UNIVERSITY OF TORONTO SCARBOROUGH

Lecture 4: Design and Prototyping

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June 1, 2022

UTSC tomorrow is created here
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Administrivia

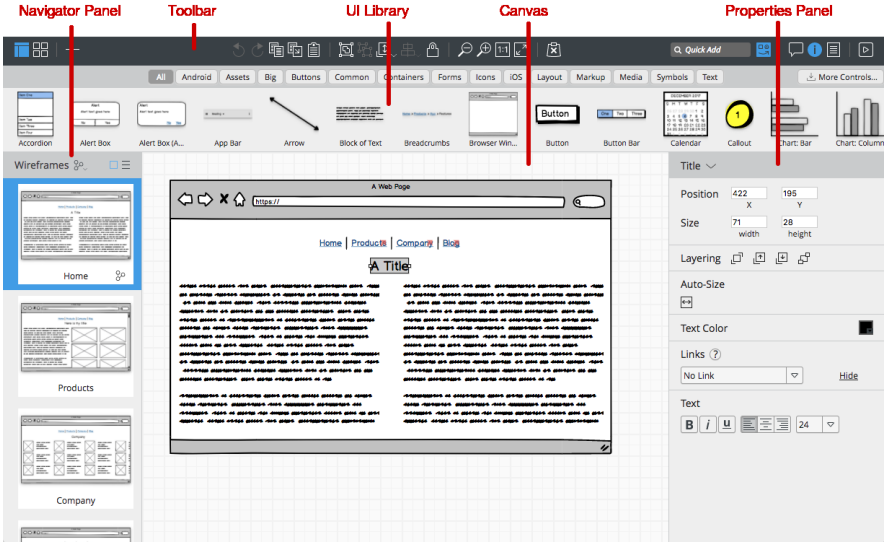
- Assignment 1
  - Due: **Friday, June 10, 2022**
- Project
  - Phase I: Peer Evaluation; Due: **Sunday, June 5, 2022**
  - Phase II: Posted; Due: **Tuesday, June 14, 2022**
- Tutorial this week
  - Demo of MURAL and Balsamiq
- Provide your Google email address: **Balsamiq Wireframes for Google Drive Access Request**

Preparation for Tutorial & Design Workshop

- MURAL and Balsamiq License
  - Install Balsamiq Wireframe App:
  - https://balsamiq.com/wireframes/google-drive/docs/installing/#installation
- Other Software Licenses:
  - Module -> Resources -> Software Licenses

MURAL is a digital workspace for visual collaboration, enabling innovative teams to solve important problems.

https://www.mural.co/



https://balsamiq.com/tutorials/articles/firstwireframe/

Recap

- User-Centered Design [ID: Ch. 7,9,10]
- User Requirements Gathering (Surveys, Interviews, Focus Groups, Observation)

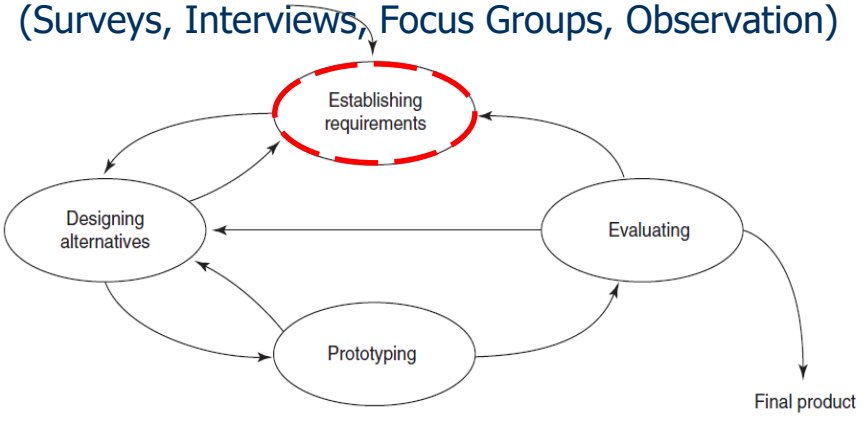


Figure 9.3 A simple interaction design lifecyle model

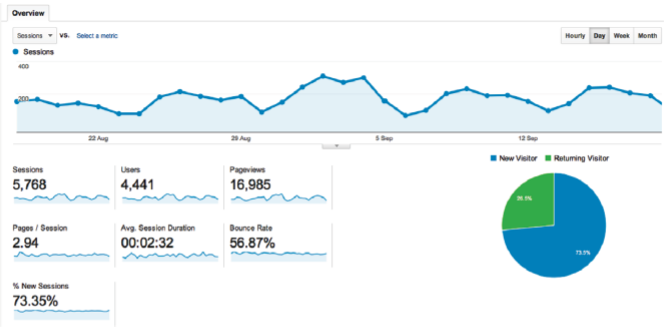
Observation in a Controlled Env.

