

# Interaction Design

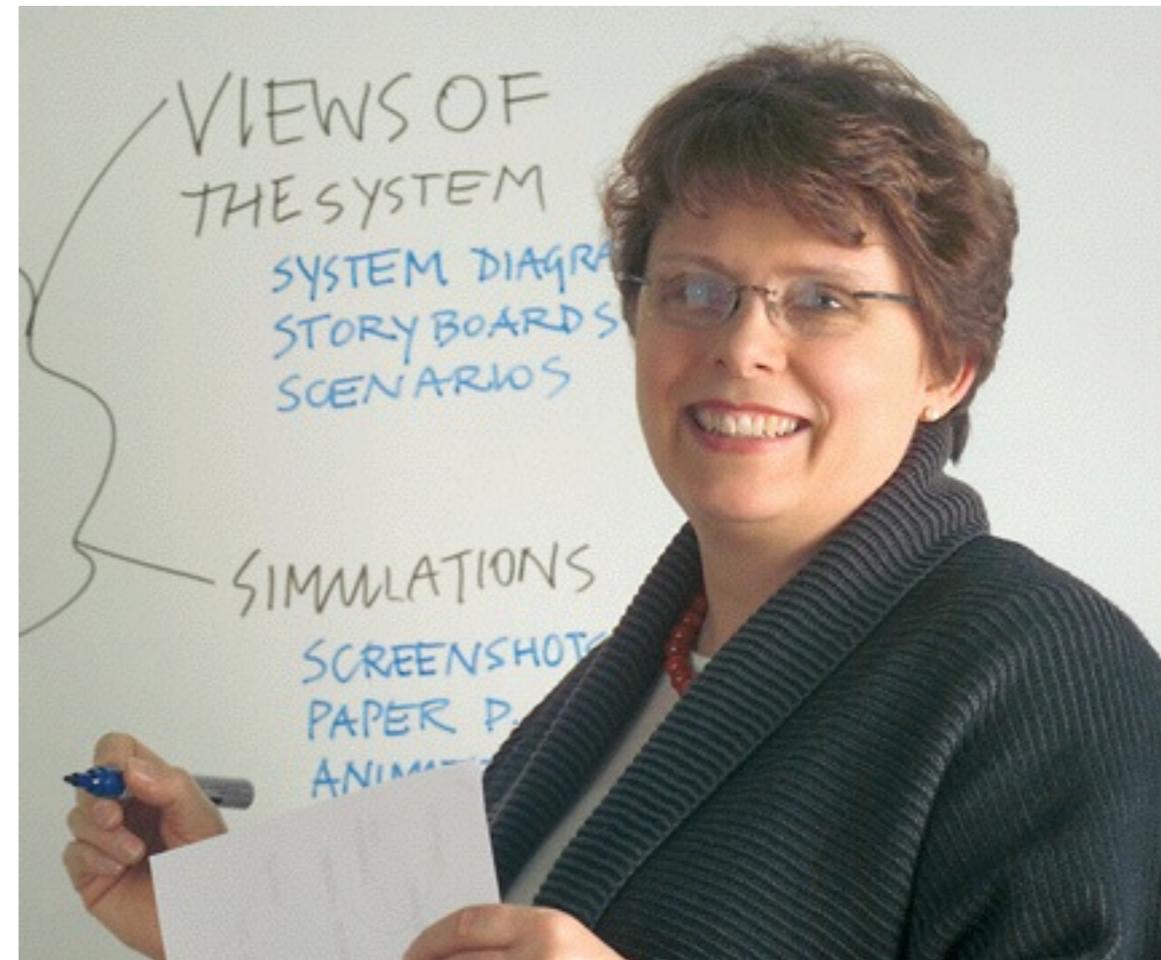
Chapter 3 (April 30, 2014, 9am-12pm):

Design Process Models, Elements and Technology

# Recap Day 1:

## Gillian Crampton Smith

- established the first Interaction Design MA program at the Royal College of Art (RCA)
- was the founder and academic director of the Interaction Design Institute Ivrea (IDII)

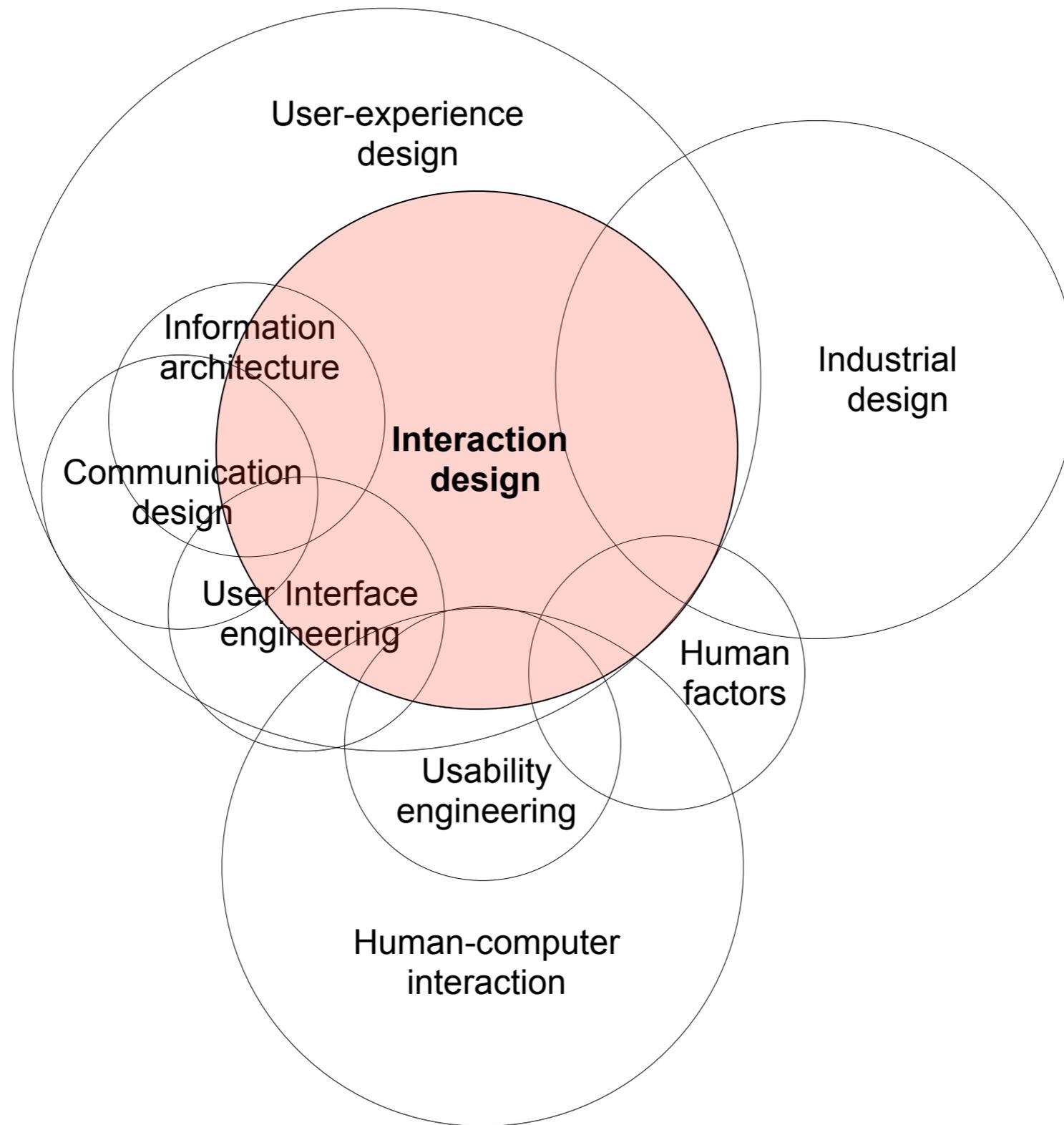


source: [3]

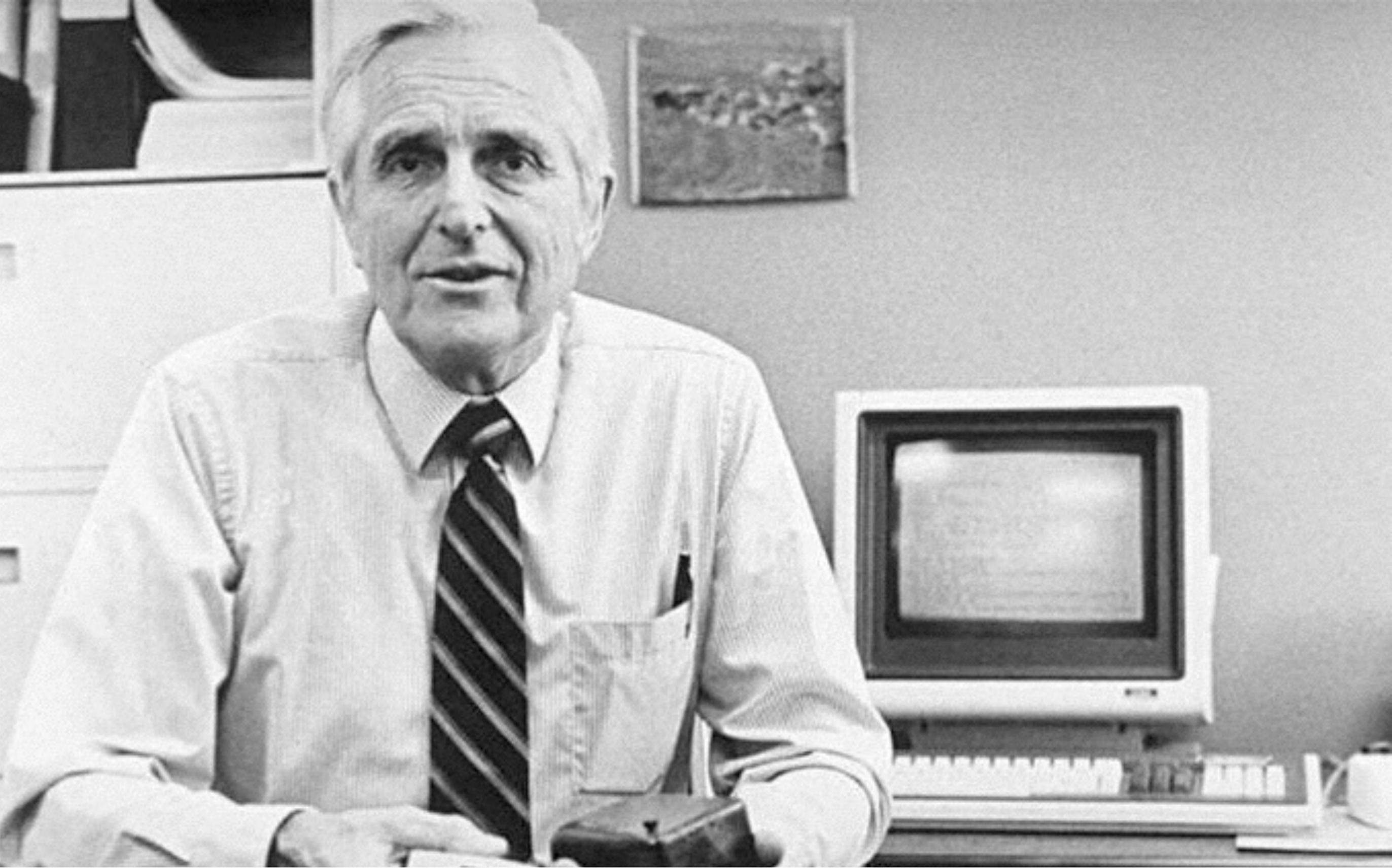
## Looking back...

