

User Interface Design, Prototyping, and Evaluation

Design Discovery:  
 Task Analysis

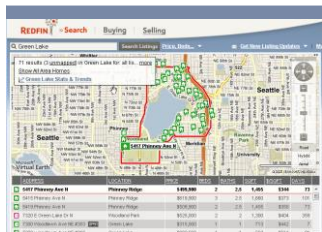
Prof. James A. Landay  
 University of Washington  
 Autumn 2008

October 7, 2008

Hall of Fame or Hall of Shame?



Hall of Fame!



- Flexible sort
- Icons change if saved a house
- Understands “neighborhoods”

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Design Discovery:  
 Task Analysis

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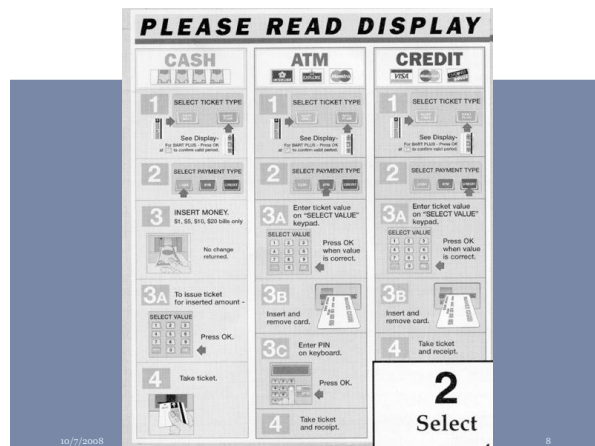
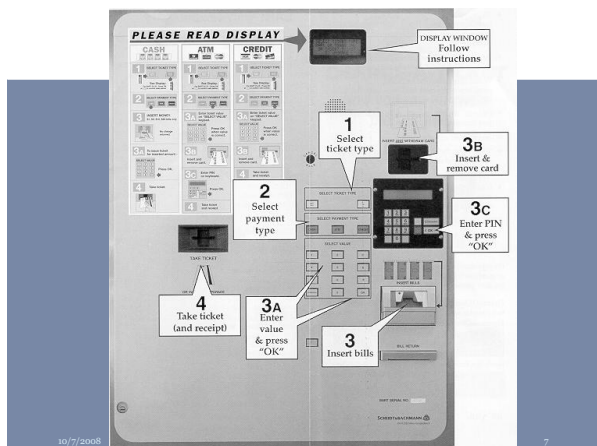
October 7, 2008

Outline

- Review
- Task analysis
- Selecting tasks
- Using tasks in design
- Caveats to user-centered design
- Working on teams

Review

- Know thy user by ?
  - involving them in design
- Contextual inquiry is for? How do we do it?
  - way to answer the task analysis questions
  - interview & observe real customers
  - use master-apprentice model to get them to teach you
- ESM stands for?
  - Experience Sampling Method
- ESM is used to get self-report data where?
  - in situ



## Task Analysis

- Find out
  - who customers are
  - what tasks they need to perform
- Observe existing work practices
- Create scenarios of actual use
- This allows us to try out new ideas *before* building software!
  - get rid of problems early in the design process

## Why Task Analysis?

- System will fail if it
  - does not do what the customer needs
  - is inappropriate to the customer
  - “the system must match the customer’ tasks”
- Can’t we just define “good” interfaces?
  - “good” has to be taken in context of users
    - might be acceptable for office work, not for play
    - infinite variety of tasks and customers
  - guidelines are too vague to be generative
    - e.g., “give adequate feedback”



## Task Analysis Questions



- Who is going to use the system?
- What tasks do they now perform?
- What tasks are desired?
- How are the tasks learned?
- Where are the tasks performed?
- What’s the relationship between customer & data?

## Task Analysis Questions (cont.)

- What other tools does the customer have?
- How do users communicate with each other?
- How often are the tasks performed?
- What are the time constraints on the tasks?
- What happens when things go wrong?

## Who?

- **Identity**
  - in-house or specific customer is easy
  - need several typical users for broad product
- **Background**
- **Skills**
- **Work habits and preferences**
- **Physical characteristics**
  - height?