- Direct observation
  - Think aloud techniques
- Indirect observation – tracking users' activities
  - Diaries
  - Interaction logs
  - Web analytics
- Video, audio, photos, notes are used to capture data in both types of observations

Web Analytics

- A system of tools and techniques for optimizing web usage by:
  - Measuring,
  - Collecting,
  - Analyzing, and
  - Reporting web data
- Typically focus on the number of web visitors and page views

Web Analytics

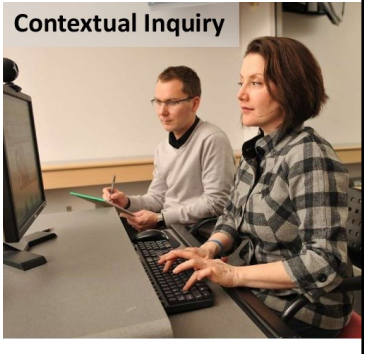


(a)

Figure 7.14 Segments of the Google Analytics dashboard for id-book.com in September 2014 (a) audience overview, (b) screen resolution of mobile devices used to view the website

Contextual Inquiry

- An approach to ethnographic study where user is expert, designer is apprentice
- A form of interview, but
  - — at users' workplace (workstation)
  - — 2 to 3 hours long
- Four main principles:
  - — Context: see workplace & what happens
  - — Partnership: user and developer collaborate
  - — Interpretation: observations interpreted by user and developer together
  - — Focus: project focus to understand what to look for



Choosing and Combining Techniques

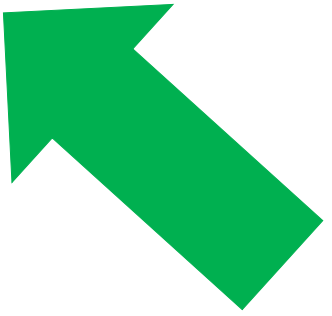
- Depends on the:
  - Focus of the study
  - Participants involved
  - Nature of the technique(s)
  - Resources available
  - Time available

Data Gathering Guidelines

- Focus on identifying the stakeholders' needs
- Involve all the stakeholder groups
- Involve more than one representative from each stakeholder group
- Use a combination of data gathering techniques
- Support the process with props such as prototypes and task descriptions

Recap…

- **User Requirements Gathering (Phase 1)**
  - **Interviews**
  - **Focus Groups**
  - **Surveys/Questionnaires**
  - **Observations**



- **Same techniques used in Evaluation Phase**

The plan for today… [ID: Ch. 11, 12]

- Design (also called (re)design)
- Prototyping
  - **Storyboarding**
  - **Card Sorting**
  - **Sketching**
  - **Wire framing**
  - **Conceptual/Concrete Designs**
  - **Aka. (re)design**

