# Design and Evaluation of Interactive Systems

**Designing your system (Phase III)**

Anastasia Bezerianos

in|situ| lab, INRIA & Univ Paris-Sud
8 January 2014

**lectures adapted from Wendy E. Mackay**

Homework due today
8 January 2013

midterm evaluation (content adjusted)

1. *Individual:* Interview, web search

2. *Group:* Executive summary PDF (5 pages max) to describe:
Who is the audience of your system? (User Profile)
What is the design concept?
Initial design scenario
NO Storyboard: will do in class in January

Keep in mind you will need to hand in all exercises done in class at the end of the class. Prepare for it during the holidays …

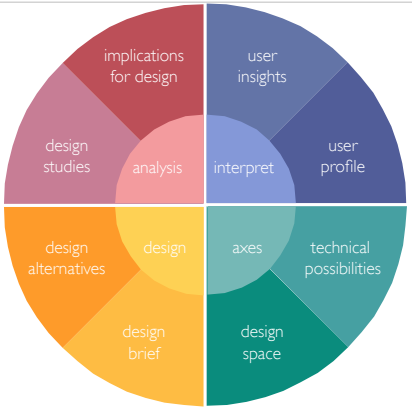
## Generative Design

Discovery
Who is the user?

Invention
What is possible?

Design
What should it be?

Evaluation :
Does it work?



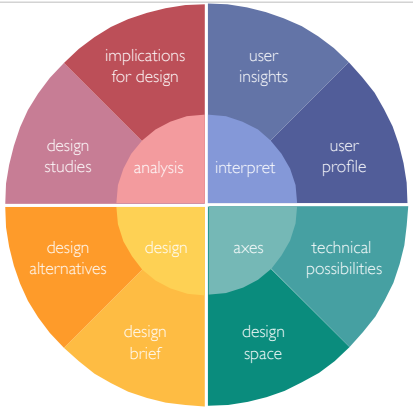

## Generative Design

Discovery
Who is the user?

Invention
What is possible?

Design
What should it be?

Evaluation :
Does it work?

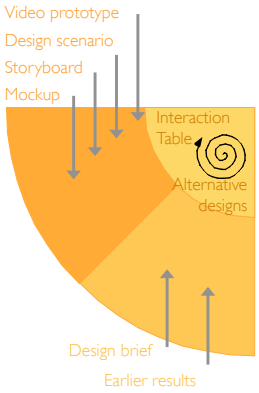


## Design: What should it be?

Collect or sample information
- Design brief
- + results from earlier phases

Analyze information
- Interaction table
- Alternative designs

Create resources for design
- Design scenario
- Storyboard
- Mockup
- Video prototype




## Remember there are many methods!

| Understand the user | Analyze the user | Invent new ideas | Prototype the system | Evaluate the system | Redesign the system |
|---|---|---|---|---|---|
| "Fly-on-the-wall observation (Ethnography) | Interactive Thread (HCI) | Oral brainstorming (Psychology) | Paper prototyping (Participatory Design) | Focus group (Marketing) | Generative Walkthrough (HCI) |
| Critical incident interview (Human Factors) | Contextual Inquiry (Anthropology) | Design space (Design) | Video prototyping (Participatory Design) | Usability study (Human Factors) | Technology probe (Design/Arts) |
| Questionaire (Sociology) | Task analysis (Human Factors) | Sketching (Design/Arts) | Wizard of Oz (Human Factors) | Design Heuristics (HCI) | Design Rationale (HCI) |
| Cultural probe (Design/Arts) | Scenario analysis (Activity Theory) | Video brainstorming (Participatory Design) | Software simulation (Computer science) | Design walkthrough (Psychology) | |
| Grounded Theory (Cognitive Psychology) | Protocol analysis (Cognitive Psychology) | Design room (Design/Arts) | Design scenario (HCI) | Design Critique (Crit) (Design/Arts) | |

## Different Types of Scenarios

Different types of scenarios

All scenarios tell a step-by-step story that illustrates how people interact with technology in a real-world setting

Use scenario: focus on what is now
- Draws from real-world observation of people who face challenges that a new technology might address

Design scenario: focus on what could be
- Builds upon use scenario and speculates how these people would interact with your new technology, in this setting

## Edit your existing use scenario

Ensure that it is written like a tiny one-act play,
- sub-divided into one-paragraph micro scenes
- that describe a series of 'interaction points'

Include 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

Identify a series of events over a period of time

## Revise it to create a design scenario

Think about your design concept, including the alternatives
and the function-interaction table

Go through each interaction point:
what does the user see (or hear)?
what does the user do?
what does your system do?

Remember, tell a story, step-by-step, about how your
personas will interact with your new system.

