

# User Centered Design

## [6] Prototyping

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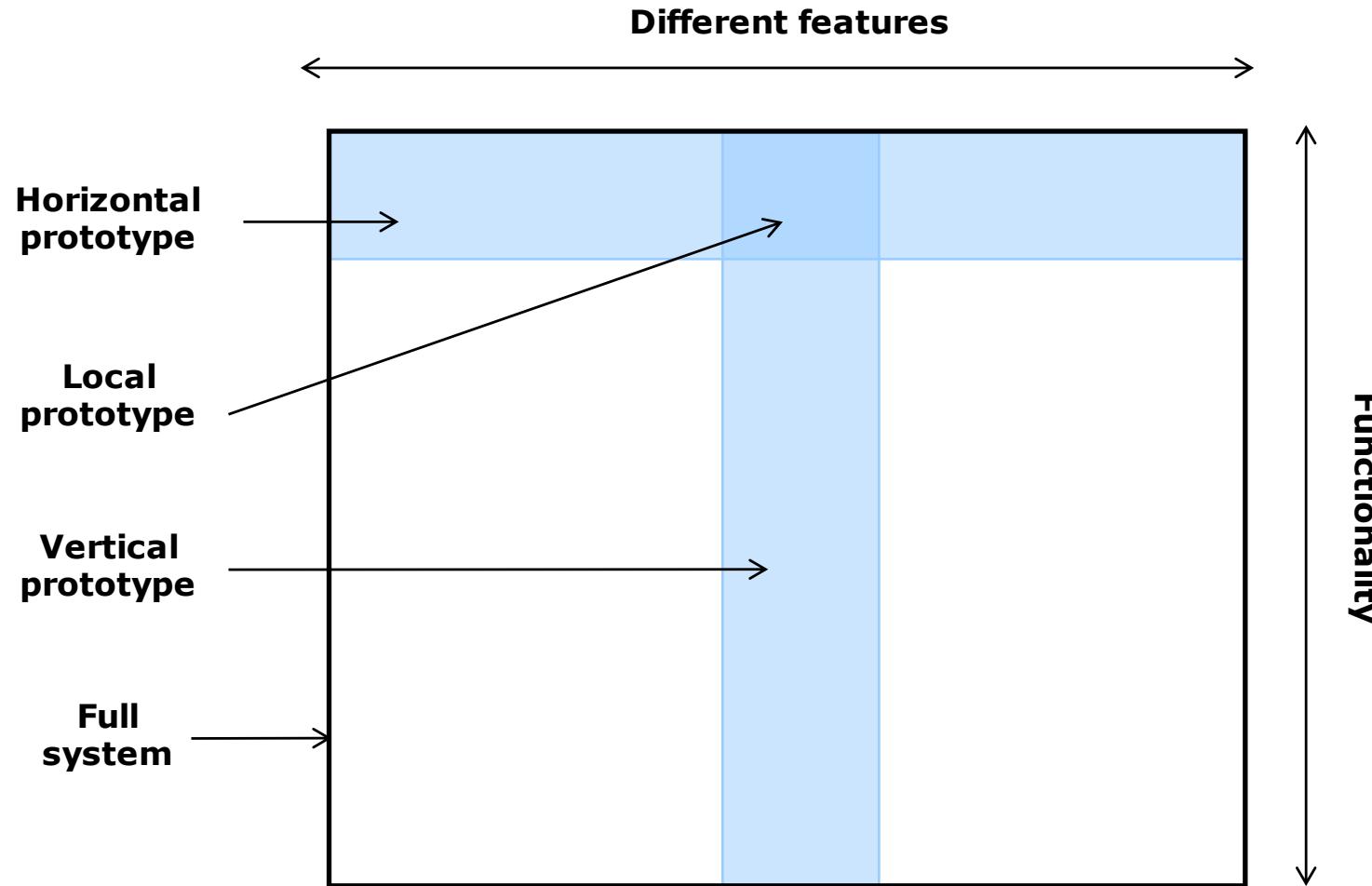
# Outline

