### USABILITY TESTING Andrea Peer Sept 15, 2011 PHP Development Course



- 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

## GAME PLAN





### WHERE'S WALDO



User-Centered Design

> 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...

space to communicate what they want.

### • A set of practices

process

• The users know what they want. They just don't have the skills, knowledge, abilities or understanding of the problem

• Theoretically can be plugged into any software development



# GOOD USABILITY DOES NOT AGOOD USER EXPERIENCE MAKE





# WHAT IS USABILITY TESTING

### • Evaluation of a system with users









### What do you know about usability?



# FORMATIVE VS SUMMATIVE

- Formative Test, evaluate and change while you are in design

  - Problem discovery
- Summative Evaluate after the design is deployed
  - How did we do? Did we meet our goals?
  - Benchmarking

• What is working and what is frustrating for users with our design? Now adapt



# 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





## LABVS FIELD



Interactions Magazine May/June 2011 Jeremiah Still



## HOW: USABILITY TESTING

### • Well...It depends...BUT there are some basics



# STAGES OF USABILITY TESTING

- I. 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)

- I. 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)



## PLANNINGAUSABILITYTEST

- 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



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



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



- 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)



- 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



- What is your dependent variable?
  - How will you measure this?
- Usability testing
  - Is your research formative or summative?
  - measures will you use?
- Usability scenario

### MEASUREMENT PLAN & SURVEY

• Will your research evaluate performance, satisfaction or both? Which usability

Ten common scenarios and their metrics - which one is your study like?



- 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?

## MEASUREMENT PLAN & SURVEY



- Performance
  - Task accomplishment
- Satisfaction
  - Experience in process

### USER GOALS



## 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



- Task success
- Task time
- Errors
- Efficiency
- Learnability
- Issues-based metrics
- Self-reported metrics

# IO USABILITY MEASURES

- Behavioral and physiological metrics
- Combined and comparative metrics
- Live website metrics
- Card-sorting data

Tullis & Albert, Table 3.1



- Performance
  - Task accomplishment
- Satisfaction
  - Experience in process

### USER GOALS



## 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 and 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



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• Ease of learning



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## BEST & NOT SO BEST















- 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 TESTING



### 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



The number in this statement provides a sense of precision and objectivity while actually preventing the statement from ever being wrong. ;; 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 12 0 in the Sahara"/ could be correct? Yup, no matter what actually happens today. ThadGuy.com



Type	Define
Nominal	Just different
<section-header></section-header>	Ordered groups or categories, Ranked data (just better, no degree)

### TYPES OF DATA

### Example



Male/Female, Windows/Mac, Task SUCCESS

### Counts, frequencies

Top 100 movie list, Rate this website

Frequencies



Туре	Define
Interval	Continuous data, no zero point
	Same as interval but has an absolute zero

### TYPES OF DATA

### Example



### SUS score of 0-100

Averages, Standard Deviations (Descriptive and Inferential)

Age, Height, Weight, Time to complete

Same as interval + geometric mean



# USABILITY TESTING RESOURCES

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





- Project for this course
- Other research





- Choose your weapon
  - Software & Hardware



# YOURTURN

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



 Sequence or counterbalance

Work the research variables in here

3

• Unit level

• System level



BACK UP SLIDES



### ISU HCI UX LAB SERVICES & FACILITIES Presenter: Andrea Peer HCI596 Summer 2011



# Defining UCD

### • Norman

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- ACM Special Interest Group Computer Human Interaction (SIGCHI)
- Usability.gov

• International Organization for Standardization (ISO)



# 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







# UCD According to ISO 4 - Ergonomics of human-system

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

• TC 159/SC 4 - Ergonomi 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-Center • Active involvement of users and a clear task requirements un

• An appropriate allocation of function between users and technology

involvement of users k requirements





# UCD According to UPA

• "T approach Design (UCD) is an approach to design that grounds the information nation about the people who will use the product. UCD processes focus on users through focus on users gn and development of a product." (UPA, 2010)

### 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







### UCD According to Usability.gov

 "User-centered design (UCD) is an approach for employing usability. It is a structur usability development methodology that involves users t methodology is 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."

Usability.gov (yr?)



## UCD According to Andrea

### Data-Driven

### Contextual

### Focus on users

### and their tasks

throughout the SDLC

Process for systems development & evaluation

### Grounded in measured & observed user behavior

### Performance and satisfaction focus

### Measured ROI





## UCD According to Andrea

• A philosophy - We believe...

• The <u>users know what they want</u>. They just don't have the skills, knowledge, or abilities to communication what they want.

• A set of practices

• Theoretically can be plugged into any software development process





Usability Testing



•UserZoom - Usability testing and analysis (web based)

Sprea - Usability testing and analysis (lab)

### HCIUXLAB

Omnigraffel - Low fidelity prototyping

justinmindst In Mind - Low, medium, and high fidelity prototyping



# HCIUXLAB







SONY Web cams



id=121)

- racking Eyetech DS

  - Audio Equipment lapel mics & mini recorders

• Library (http://uxlabcam.vrac.iastate.edu/view/viewer\_index.shtml?