Use the process to help you define the details of your system

## Scenarios: what to do

Create a theme ... and variations
to explore alternatives

Balance both 'normal' and unusual situtions
especially breakdowns and errors
(... and normal is rarely normal)

Consider external events that affect interaction
as well as motivated action by the user

Include patterns of interaction over time
including repetitions and wasted effort

Highlight surprises

## Scenarios: what NOT to do

Avoid 'selling' the technology
Explore options rather than one solution

Avoid irrelevant detail
Focus on interaction, not users' personal lives

Avoid flowery description
Stick to the facts

Avoid humor (or not, up to you)
Difficult to do well
Often distracting

## Exercise: Create a design scenario

Create a realistic account,
ideally grounded in real-world observation of users,
of a series of activities that serve to
illustrate and challenge the use of a new technology

Goal: to help you think through interaction issues
NOT to 'sell' the prototype

Techniques:
Extreme users
Theme and variations
Breakdowns

## Exercise: Design scenario

Include:

| | |
|---|---|
| Title: | Event or technology being designed |
| Who? | Characteristics: name, sex, age, profession, ... |
| What? | Event that sparks the story |
| Where? | Location |
| When? | Date, time |
| Motivation: | Why is this happening? |
| Situation: | Relevant detail to aid understanding |
| Story: | Paragraph-by-paragraph description of who does what and why. |

## Prototyping interaction

Design scenario
- Imagine the system from the user's perspective

Wizard of Oz
- Simulate the system live
- with a human operator 'behind the curtain'

Video Prototype
- Illustrate the use of the system in context
- "sketch" dynamic, interactive user experiences

Simulation
- Create a working subset of the system

## What is a prototype?

Prototype =
- concrete representation of an interactive system

Characteristics

| | | |
|---|---|---|
| Representation: | form of prototype | *sketches - simulation* |
| Precision: | level of detail | *informal – complete* |
| Interactivity: | interaction | *watch – interact* |
| Evolution: | lifecycle of prototype | *throw out - iterative* |

The choice of prototype depends upon the
- design phase and the specific needs of the designers

## Prototyping helps you ...

Consider different design alternatives

Ensure usability under diverse conditions

Help users and other stakeholders imagine the interface

Focus on problematic parts of the interface

## Rapid prototypes

Goal: Design the interface as rapidly as possible
to explore ideas

Materials:
- Paper (while, colored, transparencies, post-its)
- Colored pens and markers
- Tape, glue, scissors, cutters
- Foam, cardboard, etc.

Show how a user will interact with the device you are designing

## Representation

Paper prototypes
- Easy and fast to create and to throw away
- Most useful at the beginning of the design process
  - examples: sketches for an idea for an icon,
    storyboard sequences,
    mockups of screens,
    video prototypes of a complex interaction

On-line prototypes
- Use the computer, longer to create, more polished
- More appropriate later in the design process
  - examples: animations, interactive videos,
    interface builders

## Precision

Lo fidelity (lofi) prototypes with little detail
- Great for rapid exploration of ideas
  - *example: paper sketches, SILK*

High fidelity (hifi) prototypes, very detailed
- Good to communicate specific design considerations
  - *example: dialog box with layout alternatives*

Note: A detailed representation is not always precise
- It is possible to omit aspects that have not yet been decided

## Details

A system can be good in theory
- but unusable in practice
- because of flaws in the interface ... even small ones

Good prototypes let designers work with
- different sets of details at the same time

Good prototypes allow users to envision
- the final system:
- but also to feel comfortable suggesting changes

## Level of Interactivity

Non-interactive (fixed)
No interaction, but can show potential interaction
*example: a video clip showing user interacting with a device*

Low interaction (pre-determined path)
Can test several alternative forms of interaction
*example: designer shows a screen shot, user indicates her action, the designer shows the result*

High interaction (open)
Users interacts with the system, with some limitations
*example: Wizard of Oz or computer-based simulation*

## Wizard of Oz

Technique for prototyping
novel user interfaces

Wizard of Oz:
Designer 'plays computer'
to create an interactive
experience for the user

Useful for creating video prototypes
but also for creating live experiences
that rapidly explore different design
alternatives

## Evolution

Rapid prototypes: Early exploration of diverse alternatives
Easy to create, check, throw away afterwards
*example: paper prototype or interface like SILK*

Iterative prototypes: create individual modules
Create successively more refined versions
*example: series of prototypes, successively more detailed*

Evolving prototypes: may become the final product
Different completed sections are successively added
*example: a software module has functionality added before being added to the final system*

## Prototyping strategies

Horizontal: complete one layer of functionality at a time
*example: develop the interface details without a working database*

Vertical: complete functionality of part of the system
*example: develop the spelling checker fiirst*

Task: create functionality necessary for a single task
*example: develop the interface for adding and editing an image*

