User Experience (UX) Design Process

*User experience* encompasses all aspects of the end-user's interaction with the company, its services, and its products.
User Experience Design is Hard

- Most users are not like you

- Users can’t always tell you what they want

- But, they can sure tell you what is wrong.
  - Consistent problems are the system’s fault
User-centered Design

- Big picture: What does your program do?
- Who are your users?
- What specifically do they want to accomplish?
- How should the interface be designed?
- do { Implement, Test, Refine } while (!done)
Identifying users

- Often many types of users (many dimensions)
  - Sophisticated vs. Novice computer user
  - Social vs. Private
  - Individual vs. Group
  - Time/Money trade-off
  - Beginner, expert (with your application)

- Characterize space using “personas”
Pizza ordering personas

- **College student:**
  - Not much money, eats at irregular times, no car, orders for self or shares with group.

- **Busy professional:**
  - Money >> time, eats at standard dinner time, has transportation, ordering for whole family
What do these people want to do?

- Ask them!!!!

- Characterize as “tasks”
  - Receive notification of special deals, order pizza for delivery, be able to have toppings on part of pizza.
  - Order pizza from office, pick up on the way home.
You won’t get it right the first time:

UX Design is an Iterative Process

- Iteration can be costly
  - Might have to re-write a lot of your code
Spiral Model of Design

- Use throwaway prototypes and cheap evaluation early in the cycle. (We’ll talk about those next week.)
Inspiralional Story

“The ceramics teacher announced he was dividing the class into two groups. One group would be graded on the quantity of work produced. The other on quality. The procedure was simple. On the final day of class the teacher would weigh the work of the “quantity” group to determine their grade. Those in the quality group only needed to make one pot – albeit a perfect one – to get an “A.” At the time of grading a curious fact emerged: the works of highest quality were all produced by the group being graded for quantity. It seems that while the quantity group was busily churning out piles of work – and learning from their mistakes – the quality group had sat theorizing about perfection and had little to show for their efforts other than grandiose theories and a lump of clay.”
Evaluation

- Give user a task to complete, with no explanation of how to accomplish the task
- Have them manipulate the interface
  - Manually make it respond appropriately
- Observe their decisions
- Allow them to ask questions as per help
- Ask for additional feedback.
  - What is missing, frustrating, etc.
Human Factors / User Interface Design Guidelines
How would you interact with this?
How about this?
Design Terminology: Affordances

- An affordance is a relation between an object/environment and an organism that **affords** the opportunity for that organism to perform an action.

- For example, a knob affords twisting, and perhaps pushing, while a cord affords pulling.

- An affordance enables the possibility of some action.
Design Terminology: Signifiers

- A "signifier" is some sort of indicator, some signal in the physical or social world that can be interpreted meaningfully
User Interface design in a nutshell

- Provide the affordances desired by users

- Organize those affordances appropriately
  - “Information Architecture”

- Make your affordances obvious through correct use of signifiers
Usability

- How well users can use the system.

Dimensions of Usability:
- Learnability: Easy to learn?
- Visibility: Is the state of the system clear?
- Efficiency: Once learned, is it fast to use?
- Errors: are errors few and recoverable?
- Satisfaction: is it enjoyable to use?

Design Principles guide building usable systems
- Guided by findings in Ergonomics / Human Factors
Ergonomics / Human Factors

- the scientific discipline concerned with the understanding of interactions among humans and other elements of a system

- applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance

- Characterizes the capabilities and limitations of humans
Human Factors: Power Law of Practice

- The log time to complete a task decreases linearly with # practice trials.
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- Design Principles guide building usable systems
  - Guided by findings in Ergonomics / Human Factors
What is wrong with this?
Design Principles for Learnability

- **Consistency (in design and metaphors)**
  - Similar looking things act similarly
  - Different looking things act differently
  - In wording, location, color, ordering

- Use **common words not jargon**

- Recognition, not recall
  - Labeled buttons rather than command languages

- 2 kinds of users: Beginners & Experts
Alternative Design

[Image of a software window showing options for certificate types including Customer Service Award.]
Visibility

- Avoid affordances w/o signifiers
  - E.g., pop-up menus by clicking on open space

- Avoid hidden modes

- Perceptual Fusion:
  - Stimuli <100ms apart seems fused to humans
  - 10 frames/second appears as moving picture
Efficiency: Hand motion tasks

- Moving mouse on screen
- Finger on keyboard/touchscreen
- Hand from keyboard to mouse

- Fitts’s Law
  - Time = \( a + b \times \log(D/S) \)
  - \( \log(D/S) = \) index of difficulty

- Bigger, closer = easier
- For mousing, S is infinite on edge of screen (good!)
Efficiency: Path Steering Tasks

- Fitts’s law only for unconstrained movements
- Task much harder if constrained to tunnel

\[ T = a + b \left( \frac{D}{S} \right) \]
Design for Efficiency

- Fitt’s Law & Steering Law
  - Important targets: big, nearby, or at screen edges
  - Avoid steering tasks

- Provide shortcuts
  - Keyboard accelerators
  - Bookmarks
  - History
Delete All Records

Are you sure you want to delete all records from the database?

Yes  No
Errors

- Principle: Protect User’s Work

- Prevent Errors as much as possible:
  - Selection rather than typing (within reason)
  - Constrain user input
  - Separate risky commands from common ones

- Undo
- Confirmation Dialogs (when appropriate)
- Understandable error messages
The fixed attribute determines how the column content moves to left/right.

Thumbs are displayed when the 'Thumb' is pressed.

Files are sorted by type: directories, links, programs, documents.

The file viewer: text, pictures, movies.

Drag up or down to change the height of the viewer.

Information about active partition, directory, file, link target.

If you want to sort your projects and notes by time, change the sort mode for each column.

Set the number of columns, for each board.

Set the height of thumbs.

The hint bar shows hints for controls over which the mouse is moved.

Quickly change to a new set of colors.
Simplicity

- Less is More
  - Omit extraneous information, graphics, features

- Hick's Law:
  - time to make a decision is proportional to $\log(\# \text{ choices})$
Whenever your local SMS Administrator sends you an actual software Package, the SMS Package Command Manager will appear (usually at network logon time) displaying the available Package(s). The following screenshots display scenes similar to what you will see when you receive an actual SMS Package.

To start the demonstration, click the "CLICK HERE TO CLICK HERE" button of the screen.
<table>
<thead>
<tr>
<th>Form Title</th>
<th>Background Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q&amp;D Software</td>
<td>FFFBF0</td>
</tr>
<tr>
<td>Development Order</td>
<td></td>
</tr>
<tr>
<td>Desk</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Form Heading</th>
<th>Text Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q&amp;D Software</td>
<td>000080</td>
</tr>
<tr>
<td>Development Order</td>
<td></td>
</tr>
<tr>
<td>Desk</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E-Mail responses to (will not appear on)</th>
<th>Alternate (for mailto forms only)</th>
<th>Background Graphic</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="mailto:dversch@q-d.com">dversch@q-d.com</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Text to appear in Submit button</th>
<th>Text to appear in Reset button</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send Order</td>
<td>Clear Form</td>
</tr>
</tbody>
</table>

Scrolling Status Bar Message (max length = 200 characters)

***WebMania 1.5b with Image Map Wizard is here!!***
Simplicity, cont.

- **Good graphic design**
  - Few, well-chose colors and fonts
  - Group with whitespace

- **Use concise language**
  - Choose labels carefully
How do users hold phones
