

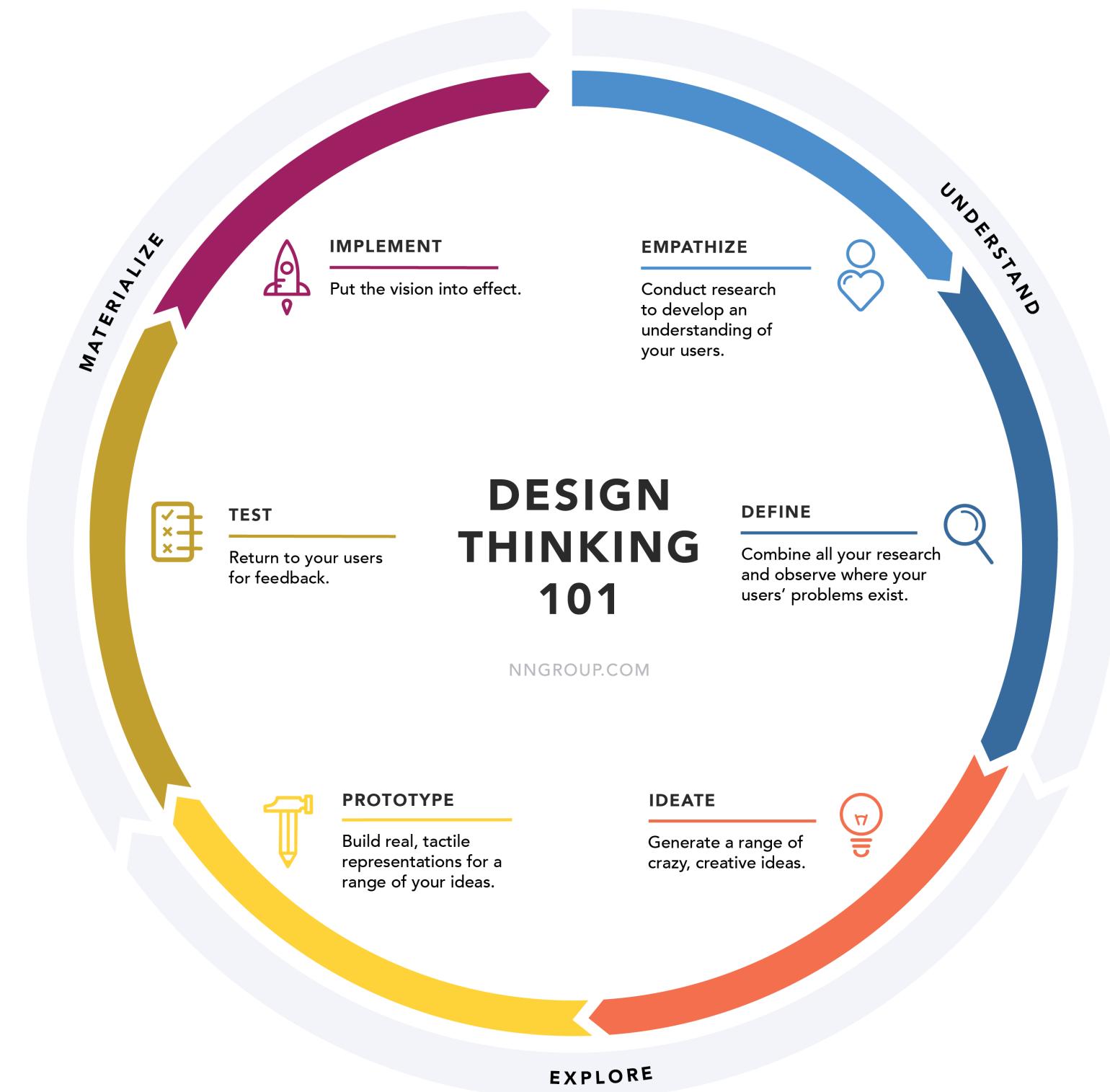
Building User Interfaces

Prototyping

Yixin Hu & Cole Nelson

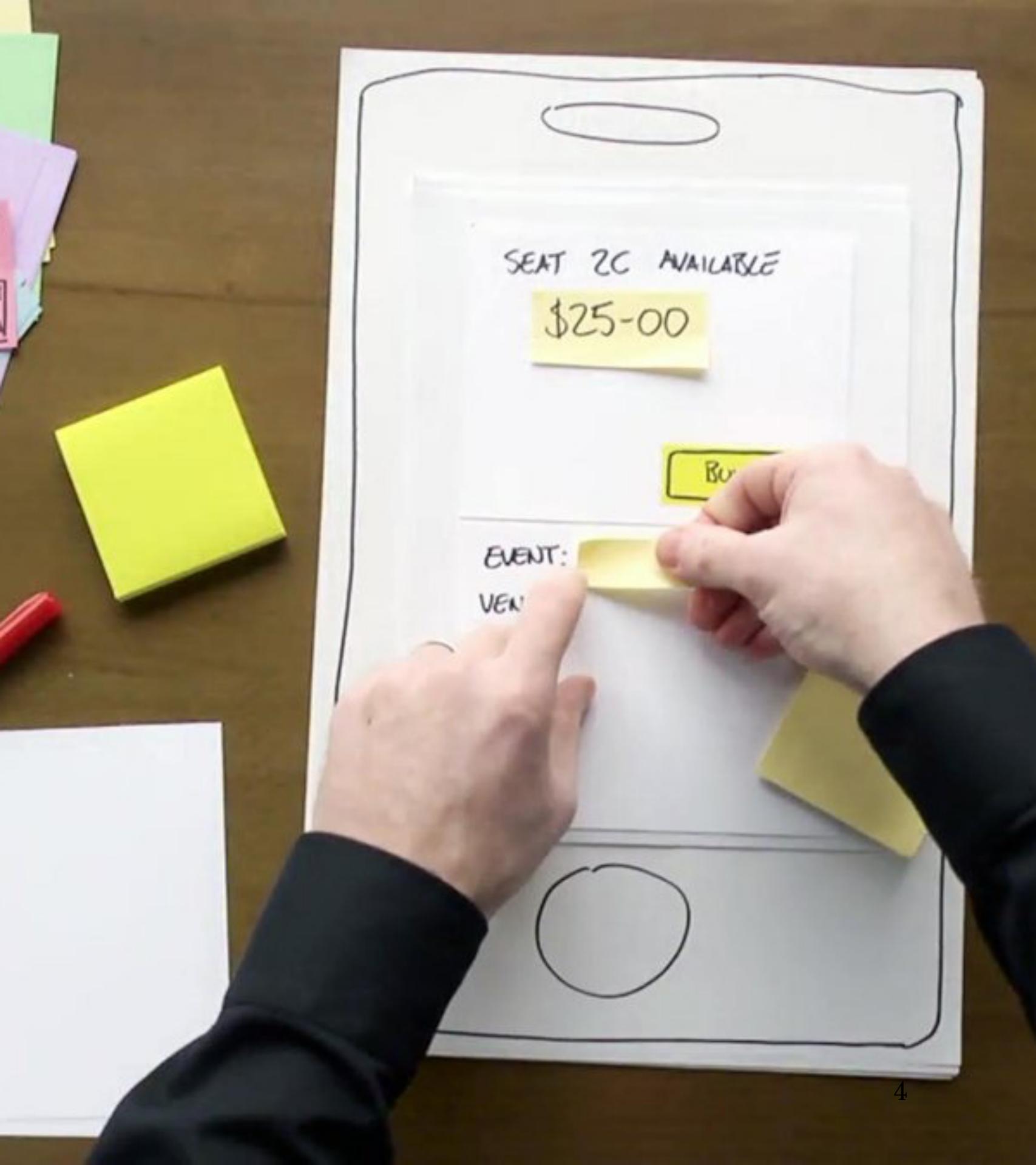
What we will learn today?

- Prototyping methods
- Prototyping theory
- Choosing the right method



Prototyping¹

Definition: Building a draft or an early version of a product or system in order to explore, demonstrate, and test design ideas for a part or the entirety of the product or system.



¹Image source

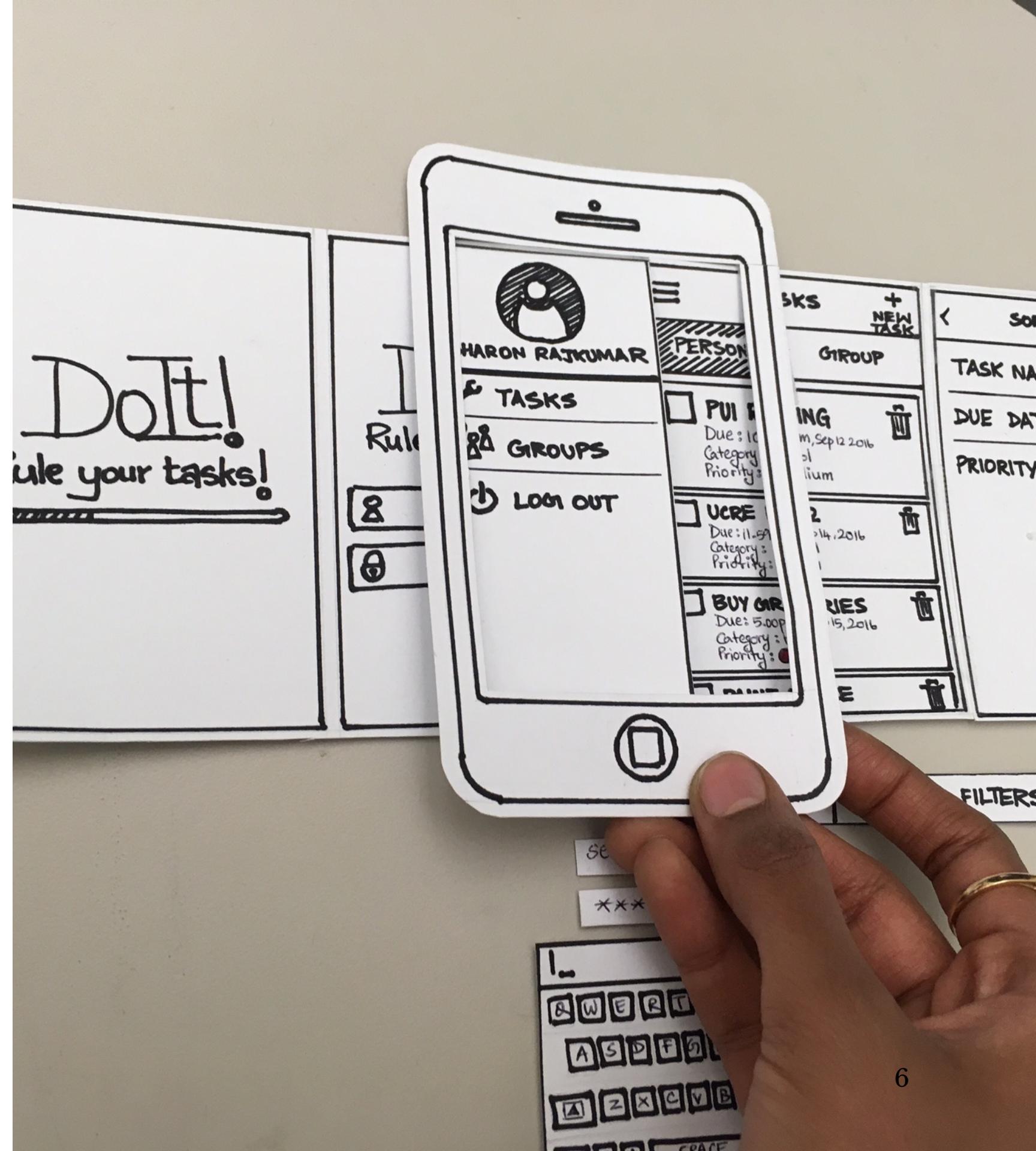
Prototyping Methods

- Paper prototyping
- Wireframes (with Annotation)
- Interactive prototyping
- Native prototyping

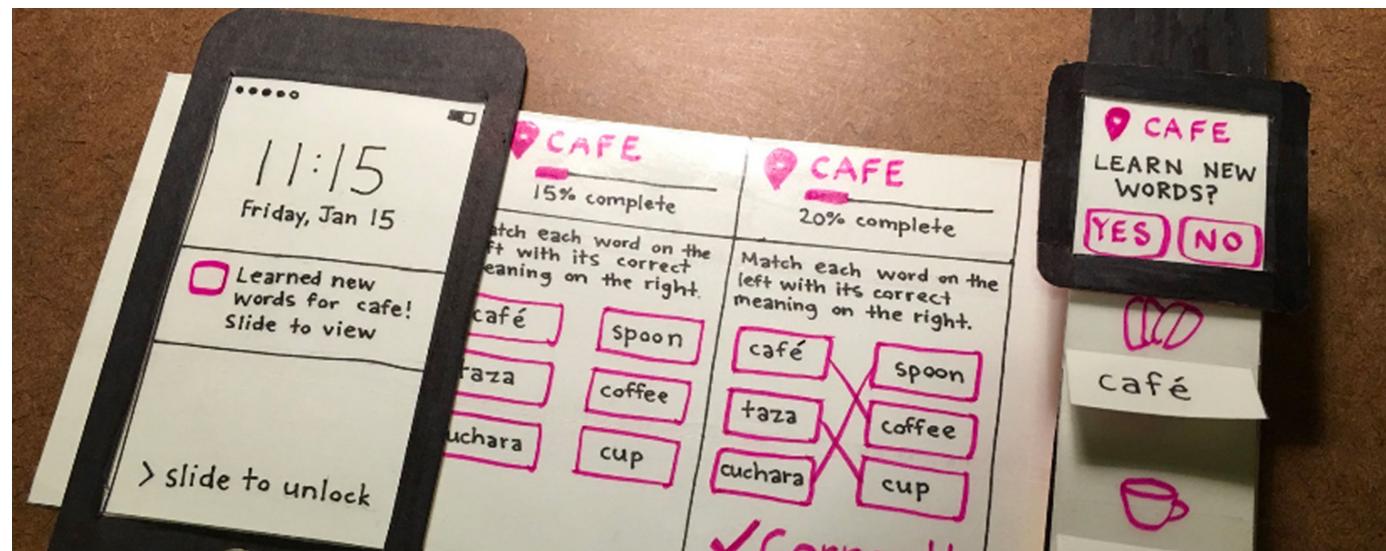
Paper Prototyping²

Definition: Mocking up design ideas by sketching pages/screens with design elements using design supplies (e.g., paper, pencils, markers, scissors, glue, tape) and simulating how the envisioned system would respond to user input by swapping different pages/screens and moving/changing design elements.

