HCI Bootcamp
29 October – 5 November 2017

Prof   Wendy Mackay   *mackay@lri.fr*

TA   Stacy Hsueh   *hsueh@lri.fr*
TA   Tong Xue   *tong.xuc@u-psud.fr*

web: *https://ex-situ.lri.fr/workshops/hci-bootcamp-2018*

Who is who?

Wendy Mackay Research Director	*mackay@lri.fr* professor
Stacy Hsueh Ph.D. student	*hsueh@lri.fr* teaching assistant
Tong Xue Ph.D. student	*tong.xue@u-psud.fr* teaching assistant
Nicolas Taffin Designer	*nicolas.taffin@inria.fr* recording

Welcome to Bootcamp!
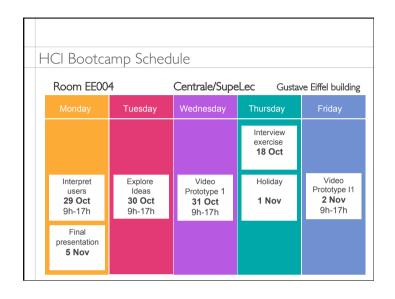

Surviving bootcamp

... and learning to be an interaction designer

• Don't argue — stop talking and do it!
• Work fast — sketch ideas, avoid perfection
• At least three alternatives, no more than 5
• Create, reflect and reuse design artifacts
• Take the user's perspective — not the technology's
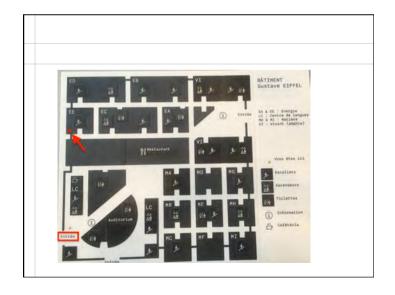
• Focus on the interaction !

Learning to observe *interaction*

To play the violin
    first learn to **hear** the music

To paint a portrait
    first learn to **see** a face

To design interactive systems
    first learn to **observe** interaction

HCI Bootcamp Schedule

Room EE004   Centrale/SupeLec   Gustave Eiffel building

Monday	Tuesday	Wednesday	Thursday	Friday
			Interview exercise **18 Oct**	
Interpret users **29 Oct** 9h-17h	Explore Ideas **30 Oct** 9h-17h	Video Prototype 1 **31 Oct** 9h-17h	Holiday **1 Nov**	Video Prototype I1 **2 Nov** 9h-17h
Final presentation **5 Nov**				

HCI Bootcamp: one *intense* week!!

Lectures   (in class)
    Some fundamentals & principles
    Complete design process

Design activities   (in class or at home)
    Individual, pair *and* group
    Each exercise builds upon previous results

Project   (in class and at home)
    Groups of 4
    Goal: produce a *grounded* video prototype

HCI Bootcamp project

Create a *video prototype* of a redesigned interactive map
that meets the needs of *real users in a real setting*

Work in groups of four

Attendance is critical!

Grades

Participation	40%	
Individual		interviews, introspection
Group		class & homework exercises
Video prototype #1	15%	
Final presentation &		
Video prototype #2	45%	

Two Story interviews   due: today

Individual activity:
Interview (at least) two people
using critical object technique
to generate (at least) two detailed, real stories

You should all have initial feedback.
You may revise them for credit.

Video prototype #1   due: Wednesday, 31 Oct

Use your interviews, web search, brainstorming, design
exercises to create a complete design

Be able to explain:
- Who is the user?
- What is the design concept?
- Which design resources did you use?
- How is it used?

