# CSE 440: Introduction to HCI

## User Interface Design, Prototyping, and Evaluation

Lecture 05:
Task Analysis

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Daniel Epstein
Brad Jacobson
King Xia

Tuesday/Thursday
10:30 to 11:50
MOR 234

# Where we came from

System will fail if:

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

Your contextual inquiries have emphasized getting to know your customers and their needs

# … So we know what to build now, right?

Can’t we now 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"

Design is often about tradeoffs

- Examples?

# Why Task Analysis?

Task analysis complements 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

# Why Now?

Task analysis questions due Tuesday, October 14

# 11 Task Analysis Questions

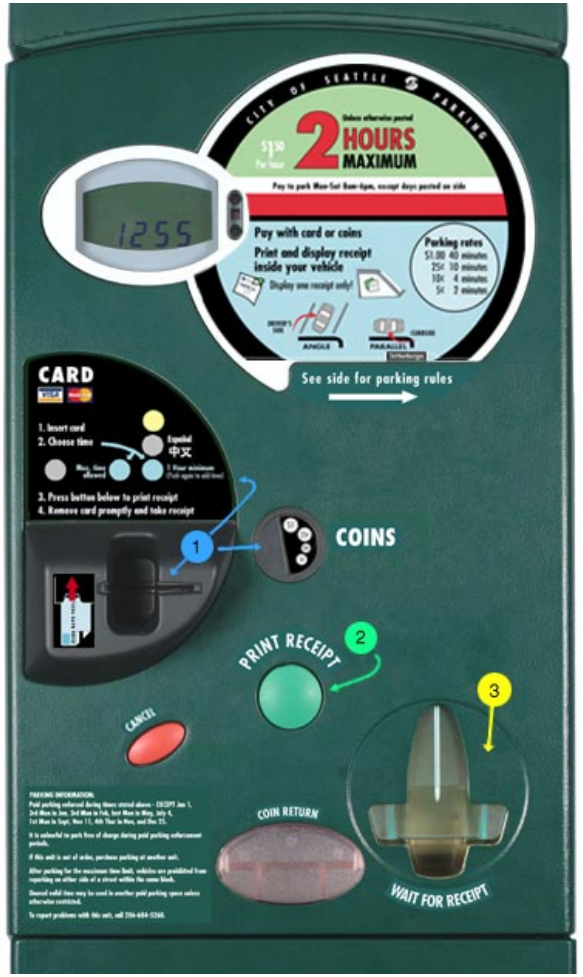
Who is going to use the system?
What tasks do they now perform?
What tasks are desired?
How are the tasks learned?
Where are the tasks performed?
What is the relationship between customers & data?
What other tools does the customer have?
How do customers communicate with each other?
How often are the 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 easy
  - Broad products need several typical consumers
- Background
- Skills
- Work habits and preferences
- Physical characteristics

Cards
Coins


CITY OF SEATTLE PARKING
2 HOURS MAXIMUM
1255
Pay with card or coins
Print and display receipt inside your vehicle
Parking rates
See side for parking rules
CARD
1. Insert card
2. Choose time
3. Press button below to print receipt
4. Remove card promptly and take receipt
COINS
PRINT RECEIPT
CANCEL
COIN RETURN
WAIT FOR RECEIPT

# 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

### Skills?

may know how to put cards into ATM

# Seattle Parking Meter

## Who is going to use the system?

### Work habits and preferences?

Park several times a week, a month, a year?

### Physical characteristics?

Varying heights, don't make it too high or too low

Anything else?

# PARK, PAY & DISPLAY

## Parking Pay Station Instructions

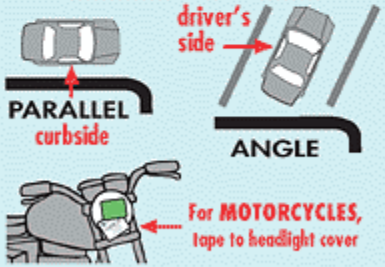
**Insert card** and push **BLUE** button to buy time **OR** **Insert coins** to buy time

Push **GREEN** button to print receipt

**Remove card quickly** 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**




Questions? Call 684-ROAD (7623)
paystations@seattle.gov
SDOT
Seattle Department of Transportation

# 泊車、付款並顯示

## 泊車付費站使用說明

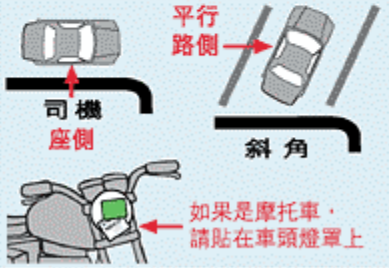
插入卡並按**藍色**按鈕購買時間，
**或投入硬幣**購買時間

按**綠色**按鈕
打印收據

**迅速將卡取出**
等候收據並適當顯示

**僅限顯示一張收據**，
以便在任何眯表或付費站的車位泊車，直到您的時間到期

**請使用可剝離的背面，將收據貼在前座側車窗內側**




有問題嗎？請致電 684-ROAD (7623)
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# ĐẬU XE, TRẢ TIỀN & DÁN BIÊN NHẬN

## Hướng Dẫn về Trạm Trả Tiền Đậu Xe

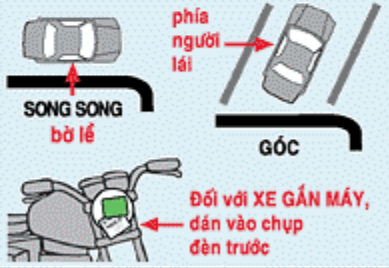
Đút thẻ vào và bấm nút **XANH** để mua giờ **HOẶC** **Bỏ tiền các** để mua giờ

