Individual Programming Assignment 4 (due Mar 3)

Assignment: Low Fidelity Prototype

Due Mar 15
Identify project mission statement.
Create low-fidelity prototype that supports 3 tasks
1 easy, 1 moderate, 1 difficult task
Create a video prototype showing (cameras next class)
How it supports the 3 tasks
Context in which it is used (back story)
Must include narration
Test the prototype with target users
No one from this class
Not your friends
Wizard of Oz Prototype Testing

Conducting a Test

Three or Four testers (preferable)

**Greeter** - Puts users at ease & gets data
  - Gives instructions & encourages thoughts, opinions

**Facilitator** - only team member who speaks
  - Gives instructions & encourages thoughts, opinions

**Computer** - knows application logic & controls it
  - Always simulates the response, w/o explanation

**Observer(s)** - Take notes & recommendations
  - Always simulates the response, w/o explanation

Typical session should be approximately 1 hour
  - Preparation, the test, debriefing

Preparing for a Test

Select your participants
- Understand background of intended users
- Use a questionnaire to get the people you need
- Don’t use friends or family

Prepare scenarios that are
- Typical of the product during actual use
- Make prototype support these (small, yet broad)

Practice running the computer to avoid “bugs”
- You need every menu and dialog for the tasks
- All widgets the user might press
- Remember “help” and “cancel” buttons

WOZ is different from pre-built/canned functionality

Observer (or video camera)

User

“Computer”

Interface

Interface elements
Critical Incidents are any unusual/interesting events. Most of them are usability problems. They may also be moments when the user:
- Got stuck
- Suddenly understood something
- Said “that’s cool” etc.

Using the Results
- Update task analysis and rethink design
- Rate severity & ease of fixing problems
- Fix both severe problems & make the easy fixes

Will thinking aloud give the right answers?
- Not always
  - If you ask a question, people will always give an answer, even if it has nothing to do with the facts
  - Try to avoid leading questions

10 steps to better evaluation
1. Introduce yourself
   - Some background will help relax the subject.

10 Steps
2. Describe purpose of observation (in general terms) and set the participant at ease
   - You’re helping us by trying out this product in its early stages. If you have trouble with some of the tasks, it’s the product’s fault, not yours. Don’t feel bad; that’s exactly what we’re looking for.
3. Tell participant that it’s okay to quit at any time

Although I don’t know of any reason for this to happen, if you should become uncomfortable or find this test objectionable in any way, you are free to quit at any time.

4. Talk about the equipment in the room.

Explain the purpose of each piece of equipment (hardware, software, video camera, microphones, etc.) and how it is used in the test.

5. Explain how to “think aloud.”

Explain why you want participants to think aloud, and demonstrate how to do it. E.g.: We have found that we get a great deal of information from these informal tests if we ask people to think aloud. Would you like me to demonstrate?

6. Explain that you cannot provide help
10 steps

7. Describe the tasks and introduce the interface
   Explain what the participant should do and in what order.
   Give the participant written instructions for the tasks.
   Don’t demonstrate what you’re trying to test.

10 Steps

8. Ask if there are any questions before you start; then begin the observation.

10 steps

9. Conclude the observation. When the test is over:
   Explain what you were trying to find.
   Answer any remaining questions.
   Discuss any interesting behaviors you would like the participant to explain.

10 Steps

10. Use the results
   When you see participants making mistakes, you should attribute the difficulties to faulty product design, not to the participant.
Advantages of Low-Fi Prototyping

- Takes only a few hours
- No expensive equipment needed
- Can test multiple alternatives
  - Fast iterations
  - Number of iterations is tied to final quality
- Can change the design as you test
  - If users are trying to use the interface in a way you didn’t design it – go with what they think! Adapt!
- Especially useful for hard to implement features
  - Speech and handwriting recognition

Drawbacks of Lo-Fi Prototyping

- Evolving the prototype requires redrawing
  - Can be slow (but reprogramming usually slower)
- Lack support for “design memory”
- Force manual translation to electronic format
- Do not allow real-time end-user interaction

Caveats

- There is a down-side to the informal design approach:
- Often hard to involve paying clients as subjects – they treat the fidelity of the interface as a sign of development effort
- Involve clients early and often, correspond with the same people, explain the process up front and set expectations

Topics

- The Model Human Processor
- Memory
The Model Human Processor

Why Model Human Performance?

To predict impact of new technology/interface
Apply model to predict effectiveness
We could build a simulator to evaluate user interface designs
Perceptual Processor

Physical store from our senses: sight, sound, touch, ...
Code directly based on sense used
Visual, audio, haptic, … features
Selective
Spatial
Pre-attentive: color, direction, …
Capacity of visual store
Example: 17 letters
Decay time for working memory: 200ms
Recoded for transfer to working memory
Progressive: 10ms/letter

How many 3’s

1281768756138976546984506985604982826762
9809858458224509856458945098450980943585
985103029905995959577564675050678904567
8845789809821677654876364908560912949686

Visual Pop-Out: Color

http://www.csc.ncsu.edu/faculty/healey/PP/index.html
Visual Pop-Out: Shape

Feature Conjunctions

Preattentive Features

Perceptual Processor

Cycle time
Quantum experience: 100ms
Percept fusion
Perceptual Processor

**Cycle time**

Quantum experience: 100ms

**Percept fusion**

Frame rate necessary for movies to look continuous?

\[ \text{time for } 1 \text{ frame } < T_p (100 \text{ msec}) \rightarrow 10 \text{ frame/sec.} \]

Max. morse code rate can be similarly calculated

**Perceptual causality**

Two distinct stimuli can fuse if the first event appears to cause the other

Events must occur in the same cycle

http://cogweb.ucla.edu/Discourse/Narrative/Heider_45.html

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Perception of Causality [Michotte 46]

Michotte demonstration I. What do you see? Most observers report that the red ball hit the blue ball. The blue ball moved “because the red ball hit it.” Thus, the red ball is perceived to “cause” the red ball to move, even though the balls are nothing more than color disks on your screen that move according to a program.

http://cogweb.ucla.edu/Discourse/Narrative/Heider_45.html
Working Memory

Access in chunks
Task dependent construct
7 +/- 2 (Miller)

Decay
Content dependant
1 chunk 73 sec
3 chunks 7 sec

Attention span
 Interruptions > decay time

Long Term Memory

Very large capacity
Semantic encoding
Associative access
Fast read: 70ms
Expensive write: 10s
Can also move from WM to LTM via rehearsal
Context at the time of acquisition key for retrieval

Cognitive Processor

Cycle time: 70ms
Can be modulated
Typical matching time
Digits: 33ms
Colors: 38ms
Geometry: 50ms...

Fundamentally serial
One locus of attention at a time
Eastern 401, December 1972
Crew focused on landing gear indicator bulb,
Aircraft is losing altitude (horn, warning indicator...),
Aircraft crashed in the Everglades
see "The Human Interface" by Raskin, p25
But what about driving and talking?