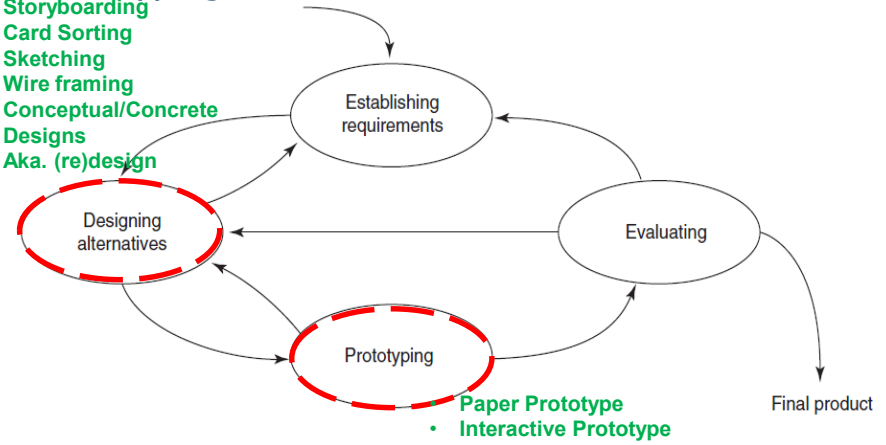


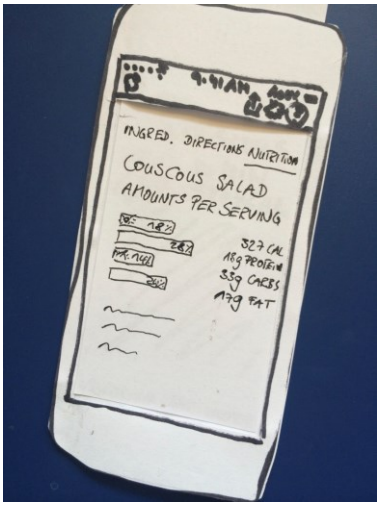
Figure 9.3 A simple interaction design lifecyle model

Overview

- Prototyping
- Conceptual design
- Concrete design
- Using scenarios
- Generating prototypes

What is a Prototype?

(a)



What is a Prototype?

"A prototype is worth a thousand meetings."

Mike Davidson
Vice President of Design for Twitter

What is a Prototype?

- A prototype is a small scale model (in other fields)
  - A miniature car
  - A miniature model of a house, condo building, etc.

(c)

What is a Prototype?

- In HCI, a prototype can be:
  - 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 Prototype?

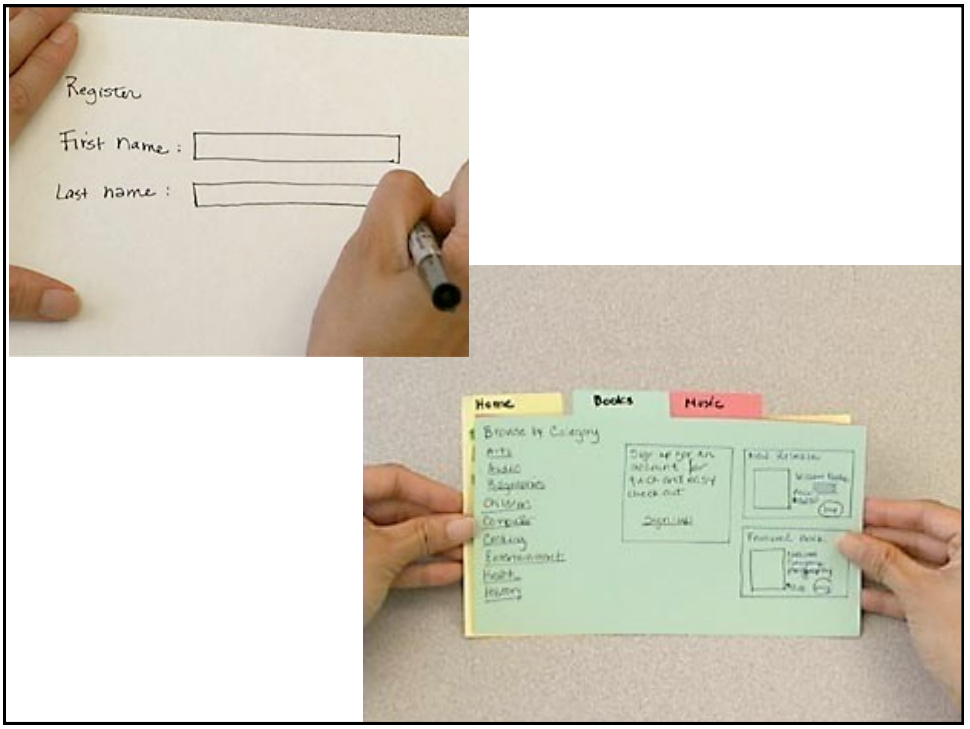
- Evaluation and feedback are central to UCD/Interaction Design
- Stakeholders can see, hold, interact with a prototype more easily than a document or a drawing
- Team members can communicate effectively
- You can test out ideas for yourself
- It encourages reflection: very important aspect of design
- Prototypes answer questions, and support designers in choosing between alternatives

What to prototype?

