Design and Evaluation of Interactive Systems

Redesign (Phase V)

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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 Feb 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
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 for both focus and periphery
  - Design the periphery
  - Users vary degree of engagement

- **Situated Action**
  - Go beyond planned activities
  - Beyond planning
  - 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 knows his son’s place at the table

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

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.

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

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 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

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)
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 critique 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