Turn in:
Storyboard
Video prototype (5-7 minutes)

Video prototype #2   due: Friday, 2 Nov

Complete redesign of video prototype #1

Revise the design to address
    breakdowns
    new interaction points
    new design feature(s)

CAREFUL:
    Must show improvement from video prototype #1

Final presentation   due: Monday, 5 Nov

Group presentation   *15 minutes*
        design problem
        user profile
        design alternatives
        final design
        video prototype   (maximum 5 minutes)
        justification   (include improvements)

Class discussion   *5 minutes*
        Every group asks at least one question

Hand in: due: Monday, 5 Nov

Folders with unused materials
Ipads

Revised storyboard   #2
Video prototype (5-7 minutes)
Presentation slides

Course evaluations (anonymous)

User-oriented thinking

Good interaction design requires
    taking the user's perspective
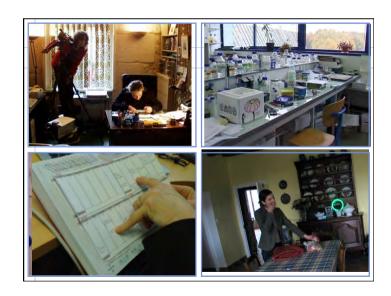
Who is the user?
What do they want to do?
What is the current context?

What about "designing the user experience"?
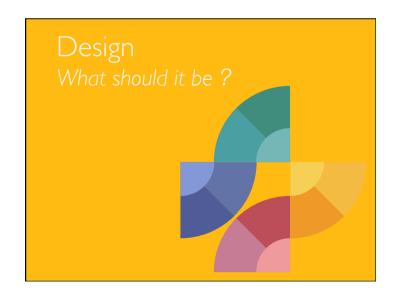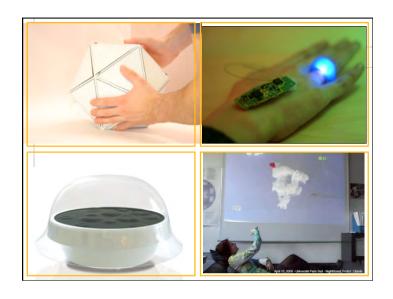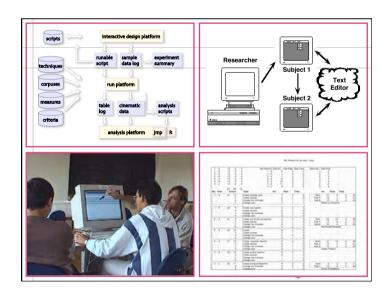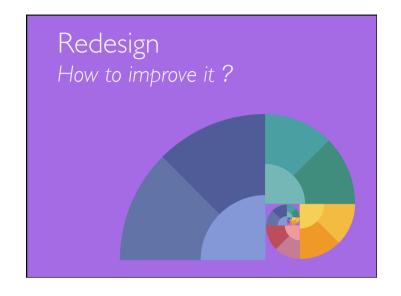   You can control part, but never all, of the user's experience

Discovery
Who is the user ?

Invention
What is possible ?

Design
What should it be ?

Evaluation
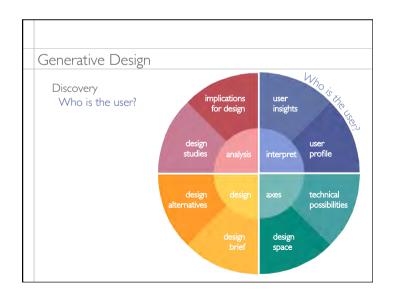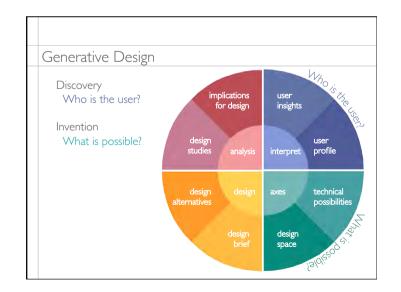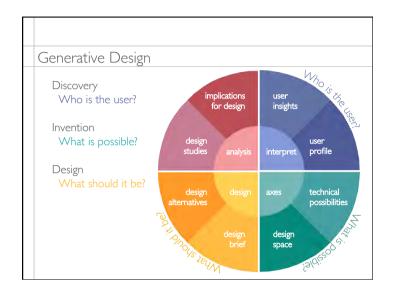*Does it work ?*

Redesign
How to improve it ?

