BALANCING FUNCTION UNIT 4

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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

   ▶ Large, fast, high-resolution color displays have potential

▶ Recognition of the creative challenge of balancing function and fashion may lead to designers even working even harder.

INTRODUCTION

➢ "This chapter deals with six design matters that are functional issues with varying styles/solutions to suite a variety of users."

➢ Error messages

➢ Non-anthropomorphic design

➢ Display design

➢ Web page design

➢ Window design

➢ Colour

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ERROR MESSAGES

➢ Overview

➢ User experience with computer-system prompts, explanations, error diagnostics, and warnings is crucial in influencing acceptance of SW systems

➢ Why do errors occur?

➢ Lack of knowledge, incorrect understanding, inadequate slips

➢ What is the consequence?

➢ Users are likely to be confused, are anxious or feel inadequate

➢ What is a solution?

➢ Make error messages as user-friendly as possible; this is especially important for novice users as they commonly have a lack of knowledge, confidence, and are sometimes easily frustrated or discouraged

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ERROR MESSAGES

▶ Improving Error Messages

➢ Measure where errors occur frequently, focus on these issues

➢ Improve messages but also revise error handling procedures, improve documentation and training manuals, change permissible actions, etc.

➢ All error messages should be reviewed by peers, managers, should be tested empirically, and be included in user manuals

ERROR MESSAGES

- Product
  - Be as specific and precise as possible
  - Be constructive: Indicate what the user needs to do
  - Use a positive tone: Avoid condemnation
  - Choose user centred phrasing
  - Consider multiple levels of messages
  - Maintain consistent grammatical forms, terminology, and abbreviations
  - Maintain consistent visual format and placement
- Process
  - Increase attention to message design
  - Establish quality control
  - Develop guidelines
  - Carry out usability tests
  - Record the frequency of occurrence for each message

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ERROR MESSAGES

➢ Rules to follow:

1. Specificity
    ➢ Avoid being too general (e.g., "Syntax Error")
    ➢ This makes it difficult to understand what went wrong and how it can be fixed

Poor	Better
SYNTAX ERROR	Unmatched left parenthesis
ILLEGAL ENTRY	Type first letter: **S**end, **R**ead, or **D**rop
INVALID DATA	Days range from 1 to 31
BAD FILE NAME	File names must begin with a letter

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ERROR MESSAGES

2. Constructive Guidance and Tone

   ➢ Avoid hostile messages and violent terminology

   ➢ Do not only focus about what went wrong (give guidance)

   ➢ Eliminate negative words (e.g., error, illegal, fatal, bad, catastrophic)

   ➢ Options for guidance: Automatic error correction, present possible alternatives, avoid errors from occurring

Poor	Better
Run-Time error '-2147469 (800405): Method 'Private Profile String' of object 'System' failed.	Virtual memory space consumed. Close some programs and retry.
Resource Conflict Bus: 00 Device: 03 Function: 01	Remove your compact flash card and restart
Network connection refused.	Your password was not recognized. Please retype.
Bad date.	Drop-off date must come after pickup date.

ERROR MESSAGES

3. User Centered Phrasing

➢ User initiates more than responds

➢ Avoid negative and condemning tone

➢ Be brief but provide more information if needed

➢ Good example
  ➢ 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
➢ Bad example
  ➢ Illegal telephone number
  ➢ Call aborted
  ➢ Error number 583-2R6.9
  Consult your user manual for further information

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ERROR MESSAGES

4. Appropriate Physical Format

- ➢ Upper vs. lower case: Use "all upper case" only in specific situations

- ➢ Never use code numbers or, if you must, place them at the end of the message or hide them from users that can not deal with the codes

- ➢ Sound may be important if there is a chance that something will otherwise be overlooked; however, be always careful with using sound

5. 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

BALANCING FUNCTION AND FASHION

➢ Error messages

➢ Non-anthropomorphic design

➢ Display design

➢ Web page design

➢ Window design

➢ Colour

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ANTHROPOMORPHIC AGENT

A highly controversial topic in HCI is the use of anthropomorphic agents.

▶ **Anthropomorphism**, (Definition American Heritage Dictionary), is the "attribution of human motivation, characteristics, or behaviour to inanimate objects, animals, or natural phenomena".

➢ The term **"agent"** in this case comes from the field of computer science and it refers to small programs (software agents) that are highly independent, and are used to perform a number of tasks with little or no human intervention.

➢The purpose of anthropomorphic agents therefore is to

1) Make communication between the computer and the user more "human-like" a

2) To increase the automation of tasks.

