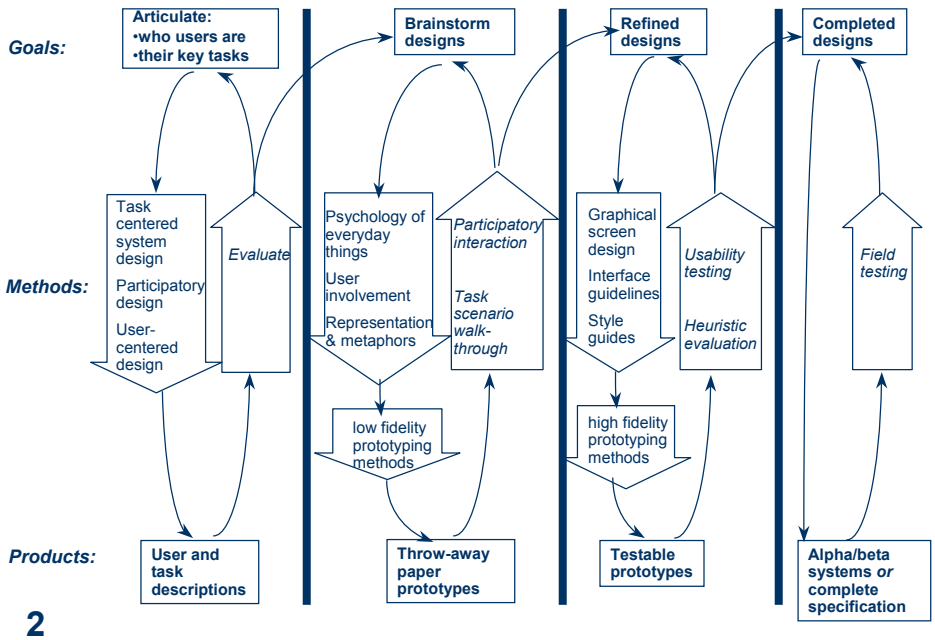
CS 544
Task Centered System Design

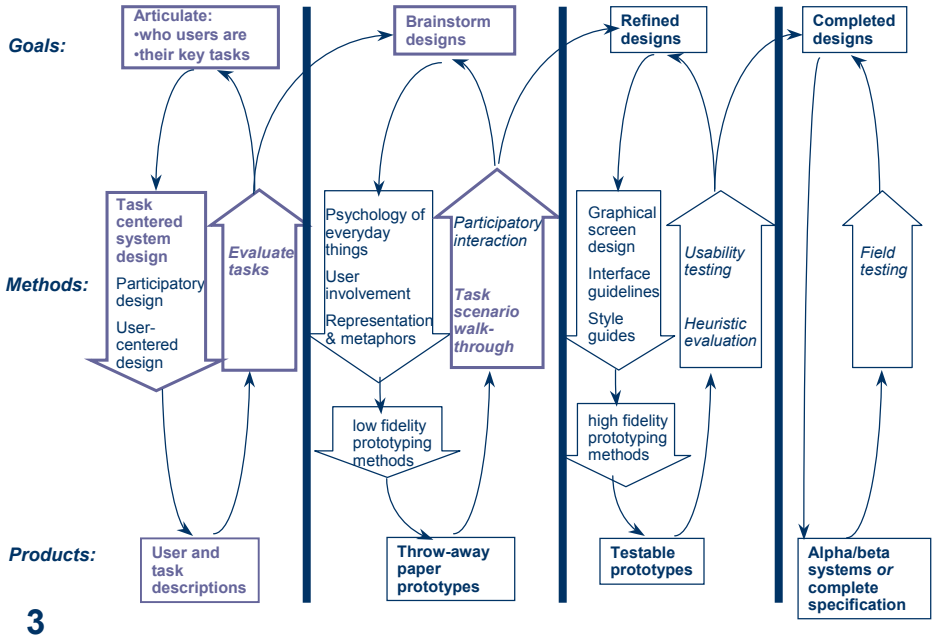
How to develop task examples
How to develop designs through a task-centered walkthrough
Exercise: The Cheap Shop interface

Acknowledgement: Some of the material in these lectures is based on material prepared for similar courses by Saul Greenberg (University of Calgary), Ravin Balakrishnan (University of Toronto), James Landay (University of California at Berkeley), monica schraefel (University of Toronto), and Colin Ware (University of New Hampshire). Used with the permission of the respective original authors.