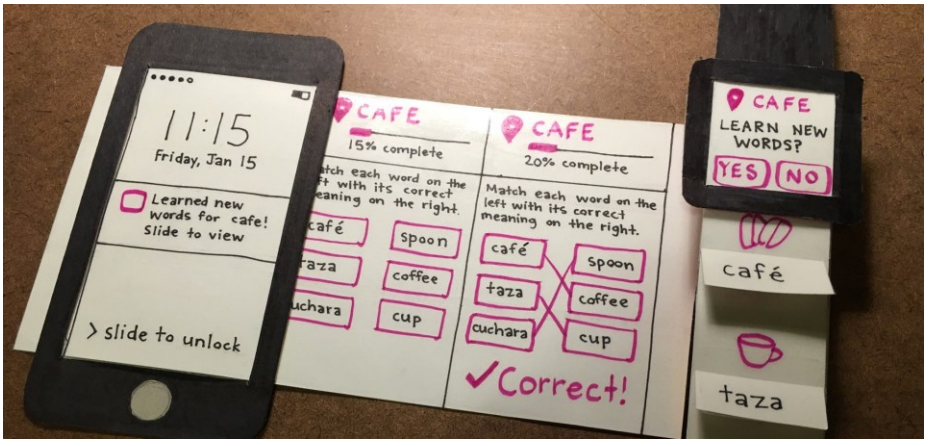
- Technical issues
- Work flow, task design
- Screen layouts and information display
- Difficult, controversial, critical areas

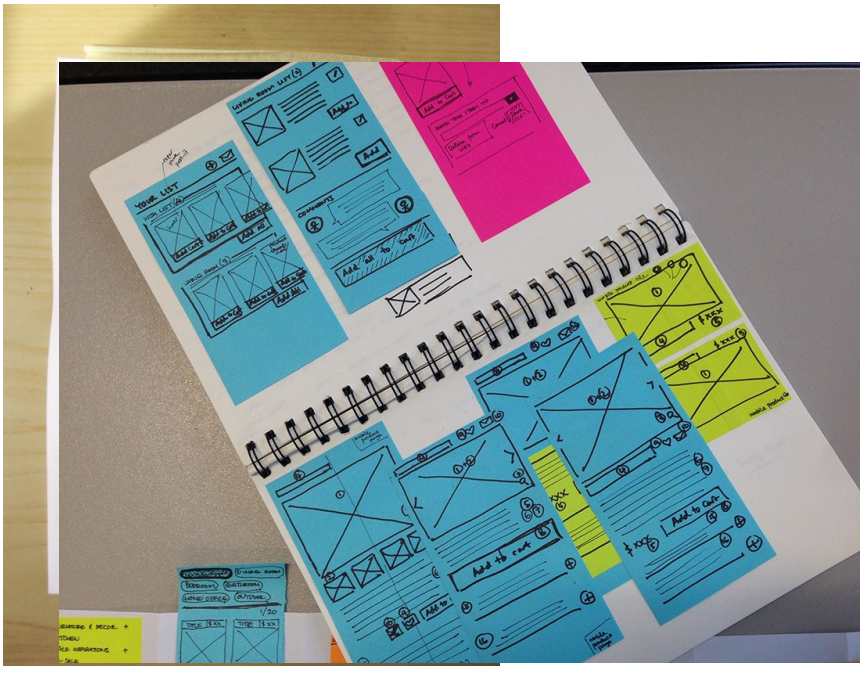
Low-Fidelity Prototypes

- Uses a medium which is unlike the final medium, e.g. paper, cardboard, post-it notes
- Is quick, cheap and easily changed
- Examples:
  - sketches of screens, task sequences, etc
  - ‘post-it’ notes
  - storyboards
  - ‘Wizard-of-Oz’


Register
First Name :
Last name :
Home
Books
Music
Browse by Category


ABOUT
SKILLS
SKILLS
BOOK SESSION
DATE
TIME
SESSION TYPE
NOTES:
THANKS


11:15
Friday, Jan 15
Learned new words for cafe! Slide to view
> slide to unlock
CAFE
15% complete
café
spoon
taza
coffee
cuchara
cup
CAFE
20% complete
Match each word on the left with its correct meaning on the right.
café
spoon
taza
coffee
cuchara
cup
✓Correct!
CAFE
LEARN NEW WORDS?
YES
NO
café
taza



Sketching

- Sketching is important to low-fidelity prototyping
- Don't be inhibited about drawing ability. Practice simple symbols

