

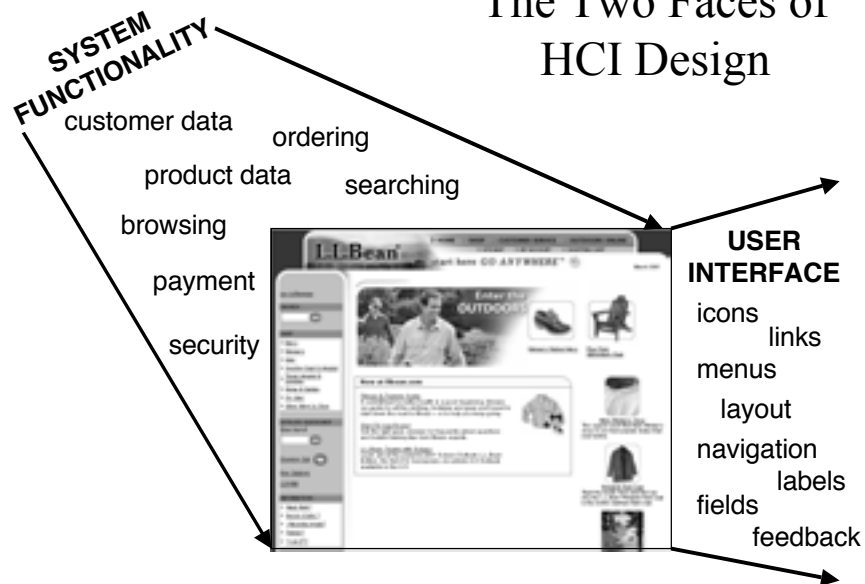
From Requirements to Design

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...

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The Two Faces of HCI Design



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Why System Functionality First?

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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

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Designing for Effectiveness

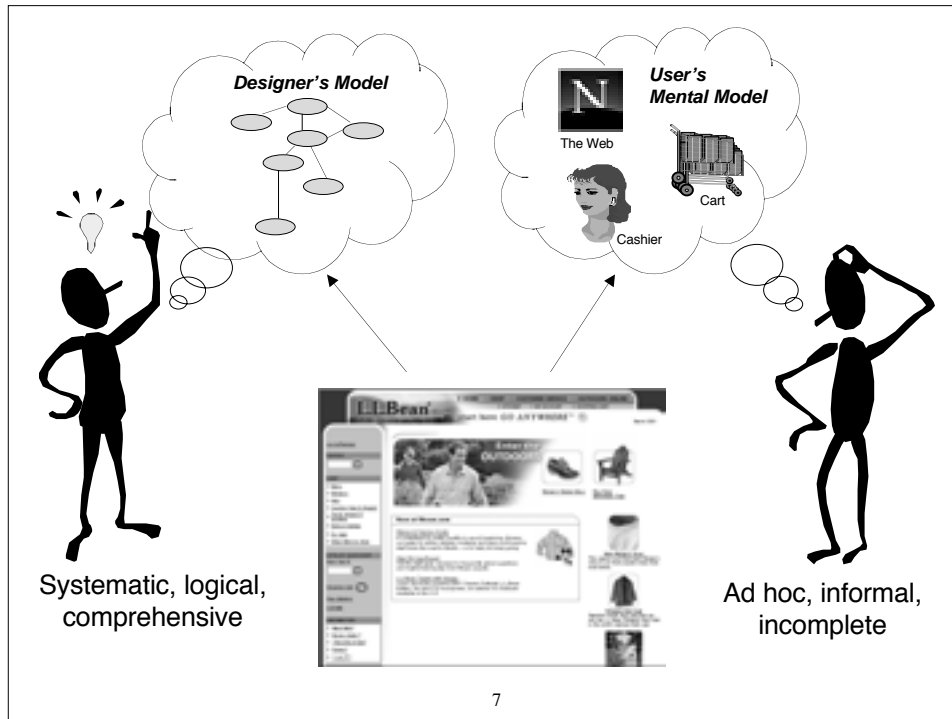
- Innovation is good, but how much is too much?
 - build on what is already working well
 - engage stakeholders in *cooperative design*
- What parts of a task to support via technology?
 - leverage other aspects of the work context, both people and things (*distributed cognition*)
- Balance tendency 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

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Designing for Comprehension

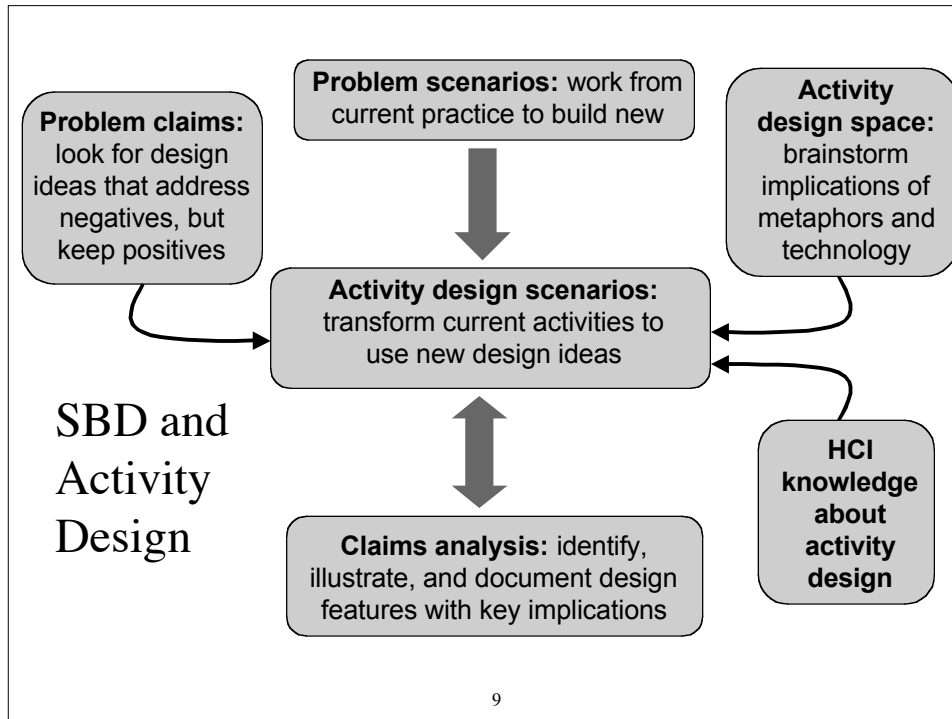
- Cannot directly observe comprehension
 - must rely on users' behaviors, reactions, comments
 - make inferences about their *mental models*
- Metaphors play a crucial role
 - designers explore metaphors to get new ideas
 - users evoke metaphors to understand new concepts
- Try to leverage users' existing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

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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)



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?

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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

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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

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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?

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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