Prototyping

Scott Klemmer

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DILBERT
BY SCOTT ADAMS
EVERYONE GRAB AN ODD-SHAPED PIECE OF FOAM AND SIT DOWN.
WE'LL CONTINUE THE DESIGN PROCESS BY POINTING TO THESE BRAINSTORM NOTES AND MAKING INSIGHTFUL OBSERVATIONS.
THE NOTES ARE ALL YELLOW.
SWEET JEEPERS!!! YOU'RE ALL ENGINEERS!
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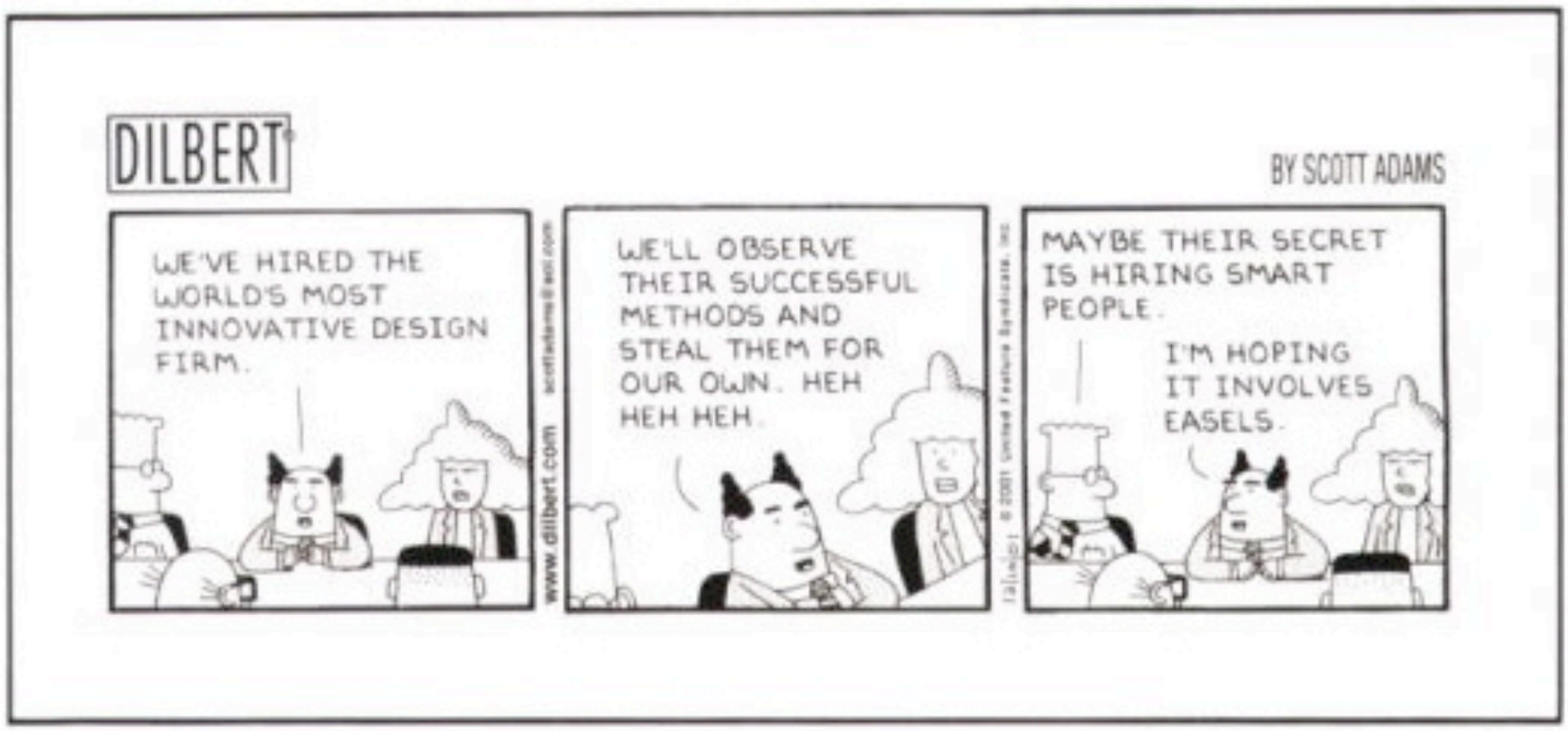
DILBERT
BY SCOTT ADAMS
WE'VE HIRED THE WORLD'S MOST INNOVATIVE DESIGN FIRM.
WE'LL OBSERVE THEIR SUCCESSFUL METHODS AND STEAL THEM FOR OUR OWN. HEH HEH HEH.
MAYBE THEIR SECRET IS HIRING SMART PEOPLE.
I'M HOPING IT INVOLVES EASELS.
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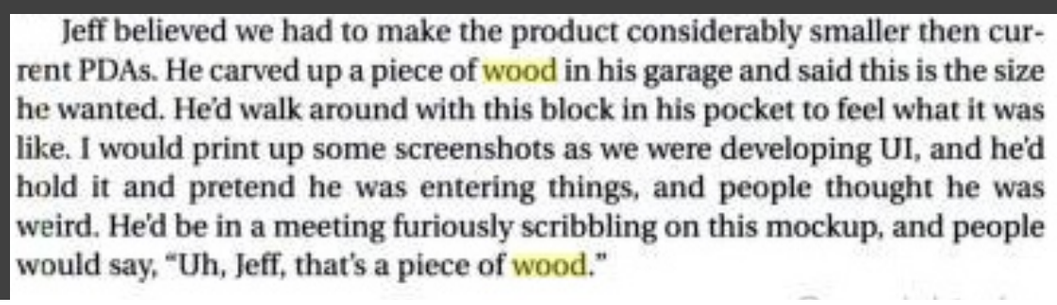
abc


