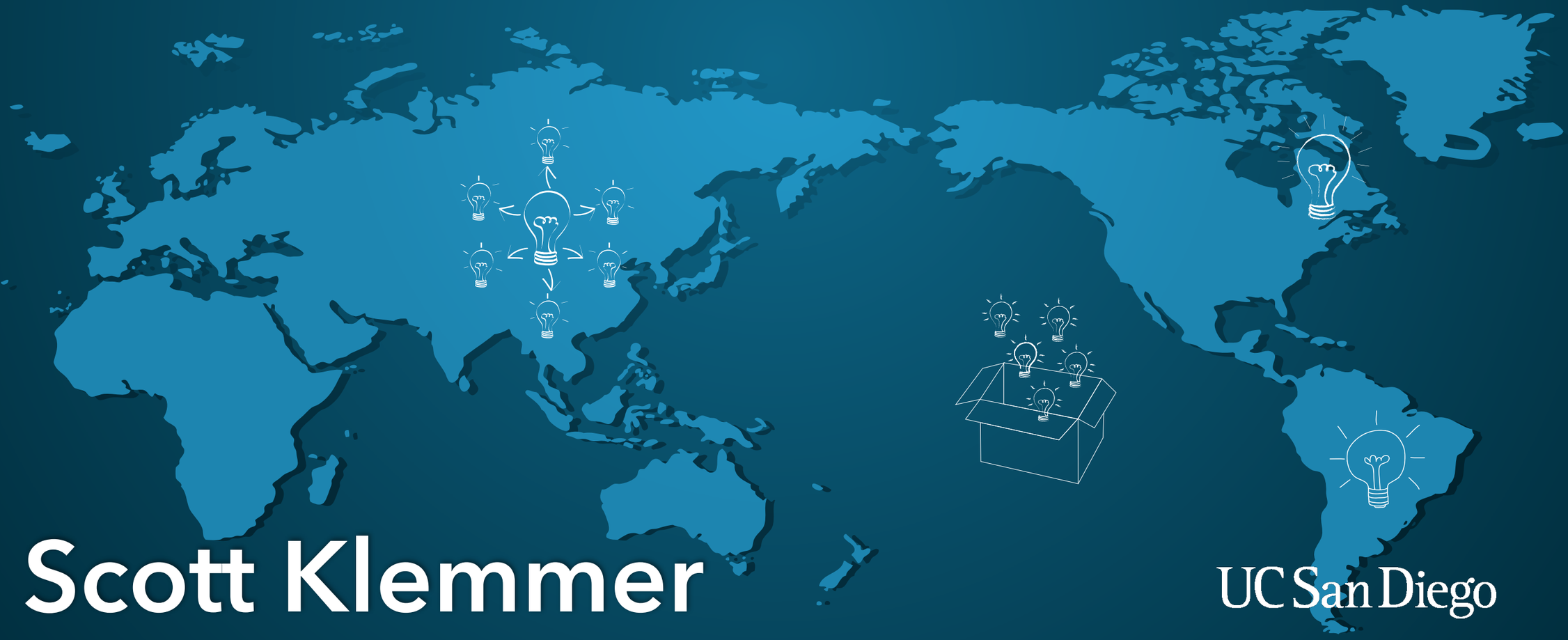
Direct Manipulation



Scott Klemmer

UC San Diego

A4 Example

Good HE: Junlin

Heuristic	Prototype #1	Prototype #2
Visibility of system status	• Lack of feedback for the "breathe in" and "breathe out" actions, unsure if the graphic would correspond accordingly. (1) • Upon success, "next" restarts the process. Ambiguous link between the word "next" and starting over the process. (2)	• Unclear what the user action should be after seeing notice upon picking up the phone before time is up. An intuitive action is to tap the screen, but there is a lack of instructions to inform the user to put the phone back down. (3)
Match between system and real world	• Instructions regarding how to "line up with the sun" are unclear as to how the user should interact with the phone (pick it up or simply use fingers). Also it's unclear as to how the graphics are oriented and the user should be instructed with more precise visual symbols such as a "sun" directly over the magnifying glass to indicate the action of "lining up" one over the other. (3)	• Unsure of what the mic check function is for and how the user should interact with it. "Mic check" could imply that the user should speak into the phone. (1)
User control and freedom	• User is unable to input/customize the amount of time for the "how much time do you have to burn" screen. Also there is a lack of confirmation regarding which time choice the user chose. (2)	• Lack of option to return to base screen from mission stats screen. (3)
Consistency and standards	• Unsure when the task log appears. After successfully aligning the sun, the fire starts, and when blowing air, the log appears inside the fire? Also unsure if there is a limit on the length of the task, what if the task does not fit within the graphic? (1)	• Unclear that "missions" lead to choosing a mission rather than simply displaying a list of missions. Can use "select mission" or "choose mission" to complement the second button of "add mission". (1) • Unclear from home screen what "quick start" implies. User may think that the feature already has a predetermined time and gadget. (1)
Error prevention	• Unclear as to how to make the instructions disappear. Should the user tap the screen or simply try to start doing the action? Ambiguous as to	• Unclear as to how to return to the "mission starts when phone is face down" page once the mission starts. User may make the error of exiting

