A Cognitive Approach to Interactive System Design

CHI 2003 Tutorial

Instructors

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Objectives

- *At the conclusion of this tutorial, you will be able to answer the following questions:*
  - *What is cognitive task analysis?*
  - *How can I get started with cognitive task analysis?*
  - *How can I tell how useful a system is?*
  - *How can I tell how useable a system is?*
- *You will also be able to able to answer the following, **important** question:*
  - *How do I get started in designing a useful and useable system?*

Overview of Today

9:00 – 9:10	Objectives and introductions
9:10 – 10:30	Cognitive Task Analysis
10:30 – 11:00	Break
11:00 – 11:30	Cognitive Walkthrough
11:30 – 12:15	Goal-Oriented Models
12:15 – 12:30	Q&A
12:30 – 14:00	Lunch
14:00 – 15:30	Design Problem 1
15:30 – 16:00	Break
16:00 – 17:00	Design Problem 2 & Usability Testing
17:00 – 17:15	Group readouts
17:15 – 17:30	Q&A, Evaluations

Cognitive Task Analysis

- Cognitive Task Analysis is the study of both the actions and cognitive processes required to achieve some goal. There is a wide variety of techniques for identifying and describing the knowledge and cognitive strategies used in task performance. The goal is to collect and analyze the information needed to design systems which are compatible with the user's knowledge, cognitive strategies and limitations.

Task Analysis Results

- High-level conceptual understanding of
  - how people get their work done now
  - what interactions there are between people
  - what the environmental factors are
  - the range of skills in the user population
  - what the user's objectives for using the product might be
  - what terminology, jargon, lingo is used

Cognitive Walkthrough: Setup

- Interface designer and a group or peers
  - modeled after *code walkthrough*
- Tell a story! (*scenario*)
  - Description of the users (experience, knowledge,)
  - Description of tasks to be performed with the system
- List of correct actions required to complete each task
  - Guided by developer's knowledge of what users want to do and what they know

Cognitive Walkthrough: Procedure

- Select *scribe* and *facilitator*
- Tell a story about what the user is trying to do
- Analyze
  - the accessibility of the correct action
  - the quality of the match between the user's goal and the action's label
  - the feedback provided after the action is taken

GOM: Goal-Oriented Model

Overview

Analysis and Design

- Four parts
  - build models (CTA)
    - what work do people do in their environment?
  - synthesize a solution (GOMs)
    - produce a design specification
    - produce prototype
  - analyze the solution (CW)
    - evaluate prototype
    - how well does the system fit the people, work, and environment?
  - feed analysis back into models (iteration)

Goal-oriented Models

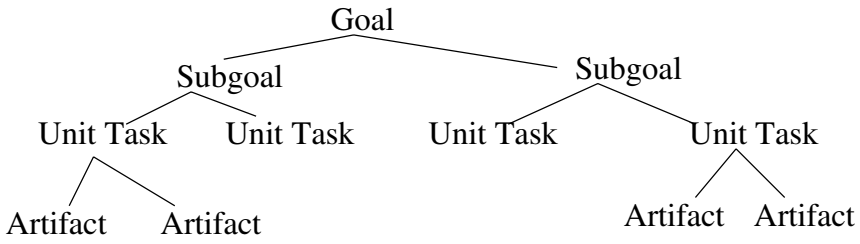
- Look for **four** things
  - goals
  - subgoals
  - unit tasks
  - artifacts
- Goals are fixed by the use
- The other three you can change

Is It Really This Simple?

- What's the difference between a *goal* and a *subgoal?*
  - e.g., why isn't *review textbooks* a goal?
  - *Goals* are things you cannot change!
- What's the difference between a *subgoal* and an *unit task?*
  - e.g., why isn't *take notes* a subgoal?
  - Unit tasks are *units* that aren't easily decomposed
  - subgoals may contain multiple unit tasks

Let's Try One!

- In your project teams, build a goal-oriented model for
  - making a peanut butter and jelly sandwich
  - Remember: start with the goal sentence!



GOM Practice (45 minutes)

- In your project groups, build a GOM for
  - A vending machine that will be located in a major international airport in the year 2005. The vending machine will dispense candy, chips, and other snacks, as well as three hot beverages that are brewed to order – coffee, tea, and hot chocolate. Show how selections will be made and payment given.

Cognitive Walkthrough Practice (45 minutes)

- You designed a vending machine.
- How well did you do?
- Evaluate it!
- Revise it, if you must!
- Post your prototype on the board
- Walk around and look at the other designs

GOM practice – Problem 2 (30 minutes)

- Vending machines!
- Isn't this the *information age*?
- Shouldn't we be vending more than food and beverages?
- Find some users, see what they might like
- Post your paper prototype on the board

Usability Testing (30 minutes)

- Pick two people from another group
- Give them some tasks to do
- Watch!
- Final revisions
- Prepare your *Review*
  - 3 minutes!
  - One slide showing your design
  - What works well, what you would change