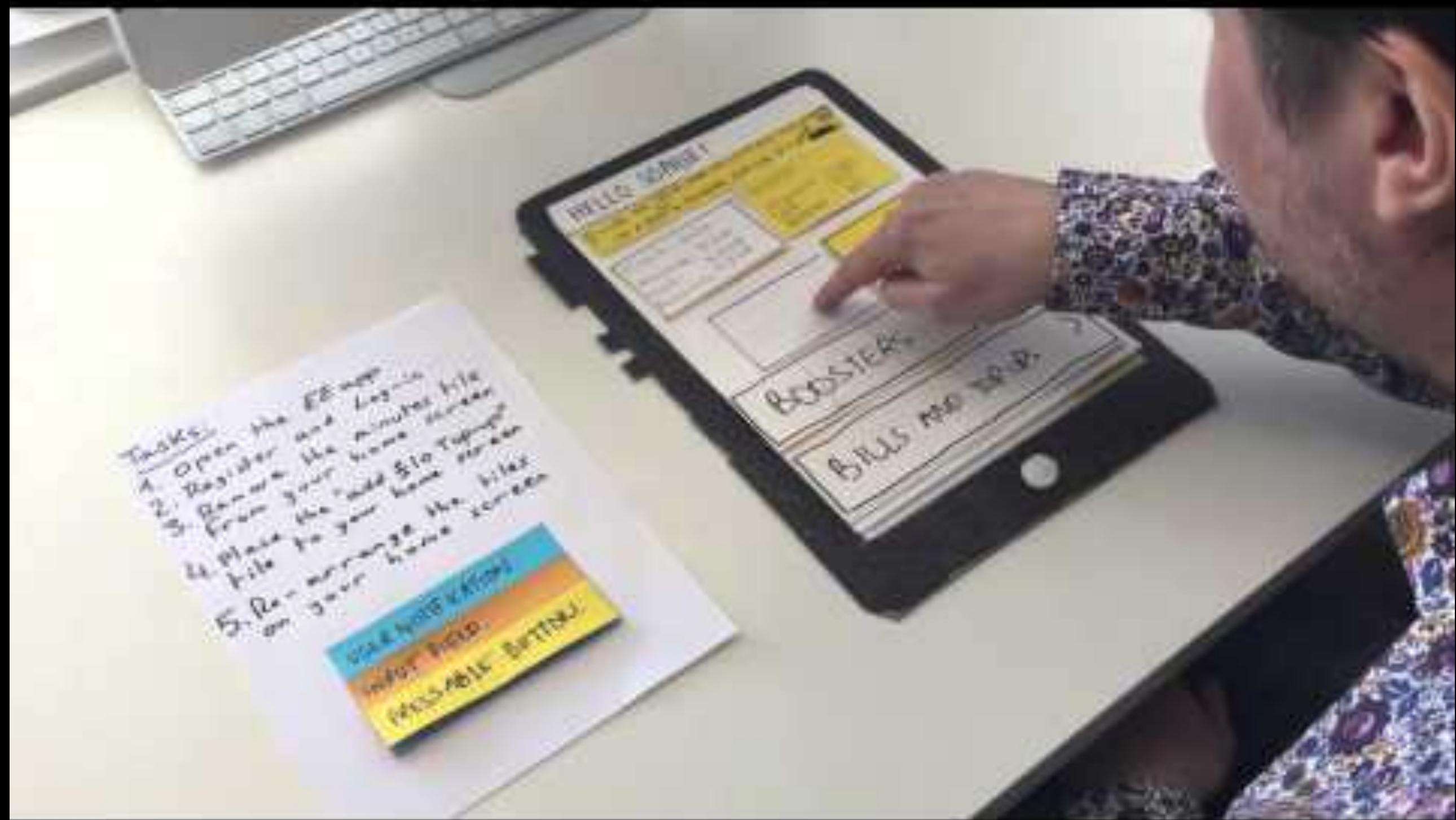
² [Image source](#)



Most useful at the earliest stages of the design process.³



³ Image source: [Left top](#), [Left bottom](#), [Right](#)



Wireframes

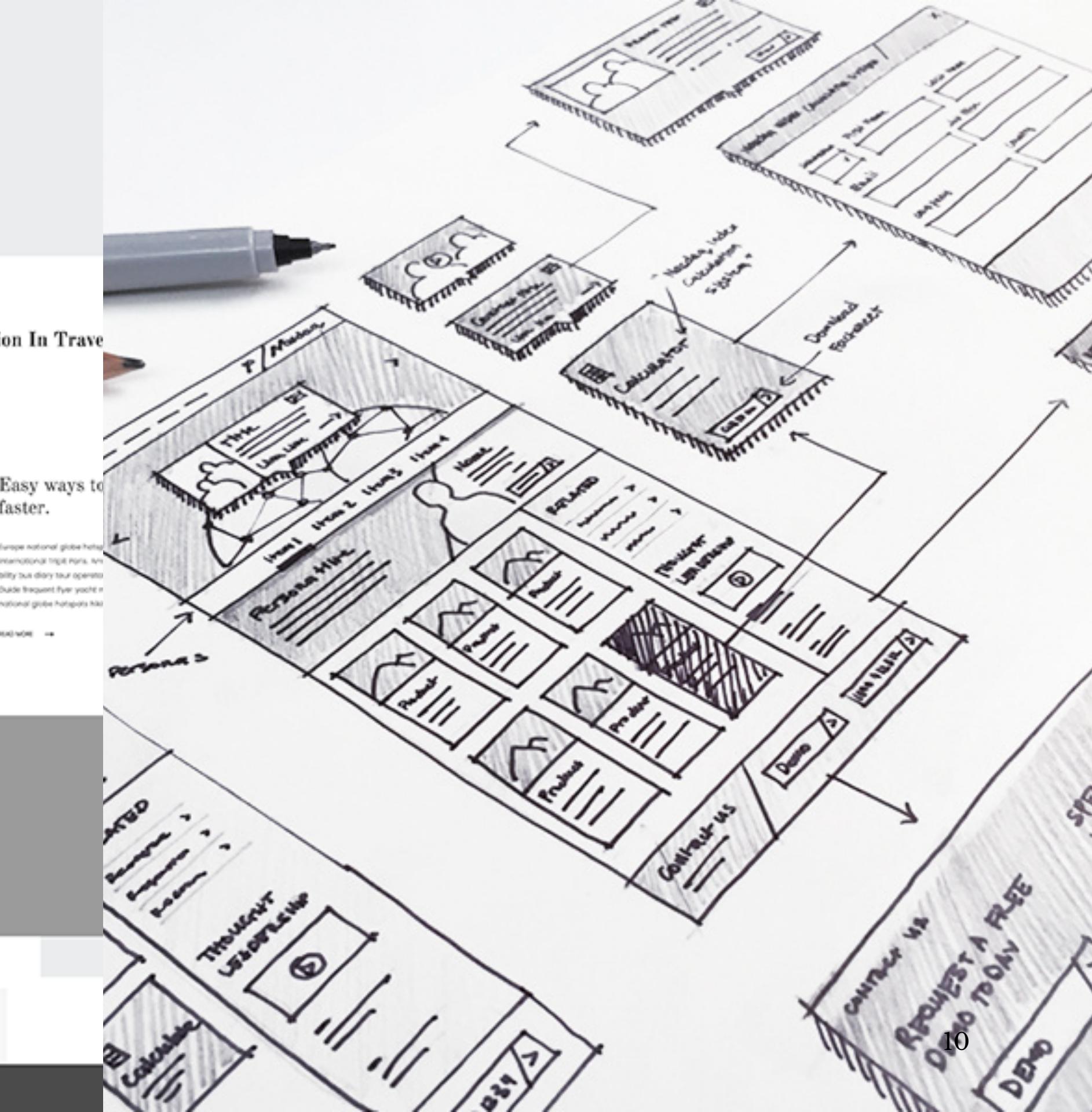
Definition: Lo-fi prototypes of the makeup of a design in terms of its structural components. Wireframes can be hand-drawn or digitally created.

Most useful in the early-to-mid stages of the design process.

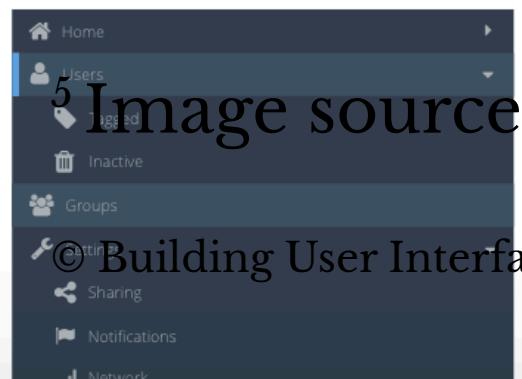
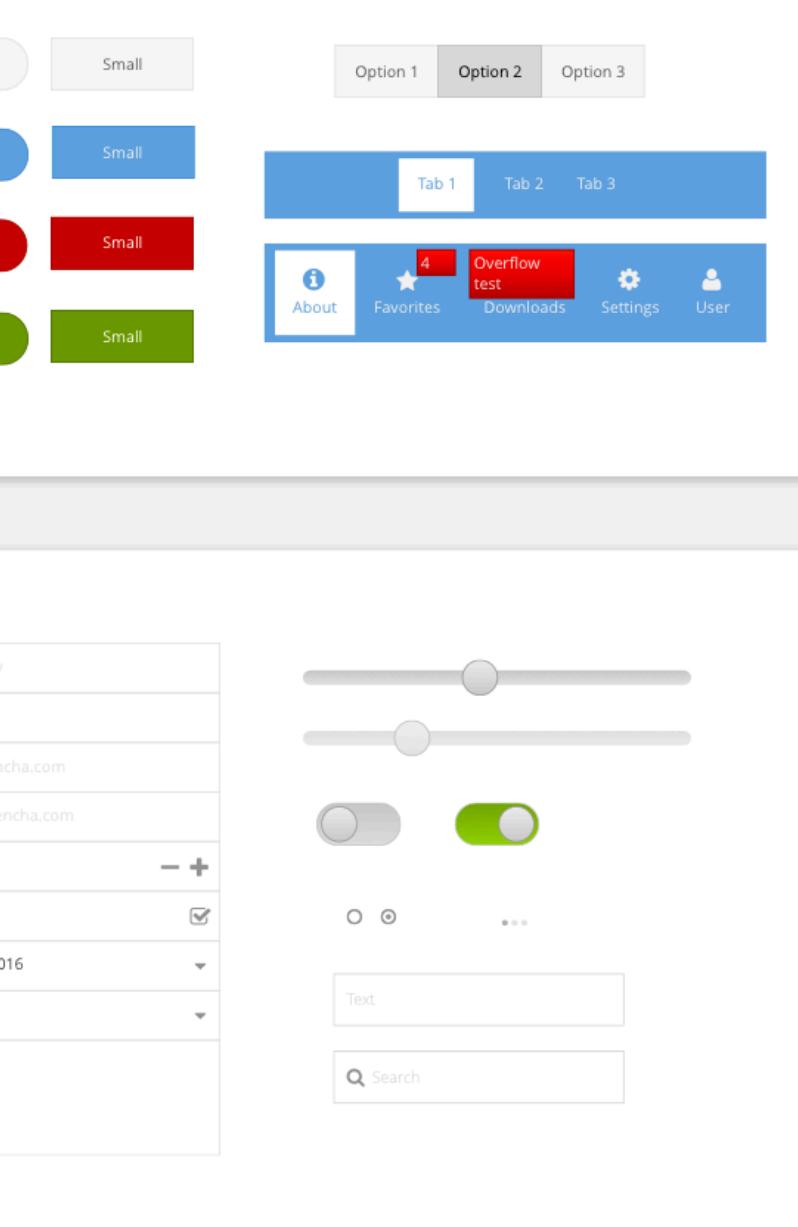
4



⁴ Image source: Left, Right



5



DataViews

A list view component titled 'DataViews'. It displays five user profiles, each consisting of a small square profile picture and the user's name followed by their employer. The profiles are: John Battelle (Federated Media Publishing Inc.), Carol Bartz (Yahoo!), Tim O'Reilly (O'Reilly Media, Inc.), Eric Schmidt (Google), and Evan Williams (Twitter, Inc.).

Overlays

A modal dialog box with a 'Cancel' button on the left and a 'Done' button on the right. Inside, there are three tabs: 'Master' (disabled), 'Journeymen' (highlighted with a yellow background), and 'Apprentice' (disabled). Below the tabs is a date range selector showing 'February 26 2014' and 'March 27 2015'.