- Prototyping
  - Depth and breadth
  - Fidelity
  - Interactivity
  - Perspective
  - Tools

# Prototyping

- What it is
  - A representation of part or all of a future system/product that can be used to discuss or evaluate design
- Advantages
  - Concrete baseline for communication between users, designers and engineers
  - Supports visual communication and common understanding
  - Encourages early user participation
  - Gives impression that design is still changeable
  - Immediately see consequences of design decisions and user performance
  - Helps sell ideas

# Prototyping: Overview



From 'The UX Book', Hartson and Pyla

# Prototyping: Depth and Breadth

## ▪ Horizontal Prototypes

- Used to show product concepts
- Includes many features, but has little functionality
- Little detail so complete workflows are not available
- UX evaluation is less realistic
- Explore how much functionality will be used by different users
  - ✓ Feedback about which functions should be included or not

## ▪ Vertical Prototypes

- Detailed functionality for narrow breadth of features
- Supports realistic UX evaluation for a limited range of features
- Need to evaluate how details of a particular interaction play out in actual use

# Prototyping: Depth and Breadth

- T-Prototypes

- Most of interface is shallow (horizontal) but a few parts are in more depth (vertical)

- Local Prototypes

- Evaluate design alternatives for particular isolated interaction details (appearance of an icon, message or behaviour) of an individual function
    - ✓ Resolve impasse in design discussions
    - ✓ Feature face-off

# Prototypes: Fidelity

- How ‘finished’ a design is perceived to be by the customer
- Low fidelity
  - Not faithful in terms of look and feel
  - Give high level abstract impression of intended design
  - Sketches, paper prototypes etc.
- Medium fidelity
  - Used to engage users
  - Provide sophisticated but limited scenarios to try
  - Usually show layout and variety of UI objects
  - But...users reluctant to challenge designer or touch design, risk thinking it's real
  - Ex: Wireframes

# Prototypes: Fidelity

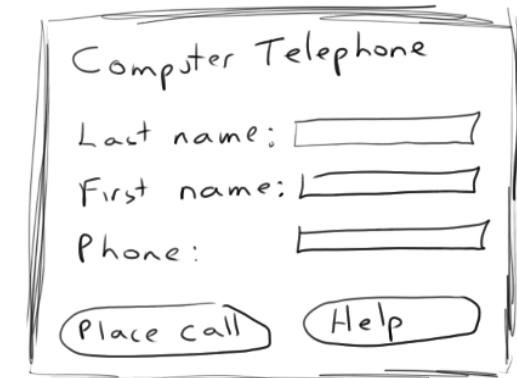
- High fidelity
  - Include details of appearance and interaction behaviour
  - Evaluation of details and how users see complete design
  - Faithful to detail, look, feel and behaviour of interaction design and/or functionality
  - Less expensive but faster than programming
  - Can be used for advanced sales demos

# Prototypes: Paper Prototypes

- What it is
  - Use paper cutouts to represent system, buttons etc.
  - Early versions are about interaction, not functionality
- How to do it
  - Quickly and efficiently
  - Images can be hand drawn or computer printed
    - ✓ Software: Omnigraffle, Microsoft Visio etc
- Why do it?
  - Highest ratio of value for effort
  - Can be modified on the fly
  - No bugs to fix
  - Paper better for comparing multiple scenarios
  - Easy access to materials
  - Lets designers focus on design and not on software (or its limitations)
  - Decreased attachment/commitment to early designs