There's method in this madness …

Though this be madness
Yet there is method in it …

Hamlet, by William Shakespeare

Generative Design

Discovery
   Who is the user?

Who is the user?

implications for design · user insights · design studies · analysis · interpret · user profile · design alternatives · design · axes · technical possibilities · design brief · design space

---

Generative Design

Discovery
   Who is the user?

Invention
   What is possible?

Who is the user?

What is possible?

implications for design · user insights · design studies · analysis · interpret · user profile · design alternatives · design · axes · technical possibilities · design brief · design space

---

Generative Design

Discovery
Who is the user?

Invention
What is possible?

Design
What should it be?

Generative Design

Discovery
Who is the user?

Invention
What is possible?

Design
What should it be?

Evaluation
Does it work?

Four interconnected phases

Each phase
contributes to
the other phases:

The process
is iterative

Jump from any phase
to any other phase
as needed

Generative Design

Each phase includes:

Collecting or sampling
information

Analyzing
information

Generating
design resources

Design is an iterative participatory process …

Design activities produce resources for design

If you create design resources, use them to help you design!

Design Brief
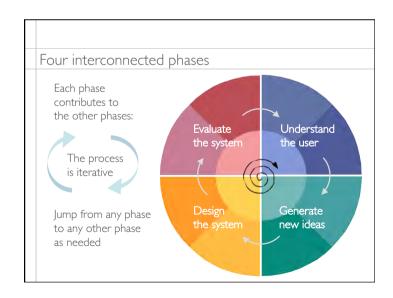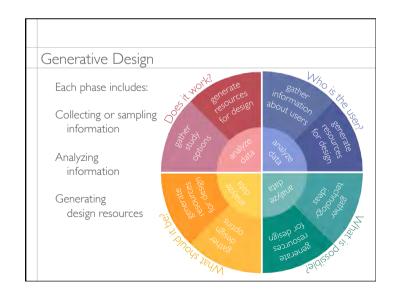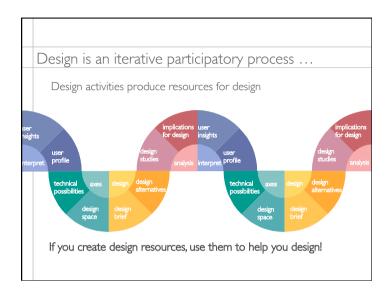

Design brief

Find a real group of users
   with a real-world problem* to solve

Listen to their stories
   What went wrong? What worked well?
   What surprised you?

Design a technology innovation to
   help these users in a particular setting

Start with a specific audience
   You can generalize later

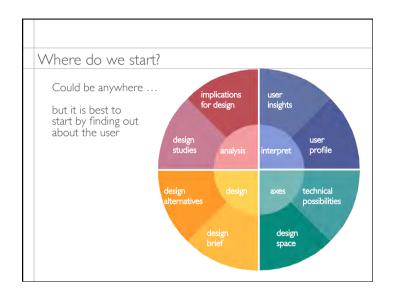   * including things like having fun

Design Brief: Map Redesign

Redesign Google Maps or other map app

Find examples of real user needs
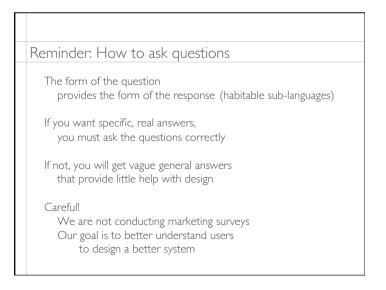   when using a map app on a phone

Create a new design that addresses a real problem
   and illustrate with a video prototype

Redesign the app using principles of instrumental interaction

Where do we start?

