CS-477

Reinventing Interactive Systems

Instrumental Interaction and Co-Adaptive Systems

Course 6: Design Exploration

Wendy E. Mackay
Michel Beaudouin-Lafon

in|situ| lab, INRIA & U. Paris-Sud Stanford University

Course Outline

	Topic	Exercises
1 April	Instrumental interaction and co-adaptive systems	Deconstructing interaction
8 April	Designing instruments	Idea generation
15 April	Learning	Design ideas & scenarios
22 April	User innovation	Design scenarios
29 April	Collaborative interaction	Video prototypes
6 May	Design exploration	Generative walkthroughs
13 May	Instrument architectures	Function-interaction tables
20 May	Ubiquitous computing	Alternative video prototypes
27 May	Tangible interaction	Final video prototypes
3 June	Final presentations	

For today

Readings:

Hollan, Hutchins & Kirsh	Distributed Cognition
Lottridge & Mackay	Generative Walkthroughs

Activities:

Generative walkthroughs

Video prototyping

What we'll do today

10 min	Distributed Cognition discussion
15 min	Redesign & Generative Walkthroughs
15 min	Generative Walkthrough exercise: color picker
45 min	Video prototype
5 min	Conclusion and homework for next week

Distributed Cognition: Key ideas

Ethnography, not just cognitive models
- to inform the design process
- to understand work practices in context

Designs must be tested in the real world

Design computer representations that
- create an 'alternate physics'
- beyond metaphor (pad++)

Distributed Cognition

Users externalize cognitive abilities
- like memory

Users communicate and share cognition
- through objects in the world

Instruments:

What we'll do today

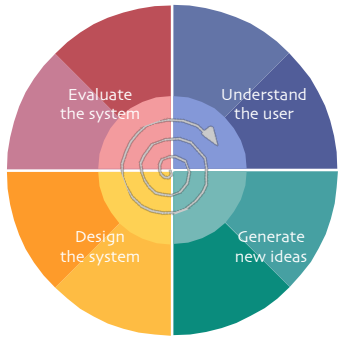
10 min	Distributed Cognition discussion
15 min	Redesign & Generative Walkthroughs
15 min	Generative Walkthrough exercise: color picker
45 min	Video prototype
5 min	Conclusion and homework for next week

Iterative design means redesign

Within an iterative design process
- *redesign* is more important
- than initial design

do not just
- "do it again!"

reflect on your designs
- in context



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

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

Generative Walkthroughs: Creative redesign

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

plus

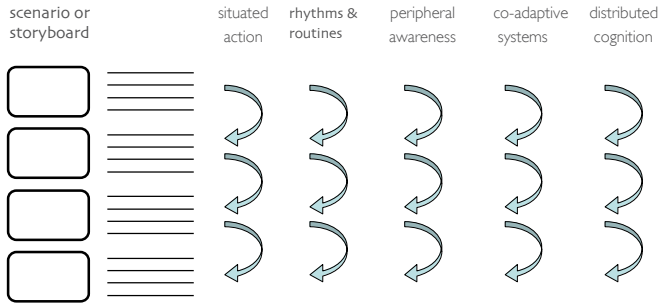
Focused brainstorming
Generation of novel ideas,
based on socio-technical principles

Socio-technical Principles

Situated Action beyond plans'	Go beyond planned activities; Acting in unforeseen circumstances
Rhythms & routines patterns; identify use patterns	Build upon routine activities and spatial Integrate into daily life
Peripheral awareness include the periphery	Design for both focus and periphery; Users can vary degree of engagement
Co-adaptation 're-interpret system'	Expect users to re-interpret and customize; Enalbe capture and sharing of customizations
Distributed cognition 'outside the head'	People and objects can reduce cognitive load for memory or communication tasks

Generative Walkthroughs

Structured walkthoughs and focused brainstorming at each step



Rhythms and routines

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 school, work and home?

Rhythms and routines

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

Rhythms and routines

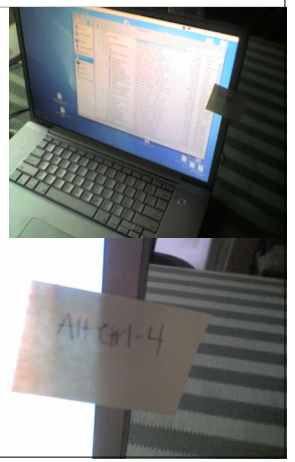
"Ralph received a call for his 13-year old son, Roger, from his friend Chris.

He wrote this message on a post-it note and left it at Roger's place at the dinner table."

Distributed cognition

What properties make it work?

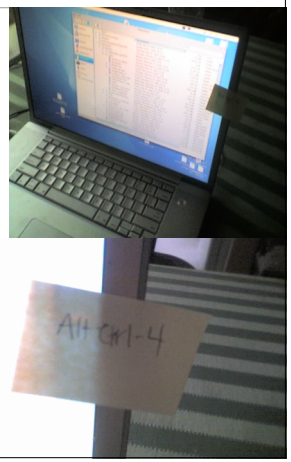
a. What objects in Dan's environment aid his memory?
b. What properties of post-it notes are useful ?
c. How will other people interpret this post-it note? *(boundary objects)*
d. What is the division of processing between Dan and the computer?