EXAMPLE FOR ANTHROPOMORPHIC AGENT

➢ **This Clippit office assistant was a feature included in Microsoft Office 97 and subsequent versions until Office 2007, in which the assistants have been removed due to widespread user dissatisfaction.**

➢ **Users complained about both the role of the agent (it could not be easily turned off or adjusted to different experience levels) as well as the look of the agent (many users felt that it had a condescending tone or frequently looked annoyed).**

2D cartoon-like non-human representation
(with human-like characteristics)

ANTHROPOMORPHIC DESIGN

➢ Many people believe that anthropomorphic design has the potential to greatly increase user satisfaction.

➢ However, many people also believe that the disadvantages of anthropomorphic design greatly outweigh the benefits.

➢ A brief summary anthropomorphic design

   ➢ Goal

   ➢ **Advantage**
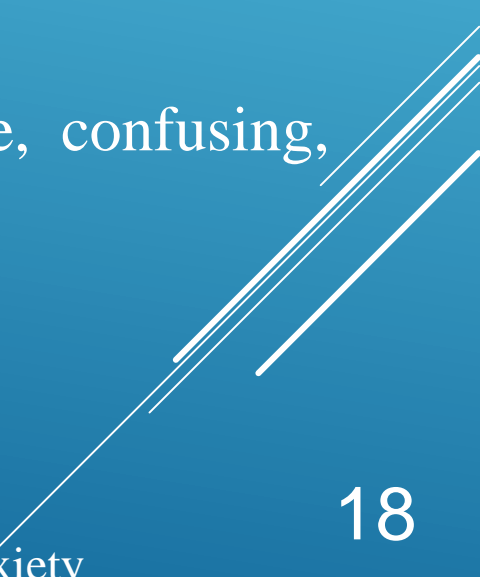
   ➢ **Disadvantage**

ANTHROPOMORPHIC DESIGN

▶ Goal: To make a computer more human-like

▶ **Advantages:**

  ▶ Making the computer appear human-like helps to establish a relationship with the user and build their trust.

  ▶ Giving the computer human-like characteristics makes it more approachable and makes it more attractive to people with little computer experience.

▶ **Disadvantages:**

▶ People like Shneiderman argues that giving the computer human-like characteristics disempowers users by louding issues such as who is responsible for a system's actions.

▶ It reduces user control and destroys a user's sense of accomplishment.

▶ Anthropomorphism deceives users because it lets the user think that the computer has all the capacities of a human. As a result, users are tempted to assign the computer with human foibles and blame it when something goes wrong.

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ANTHROPOMORPHIC DESIGN

▶ **Goal:** To help automate tasks.

▶ **Advantages:**

  ▶ Making the computer appear human-like helps to establish a relationship with the user and build their trust.

  ▶ Giving the computer human-like characteristics makes it more approachable and makes it more attractive to people with little computer experience. Users do not have to learn complex command structure and functionality.

  ▶ The agent takes care of most of this for them.

▶ **Disadvantages:**

  ▶ Users have different levels of background knowledge.

  ▶ If automation is only targeted for example to a novice user, experienced users will become easily frustrated.

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ANTHROPOMORPHIC DESIGN

- **Goal:** To encourage natural dialogue

- **Advantages:**

  - Many animated agents allow you to speak your questions to them rather than requiring that you type them.

  - This is generally more efficient and when done correctly, can increase user trust.

- **Disadvantages:**

  - Speech recognition software does not always pick up everything or may incorrectly translate what you say.

  - The accuracy of the technology still falls short of a human assistant or text based assistant.

  - Also, designers must accommodate for the deaf, those users who prefer to type, as well as the different qualities of microphones that may be available to users.

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NON-ANTHROPOMORPHIC DESIGN

➢Deals with conversational messages between humans and computers

➢Meaningful design of such dialogs is crucial to create comprehensible, predictable and controllable interfaces

➢Questions: Why not let computers talk as they were people, appear as being intelligent, human, emotional, autonomous?

   ➢**Controversy**: appealing, productive vs. deceptive, confusing, misleading, ...

      ➢Computers are not independent decision makers

      ➢Computers are not evil

      ➢Anthropomorphic interfaces can be distracting or produce anxiety

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NON-ANTHROPOMORPHIC DESIGN

➢ Arguments for Non-anthropomorphic Design

➢ People feel disillusionment, distrust computers if they can not live up to their expectations

➢ Clarification of the difference between humans and computers. Can we blame the computer?