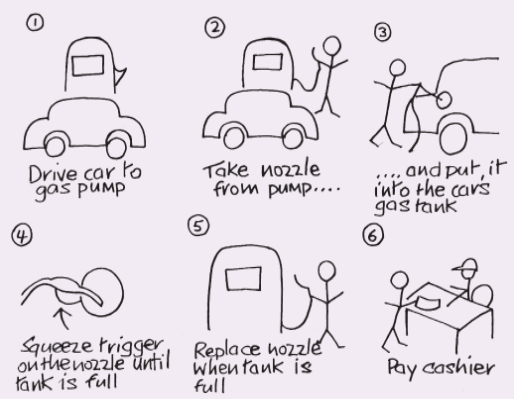
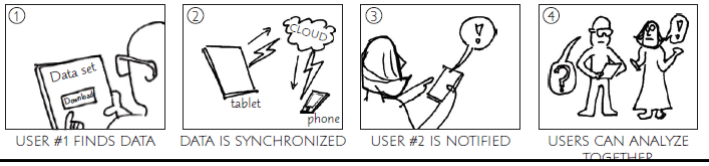


Figure 11.5 A storyboard depicting how to fill a car with gas

Storyboarding

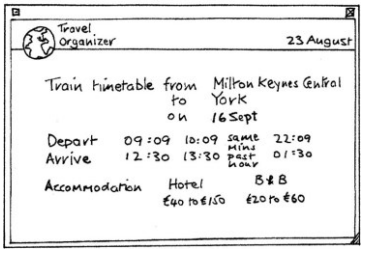
- Hand-drawn storyboard for a collaborative software that allows multiple people to view a common dataset using their personal smartphones and tablets
- Often used with scenarios, bringing more detail, and a chance to role play
- It is a series of sketches showing how a user might progress through a task using the device
- Used early in design



USER #1 FINDS DATA | DATA IS SYNCHRONIZED | USER #2 IS NOTIFIED | USERS CAN ANALYZE TOGETHER

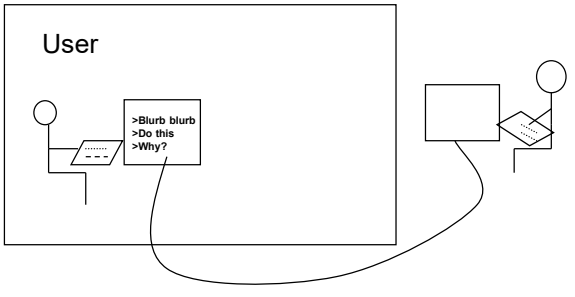
Card Based Prototypes

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



Wizard of Oz Prototyping

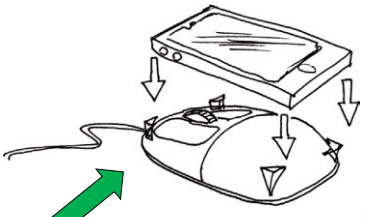
- The user thinks they are interacting with a computer, but a developer is responding to output rather than the system.
- Usually done early in design to understand users' expectations
- What is 'wrong' with this approach?



High-Fidelity Prototypes

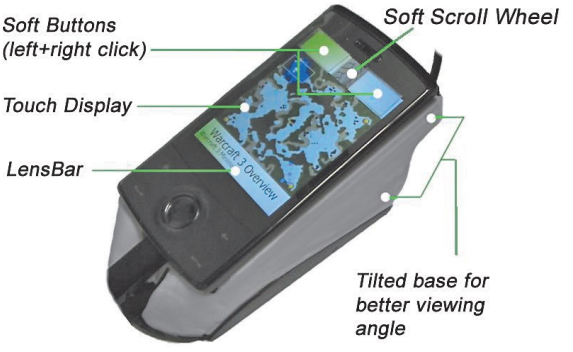
- Uses materials that you would expect to be in the final product
- Prototype looks more like the final system than a low-fidelity version
- High-fidelity prototypes can be developed by integrating existing hardware and software components
- Danger that users think they have a complete system ★