Could be anywhere …

but it is best to start by finding out about the user

implications for design

user insights

design studies

analysis

interpret

user profile

design alternatives

design

axes

technical possibilities

design brief

design space

Gather user data

Story Interviews

Reminder: How to ask questions

The form of the question
provides the form of the response (habitable sub-languages)

If you want specific, real answers,
you must ask the questions correctly

If not, you will get vague general answers
that provide little help with design

Careful!
We are not conducting marketing surveys
Our goal is to better understand users
to design a better system

Take advantage of human memory

Long-term memory is organized into two major categories
• declarative
• non-declarative

Declarative memory involves:
• semantic memory
  including facts & figures
• episodic memory
  including events, times

Non-declarative memory involves:
• procedural memory
  including skills & habits
• emotional responses
  can be primed

long-term memory
declarative memory
non-declarative memory
semantic memory
episodic memory
procedural memory (skills & habits) emotional responses priming
facts, figures
events, times

What does the interview give you?

Descriptions
    What does this technology look like?

Explanations
    How does this technology work?

Stories
    How did that user use that technology that time?

Data
    How many times did they use the technololgy?

Types of Interviews

Story interviews   Best for design
    Elicit real stories that include: user context,
    breakdowns, work arounds and user innovations

Tutorial interviews   Lacks breakdowns
    Describe how it is supposed to work,
    not how it actually works

Opinion interview   Lacks detail
    Highlights 'pain points', not very useful for design

How to ask questions

Careful!
To design better systems,
    you must understand how users interact
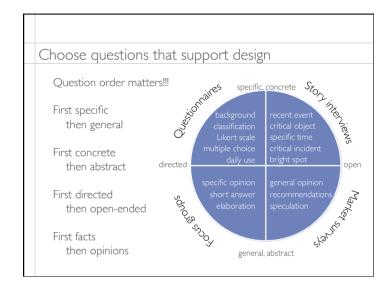   with technology
    in real-world situations

Good design interviews result in:
    concrete, specific *stories*
    NOT   opinions   (market surveys)
    NOT   tutorials   (how it is *supposed* to work)

Preserve context, identify breakdowns & patterns over time

Choose questions that support design

Question order matters!!!

First specific
  then general

First concrete
  then abstract

First directed
  then open-ended

First facts
  then opinions

Questionnaires   specific, concrete   *Story interviews*

background   recent event
classification   critical object
Likert scale   specific time
multiple choice   critical incident
daily use   bright spot

directed   open

specific opinion   general opinion
short answer   recommendations
elaboration   speculation

Focus groups   *Market surveys*

general, abstract

Story Interviews

Goal: Get a detailed story of interaction

Question types:
  Critical object   Describe how you made this

  Critical incident

    Flashbulb memory   Negative memorable event
    Bright spot   Positive memorable

  Recent event   Very recent event

Use as much context as you can to help people remember

Example: Asking questions about email

Bad question:
  How do you manage your email?

Why?

Example: Asking questions about email

Bad question:
  How do you manage your email?

Why?
  Leads to general statements and opinions
  Does not ask for a story

Example: Asking questions about email

Good question:
    Tell me about the last time you looked for a particular message.

Probe for more context:
    Why did you need it?
    Why couldn't you find it?

Probe for more detail about the interaction:
    What did you do first?
    How did the system respond?
    Was that OK?
    What did you do next?
    . . .

Story interview question types

Critical Incident question:
    Did you try to find a specific email in the past few days?
    Can you walk through exactly what you did to find it,
    step by step?

Critical object question:
    Do you have a draft message you have not sent?
    If it is not confidential, can you describe the steps
    you went through to write it and why it was not sent?

Recent event:
    Did you read mail this morning? (If yes …)
    Can you describe the process you went through?

Choose questions that support design

Question order matters!!!

First specific
    then general

First concrete
    then abstract

First directed
    then open-ended

First facts
    then opinions

Questionnaires — specific, concrete — Story interviews

background
classification
Likert scale
multiple choice
daily use

recent event
critical object
specific time
critical incident
bright spot

directed   open

specific opinion
short answer
elaboration

general opinion
recommendations
speculation

Focus groups   Market surveys

general, abstract

Questionnaire questions

Specific, directed

1. How many messages did you receive today? (count)
2. How many times did you read your mail yesterday?
3. Did you read every message?
4. How many messages did you delete without reading?
5.   Is this a typical day? If not, why not?

