Mockups and prototypes

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Lecture 6
Interfeiso projektavimas ir panaudojamumo inžinerija (Soul Greenberg)

**Goals:**
- Articulate:
  - who users are
  - their key tasks

**Methods:**
- Task centered system design
- Participatory design
- User-centered design
  
- Evaluate
  - Psychology of everyday things
  - User involvement
  - Representation & metaphors
  - Participatory interaction
  - Task scenario walk-through
  
- Brainstorm designs

- Low fidelity prototyping methods
- High fidelity prototyping methods

**Products:**
- User and task descriptions
- Throw-away paper prototypes
- Testable prototypes
- Completed designs
- Alpha/beta systems or complete specification

- Usability testing
- Graphical screen design
- Interface guidelines
- Style guides
- Heuristic evaluation
- Field testing
Overview

• Mockups
  • Why?
  • The problem of functional fixation
• Paper mockup
• Interactive mockup
• Mockup tools
• Prototypes
  • Why?
  • Wizard-of-Oz prototyping
• Tools
• Mood boards
After task analysis
What is a prototype?

In other design fields a prototype is a small-scale model:

• a miniature car
• a miniature building or town

• the example here comes from a 3D printer
What is a prototype?

In interaction design it can be (among other things):

• a series of screen sketches
• a storyboard, i.e. a cartoon-like series of scenes
• a Powerpoint slide show
• a video simulating the use of a system
• a lump of wood (e.g. PalmPilot)
• a cardboard mock-up
• a piece of software with limited functionality written in the target language or in another language
Why?

Prototyping is a strategy for efficiently dealing with things that are hard to predict.
Why prototype?

- To receive user evaluation and feedback
- Stakeholders can see, hold, interact with a prototype more easily than a document or a drawing
- Team members can communicate effectively
- You can test out ideas for yourself
- It encourages reflection
- Prototypes answer questions, and support designers in choosing between alternatives
Prototyping to avoid functional fixedness: Duncker’s candle problem

How to fix a lit candle on a wall (a cork board) in a way so the candle wax won’t drip onto the table below.


Duncker, 1945
Low-fidelity Prototyping

• Uses a medium which is unlike the final medium, e.g. paper, cardboard
• Is quick, cheap and easily changed
• Low fidelity prototype - mockup
SANTA CLARA, California: People thought Jeff Hawkins was crazy when they saw him taking notes, checking appointments, and synchronizing a small block of wood with his PC, pretending all the while that the block was a handheld computer.

“If I wanted to check the calendar I'd take it out and press the wooden button.”


Jeff Hawkins, Donna Dubinsky, and Ed Colligan (Palm Computing) http://en.wikipedia.org/wiki/Palm_(PDA)
Paper prototyping
Paper prototyping tips

• Keep all your materials in one place!
  • Small interface widgets tend to get lost or damaged easily

• Work quickly and make reusable components (buttons, etc)

• If something is difficult to simulate (progress indicators, right mouse menus, hyperlinks), have the user ask if it is available and then verbally describe the interaction
Paper mock-up for home communication systems

Benyon, Designing Interactive systems, Pearson Education Limited, 2014
Scenarios in paper mockups

SCENARIO 1

"I want to listen to alternative music"
Card-based prototypes

- Index cards (3 X 5 inches)
- Each card represents one screen or part of screen
- Often used in website development
Try Prototypes with People

• Need a picture
• Test multiple
• Emphasis on conversation
Test multiple prototypes simultaneously to get most value
Mock-ups

IDEO: kairėje - pirmojo skaitmeninio aparato maketas, valdomas kompiuterio; dešinėje – galutinis produktas, Kodak DC-210 skaitmeninė kamera (Buchenau, Suri, 2000)
Mockup is a question to stakeholders, users, designers.
Goal: to get informal opinion

• Showing mockup for the users
  • http://www.youtube.com/watch?v=_5FGeSQ7DBU
• Observe the interaction
• Make conclusions: what to redesign
Wireframes

- Outline of the structure of the software system
- Focus on the general elements of a design without worrying about the final detail

http://www.smartdraw.com/software/wireframe-software.htm
Low-fidelity prototyping

Advantages
• Lower development cost
• Evaluate multiple-design concepts
• Useful-communication device
• Address screen layout issues
• Proof-of-concept

Disadvantages
• Limited error checking
• Poor detailed specification to code to
• Facilitator driven
Interactive mockups

- Active buttons
- Essential use cases
Mockups: quantity or quality?

[Image of various pottery items]

www.hci-class.org, Bayles and Orland, 2001
Quality or quantity: what is better?

Parallel

Mockup

Mockup

feedback

feedback

Mockup

Sequential

Mockup

Feedback

Feedback

Mockup

Mockup

Mockup

Mockup

(Dow, Fortuna, Schwartz, Altringer, Schwartz, Klemmer, 2011)
‘Wizard-of-Oz’ prototyping

- The user thinks they are interacting with a computer, but a developer is responding to output rather than the system.
- Usually done early in design to understand users’ expectations.
- What is ‘wrong’ with this approach?
- Kramer movie application
  [http://www.youtube.com/watch?v=uAb3TcSWu7Q](http://www.youtube.com/watch?v=uAb3TcSWu7Q)
High-fidelity prototyping

• Uses materials that you would expect to be in the final product.
• Prototype looks more like the final system than a low-fidelity version.
• For a high-fidelity software prototype common environments include Macromedia Director, Visual Basic, and Smalltalk.
• Danger that users think they have a full system.......see compromises
High-fidelity prototyping

