Human-Computer Interaction
IS4300

Projects?!

Ethnography Status?

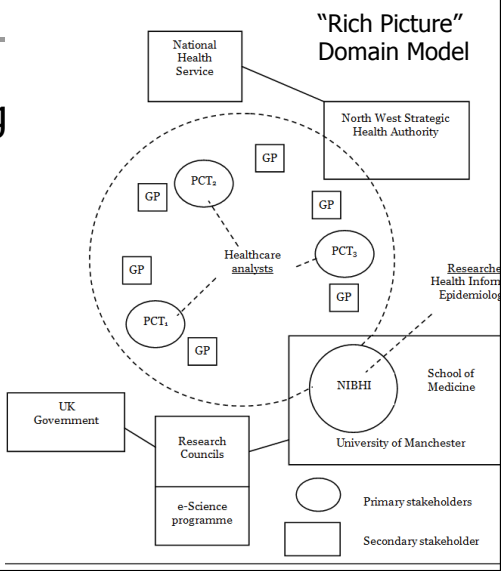
3

Requirements Analysis in HCI

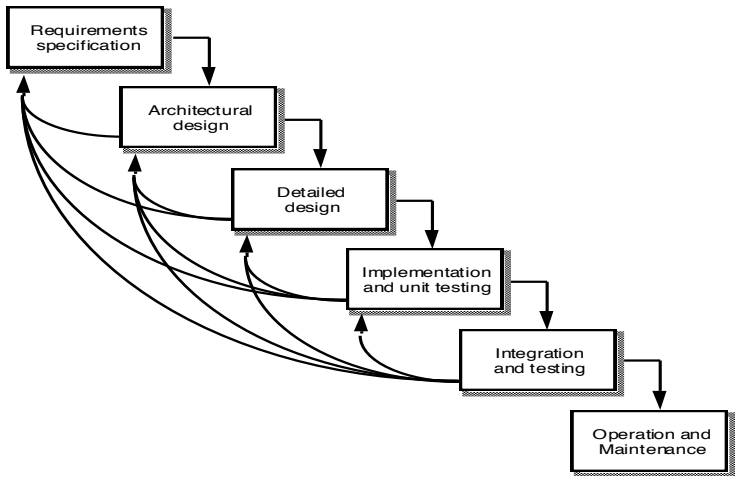
- What does the system/interface need to do?
- Who is the user?
- What does the user need to do?
- What is an example of system use?
- How well does it need to perform?

Many more dimension to consider

- Relationships among stakeholders, goals, "soft goals"
- Data flows
- Entity-relationship models



Lifecycle for UIs



Encyclopedia of HCI Chapter: Steps in Req'ts Analysis

1. Scoping — P1
2. Fact gathering
3. Analysis — P2
4. Modeling
5. Validation — P5

User Analysis

Who are the users? Stakeholders

- Not just users who touch your app, but anyone affected
- Be aware of lines of power and communication and be clear with everyone if you are breaking them
- Symmetry
- Free rider problem
- Critical mass

Classes of Stakeholders

- Primary
  - End users
- Secondary
  - Receive output or provide input
- Tertiary
  - Directly affected by success or failure
- Facilitating
  - Involved with design, development, maintenance

Example: EMR

Some issues with Stakeholders & Relationships

- Be aware of lines of power and communication and be clear with everyone if you are breaking them
- Symmetry
- Free rider problem
- Critical mass

Concepts: Participatory Design

- Include users throughout design process
  - Brainstorming
  - Storyboarding
  - Pencil and Paper Exercises (paper prototyping)

Personas (Encylc of HCI)

- Description of a fictitious person
- Gives design team a mental model of a particular kind of user, which allows the team to predict user behavior.
- Evokes empathy with users and prevent designers from projecting their own needs and desires onto the project.
- The description needs to be crafted in such a way that the reader can imagine a real person, understand this person's needs and desires, and predict the person's future actions.

