Chapter 11

Balancing Function and Fashion

Introduction

- User experiences play a critical role in influencing software acceptance
  - Conversational messages have their limits
  - Design needs to be comprehensible, predictable, and controllable
  - Information layout is important
  - Multi-window coordination
  - Designing for large, fast, high-resolution color displays

Error messages

- Phrasing of error messages or diagnostic warnings is critical, especially when dealing with novices
  - Avoid imperious tone that condemns the user
  - Messages that are too generic (e.g., WHAT? or SYNTAX ERROR)
  - Messages that are too obscure (e.g., FAC RJCT 004004400400)

- Specificity

<table>
<thead>
<tr>
<th>Error</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYNTAX ERROR</td>
<td>Unmatched left parenthesis</td>
</tr>
<tr>
<td>ILLEGAL ENTRY</td>
<td>Type first letter: Space, Back, or Del</td>
</tr>
<tr>
<td>BAD FILE NAME</td>
<td>File names must begin with a letter</td>
</tr>
<tr>
<td>INV ALID DA TA</td>
<td>Days range from 1 to 31</td>
</tr>
<tr>
<td>END FILE,lONG</td>
<td>File names must begin with a letter</td>
</tr>
</tbody>
</table>
Error messages (cont.)

- **Constructive guidance and positive tone**
  - Messages should, where possible, indicate what users should do to correct the problem.
  - Unnecessarily hostile messages using violent terminology can disturb non-technical users:
    - FATAL ERROR, RUN ABORTED
    - CATASTROPHIC ERROR: LOGGED WITH OPERATOR
    - Negative terms such as ILLEGAL, ERROR, INVALID, BAD should be eliminated or used infrequently.

- **User-centered phrasing**
  - Suggests user controls the interface, initializing more than responding.
  - User should have control over amount of information system provides e.g. screen tips; a help button for context-sensitive help or an extensive online user manual.
  - Telephone company, "We're sorry, but we are unable to complete your call as dialed. Please hang up, check your number, or consult the operator for assistance", versus "Illegal telephone number. Call aborted. Error number 583-2R6.9. Consult your user manual for further information.'

- **Appropriate physical format**
  - Use uppercase-only messages for brief, serious warnings.
  - Avoid code numbers; if required, include at end of message.
  - Debate over best location of messages. E.g. Could be:
    - near where problem arose
    - placed in consistent position on bottom of screen
    - near to, but not obscuring relevant information.
  - Audio signals useful, but can be embarrassing - place under user control.
Development of effective messages

- Messages should be evaluated by several people and tested with suitable participants.
- Messages should appear in user manuals and be given high visibility.
- Users may remember the one time when they had difficulties with a computer system rather than the 20 times when everything went well.

Recommendations

- Increase attention to message design.
- Establish quality control.
- Develop guidelines:
  - Have a positive tone.
  - Be specific and address the problem in the user's terms.
  - Place the users in control of the situation.
  - Have a neat, consistent, and comprehensible format.
- Carry out usability tests.
- Collect user performance data.

Error messages (cont.)

- Be as specific and precise as possible. Determine necessary, relevant error messages.
- Be constructive. Indicate what the user needs to do.
- Use a positive tone. Avoid condescending. Be courteous.
- Choose user-centered phrasing. State problem, cause, solution.
- Consider multiple levels of messages. State brief, sufficient information to assist with the corrective action.
- Maintain consistent grammatical forms, terminology, and abbreviations.
- Maintain consistent visual format and placement.
- Increase attention to message design.
- Establish quality control.
- Develop guidelines.
- Carry out usability tests.
- Record the frequency of occurrence for each message.
Anthropomorphic design

- Concerns
  - attributions of intelligence, autonomy, free will, etc can deceive, confuse, and mislead users
  - important to clarify differences between people and computers
  - users and designers must accept responsibility for misuse of computers
  - although attractive to some people, an anthropomorphic interface can produce anxiety in others
    - computers can make people feel dumb
    - computers should be transparent and support concentrating on the task on hand
  - anthropomorphic interfaces may distract users
    - Microsoft’s ill-fated Clippit character was intended to provide help suggestions
      - Amused some, but annoyed many
      - Disruptive interference
      - Lacked appropriate emotional expressions