Bấm nút **XANH** để in biên nhận

**Rút nhanh thẻ ra** chờ biên nhận và dán đúng cách

**Chỉ dán một biên nhận** để đậu xe tại bất cứ chỗ nào có đồng hồ hoặc trạm trả tiền cho đến khi hết giờ đậu

**Dùng miếng dán mặt sau có thể gỡ ra để dán biên nhận vào MẶT TRONG cửa kính bằng trước**




Thắc Mắc? Hãy gọi số 684-ROAD (7623)
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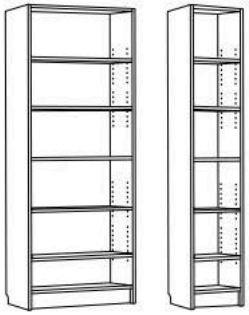
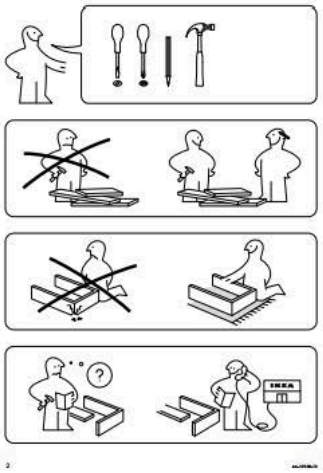
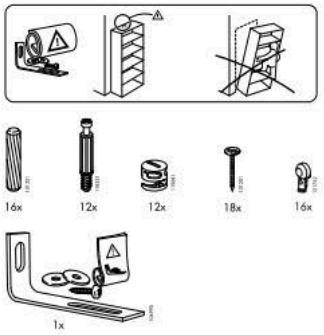
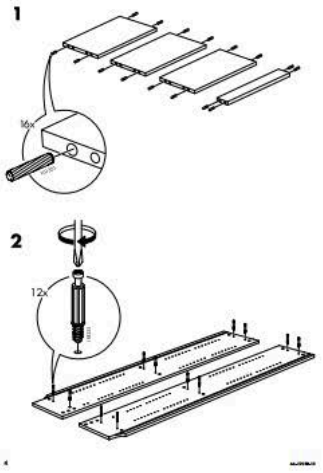
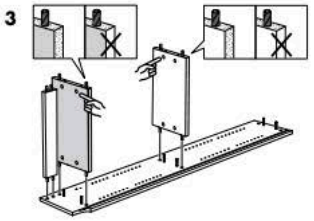
# BILLY

