Today’s lecture
- User Testing
  - Overview
  - Examples
  - Techniques
  - Case study

User testing
- Why do you want to test users?
  - Motivation
  - Answer scientific question
  - Promote a product
  - Develop a product
  - Evaluate a product
  - Understand a work process
  - Market research
  - Obvious point – goals of testing
  - Influences methodology

Product development vs. scientific studies
- Both valid – don’t knock dev
- Products
- Science
  - Emphasize different goals and methods
  - Products will be evaluated in the market place
  - Scientific results must stand on their own
  - Breadth of scientific results
  - Aim to be broader than the particular artifact

What is user testing?
- Laundry list
  - Interviews, observations
  - Surveys, logs, measurements
  - Video analysis, verbal
  - Protocols, experiments
  - Artifact examination

Damned if you do, damned if you don’t
- You will be critical of almost every user study that you read
  - And almost everyone will be critical of yours, too
  - “The food is awful and the portions are too small”
Why are user studies hard?

- Achieving statistical significance
- Confounding factors
  - Often trying to measure a low order effect
- Users are not always easy to deal with
- Experimental design is not easy
- Large resource requirements

User studies for IO devices

- How would you evaluate the NYU Quikwriting

User studies for Tablet PC grading tool (paperless grading)

- TAs annotate CS1 assignments using Tablet PC

Ethical Considerations

- Do not harm the participants

Informed consent

- Participant must be given full information
- Ability to opt out (without penalty)
- Free from coercion

Privacy

- HSB very concerned about participant privacy
- Concerns about data linked to individuals
  - Access to records
  - Retention of information
Basic techniques
- Surveys
- Unstructured interviews
- Semi-structured interviews

Emphasize that other disciplines have done a lot of work on these, it’s easy to get these wrong.

Mr. Wizard Testing
- Testing before building
- Examples of mockups
  - Paper based studies
  - Classic Clipee study

Thinking Aloud (cont.)
- Prompt the user to keep talking
  - “tell me what you are thinking”
- Only help on things you have pre-decided
- Keep track of anything you do give help on
- Recording
  - Use a digital watch/clock
  - Take notes, plus if possible
    - Record audio and video (or even event logs)

Verbal Protocols
- Need to know what users are thinking, not just what they are doing
- Ask users to talk while performing tasks
  - Tell us what they are thinking
  - Tell us what they are trying to do
  - Tell us questions that arise as they work
  - Tell us things they read
- Make a recording or take good notes
  - Make sure you can tell what they were doing

Thinking Aloud (cont.)
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Design Experiments
- Qualitative
- Inform design of educational intervention

Ethnography
- Immersive study
Case study

- Classroom Feedback System
- Student devices give real time feedback to lecturer
- Feedback associated with slide content

Main point of discussion – Mechanics of classroom evaluation

Questions

- Does this work?
- Does this improve the large lecture class?
- Is this information valuable for instructors
- Will students give useful feedback?

Questions of interest – but avoid discussion of them

Why we did not look at “learning outcomes”

Methodology

- Design experiment
  - Gather information from multiple sources
  - Study the application in the real setting
  - Use results to alter the design of the intervention
  - Qualitative, not quantitative

The studies

- Pen and paper
  - CSE 100, 4 classes observed, 1 with CFS
  - CSE 142, 20 classes observed, 6 with CFS
  - Classroom experiments, 10 students with laptops for feedback

Methodology

- Surveys
- Instructor interviews
  - With tape recording and transcript
  - Detailed classroom observations
  - Instructor and student utterances
  - System logging

Data analysis

- Survey tabulation
- Transcription
- Coding of observations
- Analysis of logs
- Correlating events
Results

- Raw data analysis –
  - Basic class had low interaction rate
  - The system received modest usage – but did increase communication rate
- Detailed analysis
  - Identified specific episodes of interaction
  - Cases where instructor used feedback
  - Discovery of usage patterns
  - Feedback lag
  - Anticipatory feedback

Next Week

- February 17. President’s day, no class
- February 19. Tangible Interfaces
  - Hiroshi Ishii and Brygg Ullmer, "Tangible Bits: Towards Seamless Interfaces between People, Bits, and Atoms". CHI ’97 Conference Proceedings, March 1997