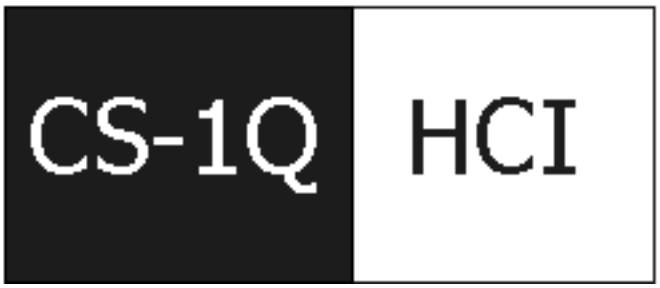
Error

C.W. Johnson,

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

October 2001



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

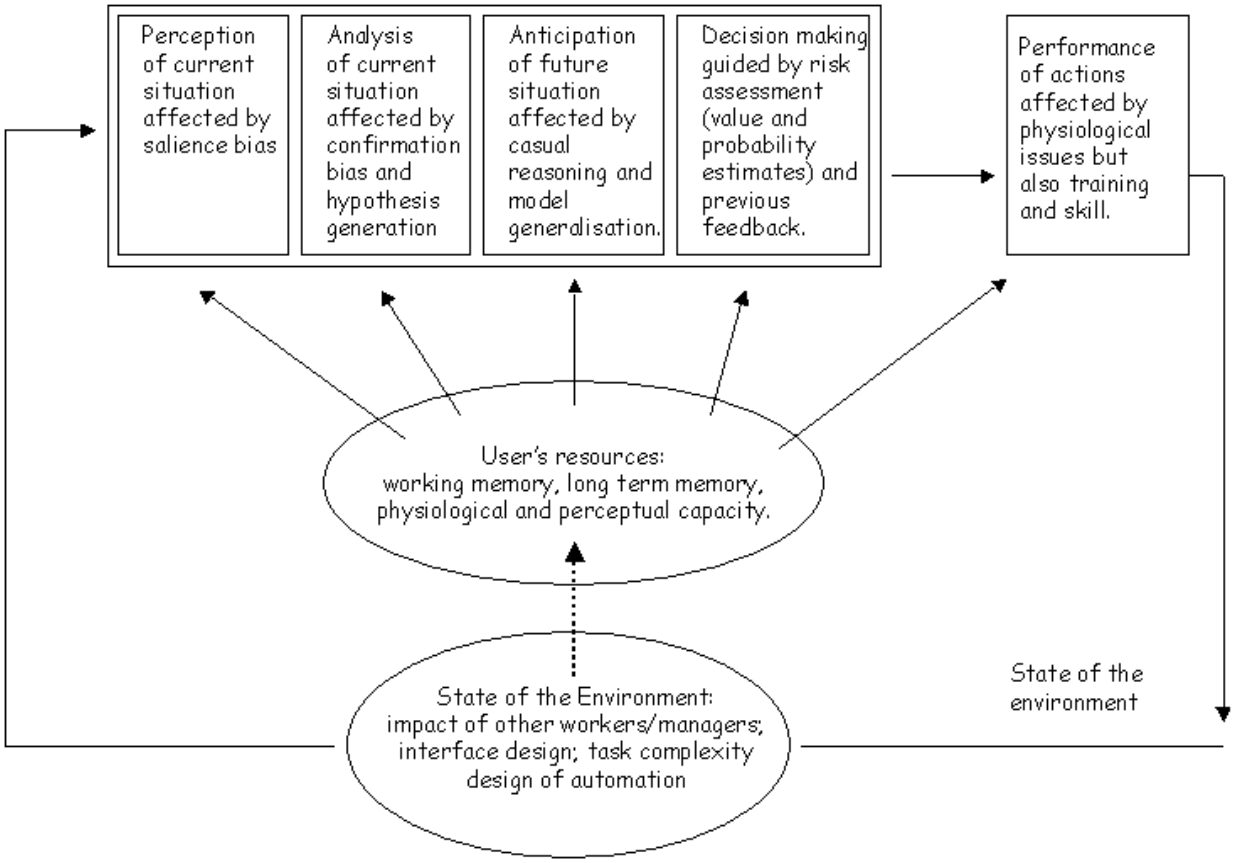
- Workload (physical, mental etc):

- 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.