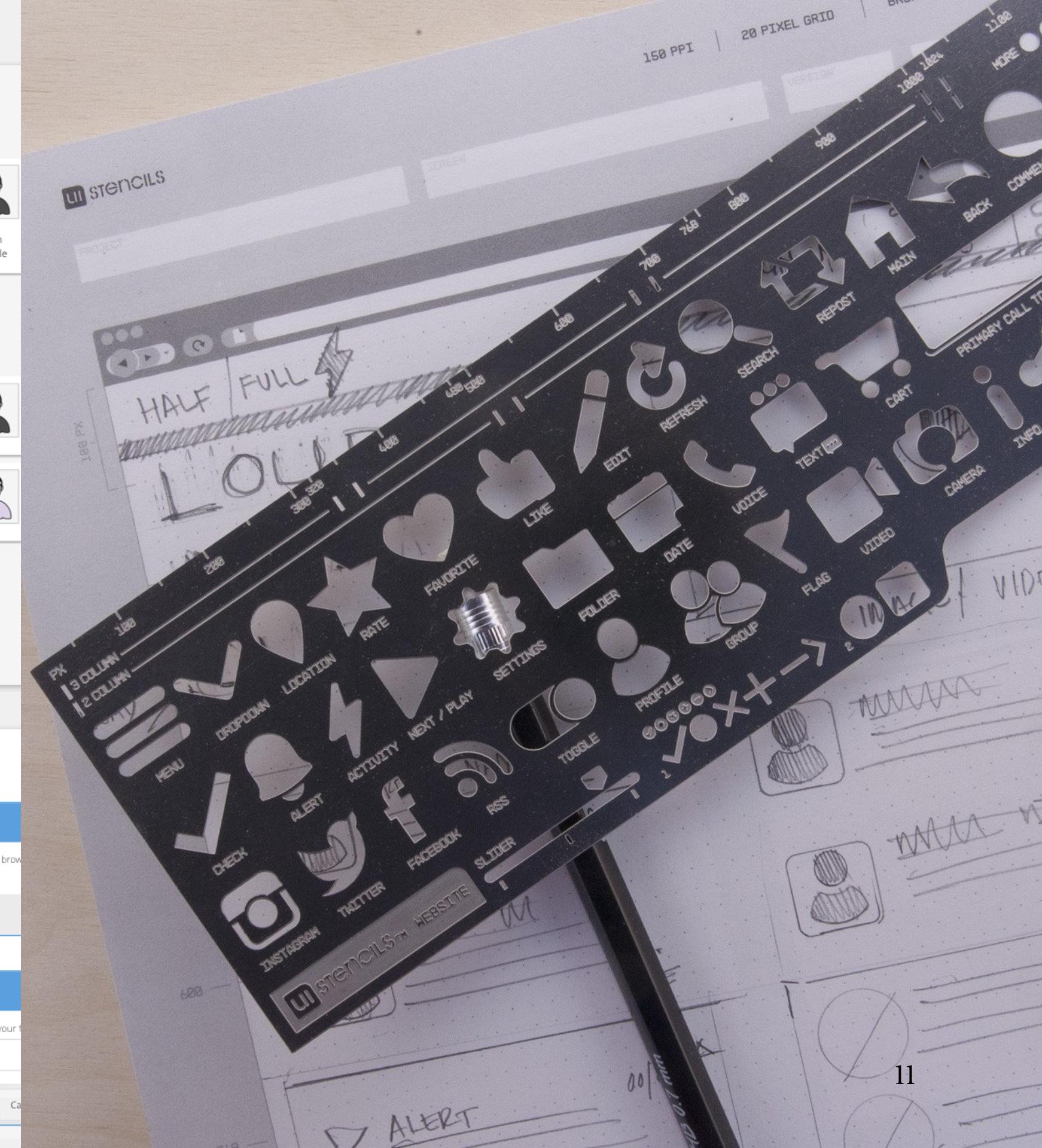


Image source: [Left](#), [Right](#)

Annotations

Definition: Labels, explanations, and notes that provide further information on the goals, content, and functioning of the design elements illustrated on wireframes.

Key in addressing the problem of interpretability of simplified designs for all stakeholders.

Requirements & Description Blocks

Item	Title	Description
1	Add Pro Coverage	When the user selects a specific pro coverage option, it will automatically be added to the cart and the line will collapse – See Page 7
2	Free Gift	The associated product should visually look as part of the parent product.
3	Promo or Source Code	Please refer to Page 7
4	Gift Card	Please refer to Page 7

MASTHEAD

Home > Shopping Cart

Shopping Cart

+ Save Cart | View Printable Cart

Your Items

Product Image	Dunlop Original Crybaby Wah Pedal Item #326874 In Stock Condition: New
	<p>1 Add Pro Coverage Descriptive text about warranty Descriptive text about warranty</p> <p><input checked="" type="radio"/> 2 Years: \$219.99 <input type="radio"/> 3 Years: \$299.99</p> <p>2 Dunlop Original Crybaby Wah Pedal FREE GIFT</p>
	Dunlop Original Crybaby Wah Pedal Item #326874 In Stock Condition: New

A Continue Shopping **B** Continue to next step

C Update **D** Remove **E** Move to wishlist

F Calculate Shipping **G** Check stores **H** Shipping outside the US?

I Continue Shopping **J** Continue to next step

K Continue Shopping **L** Continue to next step

M Continue Shopping **N** Continue to next step

O Apply **P** Apply

6 **Image source**

S Continue Shopping

Unit Price **Quantity** **Total Price**

\$100.00 2 \$200.00

FREE

\$100.00 2 \$200.00

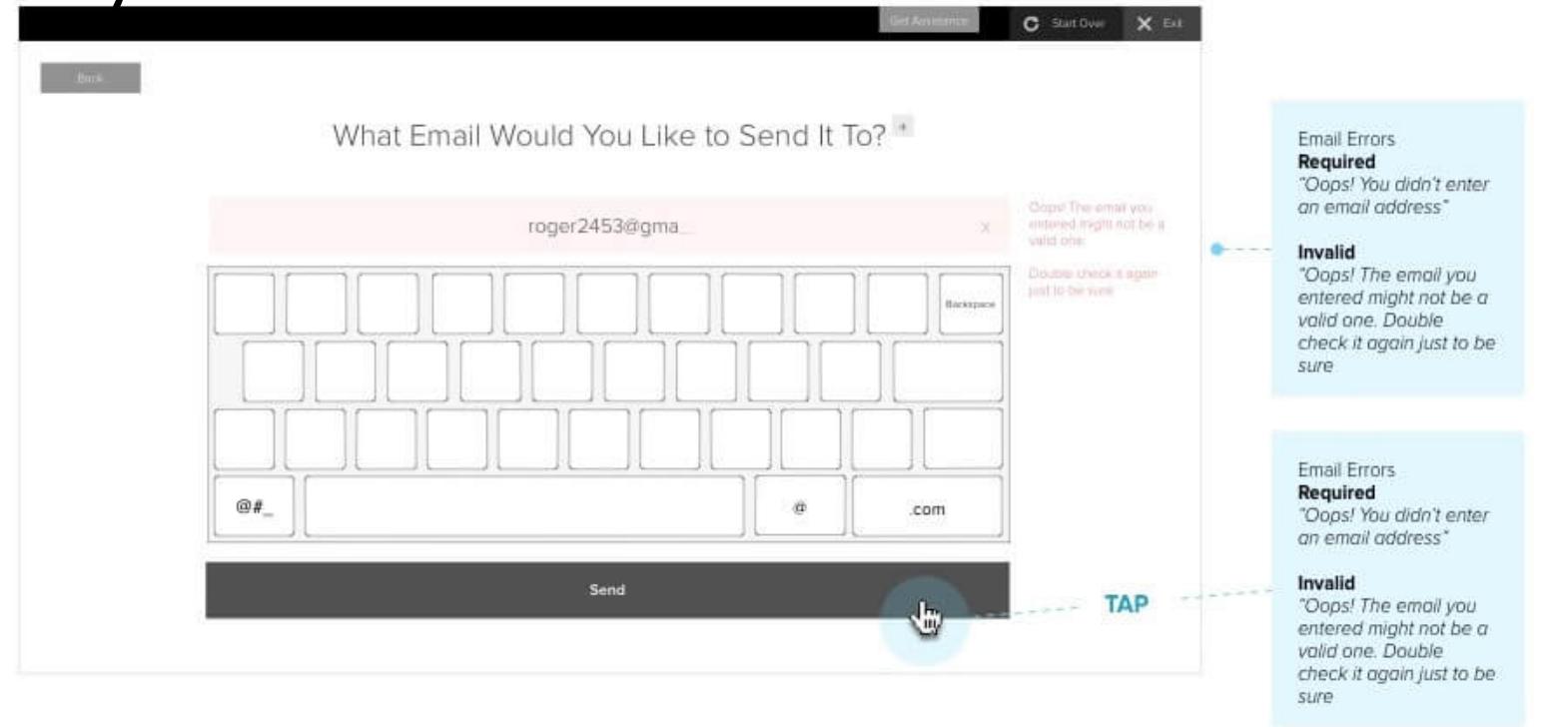
Your Subtotal: \$400.00

Continue Shopping Continue to next step

Subtotal does not include tax and shipping and handling rates, which will be calculated later

Field Label	Field Name	Type	Description	Field Length	Read Only (Y/N)
A	Continue Shopping	Text Link	Back to previously viewed page	n/a	N
B	Continue to next step	Button	Go to Checkout Page. After checkout redesign, got to sign in page	n/a	N
C	Update	Text Link	Updates line item quantity.	n/a	N
D	Remove	Text Link	Remove line item from cart	n/a	N
E	Move to wishlist	Text Link	Removes the item from the cart and adds the item to wish list. No changes to the current wish list process	n/a	N
F	Calculate Shipping	Text Link	As is today – No Change	n/a	N
G	Check Stores	Text Link	Direct users to Pick up in store page (Page 3) For public site, use the users location determined by Geo IP to show the stores in the order of proximity. If from SPO, use the store's actual location by default User can input a zip code in the search bar above to change location	n/a	N
			Please sync up this overlay and the one used on Product detail so that they are identical		
			Page functionality is the same as the one on Product Detail, except we have made the following changes		