Marketing Survey questions

General, directed

1. What do you think of this email system?
2. Which preference settings do you use?
3. When do you prefer to use:
      email, telephone, face-to-face meetings?
4. How does this system compare to other systems?

Focus group questions

General, open

1. Describe how you use your email.
2. Describe how you classify your messages.
3. When do you prefer to use:
      email, telephone, face-to-face meetings?
4. Has the Information Lens changed how you communicate with your colleagues?

Choose questions that support design

Question order matters!!!

First specific
   then general

First concrete
   then abstract

First directed
   then open-ended

First facts
   then opinions

Questionnaires
Story interviews
specific, concrete
background
classification
Likert scale
multiple choice
daily use
recent event
critical object
specific time
critical incident
bright spot
directed
open
specific opinion
short answer
elaboration
general opinion
recommendations
speculation
Marketing survey
Focus Group
general, abstract

Remember

The form of the question provides the form of the response

If you want specific, destailed answers,
      ALWAYS start with a SPECIFIC, RECENT question
      NEVER START WITH A GENERAL QUESTION

      Avoid yes/no questions or short answers

      PROBE for details: What happened next
      Get them to TELL YOU THE STORY

Red flags:

If you hear these, change the interview!
>   Usually …
>   Sometimes …
>   Normally …
>   When I do this, …

YOU NEED TO SAVE THE INTERVIEW!!

Probe for a specific story,
NOT how they usually do things

Important!!

Good interviews that find real, surprising stories will
- make this course interesting and fun
- produce innovative ideas
- help you really learn and understand these techniques

Poor interviews that result in explanations will
- make this course frustrating
- producing boring, useless ideas
- not teach you much

THIS IS THE MOST IMPORTANT PART OF THE CLASS!!!

Interaction points

Interaction points

Miniature storyboards that describe interaction
between the user and the system
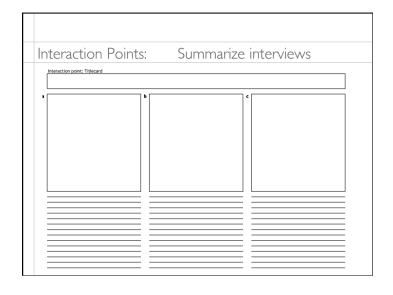
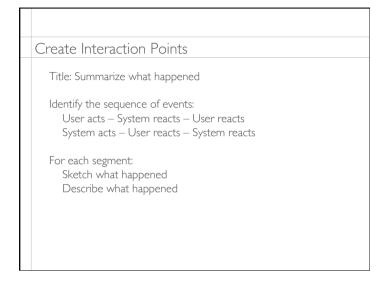Title: What does the user want to accomplish?

Sketches and descriptions   — or —
    What did the user do?   What did the system do?
    How did the system react   How did the user react?
    How did the user react?   How did the system react?

Focus on surprises:
    breakdowns, workarounds, user innovations

Interaction Points: Summarize interviews

Interaction point: Titlecard

Create Interaction Points

Title: Summarize what happened

Identify the sequence of events:
    User acts – System reacts – User reacts
    System acts – User reacts – System reacts

For each segment:
    Sketch what happened
    Describe what happened

Interaction Points: Summarize interviews

Interaction point: Titlecard

Describe what happened

Sketch: Sketch: Sketch:
What did user do?   How did system   How did user
                 react?   respond?

Describe: Describe: Describe:
What did user do?   How did system   How did user
                 react?   respond?

Discovery
Who is the user?

