02- Intro to HCI Methods and the Design of Studies

Lorrie Cranor and Blase Ur

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Usable Privacy and Security
Who you are?

• Your preferred name
• Program at CMU (e.g., Privacy Engineering, COS, ECE, Master’s in HCI)
• Why did you sign up for this course?
Human-Computer Interaction (HCI)

• You are not the user! You know too much!
• Think about the user throughout design
• Involve the user
Human-Computer Interaction (HCI)
Human-Computer Interaction (HCI)
What is usable?

- Intuitive / obvious
- Efficient
- Learnable
- Memorable
- Few errors
- Not annoying
- Status transparent
Difficulties

• Many systems and platforms
• Users are different from one another
• Required standards (or no standards)
• Documentation won’t necessarily be read
• Performance
• Legal / time pressures
• Social and external factors
Determine use cases and goals

• What are the concrete tasks users should be able to accomplish?
  – Based on understanding of users!

• Set realistic metrics
Personas (example)

Name: Patricia
Age: 31
Occupation: Sales Manager, IKEA Store
Hobbies: Painting
Fitness/biking
Taking son Devon to the park
Likes: Emailing friends & family
Surprises for her husband
Talking on cell phone with friends
Top 40 radio stations
Eating Thai food
Going to sleep late
Dislikes: Slow service at checkout lines
Smokers
Iterative prototyping is crucial!

High-fidelity, “Wizard of Oz,” low-fidelity
Iterative prototyping is crucial!

SCENARIO 1 "I want to listen to alternative music"
Iterative prototyping is crucial!
Usability prototyping for websites

Site Maps

1. home
2. login
3. forget pass
5. register new user

Storyboards

Schematics

Mock-ups
Paper prototypes

• Don’t overthink. Just make it.
• Draw a frame on a piece of paper
• Sketch anything that appears on a card
• Make all menus, etc.
• Redesign based on feedback
• “Think aloud”
Think aloud example

• Download and install software that lets you encrypt your email
  – Verify that it is installed

• Things you can ask:
  – What are you thinking now?
  – What do you expect to happen if you do X?
  – How did you decide to do that?
Paper prototype example (in groups)

• Draw a paper prototype of a tool to encrypt emails sent on Gmail
  – First step: Identify two tasks that you want to make sure are usable
Research studies: purpose and goals

• What are you hoping to learn?
• What are your hypotheses?
  – Sometimes listed explicitly in a paper
• What are your metrics for success?
  – More secure, quicker to use, more fun, etc.
• What are you comparing to?
• What data might be helpful?
Broad types of studies

• Field study
• Laboratory study
• Online study
• (Measurement study)
Quantitative vs. Qualitative

- Quantitative: you have numbers (timing data, ratings of awesomeness)
- Qualitative: you have non-numerical data (thoughts, opinions, types of errors)
Types of studies

• Find out what people want:
  – Contextual inquiry
  – Interviews
  – Focus groups
  – Surveys
  – Diary study (prompt people)

• Find out what/how people think:
  – Interviews
  – Surveys
Types of studies

• Expert evaluation of usability:
  – Cognitive walkthrough
  – Heuristic evaluation

• Usability test:
  – Laboratory (“think aloud”)
  – Online study
  – Log analysis
Types of studies

• Controlled experiments to test causation:
  – e.g., A/B testing
    • Role-playing
    • Experiments in the field

• Varying different conditions
  – Full-factorial design or not
Data to collect during experiments

- Independent vs. dependent variables
- Performance (time, success rate, errors)
- Opinions and attitudes
- Audio recording, screen capture, video, mouse movements, keystrokes
- Formative (initial) vs. summative (validate)
Even more data to collect

• Demographics
  – Age, gender, technical background, income, education, occupation, location, disabilities, first language, privacy attitudes, etc.

• Open-ended questions

• Preferences and attitudes

Please respond to the following statements:
*This user interface was difficult to understand
1- Strongly disagree  2- Disagree  3- Neutral  4- Agree  5- Strongly agree

*This tool was fun to use
1- Strongly disagree  2- Disagree  3- Neutral  4- Agree  5- Strongly agree
Logistics for a study

• How many participants?
  – Statistical power
  – Time, budget, participants’ time

• What kind of participants?
  – Skills, background, interests
  – Their motivations
  – Often not a “representative sample”

• What do you need to build, if anything?
  – Prototype fidelity
Study designs

• Between subjects
  – Each participant tests 1 version of the system
  – You compare these groups
  – Groups should be similar (verify!)

• Within subjects
  – Every participant tests everything
  – Very important to randomize order!
  – Fewer participants