Requirements Definition:
Observation, Interviews,
Surveys, Task Analysis

What are people trying to accomplish?

Connections to YOUR project?
Agenda

- Requirements Definition
  - Overview, purpose, utility
  - Gathering information (input)
  - Making sense of it all (output)
- Observation
- Interviews
- Surveys
- Task Analysis (Output)
Requirements Definition

- Define the detailed requirements for the system YOU are developing
  - Functionality
  - Usability
  - Interoperability
  - User interface elements
  - (Cost, robustness, compliance, etc...)

- Ranges from bulleted lists to “shall” statements
Input & Output

- Gather data about what users need to do or accomplish

...then...

- Represent data for interpretation and use in design decisions
- Utilize implications to define/reduce the design space
Data You Will Be Gathering

- Information about users
  - what about universal design?
- Description of environment
  - where the current tasks are performed
- Major goals of the job
  - what results in a successful end state?
- User preferences & needs
  - before they even start: coffee, pen, notebook, log sheets...
Data Gathered, cont’d…

- Tasks & Subtasks:
  - Physical
  - Cognitive
  - Communication

- Conditions under which these tasks are done

- Results/outcomes of tasks

- Requirements to perform task:
  - Information
  - Communication with others
  - Equipment

Must include
Should include
Could include
Exclude
Some Techniques, reminder

1. Observation of Current Tasks
2. Interviews & Contextual Inquiry
3. Ethnography
4. Surveys & Questionnaires
   also...
4. Focus Groups & Expert Debriefing
5. Competitive Product Review
6. Documentation mining
7. Data logging
1. Observation

- Watch users do what they do
  - Typically from a distance
- Record with videotape
  - May require coding video later
- Take lots of notes, sketches
- Focus on *specific* task-relevant behaviors in notes, but later convert to abstract subtasks
Observation, cont’d

- How will you use these methods in your project(s)?
  - Pros?
  - Cons?
2. Interviews

- Engage the user more than by just watching

- Structured interviews
  - Efficient, but requires training

- Unstructured
  - Inefficient, but requires no training

- Semi-structured
  - Good balance
  - Often appropriate
Interviews, cont’d

- How will you use these methods in your project(s)?

- Pros?

- Cons?
3. Ethnography

- Deeply contextual inquiry
  - “Wallow in the data”
- “Live among” the users
- Understanding the full complexity of behavior, in its complete social context

- **Note:** Techniques based in sociology and anthropology--the study of humans
Ethnography, cont’d

- How will you use these methods in your project(s)?

- (Unlikely, but some may use this.)

- Pros?

- Cons?
Techniques 1-3 are similar, but differ in how “plugged in” or engaged the observer gets.

There are Pros and Cons of all these techniques.

Have you planned to use these?
Other Techniques

- Likely useful to you, as well:
  4. Surveys & Questionnaires
  5. Focus Groups & Expert Debriefing
  6. Competitive Product Review
  7. Documentation mining
  8. Data logging
4. Surveys & Questionnaires

- Collect opinions
- Mix of qualitative and quantitative formats
- Subjective data in a quantitative format
  - What does this mean?

Questions:
- Exploratory vs. confirmatory
- Open-ended vs. categorical (exhaustive)

- Reminder: If you ask it, use it. If you won’t/can’t use it, don’t ask it.
Survey Issues

NB: Survey Design is like UCD!

- When/why to do survey?
- How?
  - Electronic? Paper?
  - Manually administered? Self administered?
  - People’s capabilities to “use” the survey
  - Previews and Progress indicators
  - Consistency, clarity, look and feel...

- Iterative Design (with test and fix cycles)
- Response Bias
- Response Rate
- Data entry/analysis issues
Now What?

- You have piles of notes, hours of video, surveys up to here...
- You have a handle on how they do their current tasks

- How can you digest and represent the data, to turn it into information?
Representing Data (=Output)

A. Task Outlines
B. Narratives
C. Hierarchies & Network Diagrams
   - Hierarchical Task Analysis (HTA)
   - Entity-Relationship Relationship Diagrams
D. Flow Charts
Using a lawnmower to cut grass

Step 1. Examine lawn
   a. Make sure grass is dry
   b. Look for objects laying in the grass

Step 2. Inspect lawnmower
   a. Check components for tightness
      1) Check that grass bag handle is securely fastened to the grass bag support
      2) Make sure grass bag connector is securely fastened to bag adaptor
      3) Make sure that deck cover is in place
      4) Check for any loose parts (such as oil caps)
      5) Check to make sure blade is attached securely
   b. Check engine oil level
      1) Remove oil fill cap and dipstick
      2) Wipe dipstick
      3) Replace dipstick completely in lawnmower
      4) Remove dipstick
      5) Check that oil is past the level line on dipstick
      6) ...
B. Narratives

- Describe tasks in sentences
- Often expanded version of task outline
- More effective for communicating general idea of task
- Not effective for details
- Not effective for branching tasks
- Not effective for parallel tasks
C. Hierarchies & Networks

- **Hierarchical Task Analysis (HTA)**
  - Graphical notation & decomposition of tasks
  - Tasks as sets of actions
  - Tasks organized into plans (describes sequence)

- **Network / Entity-Relationship Diagrams**
  - Objects/people with links to related objects
  - Links described functionally and in terms of strength
Plan 0: On instruction from supervisor do 1; When all evidence is collected do 2 through 5.

0. Conduct accident investigation

1. Collect evidence
2. Analyze facts
3. Integrate facts and draw conclusions
4. Validate conclusions
5. Make recommendations

Plan 1: First do 1 and 2, then 3 and 4, then 5; Repeat 3 and 4 if necessary.

1. Walk the accident site
2. Identify and preserve evidence
3. Identify witnesses
4. Interview witnesses
5. Review records

Plan 1.4: Do 1, 2, 3; Do 4 if insufficient data from 3; Then do 5; Repeat 3 and 4 to meet conditions of 5.

1. Establish meeting room
2. State purpose of interview
3. Let witness describe what happened
4. Ask open-ended questions
5. Ensure that what, where, when, who, how, why is covered
D. Flow Charts

- Flow Chart of Task Steps
  - Combines Entity-relationship (network) with sequential flow, branching, parallel tasks.
  - Includes actions, decisions, logic, by all elements of the system
  - Abstracted
  - Mature, well-known, good tools
Flow Chart

Start

Continue? 

Y -> Document

N -> Display

Manual Operation

Input

End
Summary of Task Analysis

- Determine the data you need to describe current task(s)
- Gather data using various appropriate methods and techniques
- Represent the tasks and subtasks, plus other related information
- Use this data to improve design

- Note: Be efficient!
Requirements Gathering in Project

- Recall: Part 1 is about learning who the users are, and what they are trying to accomplish.

- Must understand context, users, tasks, needs, wants, etc.

- Must perform one “formal” task analysis

- How to choose what to assess?
Upcoming

- More discussion of requirements gathering:
  - Wants/Needs Analysis
  - Focus Groups

- Predictive Models
  - Physical models
  - Cognitive models