Contextual Inquiry and Task Analysis

Due Feb 26
Find and interview 3 target users (not from class)
Pictures of observation/interview locations
Analyze their tasks
Explain how your application addresses their needs
Compare to five closest existing applications
(both mobile applications and other solutions)
See wiki for details

Should have started by now!
Finding participants will take time
We will not accept late group project assignments
Project Idea

Can modify and adapt project based on inquiry and feedback from us

Choose a very specific user group
Lots of projects are aimed at groups that are too large

Think a bit about feasibility
You will have to implement a working application
Can use APIs as necessary
Talk to us if you are worried about this
Due on Friday 2/21
Individual assignment
Choose an smart phone application, conduct a heuristic evaluation of its interface

Heuristic: Consistency and Standards

Explanation: The interface offers inconsistent ways to change different trip options. While a dropdown box to choose departure time and a button to reverse stations are available on the main screen, the origin and destination stations cannot be changed on this screen. To change these options, the user must click on the "i" icon in the top bar (which only becomes visible on mouse rollover).

Severity: 3 = Major usability problem: important to fix, so should be given high priority. I rank this problem as major because it occurs frequently - every time the user wants to change stations; and because it is persistent - there is no way for the user to change application behavior to put all controls on the same page.
Group Dynamics

Feedback on Group Collaboration plan sent to each group on Piazza

Suggestions

Get to know each other better
- share resumes, portfolios, non-technical anecdotes

Be concrete about
- technologies
- roles
- meeting times
- expected turnaround for communication
Modes
Modes: Definition

The same user actions have different effects in different situations.
Examples?
Modes: Examples
The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.

The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.

The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.

The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.
Using Modes in Interfaces

When are they useful?
Temporarily restrict users’ actions
When logical and clearly visible and easily switchable
Drawing with paintbrush vs. pencil

Why can they be problematic?
Big memory burden
Source of many serious errors

How can these problems be fixed?
Don’t use modes – redesign system to be modeless
Redundantly visible
Redesigning to Avoid Modes

Setting the time on a clock

Modal
Redesigning to Avoid Modes

Setting the time on a clock
Quasimodes

Set and hold a mode via conscious, continuous action
Shift key to capitalize (vs. Caps Lock)
Foot pedal that must remain pressed
Pull down menus
Muscle tension reminds users they are holding a mode

Also known as “spring-loaded modes”
Heuristic Evaluation
Usability Heuristics

“Rules of thumb” describing features of usable systems
Can be used as design principles
Can be used to evaluate a design

Example: Minimize users’ memory load
Heuristic Evaluation

Developed by Jakob Nielsen (1994)

Can be performed on working UI or on sketches

Small set (3-5) of evaluators (experts) examine UI

Evaluators check compliance with usability heuristics

Different evaluators will find different problems

Evaluators only communicate afterwards to aggregate findings

Designers use violations to redesign/fix problems
## Nielsen’s Ten Heuristics

<table>
<thead>
<tr>
<th>H2-1:</th>
<th>Visibility of system status</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2-2:</td>
<td>Match system and real world</td>
</tr>
<tr>
<td>H2-3:</td>
<td>User control and freedom</td>
</tr>
<tr>
<td>H2-4:</td>
<td>Consistency and standards</td>
</tr>
<tr>
<td>H2-5:</td>
<td>Error prevention</td>
</tr>
<tr>
<td>H2-6:</td>
<td>Recognition rather than recall</td>
</tr>
<tr>
<td>H2-7:</td>
<td>Flexibility and efficiency of use</td>
</tr>
<tr>
<td>H2-8:</td>
<td>Aesthetic and minimalist design</td>
</tr>
<tr>
<td>H2-9:</td>
<td>Help users recognize, diagnose, recover from errors</td>
</tr>
<tr>
<td>H2-10:</td>
<td>Help and documentation</td>
</tr>
</tbody>
</table>
H2-1: Visibility of system status

Keep users informed about what is going on. Example: response time
0.1 sec: no special indicators needed
1.0 sec: user tends to lose track of data
10 sec: max. duration if user to stay focused on action

Short delays: Hourglass
Long delays: Use percent-done progress bars
Overestimate usually better
H2-1: Visibility of system status

Users should always be aware of what is going on
So that they can make informed decision
Provide redundant information
H2-2: Match System & World

Speak the users’ language
Follow real world conventions
Pay attention to metaphors

Bad example: Mac desktop
H2-2: Match System & World
H2-3: User control & freedom

Users don’t like to be trapped!

