

Integrating Prototyping Into Your Design Process

Using appropriate fidelity for the situation
by [Fred Beecher](#) on 9-22-2009

“ Just like with any other UX research or design tool, context plays a critical role in determining how effective prototyping will be for you.”

Prototyping is a big deal right now. We get wrapped up in mailing list threads, new tools are released at an astonishing pace, books are being published, and articles show up on Boxes & Arrows. Clients are even asking for prototypes. But here's the thing... prototyping is not a silver bullet.

There is no one right way to do it.

However, prototyping is a high silver content bullet. When aimed well, a prototype can answer design questions and communicate design ideas. In this article, I talk about the dimensions of prototype fidelity and how you can use them to choose the most effective prototyping method for the questions you need answered.

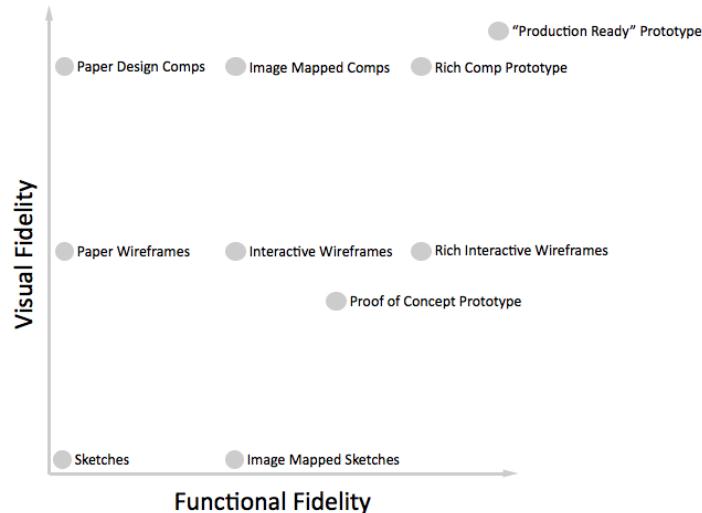
The Dimensions of Fidelity

A prototype's fidelity has the most influence over its effectiveness. Fidelity simply refers to how realistic the prototype is. Most of the time when we talk about a “high-fidelity” prototype we are referring to a prototype that has some visual or industrial design applied to it. But that leaves out what's most important to UX designers, what it's like to actually work with the prototype!

Fidelity is multidimensional.

Not only can you have a prototype that looks like a realistic product, but you can also have a prototype that works like a realistic product. I call these dimensions of fidelity “visual fidelity” and “functional fidelity.” By varying your prototyping

methodology along these two dimensions you can ensure that your prototyping effort is successful given your particular context. Let's take a look at some examples.



A prototype can be as simple as a series of hand-sketched wireframes that flow together. This is a good example of a low visual fidelity prototype. These wireframes show layout and functionality but have no visual design. Take the same wireframes, integrate a visual design, and your prototype has a high visual fidelity. While you might think of them as being similar, these two prototypes are most effective in two different situations.

That same series of sketches is also a low functional fidelity prototype. Moving through screens drawn on paper is much different than working with the developed system. But if you render those sketches in HTML, JavaScript, & CSS, they have a high functional fidelity. Working with an interactive prototype is very similar to working with the developed system. Again, high- and low-fidelity prototypes are most effective in two completely different situations.

After spending all this time talking about fidelity, I want to share one of my favorite quotes on

prototyping. Bill Buxton said this in his Interaction08 keynote:

There is no such thing as high or low fidelity, only appropriate fidelity.

Appropriate Fidelity

“Appropriate fidelity” refers to a level of prototype fidelity that allows you to achieve the goals you’ve set for doing a prototype in the first place. By varying the fidelity of your prototype along the dimensions of visual design and functionality, you make your prototype more effective at achieving some goals and less effective for others.

types of prototypes are effective in many situations:

- Evaluating the usability of proposed designs for new systems
- Exploring isolated interactions as a proof-of-concept
- Validating UX design direction with stakeholders
- Validating the implementation of requirements with stakeholders
- Supplementing printed documentation for development teams
- Performing remote testing

Remote testing has become more and more important over the last several years. At Evantage, we do approximately 75% of our user testing remotely. It would be difficult for us to get good data about our designs for modern, highly interactive sites if we were limited to representing those designs using low-to-medium functional fidelity prototyping techniques such as clickable PDFs or interactive PowerPoint presentations.

“ By prototyping isolated interactions at a high functional fidelity and testing them with users, I can get really good data about whether that interaction works before I base an application around it.... If those ideas are actually pretty slick, I can release the design with confidence instead of with gritted teeth.”

I also want to expand on proof-of-concept testing. This technique supports creativity and innovation. By prototyping isolated interactions at a high functional fidelity and testing them with users, I can get really good data about whether that interaction works before I base an entire application around it. This allows me to explore my crazy ideas and find out if they are, in fact, crazy. But if it turns out that those ideas are actually pretty slick, I’ll know that and can release the design with confidence instead of with gritted teeth.