➢ People feel less responsible for their actions/performance if they interact with an anthropomorphic interface

➢ Distraction from the actual task

➢ Anxiety, which leads to less accuracy in task performance

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NON-ANTHROPOMORPHIC DESIGN

➢ Guidelines

➢ Be cautious in presenting computers as people, either with synthesized or cartoon characters

➢ Use appropriate humans for audio or video 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" when the computer response to human action

➢ Use "you" to guide users, or just state facts

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BALANCING FUNCTION AND FASHION

- ➢ Error messages

- ➢ Non-anthropomorphic design

- ➢ Display design

- ➢ Web page design

- ➢ Window design

- ➢ Colour

DISPLAY DESIGN

➢Deals with layout of information on the display

  ➢ Goal: Avoid clutter, reduce search time, increase subjective satisfaction

  ➢ Task performance goes up!

➢For most interactive systems the display is key component of successful design

➢General rule: Always start with task analysis without consideration of display size

➢Consider:

  ➢ Provide all necessary data in a proper sequence to carry out the task

  ➢ Meaningful grouping of items (with labels suitable to users' knowledge)

  ➢ Use consistent sequences of groups and orderly formats

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DISPLAY DESIGN

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

▶ Graphic Designers have proposed principles suited for print formats and these principles are now adapting for Display Design.

▶ Mullet and Sano proposed six categories of principles that reveal the complexity of designer's task.

▶ Data display guidelines are proposed by Smith and Mosier.

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DISPLAY DESIGN

Design Principles Proposed by Mullet and Sano

1. **Elegance and Simplicity**: unity, refinement and fitness

2. **Scale, Contrast, and Proportion**: clarity, harmony, activity, and restraint

3. **Organization and Visual Structure**: grouping, hierarchy, relationship, and balance

4. **Module and Program**: focus, flexibility, and consistent application

5. **Image and Representation**: immediacy, generality, cohesiveness, and characterization

6. **Style**: distinctiveness, integrity, comprehensiveness, and appropriateness

DISPLAY DESIGN

- Ensure that any data that a user needs, at any step in a transaction sequence, are available for display.
- Display data to users in directly usable forms; do not require that users convert displayed data.
- Maintain a consistent format for any particular type of data display from one display to another.
- Use short, simple sentences.
- Use affirmative statements, rather than negative statements.
- Adopt a logical principle by which to order lists; where no other principle applies, order lists alphabetically.
- Ensure that labels are sufficiently close to their data fields to indicate association yet are separated from their data fields by at least one space.
- Left-justify columns of alphabetic data to permit rapid scanning.
- Label each page in multipaged displays to show its relation to the others.
- Begin every display with a title or header, describing briefly the contents or purpose of the display; leave at least one blank line between the title and the body of the display.
- For size coding, make larger symbols be at least 1.5 times the height of the next-smaller symbol.
- Consider color coding for applications in which users must distinguish rapidly among several categories of data, particularly when the data items are dispersed on the display.
- When you use blink coding, make the blink rate 2 to 5 Hz, with a minimum duty cycle (ON interval) of 50%.
- For a large table that exceeds the capacity of one display frame, ensure that users can see column headings and row labels in all displayed sections of the table.
- Provide a means for users (or a system administrator) to make necessary changes to display functions, as data-display requirements may change (as is often the case).

Sample guidelines
Proposed by
Smith and Mosier

DISPLAY DESIGN

▶ **Field layout**

▶ Blank spaces and separate lines can distinguish fields.

Poor:TAYLOR,SUSAN034787331WILLIAM TAYLOR
THOMAS10291974ANN08211977ALEXANDRA09081972

Better: TAYLOR, SUSAN 034787331   WILLIAM TAYLOR

THOMAS   10291974

ANN   08211977

ALEXANDRA   09081972

DISPLAY DESIGN

▶ **Field layout**

　▶ Names in chronological order, alignment of dates, familiar date separators.

Better: TAYLOR, SUSAN 034-78-7331   WILLIAM TAYLOR

　　　　ALEXANDRA 09-08-1972

　　　　THOMAS   10-29-1974

　　　　ANN   08-21-1977

Better: SUSAN TAYLOR 034-78-7331   WILLIAM TAYLOR

　　　　ALEXANDRA 09-08-1972

　　　　THOMAS   10-29-1974

　　　　ANN   08-21-1977

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DISPLAY DESIGN

▶ **Field layout**

   ▶ Labels are helpful for all but frequent users.

Better: Employee: SUSAN TAYLOR

         Social Security Number: 034-78-7331

         Spouse: WILLIAM TAYLOR

         Children: Names   Birthdates

                 ALEXANDRA   09-08-1972

                 THOMAS   10-29-1974

                 ANN   08-21-1977

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DISPLAY DESIGN

▶ **Field layout**

  ▶ Distinguish labels from data with case, boldfacing, etc.