Example Persona

- Dorte is 53 years old and works as a secretary in her husband's plumbing business in the suburbs of Copenhagen. There are 5-6 assistants and apprentices in the company.
- *Background*
  - When Dorte was very young she trained as an office clerk in the accounts department in a department store in Copenhagen. …

Example Persona

- *Computer use*
  - Dorte does the accounts and the bookkeeping...
  - If she were to use other systems or use new, digital reporting, she would prefer it to be demonstrated to her by someone. …
  - If she needs IT help, her oldest son and, less often, a woman friend provide the support….

Example Persona

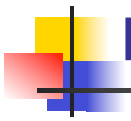
- *Her workday:*
  - …
  - She answers the telephone, handles mail, deliveries of goods (including invoices and delivery letters), and email.
  - She handles the accounts, does some bookkeeping and writes invoices.
  - She does the invoicing of clients.
  - …

Example Persona

- *Future goals*
  - Dorte dreams about a future where she no longer has to work and where she can spend more time travelling. …

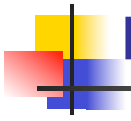
Four kinds of personas

- Goal-directed
  - Focus on work practices
- Role-based
  - Focus on user role in the organization
  - Typical day, Hopes & Fears
- Engaging
  - Focus on storytelling to create empathy
  - Social background, emotions
- Fiction-based
  - Used to explore design ideas
  - Many methods to use storytelling to think about design



Personas
From Rosson & Carroll

Sally Harris is a Blacksburg High School sophomore who has participated in the science fair for the past three years. She is very interested in science and often spends time looking into science phenomena on her own initiative. She is a good student in general, poised and articulate. She has extensive experience with computers, both at school and with her own Windows PC at home. She has been using word processors and graphics editors for many years, and in the past two years has started using spreadsheets and a few simple programming packages. She spends time on the Web almost every day, sending email to friends or just surfing around.



Exercise

- Project groups
- Write one persona for your project

P2-1 User Analysis

- Identify all (primary, secondary, etc.) stakeholders for your project
- Identify each class of primary stakeholder
  - Sociodemographics, Background, etc
- Create a (brief, 1 para) persona for each class of primary stakeholder.

Task Analysis

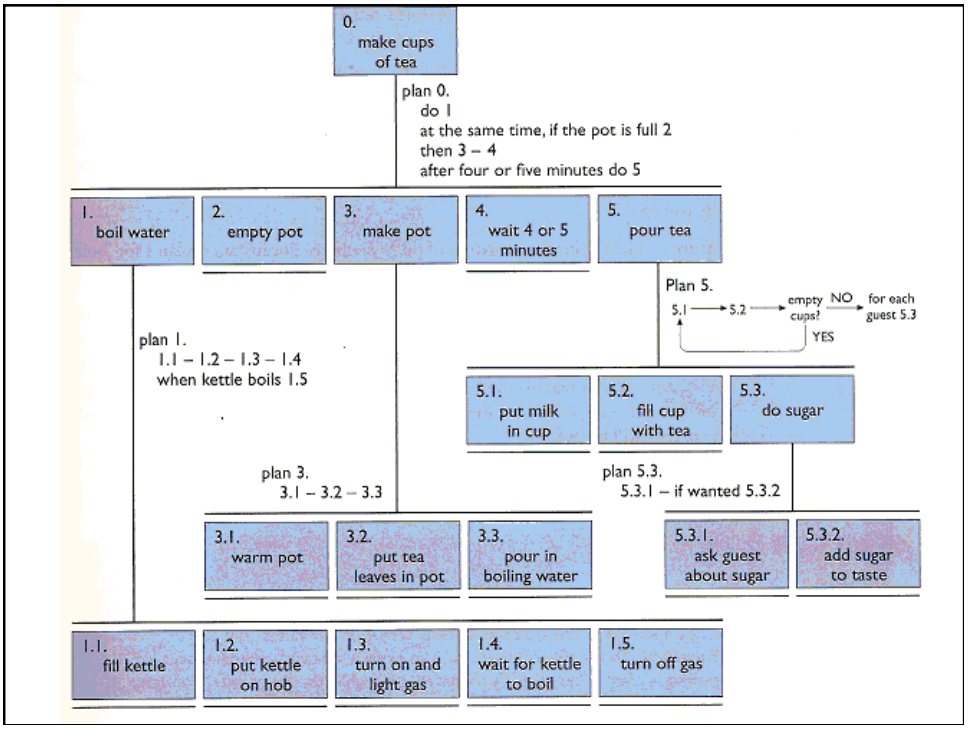
- Analysis of how people do their jobs
- Task decomposition
- Knowledge-based Techniques
- Entity-relation-based Analysis
- Especially important for modeling current problem-solving ("as is")

