Design

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Agenda

- Design challenges
- Idea generation
- Design principles
- Graphic design
Design

- Is it easy?
Difficulties

• Good design can be very challenging
• Why?

Why is Design Difficult?

• 1. Increasing complexity/pressure
  – Number of things to control has risen dramatically
  – Display is increasingly symbolic/artificial
  – Feedback is more complex and subtle
  – Errors are increasingly serious/costly
Why Difficult?

2. Marketplace pressures
   - Time is money
   - Adding functionality (complexity) is now easy and cheap
   - Adding controls/feedback is expensive
   - Design usually requires several iterations before success

3. People often consider cost and appearance over human factors design
   - Style over substance
   - Bad design may not be visible
Why Difficult?

• 4. Creativity is challenging
  – Can’t just make a copy
  – Want creativity, but want pragmatism

Idea Creation

How do we create and develop new interface ideas and designs?

• Ideas come from
  – Imagination
  – Analogy
  – Observation of current practice
  – Observation of current systems

• Borrow from other fields
  – Animation
  – Theatre
  – Information displays
  – Architecture
  – ...
Interface Metaphors

- *Metaphor* - Application of name or descriptive term to another object which is not literally applicable

  - Use: Natural transfer - apply existing knowledge to new, abstract tasks
  - Problem: May introduce incorrect mental model

Idea Creation

- Other methods for creating and developing interface ideas
  - ?
Idea Creation Methods

- 1. Consider new use for object
- 2. Adapt object to be like something else
- 3. Modify object for a new purpose
- 4. Magnify - add to object
- 5. Minimize - subtract from object
- 6. Substitute something similar
- 7. Rearrange aspects of object
- 8. Change the point of view
- 9. Combine data into an ensemble

Overall Guidelines for Design

- 1. Provide a good conceptual model
  - User has mental model of how things work
  - Build design that allows user to predict effects of actions

- 2. Make things visible
  - Visible affordances, mappings, constraints
  - Remind person of what can be done and how to do it

Norman’s advice
Design Guidelines/Principles

- General guidelines (advice) to help create more usable systems
- Can be subtle, even contradictory

Design Principles

- 1. Use simple and natural dialog in user’s language
  - Match user’s task in a natural way
  - Avoid jargon, techno-speak

  Insufficient funds to withdraw $100 VS. X.25 connection discarded due to network congestion. Local limits now in effect
  - Present exactly info that user needs
    Less is more!
    Fewer unnecessary windows, prompts, dialogs
“Fun” Examples

Design Principles

• 2. Strive for consistency
  – Sequences, actions, commands, layout, terminology
  – Makes more predictable
Design Principles

3. Provide informative feedback
   – Continuously inform user about what is occurring
   – Most important on frequent, substantive actions
   – How to deal with delays?

4. Minimize user’s memory load
   – Recognition is better than recall

   – Describe required input format, include example and default

   Date _ _ - _ _ - _ _ (DD-Mmm-YY, e.g., 02-Aug-93)

   – Use small # of generally applicable commands
Design Principles

• 5. Permit easy reversal of actions
  – Undo!
  – Reduces anxiety, encourages experimentation

Design Principles

• 6. Provide clearly marked exits
  – Don’t want the user to feel trapped
  – Examples
    • Cancel button on dialogs
    • Interrupt/resume on lengthy operations (modeless)
    • Quit - can exit anytime
    • Reset/defaults - restore on a property sheet
Design Principles

• 7. Provide shortcuts
  – Enable frequent users to perform often-used operations quickly
    • Keyboard & mouse
      - abbreviations
      - menu shortcuts
      - function keys
      - command completion
      - double click vs. menu selection
  • Navigation between windows/forms
  • Reuse
    – Provide history system

Design Principles

• 8. Support internal locus of control
  – Put user in charge, not computer
  – Can be major source of anxiety

Enter next command
VS.
Ready for next command
Design Principles

• 9. Handle errors smoothly and positively

• 10. Provide useful help and documentation
  – (More to come later in course on these two)

Good & Bad Designs

• www.baddesigns.com

• www.iarchitect.com
Graphic Design

Let’s explore the details more...

Who Needs Substance When You’ve Got Style?

WHAT ARE YOU DOING? I'M CREATING A MULTIMEDIA BOOK REPORT FOR SCHOOL.