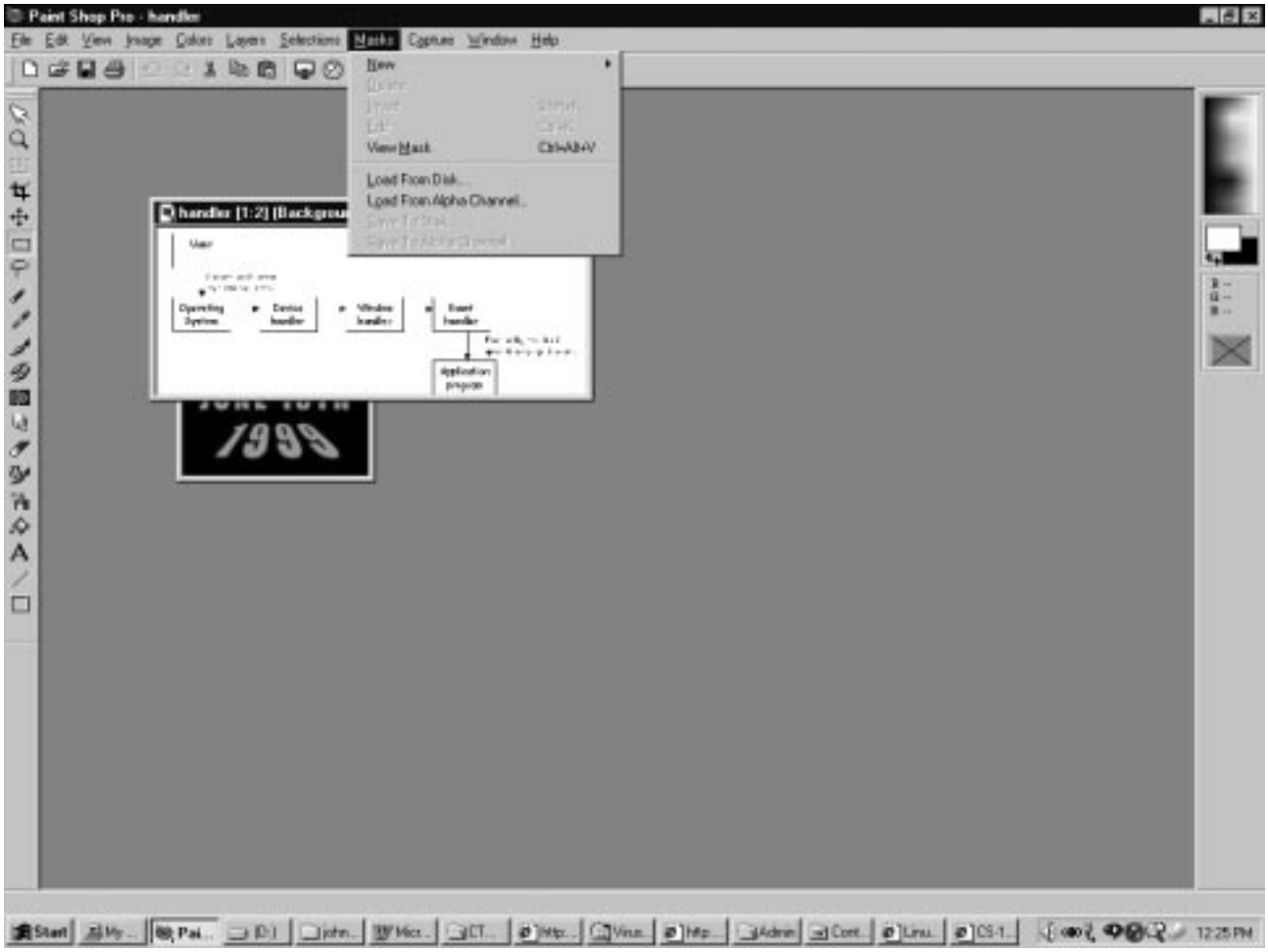
- Level 2: comprehension of current situation.

- Level 3: projection of future states.

Error Tolerant Design

- Greying out menu items:

- users can't select inappropriate item.

