Advanced Design of Interactive Systems

Participatory Design workshop

Each group should have prepared a 75-minute participatory design session for another group

- Design 3 activities (NOT interviews!)
- Create 3 method cards

Ensure that you use the whole session!
If your session is too short or if it isn’t working use prepared backup activities

Do not waste participants’ time!

Participatory design workshops

EVERYONE participates!!!
Designers do not act as independent observers

BUT design team has additional roles:
Moderator
- presents instructions
- keeps track of time
- answers questions
Scribe
- writes notes
Videographer
- operates camera

Plan for:
- instruction time
- activity time
- debriefing time

Use Video Clipper as a guide for running the workshop
Create a sequence of Method Cards
Add title cards with timing and other information (not visible to workshop participants)
Shoot video of the activity or the artifacts, organized by method
Design Concept

Choose a concept

Observe users
Generate ideas
Create a design concept

Describe a design concept

- How will the system work?
  - Functionality: what should it do?
  - User guide: how does it work?
  - Scenario: what happens in real-world contexts?

Justification
- What are the alternatives?
- What are the advantages and disadvantages of this solution?

Reminders

Instrumental interaction principles

- Reification: What actions are objects?
  - Scrolling -> scroll bar
- Polymorphism: What can each tool do?
  - Scroll text, scroll images
- Reuse: How can users reuse previous actions?
  - Replay script of previous scrolling
Generative power: Three design principles

- **Reification**: extends the notion of what constitutes an object
- **Polymorphism**: extends the power of commands with respect to these objects
- **Reuse**: provides a way of capturing and reusing interaction patterns

Each group should have

- Design concept
- Storyboard
- Video prototype (3-5 minutes)

Consider?
- What are the objects of interest?
- What instrument(s) were reified?
- How does the user discover useful properties?
- How does the user manipulate those properties?

Generative deconstruction

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<td>Socio-technical design principles</td>
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<td>Situated Action</td>
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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.

Generative Deconstruction & Reconstruction

Create a scenario-based artifact that captures current user behavior -- or -- illustrates what has been designed.

First deconstruct what is going on:
- Who is the user?
- What is the technology?
- What is the user’s context?
- What is the interaction like?

Then reconstruct the design using socio-technical principles to design a new technology or to fix an existing one.

Examples: Socio-technical Principles

<table>
<thead>
<tr>
<th>Principle</th>
<th>Description</th>
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<tbody>
<tr>
<td>Situated Action</td>
<td>Go beyond planned activities; Users decide how to act in unforeseen circumstances</td>
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<td>Build upon routine activities and spatial patterns; Users integrate systems into their daily lives</td>
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<td>Peripheral awareness</td>
<td>Design for both focus and periphery; Users vary degree of engagement</td>
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<td>Expect users to re-interpret and customize; Enable capture and sharing of customizations</td>
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<td>Distributed cognition</td>
<td>&quot;outside the head&quot;; Let objects and other people reduce cognitive load for memory or communication tasks</td>
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Generative Deconstruction

Apply socio-technical principles to generate grounded designs.

Observe use-technology-context
- Specific anecdotes, breakdowns, surprises

Deconstruct design problem from abstractions to patterns

Reconstruct design solution
- Explore design space
- Revise design space
- Explore design options
Reflecting on Post-It Notes

What is a 'post-it note'?
What are they used for?
What are their most important properties?
Why do they work?
Have you seen any creative uses of post-it notes?

Organize with Post-It's

Agenda Post-Its

Wall calendar
### Socio-technical Principles

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### Situated Action

**Lucy Suchman**

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

How do users modify plans based on context? How do they handle interruptions? Breakdowns?

As designers, how do we let users change their plans at any moment?

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The plan consisted of navigating on a direct course from point A to point B including a small detour to avoid a rock. In reality, the course was an intricate series of adjustments to circumstances including changing wind, water currents, drift, and operator over-compensation.
Situated 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?