- shaping our lives through digital artefacts...
- good IxD refers to a “mental model”
- good IxD provides a “map” of where you are in a system, how you can move around and how you get back to the point where you started
- languages of interaction design
- elements of interaction design
- the part of the interaction designer is to design the **quality** on how the interaction is performed, how the system behaves

source: [3]



source: [5]



# Douglas Engelbart

<http://www.corporationtocommunity.com/wp-content/uploads/2011/02/engelbart.jpg>

Douglas C. Engelbart : **Augmenting human  
intellect: A Conceptual Framework**  
*Stanford Research Institute (SRI), 1962.*

source: [3]

**1. Artefacts**—physical objects designed to provide for human comfort, the manipulation of things or materials, and the manipulation of symbols.

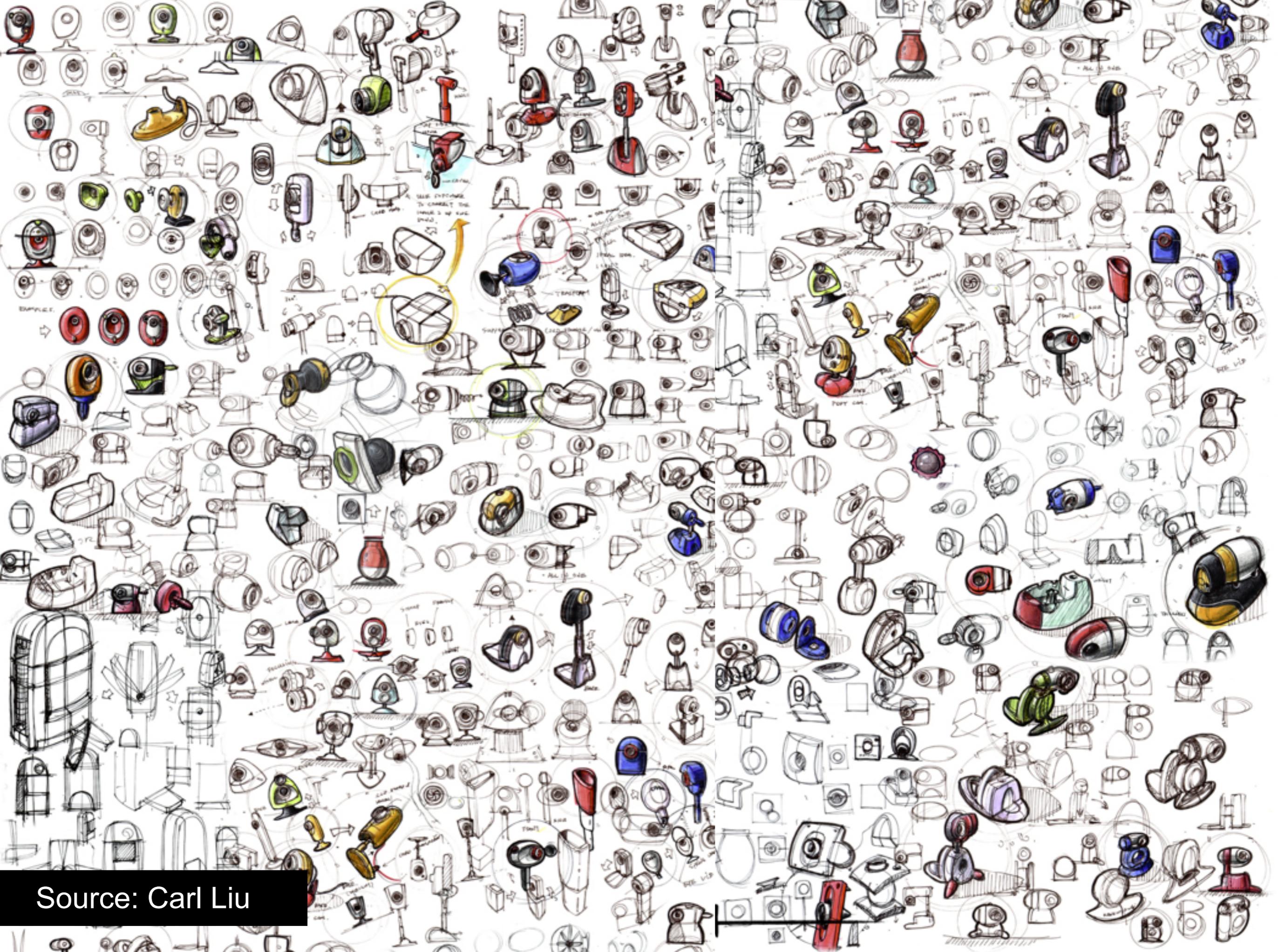
**2. Language**—the way in which the individual classifies the picture of his world into the concepts that his mind uses to model that world, and the symbols that he attaches to those concepts and uses in consciously manipulating the concepts (“thinking”).

**3. Methodology**—the methods, procedures, and strategies with which an individual organises his goal-centred (problem-solving) activity.

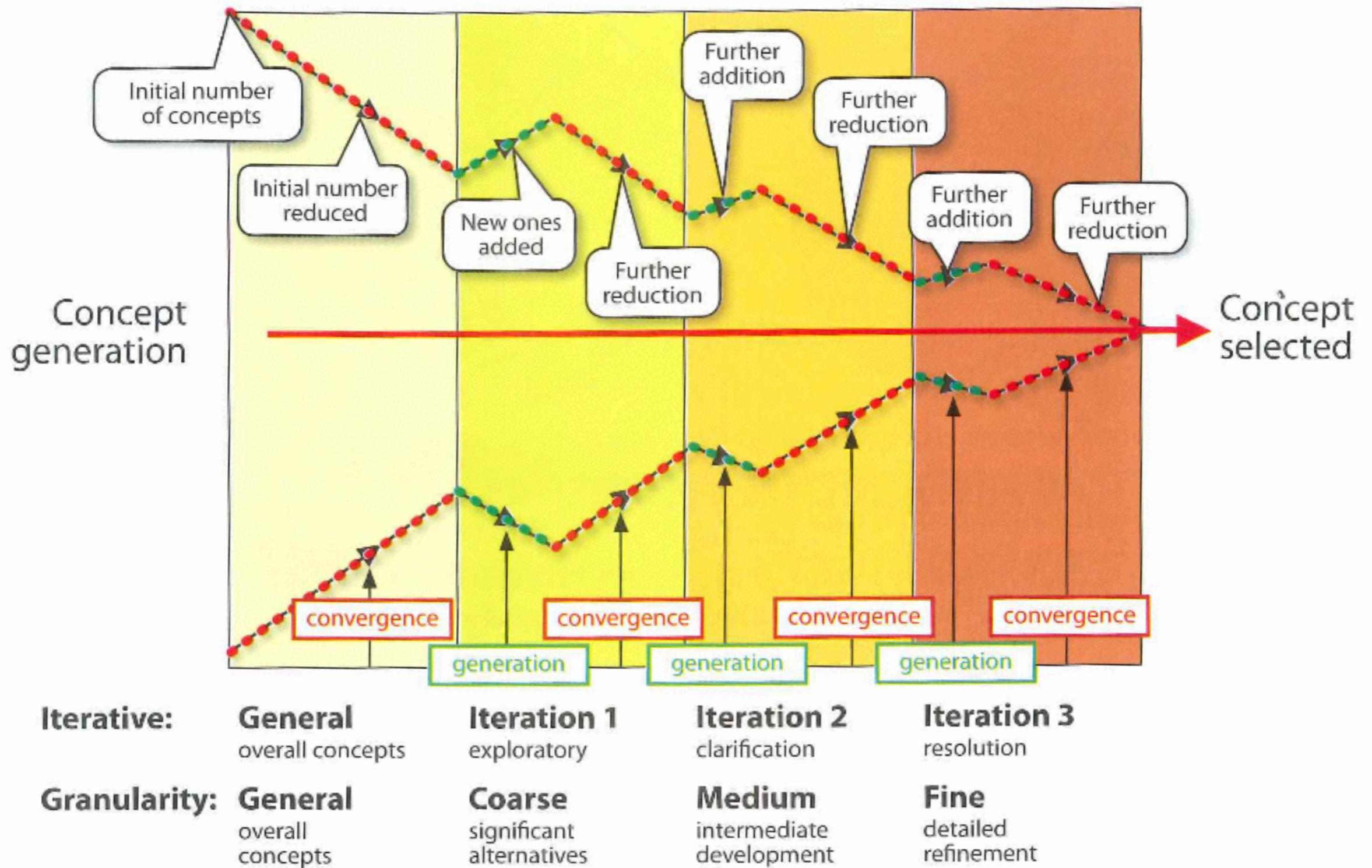
**4. Training**—the conditioning needed by the individual to bring his skills in using augmentation means 1, 2, and 3 to the point where they are operationally effective.

source: [3]

# Recap Day 2:



Source: Carl Liu



source: [6]

# Why is sketching useful?

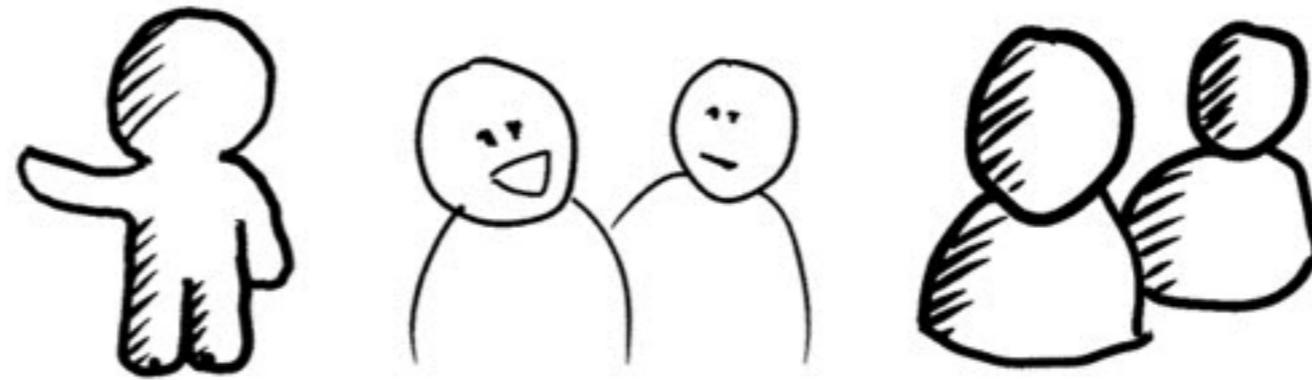
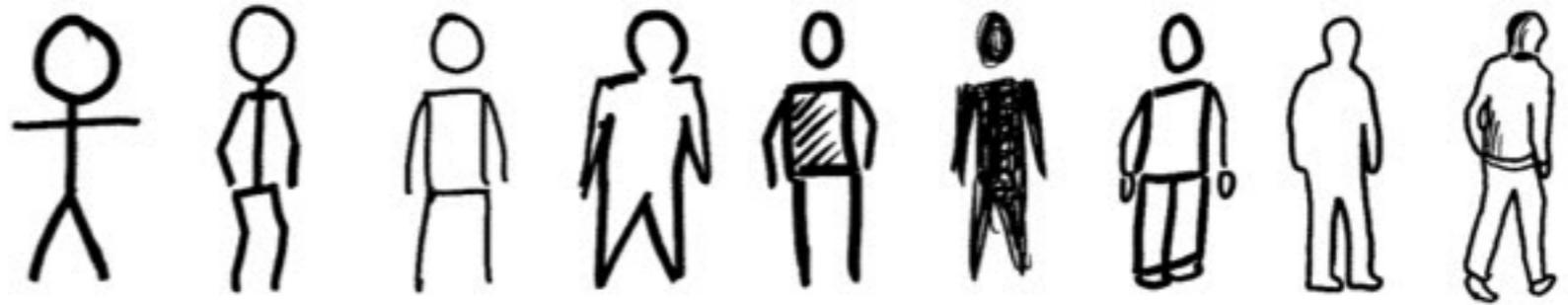
- **Early** ideation
- **Think** through ideas
- **Force** you to visualise how things come together
- **Communicate** ideas to others to inspire new designs
- **Active** brainstorming

