Design as evaluation
COMM/INFO 3450
Outline

• Design as evaluation

• Classic definitions of usability
  - And, what they leave out

• Brief intros to discount usability methods
  - Guidelines and cognitive walkthroughs
Reset: design is everywhere

- Basic principles: Norman, graphic design
- Critiquing objects and interfaces
- Designer responsibilities and stances
Reset: design is communication

• Designing for people (and contexts)

• Methods for learning from people

• Tools for recording our learning

• Tools for pondering design alternatives
Reset: design is constraint

- Individual (cognitive, motor) constraints
- Technology constraints (I/O, ubicomp)
- Social constraints (social psych, culture)
Now: design is evaluation

• Standards: usability principles/desiderata

• Methods: discount usability, user testing
  - Tools for rapid iterations and prototyping

• Special topics: awareness, games, agents (?)
Today: Nielsen classic usability rap

- Learnability
- Efficiency
- Memorability
- Errors
- Satisfaction
Learnability...

- **Learnability**: How easy is it for users to accomplish basic tasks the first time they encounter the design?
...through the user lifecycle...

- **Learnability**: How easy is it for users to accomplish basic tasks the first time they encounter the design?
...and in context

- **Learnability**: How easy is it for users to accomplish basic tasks the first time they encounter the design?
Efficiency...

- **Efficiency**: Once users have learned the design, how quickly can they perform tasks?
...is often, but not always, the goal

- **Efficiency**: Once users have learned the design, how quickly can they perform tasks?
Memorability

• **Memorability**: When users return after not using a design, how easily can they reestablish proficiency?
...really does matter

- **Memorability**: When users return after not using a design, how easily can they reestablish proficiency?

http://www.zuschlogin.com/
Errors

- **Errors**: How many errors do users make, how severe are they, and how easily can they recover from them?
...are relative to a goal

- **Errors**: How many errors do users make, how severe are they, and how easily can they recover from them?
Satisfaction

- **Satisfaction**: How pleasant is it to use the design?
Context-appropriate standards

- Word processors
- Games
- Kiosks
- Text messaging
- ArtLinks
- ...?

- Learnability
- Efficiency
- Memorability
- Errors
- Satisfaction
- (...) <= more later
Why didn't you tell us this before?

• Wrong level of detail so far
  – Hard to look at usability at idea level

• They leave things out
  – Usability vs. usefulness
  – “Satisfaction” is pretty narrow...
Don Norman through the years

• 1983: “Everyday tasks should be boring, so people can focus on important things”

• 2004: “Attractive things work better”
Thinking about experiences, too

User Hierarchy of Needs
(and desires)

Flow/Enchantment
- Does it keep me fully engaged, where the world drops away?

Intuitiveness
- Does it feel natural, and doesn’t “make me think?”

Usability
- Is it user-friendly?

Efficiency
- Does it let me do what I need without long workarounds?

Learnability
- Can I learn it quickly?
- Is the manual good?

Correctness
- Does it do it correctly, without a bunch of bugs?

Functionality
- Does it do what I need?
Mini-break

• Question: what are your project's goals?

User Hierarchy of Needs
(and desires)

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Can I learn it quickly? Is the manual good?

Does it do it correctly, without a bunch of bugs?

Does it do what I need?
Education
How do you get those goals?

- Eventually, you need to test with people
  - But that costs time and money

- “Discount usability”
  - Quick, cheap, user-free
  - Cognitive walkthroughs
  - Guidelines
  - Heuristic evaluations
Cognitive walkthroughs

- Exploit the gulfs of evaluation and execution
- Based on code inspections/walkthroughs
- Goal: identify places where the user won’t be able to make progress on a task

http://www.cc.gatech.edu/classes/cs3302/documents/cog.walk.html
A theory of (new) users

• Based on cognitive psychology and 7 stages…

• The user sets a goal to be accomplished with the system ("check spelling of this document")

• The user searches the interface for currently available actions (menus, buttons, fields, etc.)
A theory of (new) users

• The user selects the action that seems likely to make progress toward the goal.

• The user performs the selected action and evaluates the system's feedback for evidence that progress is being made toward the goal.
Good theory?

- Users try label-guided actions first before they try direct manipulations of unlabeled objects.
  - “Information scent”

- Users are reluctant to try atypical actions.

- Users are reluctant to search beyond readily available menus and controls.
You need...

- Some amount of interface
- A defined task and how to do it in the interface
- A persona (or other user description)
- A team: presenter, recorder, questioners
Activities and goals

• Goal: locate problems where users can’t act

• Method: telling stories of success and failure
  – One step at a time
  – Somewhat adversarial

• The four questions
The Four Questions. Will users...

**Be trying to produce whatever effect the action has?** Are the assumptions about what task the action is supporting correct given the user's experience and knowledge so far? e.g., Saving files may not be part of my model.

**Notice that the correct action is available?** Will users see the button or menu item, for example, that is how the next action is actually achieved by the system? An example of when this question gets a negative supporting story might be if a VCR remote control has a hidden panel of buttons.
The Four Questions

Once users find the correct action at the interface, will they know it is the right one? This complements the previous question. It is one thing for a button or menu item to be visible, but will the users know that it is the one they are looking for to complete their task? Are there competing, plausible alternatives? (example: finding courses on a department website)

After they take action, will users understand the feedback they get?
Example

• Moving backwards one slide

• Removing part of a picture
  – Words and icons are hard!

• Finding graduation requirements for an IS major in CALS
Cog walk: uses, assumptions

• Very cog-psychish

• Which usability attributes are emphasized? Ignored?

• A little costly and formal

• Assumptions about users?

• Learnability
• Efficiency
• Memorability
• Errors
• Satisfaction
Sound familiar?

• **GOMS/KLM** *(Card and Moran 1980)*

• **Goals, Operators, Methods, Selection**
  – And the Keystroke Level Model Kid

• **Basic idea: interactions are decomposable**
  – Compute task times from low-level acts
  – Compare alternative interactions

  – But what's missing?
Don Norman through the years

- 1983: “Everyday tasks should be boring, so people can focus on important things”

- 2004: “Attractive things work better”
These **guidelines** are designed to assist you in developing products that provide Mac OS X users with a consistent visual and behavioral experience across applications and the operating system. Following the guidelines is to your advantage because:

Users will learn your application faster if the interface looks and behaves like applications they’re already familiar with.

Users can accomplish their tasks quickly, because well-designed applications don’t get in the user’s way.

Users with special needs will find your product more accessible.

Your application will have the same modern, elegant appearance as other Mac OS X applications.

Your application will be easier to document, because an intuitive interface and standard behaviors don’t require as much explanation.

Customer support calls will be reduced (for the reasons cited above).

Your application will be easier to localize, because Apple has worked through many localization issues in the Aqua design process.

Media reviews of your product will be more positive; reviewers easily target software that doesn’t look or behave the way “true” Macintosh applications do.

The implementation of Apple’s human interface principles make the Macintosh what it is: intuitive, friendly, elegant, and powerful.
Main ideas

• Thinking about attributes you might want an interface to have, with respect to users

• A quick intro to methods for achieving them

• Cognitive walkthroughs as a tool for design