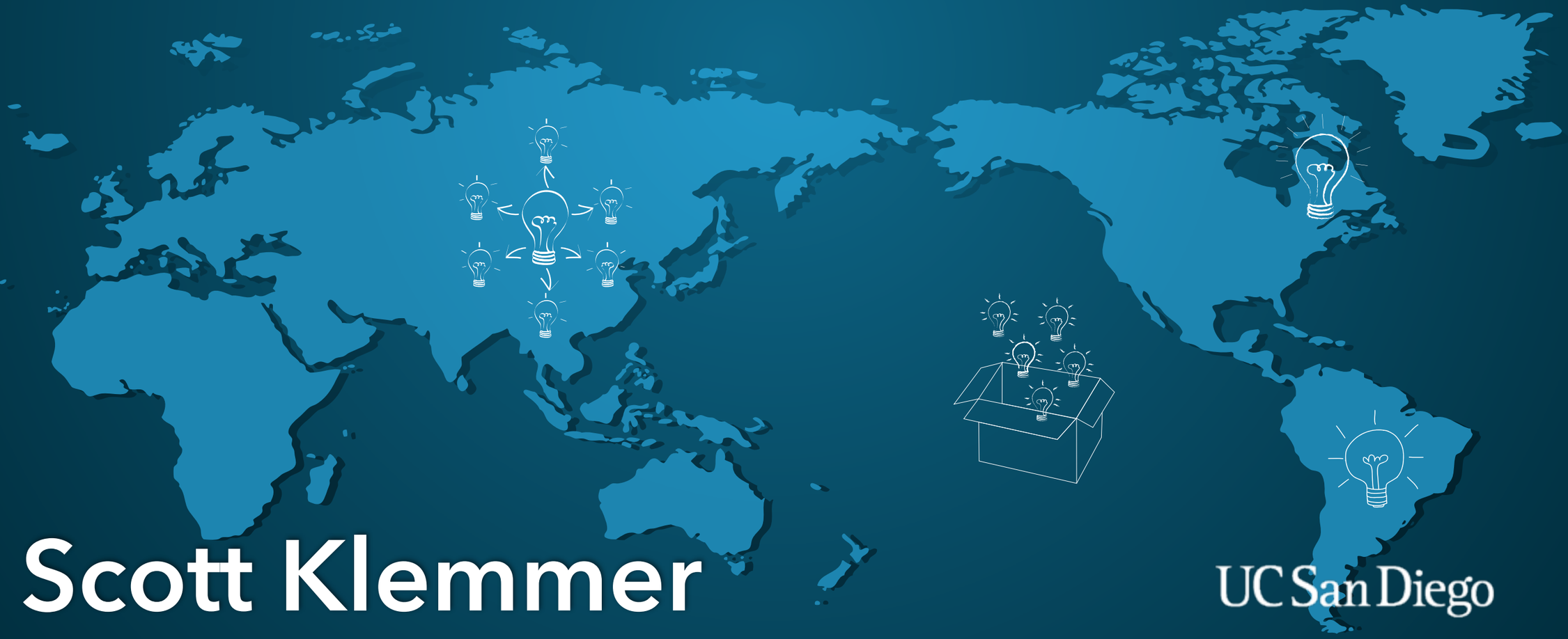
Direct Manipulation



Scott Klemmer

UC San Diego

A4 Example

J Delaney

1. **Aesthetic and Minimalist Design [4]:** Screen #7 has way too much going on. It lists tutors available, every topic they teach, their score, and give the user the ability to rate them. Even worse than having too much information is too many possible actions. This screen should fulfill one purpose and fulfill it well. It's like a spork right now, trying to do two things and not succeeding at either.
2. **Flexibility and Efficiency of Use[3]:** Screen #7 shows a large list of tutors but provides no easy way to filter them. A user should be able to sort by score and only show those with skills the user is looking to learn.
3. **Help and Documentation[3]:** Screen #7 has up/down arrows by every tutor. These arrows are ambiguous as to their purpose. It should be clearly marked that these are for the user to rate the tutor.
4. **Familiar Metaphors and Language[3]:** Screen #5 has a call button, Facebook button, and then an internal messaging system button. The Facebook button appears to be a button to message on Facebook as it is surrounded by other messaging buttons, but in fact shows how the user and the tutor have mutual friends on Facebook.
5. **Consistency[2]:** Screen #2 uses specific icons for different skills. These icons are never used again. They should also be present when viewing tutors to allow people to quickly scan the list of tutors to find ones in a category they are interested in.