STARTS WITH
HUMANS


BUT THAT IS
MORE THAN
GOOD
ERGONOMICS

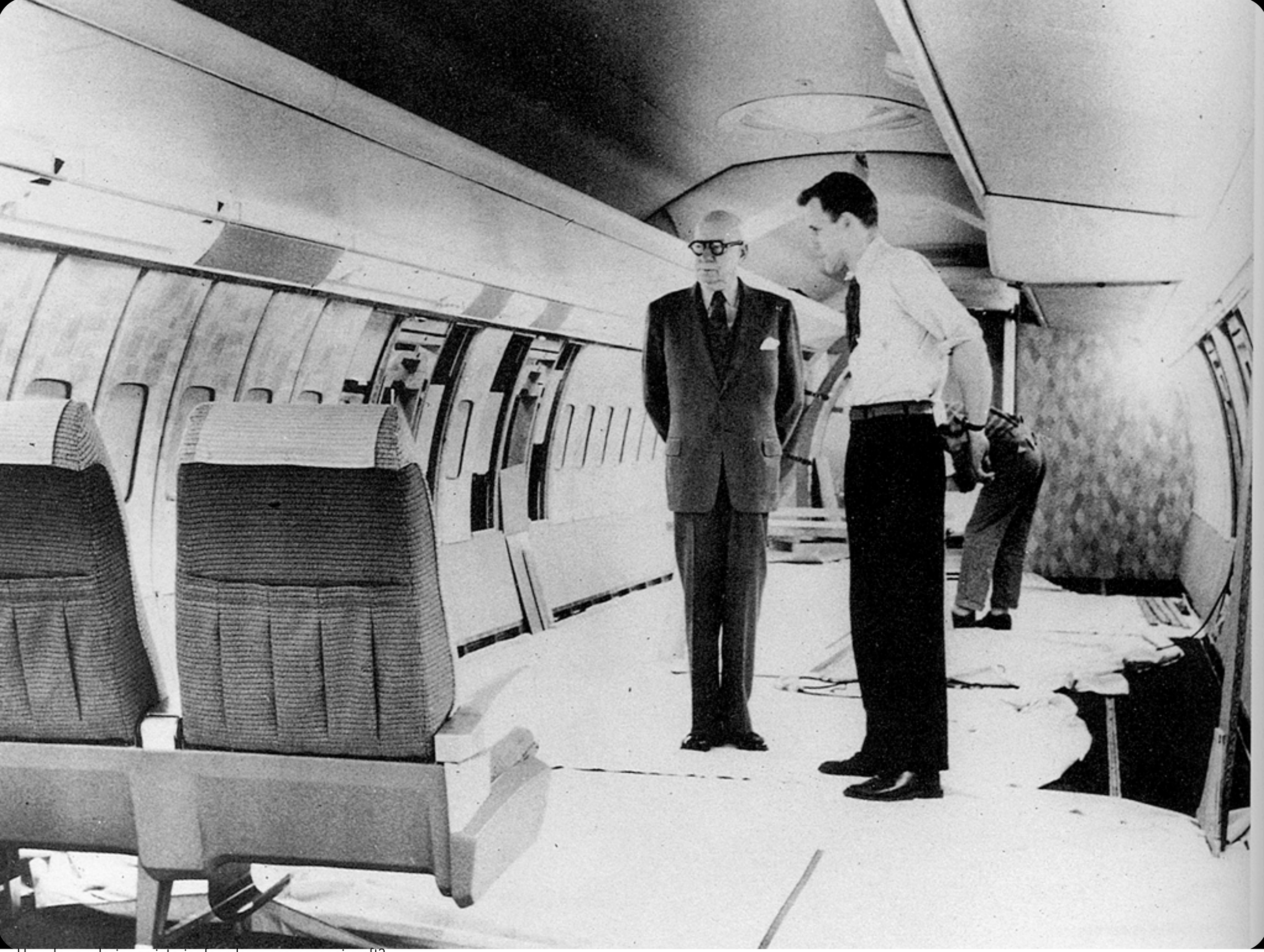
- SANTA CLARA, California -- People thought Jeff Hawkins was crazy when they saw him taking notes, checking appointments, and synchronizing a small block of wood with his PC, pretending all the while that the block was a handheld computer.
- "If I wanted to check the calendar I'd take it out and press the wooden button"

Source: “The Philosophy of the Handheld.” Wired Magazine, October 1999.



Jeff believed we had to make the product considerably smaller then current PDAs. He carved up a piece of wood in his garage and said this is the size he wanted. He'd walk around with this block in his pocket to feel what it was like. I would print up some screenshots as we were developing UI, and he'd hold it and pretend he was entering things, and people thought he was weird. He'd be in a meeting furiously scribbling on this mockup, and people would say, "Uh, Jeff, that's a piece of wood."

Prototyping matters in the real world.



How do you design an interior for a large passenger aircraft?
Build a full-scale mockup in a warehouse. This is a prototype for the interior design of a Boeing 707, the first commercially successful jet liner, 1950s.
Walter Dorwin Teague, one of the industrial design pioneers that introduced modern design process

Fast forward to the 1990s. (1998, KODAK DC210)

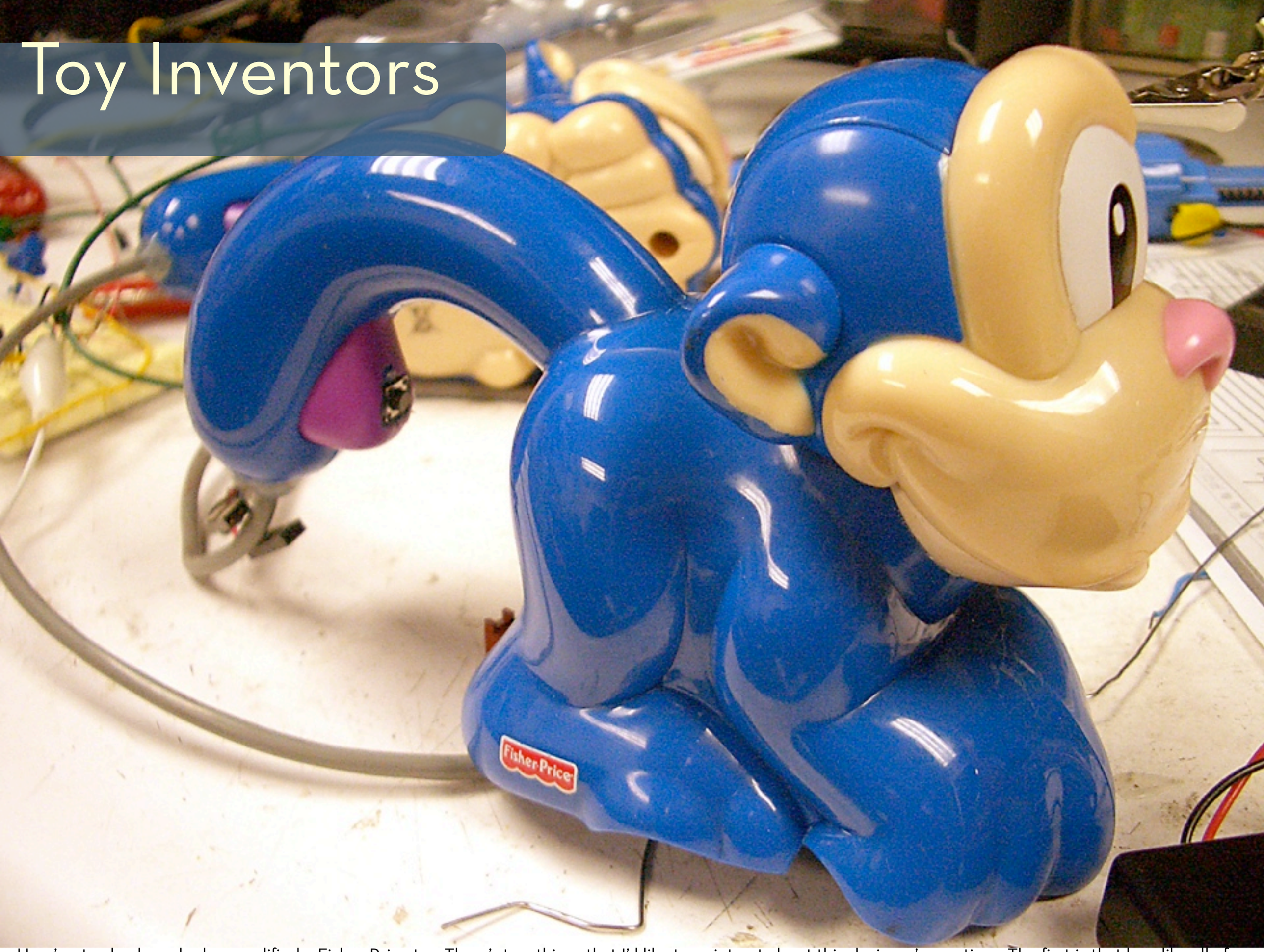
Take this prototype of a digital camera developed at IDEO, at a time when such Cameras had not yet broken into the consumer space. IDEO was tasked to find a way to make sense of possible digital camera interactions – what were the fundamental modes of use? To explore, designers built this mockup of a camera back – it's clearly not to scale, and it's tethered by a thick umbilical to a desktop computer that drives the graphics and application logic. What matters though is that it has the right set of inputs and co-location of input and output which allows users to experience the artifact as if it was a camera.

