Lecture 8

Problem Framing and Sketching

UNIVERSITY OF AUCKLAND
COMPSCI 345 / SOFTENG 350
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Lecture Q&A on zoom https://auckland.zoom.us/j/7290166787
First 15 minutes of the usual lecture times, or longer

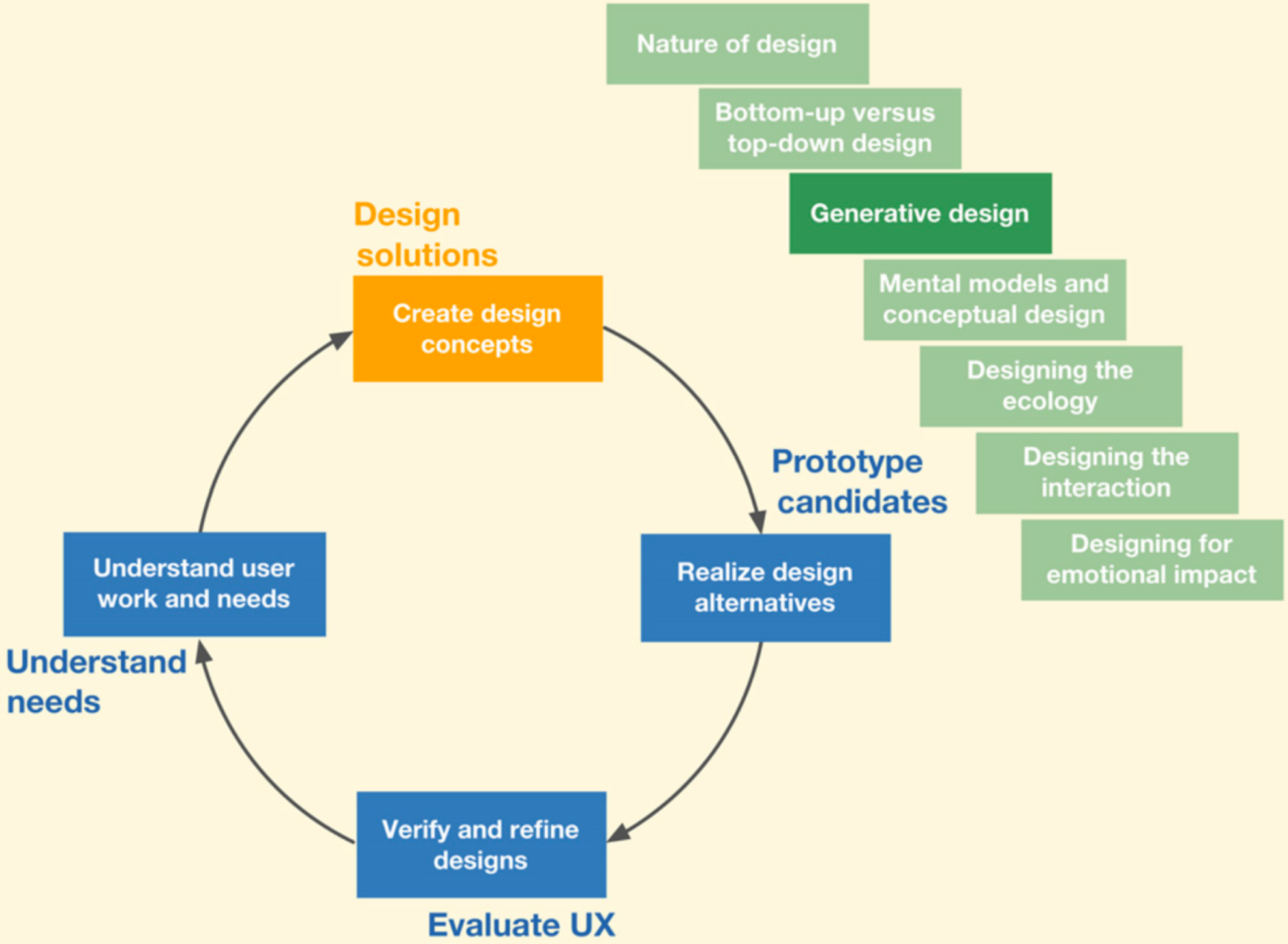
The UX Book chapter 14.3
Buchanan (1992) Wicked Problems in Design Thinking. subsection "The Wicked Problems Theory of Design"