Interface Design and Usability Engineering



Interface Design and Usability Engineering



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"One most unfortunate product is the type of engineer who does not realize that in order to apply the fruits of science for the benefit of mankind, one must not only grasp the principles of science, but must also know the needs and aspirations, the possibilities and the frailties, of those whom one would serve."

-- Vannevar Bush

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Task Centered System Design

- HCI Requirements Analysis
  - Exactly who uses the system to do what?

vs.

The User
a pretend person who will mould themselves to fit your system

Mary
a real person with real constraints trying to get her job done

The Task Centered Process

- Phase 1: Identification
  - identify specific users
  - articulate example realistic tasks
- Phase 2: Requirements
  - decide which of these tasks and users the design will support
- Phase 3: Design
  - base design representation and dialog sequences on these tasks
- Phase 4: Walkthrough Evaluations
  - using your design, walk through the tasks to test proposed interface

Phase 1: Identification

- Gould's Principle #1: Early and continual focus on users
- Contact with real people who will be potential users of system
  - identify specific end users
    - prototypical categories & extremes
- Spend time with them discussing how the system might fit in
  - who would be willing to talk to you about this?
  - if you can't get them interested, who will actually buy/use your system?
- Learn about the user's tasks
  - articulate concrete, detailed examples of tasks they perform or want to perform that your system should support
    - routine
    - infrequent but important
    - infrequent and incidental

Phase 1: Identification

- If there are no real users or tasks…
  - think again, there probably are!

  Jeff Hawkins, the inventor of the Palm Pilot, was said to have carried a small block of wood around in his shirt pocket … As various everyday situations arose, he would take out the block of wood and imagine how he would use the device.[1]

  [1]*see Sato and Salvador, interactions 6(5)*

  The same technique can be used to evoke a response from expected end-users
- If all else fails…
  - describe your expected set of users, and expected set of tasks
  - these will become your 'assumed users and tasks' that can be verified or modified later

Phase 1: Identification

Developing good task examples

1. Says what the user wants to do but does not say how they would do it
   - no assumptions made about the interface
   - can be used to compare different design alternatives in a fair way

2. Are very specific
   - says exactly what the user wants to do
   - specifies actual items the user would eventually want to input (somehow)

Phase 1: Identification

Developing good task examples

3. Describes a complete job
   - not just a list of simple things the system should do!
   - does more than present a sub-goal independent of other sub-goals
   - forces designer to consider how interface features will work together
   - contrasts how information input and output is carried through the dialog
     - where does information come from?
     - where does it go?
     - what has to happen next?

4. Says who the users are
   - design success strongly influenced by what users know
   - name names, if possible
   - reflect real interests of real users
   - helps find tasks that illustrate functionality in a person's real work context

Phase 1: Identification

Developing good task examples

5. Are evaluated
   - Circulate descriptions to users, and rewrite if needed
     - ask users for
       - omissions
       - corrections
       - clarifications
       - suggestions

6. As a set, identifies a broad coverage of users and task types
   - the typical 'expected' user — typical routine tasks
   - the occasional but important user — infrequent but important tasks
   - the unusual user — unexpected or odd tasks

Phase 2: Requirements

- Which user types will be addressed by the interface?
  - designs can rarely handle everyone!
  - includes why are particular users included / excluded?
- Which (sub-) tasks will be addressed by the interface?
  - designs can rarely handle all tasks
  - requirements listed in terms of how they address tasks
    - Absolutely must include:
      - …
    - Should include:
    - Could include:
      - …
    - Exclude:
      - ...
  - Discussion includes why items are in those categories

Phase 3: Design as Scenarios

- Develop designs around how well they fit users and specific tasks
- Use tasks to
  - get specific about possible designs
  - consider how design features work together to help a person accomplish real work
  - consider the real world contexts of real users
- Reconsider how a design scenario handles each task
  - what the user would do and see step-by-step when performing the task
- Key distinction between a scenario and a task is that a scenario is design-specific – it shows how a task would be performed if you adopt a particular design

Phase 4: Walk-through Evaluation

- Good for developing an interface
  - Debugging

Process:

1. Select one of the task scenarios

2. For each user's step/action in the task:
   - can you build a believable story that motivates the user's actions?
   - can you rely on user's expected knowledge and training about system?
   - if you answer no, to either of the above, then you've located a problem in the interface!
   - once a problem is identified, assume it has been repaired
   - go to the next step in the task

Example: Cheap Shop Catalog Store

- In Cheap Shop, people shop by browsing paper catalogs scattered around the store.
- When people see an item they want, they enter its item code from the catalog onto a form.
- People give this form to a clerk, who brings the item(s) from the back room to the front counter.
- People then pay for the items they want.