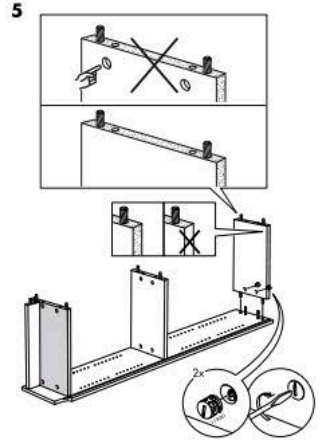


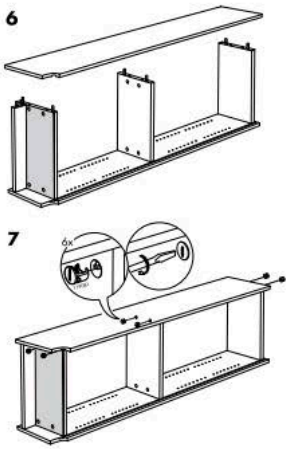


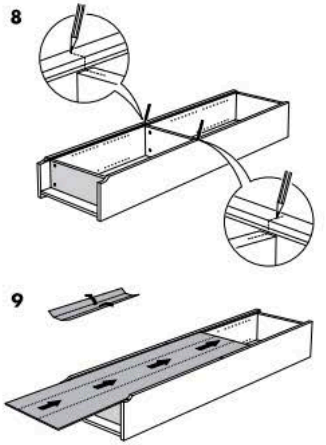


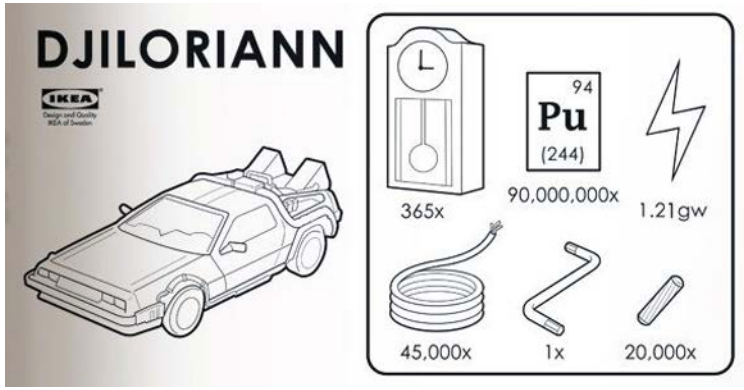

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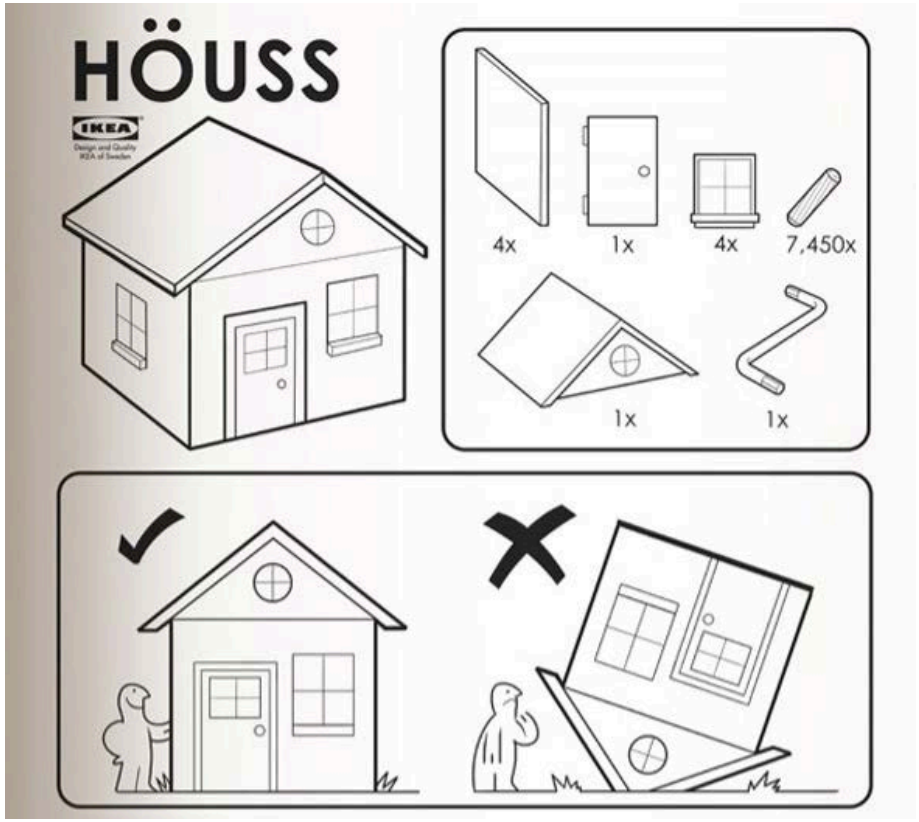
HÖUSS
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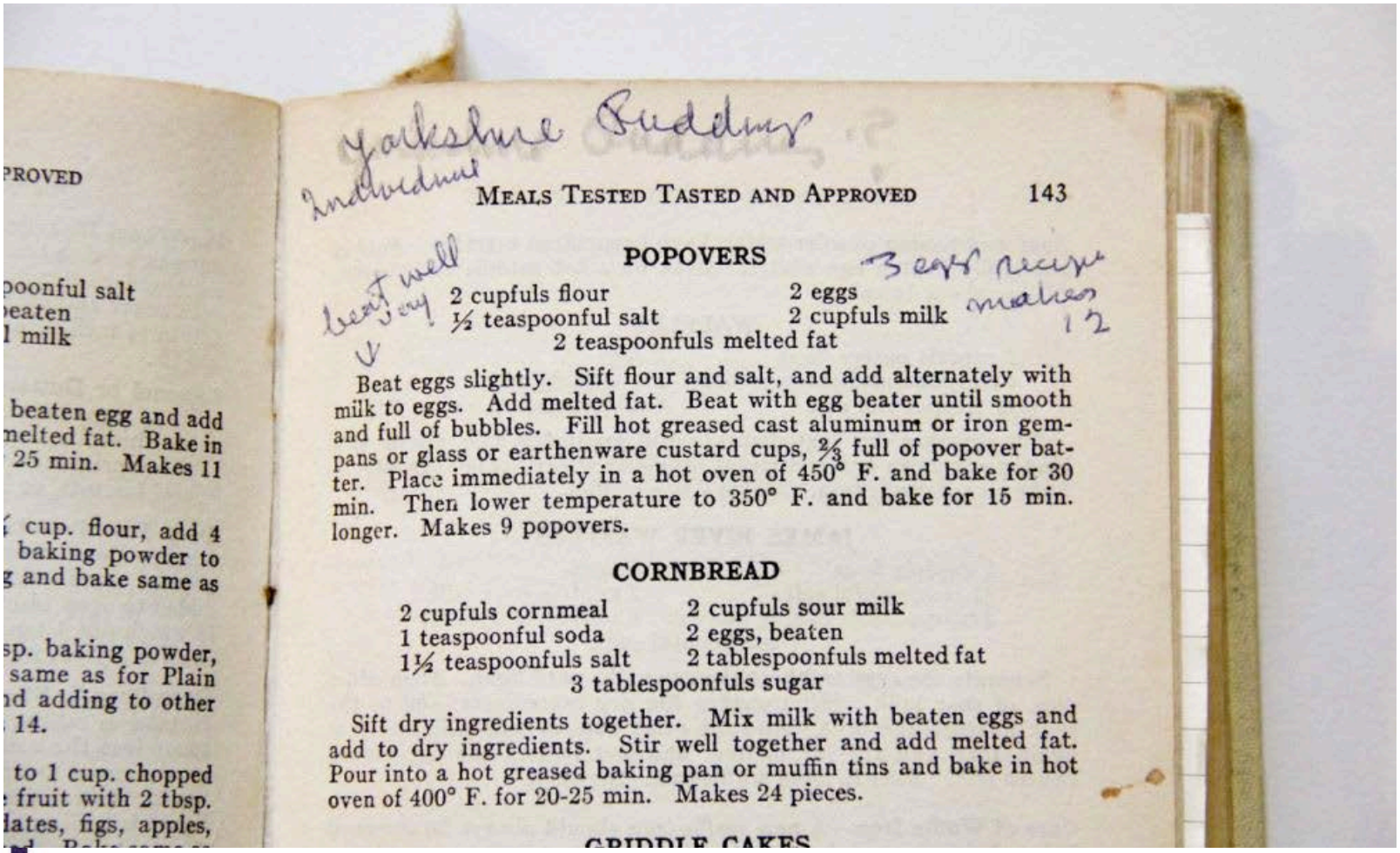
# Question 2 and Question 3

What tasks do they now perform?

What tasks are desired?

- Important for both automation and new functionality
- Relative importance of tasks?
- Observe customers, 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 A's insurance takes longer than most



PROVED

poonful salt
eaten
l milk

beaten egg and add
melted fat. Bake in
25 min. Makes 11

cup. flour, add 4
baking powder to
and bake same as

sp. baking powder,
same as for Plain
d adding to other
14.

to 1 cup. chopped
fruit with 2 tbsp.
lates, figs, apples,

Yorkshire Puddings
Individual



## POPOVERS

3 egg recipe makes 12

beat well
very!

2 cupfuls flour
½ teaspoonful salt
2 eggs
2 cupfuls milk
2 teaspoonfuls melted fat

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 gem-pans or glass or earthenware custard cups, ⅔ 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

2 cupfuls cornmeal
1 teaspoonful soda
1½ teaspoonfuls salt
2 cupfuls sour milk
2 eggs, beaten
2 tablespoonfuls melted fat
3 tablespoonfuls sugar

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.

## GRIDDLE CAKES

dub
University of Washington

# Question 4

How are the tasks learned?