Distributed cognition

"Dan placed a post-it note on the edge of his computer screen with: 'Alt ctrl 4'.

Dan uses this as a reminder of which key combination will let him capture a picture of the screen."

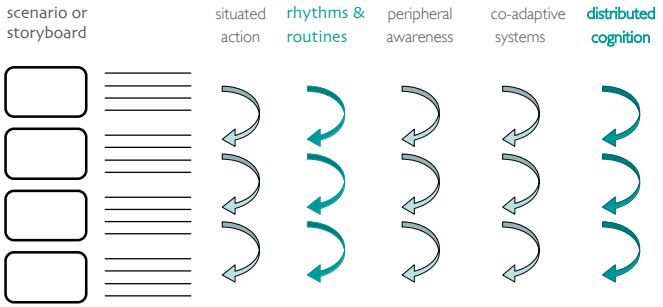


What we'll do today

10 min	Distributed Cognition discussion
15 min	Redesign & Generative Walkthroughs
15 min	Generative Walkthrough exercise: color picker
45 min	Video prototype
5 min	Conclusion and homework for next week

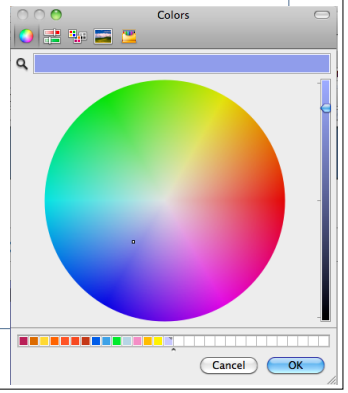
Generative Walkthroughs

analyse your storyboard
with two principles
and two techniques:



What socio-technical principles apply to color pickers?

How can we make the
color picker co-adaptive:
learnable?
appropriable?



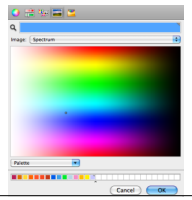
Color picker mini-scenarios

Student: Sam

Design a poster that explains the results of the bio lab experiment he ran with Mary, lab partner, based on their paper, which has photos of data and graphs.

Story with 3 events:

1.
2.
3.

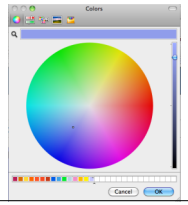


Graphic Designer: Gina

Major client needs new brochure
Challenge: pick up on the colors of the logo, but make a new, 'younger' more 'dynamic' palette that is also web safe.

Story with 3 events:

1.
2.
3.



What we'll do today

10 min	Distributed Cognition discussion
15 min	Redesign & Generative Walkthroughs
15 min	Generative Walkthrough exercise: color picker
45 min	Video prototype
5 min	Conclusion and homework for next week

Video Prototype co-adaptive instruments

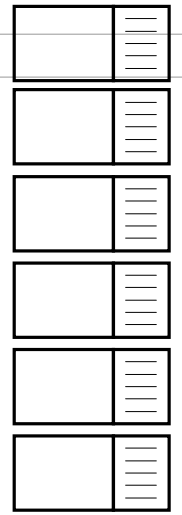
Sample instruments to explore:

1. TimeLines: Help emergency staff follow checklists

2. Decision making: Help people negotiate a choice

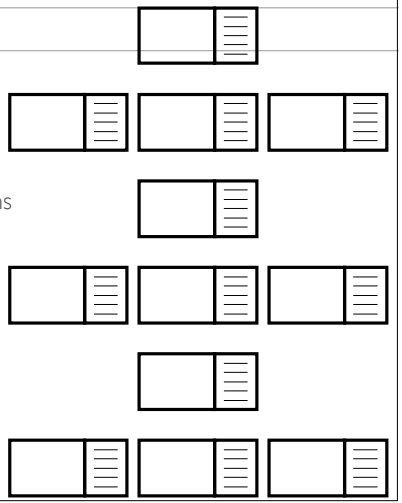
Regular storyboard

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

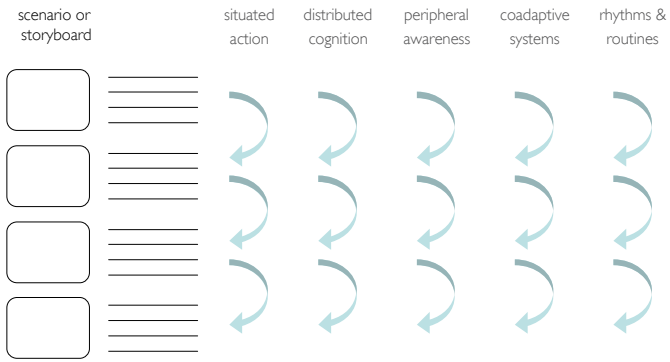


Branching storyboard

Consider:
alternative ideas
extreme uses
effect of different situations
breakdowns



Storyboards



Next week: Architecture

Homework:

- Create at least three variations of your instrument
  - Use post-its, transparencies, etc.
- Update branching storyboard to incorporate ideas:
  - show how the characters use the designs in context

We will start the class with video prototyping:

We will then discuss:

Beaudouin-Lafon, L. & Lassen, H. (2000) architecture and implementation of CPN2000, a post-WIMP graphical application. UIST 2000: pp.181-190

Olsen, D.R. (2008) Interactive viscosity. . UIST. 2008, pp. 1-2