Usability Testing

CS 4501 / 6501

Software Testing

[ TechSmith, Usability Basics: An Overview ]
[ Ginny Redish, A Practical Guide to Usability Testing ]
[ Bath and McKay, The Software Test Engineer’s Handbook, Study Guide for the ISTQB certificates ]
[ Rubin and Chisnell, Handbook of Usability Testing ]
Overview

- What we mean by “usable”
- Defining usability testing
- Importance of usability testing
- Basics of the methodology for conducting a usability testing
- Decide what / when / how many to test
- Usability testing process
What We Mean by “Usable”

“The user can do what he or she wants to do the way he or she expects to be able to do it, without hindrance, hesitation, or questions” — absence of frustration

- **Usefulness** — degree to which the product enables the user to achieve his or goals
- **Efficiency** — speed of performance (time vs. interaction)
- **Effectiveness** — the product behave the way that users expect it to (avoid error)
- **Learnability** — easy to learn, relearn, retain
- **Satisfaction** — users’ perceptions, feelings, and opinions
- **Accessibility** — usable by people with disabilities (508 standards, https://www.section508.gov/test)
Defining Usability Testing

- Any techniques used to evaluate a product or system

- Process that employs people as testing participants who are representative of the largest audience to evaluate the degree to which a product meets specific usability criteria

- Each testing approach has different objectives, different time and resource requirements
Importance of Usability Testing

• To ensure the creation of products that
  • Are usable to and valued by the target audience
  • Are easy to learn
  • Help people be effective and efficient at what they want to do
  • Are satisfying to use

• To expose design issues → remedy → minimize or eliminate frustration for users
  • Increase positive relationship (organization and customers)
  • Establish the expectation (your products are high quality and easy to use)
  • Demonstrate that the goals and priorities of customers are important
  • Release a product that customers find useful, effective, efficient, and satisfying
Importance of Usability Testing (2)

- To improve the organization’s profitability
  - Create a historical record of usability benchmarks for future releases
  - Minimize the cost of service and support call
  - Increase sales and the probability of repeat sales
  - Acquire a competitive edge because usability has become a market separator for products
  - Minimize risk
Basics of the Methodology for Conducting Usability Testing

- A hypothesis must be formulated
  - What are expected to occur when testing

- Randomly chosen (using a very systematic method) participants must be assigned to experimental conditions

- Tight controls must be employed
  - All participants should have nearly the identical experience
  - The amount of interaction with the test moderator must be controlled

- The sample (or users) must be sufficient and representative
Decide What to Test

- **Background** – product description

- **Participants** – desired qualities and characteristics
  - Who use the product? What are their goals for using the product? What tasks would they want/have to accomplish? What are design elements that may cause problems and create a lot of support calls? What new feature may make sense to current users?

- **Usability goals** – what to learn with this test

- **Key points** – kinds of actions/features to cover

- **Timeline** – when the product/prototype will be ready for testing, when the team will discuss the result or any other constraints
Decide When to Test What

- **Low-fidelity prototype or paper prototype** – hand drawn, mocked up → early in development or before work begins

- **High-fidelity prototype** – interactive system run on a computer (e.g., a Flash version of a product’s user interface and interactivity)

- **Alpha and Beta versions** – not-ready-for-release versions – enough to be sent or accessed by remote participants for a test

- **Release version** – product released to customers – effective for testing the workflow of the product from beginning to end

- **Comparative versions** – multiple versions of a design – to measure differences in performance and satisfaction
Decide How Many to Test

- The number of participants (based on the type and purpose of the test) – usually, at least four participants from each group of user types

<table>
<thead>
<tr>
<th></th>
<th>Benchmark metrics</th>
<th>Diagnostic evaluation</th>
<th>Summative testing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How many</strong></td>
<td>8-24 users</td>
<td>4-6 users</td>
<td>6-12+ users</td>
</tr>
<tr>
<td><strong>Metrics and Measures</strong></td>
<td>Focus on metrics for time, failures. Tests current process/product</td>
<td>Less formal. Increased focus on qualitative data</td>
<td>More formal. Metrics based on usability goals</td>
</tr>
<tr>
<td><strong>Why</strong></td>
<td>Establish baseline metrics</td>
<td>Find and fix problems</td>
<td>Measure success of new design</td>
</tr>
<tr>
<td><strong>When</strong></td>
<td>Before a project begins or early in development</td>
<td>During design</td>
<td>At end of process</td>
</tr>
<tr>
<td><strong>How often</strong></td>
<td>Once</td>
<td>Iterative</td>
<td>Once</td>
</tr>
</tbody>
</table>