Learning Outcomes

- To appreciate use of design space, design thinking
- To understand various kinds of design approaches and their underlying orientation, i.e., “way of knowing”
- To apply problem-framing to different kinds of problems
- To understand value and process sketching
- To know how to apply sketches techniques

Agenda

- Where we are in the HCI / UX process
- What is a design space
- Problem-Framing
  - basic concepts
  - design approaches
  - wicked problems
- Sketching


Nature of design
Bottom-up versus top-down design
Generative design
Mental models and conceptual design
Designing the ecology
Designing the interaction
Designing for emotional impact
Design solutions
Create design concepts
Prototype candidates
Realize design alternatives
Understand user work and needs
Understand needs
Verify and refine designs
Evaluate UX

What is a design space?

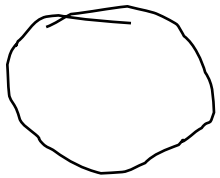
Design Space Sketches

- A design space sketch includes:
  - axes that define design dimensions;
  - point designs laid out along the axes and
  - boundaries that specify the design's scope.

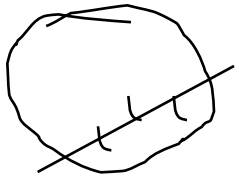
- Axes can be design dimensions, technology dimensions or social science dimensions.

Activity 1: Design Space Sketch

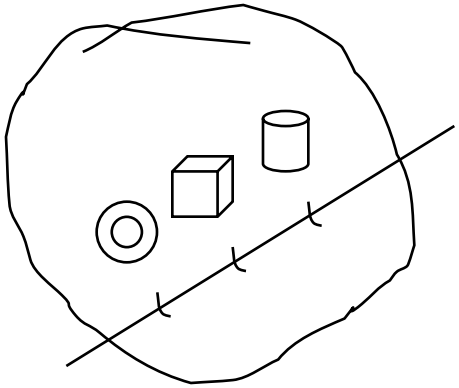
- Step 1: Boundary (Design Problem)



- Step 2: Axes with levels



- Step 3: Sketch a design alternative that supports each level



- Emergent ideas

problem framing

Richard Buchanan

Wicked Problems in Design Thinking

This essay is based on a paper presented at "Colloque Recherches sur le Design: Incitations, Implications, Interactions," the first French university symposium on design research held October 1990 at l'Université de Technologie de Compiègne, Compiègne, France.

Introduction

Despite efforts to discover the foundations of design thinking in the fine arts, the natural sciences, or most recently, the social sciences, design eludes reduction and remains a surprisingly flexible activity. No single definition of design, or branches of professionalized practice such as industrial or graphic design, adequately covers the diversity of ideas and methods gathered together under the label. Indeed, the variety of research reported in conference papers, journal articles, and books suggests that design continues to expand in its meanings and connections, revealing unexpected

from the immediate interests of designers, these works are cited because they deal with practical reasoning and have important bearing on aspects of design theory, including the logic of decision making discussed in Simon's The Sciences of the Artificial.

27) In order to solve such problems, more attention should be given to the various conceptions of design held by designers in the past. This would reposition design history from material objects or "things" to thought and action. In other words, what designers say and do, the history of their art as philosophy and practice. For a discussion of the subject matter of design history, see Victor Margolin's forthcoming "Design History or Design Studies: Subject Matter and Methods," Design Studies.

28) The phrase "non-dimensional images" refers to all images created in the mind as part of design thinking and, in particular, to the various schematizations of conceptual placements (e.g. hierarchical, horizontal, or in matrix and table form) that may aid invention.

