

## Evaluating Interfaces With Users

Why evaluation is crucial to interface design

General approaches and tradeoffs in evaluation

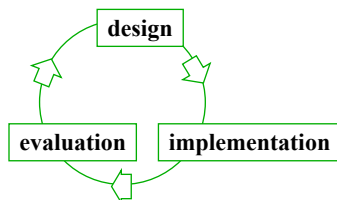
The role of ethics



## Why Bother?

Tied to all parts of the usability engineering lifecycle

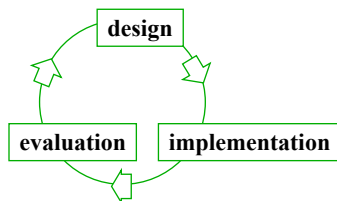
- Pre-design
  - investing in new expensive system requires proof of viability
- Initial design stages
  - develop and evaluate initial design ideas with the user



## Why Bother?

**Tied to all parts of the usability engineering lifecycle**

- Iterative design
  - does system behaviour match the user's task requirements?
  - are there specific problems with the design?
  - can users provide feedback to modify design?
- Acceptance testing
  - verify that human/computer system meets expected performance criteria  
ease of learning, usability, user's attitude, performance criteria  
e.g., a first time user will take 1-3 minutes to learn how to withdraw \$50. from the automatic teller



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## Approaches: Naturalistic

**Observation occurs in realistic setting**

- real life
  - ecologically valid
- describes an ongoing process as it evolves over time

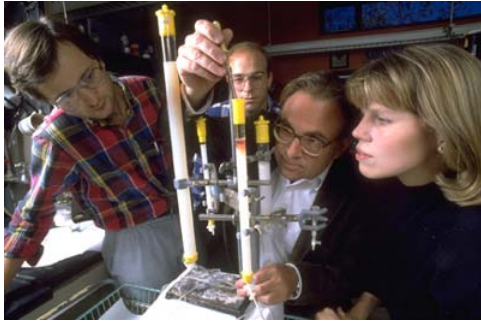


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## Approaches: Experimental

### Experimental

- Classical lab study
- study relations by manipulating one or more *independent* variables
  - experimenter controls all environmental factors (nothing else changes)
- observe effect on one or more *dependent* variables



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## Tradeoff: Natural Vs. Experimental

### Internal validity

- do you measure what you set out to measure

### External validity

- degree to which results can be generalized to other situations

	Naturalistic	Experimental
Internal validity	Low	High
External validity	High	Low

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## Reliability Concerns

Would the same results be achieved if the test were repeated?

### **Problem: individual differences:**

- best user 10x faster than slowest
- best 25% of users ~2x faster than slowest 25%

### **Partial Solution**

- reasonable number and range of users tested



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## Validity Concerns

Does the test measure something of relevance to usability of real products in real use outside of lab?

- Some typical reliability problems of testing vs real use
  - non-typical users tested
  - tasks are not typical tasks
  - physical environment different
    - quiet lab vs. very noisy open offices vs interruptions
  - social influences different
    - motivation towards experimenter vs motivation towards boss

### **Partial Solution**

- use real users
- tasks from task-centered system design
- environment similar to real situation

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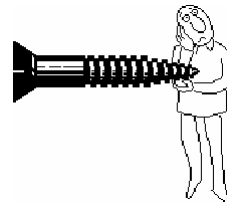
## Ethics



## Ethics

### Testing can be a distressing experience

- pressure to perform, errors inevitable
- feelings of inadequacy
- competition with other subjects



### Golden rule

- test participants should always be treated with respect

## Managing Participants In An Ethical Manner

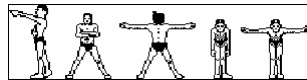
### Before the test

- don't waste the person's time
  - use pilot tests to debug experiments, questionnaires etc
  - have everything ready before the user shows up
- make participants feel comfortable
  - emphasize that it is the system that is being tested, not the user
  - acknowledge that the software may have problems
  - let users know they can stop at any time
- maintain privacy
  - tell user that individual test results will be kept completely confidential
- inform the user
  - explain any monitoring that is being used
  - answer all user's questions (but avoid bias)
- only use volunteers
  - user must sign an informed consent form

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## Managing Participants In An Ethical Manner

### During the test



- don't waste the person's time
  - never have the user perform unnecessary tasks
- make test participants comfortable
  - try to give the person an early success experience
  - keep a relaxed atmosphere in the room
  - coffee, breaks, etc
  - hand out test tasks one at a time
  - never indicate displeasure with the person's performance
  - avoid disruptions
  - stop the test if it becomes too unpleasant
- maintain privacy
  - do not allow the participant's management to observe the test

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## **Managing Participants In An Ethical Manner**

### **After the test**

- make the person feel comfortable
  - state that the participant has helped you find areas of improvement
- inform the participant
  - answer particular questions about the experiment that could have biased the results before
- maintain privacy
  - never report results in a way that individuals can be identified
  - only show videotapes outside the research group with the participant's permission

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## **You Know Now**

**Evaluation is crucial for designing, debugging, and verifying interfaces**

**There is a tradeoff in naturalistic vs experimental approaches**

- internal and external validity
- reliability

***Test participants must be treated with respect***

- ethical rules of behaviour

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