CSE 440: Introduction to HCI
User Interface Design, Prototyping, and Evaluation

Lecture 05: Task Analysis

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Tuesday/Thursday
12:00 to 1:20
Today’s Plan

Things To Talk About
Groups vs. Teams
Task Analysis
Plantr Task Analysis
Tasks in Design
Course Notes and Reminders

Room Switch

1:30 section now in MGH 254

Reading 2 for Tomorrow
Project Progression

Context Inquiries Should Be In Progress

At Least 1 inquiries due Tomorrow
At Least 3 inquiries due Tuesday, with analysis (first of your “larger” milestones)

Then we switch to tasks and design ideas

6 tasks due Friday 10/23
3x4 designs x tasks due Tuesday 10/27
1x2 design x tasks due Friday 10/30

Look at prior projects for where we are going
Aways and Team Responsibility

Many of us have legitimate times to be away

We pay attention to participation
  
  It is an element of your grade
  
  We will gather peer feedback

But your real commitment is to your team
  
  Be sure you communicate your aways
  
  Be sure you manage your commitments
  
  Let us know if there are issues
Structure of Section

Sections focus on critique

Bring your artifacts, be ready to present them

Bring paper, keep the laptops put away

Rotation of 2 staff and 3 teams in each section

For some random assignment of teams A, B, C:

Time: 0 15 30
Staff 1: Ac Ba Cb
Staff 2: Bc’ Ca’ Ab’
Themes in Questions and Feedback

You are not doing science

You seek innovative insight, not knowledge or truth

Do the best design work you can

May need additional inquiries
May be using other methods
May find that self-tracking is not the opportunity

We designed this project sequence, but be flexible

Capture and keep your raw work products

Our collection is minimal, but you will want them
Structure to Ease Observation / Diaries

<table>
<thead>
<tr>
<th>Time</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
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Need

- Mon
- Tue
- Wed
- Thu
- Fri
- Sat
- Sun

You needed:  
- □ Info.
- □ Assist.
- □ Other

What did you need?  

To know if stroller could be used on Don Kelley & Trail

Why did you need it?  

wanted to take baby for walk in town but it must be ice-free

Where were you?  

at home

What were you doing?  

planning visit

When did you need it?  

5-10 hours

What I needed was very important.
Today’s Plan

Things To Talk About
Groups vs. Teams
Task Analysis
Plantr Task Analysis
Tasks in Design
The Discipline of Teams

Teams produce both individual contributions and collective work-products.

Teams establish a social contract that relates to their purpose and guides and obligates how they must work together.

“We hold ourselves accountable” is a strict requirement, whether or not a “boss” does.
Groups vs. Teams

There is a place for groups:

Working groups are both prevalent and effective in large organizations where individual accountability is most important. The best working groups come together to share information, perspectives, and insights; to make decisions that help each person do his or her job better; and to reinforce individual performance standards. But the focus is always on individual goals and accountabilities.
Groups vs. Teams

Teams differ fundamentally from working groups... they require both individual and mutual accountability. Teams rely on more than group discussion, debate, and decision; on more than sharing information and best practice performance standards. Teams produce discrete work-products through the joint contributions of their members. This is what makes possible performance levels greater than the sum of all the individual bests of team members.

A team is more than the sum of its parts.
## Groups vs. Teams

<table>
<thead>
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<th>Groups</th>
<th>Teams</th>
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<tr>
<td>strong leader</td>
<td>shared leadership</td>
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<tr>
<td>individual accountability</td>
<td>individual &amp; mutual accountability</td>
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<tr>
<td>organizational purpose</td>
<td>specific team purpose</td>
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<td>individual work products</td>
<td>collective work products</td>
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<td>efficient meetings</td>
<td>open-ended meetings</td>
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<td>measures performance</td>
<td>measures performance</td>
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<tr>
<td>by influence on others</td>
<td>from work products</td>
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<tr>
<td>delegates work</td>
<td>does real work together</td>
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Examples we have seen?
Keys to Team Success

Common commitment
requires a purpose in which team members believe

Specific performance goals
comes directly from the common purpose
helps maintain focus, starts with something achievable

A right mix of skills
technical/functional expertise (e.g., writing/visual/coding)
problem-solving & decision-making skills
interpersonal skills

Agreement and mutual accountability
who will do particular jobs, when to meet & work, schedules
Why this Reading?

School has taught you to succeed as an individual

Too many projects are done in groups

  Drawing boundaries between code responsibilities

This class requires you to work as teams

  Do not try to divide it up and stitch it together
  Use complementary skills, be mutually accountable
  Have faith in your teammates and their execution

The “real world” requires this too
Why this Reading?

