USABILITY TESTING

Andrea Peer
Sept 15, 2011
PHP Development Course
GAME PLAN

• Usability in the Big Picture
• What is Usability Testing
• When does one Conduct Usability Testing
• How does one Conduct a Usability Test
• Best & Not So Best
• Dealing with Usability Data
• Your Turn

Put me in Coach
WHERE'S WALDO

User-Centered Design

Usability Testing

Usability Testing

Usability Testing
DEFINE UCD

- Norman
- International Organization for Standardization (ISO)
- Usability Professional Association (UPA)
- ACM Special Interest Group Computer Human Interaction (SIGCHI)
- Usability.gov
DEFINE UCD

- Design based on the needs of users
- ISO 13407 & ISO TR 18529 - Involvement of users, tasks requirements, ergonomics
- Data-driven approach which focuses on users
- Empirical analysis and approach to design
- Task analysis and improvement
- Methodology
DEFINE UCD

• A philosophy - We believe...
  • The users know what they want. They just don’t have the skills, knowledge, abilities or understanding of the problem space to communicate what they want.

• A set of practices
  • Theoretically can be plugged into any software development process
GOOD USABILITY DOES NOT MAKE A GOOD USER EXPERIENCE
WHAT IS USABILITY TESTING

• Evaluation of a system with users
USABILITY TESTING

What do you know about usability?
FORMATIVE VS SUMMATIVE

• Formative - Test, evaluate and change while you are in design
  • What is working and what is frustrating for users with our design? Now adapt
  • Problem discovery

• Summative - Evaluate after the design is deployed
  • How did we do? Did we meet our goals?
  • Benchmarking
WHEN: USABILITY TESTING

• When does usability come in?
  • Design concepts (aka test design alternatives)
  • Final design
  • Alpha, Beta,...fully deployed
• Spot testing
• Small redesign testing
• Competitor testing
LET'S TALK FIDELITY

Low: Focus on functions
Medium: Focus on areas
High: Focus on full experience
LAB VS FIELD

Interactions Magazine May/June 2011
Jeremiah Still
HOW: USABILITY TESTING

• Well...It depends...BUT there are some basics
STAGES OF USABILITY TESTING

1. Develop the test plan
2. Set up test environment
3. Find and select participants
4. Prepare test materials
5. Conduct the test sessions
6. Debrief the participants
7. Analyze data and observations
8. Report findings and recommendations

(Rubin & Chisnell, 2008)

1. Select representative users
2. Select setting
3. Decide what tasks users should perform
4. Decide what type of data to collect
5. Before the test session (informed consent, etc.)
6. Debrief after session (Lazar, 2006)
PLANNING A USABILITY TEST

- What is your research question
  - Usability vs research question
- Selecting participants
- Measurement plan and survey design
- Write a procedure
- Use a script
- Analyze your data
- Present your findings
RESEARCH FOCUS

• In your research teams answer the following
  • What is your research question?
  • What is your dependent variable?
  • What are your independent variables?
  • Exploratory or hypothesis testing?
• Usability vs Research question
  • What is the difference?
  • How does usability factor into your research focus?
• Present and get feedforward
SELECTING PARTICIPANTS

- How well do you participants reflect your target audience?
- Do you divide by participant categories?
- What is your sampling strategy
SELECTING PARTICIPANTS

• How well do you participants reflect your target audience?
  • Can you legitimately make inferences to the population of study?
SELECTING PARTICIPANTS

• Do you divide by participant categories?
  • Self-reported expertise in some domain (novice, intermediate, expert)
  • Frequency of use (ie: number of visits per month)
  • Amount of experience with something relevant (days, months, years)
  • Demographics (gender, age, location, etc.)
  • Activities (use of particular functionality or features)
SELECTING PARTICIPANTS

• What is your sampling strategy
  • Random sampling - Equal probability of being selected
  • Systematic sampling - Predefined criteria
  • Stratified sampling - Subsamples of population
  • Samples of convenience - Anyone willing, be aware of biases
• Sample size
• Within-subjects or Between-subjects study
• Counterbalancing
MEASUREMENT PLAN & SURVEY

• What is your dependent variable?
  • How will you measure this?

