Announcements 10/28

• Today
  – Feedback: research questions, solution approach
  – Info re: proposal presentations
  – Users studies

• Monday
  – Reading: Bodily orientations around mobiles

• Wednesday (11/2): Project proposals due
  – Written proposal (~3 pages)
  – In-class presentation (~5 minutes)
Feedback: Research question(s) and solution approach

• Research question(s)
  – Phrase as question(s)

• Solution approach
  – What are you going to do?
  – How are you going to do it?
    • Specify methods (design/impl, eval), tools (SW, HW)

• Research questions and solution approach should correspond
  – Incremental milestones
  – Always deliverable
Proposal presentations

• 5 minutes per group + questions
• Template is online
  – Presentation format is flexible (ppt, keynote, prezi)
  – Modify template as appropriate
• Bring your laptops, connectors
User studies

Why?

• Understand current behavior
• Understand how people use a new technology
  – Proof of concept
    • Short term usage
    • Validate effectiveness, usability
  – Technology intervention
    • Long term usage
    • Understand impact on behavior
Data collection

• Ethnography
• Direct observation (recorded)
• Diaries
• Surveys
• Experience sampling
• Interviews (structured / semi-structured, recorded)
• Focus groups
• Logging
Evaluation

• Types
  – Formative (Iterative testing and design)
  – Summative (Outcomes)

• Methods
  – Heuristic (checklist)
  – Lab (Controlled environment)
  – Field (Uncontrolled environment)
Surveys

• Can get large $n$ easily
• Questions/answers should be clear, unambiguous
• Answers should cover all possibilities
• Focus on essential questions
Lab studies

• Participants come to lab
• Controlled environment (minimize variability)
• Perform set of tasks across varying conditions
  – Change independent variable(s)
  – Measure dependent variable(s)
• Compare results in diff. conditions
Field studies

• Observe usage in situ
  – Realistic or long-term
  – Trade control for realism

• More effort

• System needs to work well
  – Monitor usage
  – Handle failure
Study design
( Depends on research question)

• What kind of study?
  – Lab, field, etc.

• What type of participants to recruit?
  – Skills, practices, demographics, location, etc.

• How many participants?

• What will participants do?

• How long will study be?

• What data will you collect? When?
Between / Within subjects

- **Between subjects**
  - Distinct groups do each condition
    (Group A does condition 1, group B does condition 2)
  - Look at differences between groups
  - Need high $n$, participant uniformity

- **Within subjects**
  - All participants do all conditions
  - Can handles participant variability, lower $n$
  - Need to avoid repetition bias (counterbalance order)
    (Group A does condition 1 then 2, Group B does condition 2 then 1)
Avoid problems

• Do pilot studies
  – Of everything: interviews, surveys, lab / in situ
  – As realistic as possible

• “Discount usability” [Nielsen]
  – Lo fi prototyping (paper, wOz)
  – Small $n$

• Avoid bias
  – Participant bias
  – Researcher bias
Ethics

• Treat participants with respect
  – Tell them what they’ll be doing, can stop any time
  – Minimize stress
  – Don’t be judgmental

• Consent

• Privacy

• Compensation (avoid coercion, bias)
Qualitative / quantitative data

• Quantitative
  – Numeric (quantity)
  – E.g. task completion time

• Qualitative
  – Non-numeric (quality)
  – E.g. participant’s experience of task

• Use multiple data sources, types
  – Validate data
  – Explain data
Analyzing quantitative data

• Descriptive statistics
  – Count, mean, intervals, etc.
  – Consider outliers (error bars, std dev)

• Inferential / predictive statistics
  – Statistical significance (result is unlikely to have occurred by chance)
    – $p$-value $< \text{threshold}$
      • Anova, t-test, Mann-Whitney U
Analyzing qualitative data

• Top down v. bottom up
• **Affinity diagramming** *(bottom up)*
  – Group comments by similarity
  – Themes/categories emerge from data
• **Coding** *(top down)*
  – Code comments by category