Hierarchical Task Analysis

- Hierarchy of tasks & subtasks

  +

- Plans
  - Express partial ordering on subtasks (possible parallelism)
  - Conditions on subtasks
  - Temporal constraints on subtasks
  - Cycles



Class Exercise

- HTA for tooth brushing

Exercise

- Project teams
- Pick a task
  - involves a "current practice" of someone solving the problem your app will solve
  - OR, a task one of you observed in your ethnography
- Do a Hierarchical Task Analysis

Task Analysis Methods from Readings

- GOMS
  - Goals, Operators, Methods, Selection rules
  - Models the (alternative) steps a user goes through to perform a given task
  - Used to estimate learnability (how many rules are required?)
  - Used to estimate efficiency (how many steps are required?)
    - Related to KLM (Keyboard Level Model)

Entity-Relationship Analysis (ERMIA)

- Objects
  - Concrete, Actors (roles), Composites
  - Attributes
- Actions
  - Agent, Patient (changes state), Instrument
- Events
  - Performing of an action, spontaneous
- Relationships
  - Object-object, Action-patient, Action-instrument
- Use HTA (e.g.) to describe sequencing

Knowledge-Based Analysis

- Goal: understand knowledge needed to perform a task
- Taxonomies
  - Ask the expert
  - Card sorting
  - Use for objects & tasks

P2-2 Task Analysis

- For at least 3 tasks
  - Hierarchical task decomposition
    - Task = Goal (what, not how)
    - Top-level = problem you're solving
    - Decompose into subtasks/subgoals
  - For each task
    - Goal – "Why do you do this?"
    - Preconditions (other tasks, information)
    - Decompose if nontrivial – "How do you do it?"