Item code	Amount
323066 667	1

Developing task examples: Cheap Shop

At Cheap Shop, people browse a catalog and then order goods from a clerk.

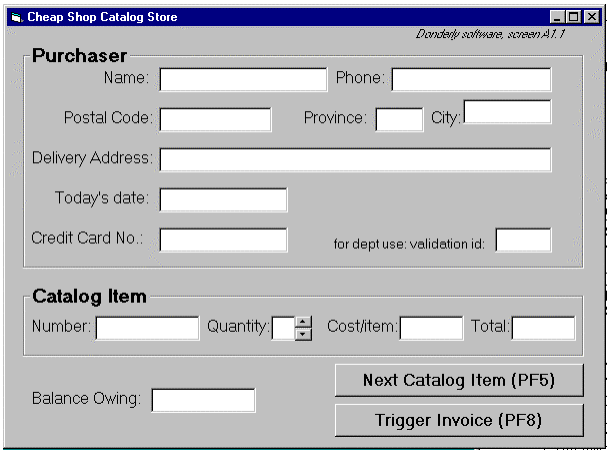
Task example 1:

- Fred, who is caring for his demanding toddler son, buys an umbrella stroller (red is preferred, but blue is acceptable), pays for it in cash, and uses it immediately.

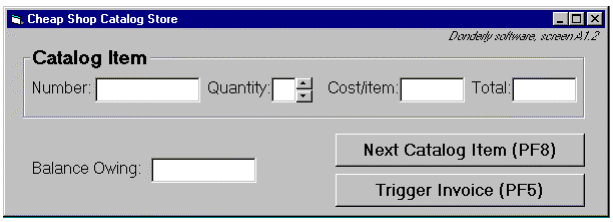
  Fred is a first-time customer to this store and has little computer experience

Cheap Shop

Screen 1



Screen 2



Cheap Shop Specifications

To create an order

- On screen 1, shoppers enter their personal information and their first order
- text is entered via keyboard
- the tab or mouse is used to go between fields.

Further orders

- shoppers go to the 2nd screen by pressing the Next Catalog Item button

Order completion

- shoppers select 'Trigger Invoice'.
- the system automatically tells shipping and billing about the order
- the system returns to a blank screen #1

To cancel order

- Shoppers do not enter input for 30 seconds (as if they walk away)
- The system will then clear all screens and return to the main screen

Input checking

- all input fields checked when either button is pressed.
- erroneous fields will blink for 3 seconds, and will then be cleared.
- the shopper can then re-enter the correct values in those fields.

Walkthrough template

Task number: ____

Description of Step	Does the user have the knowledge/training to do this?	Is it believable that they would do it? Are they motivated?	Comment / solution

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Developing task examples: Cheap Shop

At Cheap Shop, people browse a catalog and then order goods from a clerk.

Task example 2:

- An elderly arthritic woman is price-comparing the costs of a child's bedroom set, consisting of a wooden desk, a chair, a single bed, a mattress, a bedspread, and a pillow.

  She takes the description and total cost away with her, to check against other stores.

  Two hours later, she returns and decides to buy everything but the chair.

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Developing task examples: Cheap Shop

At Cheap Shop, people browse a catalog and then order goods from a clerk.

Task example 3:

- A “Cheap Shop” clerk, who is the sole salesperson in the store, is given a list of 10 items by a customer who does not want to use the computer.

  The items are:
  - 4 pine chairs, 1 pine table, 6 blue place mats, 6 “lor” forks, 6 “lor” table spoons, 6 “lor” teaspoons, 6 “lor” knives, 1 “tot” tricycle, 1 red ball, 1 “silva” croquet set

  After seeing the total, the customer decides to take all but the silverware, and then adds 1 blue ball to the list.

  The customer then changes his mind about paying by credit card, and decides to pay cash. The customer wants the items delivered to his home the day after tomorrow.

  While this is occurring, 6 other customers are waiting for the salesperson.

