Lecture 6

Usability Evaluation with Users
(Chapter 4.3)

Usability Evaluation
Summary

• Purpose: Evaluation for usability
• Methods
  – Without Users (analytic)
    • Guidelines (Chapter 2.2)
    • Interface Walkthrough
    • Expert Review (Chapter 4.2)
    • Model-Based analysis (Keystroke Model)
  – With Users (empirical)
    • Usability testing (Chapter 4.3)
    • Experiments (Chapter 4.7)
    • Field Studies (Chapter 4.5)
    • Surveys (Chapter 4.4)

Testing Goals vs. Method

<table>
<thead>
<tr>
<th></th>
<th>Guidelines</th>
<th>Walkthrough</th>
<th>Expert</th>
<th>Keystroke Model</th>
<th>Usability Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed Usability</td>
<td>✓</td>
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<tr>
<td>Usability Testing</td>
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<td>Completeness</td>
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<td>Correctness</td>
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Usability Testing

• Definition
  – Usability testing is an empirical method which puts typical users in a laboratory, gives them a prototype and a set of tasks, and records their interactions, usually on videotape.

Usability Testing

• What can you get from usability testing?
  – Testing against usability requirements: Does the system meet the usability design goals? Usability testing allows measurement of performance time.
  – Design improvements: What changes should be made to the system?
  – Conceptual problems: What misconceptions exist?
  – Repair strategies: What did the person do to recover from failure?
  – Problem solving strategies: What strategies did the person use that could promote a more supportive design?

Usability Testing

• Benefits
  – Focus on first-time users
  – Detects most serious problems
  – Uses real tasks and real users

• Problems
  – Only tests learning for first-time users
  – Finds problems but doesn’t always suggest how to fix them!
  – Expensive and time-consuming
How to do it

- Plan: Before the testing
  - Determine goals of usability testing
  - Usability problems
  - Usability specifications
- Choose pairs of users
  - Real users, not actors or other developers
  - Typical users and note relationships
    - Select users (Background Survey Form)
    - Get informed consent (Consent Form)
- Choose tasks to test
  - Develop testing materials
    - Working prototype
  - Instructions to participants (Instructions Form)
  - Qualitative assessment of testing (User Reaction Form)
- Setup video equipment and test

Usability Specifications
Virtual Science Fair Example

<table>
<thead>
<tr>
<th>Feature</th>
<th>Rule Form</th>
<th>Video</th>
<th>Reaction</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Working with a virtual server</td>
<td>1</td>
<td>working and note of</td>
<td>reaction</td>
<td>notes</td>
</tr>
<tr>
<td>2. Managing a virtual server</td>
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<td>working and note of</td>
<td>reaction</td>
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<tr>
<td>3. Selecting a virtual server</td>
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<td>working and note of</td>
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<td>4. Operating and manipulating the virtual server</td>
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<td>working and note of</td>
<td>reaction</td>
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<tr>
<td>5. Using and manipulating the virtual server</td>
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<td>working and note of</td>
<td>reaction</td>
<td>notes</td>
</tr>
<tr>
<td>6. User reaction and evaluation</td>
<td>1</td>
<td>working and note of</td>
<td>reaction</td>
<td>notes</td>
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Forms

• User background survey
  – Only ask for what you need!

Forms

• Informed Consent
  – What they are going to do
  – How you will evaluate the data
  – Anonymity
  – Can quit at any time
  – Contact information for person doing study
  – Signature
How to do it

- **Plan: Before the testing**
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Prototype Implementation

- Software Storyboard
- Software Prototype with GUI Builder or Prototyping language
- Partial Target Software Implementation
- Completed Target Software Implementation
Forms (cont.)

- General instructions
  - Do the tasks as described
  - Ask for help only when give up
  - Explain purpose; evaluating system, not participants
  - Can leave at any time

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Forms (cont.)

- Task instructions
  - don’t give away the interface!
Forms (cont.)

- User Reactions Survey
  - Ask only for what you need
  - Pilot test it to be sure you’re asking the right questions
How to do it (cont.)

- Data Collection: Videotaping Method
- Analysis of Data
- Generating solutions to the usability problems

Videotaping

- Number of participants
  - Thinking aloud (one person)
  - Constructive interaction (two or more people)
- Number of cameras
  - One camera
  - Two cameras
- Don’t watch what they are doing.
  - Set up camera and leave
  - Put camera on tripod over their heads aimed at display
- Don’t answer their questions unless they are very stuck

Usability Testing
Single Camera Videotaping Method
Usability Testing
Two Camera Videotaping
Method

Analysis of Videotape
- Review tape, noting where participants have problems
- Try to understand reasons for problems
- Prioritize problems by severity
- Summarize findings in terms of overall interface characteristics
  - Were the usability requirements met?
  - Overall impression of the software

Analysis Worksheet

<table>
<thead>
<tr>
<th>Interface Name, Date, Time, Participants</th>
<th>Location of problem on tape</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Task attempting to do</td>
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<tr>
<td></td>
<td>What were the users’ stated or assumed goal?</td>
</tr>
<tr>
<td></td>
<td>What were the users’ actions?</td>
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<tr>
<td></td>
<td>What did the users think happened? (perceived effect)</td>
</tr>
<tr>
<td></td>
<td>Priority of the problem</td>
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<tr>
<td></td>
<td>Analysis and recommendation</td>
</tr>
</tbody>
</table>
Integrating Usability Testing back into the Design

- Overall Usability
  - Overall usability requirements achieved?
  - Identify and prioritize usability problems
  - Explain causes
- Generate design alternatives to solve most important problems
  - Justify advantages/disadvantages/tradeoffs of each solution
- Choose one solution for each problem
- Implement in prototype and test again