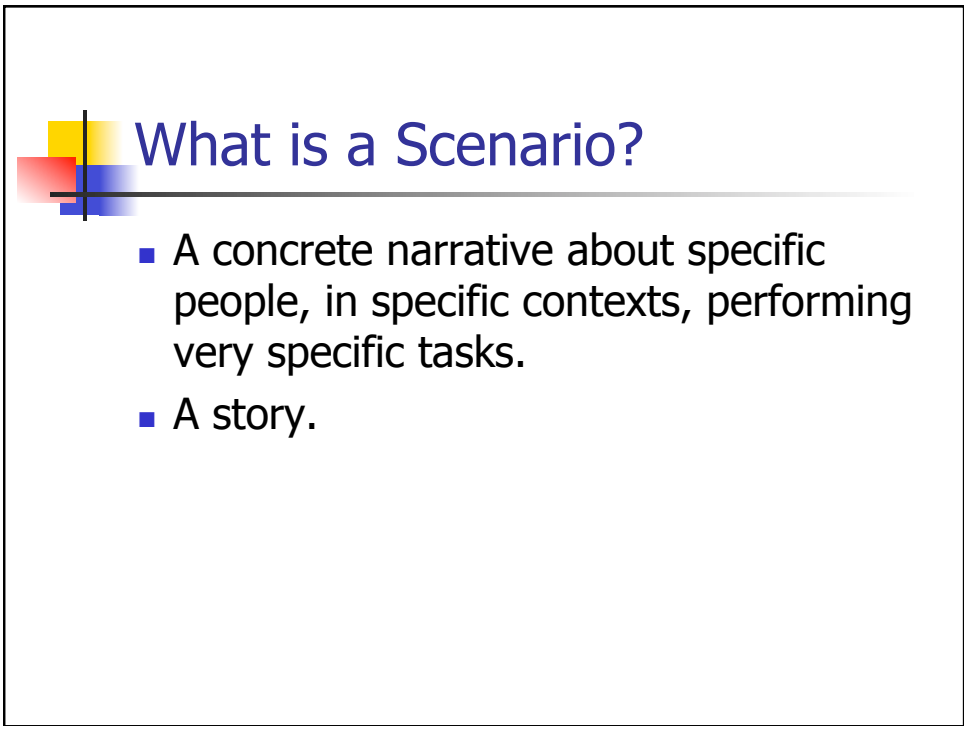
P2-2 Task Analysis

- "Understand the essential nature of the work" – not how your system will be used.
- Priorities
  1. Model current problem-solving methods
  2. Model problem-solving for an analog task
  3. Model hypothetical problem-solving for your (yet-to-be-designed) app

P2-2 Task Analysis

- Other information about tasks that may be useful
  - Where is the task performed?
  - How often is the task performed?
  - What are its time or resource constraints?
  - How is the task learned?
  - What can go wrong? (errors, exceptions)
  - Who else is involved in the task?

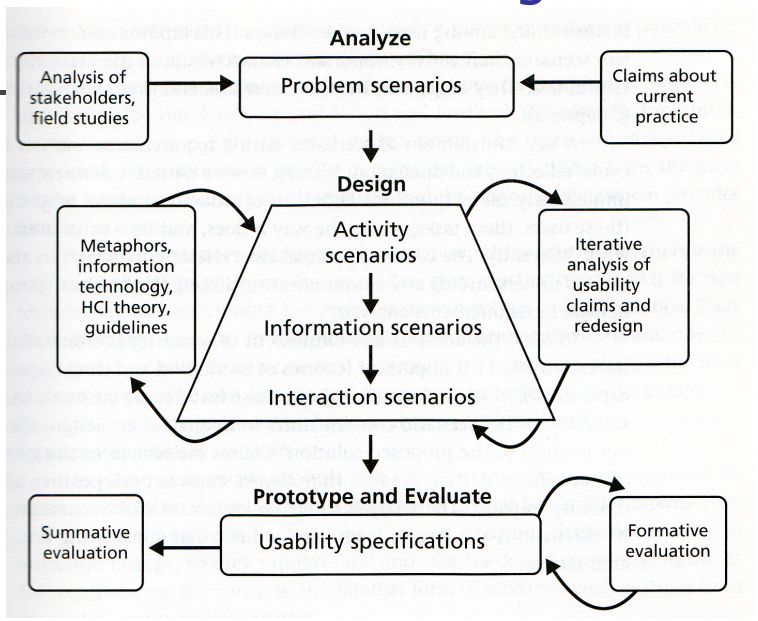

Scenario-Based Design


What is a Scenario?
A concrete narrative about specific people, in specific contexts, performing very specific tasks.
A story.

Scenarios (Encyc of HCI)