Email Validation & Confirmation

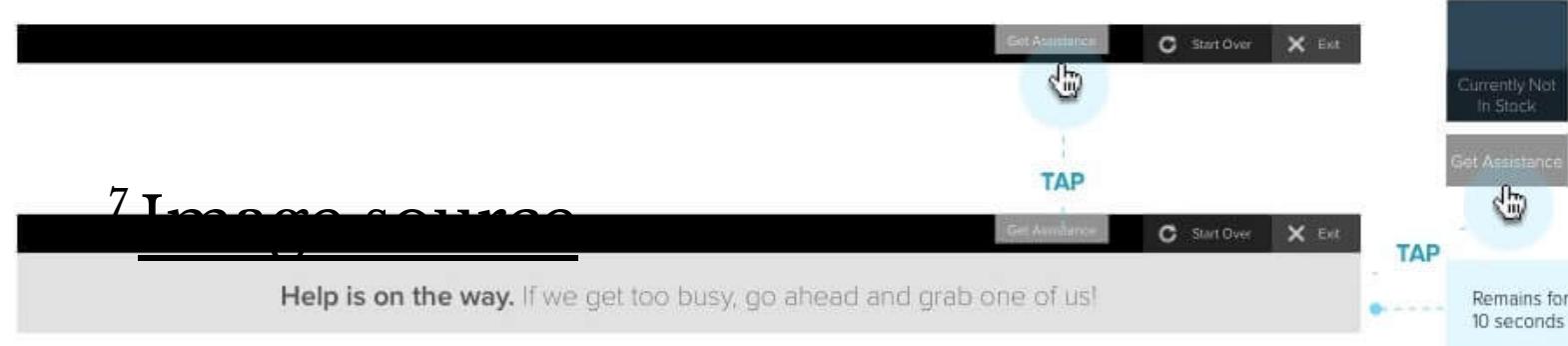


Success State

Failure State

Sending State

Get Assistance

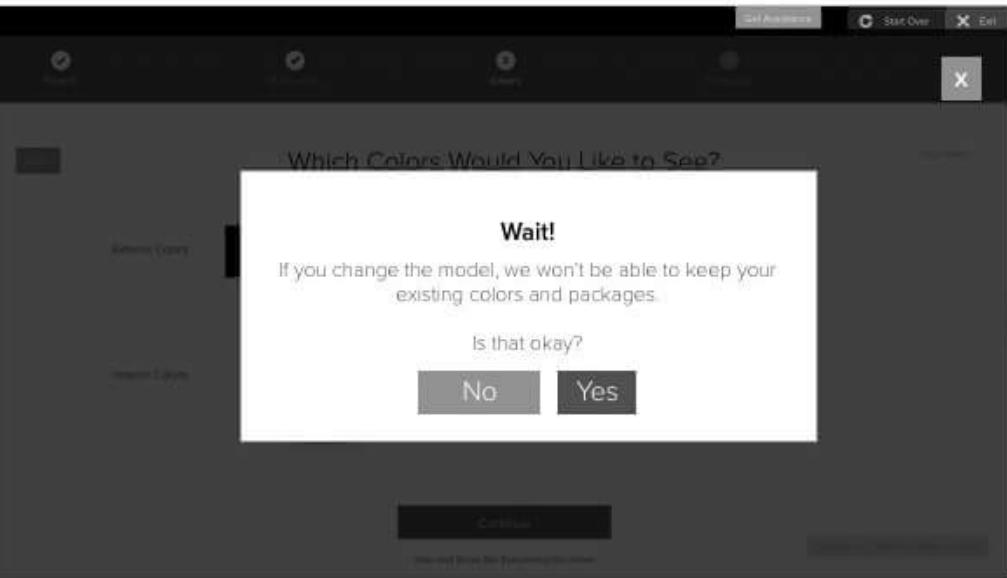


7. I need a source

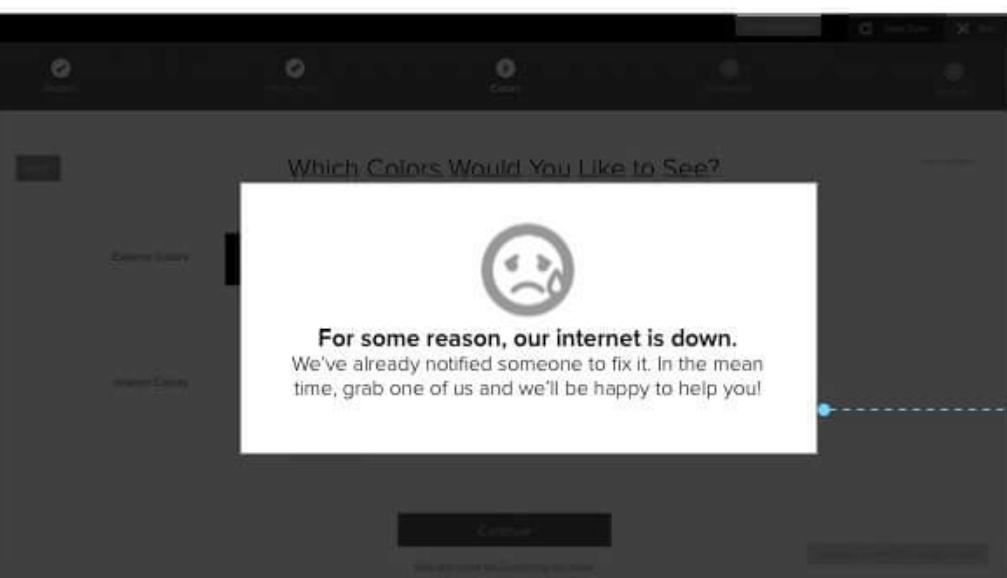
Help is on the way. If we get too busy, go ahead and grab one of us!

© Building User Interfaces | Prototyping

Warning Modals



Internet Down



Other Modals

Wizard AND Filter Change Model Event

- When user tries to change the model toggle on results screen (selecting an actual model button, not the expand down button)

"If you change the model, we won't be able to keep your existing colors, packages, or model year. Is that okay?"

Start Over Event

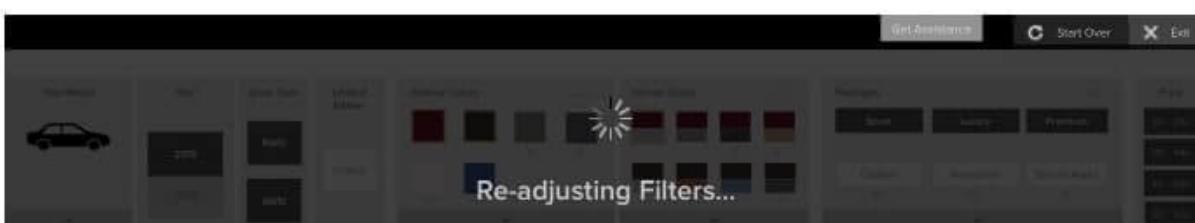
"If you start over, you'll lose any work you've done so far. Is that okay?"

Exit Event

"You're about to exit the inventory search and will lose any work you've done so far. Is that okay?"

Send an email (primary email address the dealership provides) stating the kiosk is not receiving internet

Filter Changes



Occurs when model or year is changed

14

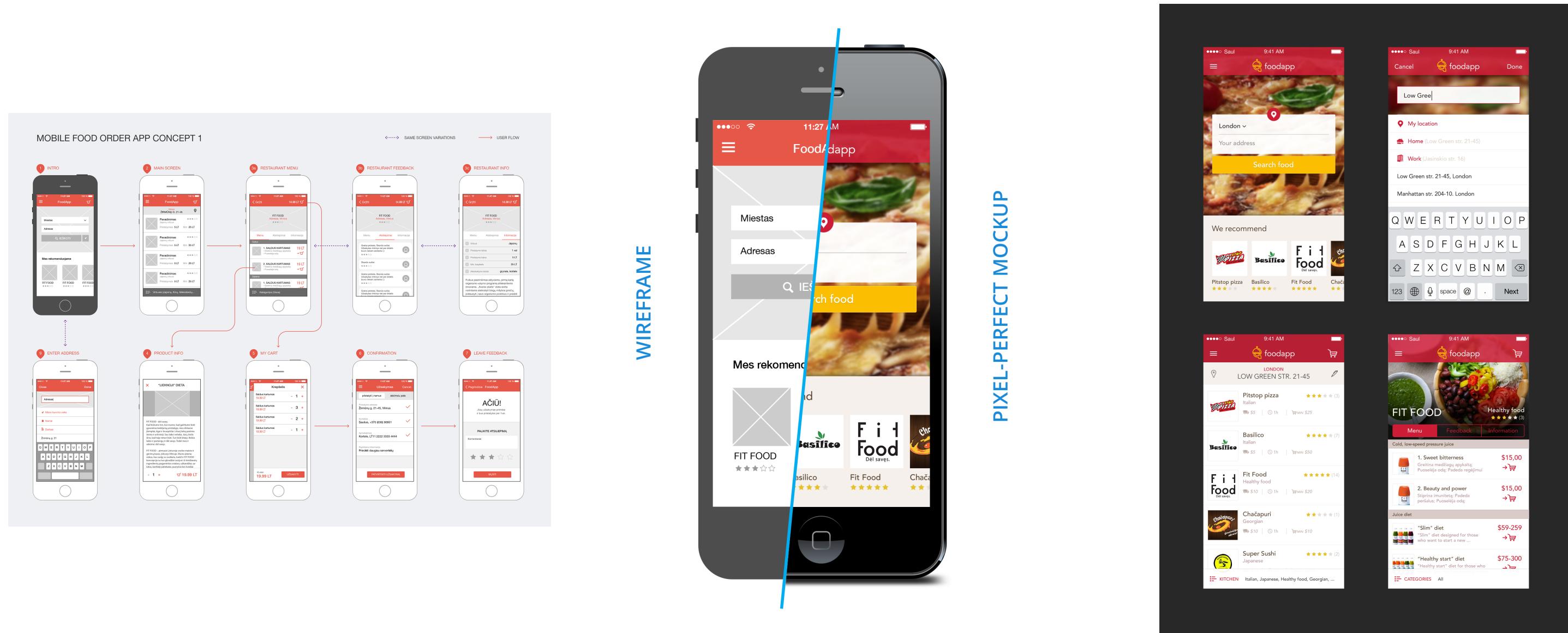
Interactive prototyping

Definition: Creating realistic prototypes of the navigation or structural components (or both) of the design idea by creating a series of screens/pages with design elements, linking these screens/pages for navigation, and simulating the transitions between screens/pages.

The screenshot illustrates a user interface design for a travel website. The 'Home' screen features a large image of mountains, a 'FEATURED' section with the title 'Backpacking Through Southern Utah', and a 'LATEST ADVENTURES' section with cards for 'CONQUERING EL CAPITAN' and 'CAMPING: THE ROCKY MOUNTAINS'. The 'CAMPING' card includes a 'Top destination' note. The 'Latest - Rocky Mountains' screen shows a landscape image, the title 'ROCKY MOUNTAINS', a subtitle 'Top destination for 2015', and a detailed paragraph about the beauty of the region. The 'Feature Story - Zion' screen displays a title, a quote by Ralph Waldo Emerson, and statistics like '10 DAYS' and '54 MILES'. The Figma interface shows the design tools and properties for the selected element.