# Buxton's Sketch Properties

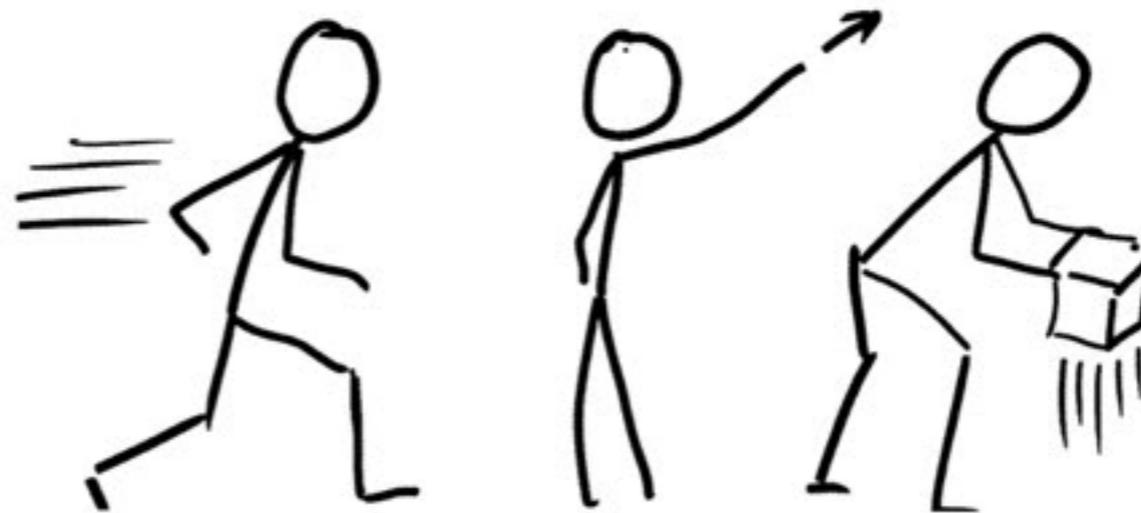
- Quick
- Timely
- Inexpensive
- Disposable
- Plentiful
- Clear vocabulary
- Distinct gesture
- Minimal detail
- Appropriate degree of refinement
- Suggest and explore rather than confirm
- Ambiguity

source: [6]

3) Try out different ways to draw people as part of the interaction sketches

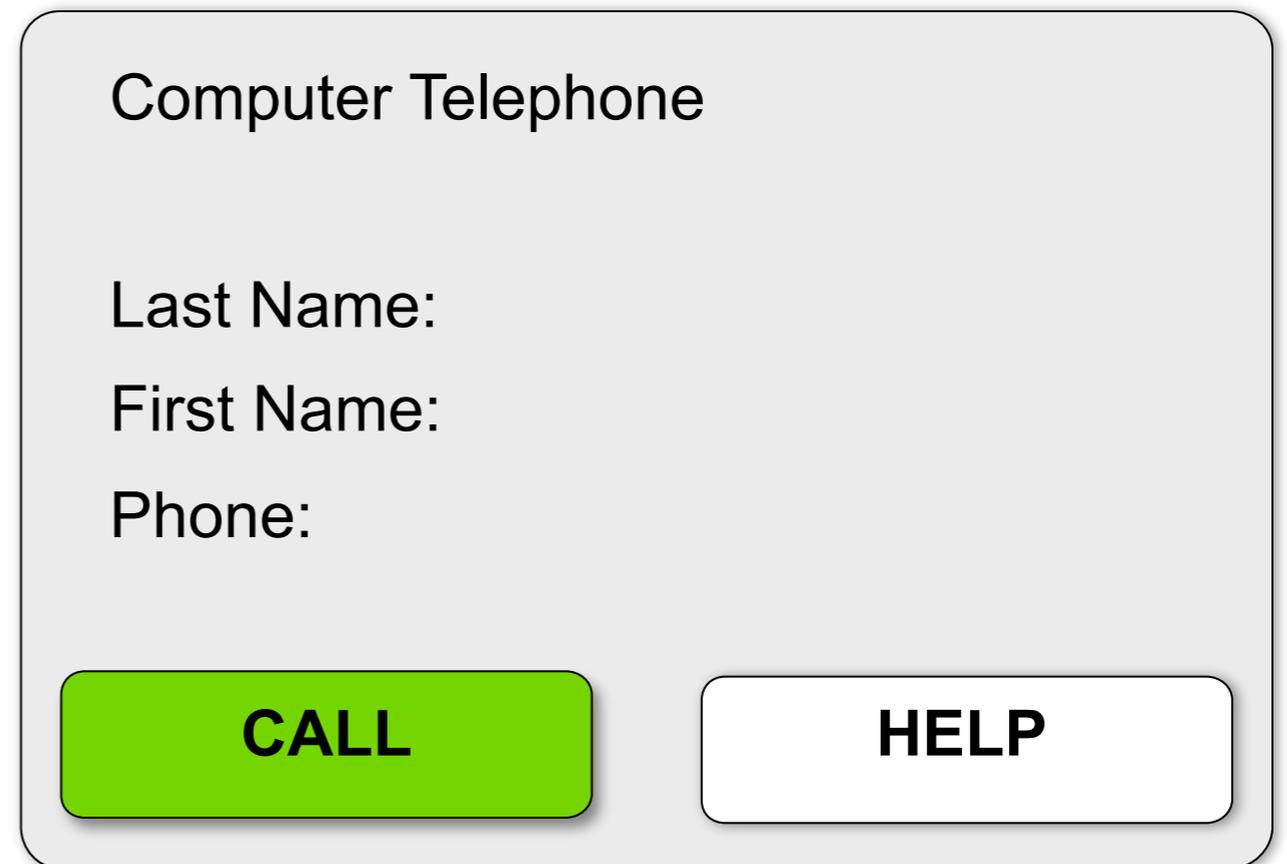
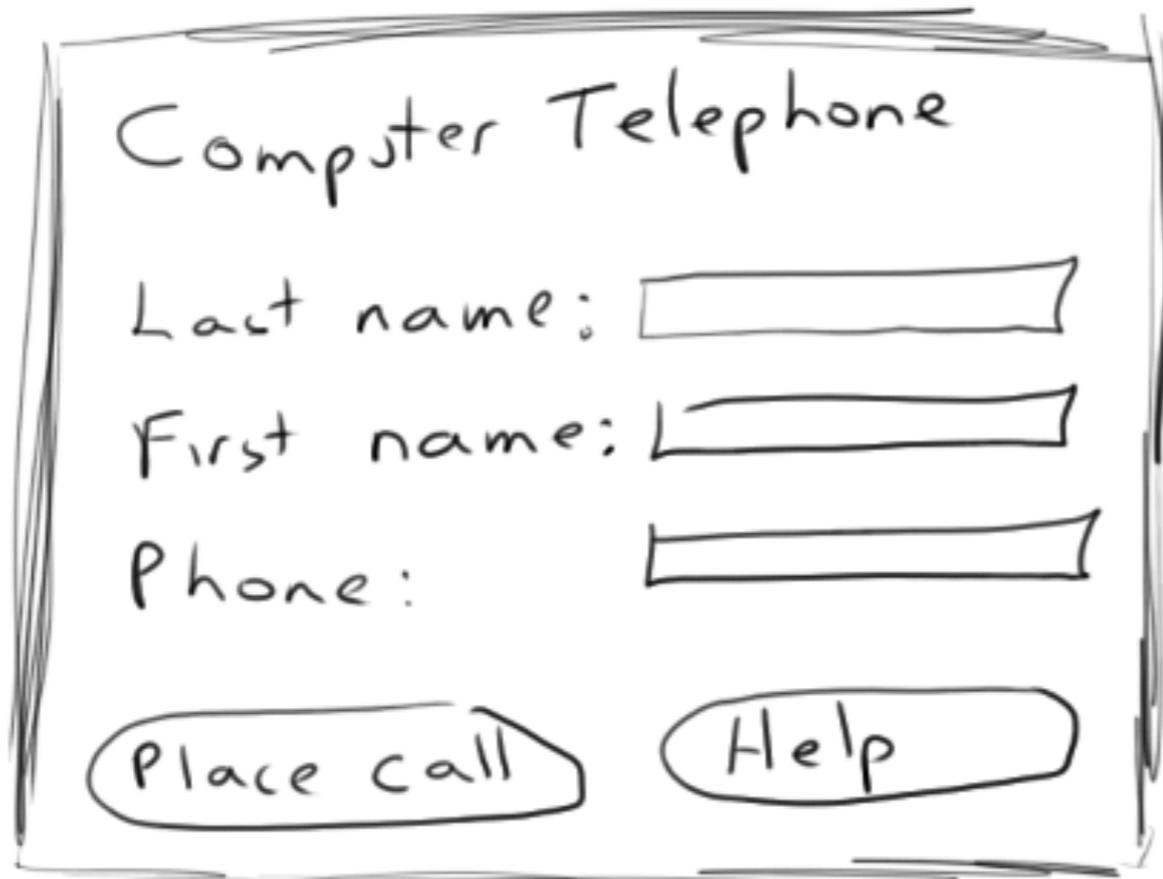


4) Illustrate activities and dynamics



source: [6]

# Technique: Reduce to essentials



**Low Fidelity**

**High Fidelity**



source: [6]

# Interaction Design

Chapter 3 (April 30, 2014, 9am-12pm):

Design Process Models, Elements and Technology

# Process Models, Elements and Technology

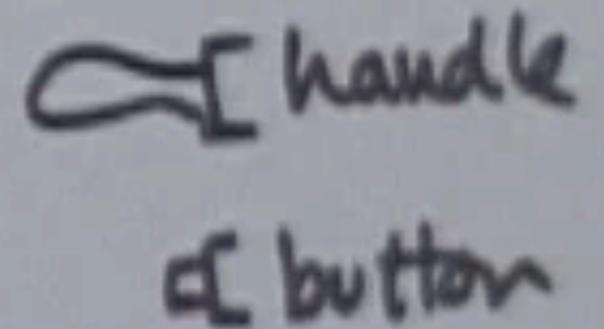
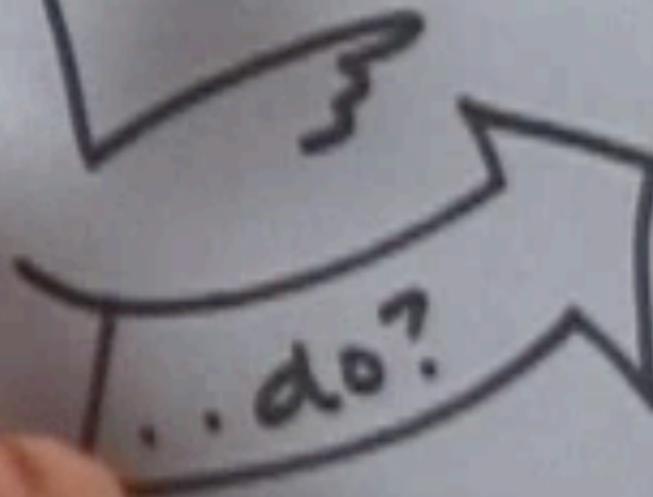
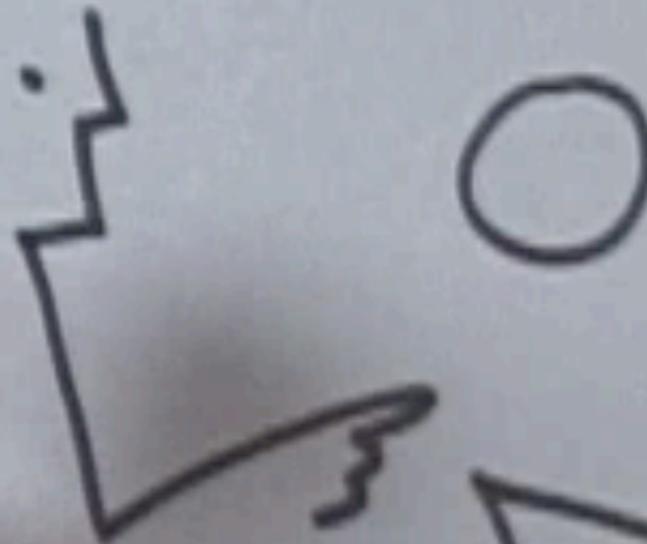
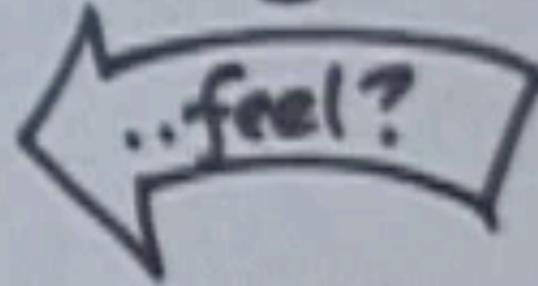
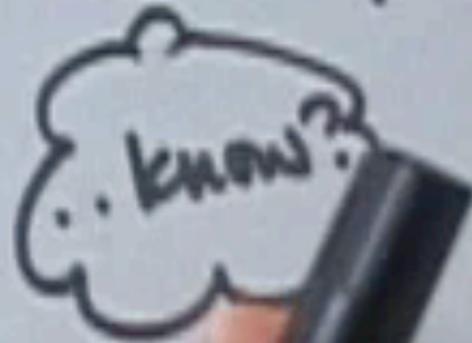
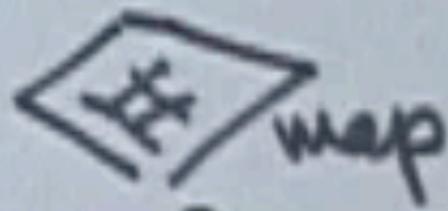
- Definition and Paradigms of Interaction Design
- Process Models
- Elements of Interaction Design
- Adapting Technology