Key to good design:

- What makes an interface easy, hard, or “natural”?

How might we improve the measuring cup?

Alex Lee, OXO, Gel 2008 http://vimeo.com/3200945

Henry Ford, Innovation, and That “Faster Horse”

Patrick Vlaskovits blogs.hbr.org/cs/2011/08/henry_ford_never_said_the_fast.html

The Simpsons, *Homer Designs a Car*

Measure Cups & Automobiles

What We Learned

The Execution Gap: How do you *do*?

Image Courtesy Bill Verplank

The Evaluation Gap: How do you *know*?

Image Courtesy Bill Verplank

Finding gaps: questions?

- Function: What is this thing?
- Actions: What can this thing do?
- Mapping: Can I figure out how to do it?
- Performance: Can I do it?
- Feedback: Did I do it?
- Meaning: What is the system telling me?

To reduce the gaps, provide...

- Visibility (perceived affordances or signifiers)
- Feedback
- Consistency (also known as standards)
- Non-destructive operations (hence the importance of undo)
- Discoverability: All operations can be discovered by systematic exploration of menus
- Reliability. Operations should work. Period. And events should not happen randomly.

Source: Donald A. Norman and Jakob Nielsen, ACM Interactions, 2010

Courtesy Bill Moggridge, IDEO

COMMAND LINE v. GUI

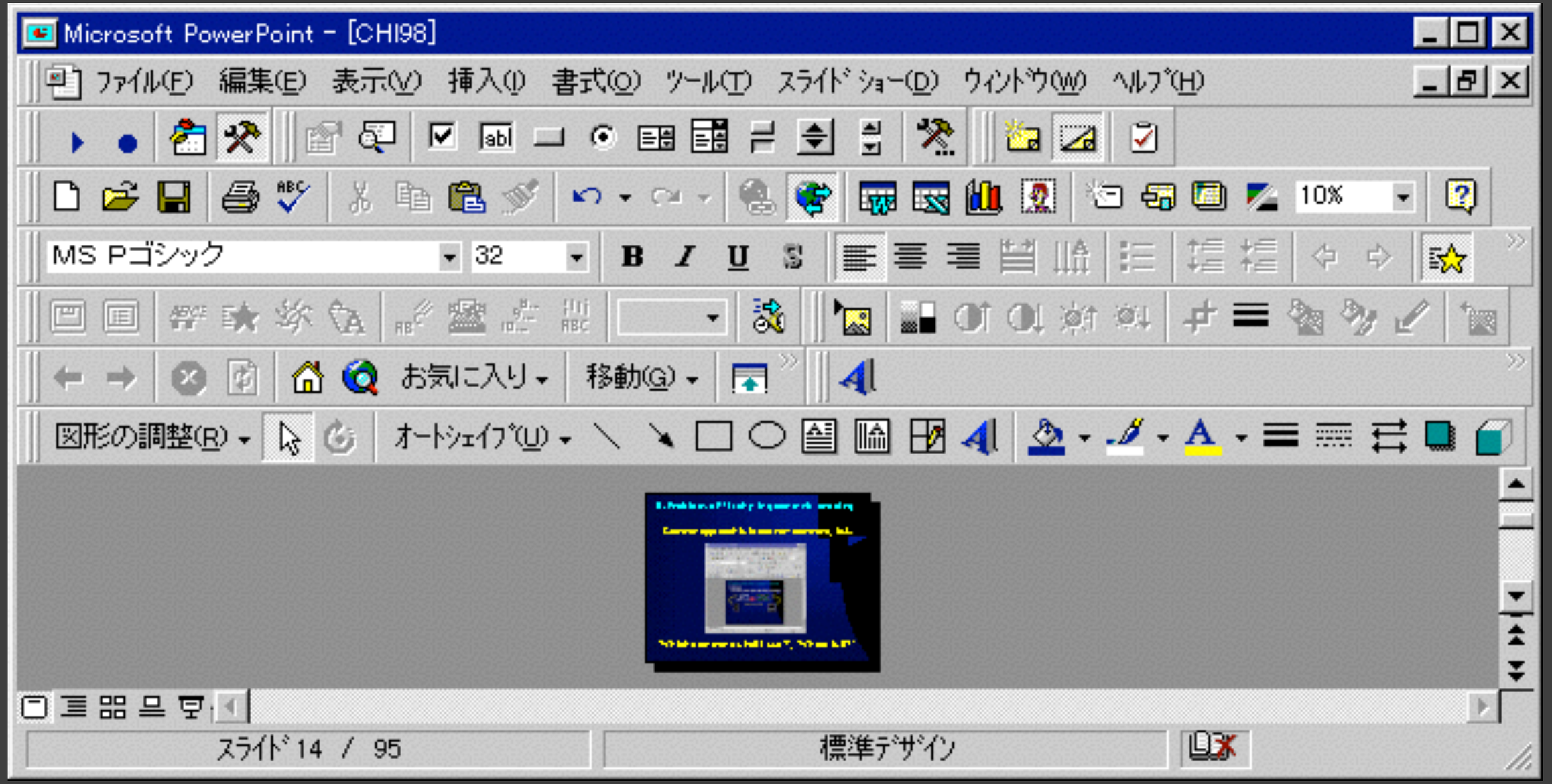
Direct manipulation

- Immediate feedback on actions
- Continuous representations of objects
- Leverage metaphor

Shneiderman, B., "Direct Manipulation: A Step Beyond Programming Languages." IEEE Computer, 1983.

Principle	Command Line	GUI
Visibility		
Feedback		
Consistency		
Non-destructive		
Discoverability		
Reliability		

Successful Indirection?



courtesy of Takeo Igarashi

Eye to the Future: Gestures

- The solution to menu creep?
- Even more direct?

The Oranges Puzzle

goal Order the oranges by size: largest-to-smallest, left-to-right

rule 1 Only one orange can be transferred at a time

rule 2 An orange can only be transferred to a plate on which it will be the largest

