Design and Evaluation of Interactive Systems

Redesign (Phase V)

Anastasia Bezerianos
Wendy E. Mackay

in|situ| lab, INRIA & U. Paris-Sud
31 January 2014

Remember: Final project presentation (12/02)

Oral presentation
- 15 minutes:
  - (why) design problem
  - (who) user profile
  - (what) final design: concept and details
  - video prototype (maximum 5 minutes)
  - justification and improvements (4 improvements in from this week as a storyboard)
  - future work
- 5 minutes:
  - class discussion: every group asks at least one question

Also due: video prototype, transparencies, final storyboard
Also due: all exercises from the course

Remember: Final report (due on 14 Fev THE LATEST by email)

Executive summary of your project
- 10 pages maximum

Potential users:
- who are they? (refer to your data)
- what do they need?

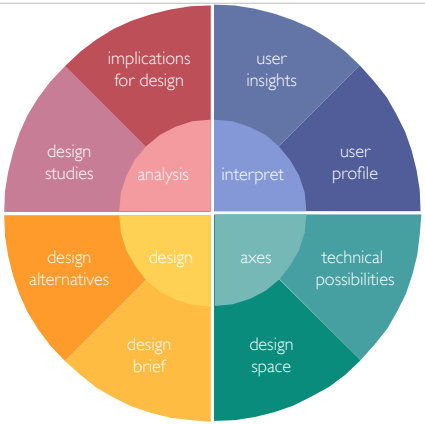
Design concept:
- what is the design concept?
- why is this a good solution? (avoid marketing! use data)

Discuss at least one design choice you made,
- include evaluation feedback for your decision (from class)

Next steps for re-design (from today and evaluation), include both the ones you did and the ones you'd like to do

Generative Design

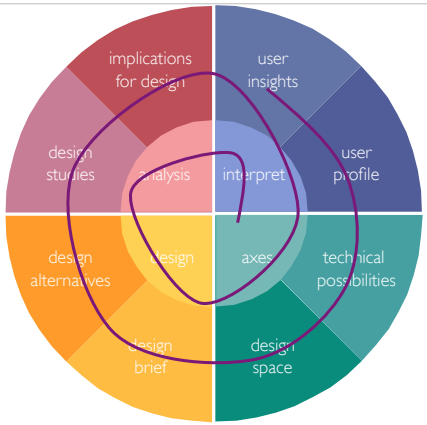
Discovery
Who is the user?
Invention
What is possible?
Design
What should it be?
Evaluation
Does it work?



Generative Design

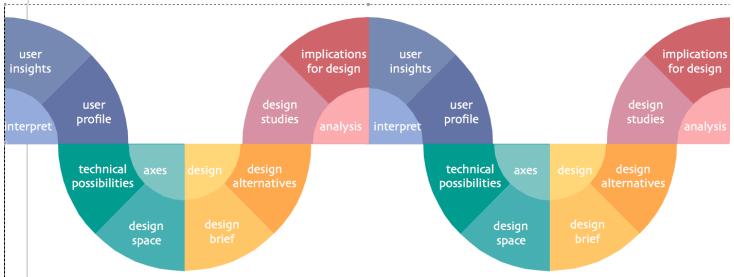
Discovery
Who is the user?
Invention
What is possible?
Design
What should it be?
Evaluation
Does it work?

Redesign
How to improve it?



Design is an iterative process

Create design artifacts that serve as resources for design



Redesign

Re-examine the resources for design:
specifications, results of each phase

Lecture: Redesign of system
Socio-technical principles

Class exercises today:
Generative walkthrough
Breakdowns
+ Chosen Improvements from evaluation from before
=> Revisit and redesign Storyboard (video for extra marks)

Homework:
Finish the new storyboard (ready to shoot), at least 3 redesigns
Final Presentation: slides, final storyboard,
final video prototype for extra marks

Multi-disciplinary Design 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	Branching storyboard — Design/HCI
Grounded Theory — Cognitive Psychology	Protocol analysis — Cognitive Psychology	Design room — Design/Arts	Design scenario — HCI	Design crit — Design/Arts	Participatory workshop — Design/HCI

Multi-disciplinary Design Methods

These design techniques are *derived* from
Human-Computer Interaction disciplines

No individual technique is best
nor can it stand alone

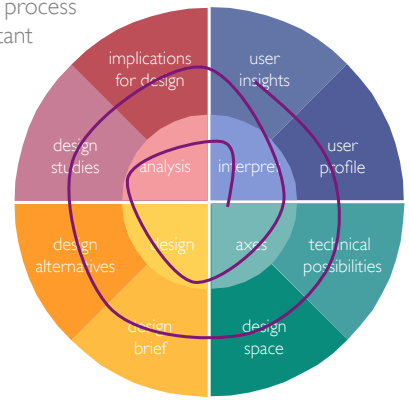
All have advantages and disadvantages,
each is influenced by the norms of the parent discipline

We can choose from among these techniques and
modify them as needed
or create our own

Iterative design means redesign

Within the iterative design process
redesign is more important
than design

do not just
"do it again!"
reflect on your designs
in context



Redesign

Evaluation and analysis:
go back to your users
does your system solve problems of the user?
what are the problems that remain?