Better: Employee: Susan Taylor SSN: 034-78-7331

  Spouse: William Taylor

  Children: Names   Birthdates

            Alexandra   09-08-1972

            Thomas   10-29-1974

            Ann   08-21-1977

▶ **Field layout**

   ▶ If boxes are available they can be used to make a more appealing display, but they consume screen space.

Better:	Employee:	Susan Taylor	SSN: 034-78-7331
	Spouse:	William Taylor	

Children:	Names	Birthdates
	Alexandra	09-08-1972
	Thomas	10-29-1974
	Ann	08-21-1977

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DISPLAY DESIGN

▶ **Field layout summary**

- ▶ 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

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

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DISPLAY DESIGN

- 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

- Four task-independent metrics for alphanumeric displays are proposed by Tullis

  - Overall Density

  - Local Density

  - Grouping

  - Layout Complexity

DISPLAY DESIGN

▶ **Overall density:** The number of filled character spaces as a percentage of total spaces available.

▶ **Local density:** The average number of filled character spaces in a five-degree visual angle around each character, expressed as a percentage of available spaces in the circle and weighted by distance from the character.

▶ Example: In a study with 110 nurses of blood tests, results showed an average task time of 9.4 seconds with low-density version and 5.3 seconds with high-density version

Grouping:

- The number of groups of "connected" characters, where a connection is any pair of characters separated by less than twice the mean of the distances between each character and its nearest neighbour

- The average visual angle subtended by groups and weighted by the number of characters in the group.

To: Atlanta, GA

```
Departs    Arrives    Flight

Asheville, NC          First: $92.57   Coach: $66.85
    7:20a     8:05a      PI 299
   10:10a    10:55a      PI 203
    4:20p     5:00p      PI 259

Austin, TX             First: $263.00  Coach: $221.00
    8:15a    11:15a      EA 530
    8:40a    11:39a      DL 212
    2:00p     5:00p      DL 348
    7:15p    11:26p      DL 1654

Baltimore, MD          First: $209.00  Coach: $167.00
    7:00a     8:35a      DL 1767
    7:50a     9:32a      EA 631
    8:45a    10:20a      DL 1610
   11:15a    12:35p      EA 147
    1:35p     3:10p      DL 1731
    2:35p     4:16p      EA 141
```

To: Knoxville, TN

```
Atlanta, GA  Dp: 9:28a  Ar: 10:10a  Flt: DL 1704  1st: 97.00   Coach: 86.00
Atlanta, GA  Dp: 12:28p Ar: 1:10p   Flt: DL 152   1st: 97.00   Coach: 86.00
Atlanta, GA  Dp: 4:58p  Ar: 5:40p   Flt: DL 418   1st: 97.00   Coach: 86.00
Atlanta, GA  Dp: 7:41p  Ar: 8:25p   Flt: DL 1126  1st: 97.00   Coach: 86.00
Chicago, Ill.  Dp: 1:45p  Ar: 5:39p  Flt: AL 58   1st: 190.00  Coach: 161.00
Chicago, Ill.  Dp: 6:30p  Ar: 9:35p  Flt: DL 675  1st: 190.00  Coach: 161.00
Chicago, Ill.  Dp: 6:50p  Ar: 9:55p  Flt: RC 398  1st: 190.00  Coach: 161.00
Cincinnati, OH  Dp: 12:05p Ar: 1:10p Flt: FW 453  1st: 118.00  Coach: 66.85
Cincinnati, OH  Dp: 5:25p  Ar: 6:30p Flt: FW 455  1st: 118.00  Coach: 66.85
Dallas, TX  Dp: 5:55p  Ar: 9:56p  Flt: AL 360  1st: 365.00  Coach: 215.00
Dayton, OH  Dp: 11:20a Ar: 1:10p  Flt: FW 453  1st: 189.00  Coach: 108.00
Dayton, OH  Dp: 4:40   Ar: 6:30p  Flt: FW 455  1st: 189.00  Coach: 108.00
Detroit, Mich.  Dp: 9:10a  Ar: 1:10p  Flt: FW 453  1st: 183.00  Coach: 106.00
Detroit, Mich.  Dp: 2:35p  Ar: 6:30p  Flt: FW 455  1st: 183.00  Coach: 106.00
```

- A structured format that leads to superior performance and preference.

