Error

C.W. Johnson,

University of Glasgow, Glasgow, G12 8QQ. Scotland. johnson@dcs.gla.ac.uk, http://www.dcs.gla.ac.uk/~johnson

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CS-1Q HCI

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Errors

• Slips, lapses, mistakes and violations.

• Error tolerant design

• Error detection and recovery.

• Organisational factors.

Slips, Lapses and Mistakes

• Junior trader sells \$16m of German bond futures.



Acknowledgement: BBC (Nov. 1998)

- Trader thought it was a training screen.
- Whose fault is this? Trader or Company?

Slips, Lapses and Mistakes

• Error:

- unwitting deviation of actions from intentions.

• Violation:

- deliberate deviation of actions from regulations.

• Slip:

- visible failure in the execution of a plan;

- a slip of the tongue is observable.

• Lapse:

- invisible failure in the execution of a plan;

- forgetting someone's name.

• Mistake:

- a failure of intention;

- trying to use Word to maintain complex accounts.

Why do Errors Occur?

- Fatigue and circadian rhythms:
- mistakes are very likely last thing on a Friday!



Stress (light, heat, noise, domestics):
environmental factors and distractions induce mistakes.

Why do Errors Occur?

• Alcohol and drugs:

- long office lunches don't help interaction

• Workload (physical, mental etc):

- time pressures can impair performance.

• Individual differences:

- some people actually do make more mistakes than others;

- spell-checking indicator - correct now or at end?

Perception, Cognition, Physiology



Situation Awareness

• Level 1: perception of elements in environment.

• Level 2: comprehension of current situation.

• Level 3: projection of future states.

Error Tolerant Design

- Greying out menu items:
- users can't select inappropriate item.



- Training wheels:
- prevent users from making an error.

Error Tolerant Design

• What happens if you undo and undo?

Рѕр.ехе					×	
This Windows application cannot respond to the End Task request. It may be busy, waiting for a response from you, or it may have stopped executing.						
o Press Cancel to cancel and return to Windows NT.						
o Press End Task to close this application immediately. You will lose any unsaved information in this application.						
 Press Wait to give the application 20 seconds to finish what it is doing and then try to close the application again. 						
	Wait	<u>E</u> nd	Task	Cancel		
Shut Do	wn Window:	s			×	
Are you sure you want to: Shut down the computer? Restart the computer? Close all programs and log on as a different user? 						
		Yes	<u>N</u> o	<u>H</u> e	İp	

- Confirmation of irreversible actions:
- do you really want to reformat this disk?
- do you really want to end this task?

Error Tolerant Design

• Validation of input prior to entry.



• As soon as possible to reduce frustration.

Error Detection

- Error messages:
- recap on Winograd and Flores' breakdown.



- Must consider both frequency and consequences:
- a rare error message may need more explanation;
- users must receive indication of seriousness.

Error Detection

- Interface design:
- some users will fail to observe error messages;
- some cannot interpret the meaning of the message.

Format A	:\		×		
\triangle	WARNING: Formatting will erase ALL data on this disk. Select OK to format the disk, CANCEL to abort.				
	[OK Cancel			
3½ Floppy (А:)					
		A:V is not accessible.			
	\bullet	The device is not ready.			
	Yuur	<u>R</u> etry Cancel			

• Focus for user testing: 'now get out of that'.

Observing Errors

- Will user testing reproduce errors?
- people strive to please investigator;
- people know they are being watched (Hawthorne effect)

• Logging and tracking of user's behaviour.

• Problems:

- will logs distinguish between slip and mistake?
- will logs help to detect lapses at all?
- ethical issues and legal issues...

Organisational Factors

- James Reason:
- Human Error (1990);
- Managing the Risks of Organizational Accidents (1997).



• Who causes the error: - the user, the designer, the manager?

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Summary

• Slips, lapses, mistakes and violations.

• Error tolerant design

• Error detection and recovery

• Organisational factors.

Further reading

• Again Shneiderman skims this issue.

Shneiderman on:
error messages - 373-379.

• Try to read Reason's Human Error?

• Yes, seriously...