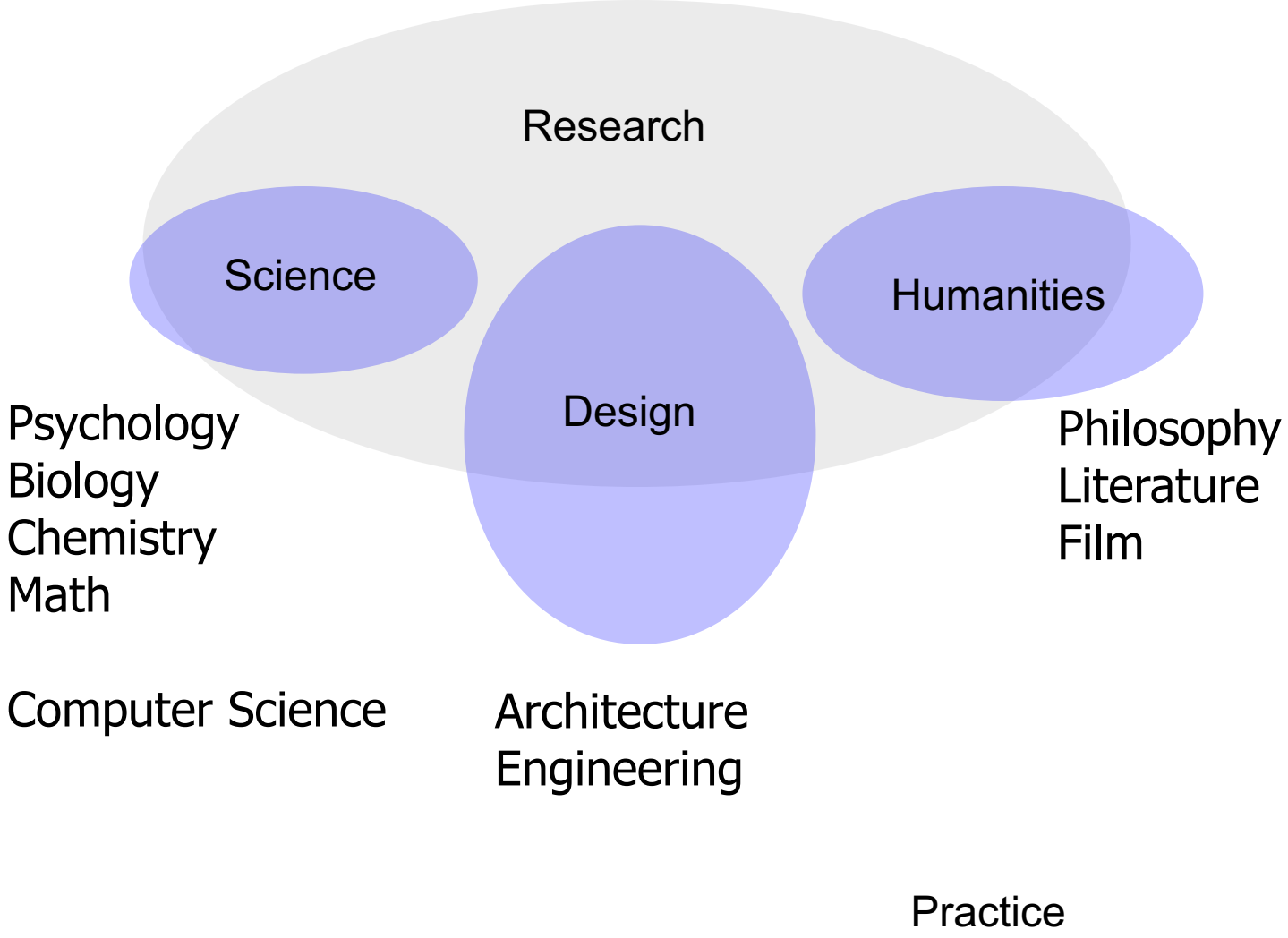
29) This list could also include the humanistic disciplines and the fine arts, because there is as much difficulty in communicating between some traditional humanists and designers as between designers and scientists. This is evident

The Wicked Problems Theory of Design

Recent conferences on design are evidence of a coherent, if not always systematic, effort to reach a clearer understanding of design as an integrative discipline. However, the participants, who increasingly come from diverse professions and academic disciplines, are not drawn together because they share a common definition of design, a common methodology, a common philosophy, or even a common set of objects to which everyone agrees that the term "design" should be applied. They are drawn together because they share a mutual interest in a common theme: *the conception and planning of the artificial.* Different definitions of design and different specifications of the methodology of design are variations of this broad theme, each a concrete exploration of what is possible in the development of its meanings and implications. Communication is possible at such meetings because the results of research and discussion, despite wide differences in intellectual and practical perspectives, are always connected by this theme and, therefore, supplemental. This is only possible, of course, if individuals have the wit to discover what is useful in each other's work and can cast the material in terms of their own vision of design thinking.

