From Requirements to Design

Goal: work from problems and opportunities of problem domain to envision new activities

- requirements analysis describes what people do
  - including prerequisites, needs, problems, opportunities, and possibilities
- design transforms people’s activities
  - new technology, new tasks, new experiences
  - and the cycle continues...

The Two Faces of HCI Design

SYSTEM FUNCTIONALITY
- customer data
- product data
- browsing
- payment
- security

USER INTERFACE
- icons
- links
- menus
- layout
- navigation
- labels
- fields
- feedback
Why System Functionality First?

Envisioning New Activities

*Three activity design concerns to keep in mind:*

- **Effectiveness:** Designing tasks that meet real needs

- **Comprehension:** Designing concepts and services that your users can predict, understand

- **Satisfaction:** Designing tasks that are motivating and lead to feelings of accomplishment, satisfaction
Designing for Effectiveness

- Innovation is good, but how much is too much?
  - build on what is already working well
  - engage stakeholders in cooperative design
- What parts of a task to support via technology?
  - leverage other aspects of the work context, both people and things (distributed cognition)
- Balance tendency toward general solutions with the needs of specific tasks
  - reuse, consistency, generality vs. fitness-to-purpose
  - predict and support exceptions, provide special cases for common or critical tasks

Designing for Comprehension

- Cannot directly observe comprehension
  - must rely on users’ behaviors, reactions, comments
  - make inferences about their mental models
- Metaphors play a crucial role
  - designers explore metaphors to get new ideas
  - users evoke metaphors to understand new concepts
- Try to leverage users’ existing knowledge
  - anticipate and support analogical reasoning
  - but look for ways to “break” current understandings
  - designs should be engaging
Designing for Satisfaction

- Automate tedious tasks, but try not to remove sources of reward or accomplishment
  - carefully examine sources of reward, maintain or enhance opportunities for feelings of achievement
  - use the computer to make tasks more personal, more stimulating, more “fun” versus “deskilling”
- Balance the needs of individuals with those of the groups they work with
  - the people who do the “work” when using a system may not be those who get the “benefit” (e.g., online group calendar)
Problem scenarios: work from current practice to build new

Activity design scenarios: transform current activities to use new design ideas

Claims analysis: identify, illustrate, and document design features with key implications

Activity design space: brainstorm implications of metaphors and technology

HCI knowledge about activity design

SBD and Activity Design

Exploring Metaphors and Technology

- Metaphors for online classroom ...

- Technology for online classroom ...
Apply a Computational Metaphor

- Taking a software object’s **point of view**
  - use *anthropomorphism* to extend the task
- Envision the object’s scenario
  - ask: What would I do, if I were an assignment trying to be helpful to this student?
- May discover new services, other objects
  - but need to reflect on implications of each idea
  - claims analysis helps you do this

Working With Claims in Design

- Maintain or enhance as many positive impacts (upsides) as you can
- While removing or minimizing negative impacts (downsides) whenever possible
- As new ideas/scenarios are envisioned, consider also the new claims that they raise
From the Science Fair Case Study

giving all students the same physical display board...
+ constrains and simplifies project lay-out
+ limits visual complexity for viewers
- but exhibits may have widely varying needs
- but regularity and simplicity may be boring to view

How to maintain or enhance the benefits for planning and viewing but address the project-specific needs, or issues of variety and creativity in display?

New Activities Lead to New Claims

*We envisioned an exhibit template that would help in planning, but made it editable so that motivated (e.g. experienced) students could be as creative as desired*

providing an exhibit template that is editable...
+ offers default planning and lay-out of exhibit parts
+ leverages students’ familiarity with science projects
+ enables expert participants to be creative
- but students may trust the template too much
- but inexperienced students may become confused
Photo taken from a garden shop problem scenario: shopper wanders by, sees the pots, is reminded of needs, but store is out of the size pot she needs.

From a Garden Shop Scenario...

- a wall of shelves for displaying products...
  + simplifies comparison of physical features
  + provides implicit availability/popularity indications
  + directs shoppers to related products
  - but some shelves will be difficult to reach
  - but browsing is constrained by physical layout

How to maintain or enhance product comparisons and other analysis tasks, while addressing awkwardness and physical constraints?
Refining an Activity Design

- Ongoing claims analysis of activity scenarios
  - capture key ideas, begin to build *design rationale*
  - document problems to address during UI design
- Participatory design
  - brainstorming sessions with stakeholders
  - share rough ideas, get them to elaborate (metaphors can be very useful here as well)
- Consistency and coherence
  - reuse actors and objects to increase coherence
  - complement with ongoing “what if?” reasoning to expand and test the overall design