Limitations

- Tasks almost always embody a process
  - may be hard to produce a pure task that is ‘system’ or ‘process’ independent
  - may encourage designs that do not look at alternative ways to do tasks
  - may be impossible to find someone who actually does the task

Goal-Centered System Design

- Articulates user goals rather than how they want to do them
  - Goal:
    - a desired end condition
    - tend to be stable
  - Task:
    - an intermediate process needed to achieve the goal
    - may change as technology / work patterns change
- Designer analyzes goals, looking for solutions and how to satisfy them
  - may result in different task / task sequence which could be better
- Approach:
  - Develop a persona
    - precise, specific description of the user and what they wish to accomplish (Goal)
    - a pretend user that are hypothetical archetypes of actual users
    - discovered as a by-product of investigating the problem domain
  - Develop a cast of characters
    - 3 – 12 unique personas
    - one will be the primary persona – the main focus of the design

Case Study: Logitech Scanman Goal-Centered System Design

- Malcolm, the Web-Warrior
  - Small office or home office, starting small consulting business, not very technical
- Chad Marchetti, Boy
  - Ten-year old boy, scans for his homework
- Magnum, DPI
  - Young freelance graphic artist, just breaking into the business, can't yet afford industrial strength product

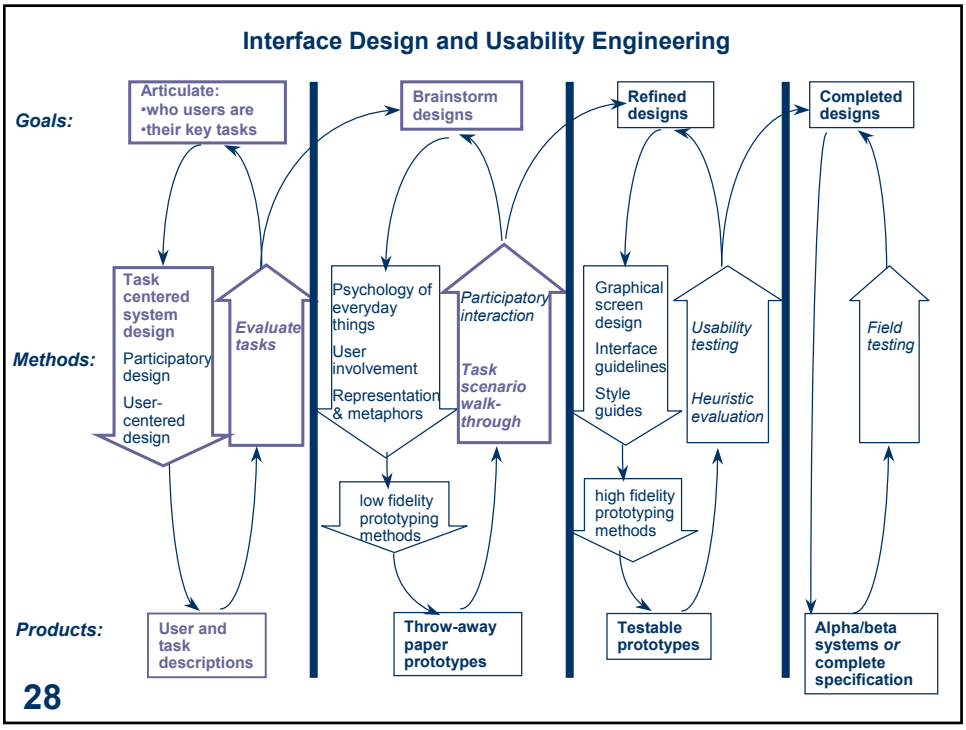
- Goals:
  - Don't want to manage scanners, resolutions, or settings
  - Want to find scanned images quickly and easily
  - Want to get scanned images into other documents in other programs quickly and easily

- Reduced functionality to 3 main functions
  - Crop, resize, reorient
  - Did these extremely well, left more complex functionality to sophisticated software (PhotoShop)

- User testing – users felt scanner was most powerful in terms of the number of features!

Summary

- How to develop concrete task examples
- How to use task examples to motivate designs
- How to evaluate designs through task-centered walkthroughs



Texts and Readings

- Lewis, C. and Rieman, J. (1994) Task Centered User Interface Design, (shareware copy online) You should read the whole book, but Chapters 1 and 2 in particular.
- Cooper, A. (1999). The Inmates are Running the Asylum. (Read chapters 9, 10, and 11: pgs 121-201. Copy should be available in the Reading Room soon.

How *you* will be evaluated

- Peer review and class participation (10%)
  - Fellow group members assessment of your contribution to the project
  - Contribution to class discussion and activities
- One small assignment done individually (10% each)
- Advanced HCI topic assignment done individually (20%)
  - Synthesis of research in topic area
  - Short written report
  - Short class presentation and lead discussion
  - In English
- In-class test (15%)
  - Covers readings, lectures, discussion in class, assignments
- Group project (45%)
  - Design, prototype, implement, evaluate an interface for some technological artifact
  - Class presentation during scheduled exam period