- An unstructured format that leads to un superior performance

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DISPLAY DESIGN

▶ Layout complexity: The complexity, as defined in information theory, of the distribution of horizontal and vertical distances of each label and data item from a standard point on the display.
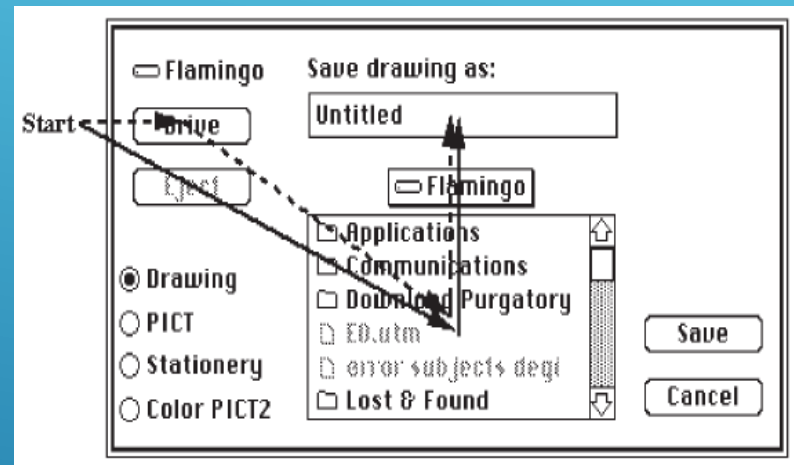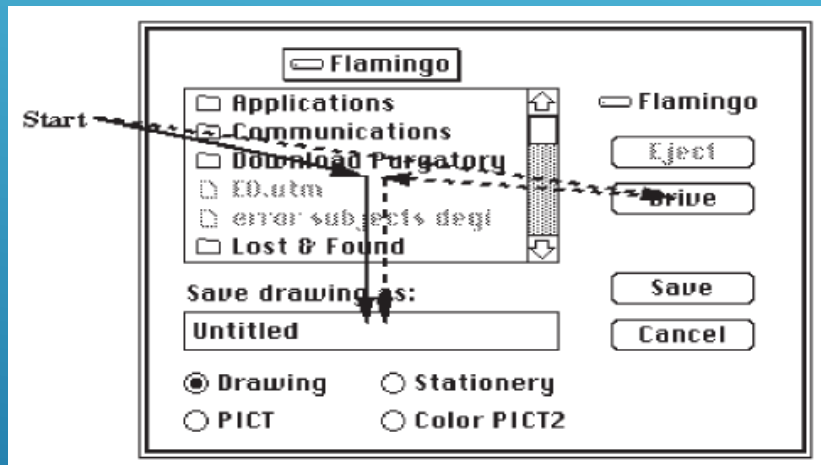
▶ Task-dependent metric called *layout appropriateness* to assess whether the spatial layout is in harmony with the users' tasks

BALANCING FUNCTION AND FASHION

- ➢ Error messages

- ➢ Non-anthropomorphic design

- ➢ Display design

- ➢ Web page design

- ➢ Window design

- ➢ Colour

WEB PAGE DESIGN

- **User** performance

  - ▶ Visual layout has a strong impact on (human) performance and is a critical factor in web page design.

  - ▶ Some specific patterns of performance with web pages reflect differences between web page and traditional GUI design.

- **User performance test based on layout and language**

  - ▶ Layout factors: Quantity of links, alignment, grouping indications, and density

  - ▶ Languages: Hebrew (right-to-left) and English (left-to-right)

  - ▶ Measurement: Search times and eye movement

- **Conclusion:**

  - ▶ Performance patterns were similar between languages

    - ▶ Poor performance in pages with many links and variable densities

    - ▶ But improved with the presence of uniform density

    - ▶ Alignment did not improve performance

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WEB PAGE DESIGN

- **User** Preference
  - Crucial to the broader consumer-oriented audience
  - Visually compelling web sites encourage users to stay longer and buy more products
  - Designers use colorful graphics, eye-catching photos, and attention-grabbing layouts
- **Design-feature impacts on high preference**
  - Columnar organization
  - Limited animated graphical ads
  - Two to three words for link text
  - Sans-serif fonts
  - Varied colors to highlight text and headings

WEB PAGE DESIGN

▶ Design goals for high preference

    ▶ Comprehensibility,

    ▶ predictability,

    ▶ familiarity,

    ▶ visual appeal, and

    ▶ relevant content

WEB PAGE DESIGN

Top Ten Mistakes of web-based presentation of information (Tullis, 2005)

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 bad forms
10. Hiding (or not providing) features that could help users

WEB PAGE DESIGN

▶ Web content issues can be broken-down into

▶ Site level Issues – Issues throughout entire website

  ▶ Navigation options

  ▶ Depth vs breadth of website

  ▶ Use of frames

▶ Page Level Issues- Observed at page level

  ▶ Components of the page

  ▶ Tables, Graphs, Forms and control

  ▶ Page layout and Presentation of links

▶ Special Information

  ▶ Site maps

  ▶ Search functions

  ▶ User assistance

  ▶ Feedback

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WEB PAGE DESIGN

➢ Guidelines

➢ Numerous guidelines for web designers are available on the Web and can be incorporated into design process to ensure consistency and adherence to emerging standards.

