

Usability Principles

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Usability

- Fundamental aspects (dimensions):
 - **easy to learn and remember** (learnability, memorability)
 - **easy to use** (fast and with few errors) (efficiency, efficacy)
 - **Satisfaction**
 - **Visibility** (Is the state visible)
 - **Errors** (few and recoverable)

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Learnability Principles

- Cues that communicate the system model
 - Affordances
 - Visibility
 - Feedback
- Consistency
 - Speak the user's language
 - Metaphors
 - Platform standards

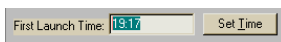
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Affordances

- Perceived and actual properties of a thing that determine how the thing could be used



- Perceived vs. actual



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Visibility

- Relevant parts of system should be visible
 - Not usually a problem in the real world
 - But takes extra effort in computer interfaces



mouse over

- Availability of drag & drop is often invisible

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Feedback



- Actions should have immediate, visible effects
 - Push buttons
 - Scrollbars
 - Drag & drop
- Kinds of feedback
 - Visual
 - Audio
 - Haptic

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Consistency



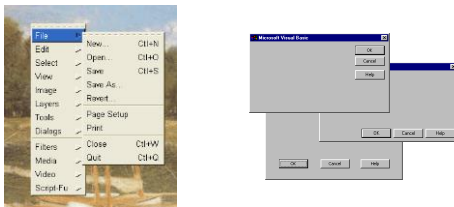
- Also called the “principle of least surprise”
 - Similar things should look and act similar
 - Different things should look different
- Kinds of consistency
 - Internal
 - External
 - Metaphorical



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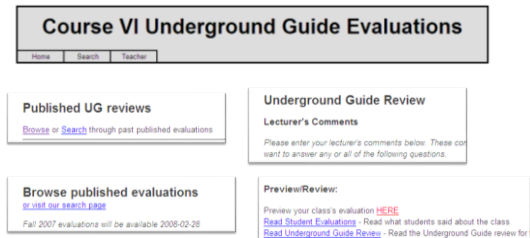
Consistency of Layout



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Consistency in Wording



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Speak the User's Language



- Use common words, not technological terms
 - But use domain-specific terms where appropriate



Source: Interface Hall of Shame

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Follow Platform Standards



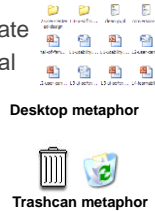
- Follow platform standards
 - Apple Human Interface Guidelines
 - Windows User Experience Guidelines
 - Android Material Design
- Or imitate what the popular programs do

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Metaphors

- Advantages
 - Highly learnable when appropriate
 - Hooks into user's existing mental models very easily
- Dangers
 - Often hard for designers to find
 - May be deceptive
 - May be constraining
 - Metaphor is usually broken somewhere



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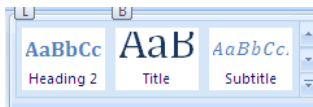
Usability

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 - Satisfaction**
 - Visibility** (Is the state visible)
 - Errors** (few and recoverable)

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Command Aggregates

- Styles
- Scripts
- Bookmarks



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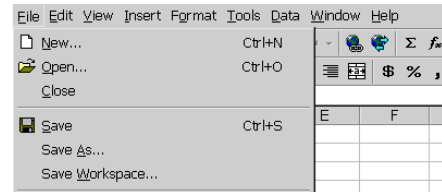
Summary

- Learnable interfaces should clearly communicate the correct mental model to the user
 - Use affordances, natural mapping, visibility
 - Consider metaphors
 - Be consistent internally, externally, metaphorically
 - Prefer knowledge in the world over knowledge in the head

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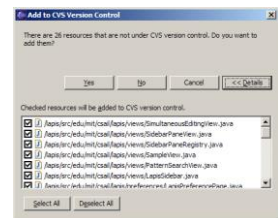
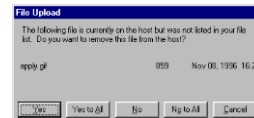
Keyboard Shortcuts

- Keyboard commands
- Menu accelerators



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Aggregating Questions

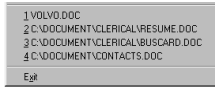


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Use Defaults and History



- Use defaults
 - Initially, most likely entry
 - After use, previous entry
- Keep histories



Source: Interface Hall of Shame

- Offer autocompletion

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Make Modes Clearly Visible



- Modes: states in which actions have different meanings
 - VI insert mode vs. command mode
 - Caps Lock
 - Drawing palette



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Visibility Depends on Locus of Attention



- **Spotlight metaphor**: attention focuses on one input channel (e.g. area of visual field) at a time
- Does the user's locus of attention include:
 - Caps Lock light on keyboard?
 - Status bar?
 - Menu bar?
 - Mouse cursor?