• Usability testing
  • Is your research formative or summative?
  • Will your research evaluate performance, satisfaction or both? Which usability measures will you use?

• Usability scenario
  • Ten common scenarios and their metrics - which one is your study like?
MEASUREMENT PLAN & SURVEY

• Formative or summative?
  • Formative - Test, evaluate and change while you are in design
    • What is working and what is frustrating for users with our design? Now adapt
  • Summative - Evaluate after the design is deployed
    • How did we do? Did we meet our goals?
USER GOALS

• Performance
  • Task accomplishment

• Satisfaction
  • Experience in process
PERFORMANCE METRICS

- Task success (clear end-state)
- Time-on-task
- Errors
- Efficiency (effort)
- Learnability (over time)
SATISFACTION METRICS

• Self reported metrics
  • Expectations
  • After scenario questionnaire (ie: SUS)
  • Ease of use
  • Satisfaction
  • Usefulness
  • Ease of learning
SATISFACTION METRICS

• Behavioral and physiological metrics Expectations
  • Verbal
    • Think aloud
    • Response
  • Non Verbal
    • Facial expressions
    • Eye-tracking
    • Pupillometry
    • Skin conductance and heart rate
USABILITY SCENARIO

• Completing a transaction
• Comparing products
• Evaluating frequent use of the same product
• Increasing awareness
• Problem discovery
• Maximizing usability for a critical product
• Creating an overall positive user experience
• Evaluating the impact of subtle changes
• Comparing alternative designs
10 USABILITY MEASURES

- Task success
- Task time
- Errors
- Efficiency
- Learnability
- Issues-based metrics
- Self-reported metrics
- Behavioral and physiological metrics
- Combined and comparative metrics
- Live website metrics
- Card-sorting data

Tullis & Albert, Table 3.1
USER GOALS

• Performance
  • Task accomplishment
• Satisfaction
  • Experience in process
PERFORMANCE METRICS

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TASK SUCCESS

• Bimodal vs Levels
  • Success
  • Partial Success
  • Partial Failure
  • Failure
• Think aloud protocol
TIME ON TASK

• Letting the user know

• What to turn on and off the clock
ERRORS

• What constitutes an error
• The best path concept
• One or multiple error opportunities
EFFICIENCY

• Combination of time on task and task success
• Identify action to be measured
• Define start and end
• Define acceptable ranges
• Lostness can be calculated (good for info arch)
LEARNABILITY

- Over time
- More longitudinal
- Frequency plays a role
- Confounding variables
SATISFACTION METRICS

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Tullis & Albert, Table 3.1
USABILITY TESTING

• Good practices
  • Determine 2 primary measures (based on business needs)
  • Have 2 people conduct the test
  • Run a pilot
  • Use established research methods
  • Use basic stats at a minimum
USABILITY TEST CHALLENGES

- Challenges
  - When and when not to use think aloud protocol
    - Think about cognitive load
  - Leading your user on the task at hand
    - “Good job” as it relates to the task
    - Helping the user
  - Answering questions during testing
    - Non verbal reassuring
USABILITY DATA

- Executive Summary
- Templates
  - Long Form
  - Short Form
- Make it tangible
- Make it visual
BASIC STATS

You will never be wrong if you use statistics correctly.

To demonstrate let us take the statement “You have a 15% chance of having a rare stinging butterfly land on you today.”

The number in this statement provides a sense of precision and objectivity while actually preventing the statement from ever being wrong.

Whether the butterfly lands on you or not, the statement could have been correct and there is no way to show otherwise.

So, even the statement “Today I have a 75% chance of becoming a millionaire and losing it all to a scruffy man from Chicago in a dramatic game of jenga played in the Sahara” could be correct?

Yup, no matter what actually happens today.