**Bill Verplank**

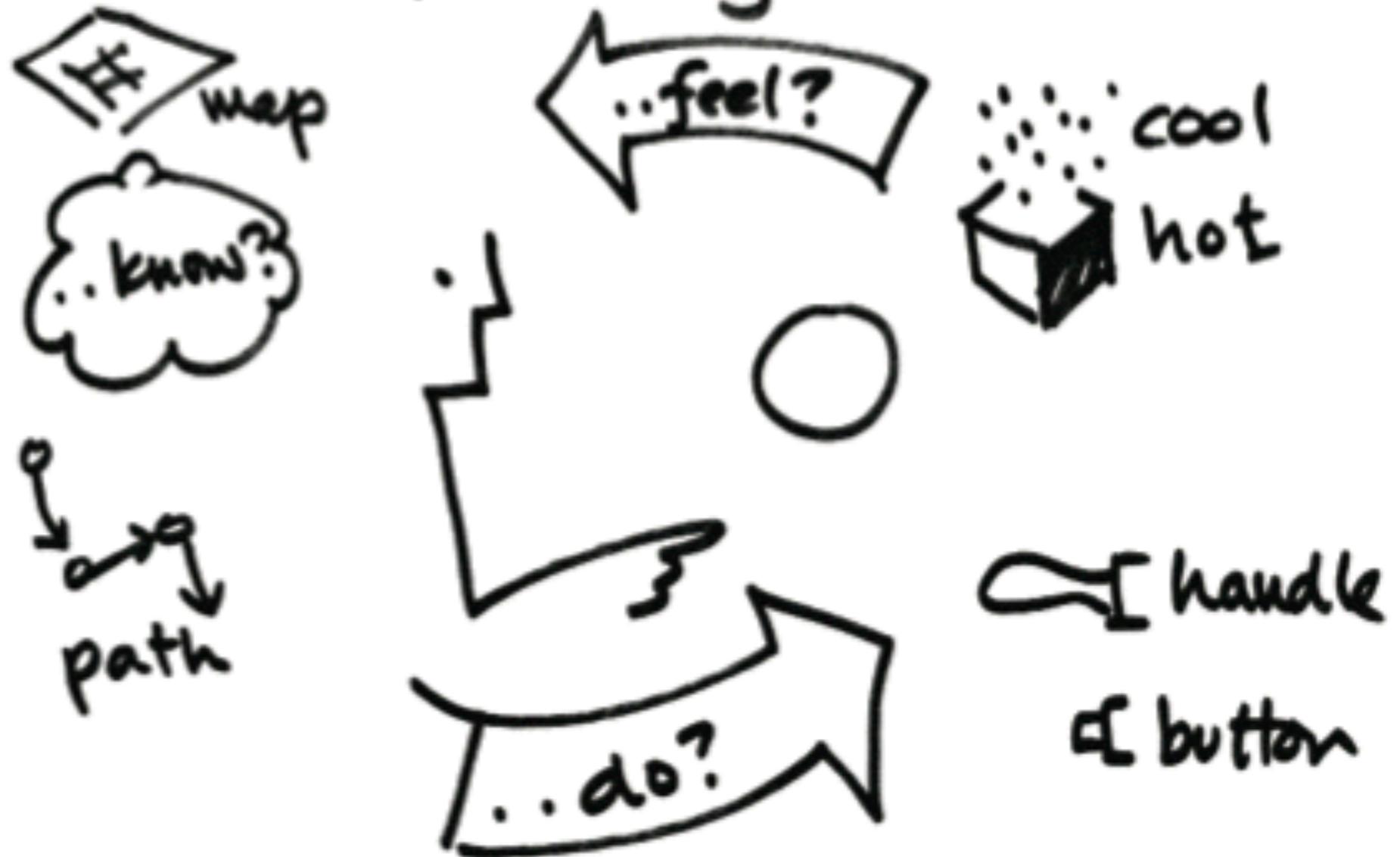
# INTERACTION

How do you...



# INTERACTION

How do you...



## Bill Verplank

says that the interaction designer has three questions to answer; they are all "How do you . . . ?" questions.

source: [3]

## 1. “How do you do?”

How do you affect the world?

You can grab hold of a handle and manipulate it, keeping control as you do it.

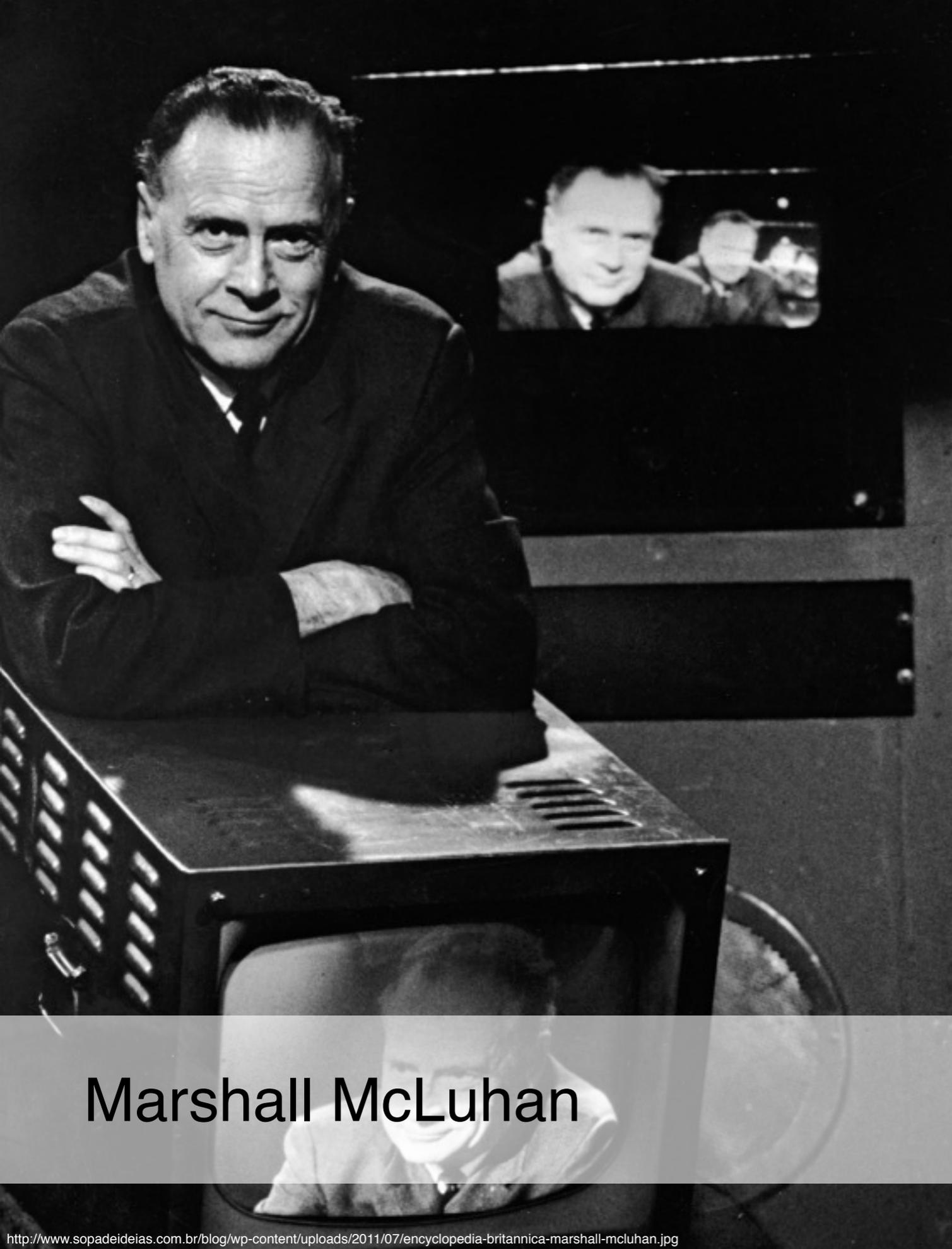
## 2. “How do you feel?”

How do you get feedback?

That’s where a lot of feelings come from; a lot of our emotions about the world come from the sensory qualities of those media that we present things with.

## 3 “How do you know?”

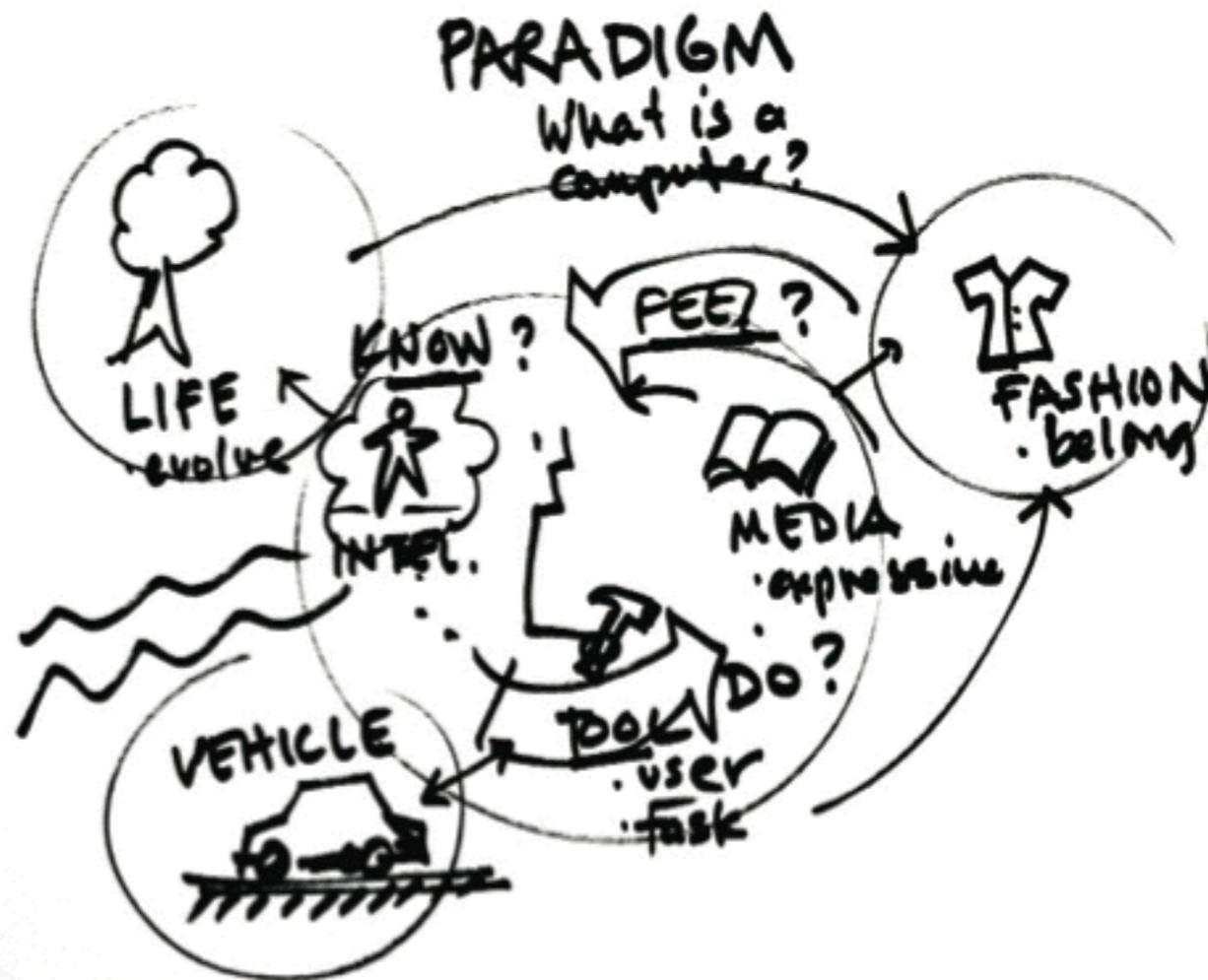
The map shows the user an overview of how everything works, and the path shows them what to do, what they need to know moment by moment



