


Requirements Definition & Task Analysis


What are people trying to accomplish?



Agenda

- Homework (hand in)
 - Task Analysis
 - ❖ Overview, utility
 - ❖ Gathering information (input)
 - ❖ Making sense of it all (representation and output)


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Homework

- Problems people had...?
- How did you know what problems they had...?
- Primary method of learning about the interaction: Observation
 - ❖ Pros, cons?


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Task Analysis

- Learning about, analyzing and describing how people do their jobs/work
- Examine users' tasks to better understand what they need from interface and how they will use it
- History: Gilbreth (1911) coal shoveling

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Input & Output

- Gather data about what users need to do or accomplish

...then...

- Represent data for interpretation and use in design decisions

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Data to be Gathered

- Information about users
- Description of environment
 - ❖ where the tasks will be performed
- Major goals of the job
 - ❖ what will result in a successful end state?
- User preferences & needs
 - ❖ before they even start: coffee, pen, notebook, log sheets...

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Data to be 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

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Data Gathering Techniques

1. Observation
2. Interviews & Contextual Inquiry
3. Ethnography

also...

4. Surveys & Questionnaires
5. Focus Groups & Expert Debriefing
6. Competitive Product Review
7. Documentation mining
8. Data logging

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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


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Observation, cont'd

- Pros?
- Cons?


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2. Interviews

- Engage the user more than just watching
- Structured interviews
 - ❖ Efficient, but requires training
- Unstructured
 - ❖ Inefficient, but requires no training
- Semi-structured
 - ❖ Good balance
 - ❖ Often appropriate

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Semi-structured Interviews

- Predetermine data of interest
- Plan for effective question types
 - ❖ **How** do you perform task x?
 - ❖ **Why** do you perform task x?
 - ❖ What **information** do you need to...?
 - ❖ **Who** do you need to communicate with to...?
 - ❖ What do you **use** to...?
 - ❖ What happens **after** you...?
 - ❖ What is the result or consequence of **NOT**...?
- ❖ See: Gordon & Gill, 1992; Graesser, Lang, & Elofson, 1987


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Interviews, cont'd

- Pros?
- Cons?


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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*


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Ethnography, cont'd

- Pros?
- Cons?


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Comment

- 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


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Other Techniques

- Often used in addition:
 4. Surveys & Questionnaires
 5. Focus Groups & Expert Debriefing
 6. Competitive Product Review
 7. Documentation mining
 8. Data logging

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8. Data Logging

➤ Automatically tracking:

- ❖ Keystroke/mouse clicks
- ❖ Timers
- ❖ Logs of transactions
- ❖ Physical location/movement trackers
 - Cell phones
 - Aware Home


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Now What?

- You have piles of notes, hours of video, surveys up to here...
- How can you digest and represent the **data**, to turn it into **information**?

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Representing Data (=Output)

1. Task Outlines
2. Narratives
3. Hierarchies & Network Diagrams
 - ❖ Hierarchical Task Analysis (HTA)
 - ❖ Entity-Relationship Diagrams
4. Flow Charts

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Using a lawnmower to cut grass 1. Task Outline

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) ...



2. 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

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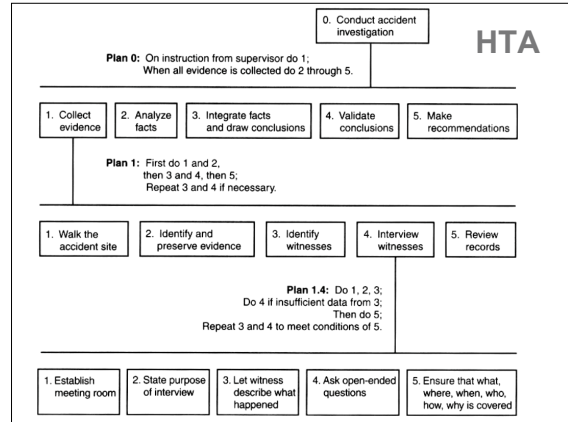
3. Hierarchies & Networks

- 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

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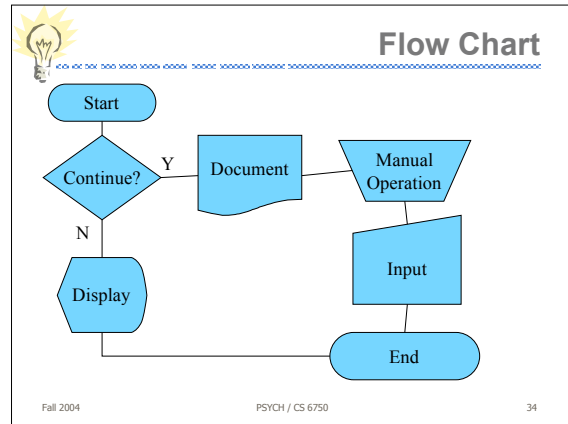
4. Flow Charts

- 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

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Summary of Task Analysis

- Determine the data you need
- Gather it using various appropriate methods and techniques
- Represent the tasks and subtasks, plus other related information
- Use this data to improve design
- Note: Be efficient!

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Task Analysis in Project

- Recall: Part 1 is about learning who the users are, and what they are trying to accomplish
- Must perform one "formal" task analysis
- How to choose what to assess?

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Upcoming

- Predictive Evaluation
- Interpretive Evaluation
- User Modeling
 - ✦ Physical models
 - ✦ Cognitive models