➢ There are numerous web sites that address web design, some of which were created as companions to relevant standard:

▶ The Java Look and Feel Design Guidelines

▶ Sun's Web Design Guide

▶ The National Cancer Institute's Research-Based Web Design & Usability Guidelines

▶ The World Wide Web Consortium's Web Accessibility Initiative

▶ The Web Style Guide

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WEB PAGE DESIGN

➢ Mash-ups

▶ Mash-ups are web pages or applications that integrate complementary elements from two or more sources

  ▶ Part of an ongoing shift towards a more interactive and participatory WWW

  ▶ Aimed at enhancing creativity, collaboration, and functionality

  ▶ Often created using Ajax

  ▶ Examples include integrated maps and geo-positioned photographs, maps of real-estate or rental property, book websites and hiking information resources,…

▶ Mash-ups and open-source software are driving new practices in development

▶ Designers can rapidly create web applications by combining pre-existing software components

▶ This allows for:

  ▶ Rapid user-interface prototyping and application development

  ▶ Reduced development risk

  ▶ Reduced time-to-market

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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™

WEB PAGE DESIGN

➤ Good approach: user task focused

    ➤ Analyze task sequences, frequencies Layout page according to the data

    e.g. Top-to-bottom movement through display more efficient than having to move around top to bottom all over the screen

    ➤ Goal is to minimize visual scanning time, movement time

Also...

    ➤ Guidelines documents are numerous

BALANCING FUNCTION AND FASHION

➢ Error messages

➢ Non-anthropomorphic design

➢ Display design

➢ Web page design

➢ Window design

➢ Color

COLOR

▶ Benefits of using Colors

➤ Soothe or strike to the eye

➤ Improve an uninteresting display

➤ Facilitate subtle discrimination in complex displays

➤ Emphasize the logical organization of information

➤ Draw attention to warnings

➤ Evoke strong emotional reactions of joy, excitement, fear or anger

COLOR

- Dangers of using Colors

  - Color pairings may cause problems

  - Color fidelity may degrade on other hardware

  - Printing or conversion to other media may be a problem

COLOR

- Color Guidelines

  - Use color conservatively

    - too much color can confuse and mislead users.

  - Limit the Number of Colors

    - Too many colors may confuse novice users.

  - Recognize the power of color as a coding technique

    - Ex Red means stop, overdue tasks. Green means go, completed tasks.

  - Ensure that color coding supports the tasks

    - Ex. Wrong data is highlighted for search task

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COLOR

- **Color Guidelines**

  - ▸ Have color coding appear with minimal user effort

    - Color coding should in general be automatic when users perform a task

  - ▸ Place color coding under user control

    – Users should be able to turn off or correct color coding

  - ▸ Design for monochrome first

    - Layout data in a logical manner first, before colouring (universal usability, black\white monitors, colour blind users)

  - ▸ Consider the needs of color-deficient users

    - Readability, universal usability issue

  - ▸ Use color to help in Formatting

    - Useful for densely packed displays

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COLOR

- Color Guidelines

  - Be consistent in color coding

    - don't use different colors for messages i.e some red and some yellow

  - Be alert to common expectations about color codes

    - Ex. Red – danger, stop, etc.

  - Be alert to problems with color pairings

    - Ex. Red and Blue

  - User color changes to indicate status changes

    - To gain attention of user

  - Use color in graphic displays for greater information density

    - Example Graphs with multiple plots

BALANCING FUNCTION AND FASHION

- ➢ Error messages

- ➢ Non-anthropomorphic design

- ➢ Display design

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- ➢ Window design

- ➢ Color

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WINDOW DESIGN

Overview

▪For many tasks it is required to deal with multiple documents, windows, forms

▪Problem: There is a limit of how many of such documents etc. can be displayed simultaneously

▪Goal: Offer sufficient information and flexibility to accomplish the task while reducing window housekeeping actions and minimizing distracting clutter

▪This leads to users being able to complete their task more rapidly and most likely with fewer mistakes

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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

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WINDOW DESIGN

- Coordinating multiple windows

    - Designers may break through to the next generation of window managers by developing coordinate 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's based on sequences of actions

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WINDOW DESIGN

▶ Important coordination's for developers to consider:

▶ *Synchronized scrolling* – the scroll bar of one window is coupled to the scroll bar of another

▶ *Hierarchical browsing* – Windows Explorer and Outlook

▶ *Opening/closing of dependent windows* – simultaneously open dependant windows in another convenient location

▶ *Saving/opening of window state* – save the current state of the display with all the windows and their contents. "Save screen as…"

▶ *Tabbed browsing* – view multiple web pages without opening a new browser window

▶ *Tiled windows* – automatically resize and arrange windows so they do not overlap

▶ *Ribbon interface* – Microsoft Office 2007

WINDOW DESIGN

- Important coordination's for developers to consider:

  - *Synchronized scrolling* – the scroll bar of one window is coupled to the scroll bar of another

  - A simple coordination is synchronized scrolling, in which the scroll bar of one window is coupled to another scroll bar, and action on one scroll bar causes the other to scroll the associated window contents in parallel.