An Example



Low Fidelity

High Fidelity



Comparison

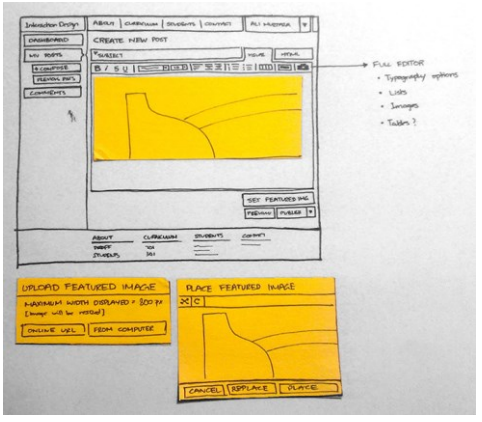
Type	Advantages	Disadvantages
Low-fidelity prototype	Lower development cost Evaluates multiple design concepts Useful communication device Addresses screen layout issues Useful for identifying market requirements Proof of concept	Limited error checking Poor detailed specification to code to Facilitator-driven Limited utility after requirements established Limited usefulness for usability tests Navigational and flow limitations
High-fidelity prototype	Complete functionality Fully interactive User-driven Clearly defines navigational scheme Use for exploration and test Look and feel of final product Serves as a living specification Marketing and sales tool	More resource-intensive to develop Time-consuming to create Inefficient for proof-of-concept designs Not effective for requirements gathering

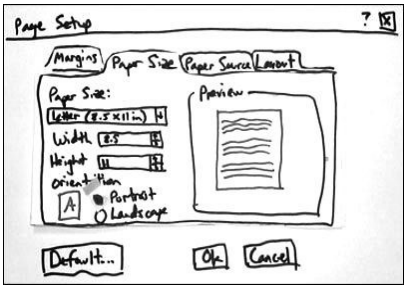
Table 11.3 Advantages and disadvantages of low- and high-fidelity prototypes

Compromises

- All prototypes involve compromises
- For software-based prototyping maybe there is a slow response? sketchy icons? limited functionality?
- Two common types of compromise
  - horizontal: provide a wide range of functions, but with little detail
  - vertical: provide a lot of detail for only a few functions
- Compromises in prototypes mustn't be ignored. Product needs engineering

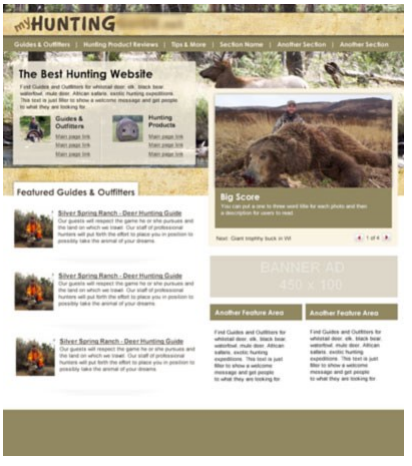
Is this Low-Fidelity? Or High-Fidelity Prototype?





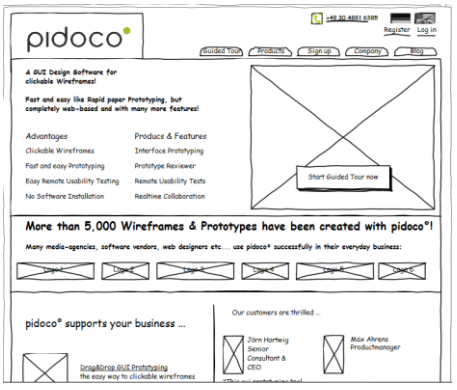
Low Fidelity!

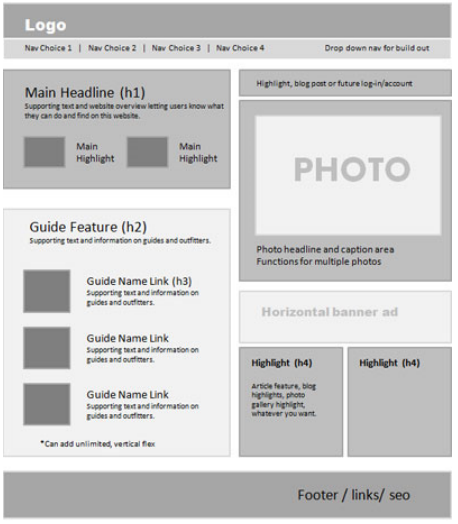
Is this Low-Fidelity? Or High-Fidelity Prototype?



High Fidelity!

What about this?