ThadGuy.com
<table>
<thead>
<tr>
<th>Type</th>
<th>Define</th>
<th>Example</th>
<th>Stats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal</td>
<td>Just different</td>
<td>Male/Female, Windows/Mac, Task success</td>
<td>Counts, frequencies</td>
</tr>
<tr>
<td>Ordinal</td>
<td>Ordered groups or categories, Ranked data (just better, no degree)</td>
<td>Top 100 movie list, Rate this website</td>
<td>Frequencies</td>
</tr>
</tbody>
</table>
## TYPES OF DATA

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</tr>
</thead>
<tbody>
<tr>
<td>Interval</td>
<td>Continuous data, no zero point</td>
<td>SUS score of 0-100</td>
<td>Averages, Standard Deviations (Descriptive and Inferential)</td>
</tr>
<tr>
<td>Ratio</td>
<td>Same as interval but has an absolute zero</td>
<td>Age, Height, Weight, Time to complete</td>
<td>Same as interval + geometric mean</td>
</tr>
</tbody>
</table>
USABILITY TESTING RESOURCES

- http://www.measuringux.com/
- http://www.usabilitybok.org/
- http://www.usability.gov/
- http://www.useit.com/
- http://www.usabilityfirst.com/
- System Usability Scale (quick exit survey to measure up to industry standards)
YOUR TURN

1. Choose
   - Project for this course
   - Other research

2. Describe your target user
   - Pick 2 usability measures
   - Determine your transactions (ROI)

3. Develop your tasks
   - Unit level
   - System level

4. Develop your protocol
   - Sequence or counterbalance

5. Choose your weapon
   - Software & Hardware
BACK UP SLIDES
ISU HCI UX LAB
SERVICES & FACILITIES
Presenter: Andrea Peer
HCI596 Summer 2011
Defining UCD

- Norman
- International Organization for Standardization (ISO)
- Usability Professional Association (UPA)
- ACM Special Interest Group Computer Human Interaction (SIGCHI)
- Usability.gov
UCD According to Norman

- “The Psychology of Everyday Things” (Norman, 1988)
- Design based on the needs of users
  - Simplify structure of tasks
  - Making things visible
  - Capturing conceptual maps
  - Affordances

Norman (1988)
UCD According to ISO

• TC 159/SC 4 - Ergonomics of human-system interaction
• ISO 9241-230 (ISO TR 16982) - Usability methods supporting human-centered design
• ISO 13407 - Guidance on software accessibility
UCD According to ISO

• TC 159/SC 4 - Ergonomics of human-system interaction

• ISO TR 18529 - Human-centered lifecycle process descriptions

• ISO 18152 - Specification for the process assessment of human-system issues
UCD According to ISO

- ISO 13407 & ISO TR 18529
- Human-Centered Design Principles
  - Active involvement of users and a clear understanding of user and task requirements
  - An appropriate allocation of function between users and technology

Nigel Bevan (2009)
“User-Centered Design (UCD) is an approach to design that grounds the process in information about the people who will use the product. UCD processes focus on users throughout the design and development of a product.” (UPA, 2010)
UCD According to SIGCHI

• Graphic design basics
• Alternative system development process
• Task analysis
• Design specifications
• Design analysis
• Industrial design basics
• Empirical analysis of design
“User-centered design (UCD) is an approach for employing usability. It is a structured development methodology that involves users throughout all stages of Web site development, in order to create a Web site that meets users’ needs. This approach considers an organization’s business objectives and user’s needs, limitations, and preferences.”
UCD According to Andrea

Process for systems development & evaluation

Data-Driven

Grounded in measured & observed user behavior

Contextual

Performance and satisfaction focus

Focus on users and their tasks

Measured ROI

throughout the SDLC
UCD According to Andrea

• A philosophy - We believe...
  
  • The users know what they want. They just don’t have the skills, knowledge, or abilities to communicate what they want.

• A set of practices
  
  • Theoretically can be plugged into any software development process
HCI UX LAB

- Usability Testing
- Omnigraffel - Low fidelity prototyping
- Just In Mind - Low, medium, and high fidelity prototyping
- UserZoom - Usability testing and analysis (web based)
- Morea - Usability testing and analysis (lab)
HCI UX LAB

• Eyetracking - Eyetech DS
• Noldus - Observer XT, Face Reader
• Audio Equipment - lapel mics & mini recorders
• Web cams
  • Library (http://uxlabcam.vrac.iastate.edu/view/viewer_index.shtml?id=121)