Members of the scientific community, however, must be puzzled by the types of problems addressed by professional designers and by the patterns of reasoning they employ. While scientists share in the new liberal art of design thinking, they are also masters of specialized subject matters and their related methods, as

concepts



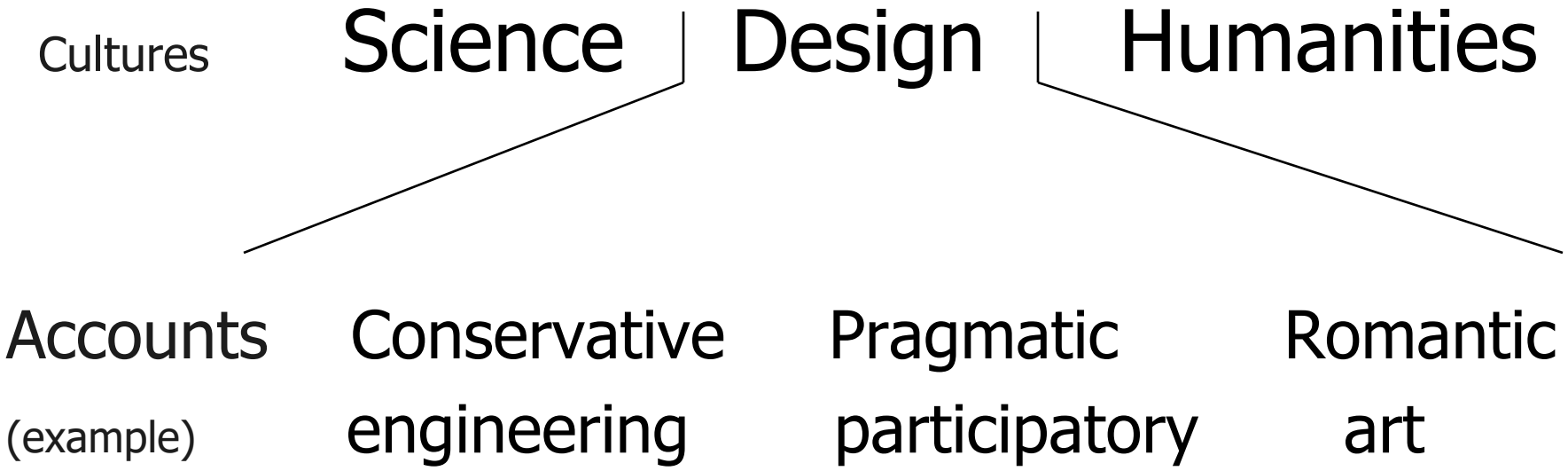
Research and practice of design across disciplines

Table 1.1 Alternative Knowledge Claim Positions

Postpositivism Determination Reductionism Empirical observation and measurement Theory verification	**Constructivism** Understanding Multiple participant meanings Social and historical construction Theory generation
Advocacy/Participatory Political Empowerment issue-oriented Collaborative Change-oriented	**Pragmatism** Consequences of actions Problem-centered Pluralistic Real-world practice oriented

Creswell, John. W. 2003. Chapter 1: A Framework for design. Pp. 3-23 in *Research Design: Qualitative, Quantitative and Mixed Methods Approaches.* Thousand Oaks, CA: Sage Publications

Design Approaches



Fallman, D. (2003). Design-oriented human-computer interaction. In Proceedings of the SIGCHI conference on Human factors in computing systems (pp. 225-232).

Design Approaches (Fallman, 2003)

Conservative	"Pragmatic/Residual"	Romantic
engineering	bricolage	art
glass box	self organizing system	black box
result of process	outcome of dialogue	functional art
methods	experience	creativity
rational	reflective	mystical

Ways of Thinking

- Induction:
  - Observation -> Pattern -> Hypothesis -> Theory
- Deduction:
  - Theory -> Hypothesis -> Observation -> Confirmation
- Abduction: (Lateral Thinking == Design Thinking)
  - Theory  Observations
  - Problem  Solution

Q1

- Write one design approach to Photo-sharing between family members, from each perspective

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wicked problems

the ten properties of *wicked problems* that Rittel initially identified in 1972.[38]

(1) *Wicked problems* have no definitive formulation, but every formulation of a *wicked problem* corresponds to the formulation of a solution.

(2) *Wicked problems* have no stopping rules.

(3) Solutions to *wicked problems* cannot be true or false, only good or bad.

(4) In solving *wicked problems* there is no exhaustive list of admissible operations.