Exploring such experience questions through prototypes is particularly important as computing moves off the desktop and into our pockets, homes, and environments, where interaction models and use cases are emerging.

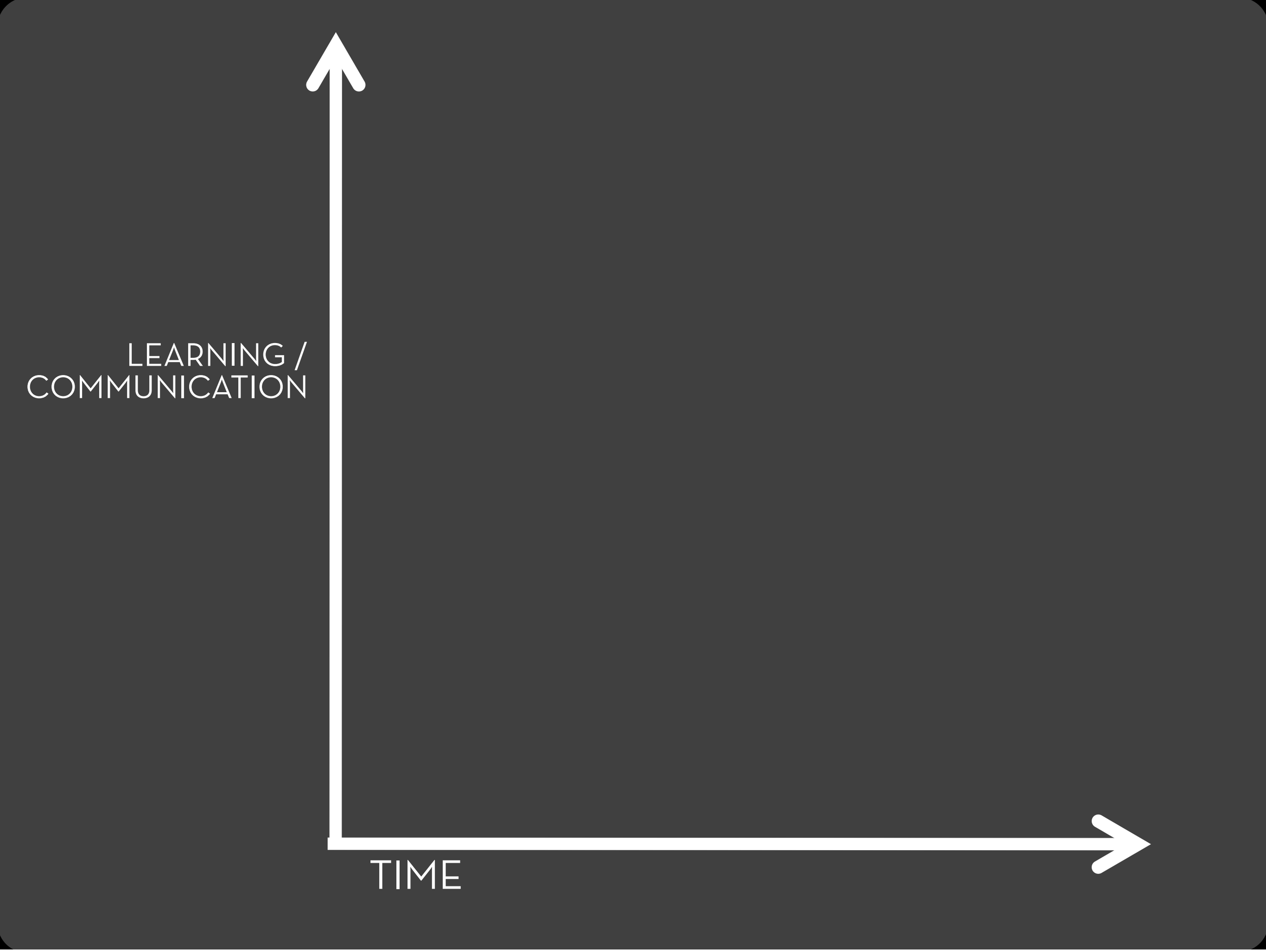
Insert transition to design tools

(p 261 and following in moggridge book)

Toy Inventors



Here's a toy hacker who has modified a Fisher Price toy. There's two things that I'd like to point out about this designer's practices. The first is that he – like all of the toy designer's we interviewed – went "shopping for functionality." In this case, that meant a weekly visit to Toys R Us. The second is that hacking physical objects – not unlike hacking web apps – means that one inherits much of the "look and feel" of the original media, and this gives rise to "mixed fidelity" artifacts, where the inherited part is really glossy, but the Frankenpart that's hacked on is much cruder.



Two key questions to ask. What do you want to learn from it? What do you want to communicate with it?