Strategies
Cancel button (or Esc key) for dialog
Make the cancel button responsive!
Universal undo
H2-3: User control & freedom

Offer “Exits” for mistaken choices, undo, redo
Don’t force the user down fixed paths

Wizards
Must respond to Q before going to next step
Good for infrequent tasks (e.g., network setup) & beginners
Not good for common tasks (zip/unzip)
H2-4: Consistency and Standards

NEW CUSTOMER

Give us your measurements
Take or ask someone to help take your measurements, by following our easy instructions. It takes just 5 minutes!

Send us your best fitting shirt* (go directly to cart)
If you prefer not to take measurements, you can mail us your best fitting shirt. Our Master Tailor will take the necessary measurements and will return your shirt along with your order.

*: Your shirt will be used for measurements only. We will not copy it.

Visit our NYC showroom (go directly to cart)
Contact us at contact@listerouge-paris.com to plan a private appointment at our New York showroom (Madison Ave & 40th St.).

EXISTING CUSTOMER

Your measurements are on file (go directly to cart)
If your last order fits perfectly, we will make the new shirts with exactly the same measurements.

If your measurements have changed
Simply note your measurements changes compared to your previous shirts.

http://www.useit.com/alertbox/application-mistakes.html
H2-5: Error Prevention

Eliminate error-prone conditions or check for them and ask for confirmation
H2-5: Error Prevention

Aid users with specifying correct input
H2-5: Error Prevention

Don’t allow incorrect input
Preventing Errors

Error types

Slips
User commits error during the execution of a correct plan.

Typos
Habitually answer “no” to a dialog box
Forget the mode the application is in

Mistakes
User correctly executes flawed mental plan
Usually the result of a flawed mental model – harder to guard against
H2-6: Recognition over Recall
H2-6: Recognition over Recall

Minimize the user’s memory load by making objects, actions, and options visible.
H2-7: Flexibility and efficiency of use

http://www.iphoneuxreviews.com/?p=114|
H2-8: Aesthetic and minimalist design

H2-8: Aesthetic and minimalist design

Present information in natural order

Occam’s razor
Remove or hide irrelevant or rarely needed information – They compete with important information on screen
Pro: Palm Pilot
Against: Dynamic menus
Use windows frugally
Avoid complex window management

From Cooper's "About Face 2.0"
H2-8: Aesthetic and minimalist design
<table>
<thead>
<tr>
<th>Field</th>
<th>Type</th>
<th>Collation</th>
<th>Operator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>blog_id</td>
<td>int(11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_name</td>
<td>varchar(255)</td>
<td>latin1_general_ci</td>
<td>LIKE</td>
<td></td>
</tr>
<tr>
<td>blog_description</td>
<td>text</td>
<td>latin1_general_ci</td>
<td>LIKE</td>
<td></td>
</tr>
<tr>
<td>blog_url</td>
<td>varchar(255)</td>
<td>latin1_general_ci</td>
<td>LIKE</td>
<td></td>
</tr>
<tr>
<td>blog_archive_url</td>
<td>varchar(255)</td>
<td>latin1_general_ci</td>
<td>LIKE</td>
<td></td>
</tr>
<tr>
<td>blog_archive_type</td>
<td>varchar(255)</td>
<td>latin1_general_ci</td>
<td>LIKE</td>
<td></td>
</tr>
<tr>
<td>blog_days_on_index</td>
<td>int(11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_language</td>
<td>varchar(30)</td>
<td>latin1_general_ci</td>
<td>LIKE</td>
<td></td>
</tr>
<tr>
<td>blog_file_extension</td>
<td>varchar(10)</td>
<td>latin1_general_ci</td>
<td>LIKE</td>
<td></td>
</tr>
<tr>
<td>blog_news_feed_url</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_draft</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_author</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_title</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_date</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_image</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_age</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_time</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_days</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_hours</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_minutes</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_seconds</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_millis</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_micros</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_nanos</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_stack</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_count</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_threshold</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_timeout</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_error</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_errno</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_error_msg</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_stacktrace</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_length</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_depth</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_file</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_func</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_lineno</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_extra</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_errno</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_error</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_length</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_depth</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_file</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_func</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_lineno</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_extra</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_errno</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_error</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_length</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_depth</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_file</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_func</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_lineno</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_extra</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_writable</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_writable_errno</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_writable_error</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_writable_traceback</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_writable_traceback_length</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_writable_traceback_depth</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_writable_traceback_file</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_writable_traceback_func</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blog_url_cache_valid_traceback_writable_traceback_writable_traceback_writable_traceback_lineno</td>
<td>tinyint(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
H2-9: Help users recognize, diagnose, and recover from errors
Good Error Messages