## Marshall McLuhan

"Any hot medium allows of less participation than a cool one, as a lecture makes for less participation than a seminar, and a book for less than a dialogue."

# Interaction Design Paradigms



**A paradigm** is an example that serves as a pattern for the way people think about something.

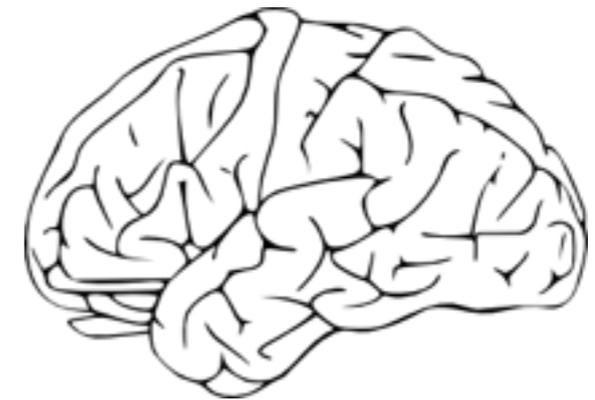
It is the set of questions that a particular community has decided are important. For interaction design there is often some confusion about what paradigm you are working with. The basic question is, What is a computer?

source: [3]

## Intelligence

In the early days, designers thought of computers as people and tried to develop them to become smart, intelligent, and autonomous.

The word “smart” is one that we associate with this paradigm, expecting the machine or product to be smart and to know how to do things for the person who uses it.



## Tool

Doug Engelbart, the inventor of the computer mouse, thought of the computer as a tool.

Styles of interaction changed from dialogs, where we talk to a computer and a computer will talk back to us, to direct manipulation, where we grab the tool and use it directly. The ideas of efficiency and empowerment are related to this tool metaphor.

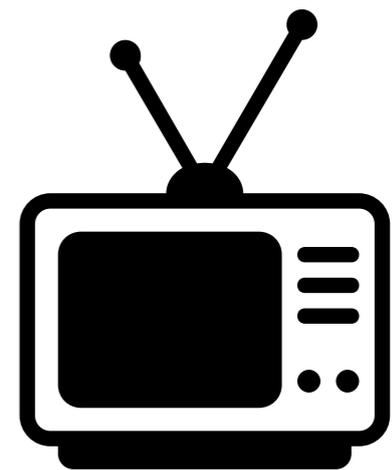


source: [3]

## Media

In the nineties, designers thought of computers as media, raising a new set of questions.

How expressive is the medium? How compelling is the medium? Here we are not thinking so much about a user interacting with or manipulating the computer, but more about them looking at and browsing in the medium.

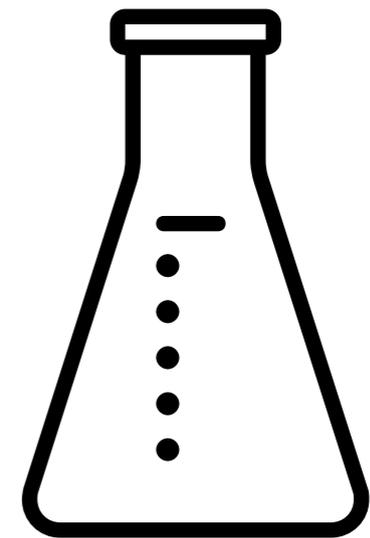


source: [3]

## Life

Starting in the mid nineties, people have been talking about computer viruses or computer evolution; they are thinking of artificial life.

When the program has been written, it is capable of evolving over time—getting better and adapting. The programmer is in a way giving up responsibility, saying that the program is on its own.



source: [3]

## Vehicle

Another metaphor is the computer as vehicle, and we have to agree on the rules of the road.

There has to be some kind of infrastructure that underlies all computer systems. People spend their careers determining the standards that will define the infrastructures, and hence the limitations and opportunities for design.

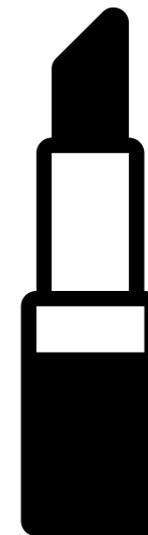


source: [3]

## Fashion

The media metaphor plays out to computers as fashion.

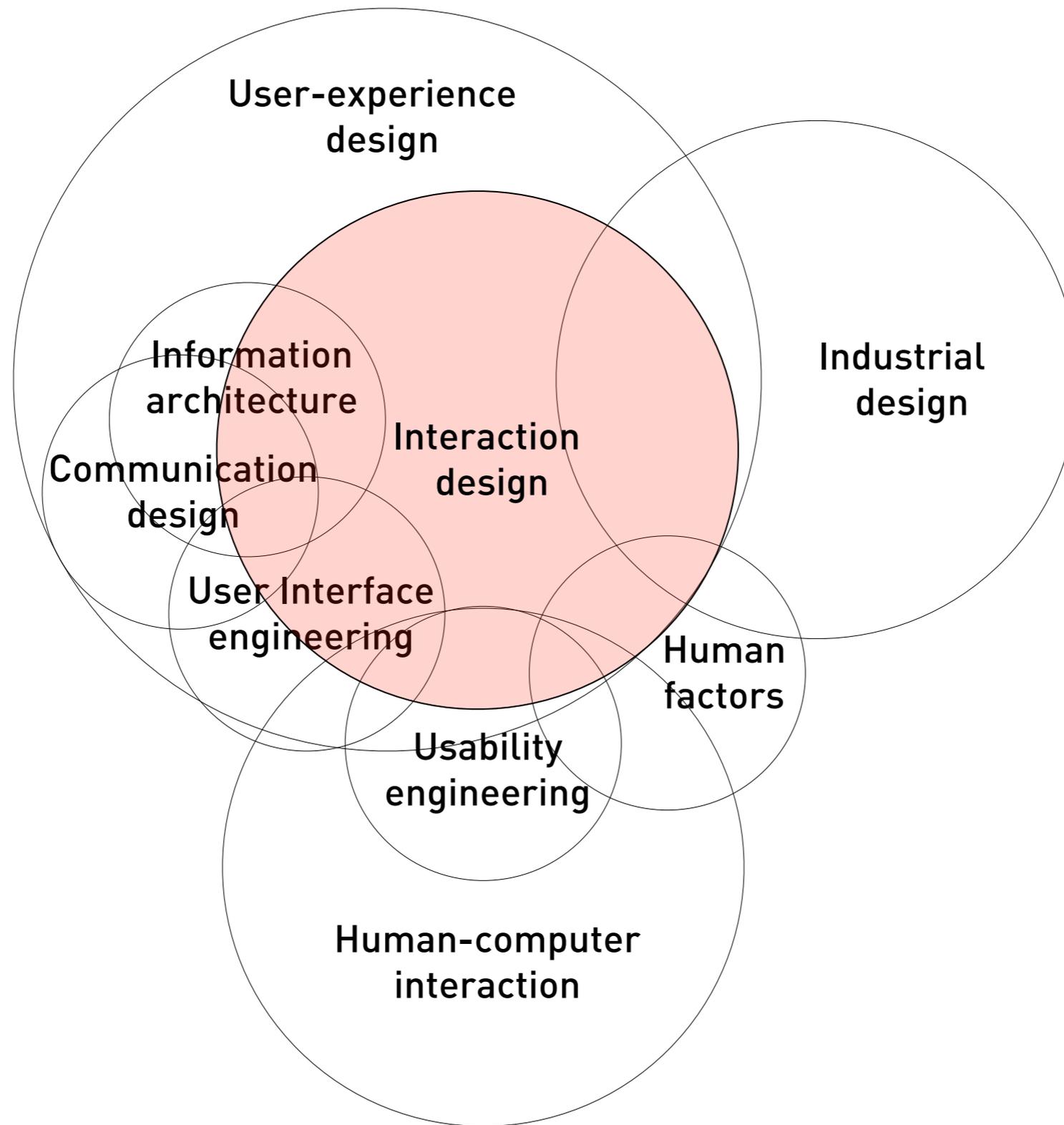
A lot of products are fashion products. People want to be seen with the right computer on. They want to belong to the right in-crowd. Aesthetics can dominate in this world of fashion, as people move from one fashion to another, from one style of interaction to another style.