As you read, think about prior groups and teams

In this class, you are a “team that does things”

Pay attention to “teams that recommend things”

HCI is often a minority interest
Need to work to ensure the impact of your work
Involve stakeholders early, not just at the end
Organize as a team:

Get to know each other

Figure out strengths of team members

Consider assigning each person a primary role

  Responsible for seeing work is organized and done
  Not responsible for doing it themselves

Be proud, include names/roles in artifacts

Group Manager  (coordinate big picture)
Documentation  (coordinate writing)
Design         (coordinate visual/interaction design)
Testing        (coordinate iterative testing)
Today’s Plan

Things To Talk About
Groups vs. Teams
Task Analysis
Plantr Task Analysis
Tasks in Design
Tasks Matter

System will fail if:

- It is inappropriate for the customer
- It does not meet customer needs

Your contextual inquiries will emphasize getting to know your customers and their needs

Can’t you then just make ‘good’ interfaces?
Why Task Analysis?

‘Good’ has to be interpreted in the context of use
   Might be acceptable for office work, but not for play
   Infinite variety of tasks and customers

Guidelines are too vague to be generative
   e.g., “give adequate feedback”
   Can be used to critique, but not to generate

Design is often about tradeoffs

Examples we have seen?
Why Task Analysis?

Task analysis is a lens on the information you obtain through methods like contextual inquiry. Use what you learned in your inquiry to answer the questions in the task analysis.

Your assignments order the two, but in practice you should iteratively decide how to best draw upon all relevant methods throughout a process.
11 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 is the relationship between people & data?
What other tools do people have?
How do people communicate with each other?
How often are the tasks performed?
What are the time constraints on the tasks?
What happens when things go wrong?
Question 1

Who is going to use the system?

Identity
In-house or specific customer is more defined
Broad products need several typical consumers

Background

Skills

Work habits and preferences

Physical characteristics and abilities
Seattle Parking Meter

Who is going to use the system?

Identity?
People who park in Seattle
Business people, students, elderly, tourists

Background?
Have used parking meters before
May have an ATM or credit card
Have used other fare machines before
Seattle Parking Meter

Who is going to use the system?

Skills?
May know how to put cards into ATM

Work habits and preferences?
Park several times a week, a month, a year

Physical characteristics and abilities?
Varying heights, do not make it too high or too low

Anything else?
PARK, PAY & DISPLAY
Parking Pay Station Instructions

- Insert card and push BLUE button to buy time OR insert coins to buy time
- Push GREEN button to print receipt
- Remove card quickly to wait for receipt and display properly
- Display one receipt only to park in any meter or pay station space until your time expires

Use the removable backing to tape receipt to INSIDE of a front-seat side window

- PARALLEL curbside
- ANGLE
- For MOTORCYCLES, tape to headlight cover

Questions? Call 684-ROAD (7623)
paystations@seattle.gov

SDOT
Seattle Department of Transportation

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这座车

都

PHOTOGRAPH BY SDOT

Thắc mắc? Hãy gọi số 684-ROAD (7623)
paystations@seattle.gov

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ĐÀU XE, TRẢ TIỀN & DẤN BIÊN NHẬN
Hướng dẫn về Trạm Trả Tiền Đầu xe

- Dứt thẻ vào và bấm nút để mua giờ HOẠC Bối tiền các đề mua giờ
- Bấm nút XANH để in biên nhận
- Rút nhanh thẻ ra chờ biên nhận và dán dũng cach
- Chỉ dẫn một biên nhận để đầu xe tại bất cứ chỗ nào có đóng hoắc tram trả tiền cho đến khi hết giờ đầu

Dụng miếng dán mặt sau có thể gỡ ra để dán biên nhận vào MẶT TRONG của kính bảng trước

- SONG SONG bo letra
- phia nguyen lêि
doi voi xe gan may, dan vao chup den truc

有問題嗎？請致電 684-ROAD (7623)
paystations@seattle.gov

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請使用可剝離的背面，將收據貼在前座側車窗內側

- 司機座位
- 斜角
- 如果是摩托車，請貼在車頭燈罩上

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有問題嗎？請致電 684-ROAD (7623)
paystations@seattle.gov
Question 2 and Question 3

What tasks do they now perform?
What tasks are desired?

Important for both automation and new functionality
Relative importance of tasks?
Observe people, see it from their perspective

Automated Billing Example
small dentists office had billing automated
assistants were unhappy with new system
old forms contained hand-written margin notes
e.g., patient’s insurance takes longer than most
POPOVERS

Beat eggs slightly. Sift flour and salt, and add alternately with milk to eggs. Add melted fat. Beat with egg beater until smooth and full of bubbles. Fill hot greased cast aluminum or iron pans or glass or earthenware custard cups, 2/3 full of popover batter. Place immediately in a hot oven of 450° F. and bake for 30 min. Then lower temperature to 350° F. and bake for 15 min. longer. Makes 9 popovers.

