An ounce of prevention...
It’s in the manual.

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Outline

• Errors
  ▪ Errors & slips
  ▪ Error prevention guidelines
  ▪ Error recovery guidelines

• Documentation and Help
  ▪ Guidelines
  ▪ Types of doc/help
  ▪ Presentation issues
  ▪ Documentation organization
Errors

- Errors
  - Avoiding and preventing
  - Identifying and understanding
  - Handling and recovering
Example Studies - Errors Happen!

• 170 experienced UNIX users over 9 days
  ▪ Individual commands had error rates of 3-50%
    Kraut et al, CHI ‘83

• 300 security system users over 20 months
  ▪ 12,117 error messages
  ▪ Most common 11 errors -> 65%
  ▪ 2517 involved repeated errors (with no non-errors in between) within 10 minutes
    → Bad error recovery/help
    Mosteller & Ballas, Human Factors ‘89
Error Prevention Guidelines

- Eliminate modes or provide visible cues for modes
- Use good coding techniques (color, style)
- Maximize recognition, minimize recall
- Design non-similar motor sequences for commands
- Minimize need for typing
Error Prevention Guidelines

• Test and monitor for errors and engineer them out
• Allow reconsideration of action by user (e.g., removing file from trash)
Error Recovery Guidelines

• Provide appropriate type of response
  ▪ Gag - Prevent user from continuing
    – Erroneous login
  ▪ Warn - Warn user an unusual situation is occurring
    – Bell or alert box
  ▪ Nothing - Just don’t do anything (Careful, user must determine problem)
    – Mac: move file to bad place
Error Recovery Guidelines

• Responses (continued)
  ▪ Self-correct - Guess correct action & do it
    - Spell-check correction
  ▪ Dialog - System opens dialog with user
    - Go into debugger on run-time crash
Error Recovery Guidelines

• Provide undo function
• Provide cancel function from operations in progress
• Require confirmation for drastic, destructive commands
• Provide reasonableness checks on input data
  ▪ Did you really mean to order 5000?
Error Recovery Guidelines

• Return cursor to error field, allow fix
• Provide some intelligence
  ▪ Guess what they wanted to do
• Provide quick access to context-sensitive help
Error Message Wording

• Error: Error code -37
• Description: Disk full
• Prescription: Disk full; recover disk space
• Prescription + aid: Disk full; recover space by deleting files or defragmenting

• Vocabulary
  ▪ User-oriented
  ▪ Defined in advance for commonality
Error Message Tone

• Sorry, command not recognized
• Command not recognized
• Illegal command
• Illegal command!
• ILLEGAL COMMAND!
• ILLEGAL COMMAND!
Help and Documentation

• Guidelines
• Types of doc/help
• Presentation issues
• Doc organization
Customer Support
User Support

• Help
  ▪ Problem-oriented and specific

• Documentation
  ▪ System-oriented and general
Help & Documentation

• Never a replacement for good design, but essential
• Simple system
  ▪ User walks up and uses it
  ▪ Name some
• Most other systems with rich features require help
User Support Requirements

• Consistency
  ▪ Across different sections, between on-line and paper documentation, in terminology, content and style
User Support Requirements

• Flexibility
  ▪ Appropriate for novices through experts, maybe by having expandable sections of details

• Unobtrusiveness
  ▪ Shouldn’t distract from or interfere with normal work flow
  ▪ Clippy!!
Types of Documentation/Help

1. Quick reference “Cheat Sheet”
2. Tutorial
3. Reference manual
4. Context-sensitive
5. Searchable
1. Quick reference/review

1. Reminder or short reference
2. Often for syntax
3. Can be recall aid for expert
4. Can allow novice to see what’s available
5. One or two page “cheat sheet”
Examples
2. Tutorial

- For start-up; gets user going
  - Incremental learning
  - Task-oriented
- Convey conceptual model
- Communicate essential items
- Sometimes an on-line tour or demo
2. Tutorial Manual - Outline

1. Introduction
   - Assumed background of reader
     - Ref on where to get it
   - General capabilities
   - Key concepts - model, metaphor