Good list of changes: Neve

My Team (1: Lauran, Tamuz, Neve) Individual Evaluation
Changes for Prototype 1
Prototype #1 is my group's chosen prototype for the rest of the quarter

From the heuristic evaluation that I completed for Group 2 as well as the feedback my group received, I think that the major changes my group needs to make to our prototype are within the scope of incorporating error prevention as well as user flexibility. There needs to be a balance of user flexibility. If there is too much, then the student will have too many options to think about and might as well use the current system of Webreg. If there isn't enough (as current), the user becomes frustrated because the schedules or how the app presents the schedules will not be exactly what they are looking for. Below I have listed the major changes I would like to make after the HE:

- Editable User Info Page. Users input all of their information (Major, email, Name…) when they first edit the app, but there needs to be *flexibility* in case that information changes.
    - Why? After going through the app's process once, Hillary decided she wanted to add a minor. However, there was no option to alter her information.
- Adding *error prevention* for user info page. For Major and Minors, there should either by autofill or scroll to look for your major
    - Why? Bryce's HE said that there should be some sort of feedback when he inputs invalid information. He didn't know how he should write his majors and minors (cogs, cogsci, or cognitive science).
- A more graphic menu button than a Hamburger button, or perhaps a menu across the top of the app instead. If the user is on the add classes, unavailable times, or view schedules pages and presses the menu options, a popup should show saying, "are you sure? The data from your unfinished scheduling will be lost."
    - Why? Cole's HE mentioned that he was worried and hesitant to press the hamburger at any point because he didn't know what would happen. He was confused in regards to whether he would have to start the whole process over or would he be able to come back to his current place.
- Add *flexibility and error recovery* to the tagging system. If a user selects morning preference, but then decides she doesn't want to choose a preference, there should be a "no preference" option.
- Making the tags on the view schedules page optional. Documentation to help the users know that they are not required to choose tags. Perhaps add "Here are some optional tags to help you narrow your search".
    - Why? All three of the evaluators were frustrated that they had to choose either morning or afternoon. They didn't know that these tags (numbers of classes and time) were just preferences and hence not required.
- Add *flexibility and error recovery* to the tagging system. If a user selects morning preference, but then decides she doesn't want to choose a preference, there should be a "no preference" option.