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## Who (BART)?

- **Identity?**
  - people who ride BART
    - business people, students, disabled, elderly, tourists
- **Background?**
  - may have an ATM or credit card
  - have used other fare machines before
- **Skills?**
  - may know how to put cards into ATM
  - know how to buy BART tickets

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## Who (BART cont.)?

- **Work habits and preferences?**
  - use BART 5 days a week
- **Physical characteristics?**
  - varying heights → don't make it too high or too low!

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## Talk to Them

- **Find some real customers**
- **Talk to them**
  - find out what they do
  - how would your system fit in
- **Are they too busy?**
  - buy their time
    - t-shirts, coffee mugs, etc.
  - find substitutes
    - medical students in training



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## What Tasks?

- **Important for both automation and new functionality**
- **Relative importance of tasks?**
- **Observe customers, see it from their perspective**
  - on-line billing example
    - small dentists office had billing automated
    - assistants were unhappy with new system
    - old forms contained hand-written margin notes
      - e.g., patient A's insurance takes longer than most, etc.

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## How are Tasks Learned?

- **What does the customer need to know?**
- **Do they need training?**
  - academic
  - general knowledge / skills
  - special instruction / training

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## Where is the Task Performed?

- Office, laboratory, point of sale?
- Effects of environment on customers?
- Users under stress?
- Confidentiality required?
- Do they have wet, dirty, or slippery hands?
- Soft drinks?
- Lighting?
- Noise?

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## What is the Relationship Between Customers & Data?

- Personal data
  - always accessed at same machine?
  - do users move between machines?
- Common data
  - used concurrently?
  - passed sequentially between customers?
- Remote access required?
- Access to data restricted?

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## What Other Tools Does the Customer Have?

- More than just compatibility
- How customer works with collection of tools
  - Ex. automating lab data collection
    - how is data collected now?
    - by what instruments and manual procedures?
    - how is the information analyzed?
    - are the results transcribed for records or publication?
    - what media/forms are used and how are they handled?

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## How Do Customers Communicate with Each Other?

- Who communicates with whom?
- About what?
- Follow lines of the organization? Against it?
- Example: assistant to manager
  - installation of computers changes communication between them
  - people would rather change their computer usage than their relationship [Hersh82]

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## How Often Do Customers Perform the Tasks?

- Frequent customers remember more details
- Infrequent customers may need more help
  - even for simple operations
  - make these tasks possible to do
- Which function is performed
  - most frequently?
  - by which customers?
  - optimize system for these tasks will improve perception of good performance

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## What are the Time Constraints on the Task?

- What functions will customers be in a hurry for?
- Which can wait?
- Is there a timing relationship between tasks?

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## What Happens When Things Go Wrong?

- How do people deal with
  - task-related errors?
  - practical difficulties?
  - catastrophes?
- Is there a backup strategy?

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## Involve Customers to Answer Task Analysis Questions

- Customers help designers learn
  - what is involved in their jobs
  - what tools they use
  - i.e., what they do
- Developers reveal technical capabilities
  - builds rapport & an idea of what is possible
  - customer's can comment on whether ideas make sense
- How do we do this?
  - observe & interview prospective users in work place, home, or in the field!

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## Selecting Tasks

- Real tasks customers have faced
  - collect any necessary materials
- Should provide reasonable coverage
  - compare check list of functions to tasks
- Mixture of simple & complex tasks
  - easy task (common or introductory)
  - moderate task
  - difficult task (infrequent or for power customers)

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## What Should Tasks Look Like?

- Say what customer wants to do, but not how
  - allows comparing different design alternatives
- Be very specific – stories based on facts!
  - say who customers are (use personas or profiles)
    - design can really differ depending on who
    - name names (allows getting more info later)
    - characteristics of customers (job, expertise, etc.)
  - forces us to fill out description w/ relevant details
    - example: file browser story
- Some should describe a complete job
  - forces us to consider how features work together
    - example: phone-in bank functions

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## Using Tasks in Design

- Write up a description of tasks
  - formally or informally
  - run by customers and rest of the design team
  - get more information where needed

Manny is in the city at a club and would like to call his girlfriend, Sherry, to see when she will be arriving at the club. She called from a friends house while he was on BART, so he couldn't answer the phone. He would like to check his missed calls and find the number so that he can call her back.

