nothing extraordinary. What I thought were mutated wings were maybe not.
- Want to see other things (2 visitors)
 - Visitor1: More interesting if it's protist or underwater things.
 - Visitor3: fruit flies not all that interesting. Maybe bee or something
- Need more information/context (1 visitor)
 - Visitor5: if there's more info

Visitors' Questions

The following are questions that visitors asked about what they saw on the main viewing monitor.

- Identification
 - Visitor5: what kind of flies?
 - Visitor6: what it is?
 - Visitor11: I would be interested to know what the insects are.
 - Visitor13: Are they flies?
 - Visitor15: What are these bugs?
- Fly features and attributes
 - Visitor1: how big are they?
 - Visitor9: Is that the natural color o the flies?
 - Visitor9: Maybe how old they are?
 - Visitor12: How old are the fruit flies?
- Fly behavior
 - Visitor12: Is there anything that could describe their behavior?
 - Visitor15: What are they eating?
 - Visitor15: What are they searching for?
- Are they special?
 - Visitor2: Is there an experiment going on? Or is it just a sample of flies?
 - Visitor8: anything special about the flies?
- GFP
 - Visitor14: Probably more about the glowing parts. It would be interesting to see one with the glowing parts and one without [side by side].
- Life in the lab and on the slide
 - Visitor5: so you raise [the flies] in lab?

NEXT STEPS

- Consider implementing a mechanical slider to control zooming in and out. This may address some of the usability issues identified in this report; in particular
 - Some visitors do not readily realize that the touchscreen is a touchscreen and that they can use it to control the microscope.

- With the touchscreen slider, visitors have to look at the slider as they control the zoom making it difficult to concurrently look at the image they're zooming in on/ out from.
- Visitors may lose the touchscreen slider bar if they are moving it too quickly.
- In addition, a touchscreen slider raises accessibility issues. Visitors with dexterity problems may find it difficult to use the touchscreen slider. On the same note, we will need to make sure that any mechanical slider implemented is accessible to visitors with limited hand dexterity.
- Reverse the directionality of the xy control. Some visitors find the control counterintuitive. They expect that the joystick moves the *image* not the window for what they're seeing. This change will also make this control consistent with the current implementation of the Zeiss user interface.
- Revisit the implementation of the touchscreen buttons for UV light control. The interface should always reflect and clearly indicate the current state of the UV light, whether it is on, off, or unavailable. No indication suggests that the control is broken.
- This study includes a list of questions visitors would like to explore and a list of what visitors find interesting about the specimen. These lists may be useful in designing the content for the accompanying media piece.

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APPENDIX A**Interview Questions**

Q1: How easy or difficult was it to control the microscope?

| | | | | |
|-----------|--------------------|---------|---------------|------|
| 1 | 2 | 3 | 4 | 5 |
| Difficult | Somewhat difficult | Neutral | Somewhat easy | Easy |

Q2: What difficulties did you have?

Q3: Did you have any difficulties trying to take a closer look or zooming in?

Q4: How interesting would you say that is to look at?

| | | | | |
|-----------------|--------------------------|---------|----------------------|-------------|
| 1 | 2 | 3 | 4 | 5 |
| Not interesting | Somewhat not interesting | Neutral | Somewhat interesting | Interesting |

Q5: Is there anything in particular that makes it _____ to look at?

Q6: Do you have any questions about what you saw?

[What would you be interested in finding out about what you saw?]