# Prototypes: Sketching

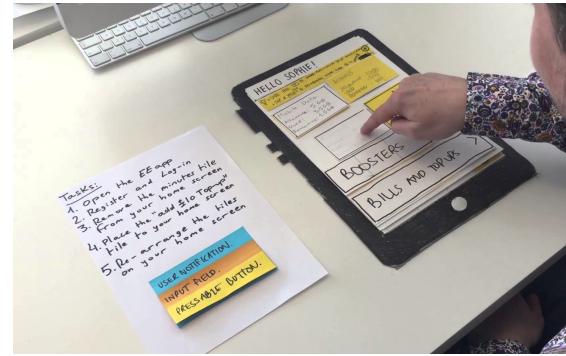
- What it is
  - Drawing of the outward appearance of the intended system
- Why it's useful
  - Crudeness means people concentrate on high-level concepts
  - BUT: hard to envision a dialogue's progression
- Attributes
  - Quick to make
  - Disposable: investment in the concept, not the execution
  - Clear vocabulary - rendering & style indicates it's a sketch, not an implementation
  - Consistency with state - refinement of rendering matches the actual state of development
  - Suggest & explore rather than confirm - value lies in suggesting and provoking what could be i.e., they are the catalyst to conversation and interaction



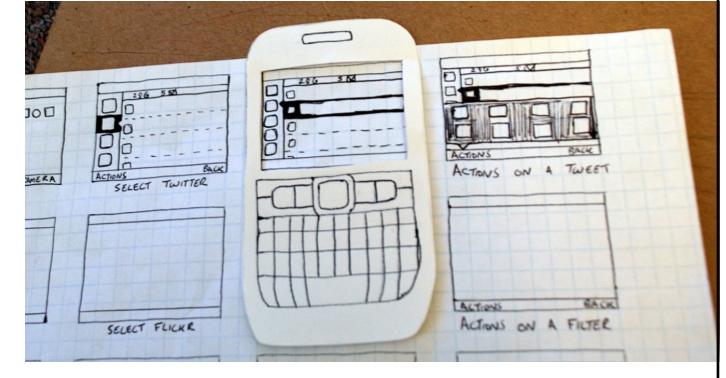
# Prototypes: Low-fidelity Examples



<https://mobgen.com/low-fi-prototyping/>



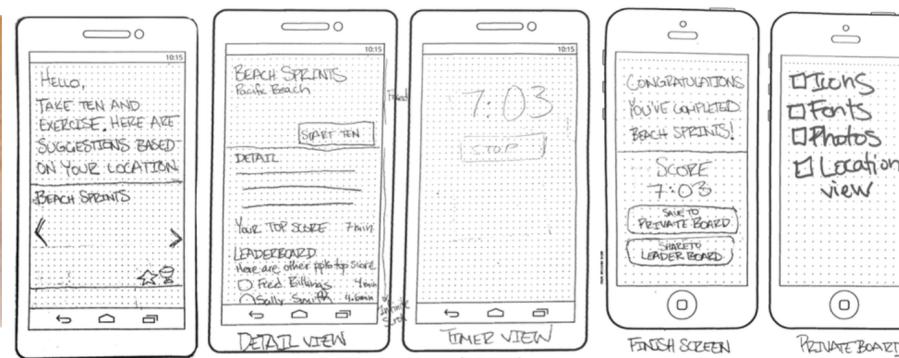
<https://www.youtube.com/watch?v=yafaGNFu8Eg>



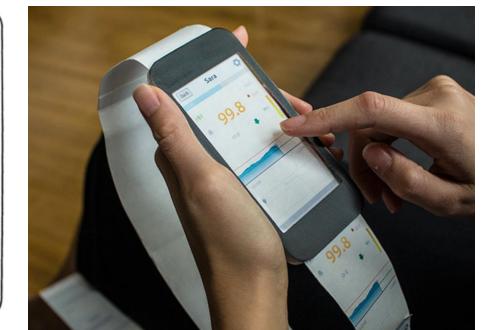
<https://www.pinterest.com/tonic3com/paper-prototyping/>



<https://www.smashingmagazine.com/2014/10/the-skeptics-guide-to-low-fidelity-prototyping/>



