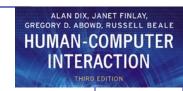


Cognitive Walkthrough

Proposed by Polson et al.

- evaluates design on how well it supports user in learning task
- usually performed by expert in cognitive psychology
- expert 'walks though' design to identify potential problems using psychological principles

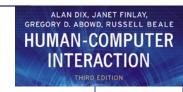




Cognitive Walkthrough (ctd)

- For each task walkthrough considers
 - what impact will interaction have on user?
 - what cognitive processes are required?
 - what learning problems may occur?
- cognitive processes include thinking, knowing, remembering, judging, and problem-solving





Review-based evaluation

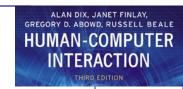
- Results from the literature used to support or refute parts of design.
- Care needed to ensure results are transferable to new design.





Evaluating through user Participation





Laboratory studies

- Advantages:
 - specialist equipment available
 - uninterrupted environment
- Disadvantages:
 - lack of context
 - difficult to observe several users cooperating
- Appropriate
 - if system location is dangerous

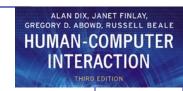




Field Studies

- Advantages:
 - natural environment
 - context retained
 - longitudinal studies possible
- Disadvantages:
 - distractions
 - noise
- Appropriate
 - where context is crucial for longitudinal studies

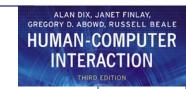




Experimental evaluation

- controlled evaluation of specific aspects of interactive behaviour
- evaluator chooses hypothesis to be tested
- a number of experimental conditions are considered which differ only in the value of some controlled variable.





Experimental factors

- Subjects
 - who representative, sufficient sample
- Variables
 - things to modify and measure
- Hypothesis
 - what you'd like to show
- Experimental design
 - how you are going to do it





Variables

- independent variable (IV)
 - characteristic changed to produce different conditions
 - e.g. interface style, number of menu items
- dependent variable (DV)
 - characteristics measured in the experiment e.g. time taken, number of errors.





Hypothesis

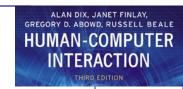
- prediction of outcome
 - framed in terms of IV and DV

e.g. "error rate will increase as font size decreases"

- null hypothesis:
 - states no difference between conditions
 - aim is to disprove this

e.g. null hyp. = "no change with font size"





Experimental design

- within groups design
 - each subject performs experiment under each condition.
 - transfer of learning possible
 - less costly and less likely to suffer from user variation.
- between groups design
 - each subject performs under only one condition
 - no transfer of learning
 - more users required
 - variation can bias results.





Observational Methods

Think Aloud
Cooperative evaluation
Post-task walkthroughs





Think Aloud

- user observed performing task
- user asked to describe what he is doing and why, what he thinks is happening etc.
- Advantages
 - simplicity requires little expertise
 - can provide useful insight
 - can show how system is actually use
- Disadvantages
 - selective
 - act of describing may alter task performance

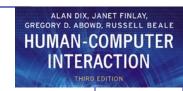




Cooperative evaluation

- variation on think aloud
- user collaborates in evaluation
- both user and evaluator can ask each other questions throughout
- Additional advantages
 - less constrained and easier to use
 - user is encouraged to criticize system
 - clarification possible





post-task walkthroughs

- transcript played back to participant for comment
 - immediately → fresh in mind
 - delayed → evaluator has time to identify questions
- necessary in cases where think aloud is not possible





Query Techniques

Interviews Questionnaires

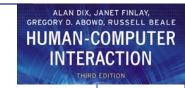




Interviews

- analyst questions user on one-to -one basis usually based on prepared questions
- Informal and relatively cheap
- Advantages
 - can be varied to suit context
 - issues can be explored more fully
 - can extract user views and identify unanticipated problems
- Disadvantages
 - very subjective
 - time consuming





Questionnaires

- Set of fixed questions given to users
- Advantages
 - quick and reaches large user group
 - can be analyzed more rigorously
- Disadvantages
 - less flexible
 - less probing

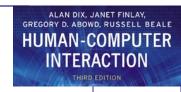




Physiological methods

Eye tracking Physiological measurement





eye tracking

- head or desk mounted equipment tracks the position of the eye
- eye movement reflects the amount of cognitive processing a display requires





physiological measurements

- emotional response linked to physical changes
- these may help determine a user's reaction to an interface
- measurements include:
 - heart activity, including blood pressure, volume and pulse.
 - activity of sweat glands: Galvanic Skin Response (GSR)
 - electrical activity in muscle: electromyogram (EMG)
 - electrical activity in brain: electroencephalogram (EEG)