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## Using Tasks in Design (cont.)

- Rough out an interface design
  - discard features that don't support your tasks
    - or add a real task that exercises that feature
  - major screens & functions (not too detailed)
  - hand sketched
- Produce scenarios for each task
  - what customer has to do & what they would see
  - step-by-step performance of task
  - illustrate using storyboards
    - sequences of sketches showing screens & transitions

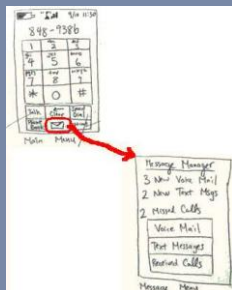
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## Scenarios (cont.)

- Scenarios are *design specific*, tasks aren't
- Scenarios force us to
  - show how various features will work together
  - settle design arguments by seeing examples
    - only examples → sometimes need to look beyond
- Show users storyboards
  - get feedback



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## Caveats of User-Centered Design Techniques

- Politics
  - “agents of change” can cause controversy
  - get a sense of organization & bond w/ interviewee
  - important to get buy-in from all those involved
- Customers are not always right
  - cannot anticipate new technology accurately
  - job is to build system customers will want
    - not system customers say they want
    - be very careful about this (you are outsider)
      - if you can't get customers interested in your hot idea, you're probably missing something
- Design/observe forever without prototyping
  - rapid prototyping, evaluation, & iteration is key

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## Teams vs. Groups

- Teams & good performance are inseparable
  - a team is more than the sum of its parts
- Groups
  - strong leader
  - individual accountability
  - organizational purpose
  - individual work products
  - efficient meetings
  - measures performance by influence on others
  - delegates work
- Teams
  - shared leadership
  - individual & mutual accountability
  - specific team purpose
  - collective work products
  - open-ended meetings
  - measures performance from work products
  - does real work together

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## Keys to Team Success

- Common commitment
  - requires a purpose in which team members believe
    - “prove that all children can learn”, “revolutionizing X...”
- Specific performance goals
  - comes directly from the common purpose
    - “increasing the scores of graduates from 40% to 95%”
  - helps maintain focus – start w/ something achievable
- A right mix of skills
  - technical/functional expertise (programming/design/writing)
  - problem-solving & decision-making skills
  - interpersonal skills
- Agreement
  - who will do particular jobs, when to meet & work, schedules

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## Team Action Items

- Keep meeting & get used to each other
- Figure out strengths of team members
- Assign each person a role
  - responsible for seeing work is organized & done
  - not responsible for doing it themselves
- Names/roles listed on next assign. turned in
- Roles
  - group manager (coordinate – design (visual/interaction) – big picture)
  - documentation (writing) – user testing

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## Summary

- Task Analysis questions ?
  - Who is going to use the system?
  - What tasks do they now perform?
  - What tasks are desired?
  - How are the tasks learned?
  - Where are the tasks performed?
  - What's the relationship between customer & data?
  - What other tools does the customer have?
  - How do users communicate with each other?
  - How often are the tasks performed?
  - What are the time constraints on the tasks?
  - What happens when things go wrong?
- Selecting tasks ,
  - real tasks with reasonable functionality coverage
  - complete, specific tasks of what customer wants to do

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## Further Reading

### *Task Analysis & Personas*

- Books
  - *User and Task Analysis for Interface Design* by Joann T. Hackos, Janice C. Redish
  - *The Inmates are Running the Asylum* by Alan Cooper

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## Next Time

- Sketching in Design
- Read
  - Read “Sketching User Experience” by Buxton, pp. 135-151 (online today)
  - [Tips for Working Successfully in a Group](#) by Randy Pausch
  - optional: [Hektner, J. M., & Csikszentmihalyi, M. \(2002\). The experience sampling method: Measuring the context and content of lives](#)

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