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

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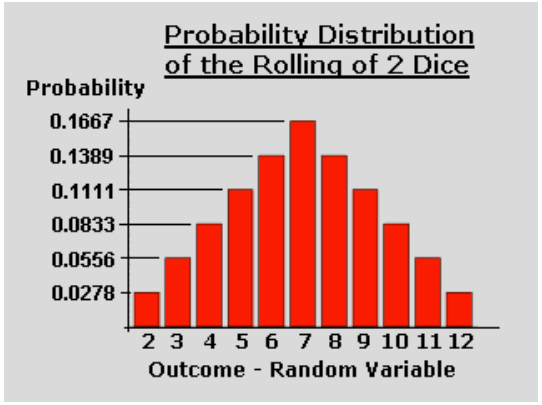

Probability Distribution of the Rolling of 2 Dice
Probability
0.1667
0.1389
0.1111
0.0833
0.0556
0.0278
2 3 4 5 6 7 8 9 10 11 12
Outcome - Random Variable

# 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

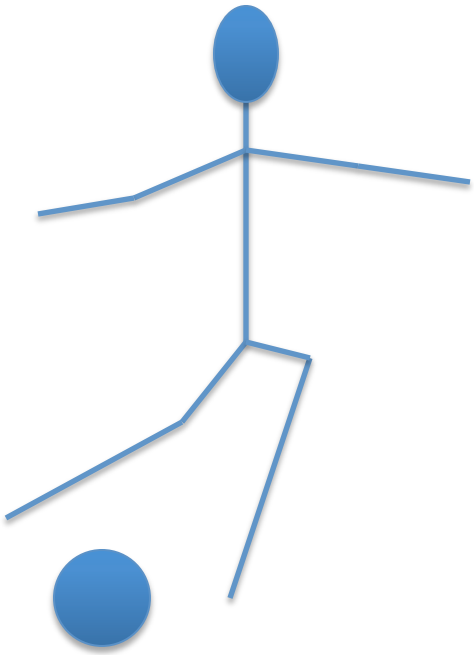
What is the relationship between customers & data?

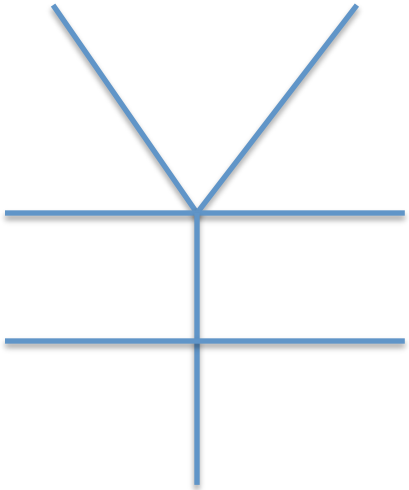
- Personal data
  - Always accessed at same machine?
  - Do people move between machines?
- Common data
  - Used concurrently?
  - Passed sequentially between customers?
- Remote access required?
- Access to data restricted?

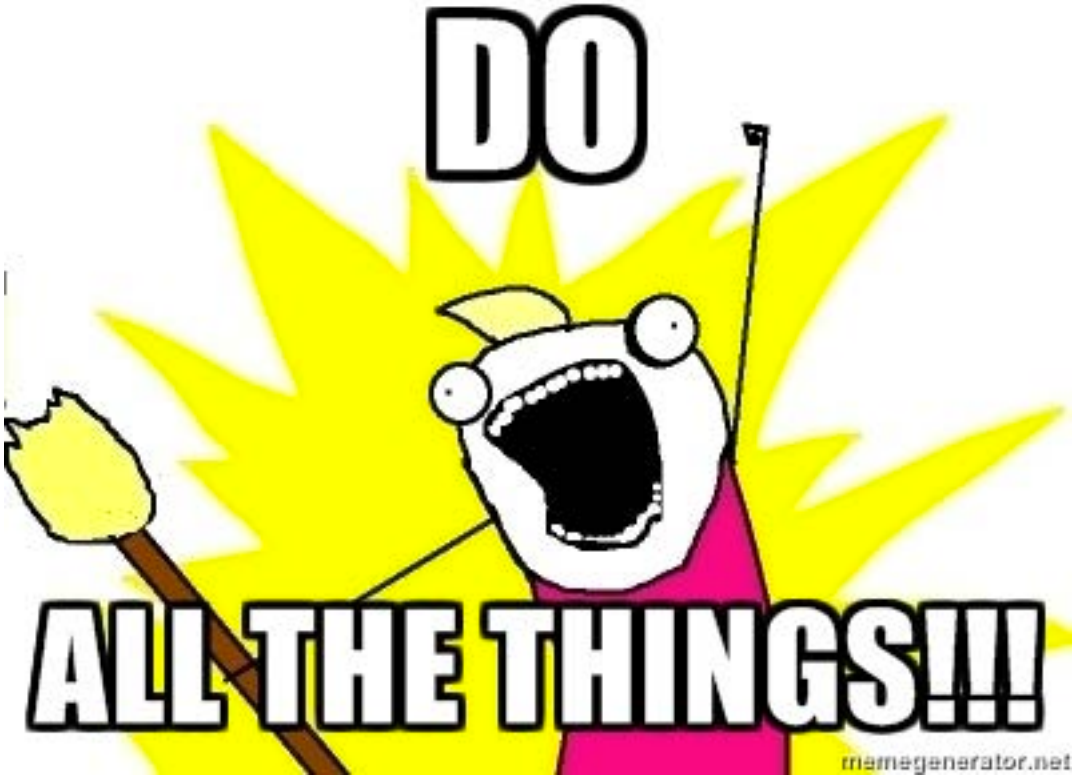
# Question 7

What other tools does the customer 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?






DO
ALL THE THINGS!!!
memegenerator.net

12,642
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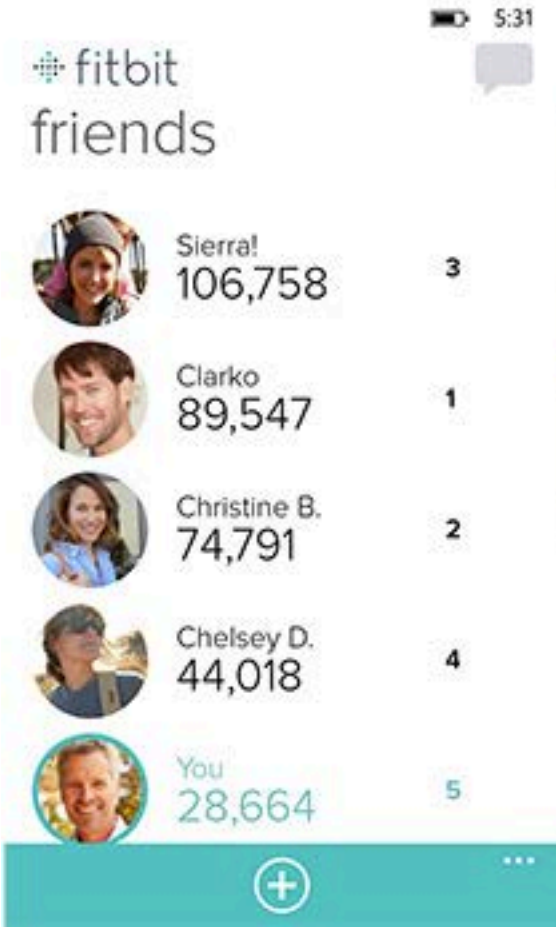