Prototypes go through multiple versions along the way

Danger Sidekick

Danger Sidekick 2

Danger Sidekick 3

- Note: these aren't the prototypes, but Danger used an extensive prototyping process

Source: Danger, Wikipedia

Make multiple prototypes simulaneously to get most value

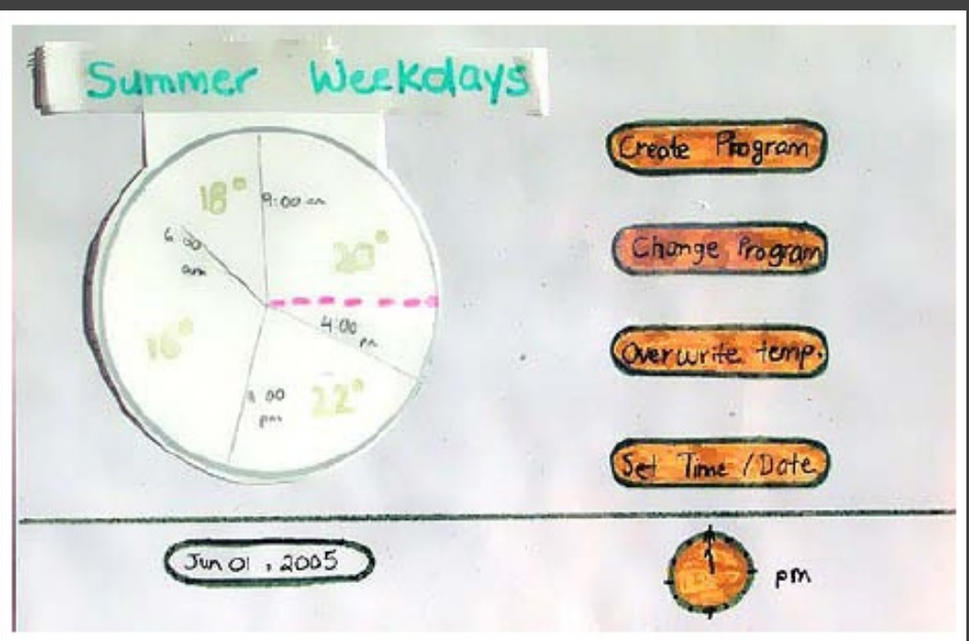


Figure 1. The "Circular" paper prototype

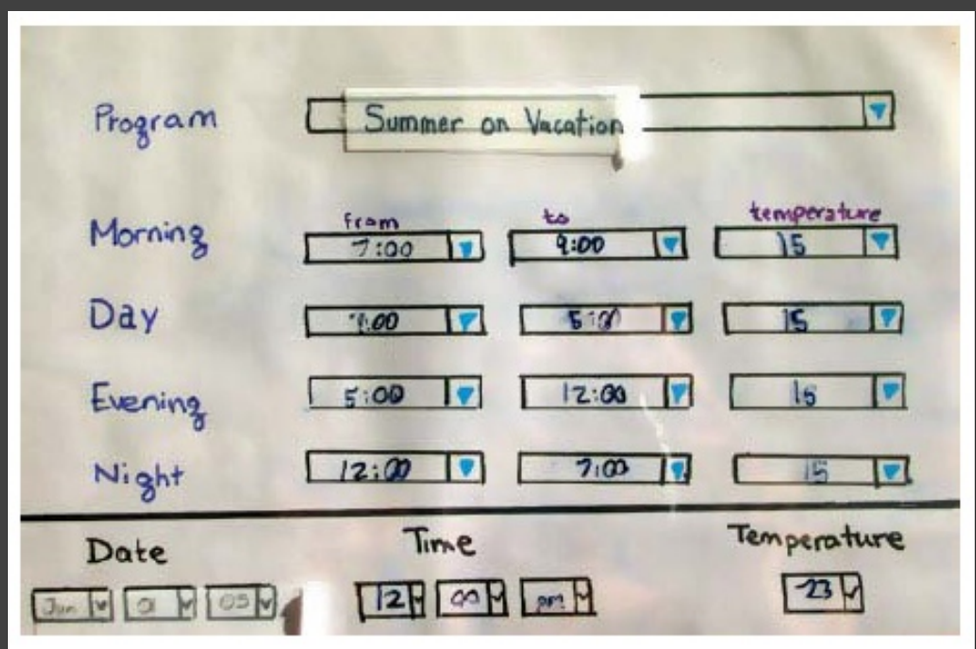


Figure 2. The "Tabular" paper prototype

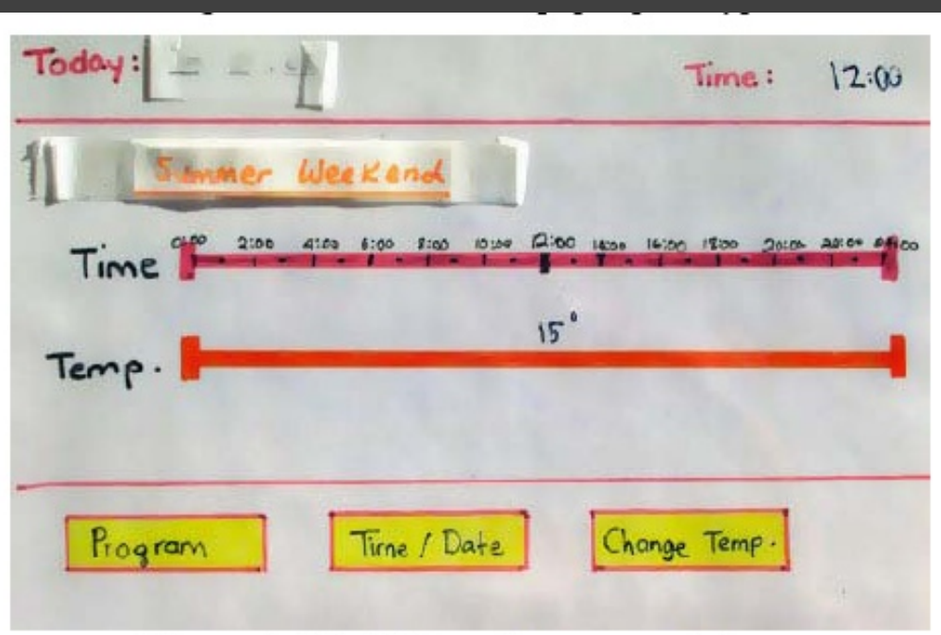


Figure 3. The "Linear" paper prototype

Source: Tohidi, Maryam and Bill Buxton, Ronald Baecker, and Abigail Sellen, "Getting the Right Design and the Design Right: Testing Many is Better than One." CHI 2006.