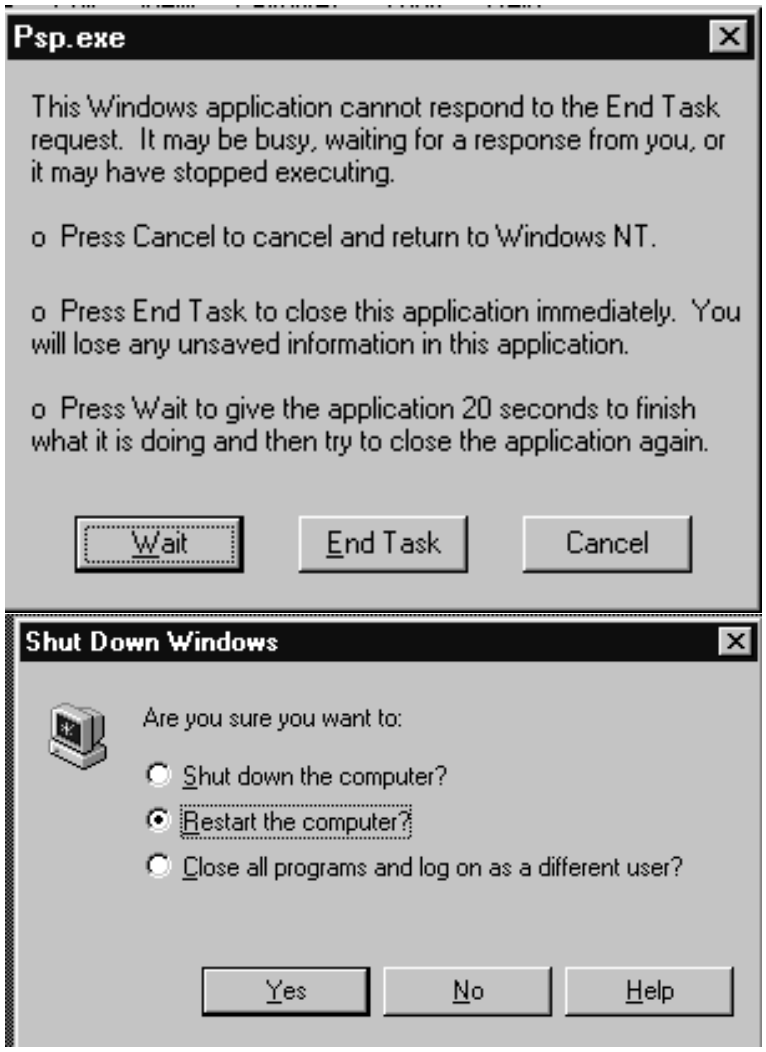


- Training wheels:

- prevent users from making an error.

Error Tolerant Design

- What happens if you undo and undo?