⁸ Image source

Interactive prototypes can use *lo-fi* or *hi-fi* components.⁹



⁹ Images source

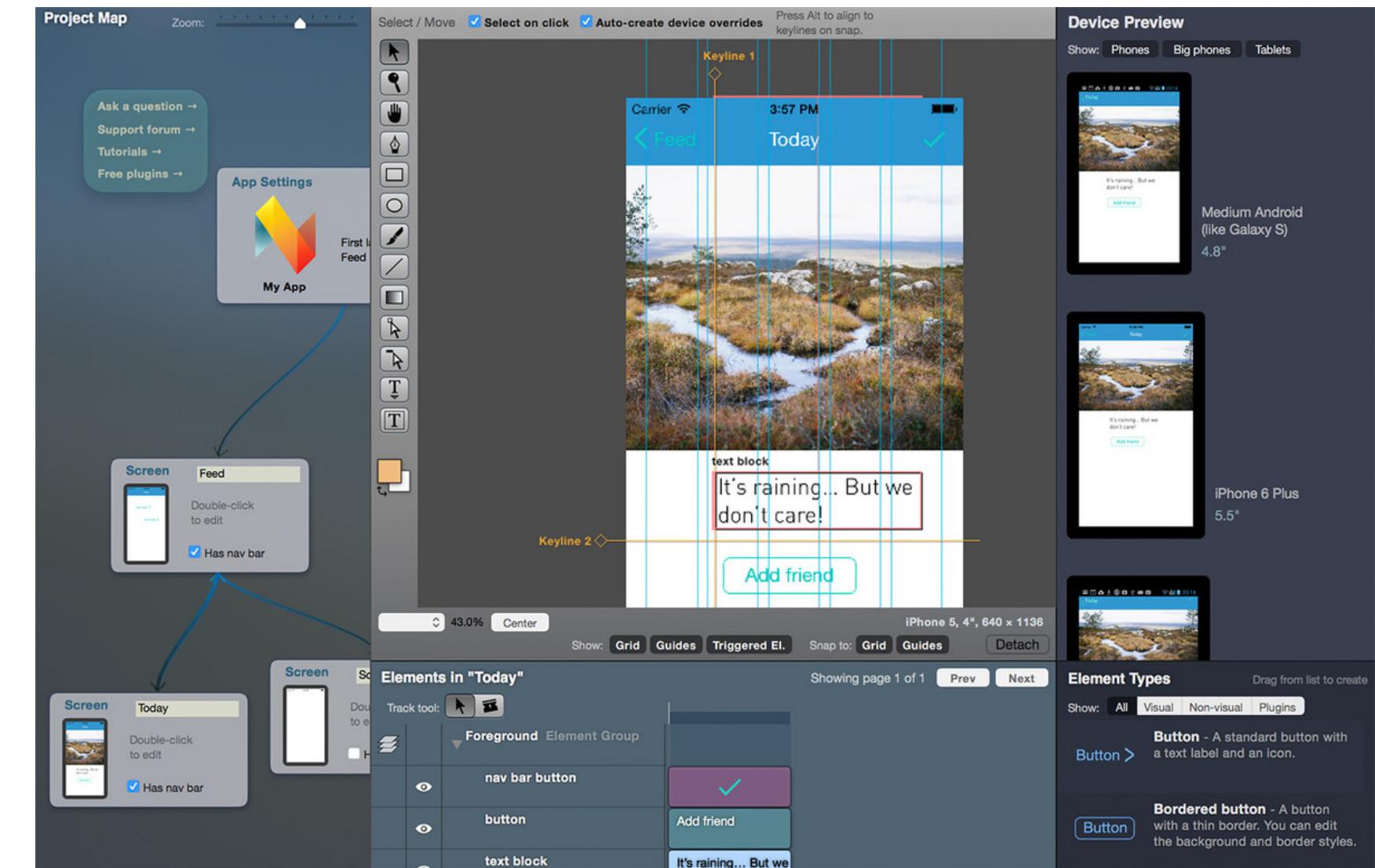
Native prototyping¹⁰

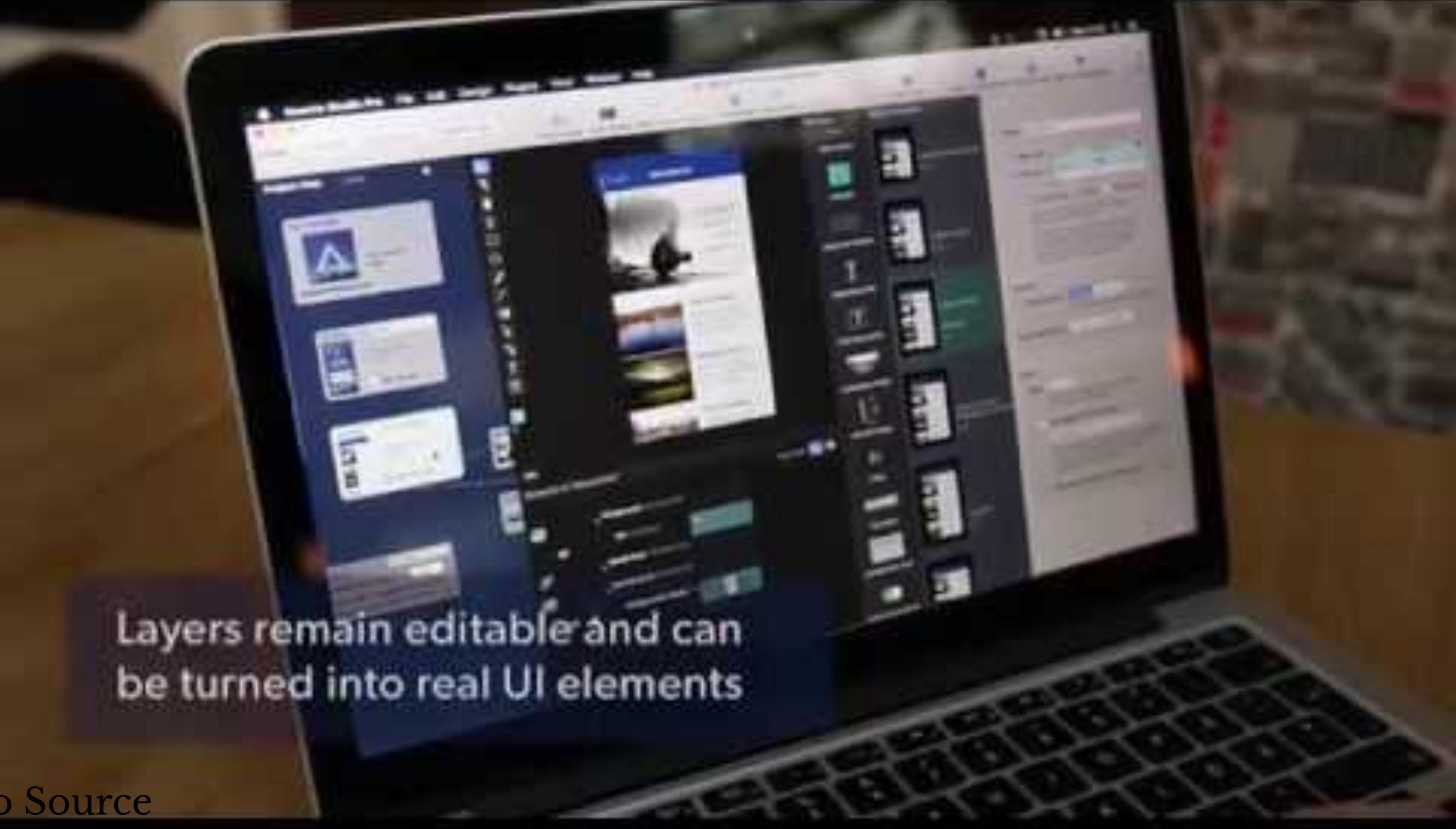
Definition: Implementing and testing design ideas on the target technology platform of the design.

Examples:

- React Studio
- Bootstrap Studio

¹⁰ Image source





Layers remain editable and can be turned into real UI elements

Source

ICA G: Prototyping

Create a *lo-fi* prototype of Badger Mart for a mobile device!

Re-visit the HW7 Demo video for features...

- A user should be able to view available products.
- A user should be able to add and remove products from their basket.
- A user should be able to submit an order.

[Link to Figma Education team \(CS571 S25\) to access professional features](#)

Prototyping Theory

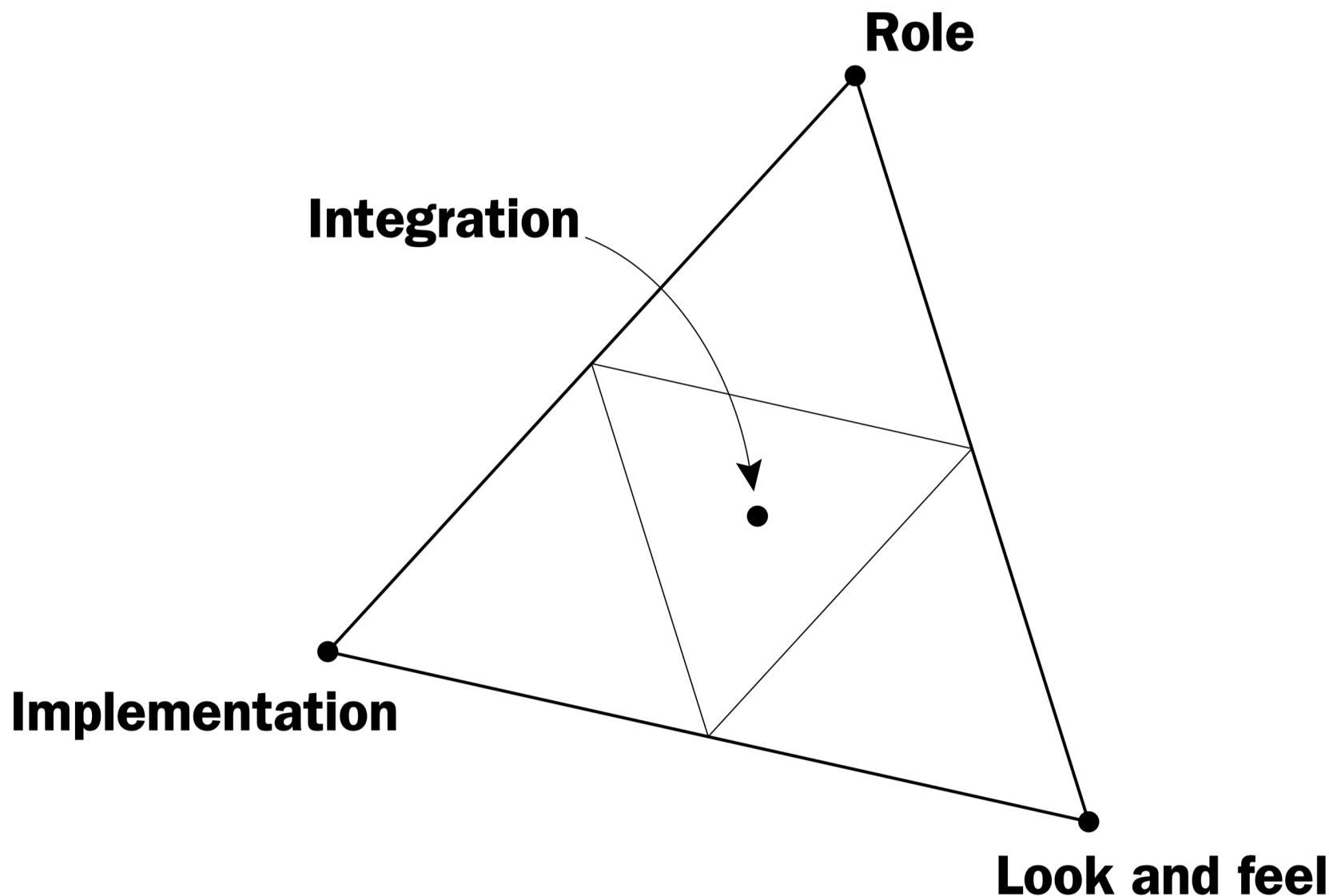
Prototyping Models & Strategies

- Three-dimensional model of prototyping
- Prototyping scope
- Prototyping fidelity

Three-dimensional Model of Prototyping¹³

Prototypes represent three dimensions of a design idea:

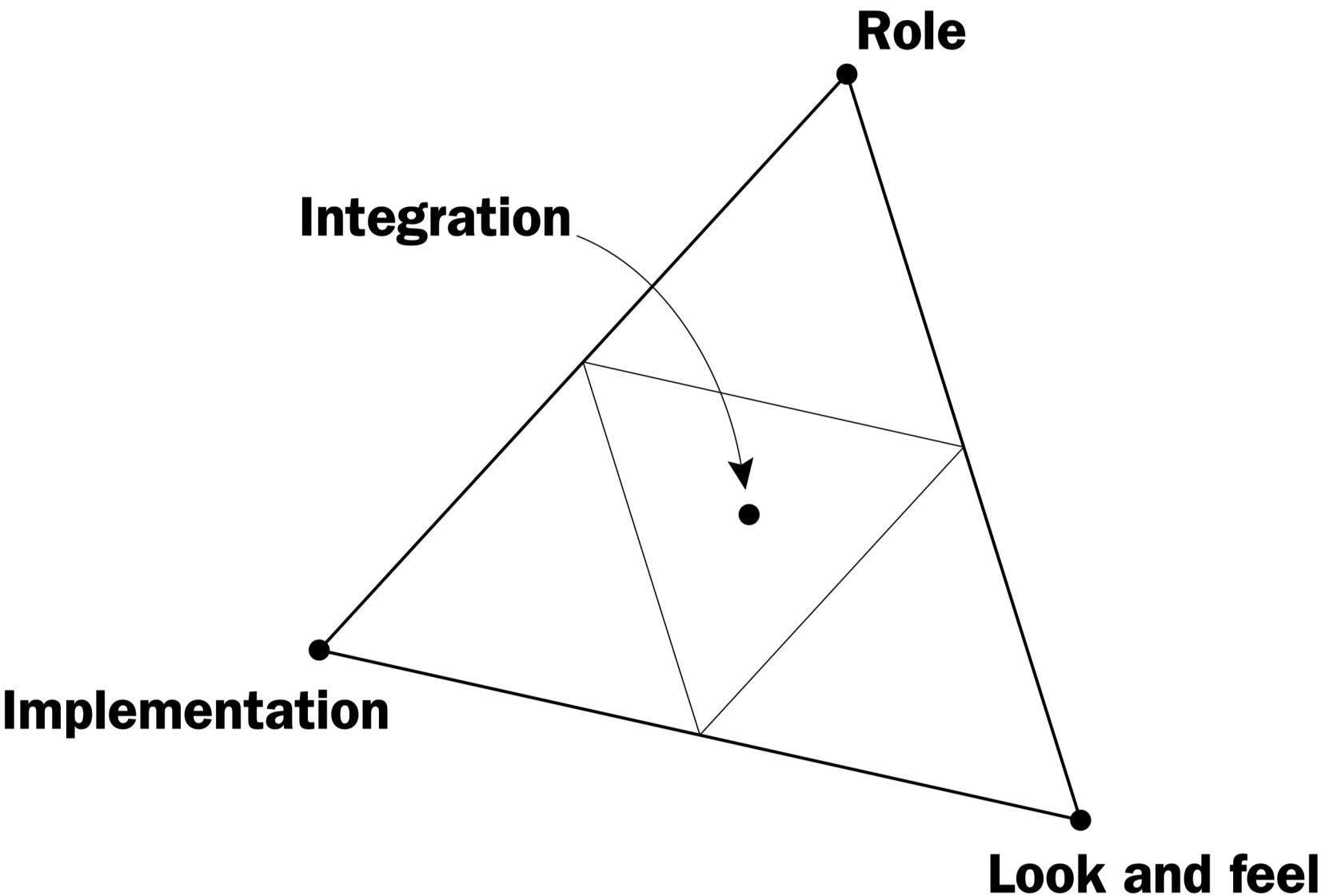
1. Role
2. Look and feel
3. Implementation



¹³ Houde & Hill, 1999. What do prototypes prototype?

Each dimension can be represented at various levels of fidelity.¹³

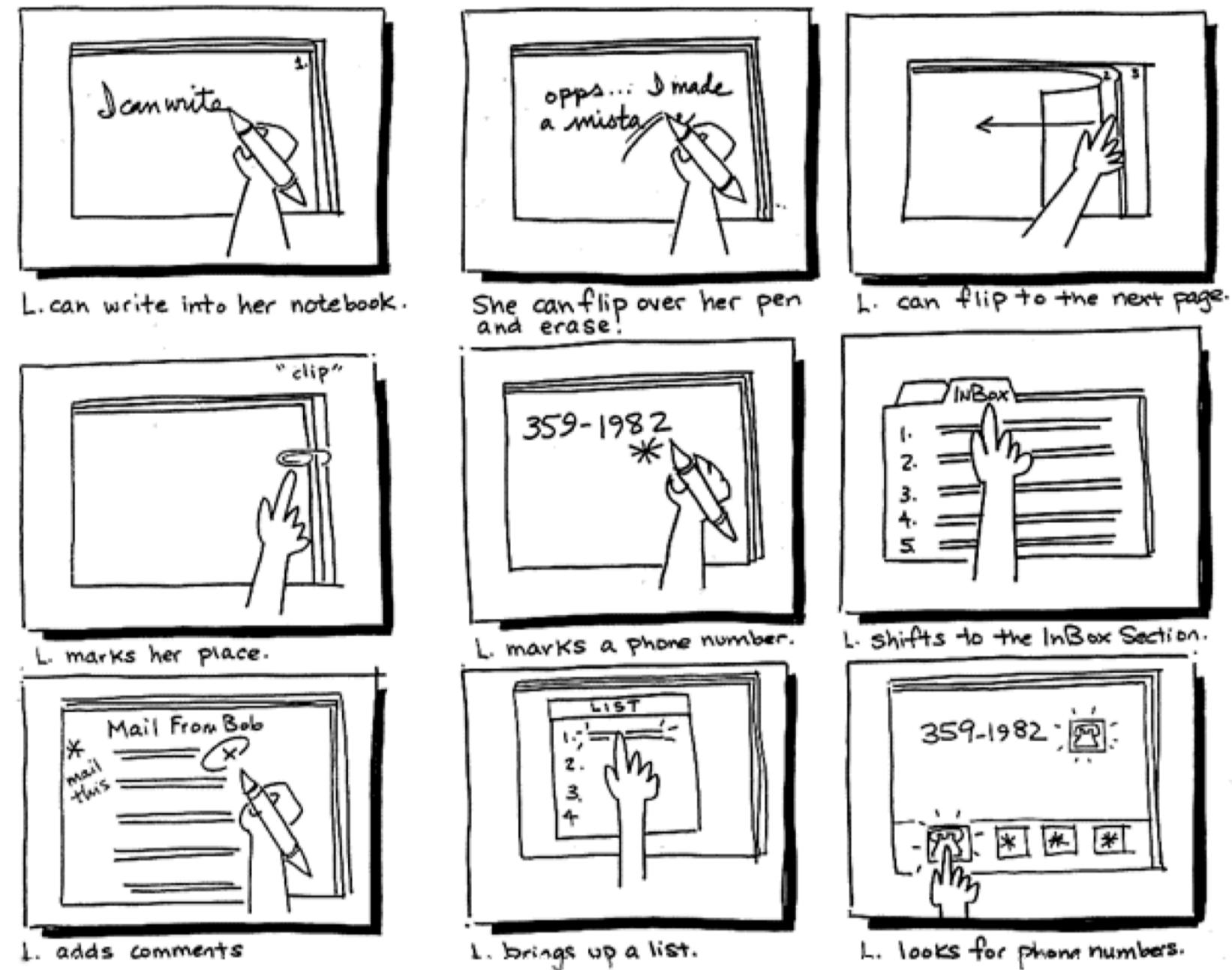
Their integration makes a working prototype or a pre-alpha product.