Low Visual and Low Functional Fidelity

In my own practice, this is the type of prototyping I do most often. What I make are interactive, HTML interactive wireframes. Everything is black, white, and gray, but the interactions are extremely close to what they’d be in the developed system. These

Integrating Prototyping Into Your Design Process

What I've talked about so far has focused on the tactical, on how to prototype effectively to achieve specific goals. What I want to talk about now is more strategic. How can you integrate prototyping effectively into your design process?

First off, do what you'd do to begin any organizational change. Start small. Find a small project, express the value of prototyping and your interest in doing it, and do it. It would be best to start with something richly interactive though, as prototyping is more crucial the more interactive a system is. Of course, make sure you use a prototype of the right visual and functional fidelity for your purpose.

“ People like shiny things that move. The cool factor of prototyping will be difficult to resist.”

As you near completion of the prototype, make sure you walk through the prototype with the project's stakeholders. Ask them if something like this was what they had in mind. This will impress them on two levels. First, people like to feel important, and you're soliciting their opinions. Second, people like shiny things that move. The cool factor of prototyping will be difficult to resist. When these stakeholders are involved in future projects, it's very likely they will actually request a prototype as a result of their first experience with you.

Once you get buy-in, you can start integrating prototyping into your process. But just like different methods of prototyping are more effective for answering certain questions, different business contexts call for different ways to integrate prototyping.

High Visual and Low Functional Fidelity

At first thought, these prototypes may not make much sense. Why bother making something look nice if it doesn't work? Well, because how something looks can have a huge impact on how easy it is to use. A high visual and low functional fidelity prototype allows you to test that with users. You can print out screen images and do a paper prototype test with them, or you can image map some JPGs and do what I've heard termed a "slap and map" test from within a browser.

High Visual and High Functional Fidelity

High visual and functional fidelity prototypes are the Rolls-Royce of prototypes. They take more time and effort to build than a lower fidelity prototype and are correspondingly more complicated to manage. Most of the time, this extra cost isn't worth it. But there are a few situations where it is:

- Evaluating the usability of proposed UX designs for an existing system
- Performing usability tests with non-savvy user groups
- Supplementing printed documentation for offshore development teams

Prototype testing is all about data, right? In the first two situations above, the prototype's high visual fidelity reduces the confounding factors a wireframey prototype can introduce into test results, thus maintaining the quality of your data. In the third situation, the high visual fidelity helps minimize the design communication and interpretation problems inherent in offshore development.

Corporate, Agile, Mature UX Practice

This situation is fast-paced and iterative, but as an employee (as opposed to a contractor or consultant) you have the opportunity to own the UX of your company's products. In this situation, there are three points in the design process that prototyping can be of benefit.

- Low visual and functional fidelity prototypes can help select good UX concepts from several that you develop at the beginning of a project.
- High functional fidelity proof-of-concept prototypes can help develop those concepts into usable designs.

You can work with a dedicated prototyper to build a separate prototype using code that can be reused in the production system to build efficiencies into an Agile process.

Corporate, Waterfall, New UX Practice

In this situation, the organization might not be comfortable enough with UX design to support the development of multiple UX concepts. You might just have to begin developing the wireframes and prototypes to meet the organization's need for documentation and measurable signs of progress. This situation relies heavily on the prototype for communicating and validating direction with project stakeholders, with user testing often not yet being a real possibility. Here's how prototyping can help:

- High functional fidelity prototypes can help you communicate better with stakeholders and get their input on your direction
- These prototypes should also be used for user testing, if at all possible.
- Walk through the interactive prototype at the same time you walk through the printed documentation for the developers during handoff.

Consulting/Agency

When doing UX design for an external client, a lot of the magic is worked behind the scenes. The result is a process that is relatively unencumbered by internal politics. The challenge is to convey the importance of iterative prototyping to clients who sometimes feel like they're paying for the same thing twice.

- Sketch two or three of your design concepts into simple, low visual and functional fidelity prototypes and test them to decide which to go with. At this stage, testing can be very informal and done with anyone capable of putting themselves in the user's shoes (e.g., other UX designers, customer service staff, or product managers who used to be users).
- Build a small interactive prototype that shows the critical interactions, walk through it with stakeholders to validate your direction, then test with users.
- Revise the prototype based on the test results, flesh it out to support more holistic tasks, and test again.
- Revise the prototype and use it to supplement the paper documentation as you walk through both with the development team.

Just like with any other UX research or design tool, context plays a critical role in determining how effective prototyping will be for you. If you follow the simple guidelines above and prototype to an appropriate level of fidelity for your context, you will achieve your goals and improve your design. No firearms required.

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