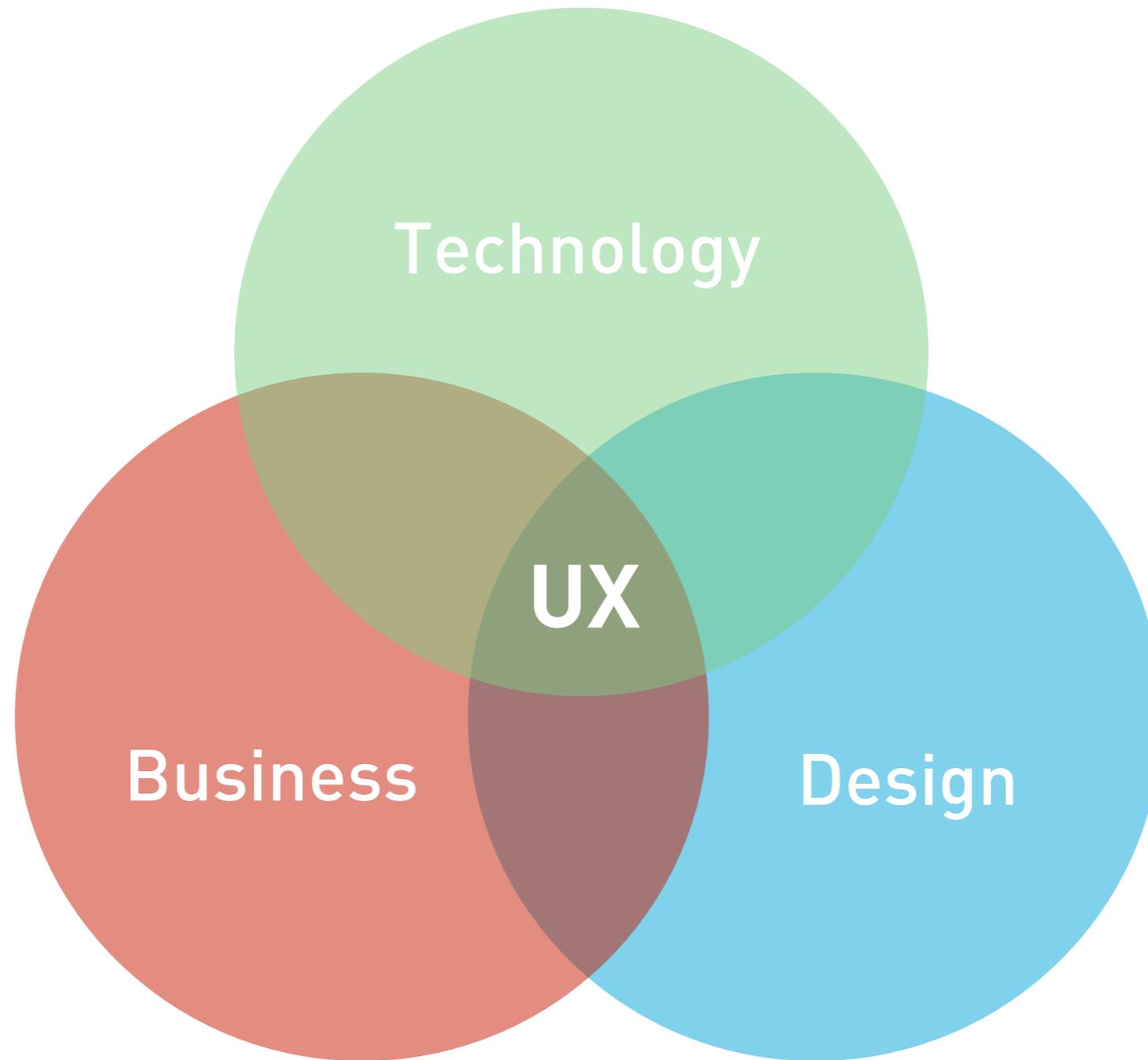
source: [3]

# Process Models, Elements and Technology

- Definition and Paradigms of Interaction Design
- Process Models
- Elements of Interaction Design
- Adapting Technology



# User Experience Design



# User Experience Design





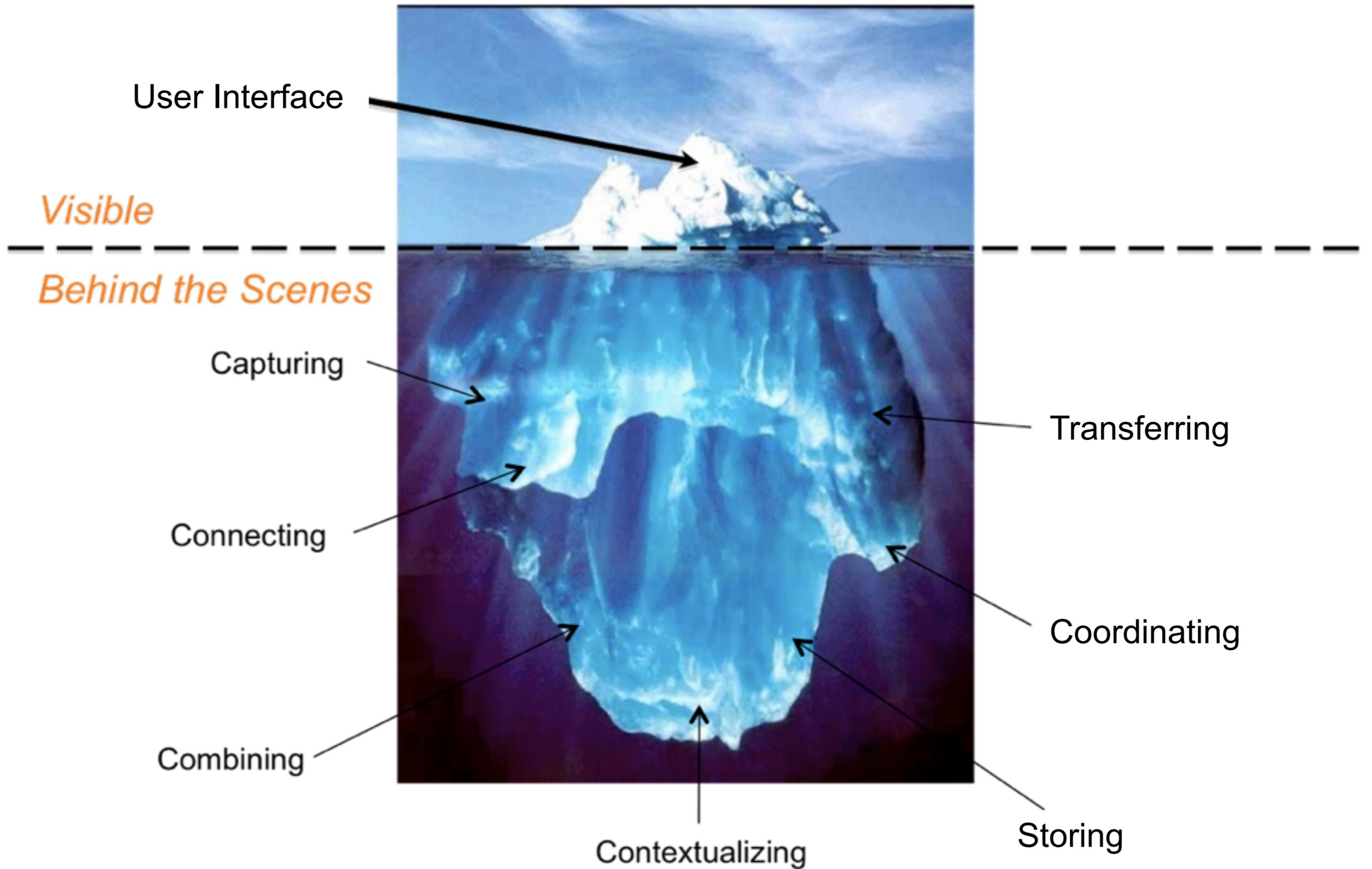
# Front Stage

<http://www.markabull.com/wp-content/uploads/2011/01/stage.jpg>

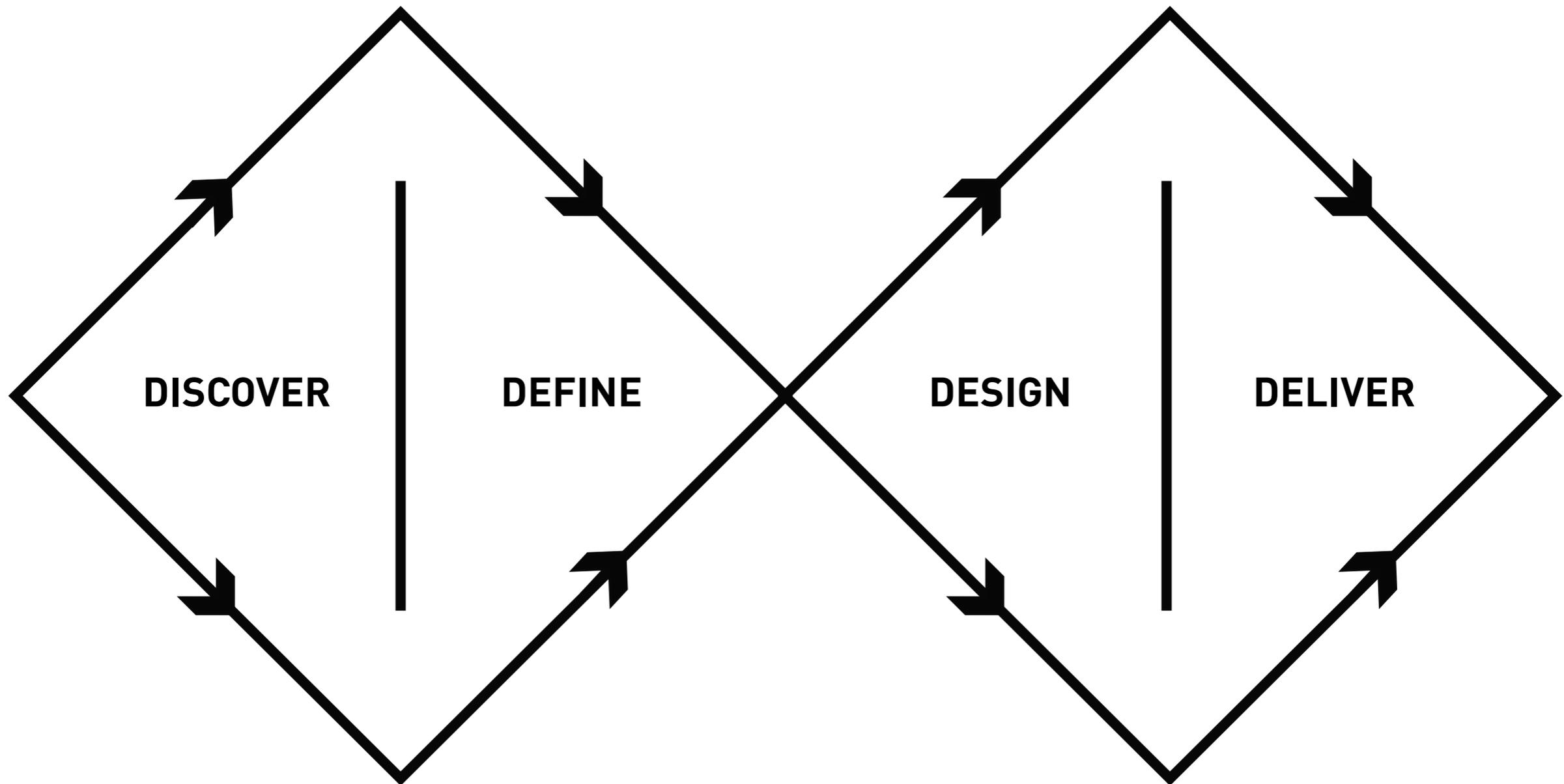


# Back Stage

<http://blog.entrepreneurhearts.com/etablog/wp-content/uploads/2010/08/backstage.jpg>