Actual path taken

<table>
<thead>
<tr>
<th>Actual path taken</th>
<th>Navigation plan</th>
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<tbody>
<tr>
<td>Point B</td>
<td>Point A</td>
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Situated Action

Sandy wants to meet with Fred this week, but doesn’t know exactly when. She adds a post-it to her calendar, in no particular spot, to remind her to find a time to talk to Fred.

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

*Co-located 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?
Rhythms and Routines

Ralph took a call from his son’s girlfriend, Tara. He wrote a message on a post-it note and left it at his son’s place at the dinner table.

Temporal rhythm/routine:
Ralph knows his son will come home at dinner time, because he is hungry.

Spatial routine:
Ralph knows where his son sits at the table.

Rhythms and Routines

1. What is Ralph’s problem?
2. How does the post-it post-it note solve it?
3. Why is this an example of both rhythms and routines?
Rhythms and Routines

What properties make it work?

a. What makes Ralph come home?
b. How does Ralph know where to sit?
c. Will it work if dinner is late?

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.

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?

Distributed Cognition

Physical objects form part of our memory
It is not necessary to remember everything

Objects can be shared among people
but they are not necessarily interpreted the same
Distributed Cognition

Dan and Mary share a home computer. Dan leaves a post-it note with the list of commands needed to perform a specific function.

Memory aid:
The post-it allows them to forget the details – they know where to find them

Boundary object:
Dan and Mary use the instructions differently

1. What are Dan’s and Mary’s problems?
2. How do they use a post-it note to solve their problem?
3. Explain why this is an example of 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? (boundary objects)
Co-Adaptive Systems

Designers of interactive systems assume that
users will use them as intended

But …
although users clearly learn to use new systems,
adapting their behavior according to the system design

They also adapt them to meet their own needs

How can we make interactive systems easier to learn
and easier to appropriate in creative ways?

Co-Adaptive Systems

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

Adapt to it:
Ann understands the properties of post-it notes
(designed to stick on to paper)

Adapts it:
Ann uses the post-it for a new purpose (as glue)

Co-Adaptive Systems

What properties make it work?
   a. What does Ann need to know about the post-it note?
   b. What elements were left ‘open’ to interpretation?
   c. How was the post-it customized?
   d. Can this customization be shared or applied in different situations?

Generative walkthrough
So …

How do we incorporate socio-technical principles into the design process?

Generative Walkthroughs: Creative redesign

Structured walkthroughs
Systematic critique of design artifacts, such as scenarios & storyboards

Focused brainstorming
Generation of novel ideas, based on socio-technical principles

Exercise: Generative Walkthrough

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 one of the principles (or assign a principle to different team members)
- Reread the storyboard out loud
- Go through the storyboard, step-by-step, examining each interaction point
- Generate at least six ideas inspired by one of the principles to improve the system from the user’s perspective
**Exercise: Generative Walkthroughs**

Analyze your storyboard or video prototype

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1. Read your storyboard out loud
2. At each interaction point:
   - Identify examples of reification, polymorphism, reuse
   - Identify any existing socio-technical principles
3. Generate ideas for improving the scenario
   - you must use at least two principles

Goal: Improve your scenario so that you have at least six new interaction points that illustrate socio-technical principles

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**Final Presentation**

Friday 14:00
Building 660 (Digiteo)
Amphitheater

15-minute presentation per group plus 5-minute discussion
All members of the group participate in the presentation

Introduction
Project name and design concept:
Problem to solve? Solution?

Story
Illustrate the design concept

Justification
Which principles did you choose?
Why? (justified based on user studies)

Conclusion
What worked? What didn’t? Future?

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**Grading**

Jury will judge on:

Creativity
Design principles:
- reification, polymorphism, reuse, co-adaptation
- situated action, peripheral awareness,
rhythms & routines, distributed cognition

Relationship with user studies
Justification

Tell a story that illustrates how your design concept is used
Avoid making a “How to” tutorial or a marketing video