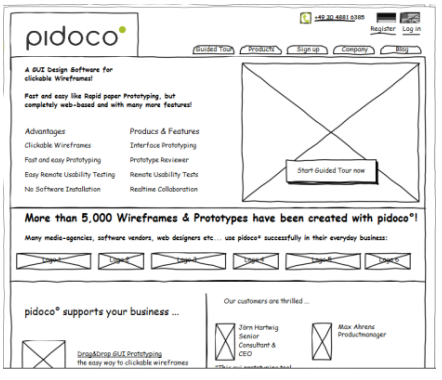


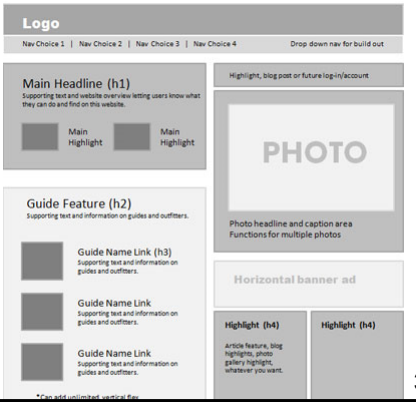


Medium Fidelity!

These are Medium-Fidelity Prototypes

They are often called ***wireframes***, and provide some standardized elements (such as buttons, menus, and text fields), even if potentially drawn in a sketchy fashion, and has some basic navigation functionality





Prototyping Exercise (20 min)

Prototype a layout design of an iWatch alarm interface

- Sketch two user tasks that your design can perform. (10 min)
  - Sketch using pen/paper, paint, tools, etc.
- Test it with a person (10 min)
  - Share screens within your break-out rooms to test
- Discuss (as a class)

Overview

- ✓ Prototyping
- Conceptual design
- Concrete design
- Using scenarios
- Generating prototypes

Conceptual Design

- Transform user requirements/needs into a conceptual model
- A conceptual model is an outline of what people can do with a product and what concepts are needed to understand and interact with it
- Mood board may be used to capture feel
- Consider alternatives: prototyping helps

Is there a suitable metaphor?

- Interface **metaphors** combine familiar knowledge with new knowledge in a way that will help the user understand the product.
- Three steps: understand functionality, identify potential problem areas, generate metaphors
- Evaluate metaphors:
  - How much structure does it provide?
  - How much is relevant to the problem?
  - Is it easy to represent?
  - Will the audience understand it?
  - How extensible is it?

Expanding the initial conceptual model

- What functions will the product perform?
  - What will the product do and what will the human do (task allocation)?
- How are the functions related to each other?
  - Sequential or parallel?
  - Categorisations, e.g. all actions related to privacy on a smartphone
- What information is needed?
  - What data is required to perform the task?
  - How is this data to be transformed by the system?

Overview

- ✓ Prototyping
- ✓ Conceptual design
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Concrete Design

Concrete Design:

- Many aspects to concrete design
  - Color, icons, buttons, interaction devices etc.
- User characteristics and context
  - Accessibility, cross-cultural design
- Cultural website guidelines

successful products “are … bundles of social solutions. Invent

Overview

- ✓ Prototyping
- ✓ Conceptual design
- ✓ Concrete design
  - Using scenarios
  - Generating prototypes

Using Scenarios

- Express proposed or imagined situations
- Used throughout design in various ways
  - as a basis for overall design
  - scripts for user evaluation of prototypes
  - concrete examples of tasks
  - as a means of co-operation across professional boundaries
- Plus and minus scenarios to explore extreme cases

Generate Storyboard from scenario

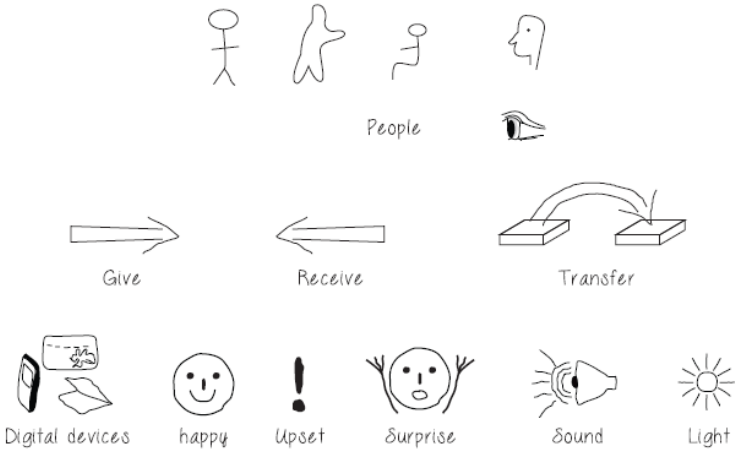


Figure 11.4 Some simple sketches for low-fidelity prototyping

Overview

- ✓ Prototyping
- ✓ Conceptual design
- ✓ Concrete design
- ✓ Using scenarios
- Generating prototypes