¹³ Houde & Hill, 1999. What do prototypes prototype?

Dimension 1: Role¹³

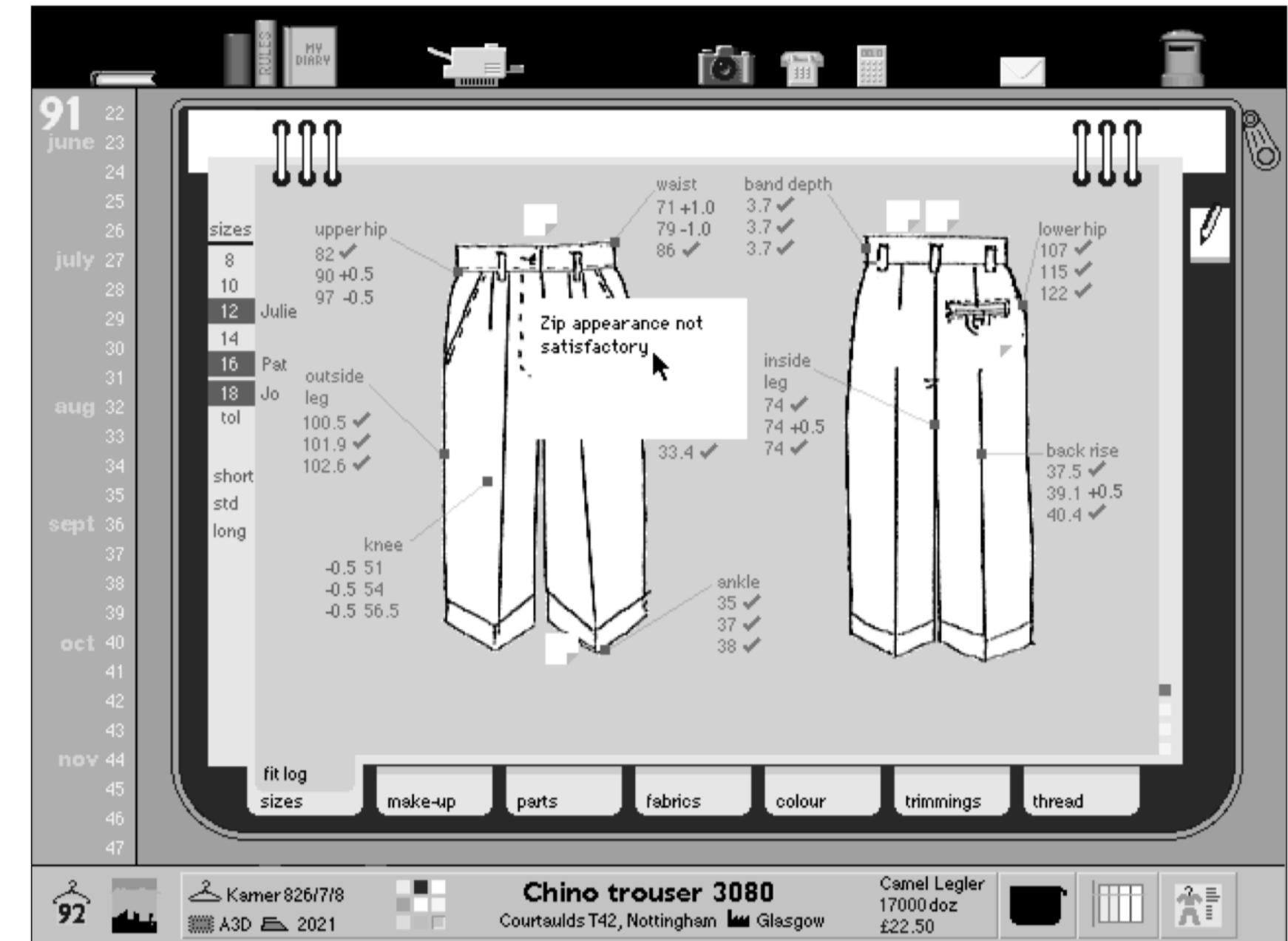
Definition: Represents the functions that the system serves in the user's life, i.e., how the system is useful to them.



¹³ Houde & Hill, 1999. What do prototypes prototype?

Dimension 2: Look and Feel¹³

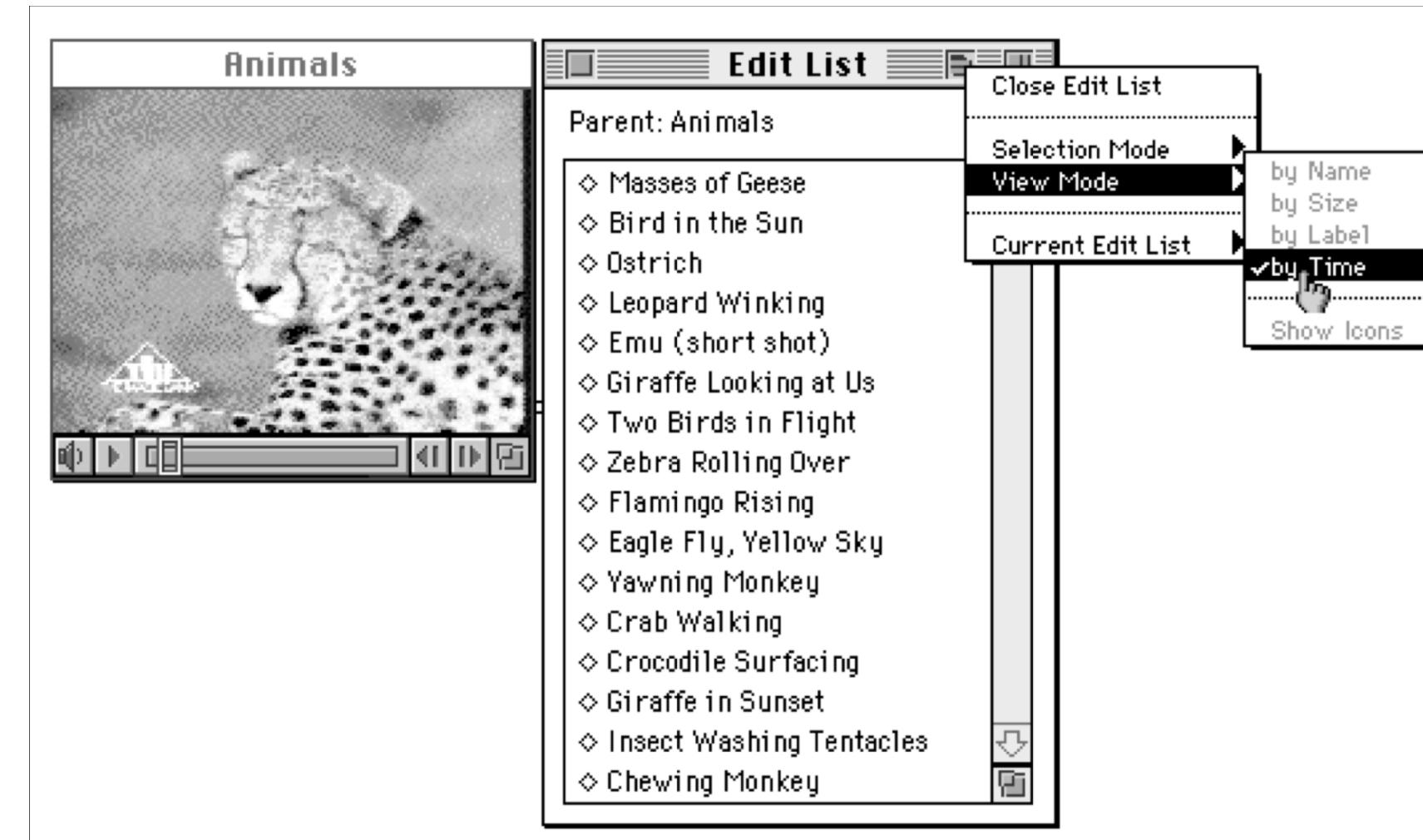
Definition: Simulates the sensory experience of the user while using the system, i.e., what the user sees, hears, and feels during use.



¹³ Houde & Hill, 1999. What do prototypes prototype?

Dimension 3: Implementation¹³

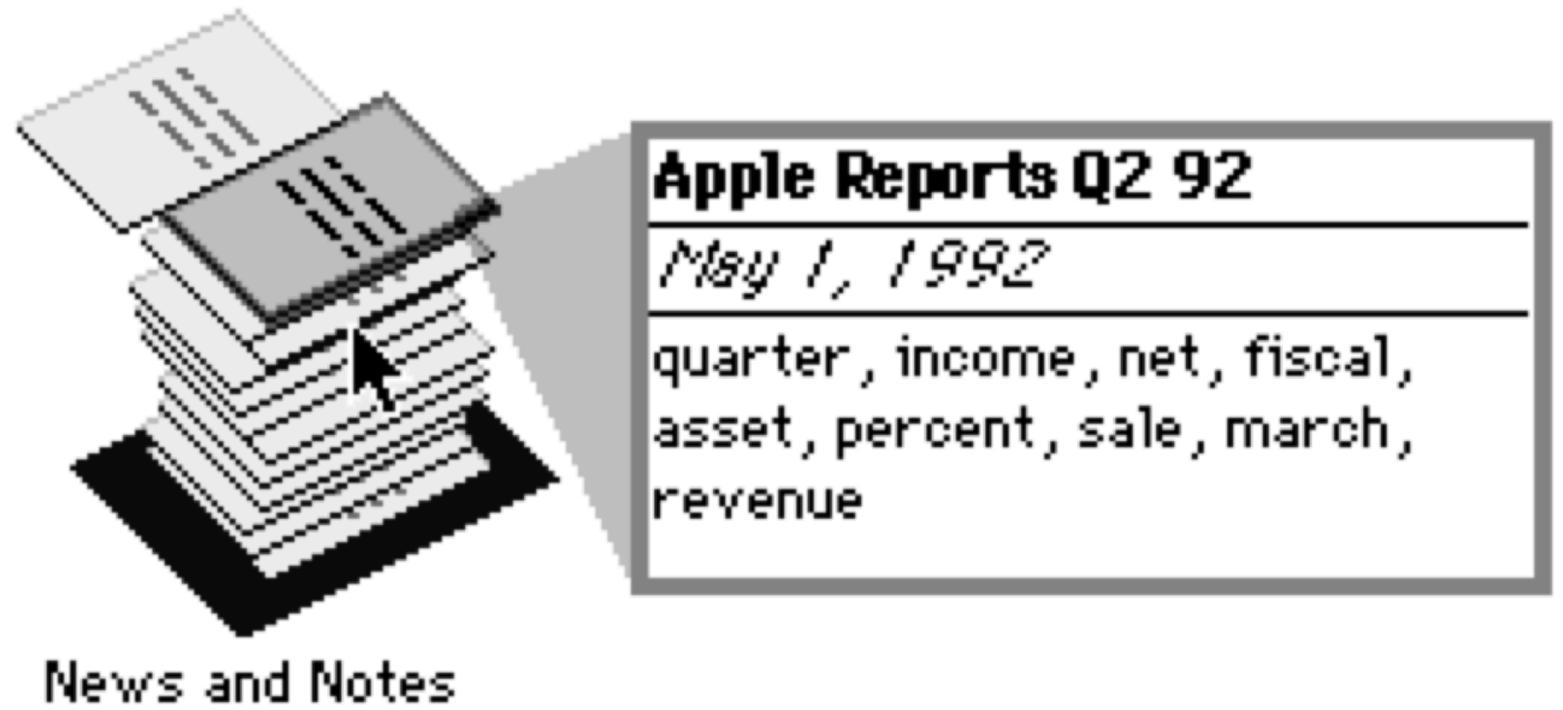
Definition: Includes the technical capabilities that enable the system to perform its function, i.e., the low-level details of how the system works.



¹³ Houde & Hill, 1999. What do prototypes prototype?

Dimensions Combined: *Integration*¹³

Definition: Represents the complete user experience with the system as envisioned in the conceptual design.