rule 3 Only the largest orange on a plate can be transferred to another plate

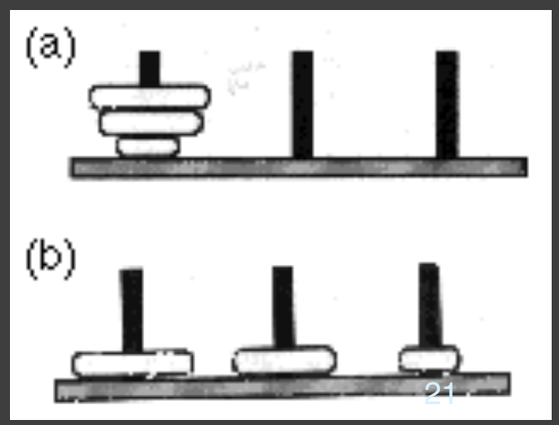
The Bagels Puzzle

goal Order the donuts by size: largest-to-smallest, left-to-right

rule 1 Only one donut can be transferred at a time

rule 2 A donut can only be transferred to a peg on which it will be the largest

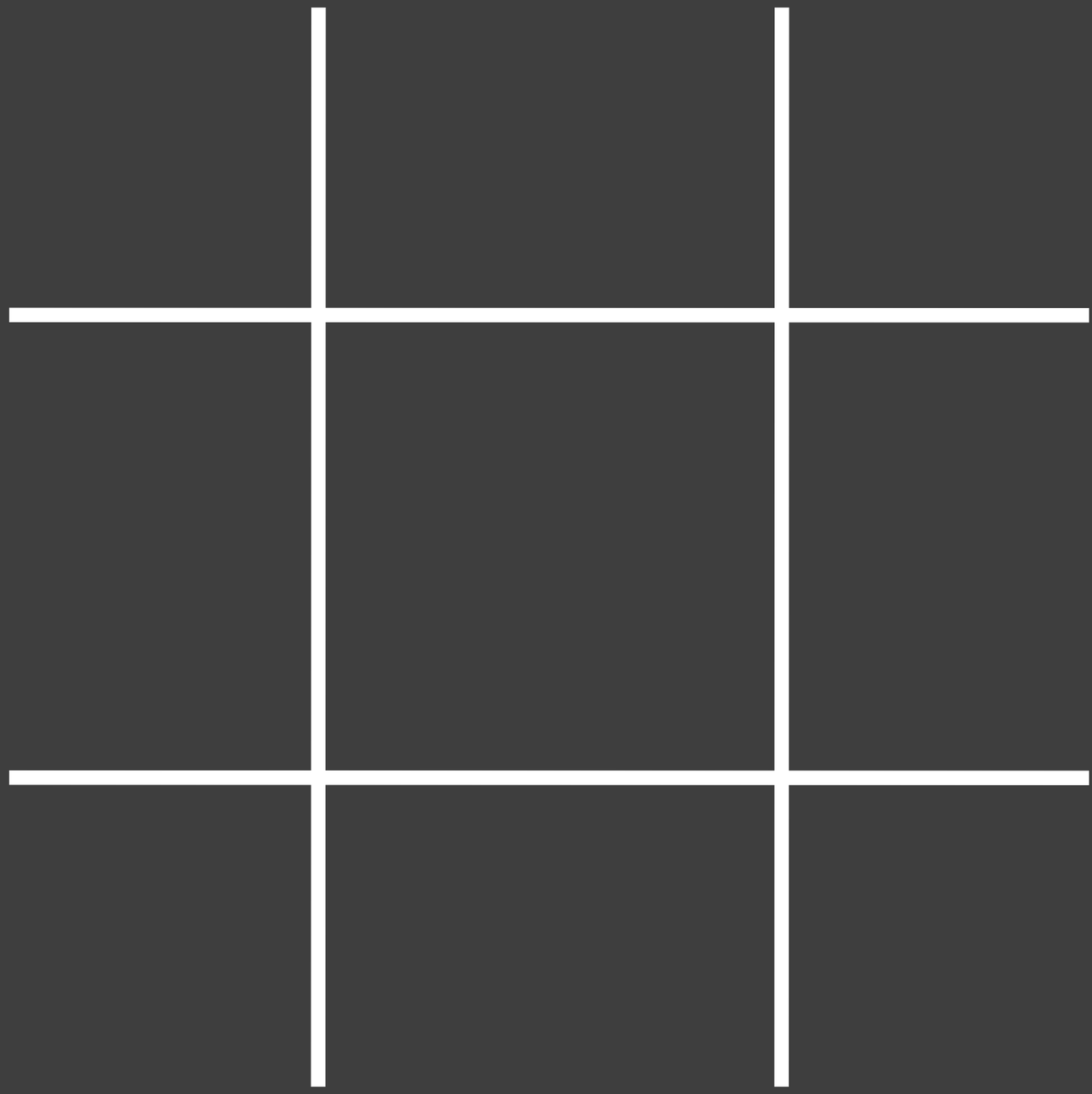
rule 3 Only the largest donut on a peg can be transferred to another peg



Let's play a number game!

- Two players
- Think of the numbers 1 to 9
- Players draw alternately, without replacement
- The objective is to make a set of 3 that adds to 15

How ‘bout Tic-Tac-Toe?



These Games are Isomorphs

Problem Solving as Representation

"Solving a problem simply means representing it so as to make the solution transparent"

—Herbert Simon, The Sciences of the Artificial

Working Memory

Getting Things Done

David Allen

Naturalness

- Cognition is aided when the properties of the **representation** match the properties of the **thing** being represented

Don Norman, *Things that Make Us Smart*

Proteus Ingestable Networked Pill

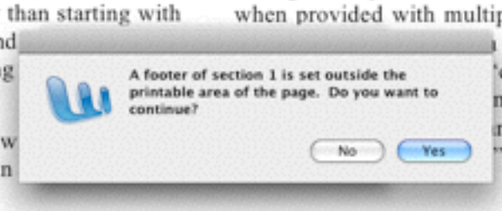
Images courtesy of Proteus Biomedical

General terms: Design, Human Factors

Keywords: Design by example.