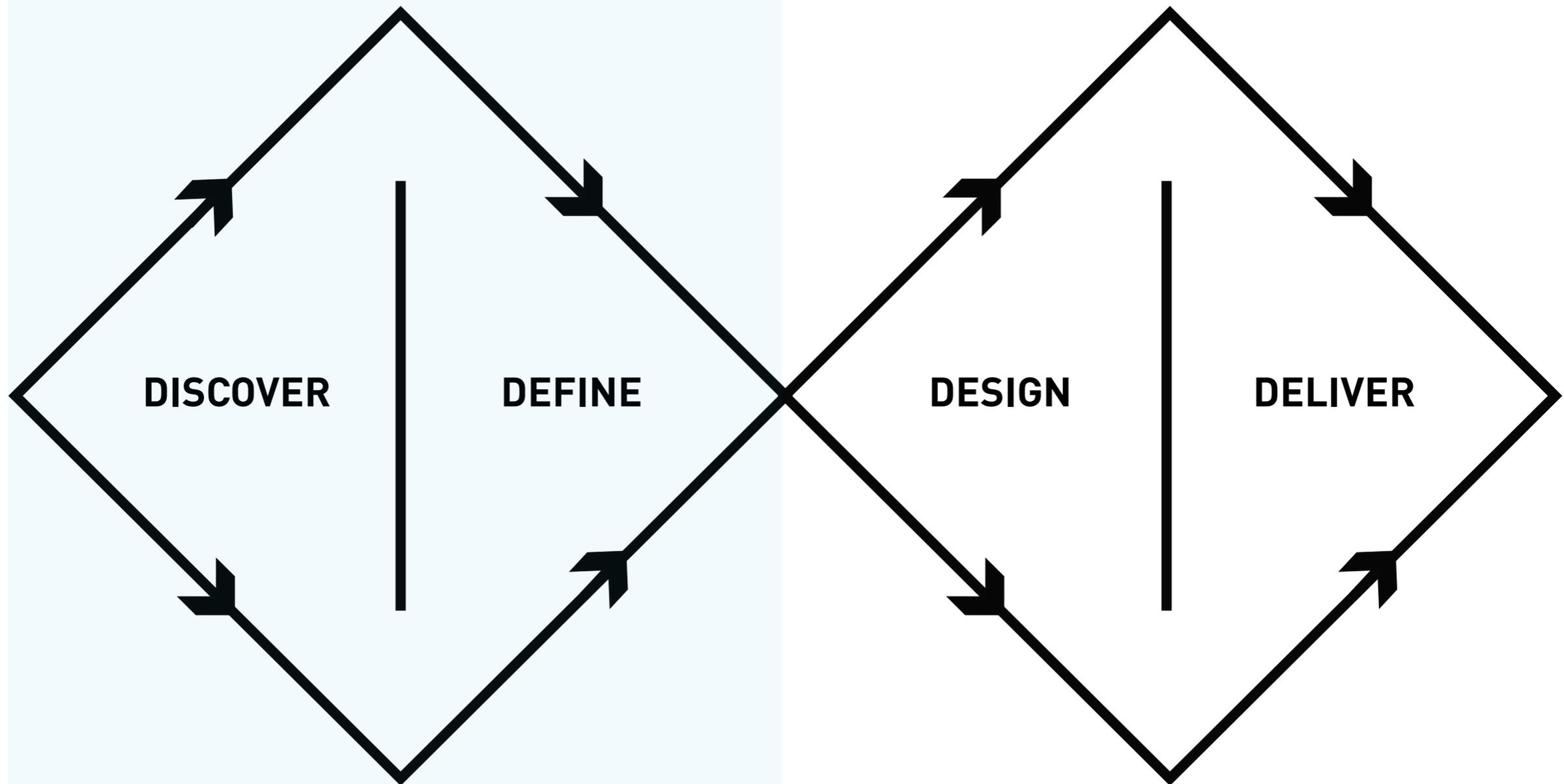


# Double Diamond



source: [2]

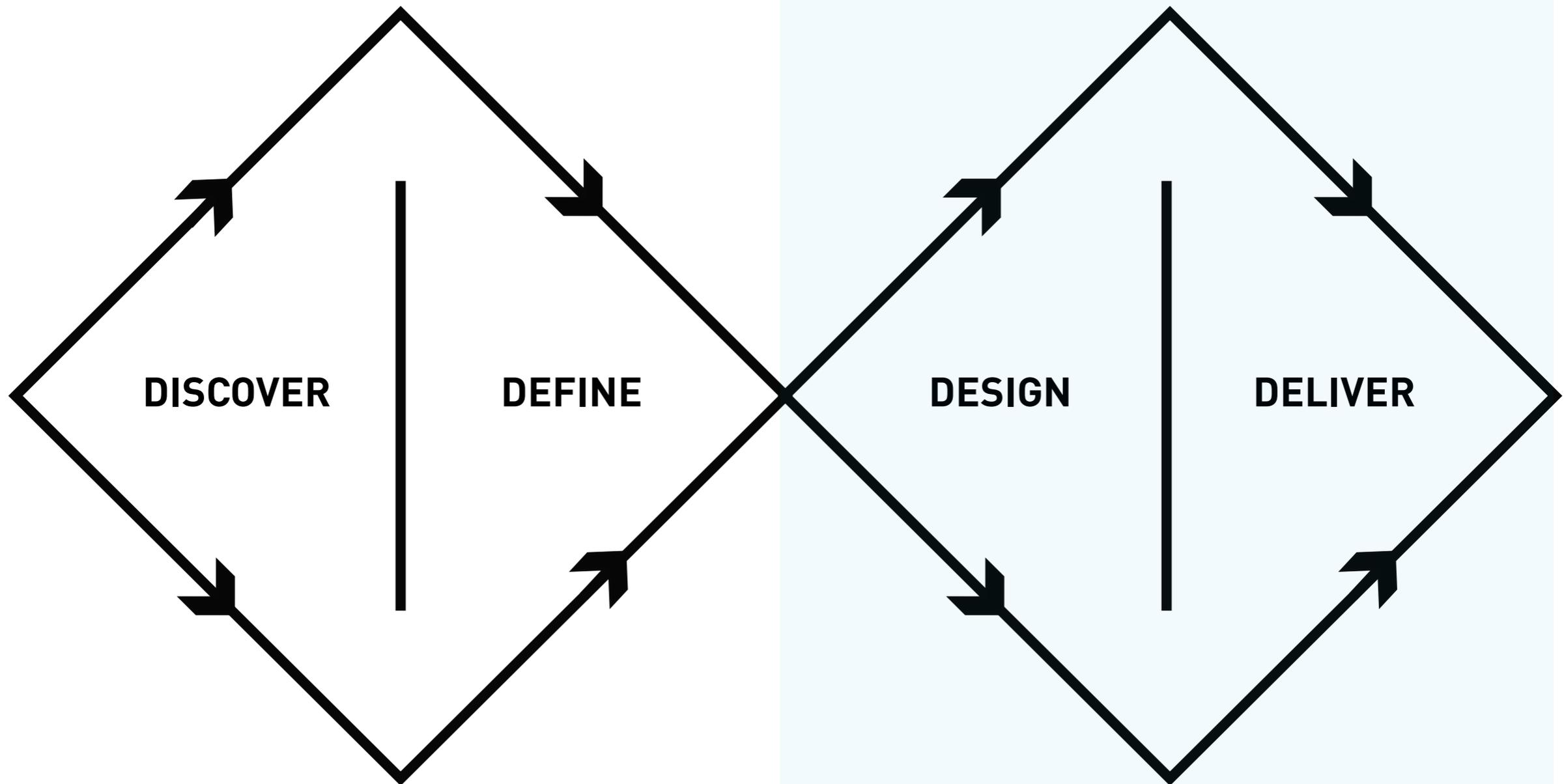
# Double Diamond



**Why? and How?**

source: [2]

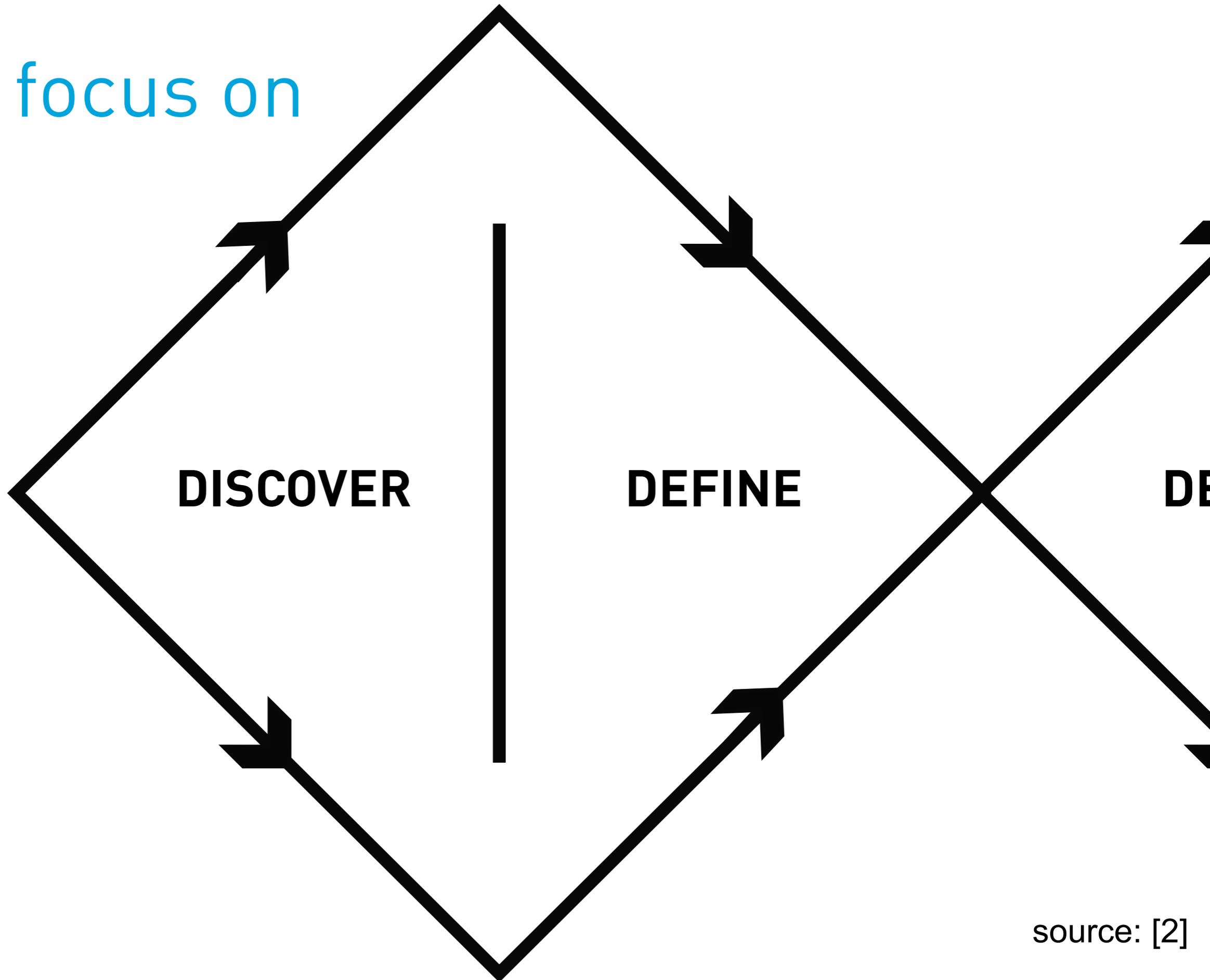
# Double Diamond



**What?**

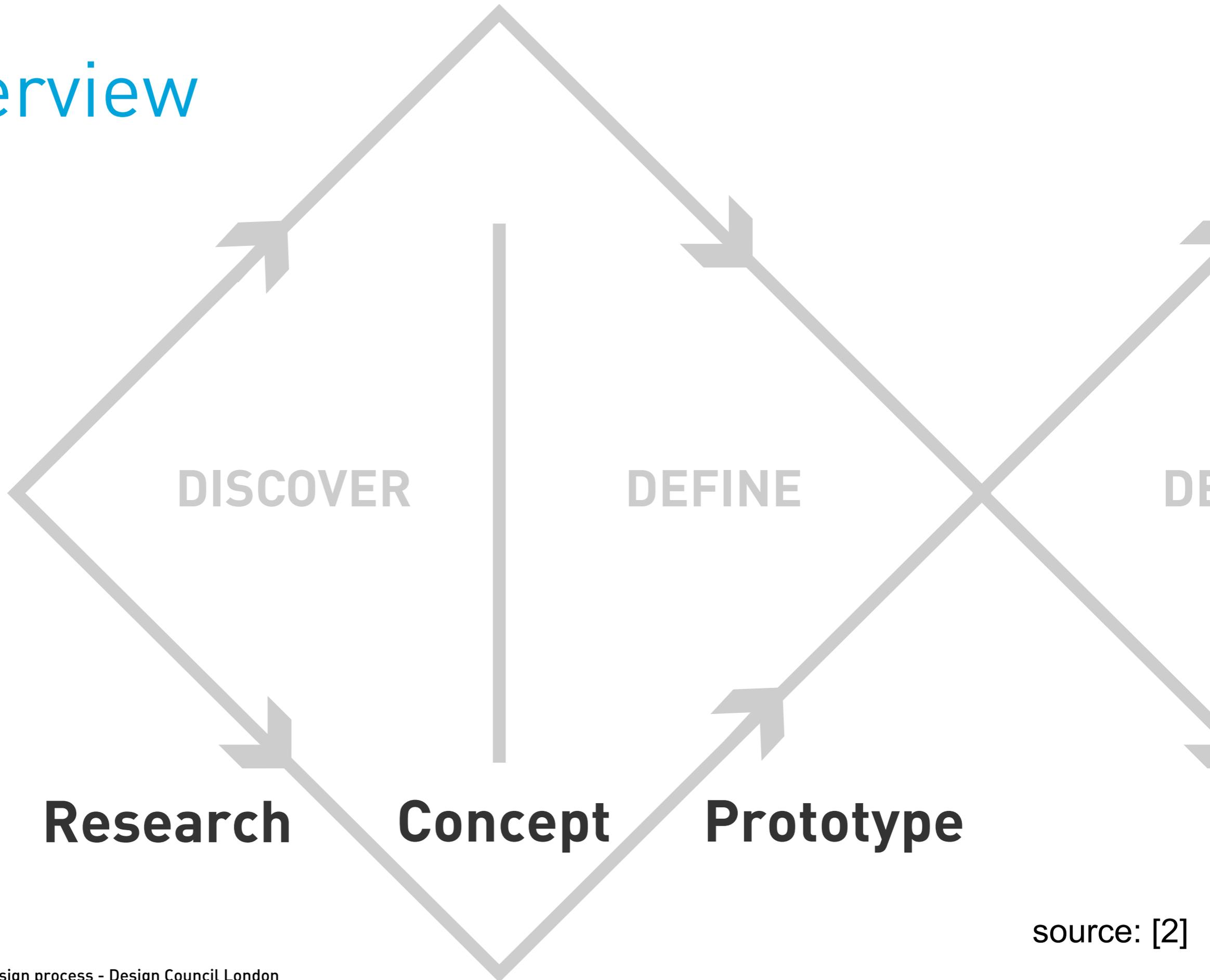
source: [2]