5:31
fitbit
friends
Sierra!
106,758
3
Clarko
89,547
1
Christine B.
74,791
2
Chelsey D.
44,018
4
You
28,664
5

# Question 8

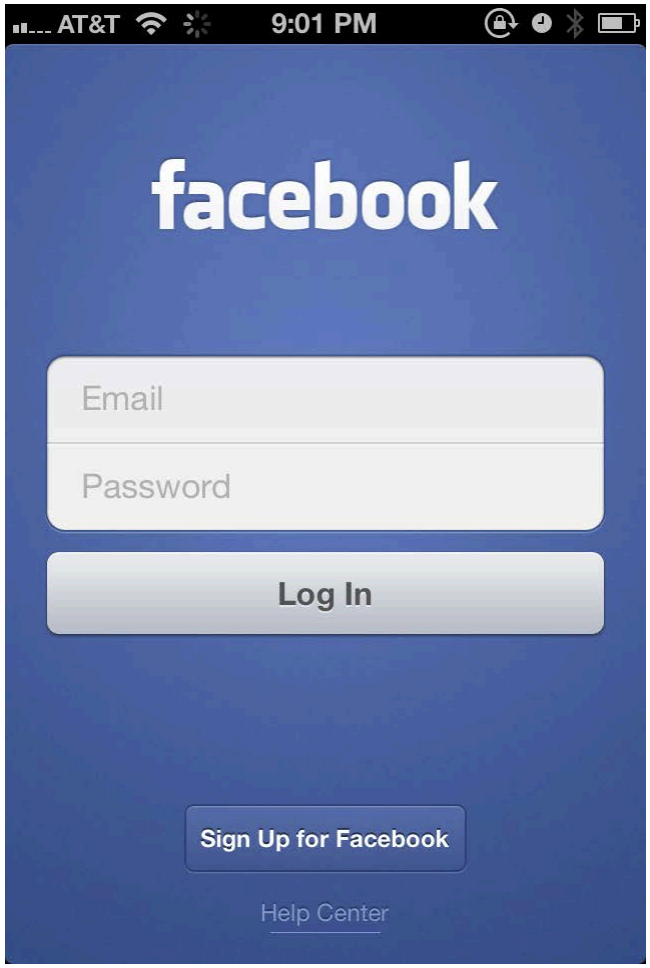
How do customers communicate with each other?

- Who communicates with whom?
- About what?
- Follow lines of the organization? Against it?

# Question 9

How often are the tasks performed?

- Frequent customers likely remember more details
- Infrequent customers may need more help
  - Even for simple operations
  - Make these tasks possible to accomplish
- Which function is performed
  - Most frequently?
  - By which customers?
  - Optimizing for these will improve perception of performance
  - Careful about initial use though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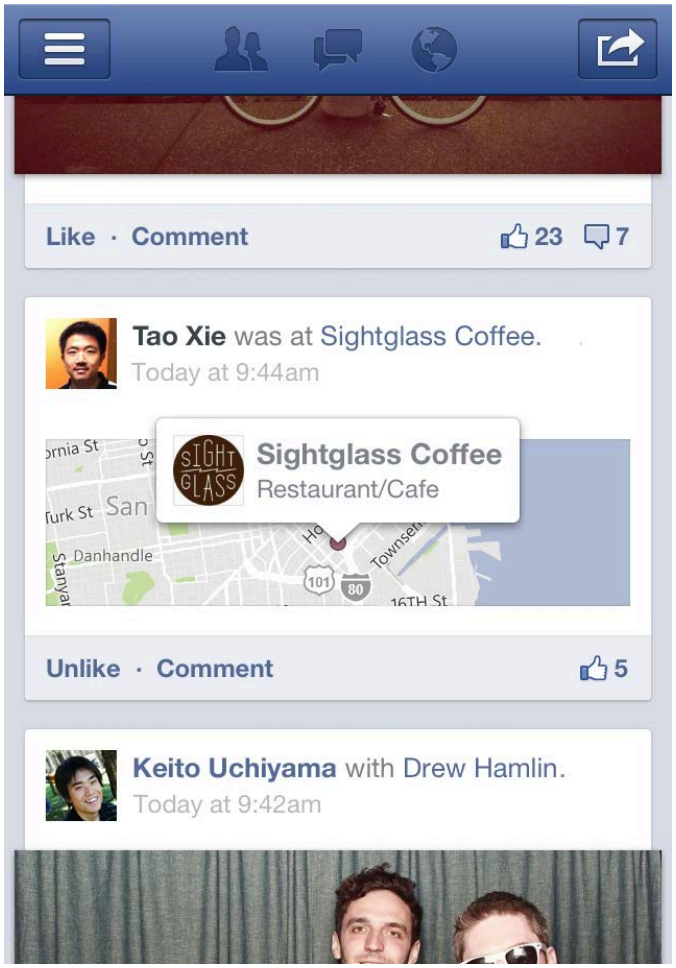
Help Center


Like · Comment
23
7
Tao Xie was at Sightglass Coffee.
Today at 9:44am
Sightglass Coffee
Restaurant/Cafe
Unlike · Comment
5
Keito Uchiyama with Drew Hamlin.
Today at 9:42am

# Question 10

What are the time constraints on the tasks?

What functions will customers be in a hurry for?

Which can wait?

Is there a timing relationship between tasks?

# 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 customers have faced or requested

- 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)

# 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
    - give names (allows referring back with more info later)
    - characteristics of customers (job, expertise, etc.)
  - story forces us to fill out description w/ relevant details
- Sometimes should describe a complete "job"
  - forces us to consider how features work together

# 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 bar and would like to call his girlfriend, Sherry, to see when she will be arriving at the bar. She called from a friend's house while he in the Paul Allen Center basement, so he missed her call. He would like to check his missed calls and find the number so that he can call her back.