How
Do
You
Design
How
do
you
design?
AMBIDEXTROUS
where design meets
from every side
ambi
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The multi-handed
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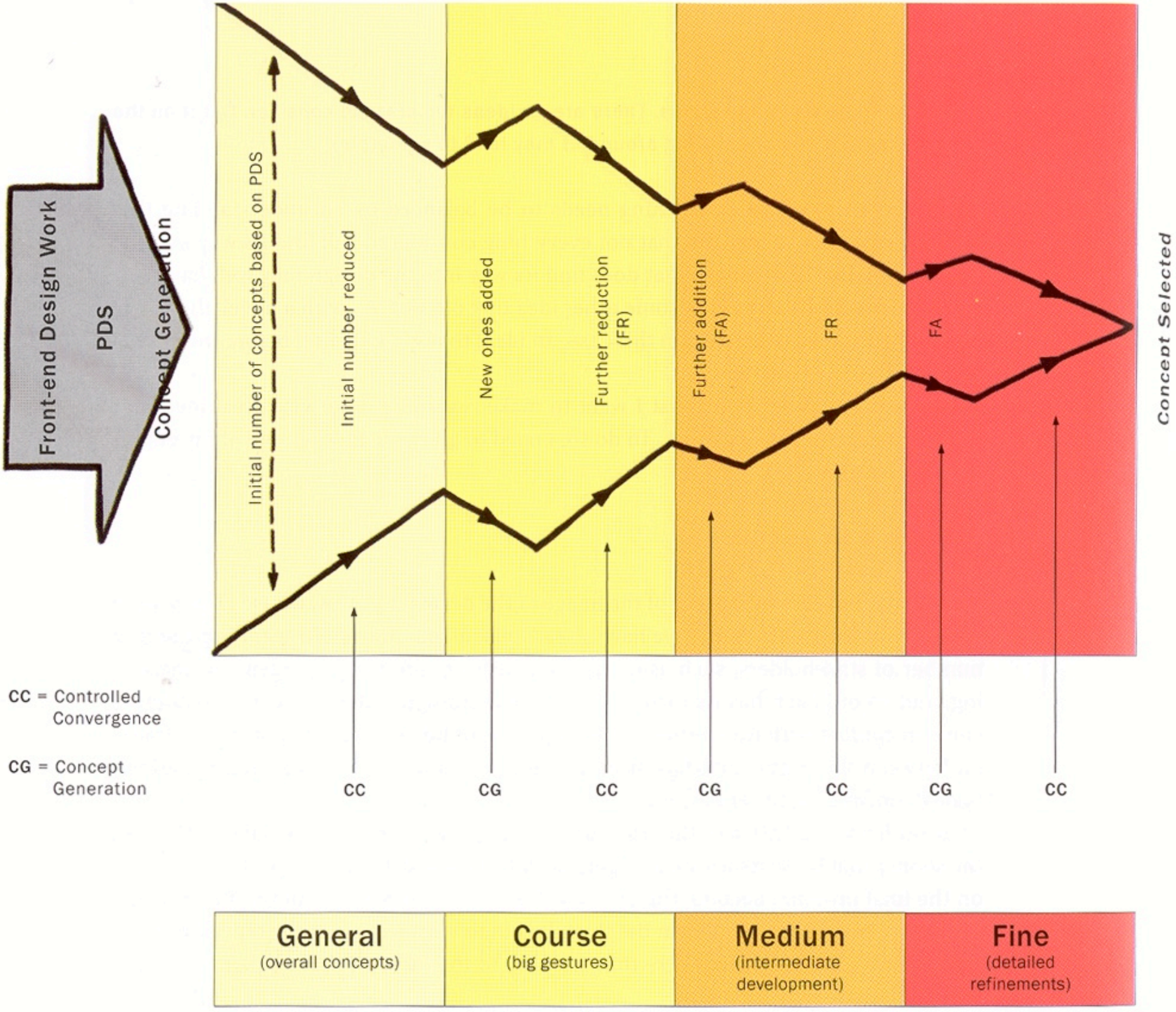
magazine
a forum for design
researchers,
professionals,
and thinkers

Design is choice, and there are two places where there is room for creativity:

1) the creativity that you bring to enumerating meaningfully distinct options from which to choose

2) the creativity that you bring to defining the criteria, or heuristics, according to which you make your choices

--Bill Buxton



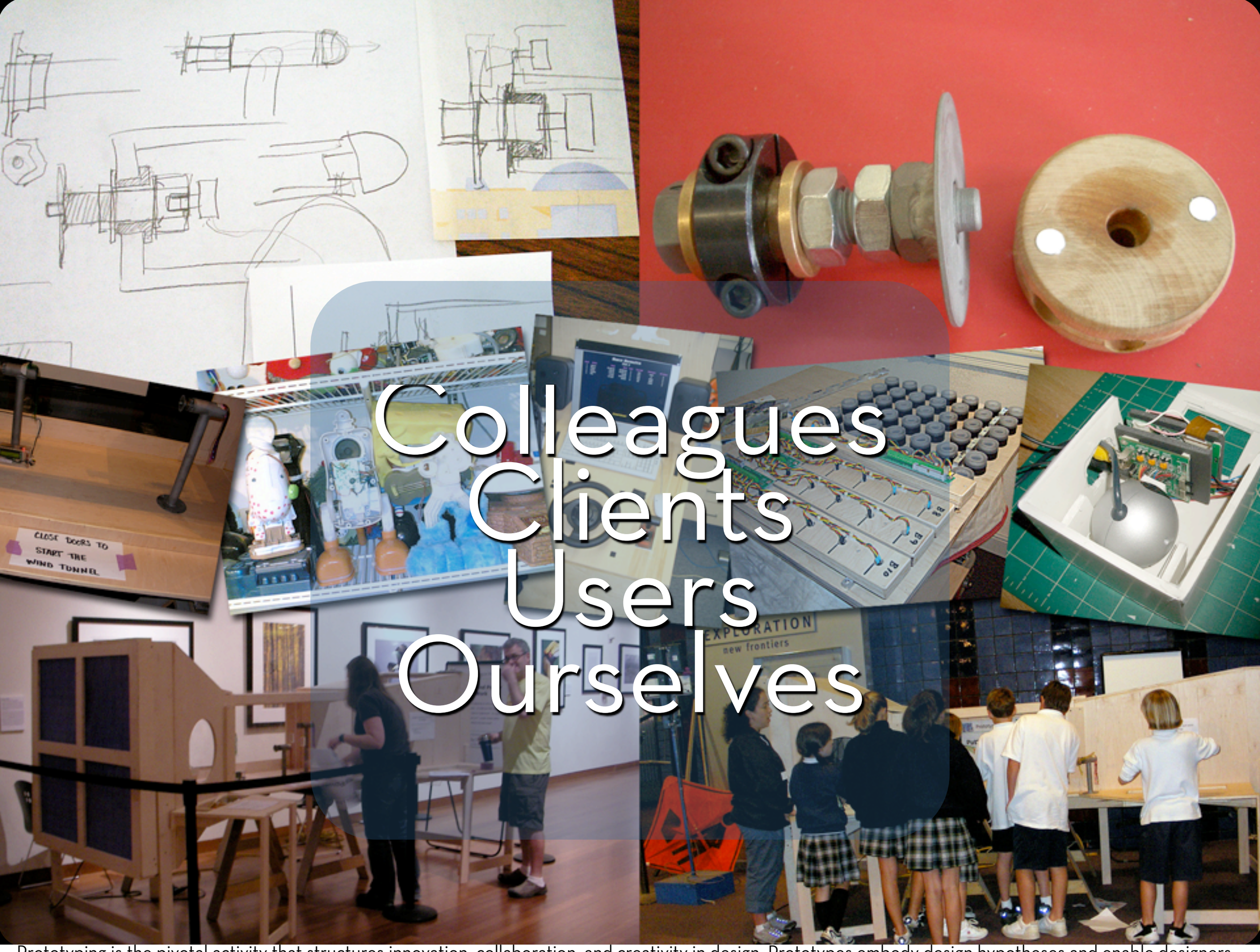
[Buxton, Sketching User Experiences]