From Cooper’s “About Face 2.0”
H2-9: Help users recognize, diagnose, and recover from errors
H2-10: Help and documentation

Help should be:
• Easy to search
• Focused on the user’s task
• List concrete steps to carry out
• Not too long
Types of Help

**Tutorial and/or getting started manuals**
- Presents conceptual model
- Basis for successful explorations
- Provides on-line tours and demos
  - Demonstrates basic features

**Reference manuals**
- Designed with experts in mind

**Reminders**
- Short reference cards, keyboard templates, tooltips…
Types of Help

Context sensitive help

Search
New User Guides

Welcome.

Getting Around
Tap to go in, pinch to go out. Swipe from the edge to turn a page.

Choose Your Tool
Swipe up from the bottom edge to pull up the tool tray.

Sharing Ideas
Hit the share button to share an idea to Tumblr, Facebook, Twitter or send an email.

Rewind
Circle with 2 fingers to undo your last moves.
The Process of Heuristic Evaluation
Phases of Heuristic Eval. (1-2)

1) Pre-evaluation training
   Provide the evaluator with domain knowledge if needed

2) Evaluation
   Individuals evaluate interface then aggregate results
   Compare interface elements with heuristics

   Work in 2 passes
   First pass: get a feel for flow and scope
   Second pass: focus on specific elements

   Each evaluator produces list of problems
   Explain why with reference to heuristic or other information
   Be specific and list each problem separately
Phases of Heuristic Eval. (3-4)

3) Severity rating
Establishes a ranking between problems
Cosmetic, minor, major and catastrophic
First rate individually, then as a group

4) Debriefing
Discuss outcome with design team
Suggest potential solutions
Assess how hard things are to fix
Typography uses mix of upper/lower case formats and fonts

Violates “Consistency and standards” (H2-4)
   Slows users down

Fix: pick a single format for entire interface

Probably wouldn’t be found by user testing
Severity Rating

Used to allocate resources to fix problems

Estimates of need for more usability efforts

Combination of Frequency, Impact and Persistence

Should be calculated after all evaluations are in

Should be done independently by all judges
Levels of Severity

0 - don’t agree that this is a usability problem
1 - cosmetic problem
2 - minor usability problem
3 - major usability problem; important to fix
4 - usability catastrophe; imperative to fix
Severity Ratings Example

1. [H2-4 Consistency] [Severity 3]

The interface used the string "Save" on the first screen for saving the user's file, but used the string "Write file" on the second screen. Users may be confused by this different terminology for the same function.
Debriefing

Conduct with evaluators, observers, and development team members

Discuss general characteristics of UI

Suggest improvements to address major usability problems

Development team rates how hard things are to fix

Make it a brainstorming session
Pros and Cons of Heuristic Evaluation
HE vs. User Testing

**HE is much faster**
1-2 hours each evaluator vs. days-weeks

**HE doesn’t require interpreting user’s actions**

**User testing is far more accurate**
Takes into account actual users and tasks
HE may miss problems & find “false positives”

**Good to alternate between HE & user-based testing**
Find different problems
Don’t waste participants
Why Multiple Evaluators?

Every evaluator doesn’t find every problem
Good evaluators find both easy & hard ones
Number of Evaluators

Single evaluator achieves poor results
Only finds 35% of usability problems
5 evaluators find ~ 75% of usability problems
Why not more evaluators???? 10? 20?
Adding evaluators costs more
Many evaluators won't find many more problems

But always depends on market for product:
popular products $\rightarrow$ high support cost for small bugs
The Model Human Processor
Why Model Human Performance?
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
Human Info. Processor

Processors:
- Perceptual
- Cognitive
- Motor

Memory:
- Working memory
- Long-term memory

Unified model

Probably inaccurate
Predicts perf. well
Very influential