

Usability - Axiovert200M Visitor Interface

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May 2002

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 Usability – Axiovert200M Visitor Interface

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PURPOSE

- To determine if visitors are able to use the visitor interface to remotely control the Axiovert200M
- To identify difficulties visitors have in using the visitor interface

These results feed into an iterative design process to develop a usable visitor interface for the Axiovert200M.

METHOD

- Cued Interviews ($N=10$)
- Visitors were recruited from the Life Sciences Area on the Mezzanine of the Exploratorium
- Each visitor was asked to use the touch-screen interface to find something to look at under the microscope and to tell the evaluator when s/he's found something.
- Each visitor was encouraged to describe what s/he saw and what s/he was trying to do as s/he used the interface.

ANALYSIS

- I performed a task analysis to identify the activity flow that Kristina, the microscopist, followed to find and view a specimen with the Axiovert200M. See Figure 1.
- I compared each visitor's interactions with the touch-screen interface against the task flow to determine usability problems.

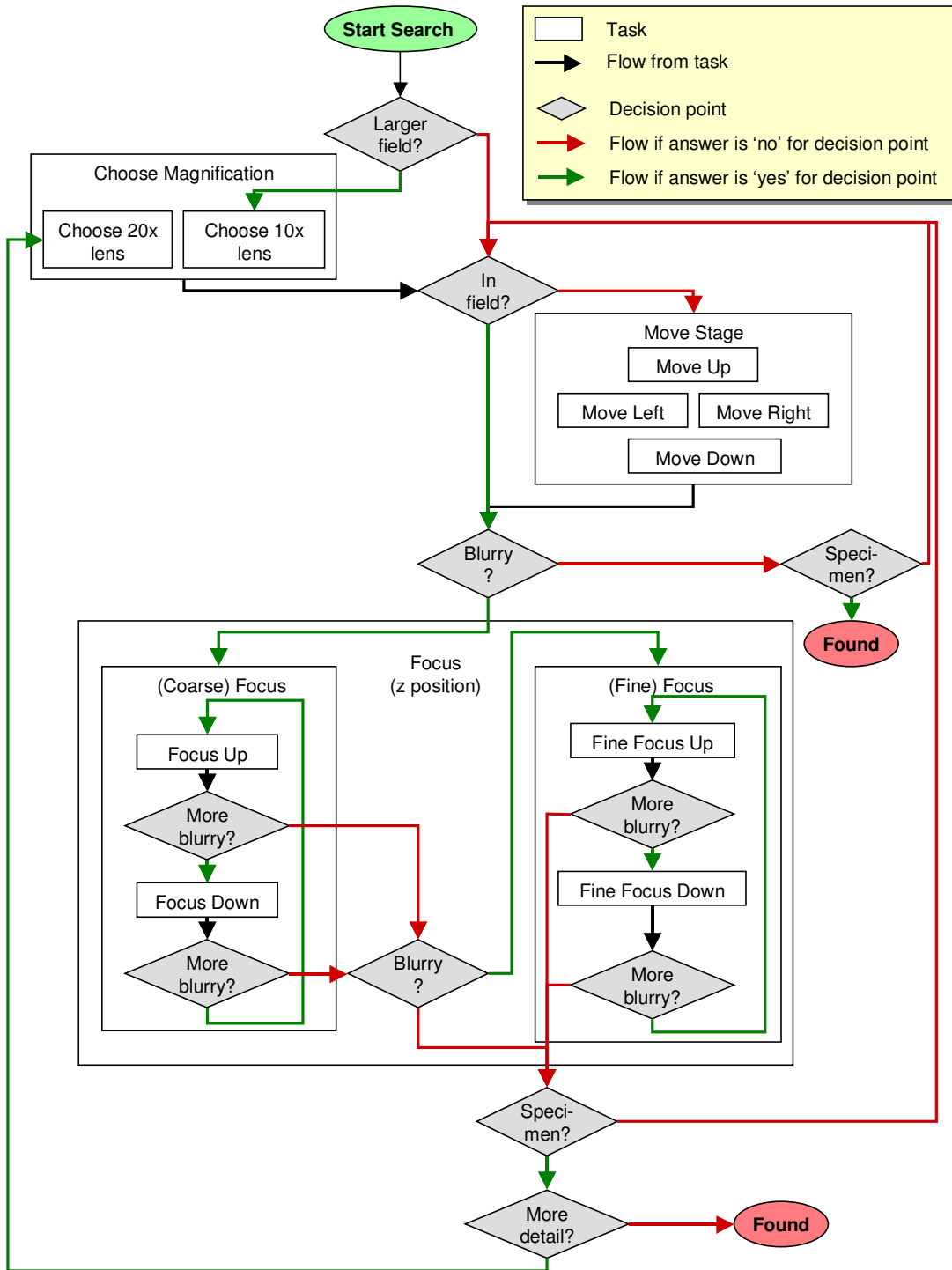
DATA COLLECTED

- Data were collected on Wednesday, May 29 and Sunday, June 2, 2002.
- Demographics

Gender	Count (out of 10)
Male	7
Female	3

Age Group	Count (out of 10)
Child	2
Teen	2
Adult	6

Figure 1. Task Flow for Finding a Specimen under a Microscope



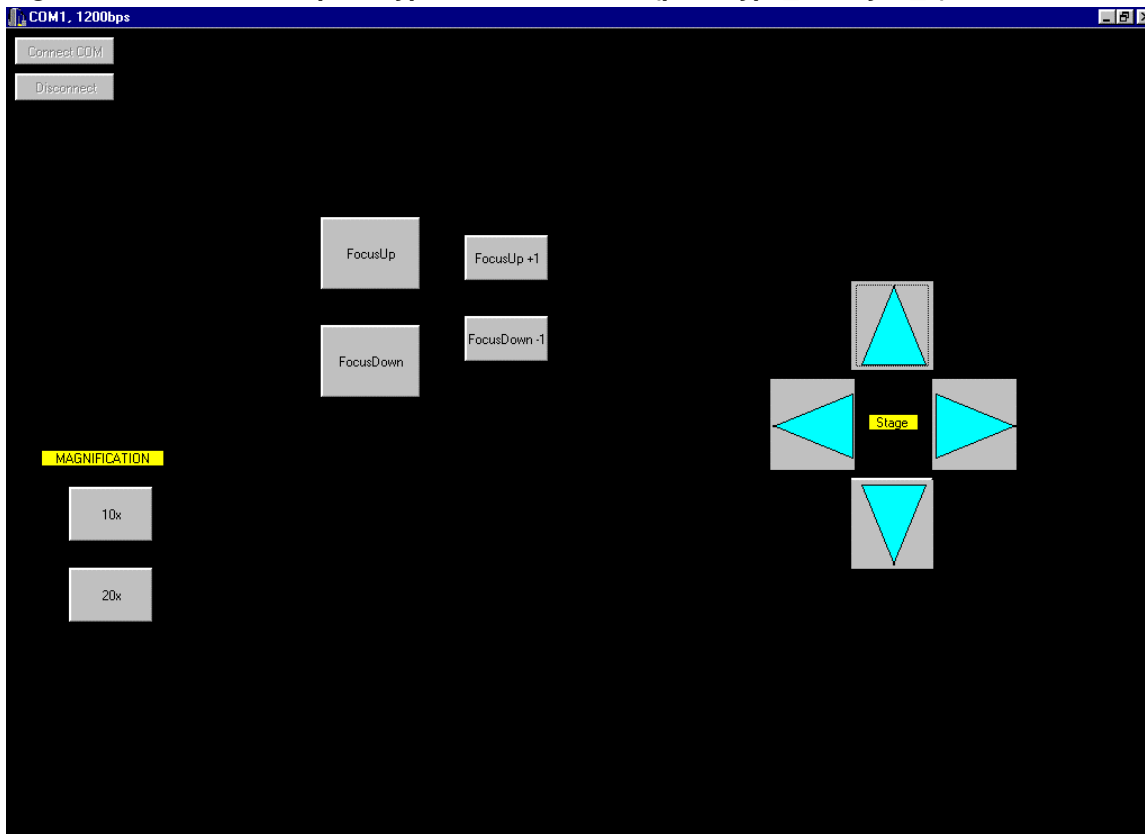
SETUP

Prototype Version: prototype_28may02_1.exe

Supported Tasks

- Move Stage
 - Move Up
 - Move Down
 - Move Left
 - Move Right
- Focus
 - FocusUp
 - FocusDown
 - FocusUp+1 (fine focus)
 - FocusDown-1 (fine focus)
- Choose Magnification
 - 10x
 - 20x

