Today

- Homework: Co-adaptive instruments
  Feedback on mid-term assessment

- Class work: Final video prototyping

- 19 February: Final presentation
  10 minutes per group
  3-5 minute video (5 minutes maximum)
  7-10 slides per group

Mid-term assessment feedback

Not bad!!!
Most of you really tried  (a few did not...)
Everyone can improve  (the best projects have a number of interesting possibilities)

What we're looking for in the final presentation:
- Do you have an original design concept?
- Do you have a specific target audience?
- one story not a story per persona?
- Does your system reflect details from your interviews?
- Did you

What we're looking for:
- Is the design concept original?
- Is the target audience specific?
- Did you create a single story with multiple personas?
- Did the events reflect your interviews?
- Did you use the following to improve your design?
  - Behavior of an extreme character
  - Addressing a breakdown
  - Sociotechnical principles
  - Co-adaptive instrument
Redesign

How to improve it?

Creating an instrument

Instruments are decoupled from applications: they turn interaction into a first-class object.

Example:
- What is the action (verb)?
  - to scroll
- What is the object-of-interest?
  - document, playlist, video

Reification:
- create an object
- scrollbar

Polymorphism:
- multiple objects
  - document, playlist, video
- past input or output
  - return to recent positions

Reuse:
- detect information about object
  - position within document
- change the object
  - move to new position

Creating a co-adaptive instrument

How do users find out:
- What the instrument can do?
- How to tell the instrument to do what they want?
- Whether this instrument works on this object of interest?

What happens when users use the instrument multiple times?
- Can use patterns be captured and reused?
- What do use patterns look like and how can they be modified?
Generative power: Three design principles

### Reification
- Extends the notion of what constitutes an object

**Example:**
- Turn concepts into (interface) objects
- Interaction instrument
  - Reification of a command into an interface widget
  - Example: scrolling a document -> scrollbar

**Examples**
- Guidelines: reification of alignment
- Layers: reification of mode

### Polymorphism
- Extends the power of commands with respect to these objects

**Common examples:**
- Cut, paste, delete, move
- Context-dependent commands
- Homogenous groups
  - If applicable to one object, then applicable to a group of same-type objects
- Heterogeneous groups
  - Applicable to a heterogeneous group if it has meaning for individual object types

### Reuse
- Provides a way of capturing and reusing interaction patterns

**Output reuse**
- Captures interaction patterns for later reuse
- Example: duplicate, copy/paste

**Input reuse**
- Reuse previous commands
- Example: redo, history, macros
### Instrumental Interaction

- **Action**
- **Command**
- **Object**
- **Feedback**
- **Instrument**
- **Response**

#### User's goal

- What does it detect in the world?
- What does it change in the world?

#### Instrumental Response

- Create your own instrument
  - Color Picker instrument
    - What does it detect in the world?
    - What does it change in the world?

#### Interaction points → Instruments

- Show what user sees and what user does
- Show how the instrument responds
- Show how object-of-interest changes

#### Exercise: Design an instrument

Create an instrument that improves interaction
Co-adaptive systems: appropriation

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

Designing co-adaptive instruments

That help users to learn new technology
… by adding dynamic feedback
… by adding in-context feedforward

That help users to appropriate new technology
… by providing hooks for customization
… by providing flexibility in the face of change

Help users understand what the computer is doing…
and modify it to meet their needs

Instrumental Interaction
Branching Storyboards

Regular storyboard

<table>
<thead>
<tr>
<th>Title</th>
<th>User(s)</th>
<th>Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Establishing shot
First interaction
Closeup shot
Second interaction
Mid-range shot
Third interaction
Wide shot
Forth interaction
Final credits

Design Space Dimensions

Revisit your design dimensions:
  How can you systematically explore alternatives along several dimensions?
For example: Remote communication
  Shared data (4):
    activity level, text, photo, video
  Synchronicity (3):
    live synchronous, back&forth, asynchronous
  Access control (4):
    sender, recipient, shared, system

Creates a combinatorial explosion of possibilities:
  $4 \times 3 \times 4 = 48$ possibilities
### Latin Square approach

<table>
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<th>activity level, text, photo, video</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronicity:</td>
<td>live synchronous, back&amp;forth, asynchronous, live synchronous</td>
</tr>
<tr>
<td>Access control:</td>
<td>sender, recipient, shared, system</td>
</tr>
</tbody>
</table>

Combine alternatives, one per category:
- shared activity level, live synchronous, sender control
- shared text, back & forth, recipient control
- shared photo, asynchronous, shared control
- shared video, live synchronous, system control

Use combinations for the branching storyboard

### Branching storyboard

At each interaction point, consider:
- alternative ideas
- extreme uses
- effects of different situations
- breakdowns

Did you change your design space?
Can you justify your design choices?

### Exercise: Branching Storyboard

Begin with your storyboard
Identify a set of interaction points

Examine your design space dimensions
Update it as necessary to match the current design
Generate 3 interaction methods per design dimension

Use a latin square approach to recombine the interaction points along multiple dimensions

Record your storyboard on the interaction point forms