Good Video: Lauren, Neve, Tamuz

https://www.youtube.com/watch?v=cSmmrcIr2VA

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

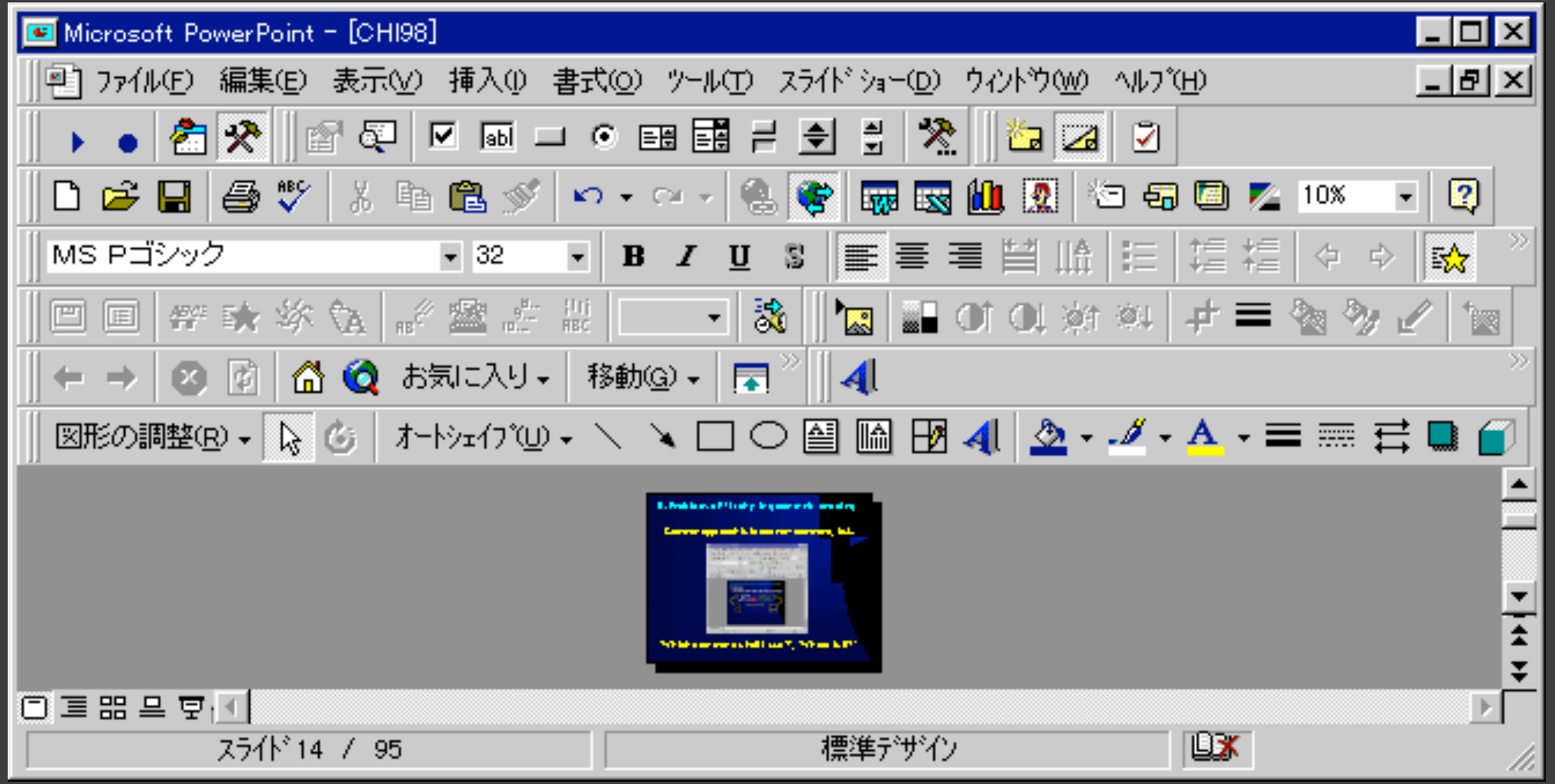
Direct Manipulation

- 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

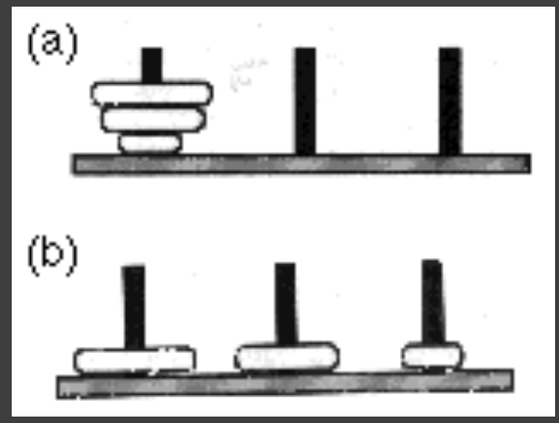
The Bagels Puzzle

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

rule 1 Only one bagel can
be transferred at a time

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

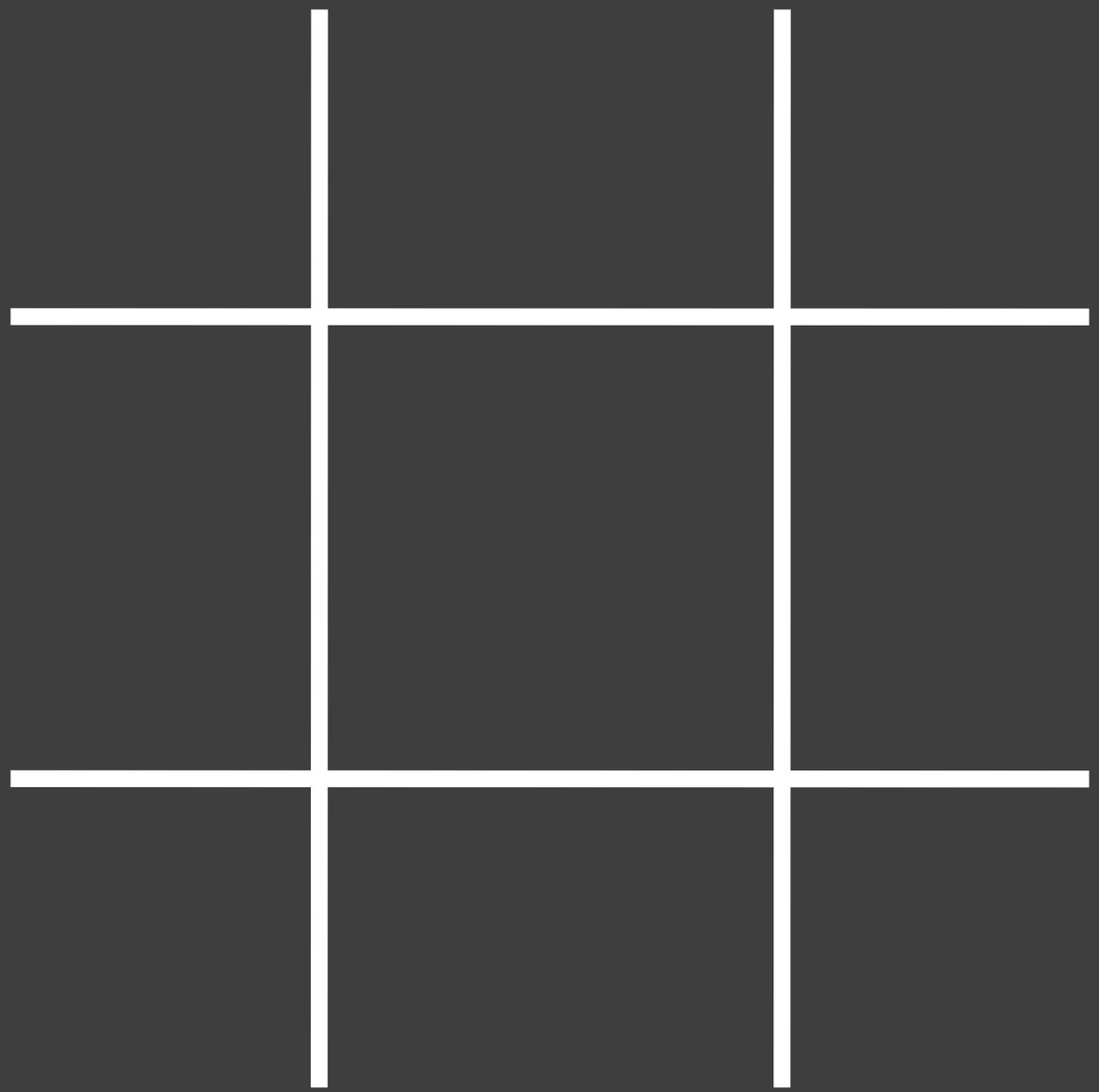
rule 3 Only the largest bagel on a peg can
be transferred to another peg



Let's play a number game!

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

How about 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 Ingestible Networked Pill

Images courtesy of Proteus Biomedical

QUARTER

. . . . .	Axess opens for course enrollment.
. . . . .	M.D. students, first day of instruction.
ER	
.m.)	Course enrollment deadline to receive stipend or refund check on first day of term.
. . . . .	New undergraduates arrive; Convocation.
. . . . .	First day of quarter; instruction begins.
p.m.)	Preliminary Study List deadline Students must be "at status"; i.e., students must have a study list with sufficient units to meet requirements for their status, whether full-time, 8-9-10 units (graduate students only), or approved Special Registration Status.
p.m.)	Deadline to submit Leave of Absence for full refund. A full refund schedule is available here.
. . . . .	Conferral of degrees, Summer Quarter.
. . . . .	Yom Kippur (classes held: some students will be observing Yom Kippur and are not expected to attend classes; some faculty will not be holding classes).
n.)	Final Study List deadline. Last day to add or drop a class; last day to adjust units on a variable-unit course. Students may withdraw from a course until the Course Withdrawal deadline and a 'W' notation will appear on the transcript.
R	
.m.)	Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund. A full refund schedule is available here.
.m)	Change of grading basis deadline.