<http://www.scotthutter.com/protohack/>



<https://smartsape.design/work/item/ptraq>

# Wireframes

- Usually used to represent
  - Information architecture
  - Visual design
  - Placement of consistent elements
  - Space to allocate for information
- Avoid
  - Colours, images and anything other than generic fonts
- Example: standard elements for a website wireframe
  - Logo, search field, header, footer, navigation, breadcrumbs, body content, share buttons, contact info

The image shows a wireframe of a web page from Usability.gov. The main title is 'Card Sorting' with a subtitle 'Usability.gov'. Below the title is a large text area containing placeholder text (Lorem ipsum...) and a large 'X' drawn across the entire area, indicating it's a wireframe. On the left side, there's a sidebar with categories like 'METHODS', 'RESEARCH & TEMPLATES', and 'GUIDELINES'. The right sidebar has sections for 'RELATED ARTICLES' (e.g., 'What is Open Card Sorting?'), 'RELATED RESOURCES' (e.g., 'Card Sort Best Practices'), and 'RELATED CATEGORIES' (e.g., 'STRATEGY', 'CONTENT', 'ORGANIZE', 'UX', 'USABILITY', 'CATEGORIES'). At the bottom, there's a 'Was This Helpful?' button and a footer with links to Accessibility, Privacy Policy, FOIA, Disclaimers, Plain Writing, and a copyright notice.

<https://www.usability.gov/how-to-and-tools/methods/wireframing.html>

# Prototypes: Wireframes



<http://www.mike-barker.com/clicksnap-case-study/>

# Prototypes: Low to High Fidelity



<http://www.oracle.com/webfolder/ux/applications/FAQs/index.html>

# Prototypes: Interactivity

- Dependent on level of fidelity
  - High interactivity requires higher fidelity
- Types
  - Scripted
    - ✓ Created using a scripting language
      - Not great for implementing functionality
    - ✓ For low and medium fidelity
    - ✓ Can create nice live-action storyboards of screens
  - Click-through
    - ✓ For medium fidelity
    - ✓ Some active links that allow sequencing through screens by clicking
    - ✓ Wireframes + links
    - ✓ Software can be as simple as PowerPoint, or more complex (Axure etc.)

# Prototypes: Interactivity

## ■ Types

### ➤ Wizard of Oz

- ✓ The user thinks he is interacting with a computer but, in fact, a human operator is manipulating the interface and simulates the software's responses to the user
- ✓ Good when user input can be unpredictable or you want to explore what users would do or their expectations



# Prototypes: Interactivity

- Physical mockups for physical interactivity
  - Involves whole device, not just screen
  - Cardboard, wood, metal, plastic
  - Details can be low-fidelity but interaction should be high fidelity
    - ✓ Models are 3D, embodied/tangible
  - Good for emotional impact
- Paper-in-device
  - Use scans of hand-drawn prototype screens loaded onto a device as a sequence of image that can be display
- Animated prototypes
  - Visualize concepts and new interactions, communicate design ideas
  - Rough enough to create engagement and design suggestions but are more like scenarios and storyboards -> convey flow and sequencing
  - Examples:
    - ✓ Storyboard frames as a flip-book
    - ✓ Film a low-fidelity prototype in stop-motion like claymation

# Prototypes: Perspectives

- Ecological

- How the system or product works within its external environment
- How it is used in its context and how it interacts and communicates with its environment
- Don't need too much detail or fidelity

- Interaction

- How users operate the system – task and intention view
- Users look at display and manipulate controls, doing sensory, cognitive and physical actions

- Emotional

- Emotional impact and value-sensitive aspects of design
- Social and cultural implications, aesthetics and joy of use
- Usually need high fidelity and high interactivity
- Need details relating to fun, joy of use and user satisfaction
- For physical devices you need physical mockups