# Using Tasks in Design

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

# Scenarios

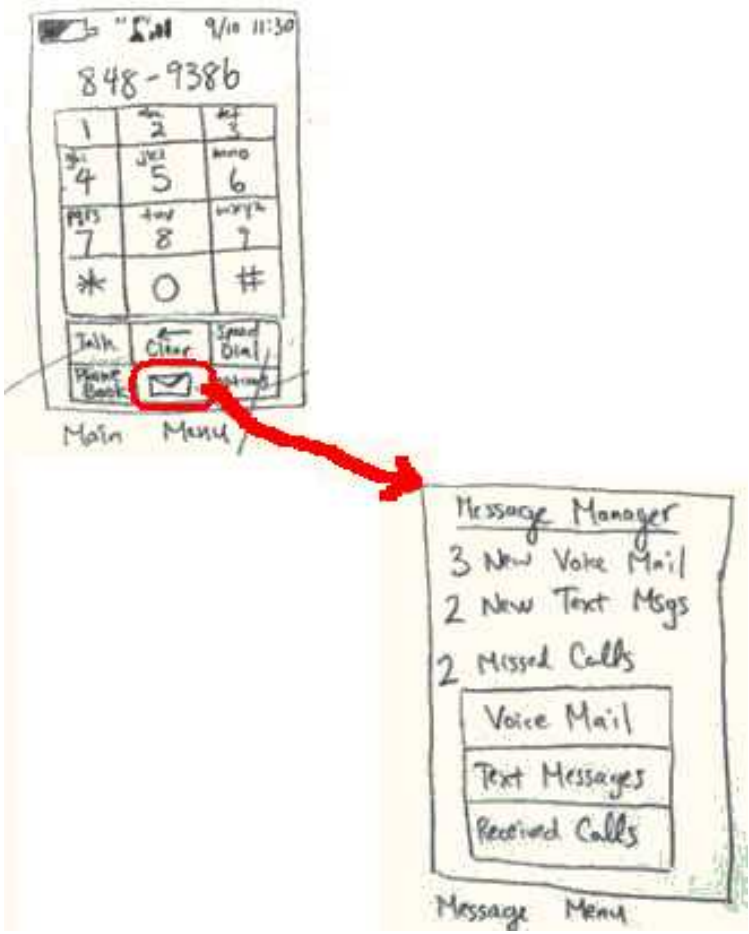
Scenarios are design specific, tasks are not

Scenarios force us to

- show how features will work together
- settle design arguments by seeing examples
  - but these are only examples, and sometimes need to look beyond flaws

Show users storyboards

- get feedback



# Caveats of User-Centered Design

- 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, you're probably missing something
- Design/observe forever without prototyping
  - rapid prototyping, evaluation, & iteration is key

# 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

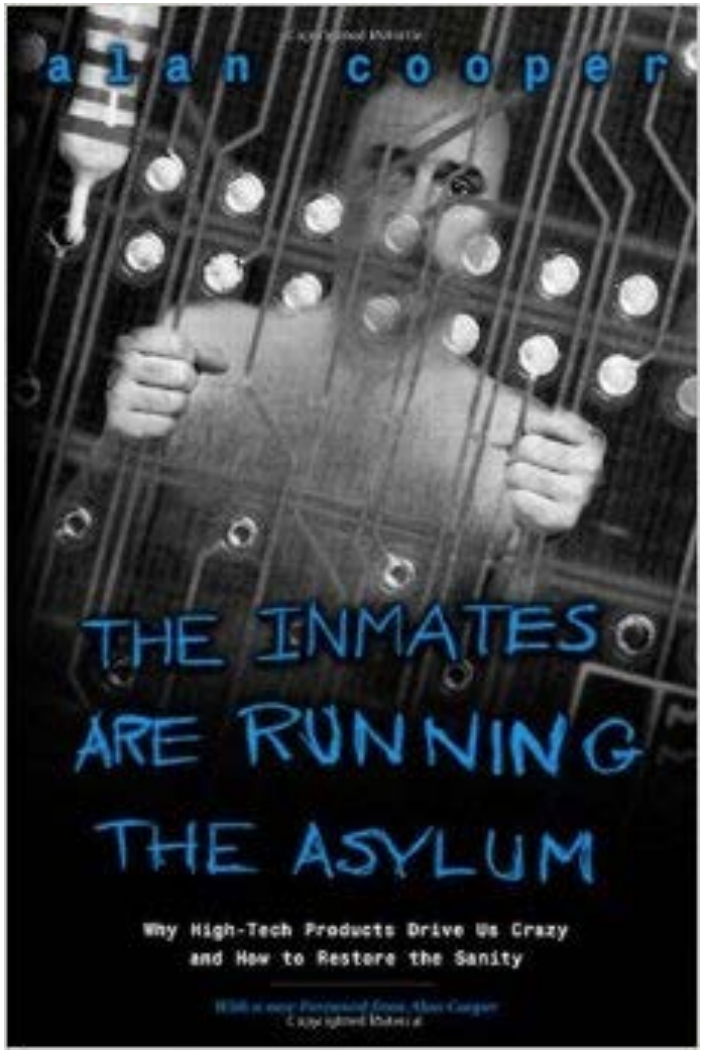
# Personas

# Question 1

Who is going to use the system?

- Identity
  - In-house or specific customer is easy
  - Broad products need several typical consumers
- Background
- Skills
- Work habits and preferences
- Physical characteristics

"If you want to create a product that satisfies a broad audience of users, logic will tell you to make it as broad in its functionality as possible to accommodate the most people. **Logic is Wrong**."