INTRODUCTION

Many users learn web design by viewing and modifying the source code from other pages on the web. For its ability to scaffold learning, the "view source" option in web browsers is a pinnacle of interface design. Leveraging examples of previous work is an established technique in design [3, 32]. Many design education programs teach students to think like experts by exposing them—and encouraging them to draw upon—examples of previous work. Merging and adapting past solutions to fit the current context can facilitates creativity in new situations [20, 21]. Design compendiums such as *The Big Book of Logos* [5] serve as valuable resources for inspiration, and the advent of prolific, searchable Web content has provided ready access to a broad array of work created by other designers. When appropriate, example designs can offer pragmatic value as well as inspirational value. Starting with an existing design and modifying it can provide a lower barrier to entry than starting with a blank slate. Amateurs, prototypers, and



create a new design quickly find reusing
cially valuable [2, 17, 27].

Designers' current practices for working w
largely informal and ad hoc [19, 28]. Can

draw on multiple examples when creating new designs. While the software tool and empirical results in this paper examine the specific context of Web page design, the intuitions this work draws upon—most notably, the importance of analogy in creative cognition [13, 40]—suggests these findings likely have broader import.

The Existing and Potential Role of Examples

While it sometimes seems like ideas arise out of thin air, creativity is necessarily the result of applying existing knowledge [1]. Our prior experiences provide the scaffold upon which we create new ideas [13, 30, 36], and copying someone else's successful actions is more efficient than reinventing them from scratch. As Gick and Holyoak succinctly put it, "analogy pervades thought" [16]. Despite the centrality of experience to creativity and insight, people often neglect to draw on relevant knowledge, even when encouraged to do so through summarizing the relevant experience, stating the principle it embodies, or creating a diagram [15, 16]. People are much more likely to draw on analogous experiences and infer the underlying principle when provided with multiple examples, or when presented
case, and asked to compare them
'comparison processes can reveal
mbine partial structures and thus
rly in learning when neither ex-
" [14]. The benefits of principle-

case comparison may help explain the value of design patterns in architecture and software engineering [11, 29]. Similarly, software developers frequently copy example software code from web tutorials, and the tutorials' descriptions help developers locate and comprehend relevant examples [2].

While working with examples can provide important benefits for both learning and outcome, there is the danger of over-learning from at-hand examples. Sometimes, people interpret the current situation exclusively in terms of at-hand or in-mind previous situations [4]. This is known as a conformity effect, and it has been demonstrated empirically for creative tasks [34].

by extending the Firefox browser's built-in graphical HTML editor. The prototype's example corpus comprises 250 Web pages that we manually harvested and tagged with faceted metadata. Adaptive Ideas introduces an optimization-based approach to selecting, presenting, and browsing design material. The core of this approach is a *subset selection algorithm* that chooses examples from a corpus to display so as to maximize estimated design value.

The Adaptive Ideas interface comprises an editing pane, an examples gallery, and a preview pane (see Figure 1). The user can begin with a complete example by selecting one from the gallery. The preview pane enables users to see an example in greater detail and select a feature of it to bor-

Thanks for Your Midterm Feedback

“I like”: Lecture

- The material (videos/concepts) behind designing, iterating, and testing is great.
- Videos that supplement the lecture material
- Lecture activities really help me apply the info

“I like”: Labs

- Gives the steps and tools needed to build a functional website
- Helped me learn a lot of HTML, CSS, and JS knowledge
- Teaches me skills I will use in the future

“I like”: Studio

- Constant feedback from TAs and classmates each week so we have new ideas for making further changes and improvements
- Studio gives us the chance to collaborate with other teams, evaluate each other’s work, and give feedback.

“I like”: General

- Each assignment is thorough and pushes students beyond what they might might be used to doing
- Fast pace and practical applicability.
- Studio, lab, and lecture all interplay nicely.

“I wish”: Assignments

- Assignments have a lot of information, which makes it difficult for students to know what is due
- Expectations for grades are not clear and not clearly correlated with my effort
- “Stretch goals” for assignments as well as labs

“I wish”: Labs

- I wish labs were more challenging rather than just copy/pasting
- I don’t really feel like I’m learning as a CS major.
- Vagrant makes lab a struggle

“I wish”: Studio

- The initial studio allocations make it hard for waitlisted students to get into the studios they want
- Studio often feels rushed and jam-packed
- More elaboration on studio brief and why it matters

Assignment 5

All Design is Redesign

- Let's reduce the gulfs
- Say you're looking for a dorm desk…

Start on Pinterest

Head to Craigslist