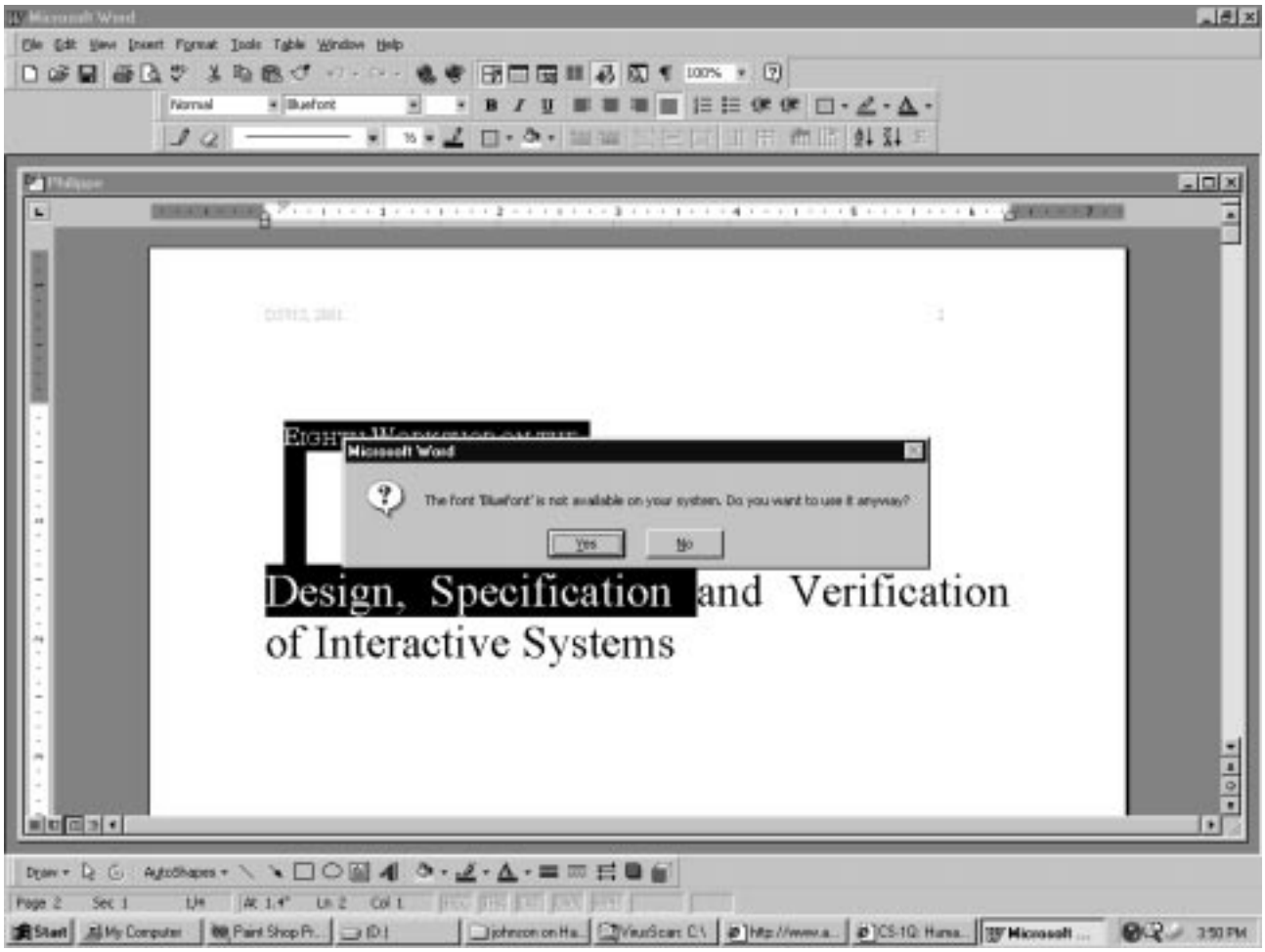


- Confirmation of irreversible actions:

- 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.

- 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.

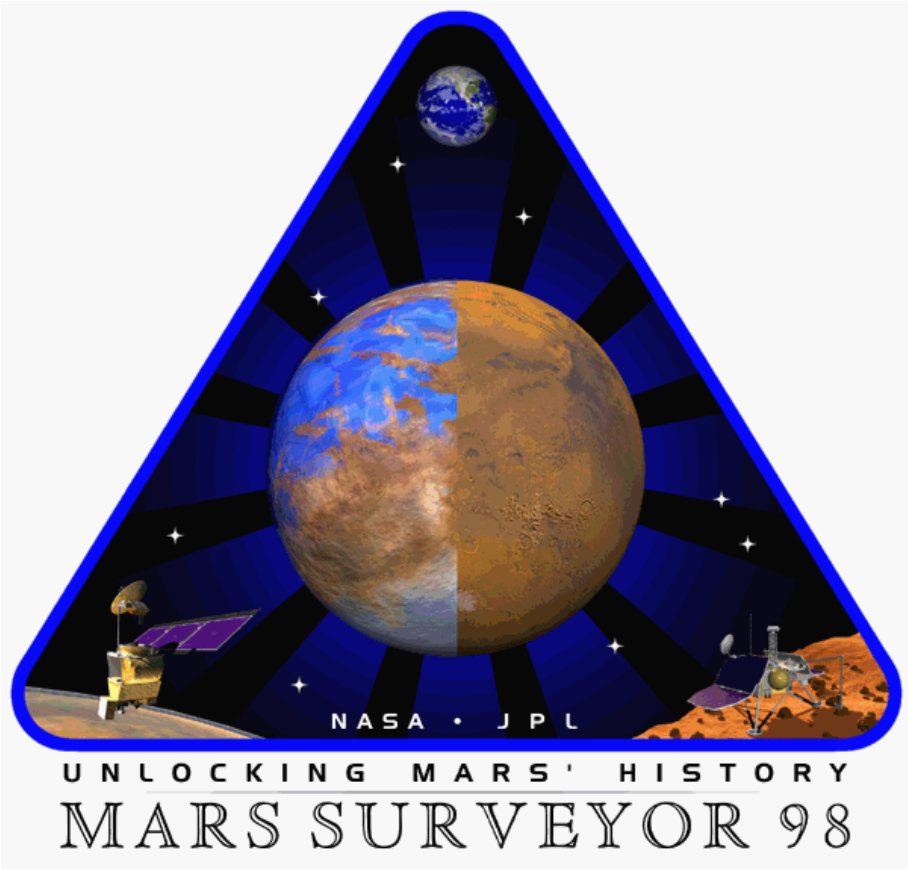
- Problems:

- 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?

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...