# Prototypes: Overview

## ■ Low fidelity

### ➤ Advantages

- ✓ Lower development cost
- ✓ Evaluate multiple design concepts
- ✓ Useful communication device
- ✓ Addresses screen layout issues
- ✓ Useful for identifying market requirements
- ✓ Proof of concept

### ➤ Disadvantages

- ✓ Limited error checking
- ✓ Poor detailed specification to code to
- ✓ Facilitator driven
- ✓ Limited utility after requirements established
- ✓ Limited usefulness for usability tests
- ✓ Navigation and flow limitations

## ■ High fidelity

### ➤ Advantages

- ✓ Complete functionality
- ✓ Fully interactive
- ✓ User-driven
- ✓ Clearly defines navigational scheme
- ✓ Use for exploration and testing
- ✓ Look and feel of final product
- ✓ Serves as a living specification tool
- ✓ Marketing and sales tool

### ➤ Disadvantages

- ✓ More resource-intensive to develop
- ✓ Time consuming to create
- ✓ Inefficient for proof-of-concept designs
- ✓ Not effective for requirements gathering

# Prototypes: Choosing the Right Type

- 3 main factors
  - Stage within overall project
  - Which questions you want to answer
  - What device you'll be using
- Keep in mind
  - Low-fidelity without proper explanation can have negative effects
    - ✓ Misinterpretation
      - Users assume it's finished -> amateurish
    - ✓ Make users focus on what's missing
    - ✓ Create credibility gap
  - Too realistic too soon might be mistaken for complete design
    - ✓ Disappointment if things don't work
    - ✓ Get stuck in the design

# Prototyping Tools



**Atomic.io**  
Prototyping tool for mobile or desktop interactions or animations



**Axure**  
Robust prototyping tool for websites and apps



**Briefs**  
Live prototyping tool for iOS apps



**Flinto for Mac**  
Prototyping tool ideal for high fidelity motion prototypes or complex interactions.

FLINTO Lite



**Flinto Lite**  
Simple prototyping tool for iOS apps

**Fluid**  
Prototyping tool for mobile apps



**Form**  
Native prototyping tool for iOS apps



**Framer**  
Prototyping tool built on framer.js for prototyping mobile and desktop apps



**HotGloo**  
Prototyping tool for interactive and responsive wireframes



**Indigo Studio**  
Robust prototyping tool for web, desktop and mobile apps



**Justinmind**  
Prototyping tool for web and mobile apps



**Pixate**  
Live prototyping tool for iOS and Android apps



**InVision**  
Collaborative click-through prototyping tool for web and mobile



**Marvel**  
Simple click-through prototyping tool for web and mobile apps



**Origami**  
Free tool that works with Quartz Composer for prototyping mobile and desktop apps



**proto.io**  
Prototyping tool for mobile devices



**Principle**  
Motion design prototyping tool for mobile and web applications.



**Solidify**  
Click-through prototyping tool for user testing



**UXPin**  
Collaborative prototyping tool for web and mobile



**Webflow**  
Website builder for designing professional looking web sites from scratch

...

# How do you choose?

cooper

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## Prototyping Tools

### Ideal for:

- Web 
- Mobile 
- Desktop 

### Features:

- High Fidelity
- Animations
- Export to code
- Sharing
- Mobile/Touch
- Device testing
- Support/community
- Good for user testing
- Trial version available
- Asset and project syncing
- Good for existing mocks
- Good for wireframes
- Good for simulating overall flow
- Good for complex interactions

### SORT BY

### SPEED

### FIDELITY

### SHARING

### USER TESTING

### SUPPORT

### MOBILE & TOUCH

### DYNAMIC ELEMENTS



UXPIN

Collaborative prototyping tool for web and mobile

Last updated: May 16

40-80 mins

Average

High

Good

Good

Low

Good



IRISE

Agile requirements and

40-80

Good

High

Average

High

Good

High

Good resource to help you choose: <https://www.cooper.com/prototyping-tools>