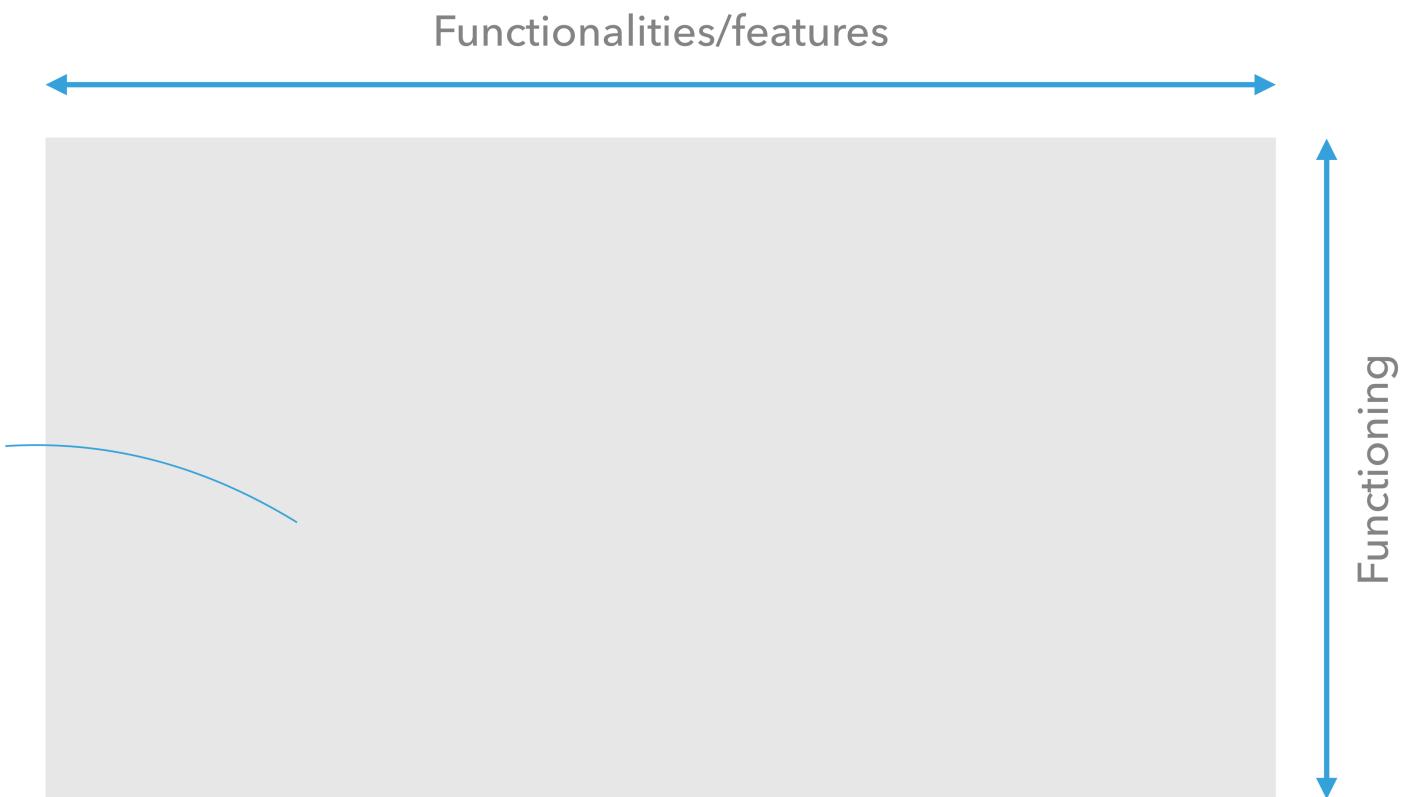


News and Notes

¹³ Houde & Hill, 1999. What do prototypes prototype?

Prototyping Scope

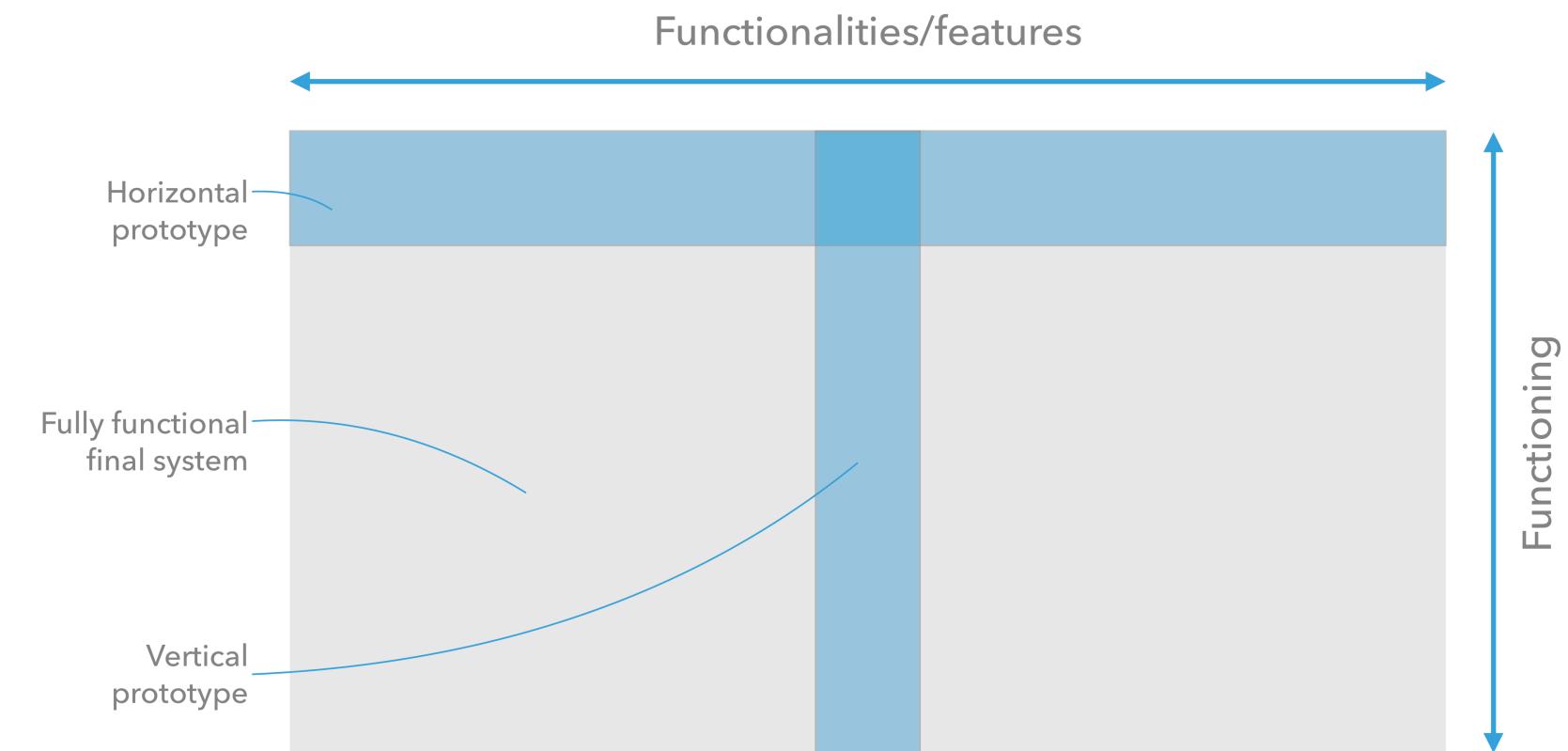
Consider the space of *features* and *functioning* as everything that a system does.



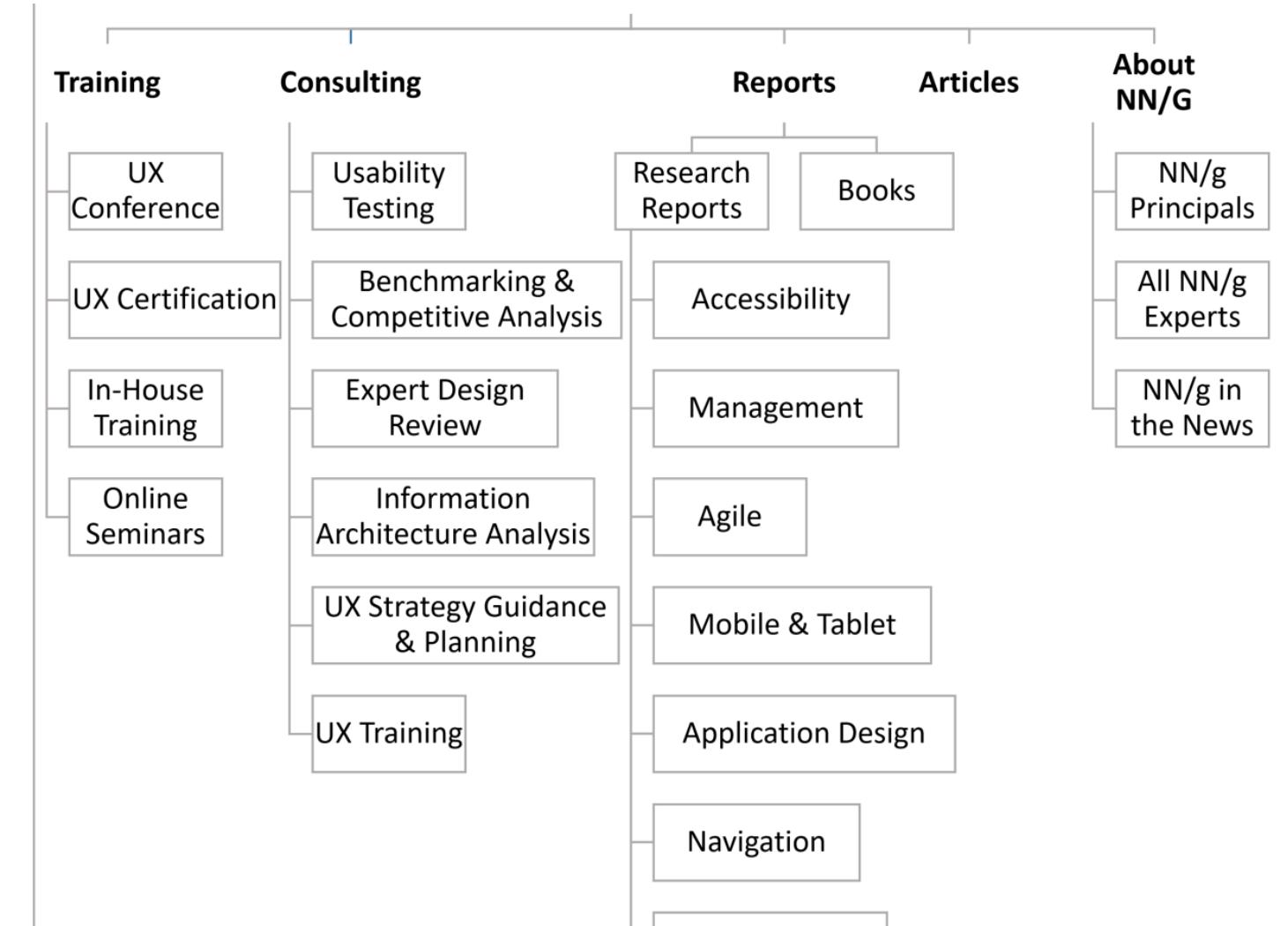
Prototyping Scope, Continued

Horizontal Prototype: Provides a broad view of the entire system and focus on the user interaction rather than the functionality.

Vertical Prototype: Focuses on a single feature/functionality and provides the full functioning of that feature.