(5) For every *wicked problem* there is always more than one possible explanation, with explanations depending on the *Weltanschauung* of the designer.[39]

(6) Every *wicked problem* is a symptom of another, "higher level," problem.[40]

(7) No formulation and solution of a *wicked problem* has a definitive test.

(8) Solving a *wicked problem* is a "one shot" operation, with no room for trial and error.[41]

(9) Every *wicked problem* is unique.

(10) The *wicked problem* solver has no right to be wrong—they are fully responsible for their actions.

Wicked Problems

- "A class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing."
- Problem definition is followed by problem solution
- Indeterminate
- Designers conceive of the general and the particular

Designers conceive of the general (design for pride) and the particular (how to show Thor's hammer).

What design is and isn't

- What is the difference between designing a product and making it?
- Problem framing and then skills of production

Q2

- Describe how designing a family photo-sharing application is a wicked problem.

sketching

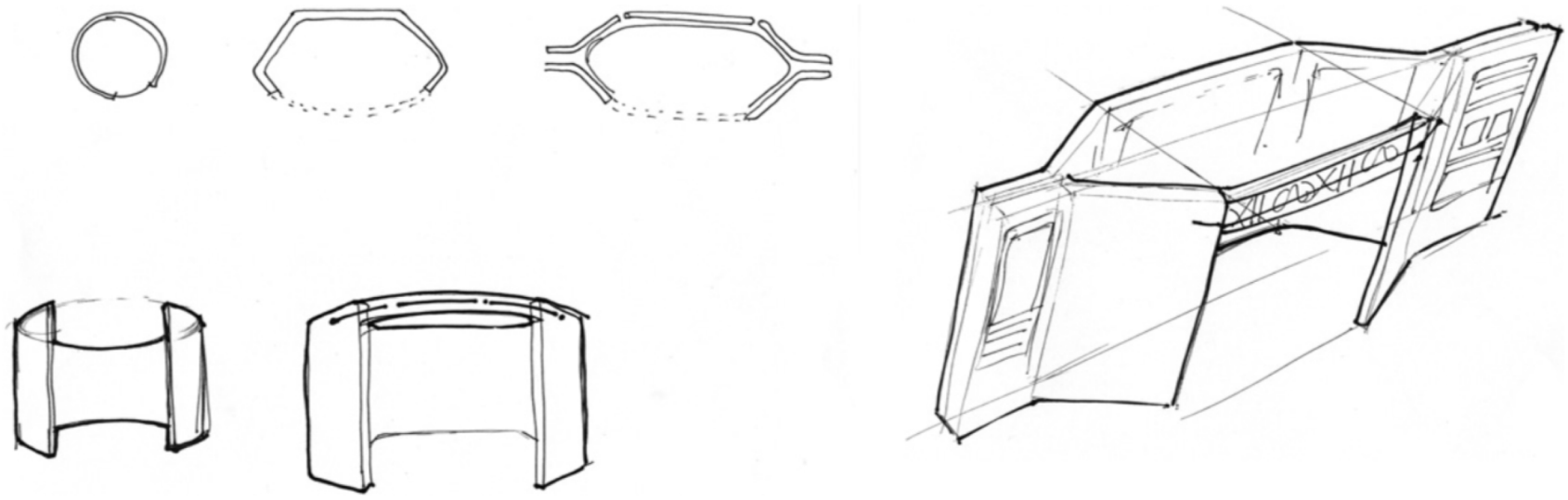


Fig. 14-6

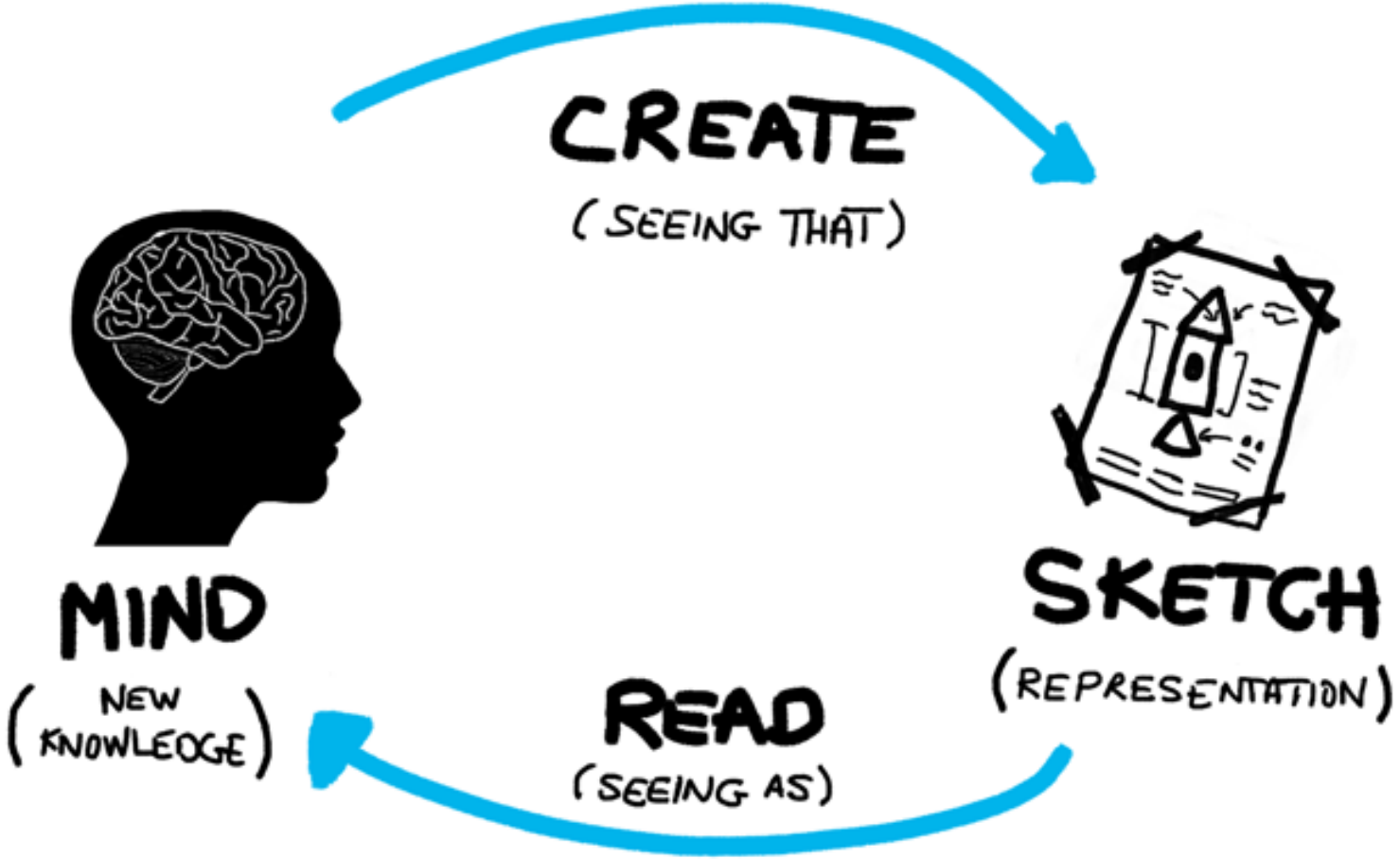
Freehand gestural sketches for the Ticket Kiosk System

Here are some more defining characteristics of sketching (Buxton, 2007b; Tohidi, Buxton, Baecker, & Sellen, 2006):

- Everyone can sketch; you do not have to be artistic.
- Most ideas are conveyed more effectively with a sketch than with words.
- Sketches are quick and inexpensive to create; they do not inhibit early exploration.
- Sketches are disposable; there is no real investment in the sketch itself.
- Sketches are timely; they can be made just in time, done in the moment, provided when needed.
- Sketches should be plentiful; entertain a large number of ideas and make multiple sketches of each idea.
- Textual annotations play an essential support role, explaining what is going on in each part of the sketch and how.