CORNBREAD

Sift dry ingredients together. Mix milk with beaten eggs and add to dry ingredients. Stir well together and add melted fat. Pour into a hot greased baking pan or muffin tins and bake in hot oven of 400° F. for 20-25 min. Makes 24 pieces.
Question 4

How are the tasks learned?

What does a person need to know?

Do they need training?

academic

general knowledge / skills

special instruction / training
Question 5

Where are the tasks performed?
Office, laboratory, point of sale?
Effects of environment on customers?
Are people under stress?
Confidentiality required?
Do they have wet, dirty, or slippery hands?
Soft drinks?
Lighting?
Noise?
Question 6

What is the relationship between people & data?

**Personal data**
- Always accessed at same machine?
- Do people move between machines?

**Common data**
- Used concurrently?
- Passed sequentially between customers?
- Remote access required?
- Access to data restricted?
- Does this relationship change over time?
Question 7

What other tools does a person have?

More than just compatibility

How customer works with collection of tools

Automating lab data collection example:
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?
Question 8

How do people communicate with each other?
Who communicates with whom?
About what?
Follow lines of the organization? Against it?
Question 9

How often are the tasks performed?
Frequent use likely remember more details
Infrequent use may need more help
Even for simple operations
Make these tasks possible to accomplish

Which function is performed
Most frequently?
By which people?

Optimizing for these will improve perception of performance
Careful about initial use scenario
Question 10

What are the time constraints on the tasks?

What functions will people be in a hurry for?

Which can wait?

Is there a timing relationship between tasks?
  e.g., pregnancy in web search
Question 11

What happens when things go wrong?
How do people deal with task-related errors?
practical difficulties?
catastrophes?
Is there a backup strategy?
What are the consequences?
Selecting Tasks

Real tasks people have faced or requested
- collect any necessary materials
Should provide reasonable coverage
- compare check list of functions to tasks
Mixture of simple and complex tasks
- easy tasks (common or introductory)
- moderate tasks
- difficult tasks (infrequent or for power use)
What Should Tasks Look Like?

Say what person wants to do, but not how
  allows comparing different design alternatives
Be specific, stories based in concrete facts
  say who person is (e.g., using personas or profiles)
    design can really differ depending on who
give names (allows referring back with more info later)
  characteristics of person (e.g., job, expertise)
    story forces us to fill in description with relevant details
Sometimes describe a complete “accomplishment”
  forces us to consider how features work together
Using Tasks in Design

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

Manny is in the city at a restaurant and would like to call his friend Sherry to see when she will be arriving. She called from a friend’s house while he was in the bus tunnel, so he missed her call. He would like to check his missed calls and find the number to call her back.
Task: Park in a New Neighborhood

Peter is going to brunch on a Sunday with his roommates. He is trying a new place he found on Yelp. He has the address for the place and he is using a smartphone GPS for directions. He leaves the apartment with his roommates at around 8:30am and he wants to beat the crowd so they won’t have to wait in line. He is driving a Toyota Corolla that he has owned for five years. It is a rainy day and he doesn’t have an umbrella.
Hierarchical Task Analysis

Steps of the task execution (detailed in a hierarchy)

park in new neighborhood

- determine destination
- drive to destination
- locate parking spot
- secure parking spot
- park

- enter address in GPS
- follow directions
- arrive at destination

...
Hierarchical Task Analysis

Steps of the task execution (detailed in a hierarchy)

park in new neighborhood

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- enter address in GPS
- follow directions
- arrive at destination

...
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Things To Talk About
Groups vs. Teams
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Tasks in Design
Plantr Task Analysis

1. Who is going to use the system?

Anyone who owns indoor plants is a potential user of Plantr. All of the plant owners that we interviewed forgot to water their plants at some point regardless of age, experience, and background. Even Lucy, who spent most of her time at home because she worked from home, struggled with timely watering.
Plantr Task Analysis

2. What are the currently possible tasks?

When people purchase a plant, they often look up information about the proper lighting and temperature conditions for their plants. Additionally, people must find out how much and how frequently to water and fertilize their plants.
Plantr Task Analysis

3. What are currently unavailable, desired tasks?

People want a way to remember to water and care for their plants. Forgetting to water plants was the most cited reason for plant death, and the only task that participants in our inquiries mentioned completing on a regular basis.
Plantr Task Analysis