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Visible Navigation State



- Breadcrumbs

[Travel](#) > [Guides](#) > North America

- Pagination

Results Page:
1 2 3 4 5 6 7 8 9 10 > [Next](#)

- Tabs



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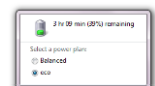
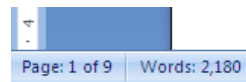
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Visible Model State



- Continuous visual representation of model
 - What to visualize should be guided by the user's tasks

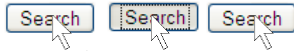


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Feedback: Actions Should Have Immediately Visible Effects

- Low-level feedback
 - e.g. push button



- High-level feedback
 - model state changes
 - new web page starts loading

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Unnecessary Feedback



Source: Interface Hall of Shame

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Visibility not just visual

- Audio
- Haptic

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Error Types

- Slips and lapses
 - Failure to correctly execute a procedure
 - Slip is a failure of execution [Doing the wrong thing]
 - lapse is a failure of memory [Forgetting to do the right thing]
- Mistakes
 - Using wrong procedure for the goal
 - Typically found in rule-based behavior or problem-solving behavior
 - Users does not know what to do

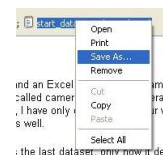


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Avoiding Capture and Description Slips

- Avoid habitual action sequences with identical prefixes
- Avoid actions with very similar descriptions
- Keep dangerous commands away from common ones



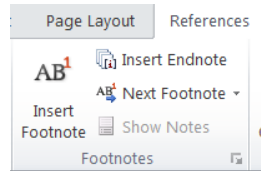
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Avoiding Mode Errors



- Eliminate modes
- Increase visibility of mode
- Spring-loaded or temporary modes
- Disjoint action sets in different modes



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Other Rules for Error Prevention



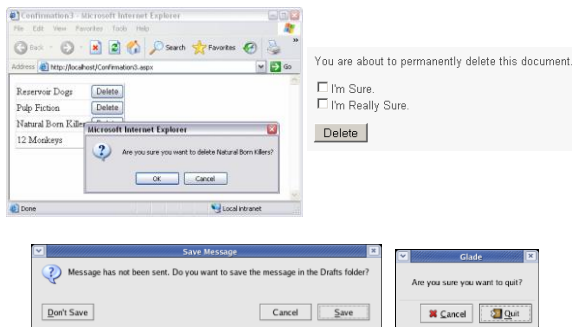
- Disable illegal commands
- Use menus & forms, not command languages
- All needed information should be visible
- Use combo boxes, not textboxes
 - Not to much...



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Confirmation Dialogs



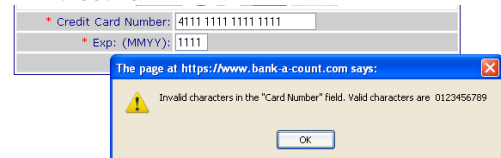
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Writing Error Message Dialogs



- Best error message is **none at all**
 - Errors should be prevented
 - Be more flexible and tolerant
 - Nonsense entries can often be ignored without harm



Source: "No Dashes Or Spaces" Hall of Shame

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Error Message: Be Precise and Comprehensible



- Be precise
 - "File missing or wrong format"
 - "File can't be parsed"
 - "Line too long"
 - "Name contains bad characters"
- Restate user's input
 - Not "Cannot open file", but "Cannot open file named paper.doc"
- Speak the user's language
 - Not "FileNotFoundException"
 - Hide technical details (like a stack trace) until requested

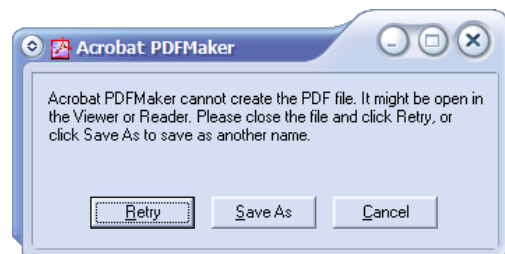
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Suggest Reasons and Solutions



- Give **constructive** help
 - why error occurred and how to fix it



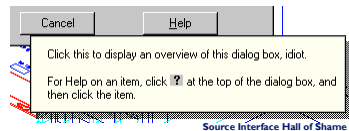
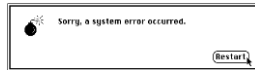
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Be Polite



- Be polite and nonblaming
- Avoid loaded words
 - Fatal, illegal, aborted, terminated



Source: Interface Hall of Shame

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Clearly Marked Exits



- Long operations should be cancelable



- All dialogs should have a cancel button



Source: Interface Hall of Shame

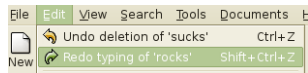
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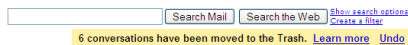
Support Undo



- Desktop



- Web



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Principal bibliografia



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- The Encyclopedia of Human Computer Interaction, 2nd ed., Interaction Design Foundation. <https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed>
- Butler, B.A., Jabob, R.J.K, Kieras, D., Course Notes on "Human Computer Interaction: Introduction and Overview", CHI 2009.
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