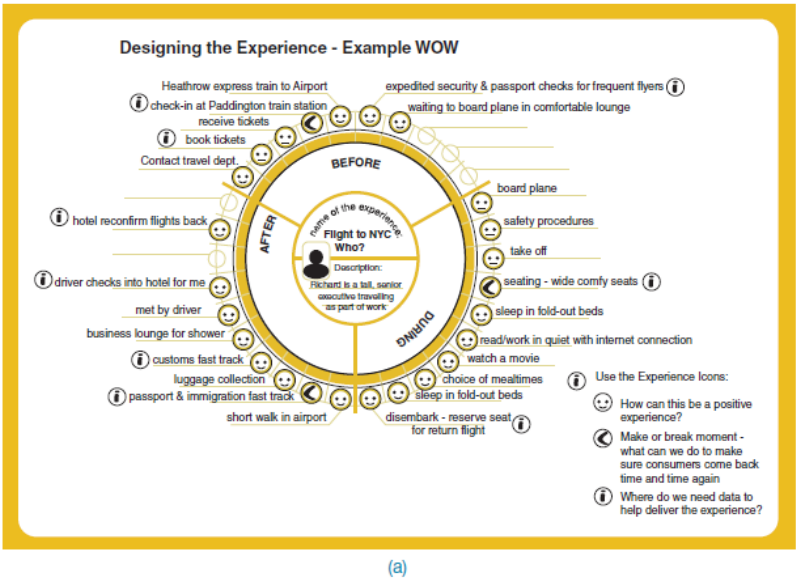
Card based Prototype from Use Case

Figure 11.6 Prototype developed for cell phone user interface

Explore User's Experience

- Use personas, card-based prototypes or stickies to model the user experience
- Visual representation called:
  - design map
  - customer/user journey map
  - experience map
- Two common representations
  - wheel
  - timeline

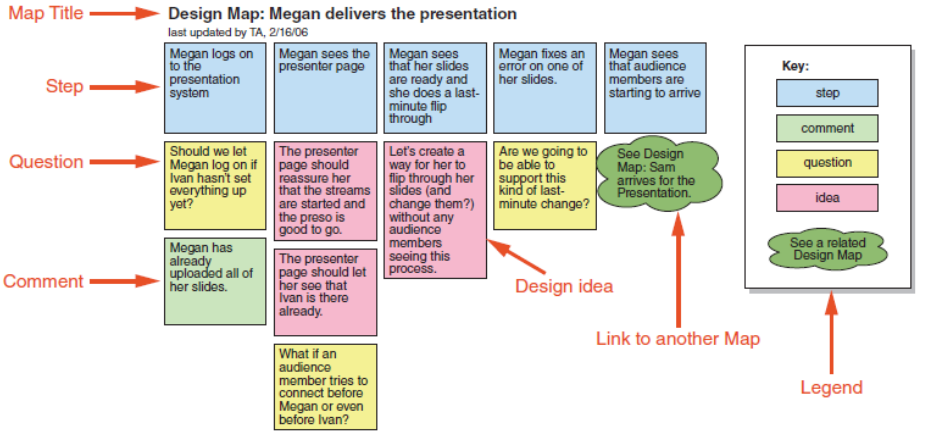
Wheel vs. Timeline



(a)

Figure 11.19 (a) An experience map using a wheel representation. (b) An example timeline design map illustrating how to capture different issues.

Wheel vs. Timeline



(b)

Figure 11.19 Continued

Tools for High-Fidelity Prototypes

- Balsamiq
- JustInMind
- Axure RP
- Adobe XD
- Figma
- Photoshop
- Illustrator
- Proto.io

Summary

- Prototypes answer questions
- Two aspects of design: conceptual and concrete
- To generate conceptual design, consider interface metaphors, interaction types and interface types
- Storyboards can be generated from scenarios
- Card-based prototypes can be generated from use cases

Summary (cont'd)

- Different kinds of prototyping are used for different purposes and at different stages
  - **Low-fidelity prototypes** are useful for early, iterative design.
  - **High-fidelity prototypes** are useful for more thorough testing of specific designs.
  - User testing is possible, even with paper prototypes.