# 3 types of people

- Parent concerned about safety
- Carpenter who needs to transport tools
- Executive looking for a fast & sporty car

# Principles of Personas

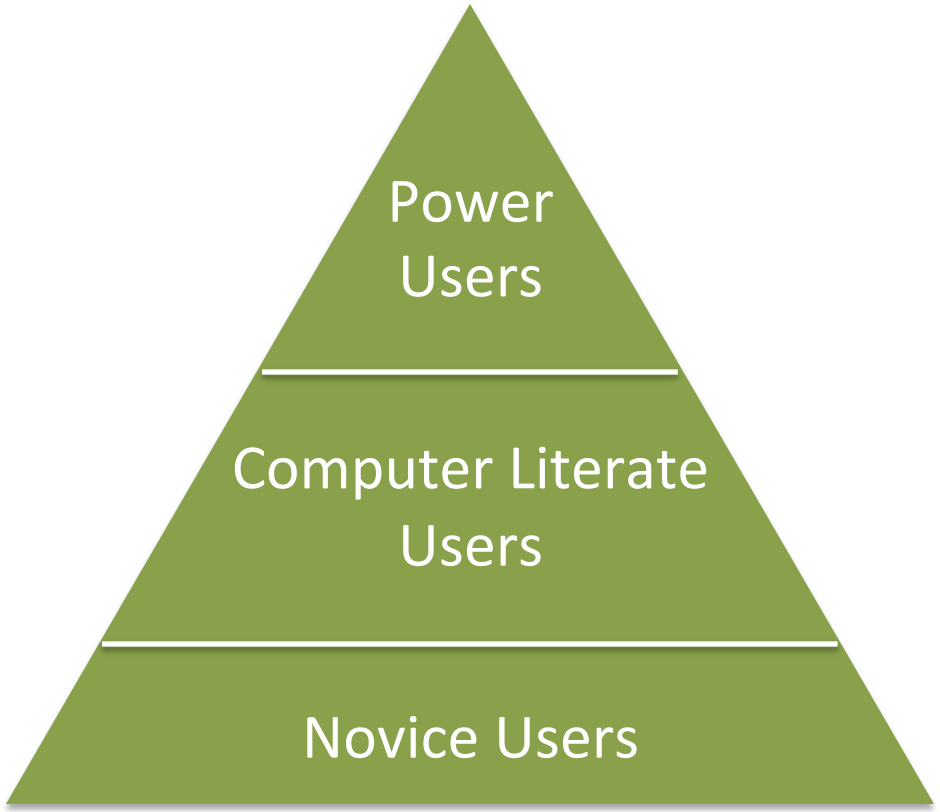
- More specific, more effective
- Give the person detail
- Give them a name
- Make it believable

# Microsoft Kin

*"Tia always wants to know what cool things her friends are up to"*

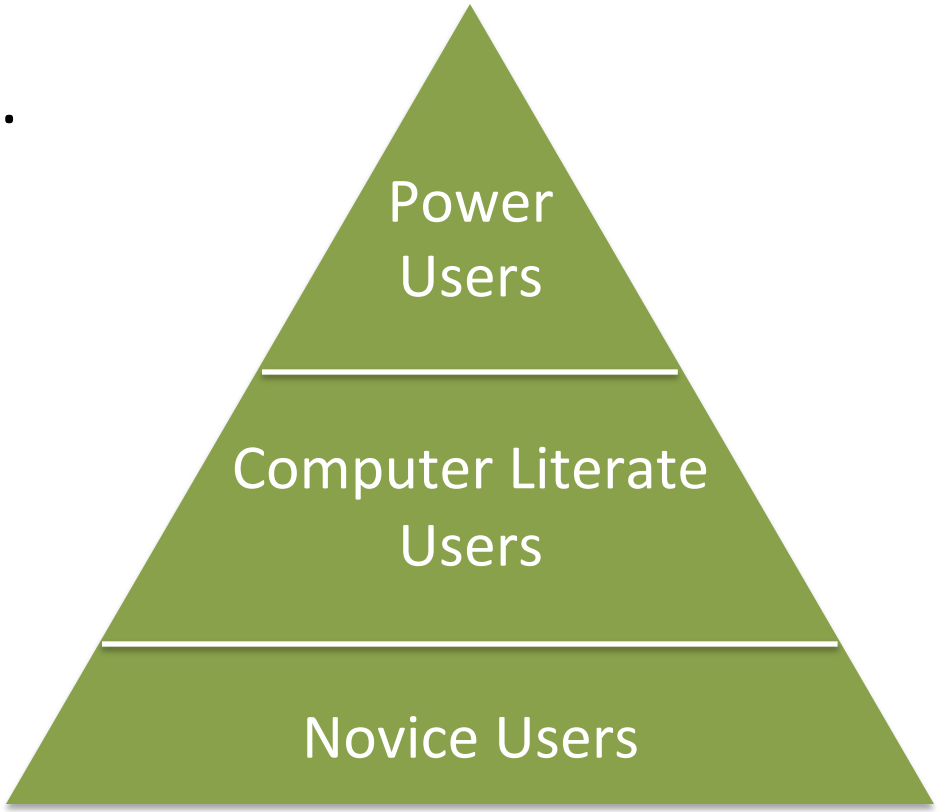
- 16 years old
- From La Jolla, CA
- Loves all things pink
- 2 sisters, Diana & Ashley
- Was Juliet in last year's school performance of "Romeo & Juliet"

# Types of users



# Types of users

"Elise is a 33-year-old accountant who uses Microsoft Excel every day. She likes to watch 'House of Cards' on her iPhone before bed, but has had trouble connecting her email to her phone. She goes hiking nearly every weekend."



# Designing with Personas

- Design to make the “primary” persona(s) happy

- Avoid design choices that make personas unhappy

# Why use Personas?

Thoroughly think about who is using your product

- Ensure the design is effective for those people
- Make the product and its impacts “real”