- Advocates of anthropomorphic interfaces suggest that they may be most useful as teachers, salespeople, therapists, or entertainment figures

- An alternative design is to present a human author of a package through prerecorded audio or video

Guidelines

- Be cautious in presenting computers as people.
- Design comprehensible, predictable, and controllable interfaces.
- Use appropriate humans for introductions or guides.
- Use cartoon characters in games or children’s software, but usually not elsewhere.
- Provide user-centered overviews for orientation and closure.
- Do not use ‘I’ pronouns when the computer responds to human actions.
- Use “you” to guide users, or just state facts.
Display design

- Effective display designs must provide all the necessary data in the proper sequence to carry out the task.

- Mullet and Sano’s categories of design principles:
  - Elegance and Simplicity
  - Scale, Contrast, and Proportion
  - Organization and Visual Structure
  - Module and Program
  - Image and Representation
  - Style

Field layout

- Blank spaces and separate lines can distinguish fields.
- Names in chronological order, alignment of dates, familiar date separators.
- Labels are helpful for all but frequent users.
- Distinguish labels from data with case, boldfacing, etc.
- If boxes are available they can be used to make a more appealing display, but they consume screen space.
- Specify the date format for international audiences
- Other coding categories – background shading, color, and graphic icons
Display design (cont.)

- **Empirical results**
  - structured form superior to narrative form
  - improving data labels, clustering related information, using appropriate indentation and underlining, aligning numeric values, and eliminating extraneous characters improves performance
  - performance times improve with fewer, denser displays for expert users
  - screen contents should contain only task-relevant information
  - consistent location, structure, and terminology across displays important
  - sequences of displays should be similar throughout the system for similar tasks

- **Display-complexity metrics**
  - Although knowledge of the users' tasks and abilities is key to designing effective screen displays, objective and automatable metrics of screen complexity are attractive aids
  - Tullis (1997) developed four task-independent metrics for alphanumeric displays:
    - Overall Density
    - Local Density
    - Grouping
    - Layout Complexity

- **Sears (1993)** developed a task-dependent metric called layout appropriateness to assess whether the spatial layout is in harmony with the users' tasks
Web page design

- Numerous guidelines for web designers are available on the Web and can be incorporated into your design process to ensure consistency and adherence to emerging standards.
- Examples include, but are not limited to:
  - The Java Look and Feel Design Guidelines, Second Edition (Sun, 2001)
  - Sun’s Web Design Guide (Sun, 2008)
  - The National Cancer Institute’s Research-Based Web Design & Usability Guidelines (NCI, 2008)
  - The Web Style Guide (Lynch and Horton, 2008)
- There are numerous web sites that address web design, some of which were created as companions to relevant books:
  - Web 2.0 How-To Design Guide (Hunt, 2008)
  - Web Bloopers (Johnson, 2003)
  - KillerSites.com (Siegel, 1997)

Web page design (cont.)

Mash-ups are web pages or applications that integrate complementary elements from two or more sources (for example, Craigslist and Google Maps™).

Top Ten Mistakes in Web Design

Top Ten Mistakes
1. burying information too deep in a web site
2. Overloading pages with too much material
3. Providing awkward or confusing navigation
4. Putting information in unexpected places on the page
5. Not making links obvious and clear
6. Presenting information in bad tables
7. Making text so small that many users cannot read it
8. Using color combinations for text that many users cannot read
9. Using bed forms
10. Hiding (or not providing) features that could help users
Window design

Introduction
- Users need to consult multiple sources rapidly
- Must minimally disrupt user's task
- With large displays, eye-head movement and visibility are problems
- With small displays, windows too small to be effective
- Need to offer users sufficient information and flexibility to accomplish task, while reducing window housekeeping actions, distracting clutter, eye-head movement
  - opening, closing, moving, changing size
  - time spent manipulating windows instead of on task
- Can apply direct-manipulation strategy to windows
- Rooms - a form of window macro that enables users to specify actions on several windows at once