Generate alternatives for our design, as follows:
the results of experiments and walkthroughs (user feedback)
any other design and evaluation principles
the functional / interaction table (things you have not done)
+ use what we learn today

Warning: It is easy to introduce new problems

What are socio-technical principles?

Social scientists conduct extensive field studies
and provide deep insights in the form of
socio-technical principles
about how people interact with technology in context

But
it is difficult to translate these principles
into specific designs

Implications for design

Dourish argues that
we should not force social scientists
to generalize from specific field studies to create general
implications for design

but

We CAN bring social science insights
to bear on specific design artifacts
to enhance and explore the design space

Examples: Socio-technical Principles

Rhythms and Routines *identify use patterns*	Build upon routine activities and spatial patterns; Users integrate systems into their daily lives
Peripheral awareness *design the periphery*	Design for both focus and periphery; Users vary degree of engagement
Situated Action *beyond planning*	Go beyond planned activities; Users decide how to act in unforeseen circumstances
Distributed cognition "outside *the head*"	Let objects and other people reduce cognitive load for memory or communication tasks
Co-adaptive systems *re-interpret use*	Expect users to re-interpret and customize; Enable capture and sharing of customizations

Generative deconstruction

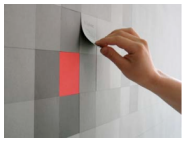
Purpose: To analyze the problems and improve the system

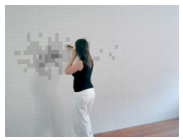
Principles to help redesign (in another way):
Social science can help us to consider several aspects of
design from the user's perspective

The socio-technical principles can expand and improve
your design space + targeted brainstorming

Example: Reflections on Post-Its

What is it?
How are they used?
What are the important properties?
Why do they work?





Rhythms and Routines

In everyday life:
people are influenced by external rhythms:
the sun rises, the night falls, days pass
which create their biological rhythms
when to eat, when to sleep

people also establish routines
eat, sleep, go to work every day
perform activities in certain places

How can we take this into account when designing interactive systems?

Rhythms and Routines

Ralph took a call from his son's best friend, Tara.

He wrote a message on a post-it note and left it at his son's place at the dinner table.

Temporal rhythm:
Ralph knows his son will come home at dinnertime
Spatial routine:
Ralph know his son's place at the table

Rhythms and Routines

1. What is Ralph's problem?
2. How does he use the post-it note to solve the problem?
3. Explain why this is an example of *rhythms and routines.*

Rhythms and Routines

Mary places her pills next to the coffee maker to remind her to take her pill every morning.

1. What is Mary's problem?
2. How does he use location to solve the problem?
3. Explain why this is an example of *rhythms and routines.*

Rhythms and Routines

What properties make it work?

a. What biological rhythms influence people?
(temporal rhythms)

b. What spatial layouts help people find things?
(spatial routines)

c. What routines occur on a regular basis
at home? at work? in the car?

Apply this principle to your scenario.

Peripheral awareness

Human perception involves both
focus and periphery

Example: Vision
Central vision: you see color, detail
Peripheral vision: you see black & white, movement

Most interactive system designers assume
they have the user's full attention
... but users multi-task and live in a complex world

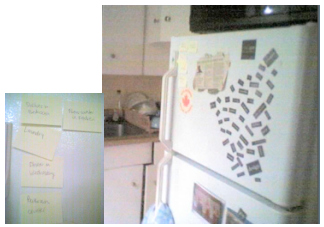
How can we design for what happens in the periphery?

Peripheral awareness

Paul puts his chores on post-it notes on the fridge. He doesn't look at them all the time, but when he has the sense that it's "too yellow", he knows it's time to stop procrastinating.

Focused attention:
Paul can read the note
when he's ready to act

Peripheral awareness:
Paul senses when the fridge
is 'yellow' and he should act



Peripheral awareness

1. What is Paul's problem?
2. How does he use the post-it note to solve the problem?
3. Explain why this is an example of peripheral awareness.

Peripheral awareness

What properties make it work?

a. What happens when Paul does not pay much attention?

b. What happens when Paul is actively engaged in a task?

c. How does Paul transition between levels of attention?

d. What tasks are appropriate for what types of awareness?

Apply this principle to your scenario

Situated and planned action

We can plan our activities
but we always act within a real-world context

How can we take context into account?
What about interruptions? Breakdowns?

How can we give users the ability to change their plans at any moment?

