


Errors


An ounce of prevention...



Agenda


- Error types
- Slip types
- Error prevention guidelines
- Error recovery guidelines

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Error-handling Strategies

1. Avoid and prevent
2. Identify and understand
3. Handle and recover




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Perceptual Errors

- Result from poor perceptual cues
 - ❖ Display of objects that are visually similar
 - ❖ Invisible or poorly expressed states
 - ❖ Failure to capture user's attention
 - ❖ Lack of perceivable feedback

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Perceptual Errors


Are perceptual errors likely here?

[FrontPage Save Results Component]
Fields marked in **BOLD RED** are required fields and need to be filled in to process the account setup.

First Name <input type="text"/>	Last Name <input type="text"/>
Street Address <input type="text"/>	City <input type="text"/>
State/Prov <input type="text" value="Choose a State"/>	Country <input type="text" value="United States"/>
If other please specify below	
Postal/Zip <input type="text"/>	Phone <input type="text" value="-"/> <input type="text" value="-"/>
E-Mail <input type="text"/>	Fax <input type="text" value="-"/> <input type="text" value="-"/>
Birth Date <input type="text" value="-Select-"/> <input type="text" value="--"/> <input type="text" value="--"/>	Weight <input type="text" value=""/> <input type="text" value=""/> Lbs.
Sex <input type="text" value="--"/>	Smoker? <input type="text" value="--"/>
Are You Pregnant? <input type="text" value="--"/>	Are You Nursing? <input type="text" value="--"/>

Please indicate here if you will accept the generic version of the medication that you seek to have dispensed through The Canadian Drug Store.
Yes

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Cognitive Errors

- Caused by taxing memory and thinking
 - ❖ Tax recall memory
 - ❖ Poor mnemonic aids
 - ❖ Inconsistency
 - ❖ Lack of context or status info
 - e.g., where came from in a menu
 - ❖ Mental calculations and translations

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Cognitive Errors

Are cognitive errors likely here?

New York State Unified Court System
OnLine Decisions

Decisions are available for many Supreme Court Civil Cases in Broome, Kane, Warren, New York, Queens, and Suffolk Counties. Other decisions from New York State Supreme Court and other criminal courts are also available. More counties and courts to be added shortly (limited online decisions now available in Erie, Livingston and Monroe Counties).
[Full Text Search of Decisions Now Available. Click Here.](#)

Query Options:
Enter Index No. (or Docket No.)
Optional Enter County

[Full Text Search of Decisions](#)

These options are unrestricted and subject to revision in the Official Reports. They may or may not have been entered in the County Clerk's Office. Reliance on the decisions on this site for purposes other than inquiry is at the user's risk.

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Motor Errors

- Taxing the motor skills
 - ❖ Awkward movements
 - ❖ Highly similar motor sequences
 - e.g., double click, click
 - ❖ Pressure for speed
 - ❖ Require a high degree of hand-eye coordination
 - ❖ Requiring special types of motor skills (type)

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Motor Errors

Lots of errors are likely here!!

JavaScript Search

This shows how to have a menu that is a drop down from the top of the page. It is possible to modify the menu to scroll on/off, auto to change colors, and so on. [Click here to see the example.](#)

Author Name: [J. K. Adams](#) [mailto:jk@adams.com]
Date Submitted: [March 2004](#)
Items Found: [101/100](#)
Name in URL: [Yes](#)
Category List: [None](#)
Key Words: [JavaScript Search](#)

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Early example Studies

- 170 experienced UNIX users over 9 days
 - ❖ Individual commands 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 accounted for 65%
 - A "65:0.1" rather than "80:20" rule
 - Ample opportunity for eradicating errors!
 - ❖ 2517 (20%) involved repeated errors (with no non-errors in between) within 10 minutes
 - No support for error recovery or help
 - Mosteller & Ballas, Human Factors '89

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Slips

- Norman:
 - ❖ Slips vs. mistakes
- Automatic (subconscious) error that occurs without deliberation
- User generally knows what to do, but does something else

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Types of Slips

- 1. Capture error
 - ❖ Continue frequently done activity instead of intended one
 - Type "animation" instead of animate
 - Confirm deletion of file instead of cancel
- 2. Description error
 - ❖ Intended action has much in common with others possible (usually when distracted, close proximity)
 - ctrl key & caps lock key / Sun & Mac

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Types of Slips

- 3. Data driven error
 - ❖ Triggered by arrival of sensory info which intrudes into normal action
 - Call to give someone a number, dial that number instead
- 4. Associative activation
 - ❖ Internal thoughts and associations trigger action
 - Phone rings, yell "come in"
 - (Note: These categories are approximate. Capture errors usually depend on inappropriate triggering of associations.)