Coordinating multiple windows
- Designers may break through to the next generation of window managers by developing coordinated windows, in which windows appear, change contents, and close as a direct result of user actions in the task domain
- Such sequences of actions can be established by designers, or by users with end-user programming tools
- A careful study of user tasks can lead to task-specific coordination based on sequences of actions
- Important coordination:
  - Synchronized scrolling
  - Hierarchical browsing
  - Opening/closing of dependent windows
  - Saving/opening of window state

Hierarchical browsing has been integrated into Windows Explorer to allow users to browse hierarchical directories, into Outlook to enable browsing of folders of e-mails and into many other applications. Hierarchical browsing in the XperCASE tool example here (now called EasyCASE with EasyCODE).

The specification is on the left. As users click on components (DoubleAttrWebAdapter), the detail view appears on the right in a Nassi-Shneiderman chart.
Window design

- **Image browsing**
  - A two-dimensional cousin of hierarchical browsing
    - Works with large images
    - Overview in one window (context), detail in another (focus)
    - Field of view box in the overview
    - Panning in the detail view, changes the field of view box
    - Matched aspect ratios between field of view box and the detail view
  
  • Zoom factors: 5-30
    - Larger suggests an intermediate view is needed
  • Semantic zooming
  • Side by side placement, versus fisheye view

Window design

- **Image browsing (cont.)**
  - The design of image browsers should be governed by the users’ tasks, which can be classified as follows:
    - Image generation
    - Open-ended exploration
    - Diagnostics
    - Navigation
    - Monitoring
Window design

- Personal role management
  - A role centered design emphasizes the users’ tasks rather than the applications and documents
    - Vision statement
    - Set of people
    - Task hierarchy
    - Schedule
    - Set of documents

Personal role management (cont.)

- The requirements for personal role management include:
  - Support a unified framework for information organization according to users’ roles
  - Provide a visual, spatial layout that matches tasks
  - Support multi-window actions for fast arrangement of information
  - Support information access with partial knowledge of its nominal, spatial, temporal, and visual attributes and relationships to other pieces of information.
  - Allow fast switching and resumption among roles
  - Free user’s cognitive resources to work on task domain actions rather than interface domain actions.
  - Use screen space efficiently and productively for tasks.

Color

- Color can
  - Soothe or strike the eye
  - Add accents to an uninteresting display
  - Facilitate subtle discriminations in complex displays
  - Emphasize the logical organization of information
  - Draw attention to warnings
  - Evoke strong emotional reactions of joy, excitement, fear, or anger
Color Guidelines

- Use color conservatively
- Limit the number and amount of colors
- Recognize the power of color to speed or slow tasks
- Color coding should support the task
- Color coding should appear with minimal user effort
- Color coding should be under user control
- Design for monochrome first
- Consider the needs of color-deficient users
- Color can help in formatting
- Be consistent in color coding
- Be alert to common expectations about color codes
- Be alert to problems with color pairings
- Use color changes to indicate status changes
- Use color in graphic displays for greater information density

Color

Guidelines for using color

- Use color conservatively: Limit the number and amount of colors.
- Recognize the power of color to speed or slow tasks.
- Ensure that color coding supports the task.
- Make color coding appear with minimal user effort.
- Keep color coding under user control.
- Design for monochrome first.
- Consider the needs of color-deficient users.
- Use color to help in formatting.
- Be consistent in color coding.
- Be alert to common expectations about color coding.
- Be alert to problems with color pairings.
- Use color changes to indicate status changes.
- Use color in graphic displays for greater information density.

Benefits of using color

- Various colors are soothing or exciting to the eye.
- Color can improve an unstructured display.
- Color facilitates subtle distinctions of complex systems.
- A color code can emphasize the logical organization of information.
- Certain colors can draw attention to key things.
- Color coding can evolve into emotional markers of the important, true, or urgent.

Downsides of using color

- Color pairings may cause problems.
- Color fidelity may degrade on other hardware.
- Printing or conversion to other media may be a problem.