Peer Introspection

Introspection

The designer tries the system
    What works, what does not?
You can do this systematically:
    Begin with a clearly defined, real task
    Set aside a limited amount of time
    Make sure that you are not interrupted
    Begin the task
    Record while you talk aloud or take notes
Analyze what you did:
    Positive and negative aspects
    Surprises
    Ideas for making it better

Peer Introspection

Bring up google maps on your phone
Turn on screen recording if possible

Take notes
    Record each keystroke or command:
        What were you trying to accomplish?
        Did you find the command you were looking for?
        If so, were you able to use it successfully?
        If not, did you find an alternative?
Proceed, step-by-step, capturing as much detail about the
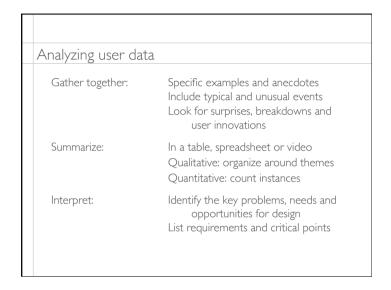   interaction as you can.

Don't forget…

Introspection is very, very common
    but is the technique most susceptible to errors

This is a *design* method
    but NOT a scientific research method

If you use introspection as part of a design process:
    follow a protocol
    do not forget that your opinions and experiences
        are rarely the same as those of other users
    seek insights and inspiration, rather than "truth"

Analysis

Analyzing user data

Gather together:	Specific examples and anecdotes
	Include typical and unusual events
	Look for surprises, breakdowns and user innovations
Summarize:	In a table, spreadsheet or video
	Qualitative: organize around themes
	Quantitative: count instances
Interpret:	Identify the key problems, needs and opportunities for design
	List requirements and critical points

Creating design resources

Once you have gathered information about users,
you must analyze it:
    Thematic Analysis

and create design artifacts :
    User profile
    Persona
    Extreme character
    Use scenario

To help you to choose and refine your design concept

Breakdown analysis

Thematic Analysis

Based on 'Grounded theory': Qualtiative data analysis technique
Emphasizes external validity (based on reality)

Coding	Identify the key points from the interviews and give each one a *code*
Concepts	Group codes with similar content
Categories	Create broad groups of similar concepts to generate a theory
Theory	Create explanations and testable hypotheses

We are primarily interested in steps one and two (in blue)
because our goal is to identify real-world opportunities for design.

Breakdown Analysis

Focus on identifying user problems and challenges
includes workarounds, that work and that do not work

Go through your data (interviews, interaction points)
Describe breakdowns in a phrase
Group them by category

Exercise: Breakdown Analysis

Roles:	Moderator	Scribe
Resources:	Interviews	Questionnaires
	Design Brief	Observation

Procedure: Reread the interviews and interaction points
Identify breakdowns: incidents where
   users need a better solution
Organize them into categories
Give each category a code name

Tips

Focus on *user* problems, not technologies
   - Not "no signal"
   - But "too many steps to get to goal"

   - Not "missing information"
   - But "mismatch between user's vocabulary
         and system vocabulary"

Use your own experiences and observations
   as well as the interviews

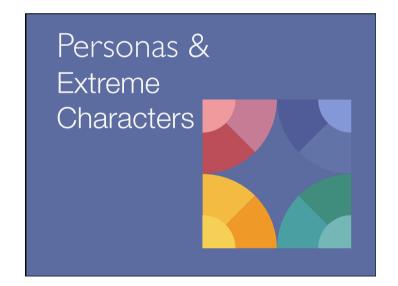## User Profile

---

User profile

Factual description of the needs and characteristics of
    the target group of users

Top-down analysis of the user population:
    Who is the audience for the system you are designing?
What did you discover from your studies of users?
    What are the key problems to solve?
    (Consider surprises, breakdowns and user innovations)
What are the user's most important, relevant characteristics?
    Use the thematic analysis categories you identified
Which of the users needs will you address?
    Forms the basis for the design your system

Exercise: User Profile

Roles: Moderator   Scribe
Resources: Interviews   Design Brief
                Thematic analysis categories

Procedure: Describe the characteristics of these users
                    Age? Profession? Gender? Country?
                    Specific problem they face
                Consider how they solve the problem now
                    and how they address it

Personas & Extreme Characters

Persona

Personal details: Name, age, gender
                     Physical description
                     Occupation, relevant activities
                     Representative or Extreme user?