2. Starter kit of tasks and how to accomplish
   - For each task - examples, screen shots
   - Introduce additional elements of conceptual model only as needed
   - How to deal with common errors / exceptions
2. Tutorial Manual - Outline

3. More tasks
   - Introduce more commands as needed by tasks
   - More sophisticated uses of earlier commands
   - Changing defaults
   - Etc
   - Etc

N. Index
   § Organized by terms, concepts, tasks, commands

- Full explanation of everything
- Organized by commands or by concepts
- Detailed command descriptions
  - Unix on-line manual pages, for example
- Usually for experts
- May use terse or abstract notations
  - BNF for syntax, for instance
3. Exp’t Comparing Tutorial and Reference Manuals

<table>
<thead>
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<th>Ref Man</th>
<th>Tutorial</th>
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<td>18.81 min</td>
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<td>Commands/task</td>
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<td>18.13</td>
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<td>5.09</td>
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<td>Tasks completed</td>
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<td>8.36</td>
</tr>
<tr>
<td>Errors/task</td>
<td>.36</td>
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</table>

4. Context-sensitive (task-specific) help

- System provides help on current situation
- Macintosh balloon help (old), ToolTips, for example
- Other examples?
4. Command-line Context
Sensitive Help

• Note: > is command line prompt

• >?
  List of all available commands

• >dir ?
  Help on dir command

• >dir abc ?
  Help on second parameter of dir

• > dir abc dev
  Error; abc is unknown ?
  Help on error message
5. Searchable Help

- Sometimes it works....

![Microsoft Office Help interface](image)
5. Searchable

- And sometimes, it doesn’t....

- Prevent chart colors from being updated when you change the color scheme
- Change default PowerPoint Movie options
- I changed the fill, border, shadow, or 3-D effect, but when I draw an object, I get the old settings.
- My inserted picture does not look right.
- The graphics and text on my Web page look different on another computer.
- Set the timing for movies and sounds
- Animate the elements of a chart
- Add a built-in menu to a toolbar or the menu bar
- Add data to a Microsoft Excel chart
- Add rows or columns to a table
- Add a custom menu to a toolbar or the menu bar
- How color schemes work
- Type and move around in a table
- Create or change a color scheme by using the Crayon color picker
- Create or change a color scheme for display in a Web browser
- Create or change a color scheme by entering RGB values
- Create or change a color scheme by entering HSV values
- Create or change a color scheme by entering CMYK values
- Create a list of action items during a slide show
- Advanced search options for Summary
User Support Approaches

- **Context-sensitive help**
  - Knowledge of particular user
  - Provide information pertinent to a particular situation or interface item

- **On-line tutorials**
  - Work through simple examples, provide a feel for application
Presentation Issues

• Effective presentation of help
  ▪ Design it like any other part of UI: language, terminology, jargon, etc.
  ▪ Use active voice
    – “To close a window, place the mouse cursor in the box at the upper right corner (with the X) and click the mouse button.”
Recommendations

• **OK**
  - All details of each command
  - BNF or formal notation
  - Terse, technical prose

• **Better**
  - Subsets of concepts
  - Lots of examples
  - Readable explanations with a minimum of technical terms
Doc Organization

- State educational objectives
- Present concepts in logical sequence, increasing order of difficulty
- Avoid forward references
- Make sections have roughly equal amounts of material
- Have plenty of examples, complete sample sessions
Doc Organization

• Each concept section:
  ▪ Explain reason for concept
  ▪ Describe concept in task-domain semantic terms
  ▪ Show computer-related semantic concepts
  ▪ Offer syntax

• Table of contents and index are important
• Keep reading level simple
Reading Level

- Study on doc at 5th, 10th, 15th grade reading levels among low, mid, high reading level people
- Reading level of person affected performance, but not reading level of text
- People liked 5th grade text best  
  Roemer & Chapanis, CHI ‘82
Improving Doc

• Run through think-aloud sessions
• Use on-line example tutorials
• Try to predict common states and problems
• Anticipate errors
• Develop manuals early and pilot test
• Iteratively refine
The End