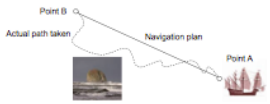
Situated and planned action

a. What actions emerge when the user is in a specific situation?
(Emergent *action*)

b. What objects are physically next to each other?
(Co-located *artifacts*)

c. What are useful properties of the physical objects involved?

d. What are useful properties of the surrounding environment?



Situated action

Sandy knows that she needs to meet with Fred this week, but doesn't know exactly when. This post-it note is stuck to her calendar, in no particular spot. It acts as a reminder that she plans to talk to Fred, but she still needs to specify the precise time.

Emergent action:
Sandy knows that the dates may change, her system is flexible

Co-localisation of artifacts:
Sandy knows that when she next looks at the calendar, she'll see the post-it.

Situated action

1. What is Sandy's problem?
2. How does she use the post-it note to solve the problem?
3. Explain why this is an example of situated action.

Situated action

What properties make it work?

a. What does Sandy do in what specific situation? (emergent *action*)

b. What objects are physically next to each other? (co-located *artifacts*)

c. What are useful properties of the physical objects involved?

d. What are useful properties of the surrounding environment?

Apply this principle to your scenario

Distributed cognition

Physical objects are part of our memory
it is not necessary to memorize everything

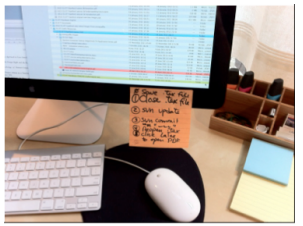
Objects can be shared among people
but they are not interpreted the same way by everyone

Distributed cognition

Mary shares her computer with her husband, Dan.
Dan leaves a post-it on the screen that explains how to do several tasks they do often

Memory Aid:
The post-it helps Mary and Dan to forget the details: they know where to find them on the post-its

Boundary object:
Mary and Dan may use the same post-it differently



Distributed cognition

Distributed cognition

What properties make it work?

a. What objects in Dan's environment aid his memory?

b. What properties of post-it notes help support distributed cognition?

c. How will other people interpret this post-it note? *(boundary objects)*

d. What is the division of processing between Dan and the computer?

Apply this principle to your scenario

Co-adaptive systems

Ann gets a business card and is afraid to lose it
so she uses a post-it note to attach it to her agenda

System adaptation:
Ann understands the properties
of post-it notes and
uses them for a new purpose

Co-adaptive systems

a. What does the user need to learn to use the system?

b. What elements of the system can be left 'open' to interpretation by the user?

c. How can the system be explicitly customized?

d. How can customizations be shared?

e. How can customizations apply in different situations?

Apply this principle to your scenario.

Generative deconstruction

Purpose: To analyze the problems and improve the system

Principles to help redesign (in another way):
Social science can help us to consider several aspects of design from the user's perspective

The socio-technical principles can expand and improve your design space + targeted brainstorming

Generative deconstruction: 5 Examples

Rhythms and Routines
incorporate your system in existing ones?
need to break existing ones with your system?

Focus vs. peripheral awareness
what does your system assume and can you extend it?

Planning vs. situated actions
does your system support planning or situated actions, can users change their mind and recover from interruptions?

Distributed cognition
do you help your users externalize their memory?

Co-adaptive systems
is your system adaptable?

Exercise 1:

Goal Deconstruct your system based on socio-technical design principles, then reconstruct it, using them to generate new ideas for improving the system

Procedure
Choose two of the principles
(or assign a principle to different team members)
Go through the storyboard, step-by-step,
examining each interaction point
Generate at least *three ideas* inspired by *one of the principles*
to improve the system from the user's perspective (Brainstorm)

In-class Exercise

Socio-Technical Deconstruction
30 min

Exercise 2

Review the scenario relative to the changes in your system

Add a 'breakdown' (situation to consider when your system is not perfect or does not work)

In-class Exercise

Breakdown
30 min

Final Exercise (start in class, home-work)

Redo the storyboard to account for
the 3 aspects above (socio-technical principles + breakdown)
and the results from your evaluation)
– start with adapting your design scenario, or doing 2 scenarios

Re-film the video prototype for extra points

Other *possible* redesign activities

Analyze the results of the evaluation
did you follow your functional table?
did you solve the problems of your users?
what types of problems remain?

What can we do to improve it?
Design Principles
Functional table: have we thought of everything?
Interaction table: other possibilities
Alternatives: best choice?
Scenario: other non-planned events?

Homework due with the final
12 February 2014

Redo or improve your storyboard in 4 ways
- Adding at least one redesign options from today
- Adding at least one "break down"
- Improve as a result of one major user critiques from the evaluation
(even if you have no time to do a new video prototype)
- An extra improvement of your choice from the above

more marks if you also do a video

Summary of what we have done

User Analysis
Defining the problem

Brainstorm key ideas
Development of a concept

Design and Specification:
Functionality and interaction
Script and storyboard
Video prototype

Evaluation

Redesign