4. How are tasks learned?

Most people learned how to take care of their plants through trial and error. Some consulted the Internet, nursery staff, or friends for more information on plant care.
Plantr Task Analysis

5. Where are the tasks performed?

Tasks like watering and fertilizing are performed at the plant's location. People keep plants in their workplace, like Jack, or at home, like Lucy and Caroline. Getting information about plant care was performed in a variety of places. People who consult the Internet could be anywhere with a platform that supports web browsing and Internet access. Those who go to the nursery to talk to plant experts are required to go to a specific location to talk to someone in person.
Plantr Task Analysis

6. What is the relationship between a person and data?

We identified three different types of data: a plant’s current state, information about plants, and data that reflects the person’s plant care history. A plant's current state is data on the moisture level of its soil and the general appearance of the plant (e.g., color, stiffness/limpness of leaves, etc.). People use this information to determine the plant's needs. Caroline and Lucy watered their plants when the soil felt dry or the leaves began to droop.
6. What is the relationship between a person and data?

People consulted various plant care information databases when they wanted to know how to care for their plants. People used their personal history of plant care to determine how to take care of plants. Caroline said that she used to underwater plants, but she learned from her mistake and now tries to water them more often. People also base their buying decisions based upon their plant care history. Caroline noted that she tries to buy plants that require minimal water.
Plantr Task Analysis

7. What other tools do people have?

Caroline, Lucy, Jack, and Kacy all have smart phones and computers. People also have a water source, pots, and soil for their plants. Most people probably have access to a nursery or library.
Plantr Task Analysis

8. How do people communicate with each other?

Plant owners communicate on online forums and message boards. People who happen to be in the nursery at the same time might talk to each other about plant care. Likewise, people who have friends with indoor plants may share plant care tips.
9. How often are the tasks performed?

Watering is performed with a frequency between twice a week (Jack) and twice a month (Caroline). Fertilizing is performed less frequently, between once every two weeks to once every three months. Plants do not become sick often enough to make a good estimate about how often people try to get help.
Plantr Task Analysis

10. What are time constraints on the tasks?

Plants must be watered with some regularity, so if people do not water their plants for long enough, the plants will start to die. Likewise, if plants are in need of attention for other reasons - pH imbalance, environment too dry - and they do not receive attention within some amount of time, they will die. Watering, caring, and learning how to care for a plant takes time. People who are very busy might not have the time or attention required for plant care.
Plantr Task Analysis

11. What happens when things go wrong?

When plants became "sick", people take action, seek help, or ignore the problem until the plant dies. When people forget to water plants, they usually notice that the plant needs water and give it water. Sometimes people may not realize that a plant needs water until it is too late.
Today’s Plan

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Plantr Task Analysis
Tasks in Design
Using Tasks in Design

Rough out an interface design

discard features that do not support your tasks
or add a real task that exercises that feature
major elements and functions, not too detailed
hand sketched

Produce scenarios for each task
what person does and what they see
step-by-step performance of task
illustrate using storyboards
Scenarios

Scenarios are design specific, tasks are not. Scenarios force us to show how things work together. Settle arguments with examples but these are only examples, and sometimes need to look beyond flaws.

Show people storyboards. Nice mechanism for feedback.
Tasks in Your Projects

Say what is accomplished, not how

Real tasks that people currently encounter, or new tasks your design will enable

Reasonable coverage of the interesting aspects of your problem and your design space

Range of difficulty and complexity

Park at the zoo, Friday night in Ballard, at the airport
Tasks, Personas, and Scenarios

Task: a design-agnostic objective
Persona: a fictional person with a backstory
Scenario: narrative that demonstrates a persona completing a task using a particular design

Use Case: in software engineering, describes requirements using one or more scenarios
Combine with Other Methods

Personas
Brainstorming
Affinity Diagramming
Concept Mapping
Competitive Analysis

“If you want to create a product that satisfies a broad audience ..., logic will tell you to make it as broad in its functionality as possible to accommodate the most people. Logic is Wrong.”
Combine with Other Methods

Personas
Brainstorming
Affinity Diagramming
Concept Mapping
Competitive Analysis

Example Personae:
- Parent concerned about safety
- Carpenter transporting tools
- Executive wants a sporty car

More specific is effective
- Give the person detail
- Give them a name
- Make it believable

Careful of stereotyping
Web littered with examples
Combine with Other Methods

Personas
Brainstorming
Affinity Diagramming
Concept Mapping
Competitive Analysis
Combine with Other Methods

Personas
Brainstorming
Affinity Diagramming
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Competitive Analysis
Combine with Other Methods

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