

# ***Predictive Evaluation***

Evaluation without users

Evaluation

Overview

Predictive Evaluation

Heuristic evaluation

Discount usability testing

Cognitive walkthrough

(User modeling)

# Evaluation

- Gathering data about usability of a design by a specified group of users for a particular activity within a specified environment
- Goals
  1. Assess extent of system's functionality
  2. Assess effect of interface on user
  3. Identify specific problems with system

# Evaluation ...

- Forms
  - Formative
    - As project is forming. All through the lifecycle. Early, continuous. Iterative.
  - Summative
    - After a system has been finished. Make judgments about final item.
- Approaches
  - Experimental (Lab studies, quantitative)
    - Typically in a closed, lab setting  
Manipulate independent variables to see effect on dependent variables
  - Naturalistic (Field studies, qualitative)
    - Observation occurs in “real life” setting  
Watch process over time

# Evaluation Methods

1. Experimental/Observational Evaluation
  - a. Collecting user opinions
  - b. Observing usage
  - c. Experiments (usability specifications)
  
2. Predictive Evaluation
  
3. Interpretive Evaluation

# Predictive Evaluation

- Basis:
  - Observing users can be time-consuming and expensive
  - Try to predict usage rather than observing it directly
  - Conserve resources (quick & low cost)
- Approach
  - Expert reviews (frequently used)
    - HCI experts interact with system and try to find potential problems and give prescriptive feedback
  - Best if
    - Haven't used earlier prototype
    - Familiar with domain or task
    - Understand user perspectives

# 1. Heuristic Evaluation

- Developed by Jakob Nielsen
- Several expert usability evaluators assess system based on simple and general heuristics (principles or rules of thumb)
- Procedure
  1. Gather inputs
  2. Evaluate system
  3. Debriefing and collection
  4. Severity rating

# 1. Heuristic Evaluation ...

- Advantage
  - Cheap, good for small companies who can't afford more
  - Getting someone practiced in method is valuable
- Somewhat Controversial
  - Very subjective assessment of problems
    - Depends of expertise of reviewers
  - Why are these the right heuristics?
    - Others have been suggested
  - How to determine what is a true usability problem
    - Some recent papers suggest that many identified “problems” really aren't

## 2. Discount Usability Testing

- Hybrid of empirical usability testing and heuristic evaluation
- Have 2 or 3 think-aloud user sessions with paper or prototype-produced mock-ups





## 3. Cognitive Walkthrough

- Assess learnability and usability through simulation of way users explore and become familiar with interactive system
- A usability “thought experiment”
- Like code walkthrough (s/w engineering)
- From Polson, Lewis, et al at UC Boulder

## 3. Cognitive Walkthrough ...

- CW Process
  - Construct carefully designed tasks from system spec or screen mock-up
  - Walk through (cognitive & operational) activities required to go from one screen to another
  - Review actions needed for task, attempt to predict how users would behave and what problems they'll encounter
- Requirements
  - Description of users and their backgrounds
  - Description of task user is to perform
  - Complete list of the actions required to complete task
  - Prototype or description of system

## 3. Cognitive Walkthrough ...

- Assumptions
  - User has rough plan
  - User explores system, looking for actions to contribute to performance of action
  - User selects action seems best for desired goal
  - User interprets response and assesses whether progress has been made toward completing task
- Methodology
  - Step through action sequence
    - Action 1
    - Response A, B, ..
    - Action 2
    - Response A
    - ...
  - For each one, ask four questions and try to construct a believability story

# CW Questions & Answers

1. Will user be trying to produce effect?
  - Typical supporting Evidence
    - It is part of their original task
    - They have experience using the system
    - The system tells them to do it
  - No evidence?
    - Construct a failure scenario
    - Explain, back up opinion

# CW Questions & Answers

2. Will user notice action is available?
  - Typical supporting evidence
    - Experience
    - Visible device, such as a button
    - Perceivable representation of an action such as a menu item
  
3. Will user know it's the right one for the effect?
  - Typical supporting evidence
    - Experience
    - Interface provides a visual item (such as prompt) to connect action to result effect
    - All other actions look wrong

# CW Questions & Answers

4. Will user understand the feedback?
- Typical supporting evidence  
Experience  
Recognize a connection between a system response and what user was trying to do

## Example:

- Program VCR
  - List actions
  - Ask questions

## 4. User/Cognitive Modeling

- Build a model of user in order to predict usage
  - User as processor model
    - GOMS & keystroke level model
  - Contextual models
    - Activity theory, distributed cognition,...