Alternating between Divergent and convergent steps happen at different granularities throughout a design process. While initially you may survey a range of very different concepts, the scope of experimentation narrows as a product becomes more well defined.

Prototyping as Communication

Prototyping is the pivotal activity that structures innovation, collaboration, and creativity in design.
Prototypes embody design hypotheses and enable designers to test these hypotheses. Successful designs result from a series of "conversations with materials," as Donald Schoen called them.
The goal in prototyping is *not* the artifact – it's feedback and iteration: you build some prototypes, evaluate them, and use what you learned to drive the next design.

And prototypes serve four distinct audiences: colleagues, clients, users and ourselves.



Colleagues Clients Users Ourselves

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There are four audiences.

Different representations teach us different things and have different goals

Some are useful contemporaneously with the design; others are primarily useful for later.

Prototypes are disposable

...because it takes effort to keep them in sync.
Now, if they can be kept in sync automatically – like round-trip UML – then I'll call them not a prototype. (Clever use of semantics, eh?)

The rights of a prototype

- Should not be *required to be* complete
- Should not *need* to be updated
- Should be easy to change

What Do Prototypes Prototype?

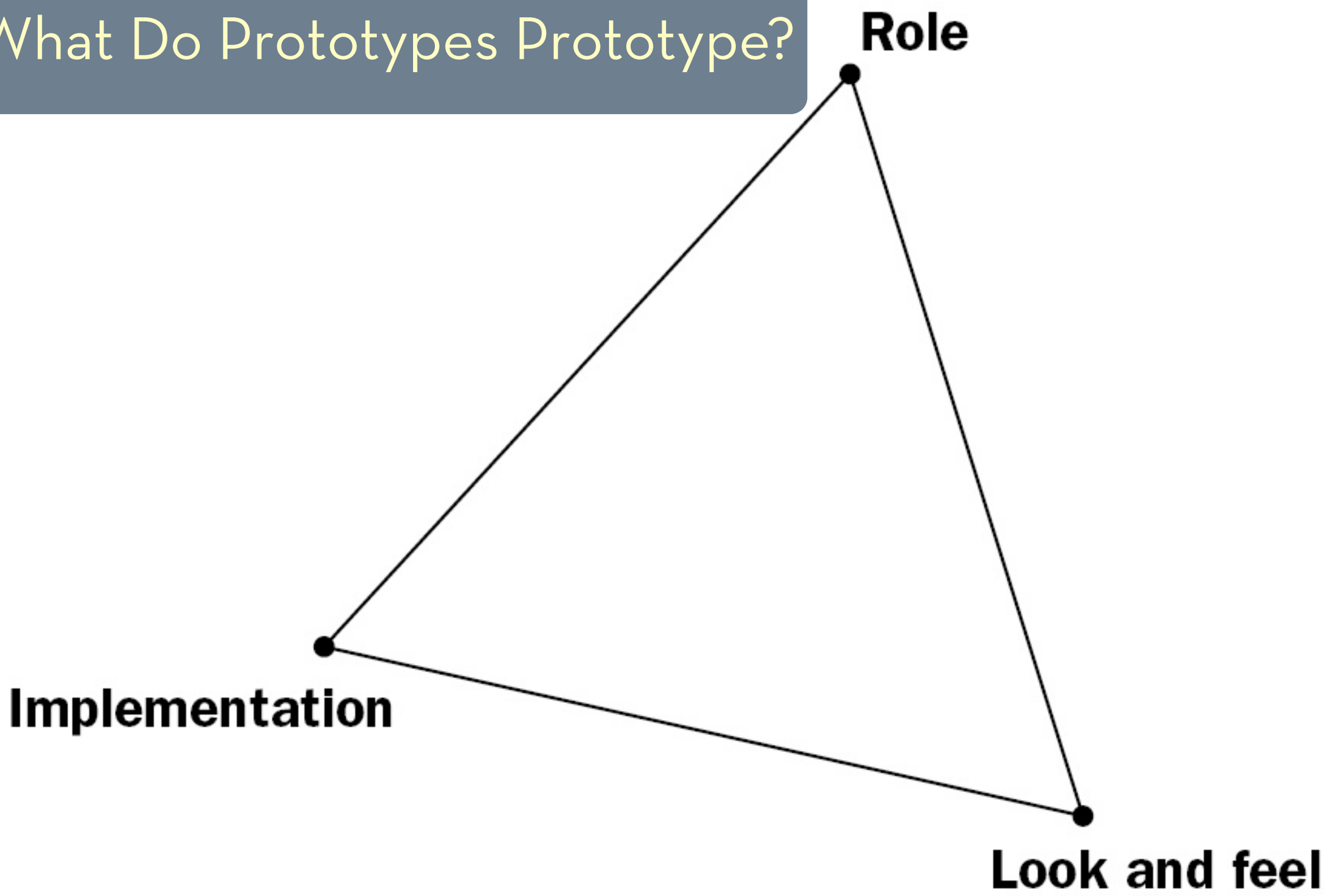

Figure 1. A model of what prototypes prototype.