I'VE SPENT ALL WEEK PROGRAMMING THIS THING. IT'S NOT MUSIC... IT'S NOT ANIMATION... IT'S JUST SOUND EFFECTS RENDERS... IT'S JUST WIRE EFFECTS THAT'LL KICK YOUR SOCKS OFF.

EXCEPT A REPORT ON THE BOOK... LOOK HOW I GOT THE END CREDITS TO SPARK!

6750-Spr '07
Graphic Design

- The “look & feel” portion of an interface
- What someone initially encounters
  - Conveys an impression, mood

Graphic Design

- It shares aspects of design practices in engineering and CS, but focuses on the cultural, symbolic & affective aspects.

- “useful, usable, desirable”
• As a practice, it has been around for thousands of years.

• With the industrial revolution, art and design began to diverge

• Design for mass-production - of printing, of artifacts
Graphic Design

- In the US, graphic design developed into a profession after WWII

- Relies on a BALANCE and integration of: objective and subjective
Graphic Design

- **Objective:** relies on quantitative studies, like usability testing
- Does the “look” **work?**

Subjective: “look” relies on subjective judgement by experts, and depends on contextual factors

- “look” is contextual, based on culture
  - Culture is learned
  - Cultural meanings change
  - There can be multiple meanings
- Uniqueness is valued (not programmable)
Graphic Design

• You cannot empirically measure the subjective aspects, but there is a discipline to its study

• Is rigorous in its own realm

1. Graphic Design experts
   vs.

2. Applying graphic design principles
   Our goal in this course
Graphic Design

- **So what?**

- Knowing graphic design principles will:
  - Enhance your ability to communicate with designers
  - Enable you to create more user-friendly interfaces

Design Philosophies

- My personal preferences:
  - Economy of visual elements
  - Less is more
  - Clean, well organized
Graphic Design Principles

- Metaphor
- Clarity
- Consistency
- Alignment
- Proximity
- Contrast

Metaphor

- Tying presentation and visual elements to some familiar relevant items
  - e.g., Desktop metaphor
  - If you’re building an interface for a grocery application, maybe mimic a person walking through a store with a cart
Example

www.worldwidestore.com/Mainlv1.htm

Clarity

• Every element in an interface should have a reason for being there
  – Make that reason clear too!

• Less is more
Clarity

- White space
  - Leads the eye
  - Provides symmetry and balance through its use
  - Strengthens impact of message
  - Allows eye to rest between elements of activity
  - Used to promote simplicity, elegance, class, refinement

Example

Clear, clean appearance

Opinion?
Consistency

- In layout, color, images, icons, typography, text, ...
- Within screen, across screens
- Stay within metaphor everywhere

- Platform may have a style guide
  - Follow it!

Example

Home page  Content page 1  Content page 2

www.santafean.com
Alignment

- Western world
  - Start from top left

- Allows eye to parse display more easily
- “Read-flow” principle

Alignment

- Grids
  - (Hidden) horizontal and vertical lines to help locate window components
  - Align related things
  - Group items logically
  
  - Minimize number of controls, reduce clutter
Alignment

- Grids - use them

Grid Example
Alignment

- Left, center, or right

Choose one, use it everywhere

Novices often center things
  - No definition, calm, very formal

Proximity

- Items close together appear to have a relationship

- Distance implies no relationship

Time:
### Example

<table>
<thead>
<tr>
<th>Name</th>
<th>Addr1</th>
<th>Addr2</th>
<th>City</th>
<th>State</th>
<th>Phone</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Contrast

- **Pulls you in**
- Guides your eyes around the interface
- Supports skimming
- Take advantage of contrast to add focus or to energize an interface
- Can be used to distinguish active control
Contrast

- Can be used to set off most important item
  - Allow it to dominate

- Ask yourself what is the most important item in the interface, highlight it

- Use geometry to help sequencing

Example

Old
www.delta.com

Important element
UI Exercise

- Look at interface and see where your eye is initially drawn (what dominates?)
- Is that the most important thing in the interface?
- Sometimes this can (mistakenly) even be white space!

Example

Disorganized
Visual noise

Overuse of 3D effects
Economy of Visual Elements

- Less is more
- Minimize borders and heavy outlining, section boundaries (use whitespace)
- Reduce clutter
- Minimize the number of controls

Coding Techniques

- Blinking
  - Good for grabbing attention, but use very sparingly
- Reverse video, bold
  - Good for making something stand out
  - Again, use sparingly
Project Part 1

- Questions?
- Due on Thursday (2 copies, at start of class)

Upcoming

- Continuing graphic design
- Prototyping