[Recommended number of participants, Ginny Redish]
Usability Testing Process

- **Develop a testing plan** – documentation / checklist to help keeping track all the details
  - **Introduction**
    - Communicate to participants what is going to happen
    - Should be from user’s perspective
  - **Background**
    - Describe user’s characteristics
    - Discuss experience and the type of technologies the participants have
  - **Scenarios and tasks**
    - Document what participants will go through
    - Set stage for tasks and communicate why they are doing what they are doing
    - Describe based on user goals (scenarios and tasks → goals)
    - Describe tasks as ways to achieve goals (realistic, actionable, avoid describing steps)
Usability Testing Process (2)

- **Evaluation measurement**
  - Define criteria determining pass or fail

<table>
<thead>
<tr>
<th>Criteria</th>
<th>What is measured</th>
<th>When to use the measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task success</td>
<td>Whether or not the participant was successful and to what degree</td>
<td>Goal is effectiveness</td>
</tr>
<tr>
<td>Time on task</td>
<td>Time taken to complete a task</td>
<td>Goal is efficiency</td>
</tr>
<tr>
<td>Errors</td>
<td>Number of errors each participant makes</td>
<td>Minimize the problems a user may encounter</td>
</tr>
<tr>
<td>Learnability</td>
<td>Given a repeated task, determine whether the time on task is shorter, fewer errors are made, or more task if more successful</td>
<td>Determine whether the interface will be easier to use over time</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>Participants’ overall feelings</td>
<td>Allow participants to quantify and describe their emotional reaction</td>
</tr>
</tbody>
</table>

[Common key evaluation measures for usability testing, Techsmith]
## Usability Testing Process (3)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>What is measured</th>
<th>When to use the measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouse clicks / number of interactions</td>
<td>Number of clicks or interactions that participants make</td>
<td>Measure the effectiveness and efficiency – complete a task with less effort</td>
</tr>
<tr>
<td>Mouse movement</td>
<td>Distance the mouse travels</td>
<td>Measure the efficiency – complete a task with less effort</td>
</tr>
<tr>
<td>Problem / issue counts</td>
<td>Counts, ranks, and categories of problems observed</td>
<td>Provide an overview of the issues, analyze severity of the issues</td>
</tr>
<tr>
<td>Optimal path</td>
<td>Path a participant takes to accomplish a task, and compare it with a predefined optimal path</td>
<td>Measure the variance from the ideal path</td>
</tr>
</tbody>
</table>

[organization-specific, accessibility-specific criteria, measurement, and purpose]

[Common key evaluation measures for usability testing, Techsmith]
Usability Testing Process (4)

- **Recruit participants** – representativeness, may be current customers or contacts, or hire an outside agency (compensation may apply)

- **Prepare for test session** – setting environment: schedule participants, work with stakeholders, arrange observers, create a facilitator script, prepare pre-test survey (background) / post-task survey (ease of use and possibly satisfaction) / post-test survey (satisfaction)

- **Conduct test sessions** – running through the test, facilitating participants, resetting the machine

- **Analyze the study** – identifying exactly what were observed, identifying the causes of any problems, determining solutions
Summary

• Software becomes more pervasive in everyone’s lives

• Usability testing becomes more and more important

• Users can be almost anyone, ranging from children to IT experts, from retired people to people with disabilities

• The wider the usage base of the software, the more critical and usability and accessibility testing

• Things to remember:
  • Keep it practical
  • Observe
  • Take brief notes
  • Score considering confidence
Let’s Try: Activity 1

• Work with your neighbors in groups
• Develop a usability testing plan for one of the following options (make any assumption as needed)

• Write down you test plan on the provided post-it
Let’s Try: Activity 2

• Work with your neighbors in groups

• Develop a usability testing plan for one of the following options (make any assumption as needed)
  
  • UVA Bookstore (https://uvabookstores.com/)
  
  • Firehouse Subs (https://www.firehousesubs.com/)

• Write down your test plan on the provided post-it