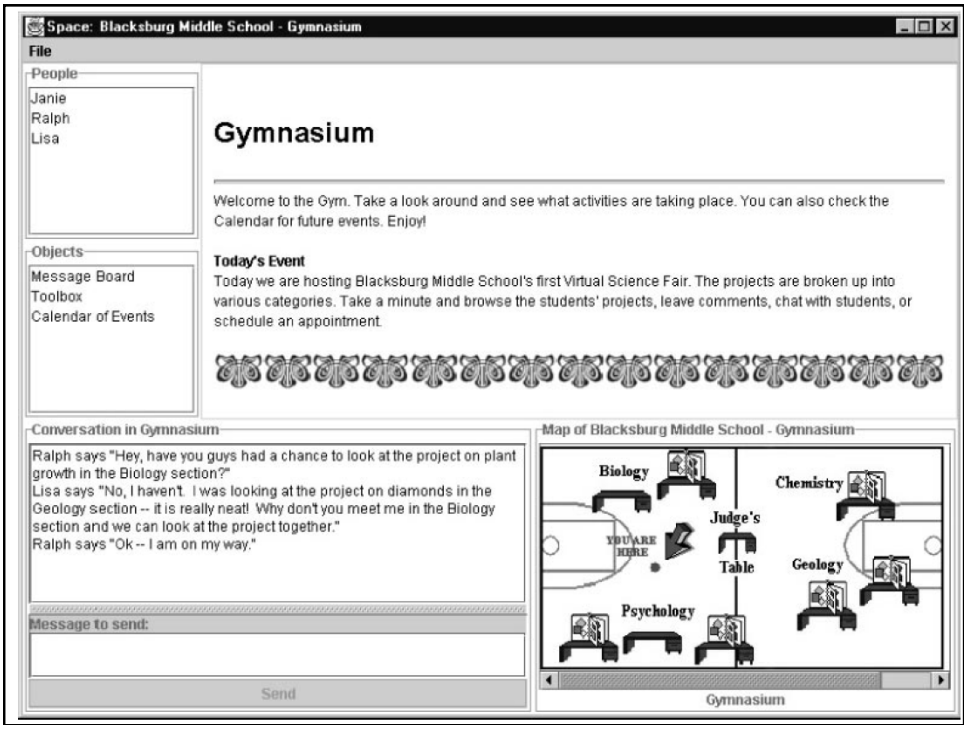
- Beginning
  - presents the user and what the persona wants to achieve.
- Middle
  - describes what the user does, e.g. the navigation and the information that is offered.
  - describes the persona's motivation for pursuing the goal.
- End
  - describes whether the persona succeeds in his or her intentions.

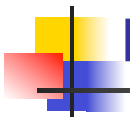
Scenario-Based Design



Problem Scenarios

- Tells a story of a current practice.
- Narratives of activities in the current situation (prior to technology introduction) that reflect needs and opportunities for redesign.
- Carefully constructed to reveal aspects of the stakeholders & activities that have implications for design. (*fictional!)*
- Not requirements, per se, but captures insights about the current situation.
- Basis for our design methodology.





Example Problem Scenario

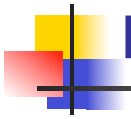
Sally Harris is a high school sophmore who has been researching black holes for the past 3 months… She has been in the science fair for the last 3 years, so she knows a lot about…

She is a bit worried about the space and materials provided to everyone… This year she has explored some new methods-for example, an Authorware simulation that illustrates her theory of black hole formation. …

As she studies her simulation, Sally thinks of a way to turn the lack of computer support into a "feature": She will create a sequence of visualizations that can be flipped like a deck of cards to show the animation. …

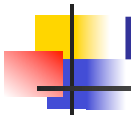
Why Use Scenarios?

- Concrete
- Flexible
- Supports communication and shared understanding of requirements
- Supports interdisciplinary design
- Supports participatory design
- Supports & promotes reflection and discussion



How many scenarios? Rules of Thumb

- You should have at least one scenario for each major task your app supports
- You should have at least one scenario for each type of primary stakeholder

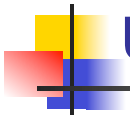


Exercise

- Project teams
- Write a primary stakeholder problem scenario for the HTA task you just did

P2-3 Problem Scenarios
as in Rosson & Carroll Fig 2.13

- Using your persona(s)…
- Write problem scenarios for your 3 tasks
- Be as concrete as possible to show actors' motives



Usability Requirements

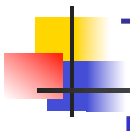
- Learnability
- Efficiency
- Memorability
- Error prevention
- Satisfaction
- Examples?

P2-4 Usability Requirements

- Specify at least two meaningful usability requirements for your project
- Example:
  - "New users will be able to find a typical course listing in under 30 seconds, and rate satisfaction 5.0 or greater on a 1-7 scale."

P2 - Project

- Description of stakeholders / primary stakeholder classes / persona(s)
- Task Analysis
  - Three or more tasks, including goal, preconditions, subtasks, and exceptions
- Problem Scenarios
  - For 3 most important tasks
- Specify at least two meaningful usability criteria



To Do

- Read Myers Chapter & Intro to Swing
- Work through Netbeans tutorial
  - Ignore Layout Manager info
- Play with NetBeans
- Finish I3, ethnography
  - Volunteers to present?
- Start P2, requirements analysis (1wk)