Personality: Describe the person with design-relevant details
                         Likes, dislikes?
                         Capabilities, weaknesses?
                         Unusual characterstics?

Activities: Typical, breakdowns, user innovations

Identify the relationship with real users interviewed or observed.

Extreme character

Identify people who are extreme
    along one or more dimensions:

Normal hands	→ Arthritic hands
Takes vitamins	→ Cancer patient
Exercises regularly	→ Athelete
Adult	→ Child

It is useful to brainstorm ideas about what it means
    to be extreme in the context for which you are
    designing, even if you do not end up using such
    extreme characters.

Exercise: Persona / Extreme character

Roles: Moderator   Scribe
Resources: Interview   User Profile

Procedure: Create two personas
              Create one extreme character

For each: Name
              Personal characteristics
              Situation

Creating design resources

Goal: Ground the system design in real-world use

1. User profile
   Description of the needs and characteristics of users

2. Persona or extreme character
   A specific, imaginary person who represents a member of the user population.
   Normally, personas represent 'typical' users. However, it is sometimes useful to
   create *extreme characters* to help you push the limites of the design.

3. Use Scenario
   A realistic description of a series of events and activities of one or more users
   (personas) in a real-world setting. Scenarios provide a composite view of the
   most important or relevant actions identified in interviews and observation.

Use Scenario

Use Scenario

Goal: Create a realistic description of the user in context
        emphasizing opportunities for design

Procedure
    Identify specific *interaction points* from multiple users
    based on your interviews, introspection, observations, etc.
    Include: normal and unusual situations
            planned and unplanned activities
            effective and problematic incidents
    Choose a specific day, setting and hypothetical, realistic user
    Tell a story, step-by-step of what the user does
            include relevant detail in a series of *interaction points*
    Ideally, go over the scenario with at least two users

Writing a use scenario

Design resource:
    Data you have collected about users

Raw data you gather yourself:
    Observation of people in real-world situations
    Interview stories about actual user experiences
    Introspection stories (if applicable)
Data from other sources:
    Research literature
Base later modifications on design resources you
    Analysis of user characteristics and needs
    Design brief / design requirements
    Personas and extreme characters

Use scenario: What happens now

Like a tiny, branching one-act play,
    sub-divided into one-paragraph micro scenes
    that describe a series of 'interaction points'

Create one or more personas (characters), each with:
    name, age, gender, motivation
    usually with a profession, expertise
    usually with a goal or motivation

Create one or more realistic setting(s):
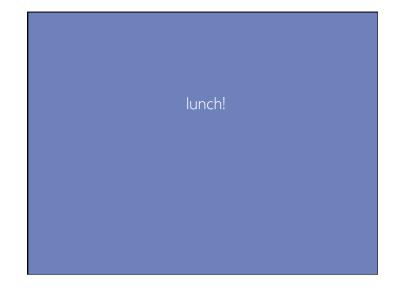   date, time, place, context

Assemble the interaction points into a coherent story,
    a series of events over a period of time

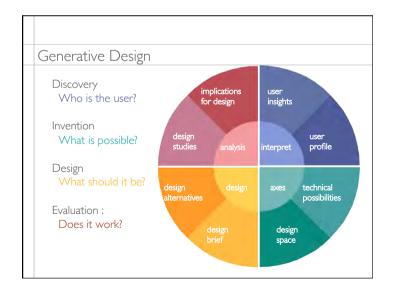## Exercise: Use Scenario

Resources: Breakdown analysis categories
               Personas   Interaction points

Procedure: Choose relevant personas
               Choose category
               Identify a series of 'interaction points'
                   to make one coherent story
               Animate the personas to show
                   how they currently address the problem

All three personas must fit into one story

---

lunch!

Generative Design

Discovery
   Who is the user?

Invention
   What is possible?

Design
   What should it be?