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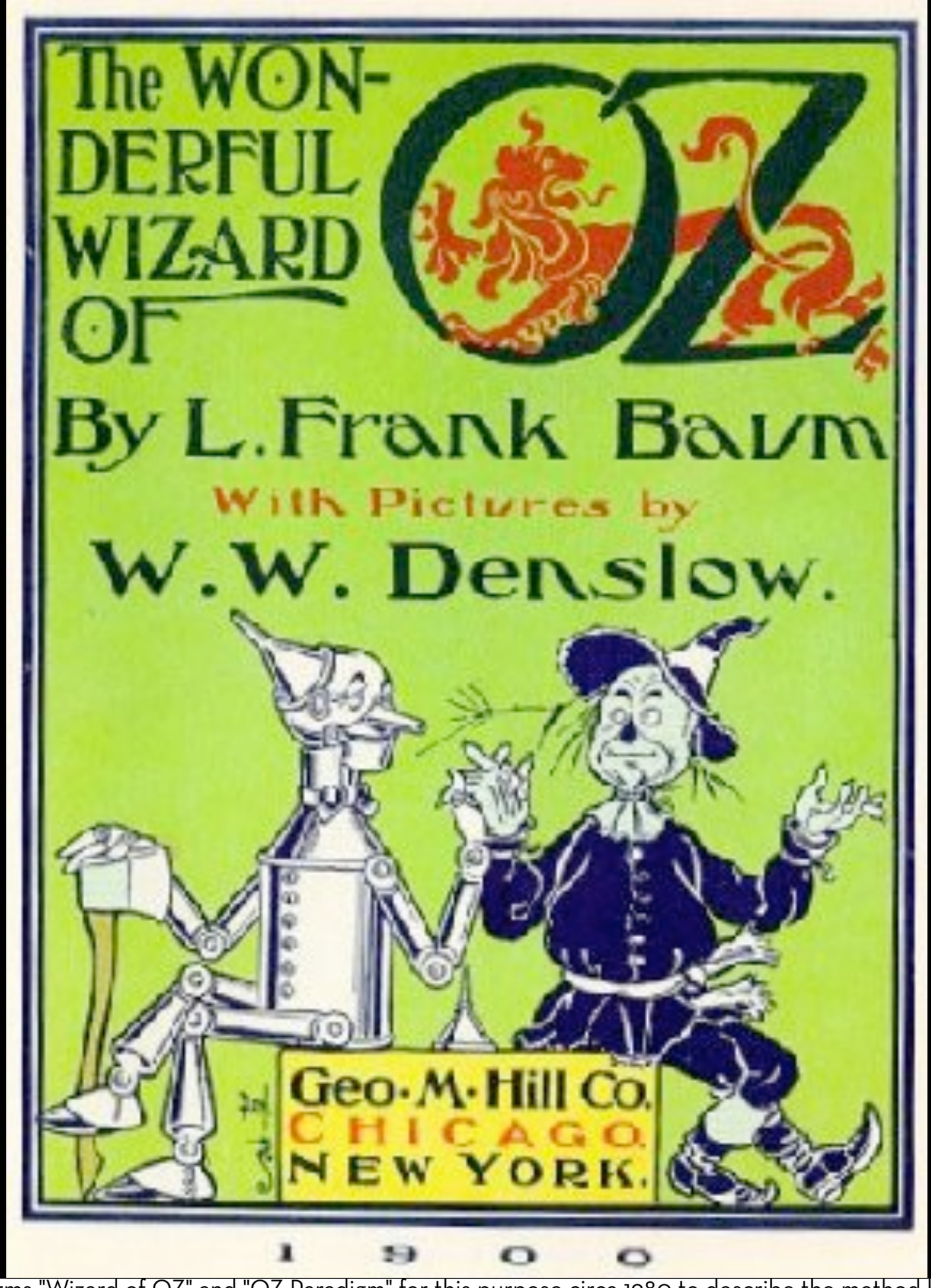

John F. ("Jeff") Kelley coined the terms "Wizard of OZ" and "OZ Paradigm" for this purpose circa 1980 to describe the method he developed during his dissertation work at The Johns Hopkins University (his dissertation advisor was Professor Alphonse Chapanis, the "Godfather of Human Factors and Engineering Psychology"). Amusingly enough, in addition to some one-way mirrors and such, there literally was a curtain separating Jeff, as the "Wizard", from view by the participant during the study.

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Form prototype

- Looks good
- But doesn't really work

Project inkwell "Spark" computing device concept

Nintendo control pad mockup

Source: Buxton, Bill. Sketching User Experiences. Morgan Kaufman, 2007. Nintendo via 37signals.com blog, IDEO.

Function prototype

- Looks like wireframes (no fonts, colors)
- Interactive functionality (spectrum up to working all the way)

Functional keyboard prototype

Functional water faucet

Source: Buxton, Bill. Sketching User Experiences. Morgan Kaufman, 2007. http://www.ammodel.com/PrototypeDesign.aspx

Experience prototype

- Video prototyping
- Role playing

Figure 1: The patient's experience kit.

When participants were paged this indicated that they had received a defibrillating shock; they recorded their surroundings with the camera, and noted their impressions.

Figure 2: Experiencing a train journey.

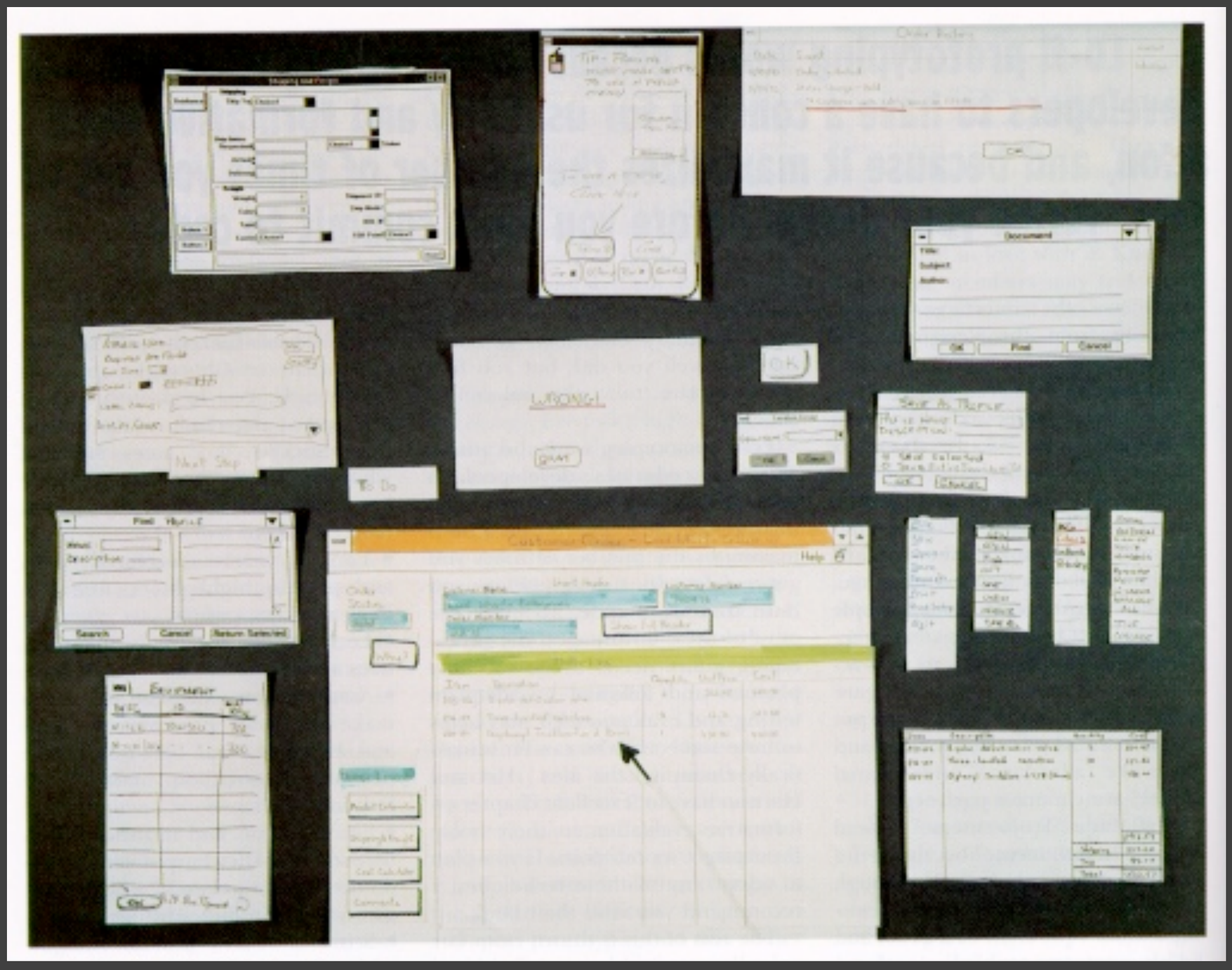
The team combined objective passenger research with subjective discovery as they played out roles they assigned each other.