Prototyping Scope, Continued¹⁴



¹⁴ Image source

Prototyping Scope, Continued¹⁴

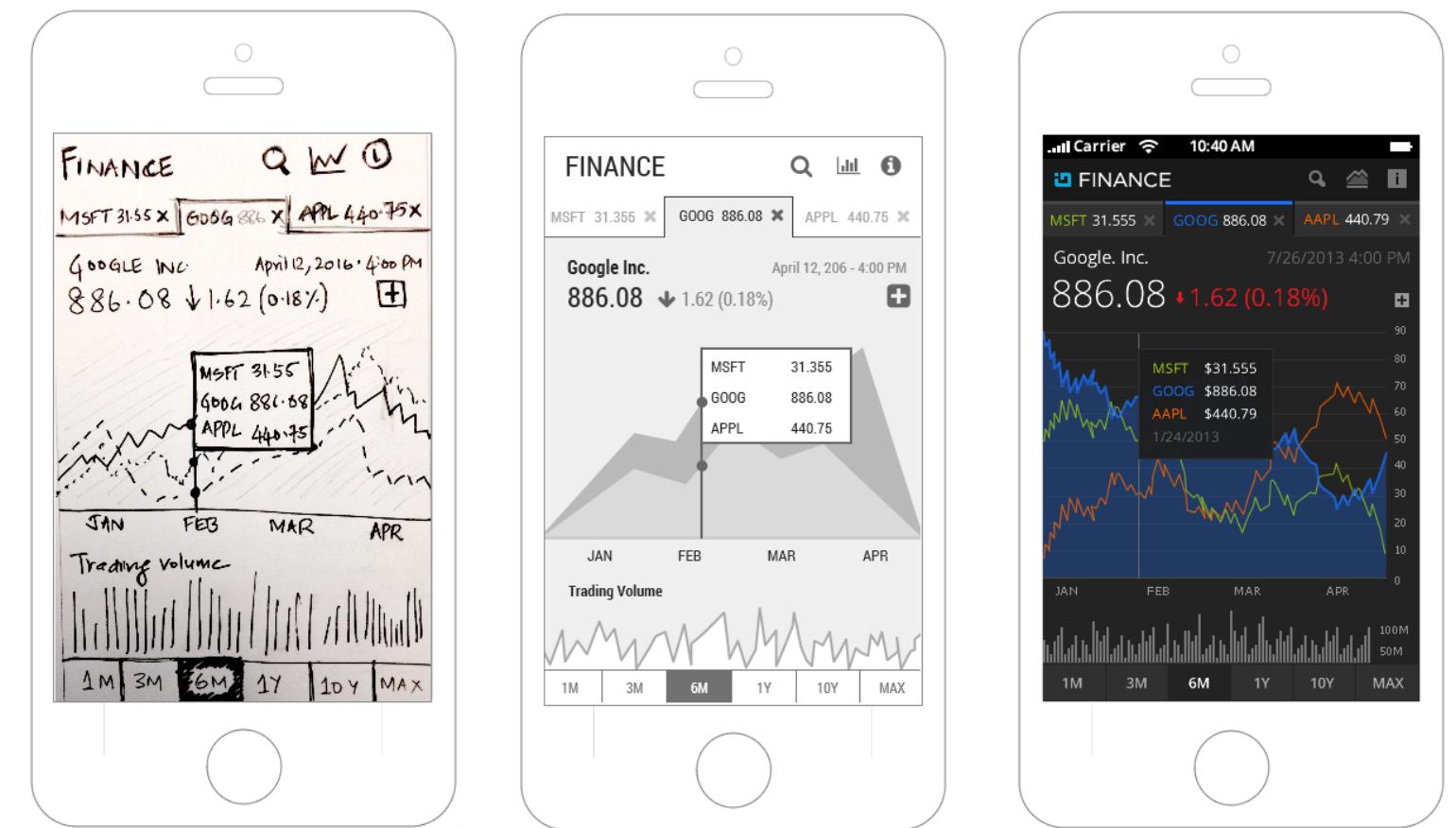
Horizontal	Discoverability	Findability	Usability
	<p> Whether people realize a feature exists</p>	<p> Whether people can find commands in the menus, or on main section pages, and where they look</p>	<p> Maybe for something extremely simple, like seeing an icon</p>
	<p> Only for the 1st or 2nd task can you usually test whether people realize a feature exists in the navigation. Testers quickly learn to go to the one prepared area of the prototype</p>	<p> Only for the 1st or 2nd task can you test whether people can find the expected command in the menus, and where they look for items. Testers quickly learn to go to the one prepared area of the prototype</p>	<p> For the one area that is more fully designed, collect feedback about interaction and flow of that design</p>
	<p> Can be tested slightly better than in T prototypes. Only for the first few tasks can you usually test whether people realize a feature exists in the navigation. Testers quickly learn to go to those few prepared areas of the prototype</p>	<p> Can be tested slightly better in T prototypes. Only for the first few tasks can you test whether people can find the expected command in the menus, and where they look for items. Testers quickly learn to go to those few prepared areas of the prototype</p>	<p> For the few areas that are more fully designed, collect feedback about interaction and flow of those designs</p>
Semi-Complete 	<p> Whether people realize a feature exists in the navigation</p>	<p> Find the expected commands in the menus, or on main section pages, and where people look for items</p>	<p> For the areas that are more fully designed, collect feedback about interaction and flow of those designs</p>

¹⁴ [Image source](#)

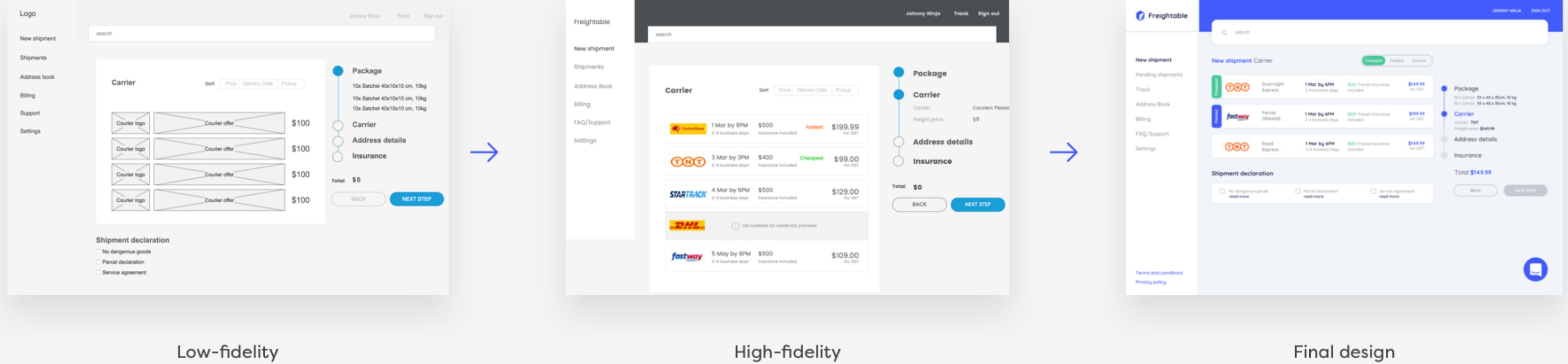
Fidelity in Prototyping¹⁵

Definition: The level of detail in which a design is represented in the prototype.

- Two ends of a fidelity spectrum:
 - Low-fidelity (lo-fi) prototyping
 - High-fidelity (hi-fi) prototyping



¹⁵ [Image source](#)



¹⁶ Image source

Why is fidelity important?

The more "done" the prototype looks, the narrower the feedback will be; and vice versa.

This is just an idea. I'm not done!

As a principle, use no higher resolution than is necessary.

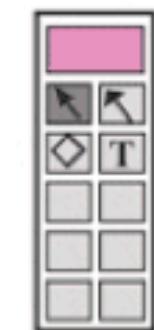


Looks Done

Mocked up in Photoshop, a multimedia program (Director, Flash, etc.), or a GUI builder (NetBeans, Visual Studio, etc.)

"Can you change the font on that 'T'?"
Not sure I like the bevel line weight..."

Feedback: detailed tweaks to specific features. Very focused and incremental.



Visio, Powerpoint, etc.

Illustrated using a professional drawing or presentation tool.

"I don't like the two-column layout for tools. Can we have them go across the top?"

Feedback: tweaks to the 'screen' or page as a whole. Incremental improvements.



Rough Sketch

Scanned from a hand-drawing, made with a drawing app and a tablet, or using the Napkin Look and Feel skin.

"Maybe the tools should be context-specific... Let's kill the toolbar and bring up only the tools that make sense at that moment..."

Feedback: higher-level features are questioned, bigger changes possible.



Storyboard or Use Case

The "story" of how the user might need or want to interact with the interface (app, book, product, etc.)

"We should NOT try to put a drawing feature in here... it's featuritis without a key benefit to most users."

Feedback: big-picture ideas, possibility for revolutionary changes.

Why bother with lo-fi prototyping?

- Has lower development cost
- Prevents designers from prematurely wedding to specific design ideas
- Enables exploring, communicating, and testing of conceptual designs
- Helps designers identify structural, navigation, and organizational issues
- Allows rapid evaluation of multiple design ideas

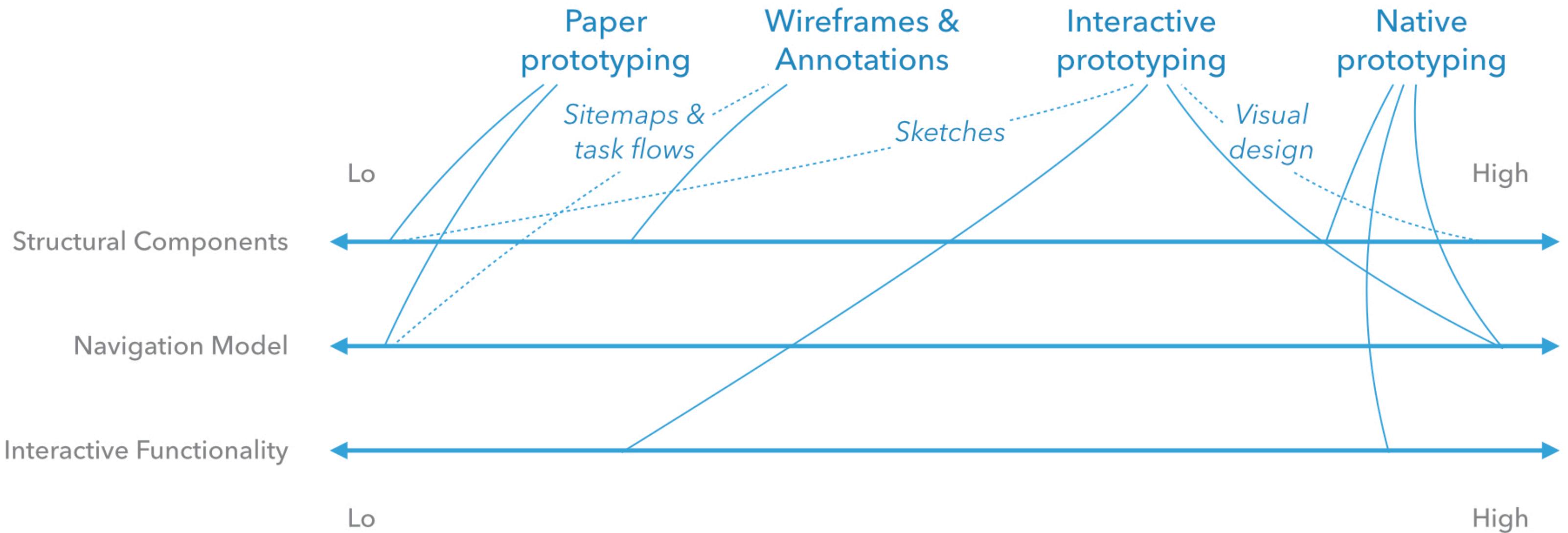
Limitations of Lo-fi Prototyping

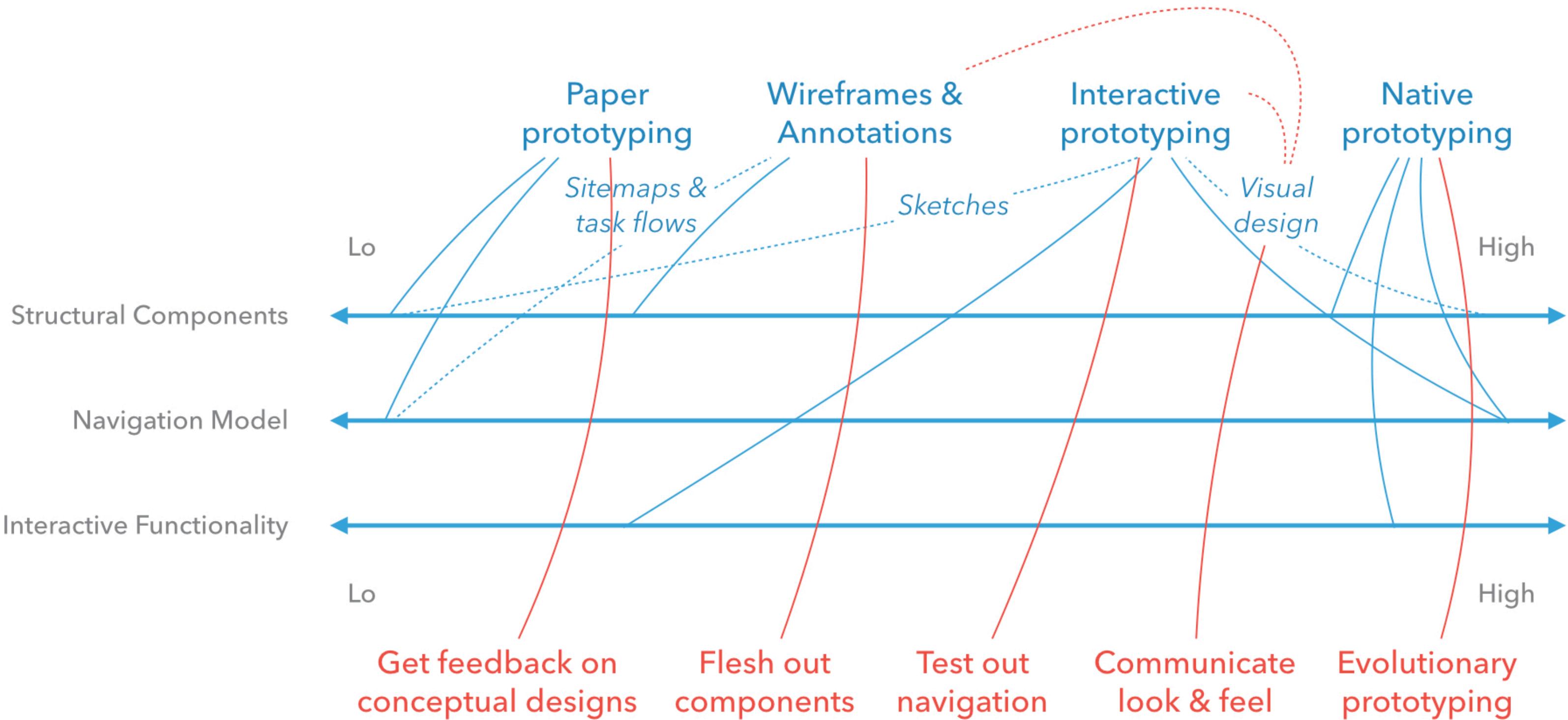
- Requires a facilitator to drive the prototype during testing and communication
- Offers limited ability to identify breakdowns in design
- Lacks sufficiently low-level specifications for development
- Provides limited sense of feasibility

Choosing the Right Method

How do we choose the right method?

- Various methods, approaches, and strategies for prototyping
- Criteria for choosing the right method:
 - Design team goals
 - Capabilities and resources
 - Available time for prototyping





ICA G: Prototyping

Turn your *lo-fi* prototype into a *hi-fi* prototype!

Strategically use...

- Color
- Imagery
- Type

What did we learn today?

- Prototyping methods
- Prototyping theory
- Choosing the right method
- Hands-on activity