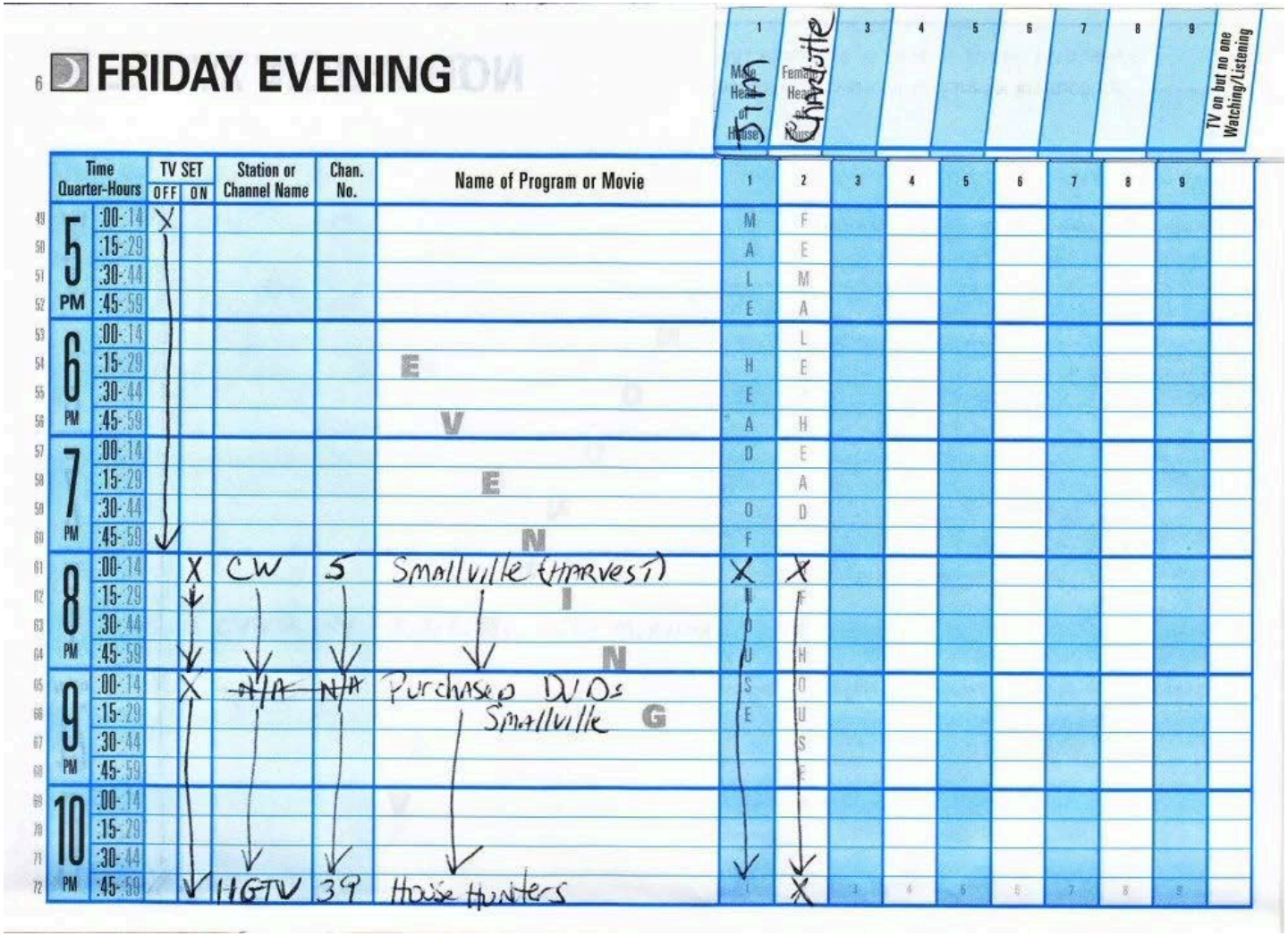
# Cultural Probes & Diary Studies

Self-Report Data

Minimal influence on actions

Event takes place over a long period of time

# Diary Study

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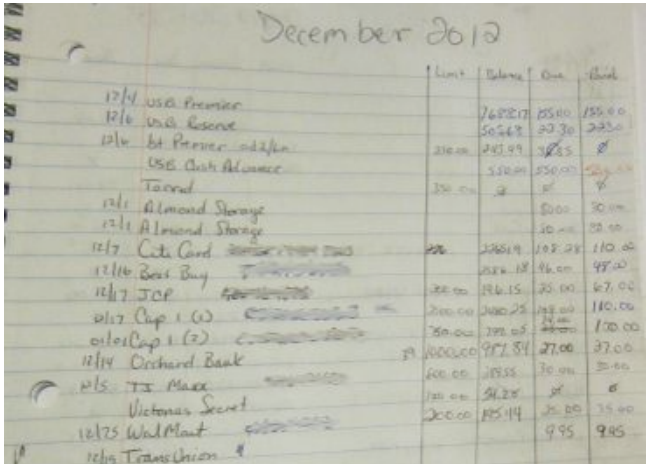
University of Washington

# Cultural Probe



Kaye et al. *Money Talks: Tracking Personal Finanaces*, CHI 2014

# Why use Diary Studies & Cultural Probes?

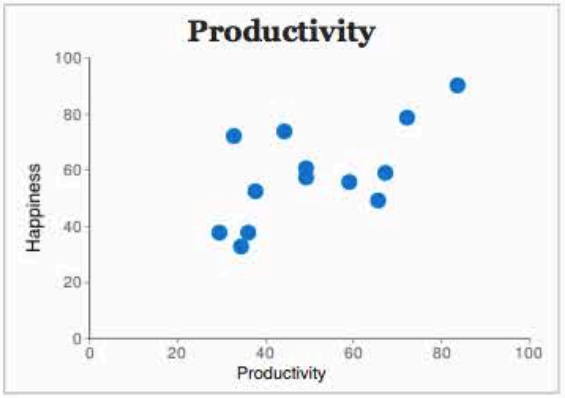
Learn about your [potential] user's habits

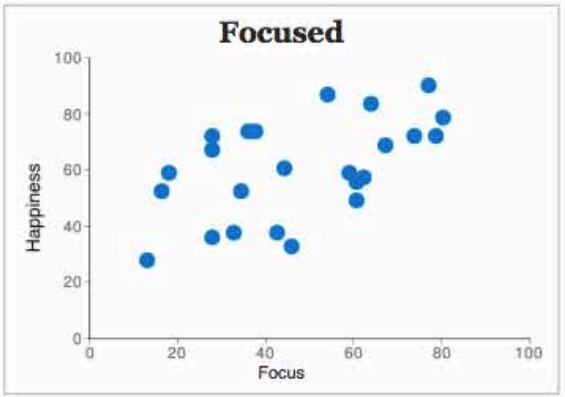
Artifacts reflect how people currently do something

- Contextual Inquiry with a record

# Experience Sampling Method

Carrier
3:21 AM
How do you feel right now? — Track Your Happ...
trackyourhappiness.org
Google
Track Your Happiness
How do you feel right now?
Very bad
Very good
Next


Productivity
Happiness
Productivity
0
20
40
60
80
100


Focused
Happiness
Focus
0
20
40
60
80
100

# Why use Experience Sampling?

Learn about your [potential] user's habits

Learn what influences these habits

Diary studies with prompting