Advantages
- Complex functionality.
- Fully interactive.
- User-driven.
- Clearly defines navigational scheme
- Use for exploration and test
- Look and fell of final product
- Serves as living specification
- Marketing and sales tool

Disadvantages
- More expensive to develop
- Time-consuming to create
- Inefficient for proof-of-concept designs
- Not effective for requirements gathering
High fidelity prototypes

• Look and feel of final product
• Effective for testing with users
• Variety of tools, for example:
  • **Axure:**
    • installed in MIF computer classes, for Vu students academic license for the semester is available.
  • **Proto.io:**
    • highly intuitive prototype building tool but short trial (11 days)
    • Prototype should be developed within 11 days, then project can be exported to html.
    • Html version will be used for usability testing
  • **Justinmind Prototyper, Flinto, UXPin:** 30 days
  • **Invision, Weebly** – free limited versions
Mock-ups and prototypes in project life cycle

Details

High fidelity prototypes

Digital mock-ups

Paper mock-ups

Interaction mock-ups

Project timeline

Scot Klemmer, www.hci-class.org
Example: Samsung VI660 prototipes

The paper prototyping setup and its use situation.

Lim et al. 2008
Example: telefono Samsung VI660 prototypes

The computer-based prototype and its test setup

Lim et al. 2008
The fully functional prototype (Samsung VI660)

Lim et al. 2008
<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Paper Prototype</th>
<th>Computer Screen-Based Prototype</th>
<th>Final Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manifestation dimensions</td>
<td><em>Materials</em>—paper; foam core board; knife; pen; wooden sticks; glue; yellow cellophane paper; two-dimensional phone appearance color-printout</td>
<td><em>Materials</em>—mobile phone simulation toolkit; laptop computer; mouse <em>Resolution</em>—simplified screens using given interface formats from the simulation toolkit;</td>
<td><em>Materials</em>—same as the final product <em>Resolution</em>—the same as the final product (picture from [Lim et al. 2006])</td>
</tr>
<tr>
<td></td>
<td><em>Resolution</em>—rough and simplified sketches of screens;</td>
<td></td>
<td>(picture from [Lim et al. 2006])</td>
</tr>
<tr>
<td></td>
<td>(picture from [Lim et al. 2006]) large time lags by human’s simulating the product behaviors; buttons on the keypad are not push-enabled <em>Scope</em>—Limited to the text-messaging feature and making other parts as “not available” screens</td>
<td></td>
<td>partially working in a simulated way; keying with a mouse (not a touch screen) <em>Scope</em>—Limited to the text-messaging feature and making other parts as “not available” screens</td>
</tr>
</tbody>
</table>
Developing interactive prototypes

• Paper is a great prototyping tool, superior to most digital tools in terms of flexibility, speed and ease of use. After working on paper, the next step is to move to something more interactive and higher in fidelity.

• Hybrid paper/digital tools allow you take a picture of a paper sketch and animate it:
  • Pop - https://popapp.in/
  • Flinto - https://www.flinto.com/
  • Apple Keynote or MS PowerPoint or Google presentation - http://keynotopia.com/guides/
  • Balsamiq - http://balsamiq.com/

• If you do not know how to code, here are some tools that generate HTML5 prototypes:
  • Tumult Hype - http://tumult.com/hype/
  • Adobe Edge Animate - http://html.adobe.com/edge/animate/
  • Google’s Web Designer - https://www.google.com/webdesigner
Mood boards

• Visual stimuli are gathered that capture of how you feel about the design
  • photographs, images
  • textures
  • shapes
  • colors
  • headline styles
  • quotation styles
• Attached to the pinboard

http://viget.com/inspire/perspectives-on-mood-boards
Developing the aesthetics in design

- Mood boards
  - a collage of the ideas and inspiration
Support for design

- Patterns for interaction design
  - individual patterns
  - pattern languages
  - pattern libraries
- Open source systems and components

- Tools and environments
Rapid prototyping tools

- Balsamiq Mockups
  - 1 month

http://www.balsamiq.com/products/mockups
Axure

• Powerful prototyping tool
• High-fidelity prototyping without coding
• Available in MIF computer classes
• Free widget libraries on
  • axemplate.com
  • humbleux.com
  • Material design widget library
Tools for interactive prototypes

• Paper is a great prototyping tool, superior to most digital tools in terms of flexibility, speed and ease of use. After working on paper, the next step is to move to something more interactive and higher in fidelity.

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  • Pop - [https://popapp.in/](https://popapp.in/)
  • Flinto - [https://www.flinto.com/](https://www.flinto.com/)
  • Apple Keynote or MS PowerPoint or Google presentation - [http://keynotopia.com/guides/](http://keynotopia.com/guides/)
  • Balsamiq - [http://balsamiq.com/](http://balsamiq.com/)

• If you do not know how to code, here are some tools that generate HTML5 prototypes:
  • Tumult Hype - [http://tumult.com/hype/](http://tumult.com/hype/)
  • Google’s Web Designer - [https://www.google.com/webdesigner](https://www.google.com/webdesigner)
Summary

• Different kinds of prototyping are used for different purposes and at different stages

• Prototypes answer questions, so prototype appropriately

• Construction: the final product must be engineered appropriately

• Conceptual design (the first step of design)
  • Consider interaction types and interface types to prompt creativity

• Storyboards can be generated from scenarios
• Card-based prototypes can be generated from use cases
References


• Bergmann, Haitani (2000). Designing the PalmPilot: A Conversation with Rob Haitani. Chapter 4 in Information Appliances and Beyond, Eric Bergman

• Bødker, S. Scenarios in user-centered design – setting the stage for reflection and action. Interacting with Computers, 2000, 13 (1), 61–76.