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Types of Slips

- 5. Loss of activation (a.k.a. absent-mindedness)
 - ❖ Forgetting the goal in middle of sequence of actions
 - Start going into room, then forget why you're going there
- 6. Mode errors
 - ❖ Do an action in one mode while thinking that you're in another
 - Delete file, but you're in wrong directory
 - 'EDIT' in the wrong command-line editor
 - Select entire document,
 - dele~~t~~e selection,
 - go into inser~~t~~ mode,
 - finally (and irrevocably) type T

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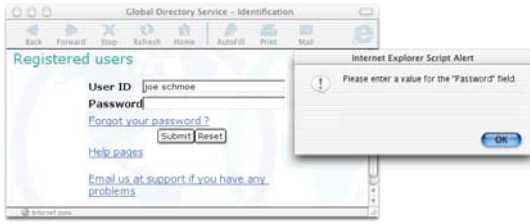
Errors: The designer's view

- Prevent errors from occurring in the first place
- Support recovery from errors that occur

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Error Handling Example (Web)

➤ Form fill in is the most common error case



The screenshot shows a web browser window with a form titled 'Registered users'. The form has fields for 'User ID' (filled with 'joe schmo') and 'Password'. There are 'Submit' and 'Reset' buttons. A 'Forgot your password?' link is also present. An 'Internet Explorer Script Alert' dialog box is overlaid on the form, displaying the message: 'Please enter a value for the "Password" field'. The browser's address bar shows 'Global Directory Service - Identification'.

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Error Prevention Guidelines


- Eliminate modes or provide visible cues for modes
 - ❖ T-shirt seen at CHI in 1980's: "Don't mode me in!"
- Minimize need for recall and interpretation
 - ❖ Provide prompts/cues that maximize opportunities for recognition
 - ❖ Use good coding techniques (color, style) with transparent or readily learned meaning

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Error Prevention Guidelines

- Avoid confusions: opportunities for motor and capture errors
 - ❖ Design motor sequences or commands to be dissimilar
 - ❖ Minimize need for typing
- Are you sure?
 - ❖ Require confirmation for drastic, destructive commands
 - ❖ Provide reasonableness checks on input data
 - Did you really mean to order 5000?
- Test and monitor for errors and engineer them out


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Error Recovery: Feedback

- Provide appropriate type of feedback
 - ❖ Don't do anything
 - E.g. Mac: move file to bad place
 - But be careful: user must diagnose that there is a problem and determine what it is.
 - ❖ Prevent user from continuing
 - E.g. Erroneous login
 - But be careful: this can prevent user from doing anything useful
 - ❖ Warn - Warn user an unusual situation is occurring
 - Bell or alert box
 - But be careful: Bell can alert user to presence of error without diagnosing it; alert box should be action-oriented.


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Error Recovery: Undo

- Allow reconsideration of action by user
 - ❖ e.g., general 'undo' command
 - ❖ E.g. putting file in trash and removing file from trash
 - ❖ Provide 'cancel' function from operations in progress


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Error Recovery: DWIM

- DWIM: provide intelligent 'do what I mean') support
 - ❖ Self-correct - Guess correct action & do it
 - Spell-check correction
 - But be careful: systems make errors, too
 - ❖ Confirmation without self-correction
 - Dialog - System opens dialog with user
 - E.g. Go into debugger on run-time crash
 - Query - Ask user what should've been done, then allow error action as legal one
 - E.g. "Did you mean...?" for Command language naming error
 - But be careful: Dialog must be conducted at appropriate level for the user's mental model

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Error Recovery: What now?

- Help the user determine what to do next to fix any mess
 - ❖ Return cursor to error field, allow fix
 - Tell them what to fix, how to fix it
 - ❖ Provide some intelligence
 - Guess what they wanted to do
- Provide quick access to context-sensitive help

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