  - This technique is useful for comparing two versions of a program or document.

  - Synchronization might be on a line-for-line basis, on a proportional basis, or keyed to matching tokens in the two windows.

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WINDOW DESIGN

▶ Important coordination's for developers to consider:

  ▶ *Hierarchical browsing* – Windows Explorer and Outlook

  ▶ Coordinated window scan be used to support hierarchical browsing.

  ▶ For example, if one window contains a book's table of contents, selection of a chapter title by a pointing device should lead to the display, in an adjoining window, of the chapter contents.

  ▶ Hierarchical browsing was nicely integrated in Windows Explorer to allow users to browse hierarchical directories, in Outlook to browse folders of e-mails

WINDOW DESIGN
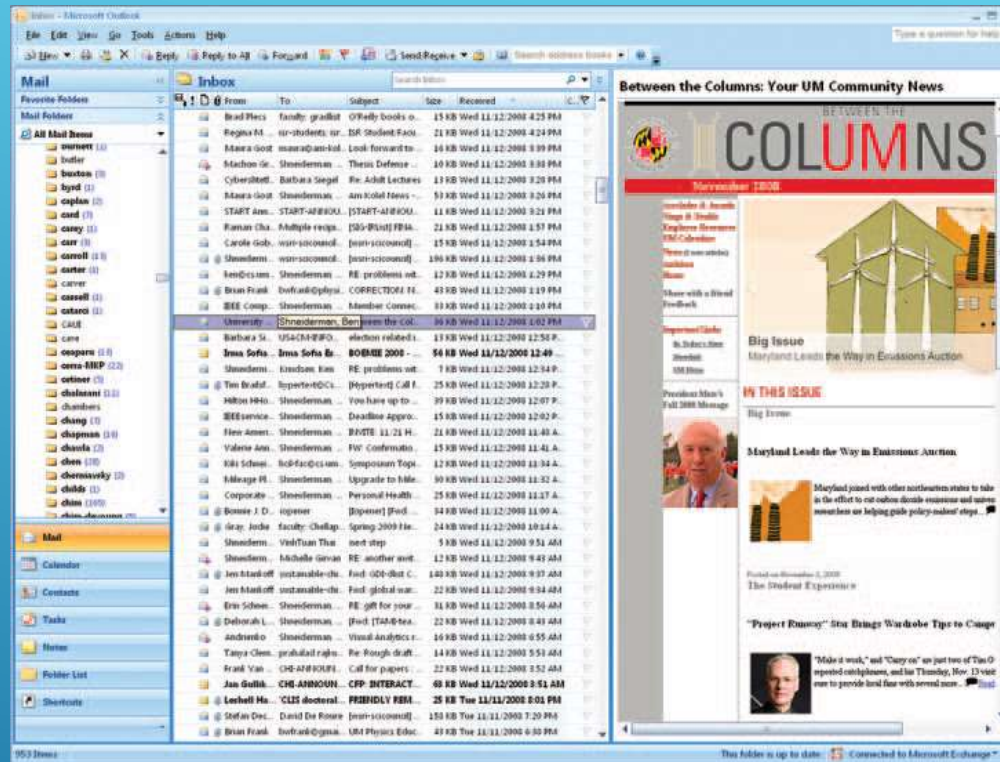
Hierarchical browsing has been integrated into Windows Explorer to allow users to browse hierarchical directories, into Outlook to enable browsing of folders of e-mails and into many other applications.

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

▶ Important coordination's for developers to consider:

  ▶ *Opening/closing of dependent windows* – simultaneously open dependant windows in another convenient location

  ▶ An option on opening a window might be to simultaneously open dependent windows in a nearby and convenient location. For example, when users are browsing a program, if theyopen a main procedure, the dependent set of procedures could open up automatically .

  ▶ Conversely, in filling in a form, users might get a dialog box with a choice of preferences. That dialog box might lead the user to activate a pop-up or error-message window, which in turn might lead to an invocation of the help window. After the user indicates the desired choice in the dialog box, it would be convenient to have automatic closing of all the windows.

