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uncovering a shared approach for creating value

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11 Prototyping
Shaping Great Ideas

The long-running PBS show *This Old House* shows a creative process from the start, as a tired, past-its-prime hovel becomes a glorious Queen Anne mansion with granite countertops, slate roof, and a Jacuzzi. Even though the show is obviously edited, like other reality shows, to portray step-by-step progress toward a final goal, it is full of prototypes:

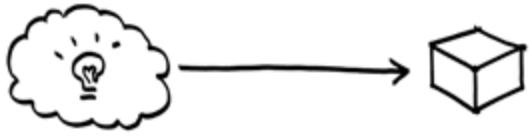
- an architect's sketch
- a blueprint
- a construction budget
- a back-of-the-envelope diagram showing a contractor where to place a joist
- a palette of finish colors and textures
- Norm Abram measuring twice, cutting once

On *This Old House* they use forms of prototyping throughout to try out ideas, to align a team, and to get feedback from the client. We recommend a similar approach for your innovation process—and that's why this chapter is not so much the next

step as it is a brief discussion of a way of life for every innovator and designer. Prototypes happen anytime—napkin sketches are often the rough prototype that instigates a project in the first place. Frameworks are also prototypes, as are sketches and diagrams.

Prototyping is one of the simplest thing you can do to make innovation easier—and yet it seems to be the most underused tool in the innovator's toolkit. Maybe because we seldom see the prototypes that lead up to a finished product—or because we think being clever and creative means doing a purely mental, and entirely within-the-brain activity. (Albert Einstein and his "thought experiments" notwithstanding!) If you think about it, though, the act of writing is innovation (creating unique value for readers), and only a rare and gifted writer can set pen to paper and produced final, polished prose without some intermediate steps of outlines or drafts. Perhaps an even better example would be collaborative writing, like scripts for *The Simpsons*, or this book. Not only do various prototypes of the text encourage revisions and improvements, but by putting words on paper, it allows a team to work on an idea together. Early reactions to the script in draft form can inform ways of improving it, giving plenty of times to fix problems before spending the money on animators and editors. Ideas become strong when they are exposed to reality early, and often, through prototyping.

In the chapter on Conceptual Frameworks, we described the journey you are taking from an idea to a concept:



Prototypes, like Frameworks, can be used throughout the journey. They come in different forms and degrees of refinement, depending on where they come in the process. At an early stage, prototypes might be simple sketches of concepts. The Balanced Breakthroughs model from Chapter 2 functions as this kind of prototype. Frameworks are themselves a sort of conceptual prototype, As an idea emerges, you might try mocking up one particular kind of functionality (a "works-like" prototype), or the appearance of something (a "looks-like" prototype). Prototypes may have varying levels of detail or fidelity. A simple prototype may be quite abstracted from reality, which can help you see the big picture. Or, they may be a thorough exploration of just one portion of the innovation, helping focus attention on that one issue—like the arrangement of a control panel, or the texture of a hand grip.

Low-fidelity prototyping tools should be easily accessible to the team throughout the process—things like Play-Doh, Legos, foam core, and paper and pencils. Later on, more detailed and accurate prototypes can work out nuances, and convincingly present a concept to management or an investor. But if you start making fancy, costly prototypes too early, you won't feel the freedom to try out things. And simple prototypes can reveal plenty. Working on some issues related to drive-through restaurants, we equipped ourselves with a set of cheap toy cars, and enlarged site blueprints to a matching size, and tried "driving" the cars around the lot. Grown-ups playing with toy cars seemed ridiculous, but quickly spotting and addressing issues with our concepts saved us a lot of time before we called in architects and site planners.

A critical function of prototypes is revealing flaws. This can be discouraging if you have fallen in love with your own ideas. We'll even go so far as to say that having other people point out those flaws can be downright annoying—who likes to have

their brilliance challenged? What innovators need to realize is that the critique of a prototype saves tremendous time and expense compared with actually producing a flawed product. Receiving feedback humbly, and with the attitude of one who is eager to learn and open to new ideas, will serve you well.

Here is a quick look at a few different kinds of prototypes you might use at various stages in your project:

Conceptual Prototypes

Value Webs, as described in Chapter 9, can describe a present reality, or they can map out a potential future. The schematic, abstracted representation of value flows between participants can provide an excellent opportunity to test assumptions. If makers of the :CueCat had looked at a value web for their product, they might have noticed the imbalance of value between consumer and website/advertiser. If the user's only benefit is saving the effort of typing a ten-letter web address into their browser, it seems unlikely to be successful.

Behavioral Prototypes

Because we place such a high importance on providing benefit to the people that will ultimately use the product or service, it is critical that ideas be tested with users early on. How will they actually interact with it? Will they really do the things we expect them to do? Does our mental model of the system correspond to the user's mental model, or will they frame the entire interaction differently, and be disappointed when their expectations are unfulfilled? Because you want to do behavioral prototyping early enough to head off fundamental problems, don't let the final execution technology stand in your way. A perfect example is with websites. You can test the navigational structure of a website using paper sketches of different web pages. Show the home page to a user, and ask them to "perform" a task by selecting a menu item. Next, show them the page sketch that would come up if they had actually clicked on the menu button. With a handful of simulated, paper web pages, you can get an idea if your menu structure will really work. Be careful in behavioral prototyping that test users understand the limitations of the prototypes, and focus on the core issue you are exploring—but also don't give them more information than they would have if they were an actual user.