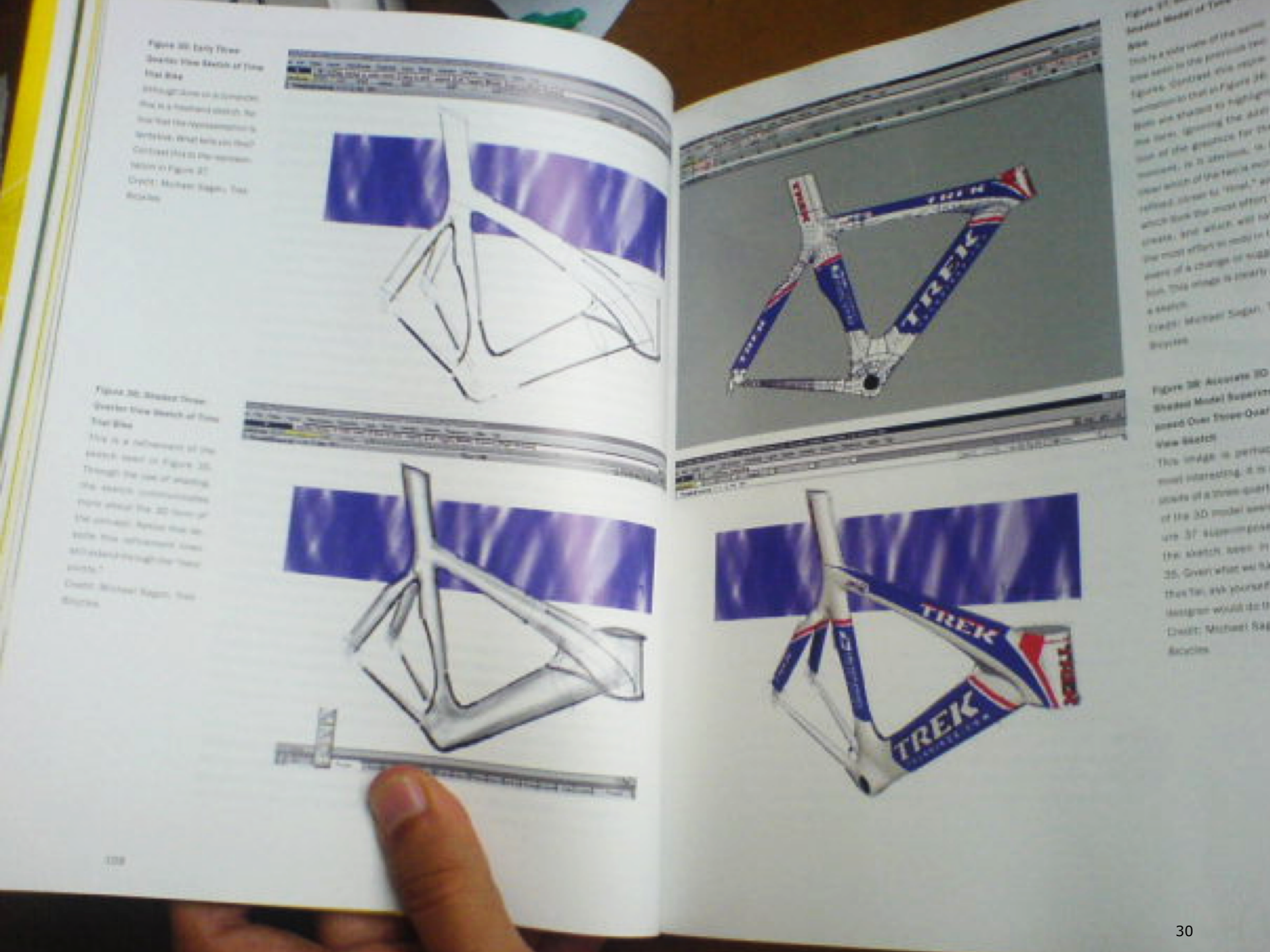
DIALOGUE WITH A SKETCH

We create sketches from our current knowledge. By interpreting the sketches we create new knowledge and understanding which continues the loop.