Figure 8: The Kiss Communicator.

This pair of prototypes let people have the hands-on experience of creating, sending and receiving subtle sensual messages. Video helped to create an appropriate context.

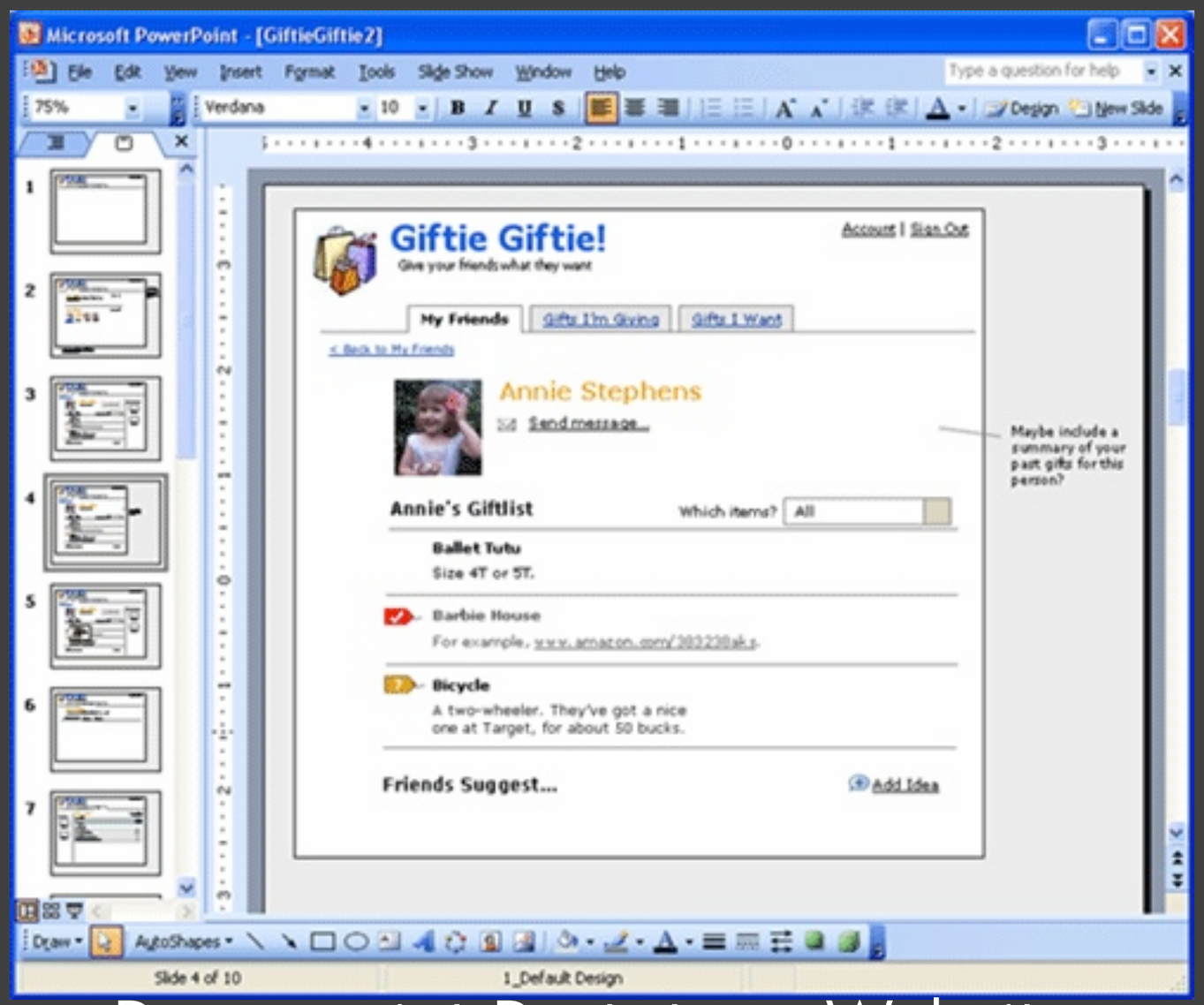
Source: Buchenau, Marion and Suri, Jane Fulton. "Experience Prototyping." DIS, 2000.

Paper prototyping



Source: Rettig, Marc. “Prototyping for Tiny Fingers.” Communications of the ACM archive Volume 37 , Issue 4 (April 1994)

Powerpoint Prototyping



Powerpoint Prototype Website

Source: Kelly, Maureen. "Interactive Prototypes with PowerPoint". http://www.boxesandarrows.com/view/interactive

Powerpoint Prototyping

Source: Brunette, Kynthia, et. al. "Meeteetse". Indiana University. Student Contest Entry. CHI 2005.

Hanmail

“the companies that want to see the most models in the least time are the most design-sensitive; the companies that want that one perfect model are the least design sensitive.”

--Michael Barry

What (and when) does formality get you somewhere?

Have this be a question for the students.