Figure 2. Screenshot of prototype visitor interface (prototype_28may02_1)



Specimen - Amoeba

- Some movement
- Lightly stained
- Slide included other organisms - bacteria (food for amoeba) and weed seed (food for bacteria)

FINDINGS

- 3/10 visitors could not find an amoeba using the visitor interface during their interview. An interview typically lasted 10 minutes.
- A closer look at visitors' task flows and their interactions with the interface showed the following:

Task: Choose magnification

- 7/10 visitors changed the magnification.
- 5/10 visitors began their search using the 20x objective, pressing the 20x magnification button. (The default objective is 10x.) This made it difficult for them to find anything under the microscope since they were looking at a much smaller area of the slide at one time. Some visitors used the 20x magnification throughout their entire interview.
- Some visitors believe that increased magnification helps them “see better”, not just bigger.
- 4/10 visitors repeatedly tapped the same magnification button. For example, they would tap 10x even when the 10x objective was already chosen and in position. This suggests that visitors do not see the two buttons as toggling between two options; instead, they see the 10x button as providing 10 times more magnification with every tap.

Task: Move Stage

- All but one visitor knew to touch the STAGE buttons to move the microscope. The one visitor who did not, thought that she could move the image by doing something with the mouse, though she was not sure what.
- It took a while for some visitors to realize that they need to tap the buttons instead of hold the button down to make the stage move
- 2 visitors complained that the movement was too abrupt (i.e., the step size was too large)
- Some visitors thought the image movement was counterintuitive. For example, they thought that tapping the left arrow should move the image left, not to the right.
- It was difficult for visitors to determine where they were on the slide. Consequently, 3 visitors wandered out of the well into the silicon frame, 2 of whom could not find their way back to the well without coaching from me.
- 4/10 visitors touched the intersection or the 4 move buttons expecting the slide to re-center, a feature that was not supported in this version of the interface.

Task: Focus

- 9/10 visitors used the focus buttons. The one visitor who did not was able to find an amoeba without changing the focus.

- 3/9 visitors used the fine focus buttons. One of these visitors realized during the interview that the fine focus works better with the higher magnification. It is not clear what the other visitors thought the focusUp+1 and the focusDown-1 buttons did.
- One visitor did not change the direction of focus even when the image was becoming blurrier and blurrier. This can indicate that some visitors will not know how to focus a microscope.

Decision: Do I see a specimen?

- When visitors are not told what to look for, they look for things that
 - move somewhat quickly. For example, visitors pointed out the fast swimming bacteria that was included in the sample. However, one of these visitors moved passed an amoeba without stopping, even thought that amoeba was slowing moving.
 - are richly textured. 2 visitors found the silicon frame fascinating because of all the bubbles and lines.
- When visitors are told what to look for (some visitors were given pictures of amoeba to help them search for the specimen), some visitors were very specific in their interpretation of what is a specimen. For example, one visitor thought he had found something only when its shape matched closely to the shape of the amoeba in the picture. Another visitor scanned the well looking to match each of the 4 pictures of amoeba he was given. This warrants further study.

RECOMMENDATIONS

Magnification

- Remove the magnification option.
 - Visitors unfamiliar with how to search for a specimen will not begin with an inappropriate objective.
 - Which objective to use depends on the specimen. We will choose specimens which can be adequately seen with one preset objective.
 - This will allow us to focus on improving other aspects of the interface. We will reintroduce the magnification option at a later date.

Move Stage

- Make xy stage movement less abrupt and jerky.
- Provide visitors with information about where they are on the stage
 - Consider including a graphical ‘map’ of the slide which would indicate where they are looking.
 - Add a ‘centering button’ that will take visitors back to the center of the slide.
- Set xy limits so visitors do not wander outside the well.
- Make buttons look like buttons.

- Allow visitors to hold down buttons for continuous movement.

Focus

- Set focus limits so visitors do not go too far out of focus.
- Make buttons look like buttons.
- Allow visitors to hold down buttons for continuous movement.

Recognizing Specimens

- Experiment with different ways to help visitors know what they are looking for.

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