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WINDOW DESIGN

▸ Important coordination's for developers to consider:

  ▸ *Saving/opening of window state* – save the current state of the display with all the windows and their contents. "Save screen as…"

  ▸ A natural extension of saving a document or a set of preferences is to save the current state of the display, with all the windows and their contents.

  ▸ This feature might be implemented by the simple addition of a "Save screen as..." menu item to the "File" menu of actions.

  ▸ This action would create a new icon representing the current state; clicking on the icon would reproduce that state.

  ▸ This feature is a simple version of the rooms approach

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WINDOW DESIGN

▶ Important coordination's for developers to consider:

  ▶ *Tabbed browsing* – view multiple web pages without opening a new browser window

  ▶ *Tiled windows* – automatically resize and arrange windows so they do not overlap

  ▶ *Ribbon interface* – Microsoft Office 2007

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WINDOW DESIGN

- Image browsing

  - A two-dimensional cousin of hierarchical browsing

    - Work 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

GLOBAL VIEW — *World* — FIELD-OF-VIEW

INTERMEDIATE VIEWS — *Europe*, *France*

DETAIL VIEW — *Paris*
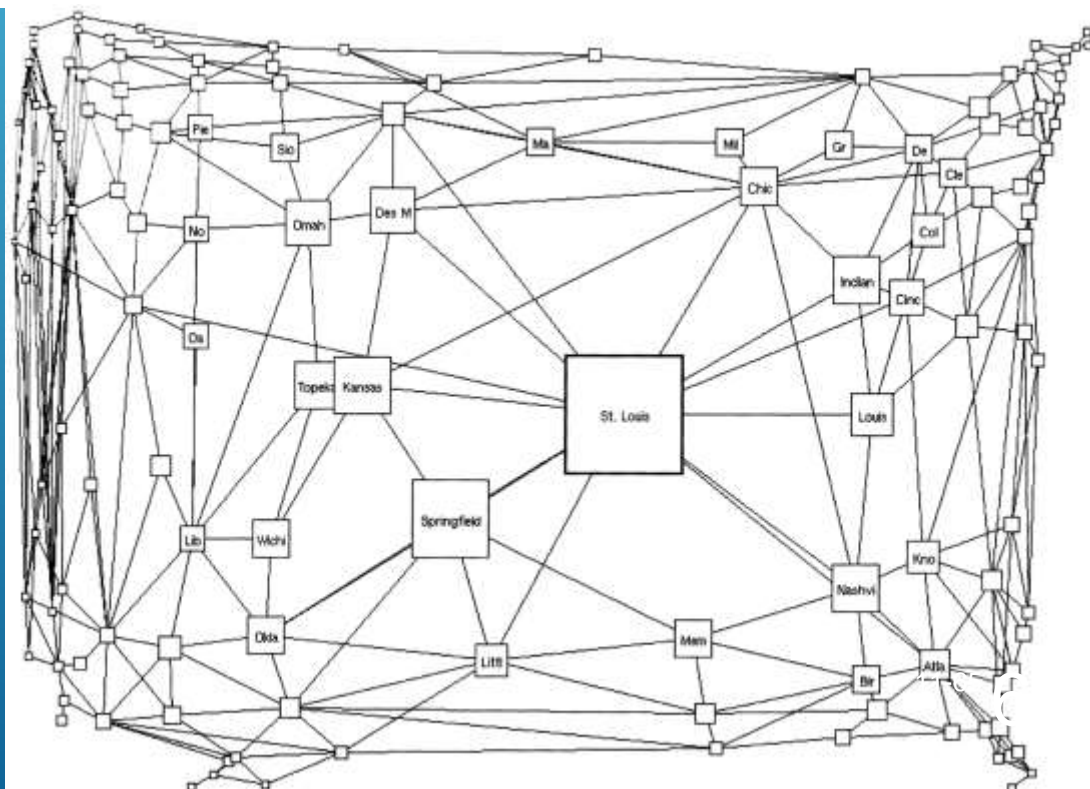
COORDINATED PAIRS

- 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

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WINDOW DESIGN

▸ Image browsing

  ▸ Image generation. Paint or construct a large image or diagram.

  ▸ Open-ended exploration. Browse to gain an understanding of the map or image.

  ▸ Diagnostics. Scan for fla\vs in an entire circuit diagram, medical image, or newspaper layout.

  ▸ Navigation. Have knowledge of the overview, but need to pursue details along a highway or vein.

  ▸ Monitoring. Watch the overview and, when a problem occurs. zoom in on details.

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

WINDOW DESIGN

▶ Requirements for Personal role management

 ▶ 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.

ANY QUESTIONS???