Scenario : create functionality needed to run a scenario
*example: develop the functions needed to edit three images and spell- check a document within a design scenario*

Beaudouin-Lafon and Mackay (2007) Prototyping Tools and Techniques

## Design Scenarios lead to storyboards

| | |
|---|---|
| Title: | What is the name of your system? (you may use a subtitle too) |
| Who? | Personas: name, sex, age, profession, ... |
| Where? | Location |
| When? | Date, time |
| Motivation: | Why is this happening? |
| Situation: | Relevant detail to aid understanding |
| Story: | Paragraph-by-paragraph description of who does what and why, from one interaction point to the next |

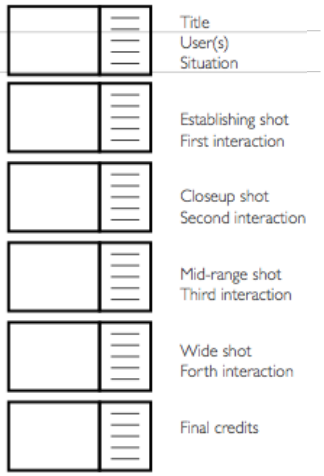
## Regular storyboard

Identify key interaction points in the scenario

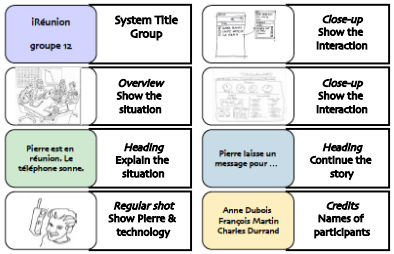
Examine the key ideas from the design space (brainstormed ideas)

Illustrate the interaction between user and novel system

Describe key issues on the right

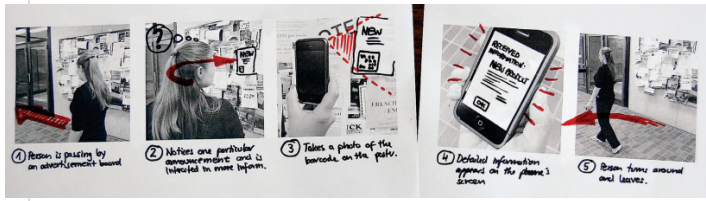



## Storyboard structure




*From Wendy Mackay*

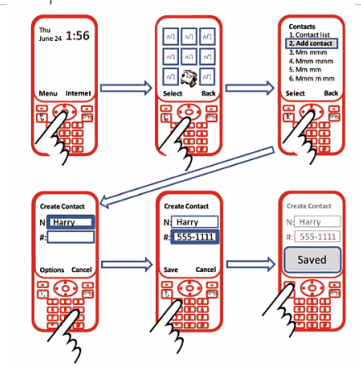
## another example




this one focuses on a complete interaction

http://grouplab.cpsc.ucalgary.ca/grouplab/uploads/Publications/Publications/2012-NarrativeStoryboard.Interactions.pdf

## another example




this one focuses on detailed interaction sequences

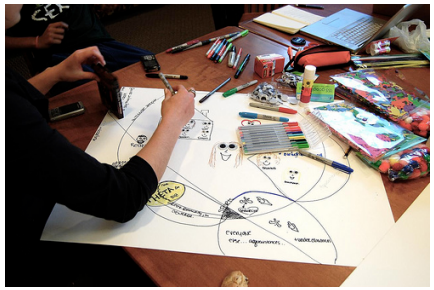
from the book "Sketching User Experiences: The Workbook"

## In-class Exercise

Storyboard
60 min

## Prototyping

Next we will turn our storyboard to a prototype



## Video prototyping

Goal:

- Provide more detail on the interaction with the designed system
- Finalize details
- See if things do not work well in sequence
- Explore interesting alternatives (if you have more than one ideas for specific interactions)
- Demonstrate what the final interface could look like in order to get feedback

## Video prototyping

Procedure:
- Begin with existing design scenario and storyboard
- Shoot your storyboard in sequence
- Use "Wizard of OZ" to show ideas
- Shoot a title card for the video at least 15sec
- Use also if you have multiple sequences
  (sequence 1,2,3 … – take 1,2,3 …)

The goal is to share this with others, so quality maters!

Roles: Cameraman, a director, if needed narrator, makers, actors

## Video prototyping

Remember:
- keep camera stable (hold against your body)
- 3 - 2 - (1)
- practice and reshoot
- use "take" cards in same color for every scene you reshoot
- use stop-motion, projectors, transparencies, etc. for effects

Observations from other video sessions:
- Too much talking over
- Camera position, or item position changed
- "helper hands" visible

## In-class Exercise

## Video Prototype
## 60 min