Interactive System Design: Identifying the problem and designing the solution

+ You've identified the problem. Now you must design a user-centered system and communicate it to others:
  - During the design process.
  - As a product of the design process.

Topics for today:
- User Studies
- Design Notations

Announcements
- Upcoming Reading Assignments
  - Tues - 5/2/00 - N&L 6&7
  - Teaching Effectiveness Program visitors
  - Georgeanne Cooper next Tuesday
  - Videotaping next Thursday

What follows after problem definition?
- Design

- Design is as much about communication as it is about creativity

User Studies
- Interviews
- Observations
- Questionnaires

For All User Studies
- You must find representative users.
- Design meetings at Tektronix

Interviews
- Why they are good
  - Social
  - Can instantly follow leads that appear
  - You can pursue areas of interest
- Potential problems
  - Some people are not great interviewers
  - DiCaprio interviewing Clinton
  - People might not open up

Notations
- Textual summaries
- Statistical analyses
- Not aware of any special notations

How to conduct a good interview, Part 1
- Listen -- the most important part
  - Listen more than you talk
  - Listen actively
  - Assume the user knows a lot about his or her work
  - Treat the participant/user as a partner, not a research subject.
  - You are examining the activity, not the user.

How to conduct a good interview, Part 2
- Plan the interview. Know what you are trying to learn
+ Use different kinds of questions.
  - Closed versus open
  - General versus specific
  - Factual versus hypothetical
+ Ask neutral questions
  - Remember: User’s tend to blame themselves, and people
  - “How did it go” vs. “Hard, right?”
  - “Do you have a user’s manual” versus “Why didn’t you just look it up?”

+ How to conduct a good interview, Part 3
  - Respect silence
  - Be conscious of body language and other signals
  - Be sensitive to cultural differences.
  - Keep the conversation going.
  - Probe to get additional information
+ Capture exactly what the user says
  - Brings it more alive for team members who are not there
  - Good systems incorporate the users vocabulary

+ Observational Studies
  - Potentially the most “natural” task setting.
+ Video recording is a good tool
  - Typically need to get permission
  - Frame the computer screen or the whole room?
  - Transcribe using verbal and physical protocols (set of conventions or codes)
  - Transcription time
+ Ethnographic field studies
  - From anthropology
  - In vogue a few years ago
+ Potential problems
  - Hawthorne effect

+ Tips for Conducting an Observational Study, Part 1
  - Get to the most realistic task situation possible.
+ Make it a cooperative venture.
  - Work to build rapport.
  - You are interested in what users do, however they do it.
  - Make it clear you are not testing the person, but studying the work environment supporting them.
  - Don’t let the user make you the “expert.”
  - Be flexible about intervening tasks. These also might be part of the data that you want.

+ Tips for Conducting an Observational Study, Part 2
  - Mind the same rules as in the interview, but talk even less. Stay friendly but neutral.
  - Mostly ask clarifying questions.
+ Observe the user’s environment.
  - What kinds of knowledge in the world do they use? Lots of Post-It’s?
  - What are the visual and sound characteristics? Wide open office? Factory floor?
  - What kinds of interruptions occur?

+ Tips for Conducting an Observational Study, Part 3
  - Try to get to the user’s goals. It’s not just “what are they doing now”, but “what is the higher level goal in the hierarchy?”
  - Task --> Goal
  - Change the channel --> watch the debate.
  - Turn on the oven --> feed the guests.
  - Read the notes from the last customer visit --> secure a sale.
  - Install the modem --> download assignments from home.
Tips for Conducting an Observational Study, Part 4

To get out the goals
- Ask them what they are doing now. They will probably say tasks or secondary goals. Then ask them "Why do you want to do that?"
- Note what triggers the task, where the user starts it, and where it ends.

Get them to talk
- Ask users to "think aloud"
- Use co-discovery
- Take lots and lots of notes. Write down everything. This is your only chance. You will not regret it.

Questionnaires
- Relatively easy to distribute
- Difficult to design them well
- No immediate social buy-in
+ Response rates not always good
- 1990 Census - 65%
- 2000 Census - just hit 65%
+ Questionnaires via email might be considered a spam.
- If you must, then tightly constrain your userlist, use bcc:, keep it short.

Design Processes and Representations
+ Different styles of notation for different steps in the design process
  + For conveying the process of design
    - N&L's design representation and process flow diagram.
  + For conveying the specification requirements
    - Outline document
  + For conveying the software design
    - Object, Dynamic, and Functional Models

Design Processes and Representations
+ For analyzing user data
  - Dialogue or interview fragments
  - Questionnaire summaries
  - Hierarchical task decomposition
  - Process flow diagrams
+ For conveying the UI design
  - Interaction state transition networks
  - Verbal scenarios
  - Storyboard

Models in Rumbaugh's OMT
+ Object model
  - Describes what changes--the static structure of the objects and their relationships.
  - Contains object diagrams, graphs in which nodes are classes and arcs are relationships among classes.
+ Dynamic model
  - Describes when it changes--the aspects that change over time, the control specifications.
  - Contains state diagrams, graphs in which nodes are states and arcs are transitions between states caused by events.
+ Functional model
  - Describes how it changes--the data value transformations within a system.
  - Contains data flow diagrams, graphs in which nodes are processes and arcs are data flows. A data flow diagram represents a computation.

Conclusion
- You've identified the problem. Now you must design a user-centered system and communicate your design to others.