Functional (or "Works-Like") Prototypes

The Functional Prototype simulates the functionality of an innovation, even if it looks clunky and impractical. In the web design world, paper prototypes of individual web pages are shown to a test user one at a time, in a sequence determined by which menu items the user "clicks" on, in conversation with the designer facilitating the interaction. A mechanical Works-Like prototype of a clothes dryer might include the moving parts, but leave off the control mechanisms and outer case. Works-Like models test how effectively the innovation performs essential tasks, and allow for experimentation with behind-the-scenes mechanisms without the hassle of making them look pretty.

Appearance (or "Looks-Like") Prototype

Looks-Like prototypes simulate the appearance of an innovation, but without full functionality behind it. A Looks-Like web page prototype might be a beautifully-rendered screen without any live, "clickable" elements; a Looks-Like clothes dryer presents the outer case and control panel, but can't actually hold clothes. Functionality can be simulated through verbal instructions to evaluators; the goal is to see if the appearance gives the right messages and expectations to users. Our background as designers has taught us that showing Looks-Like prototypes may require some careful planning, because evaluators will react to anything that looks intentional—even if it is, in your mind, just a placeholder for something else. A mock-up of

a magazine layout with a "temporary" picture may get you reactions, positive and negative, to the person in the picture, instead of to the typographic layout. Sometimes low-fidelity can be better—in this case, a solid grey box is a better stand-in for a future picture than just whatever picture you might happen to have available.

The Future of Prototyping

Complex or risky products and services, or ones that target users that may be hard to connect with for review sessions, call for more creative prototyping methods. One approach that has been used with success at Stanford is Video Prototyping. A short film showing a user interacting with the product or service, can include several scenes, each with a variation on the functionality. Because people are familiar with movies, and used to suspending disbelief and imagining themselves participating in the scene, their reactions to watching someone else try different ways of using the product can provide valuable insights.[1]

Another way of simulating certain kinds of offerings is in an immersive online environment like Second Life. American Apparel is just one of the companies that has opened up a virtual store within Second Life, and can gauge, both from customer feedback, and from sales of virtual clothing for Second Life avatars, which styles might be worth executing in the real world.[2]

Video Prototyping and Virtual Prototyping are not only interesting approaches in themselves, but exemplify an experimental approach we commend: **try stuff out, see what happens!**

[1] We first heard of video prototyping from Wendy Ju, a doctoral student at Stanford's Center for Design Research: http://www.WendyJu.com/

[2] Virtual prototyping in the context of Second Life is described briefly in Philip Rosedale, "Alter Egos," *Forbes* May 7, 2007, p. 76–80.

Experience Prototypes

A team of experienced innovators, engineers, and designers can often use their imaginations to fill in the gaps in a prototype. However, the more immersive an experience is, the harder it is to make those mental leaps. People in Hollywood didn't see anything particularly special about the first Star Wars movie when it was just a script—it seemed like just another Sci-Fi B-movie.[1] Even the first editor initially cut together a film that was lifeless and dull. It wasn't until George Lucas spliced together aerial combat scenes from old World War II movies that his colleagues finally grasped his full cinematic vision, for an adventurous, Saturday morning space opera.

To help customers and executives understand the vision, a much higher degree of realism may be needed—and even a certain amount of stagecraft. Architect's models are easier for a client to understand than blueprints, but even better is a full-sized mock-up of, say, the kitchen layout. You can put together something like that using cardboard boxes cut to size, or (with a little more effort) using foam core panels glued into the dimensions of counters and appliances. Adding some representative finish treatments and light placements will create a more complete experience, and make is easier to imagine being in the space. That's how you discover problems like having to take extra steps between the stove top and refrigerator.

Although our discussion of prototyping is taking place relatively late in our Naked Innovation structure, you shouldn't defer prototyping. Prototyping is not a project step—it's a way of working that should be infused throughout your project. A quick sketch on a whiteboard even while you're mapping out research topics is a simple prototype that help align your team.

[1] Even if you think that *Star Wars* is merely a B-movie, you'll have to admit that it's at least a B-Movie in a whole different category than the space movies that preceded it.

Quick'n'dirty prototypes, used frequently, will reduce misunderstandings and unveil hidden assumptions.

Your Prototyping Mission

As you consider how to use prototyping in your project, remember these key points:

1. Different kinds of prototypes are appropriate in different situations. Determine first what kind of feedback you need, and then make the appropriate prototype—a carefully refined appearance prototype won't be the best way to figure out whether the core concept is useful to a customer.
2. Talking about prototypes doesn't put something real in front of users or teammates. Prototype early and often for maximum benefit.

RESOURCES FOR PROTOTYPES

Cooper, Alan. *About Face 2.0: The Essentials of Interaction Design*. Hoboken, N.J.: Wiley, 2003.

Grimm, Todd. *User's Guide to Rapid Prototyping*. Dearborn, Mich.: Society of Manufacturing Engineers, 2004.

Kelley, Tom. *The Art of Innovation*. New York: Currency, 2001.

Snyder, Carolyn. *Paper Prototyping: The Fast and Easy Way to Design and Refine User Interfaces*. San Francisco: Morgan Kaufmann, 2003. See also the companion website at http://www.paperprototyping.com/.