From the book: Sketching User Experiences by Bill Buxton

https://www.youtube.com/watch?v=0mPlbyuUw_c&t=13m16s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TREK
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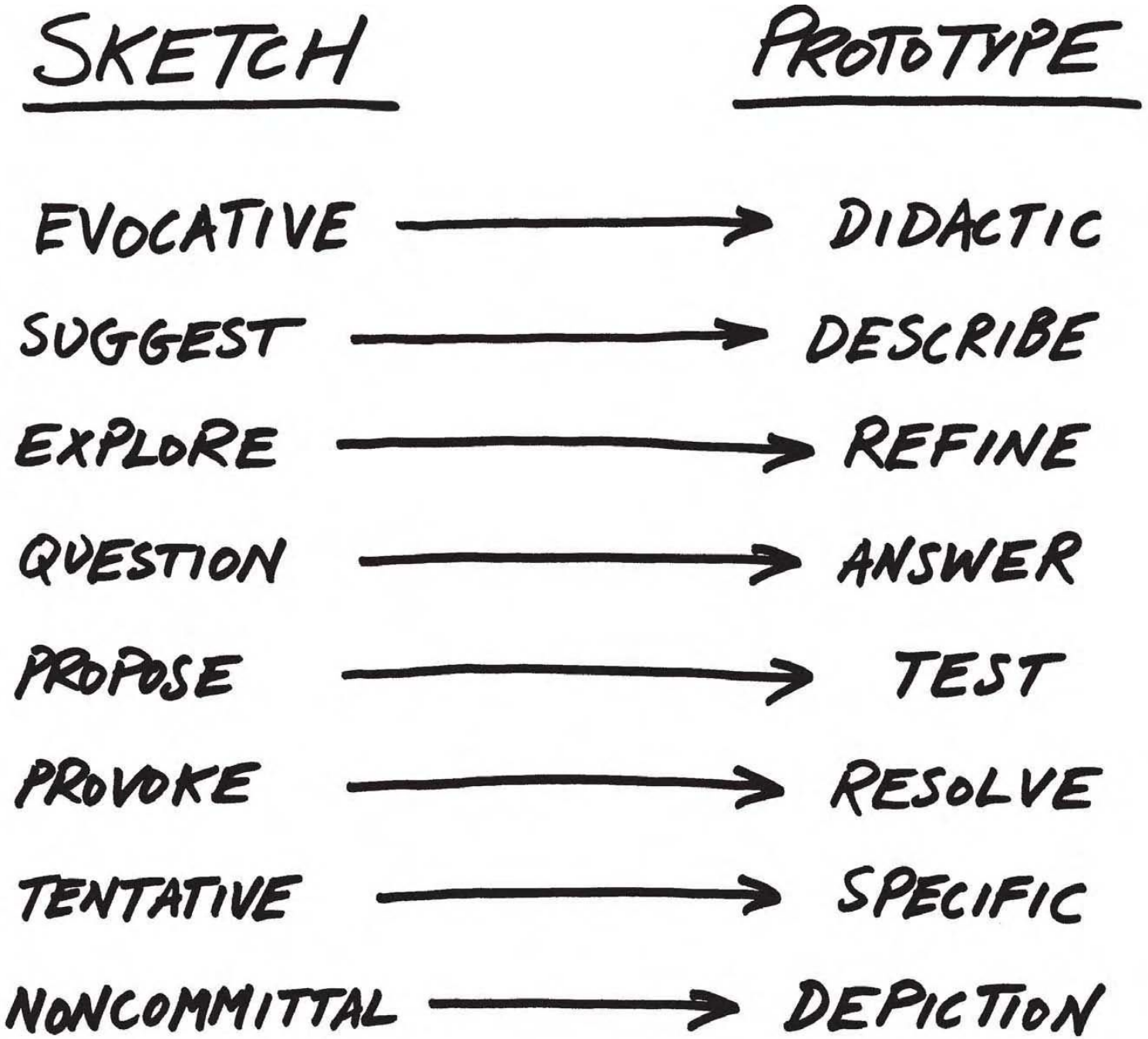
Q3

- Sketch two ideas for a wearable that senses slumped posture. Share an insight from dialoguing with your sketch. Justify the amount of detail in each sketch.

sketch an idea for a wearable
to sense posture


SKETCH
PROTOTYPE
EVOCATIVE
DIDACTIC
SUGGEST
DESCRIBE
EXPLORE
REFINE
QUESTION
ANSWER
PROPOSE
TEST
PROVOKE
RESOLVE
TENTATIVE
SPECIFIC
NONCOMMITTAL
DEPICTION

Rhythm of the course

- Assignments due Mondays at 8am
- Tutorial worksheets by Fridays 6pm
- Pop into a tutorial zoom office hours
  - Mondays @ 11am
  - Tuesdays @ 2pm
  - Wednesdays @ 1pm
- Chat with your instructor zoom office hours
  - Tuesdays @11, Wednesdays @ 3pm
  - Fridays @ 11am and 1pm

What's coming up

- Assignment 1 due Monday April 6, 8am
- Lecture 9 next week: Prototyping
- No lecture on Good Friday April 10 2020