Evaluation :
   Does it work?

implications for design
user insights
design studies
analysis
interpret
user profile
design alternatives
design
axes
technical possibilities
design brief
design space

Goal: Create a Design Concept

Base your design concept on
   - the user profile, grounded in your interviews
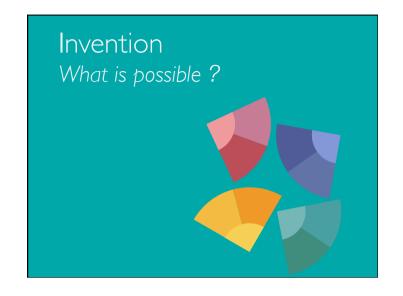
"Animate" your personas to
   - walk through the use scenario
   - push the limits with your personas / extreme characters

Create a design scenario
   - choose your favorite video brainstormed ideas
   - illustrate what happens at each interaction point
   - create a sequence of events in the storyboard
Friday:
   - shoot a video prototype to illustrate the concept in context

Invention
What is possible ?

How do you find the design concept?

Based on your studies of users
    choose a problem to solve
        specific to your audience.

Generate a variety of ideas
    that offer potential solutions

Create a design space to
    embody the set of alternatives

Choose a concept to explore
    not just functionality, but also *interaction*

Invention
Standard
Brainstorming

Generate new ideas

Brainstorming:
    Imagine different situations in which users
    might interact with technology in a new way
    that meets a need or helps them do something new

Focus on interaction in context
    not just a list of functions

Standard brainstorming rules

Phase I
    Generate the maximum quantity of ideas
    Everyone participates
    Record every idea
        … and everyone contributes at least one stupid idea

Phase II
    Reread all the ideas
    Everyone has three votes: mark your favorite ideas
    Rank the ideas according to the number of votes
    Discuss these ideas with respect to your design concept
        Don't forget weird or unusual ideas

Brainstorming

Do not:	*Instead:*
Discuss ideas	Just state each idea
Criticize ideas	Just ask a question to clarify
Argue why an idea is good/bad	Move to the next idea
Ignore each other's ideas	Use them to create new ones
Shift topics	Stick to the key topic
Jump to abstractions	Keep it specific
Get stuck	Think orthogonally

Opposites Technique

If you get stuck, push existing ideas in new directions

Opposites:
simple	complex	
short	long	
direct	indirect	
good	bad	
text	graphic	haptic
funny	serious	
process	objet	
start	end	
single	sequence	

Exercise : Standard brainstorming

Each group:
    Moderator: Ensures that everyone participates
                Stops discussions and critiques,
                Keeps the time
    Scribe: Writes every idea
                Reads the ideas at the end

Remember:
    Generate the maximum number of ideas
        without evaluating them
    Quantity is more important than quality
    Everyone must participate
    Everyone has to give at least one 'stupid' idea

Invention
Video
Brainstorming

How to express interaction?

Text:	explain an idea in words	(Standard brainstorming)
Sketch:	draw to illustrate an idea	(Standard brainstorming)
Mockups:	interact with paper prototypes	(Rapid prototyping)
Theater:	Act out the idea	(Rehearse brainstorming)
Video:	Capture interaction details	(Video brainstorming)

Video brainstorming

Goal: Capture the interaction between the user and the
        system being designed

For each idea:
   Choose a director who has complete control over:
      Describing and illustrating the idea
      Recording the idea
      Assigning roles
   Scribe: fills out video title card and idea list, keeps materials
   Camera person: videos the title card and the action
   Makers: create the paper prototype
   Actors (talent): perform the interaction, record voice-overs

---

Exercise : Video brainstorming

Goals: Capture as many ideas as possible
        Illustrate the interaction: show the user's experience

Explore a theme and variations
Only one director per idea
Do not waste time arguing,
   the director decides
If you disagree,
   be the director for take 2
Each idea is short:
   NOT scenarios
Use post-its, transparencies …

In other words,
Shut up and start shooting!

Invention
Websearch

Homework exercise: Web search

Each person:
Find 10 examples of exisiting technologies
that are relevant to your design problem

Look for alternatives:
Which technologies?
Which interaction techniques?
Which metaphors?
Which use settings?

Bring to class Tuesday morning

Video
Clipper