SPRING QUARTER

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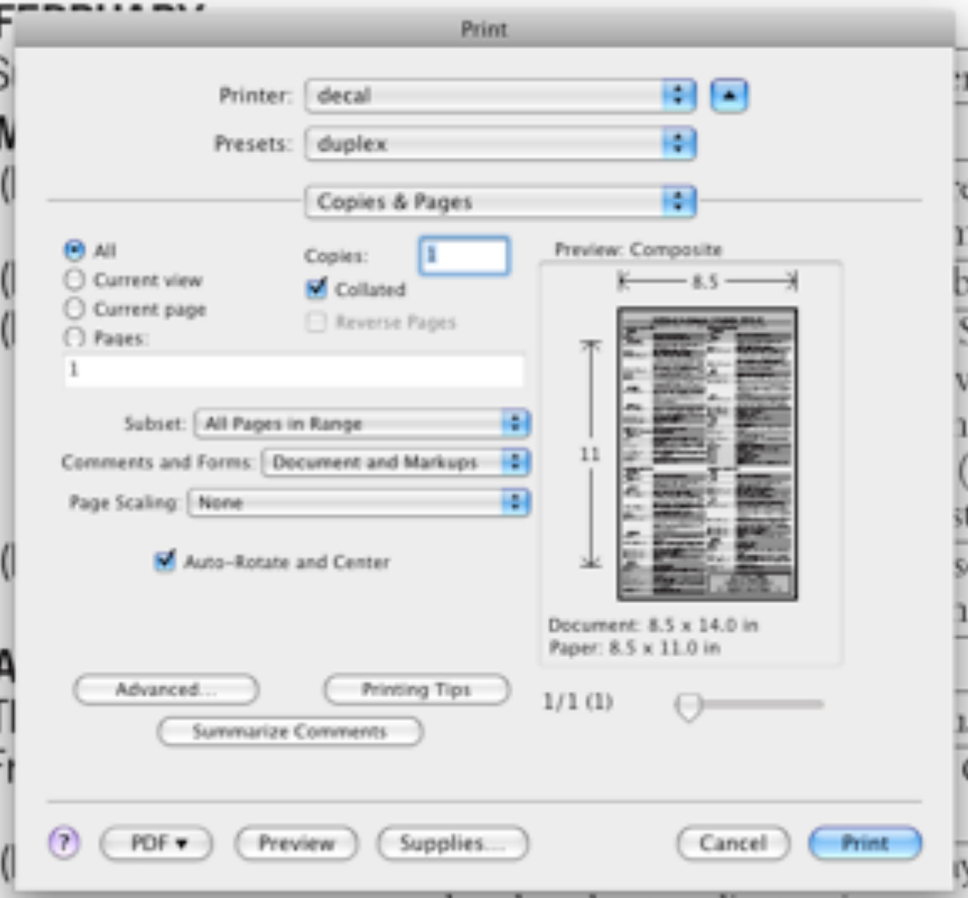

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Students must be
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(graduate students
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Quarter degree con-

y to add or drop a class; last day to adjust units on a variable-unit course. Students may withdraw from a course until the Course Withdrawal deadline and a "W" notation will appear on the transcript.

MAY

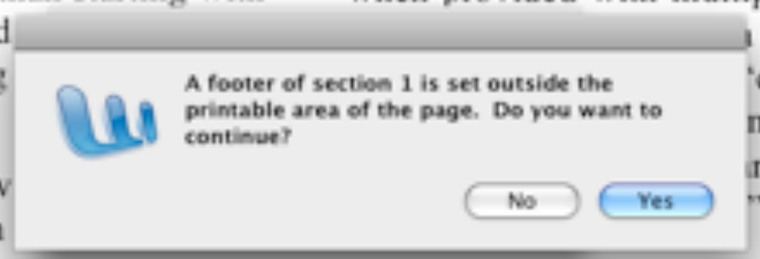
12 (Wed, 5:00 p.m.)	Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund. A full refund schedule is available here.
21 (Fri, 5:00 p.m.)	Change of grading basis deadline.
21 (Fri, 5:00 p.m.)	Course withdrawal deadline.
28-June 3 (Fri-Thu).	End-Quarter Period.
31 (Mon)	Memorial Day (holiday, no classes) .

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



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-

Thanks for Your Midterm Feedback

What are we doing well?

- Feedback and interaction in studio are helpful
- Going through the design process with tools and techniques used in the real world
- Videos that supplement lecture to help with design concepts

What can we do better?

- Debugging the labs
- More details about why we're doing what we're doing in lab
- Organization of course

What's one thing you could do better?

- Go to office hours
- Go to lecture/lab
- Work on assignments sooner
- Spend time exploring concepts