We focus on



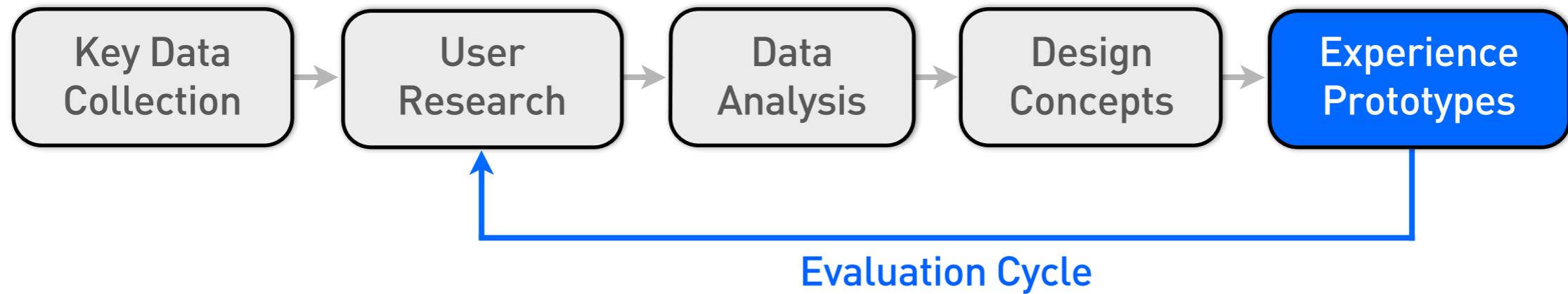
source: [2]

# Overview



source: [2]

# UCD Design Process Model



source: [2]

# Process Models, Elements and Technology

- Definition and Paradigms of Interaction Design
- Process Models
- Elements of Interaction Design
- Adapting Technology

# User Experience Design



## Elements in Interaction Design

Within interaction design, products and services can be purely digital, physical and/or hybrid.

Therefore considerations on the different elements are necessary.

hydrogen 1 <b>H</b> 1.0079	
lithium 3 <b>Li</b> 6.941	beryllium 4 <b>Be</b> 9.0122
sodium 11 <b>Na</b> 22.990	magnesium 12 <b>Mg</b> 24.305
potassium 19 <b>K</b> 39.098	calcium 20 <b>Ca</b> 40.078
rubidium 37 <b>Rb</b> 85.468	strontium 38 <b>Sr</b> 87.62
caesium 55 <b>Cs</b> 132.91	barium 56 <b>Ba</b> 137.33
francium 87 <b>Fr</b> [223]	radium 88 <b>Ra</b> [226]

**Motion, Space, Time, Appearance, Texture  
and Sound: Cordell Ratzlaff: Developing OSX**

source: [5]

## Cordell Ratzlaff

- managed the human interface group at Apple for 5 years
- led the design team of OSX
- founded the company GetThere.com
- creative director at Frog Design SF, USA





**Home HD**

**74.52 GB, 1.22 GB free**



**Fam flicks 78-9.mov**

**01'08**

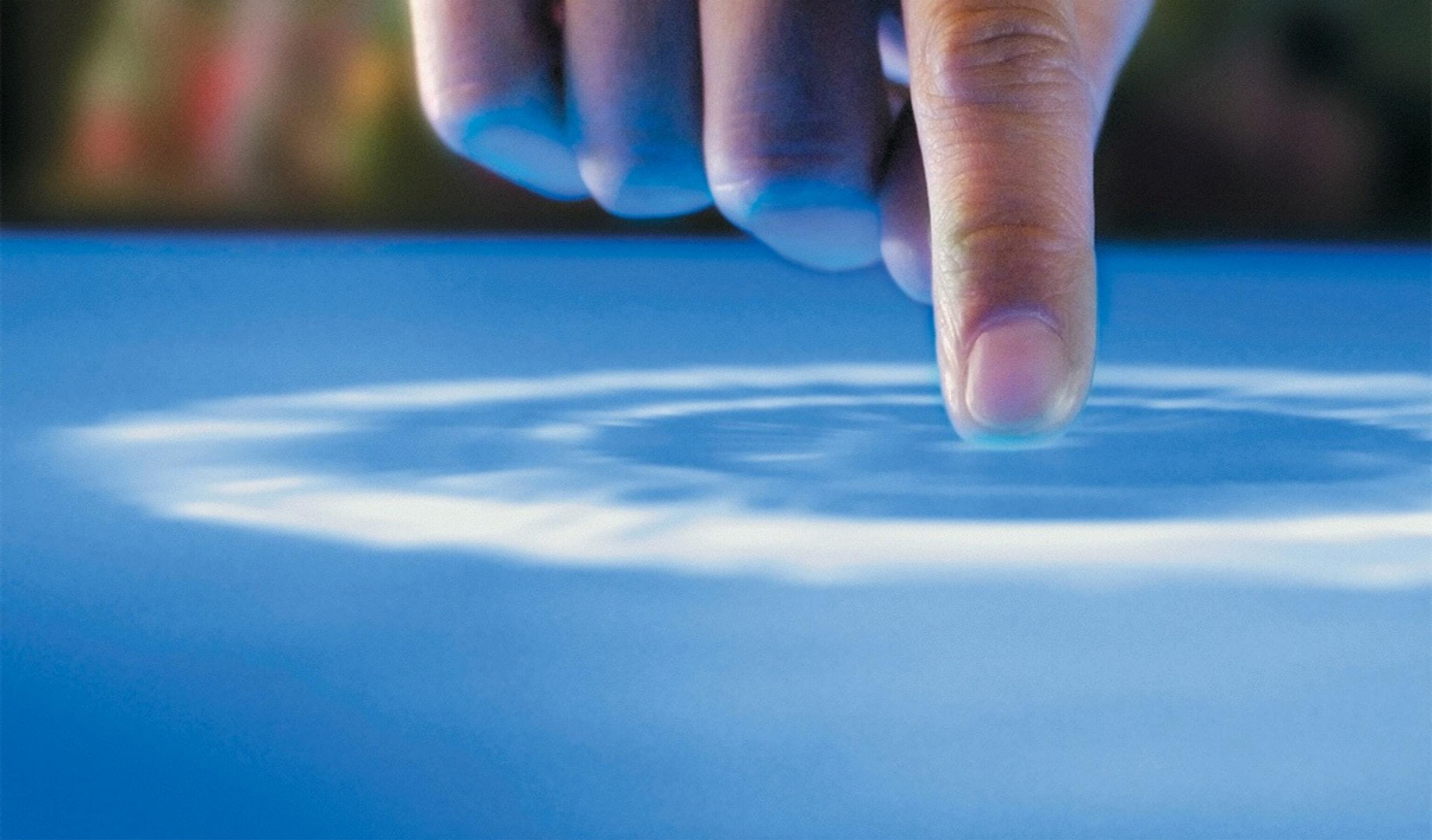


**IOMEGA\_HDD**

**55.86 GB, 445.4 MB free**



**Looking back...**



# Motion

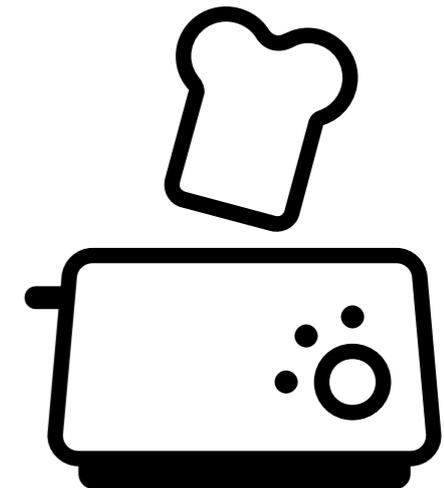
[http://www.ipadforums.net/wallpapers/data/500/hand\\_touch.jpg](http://www.ipadforums.net/wallpapers/data/500/hand_touch.jpg)

## **Motion**

Motion is often a trigger for action.

The triggered action (or at least the feedback for that action) is often about motion as well.

**Without motion, there can be no interaction.**



source: [5]



# Space

<http://www.klein-dytham.com/uploads/projects/full/327.jpg>

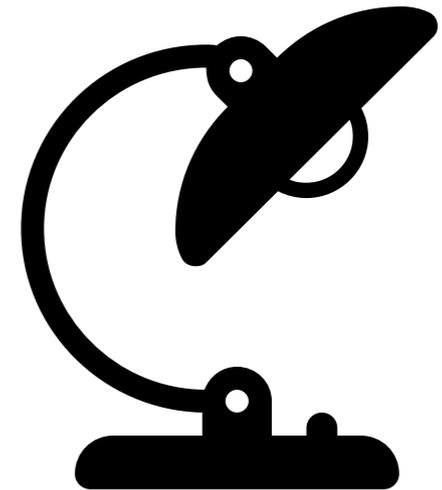
## Space

Space provides a context for motion.

Where is the action taking place ?

How are the constraints of the space ?

**All interactions take place in a space.**



source: [5]



# Time

<http://www.flickr.com/photos/davespilbrow/3200031698/sizes/o/in/photostream/>

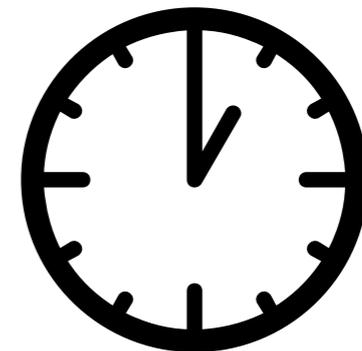
## Time

Movement through space takes time to accomplish.

Interaction designers need an awareness of time. Some tasks are complicated and take a long time to complete.

Time creates rhythm.

**All interactions take place over time.**



source: [5]



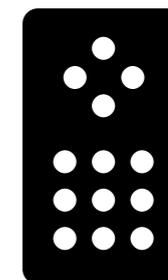
## Appearance/Affordances

## Appearance

Appearance is the major source (texture is the other) of what cognitive psychologist James Gibson, in 1966, called **affordances**.

Gibson explored the concept more fully in his 1979 book *The Ecological Approach to Visual Perception*, but it wasn't until Don Norman's seminal book *The Psychology of Everyday Things*, in 1988, that the term spread into design.

An **affordance** is a property, or multiple properties, of an object that provides some indication of how to interact with that object or with a feature on that object.



source: [2&5]

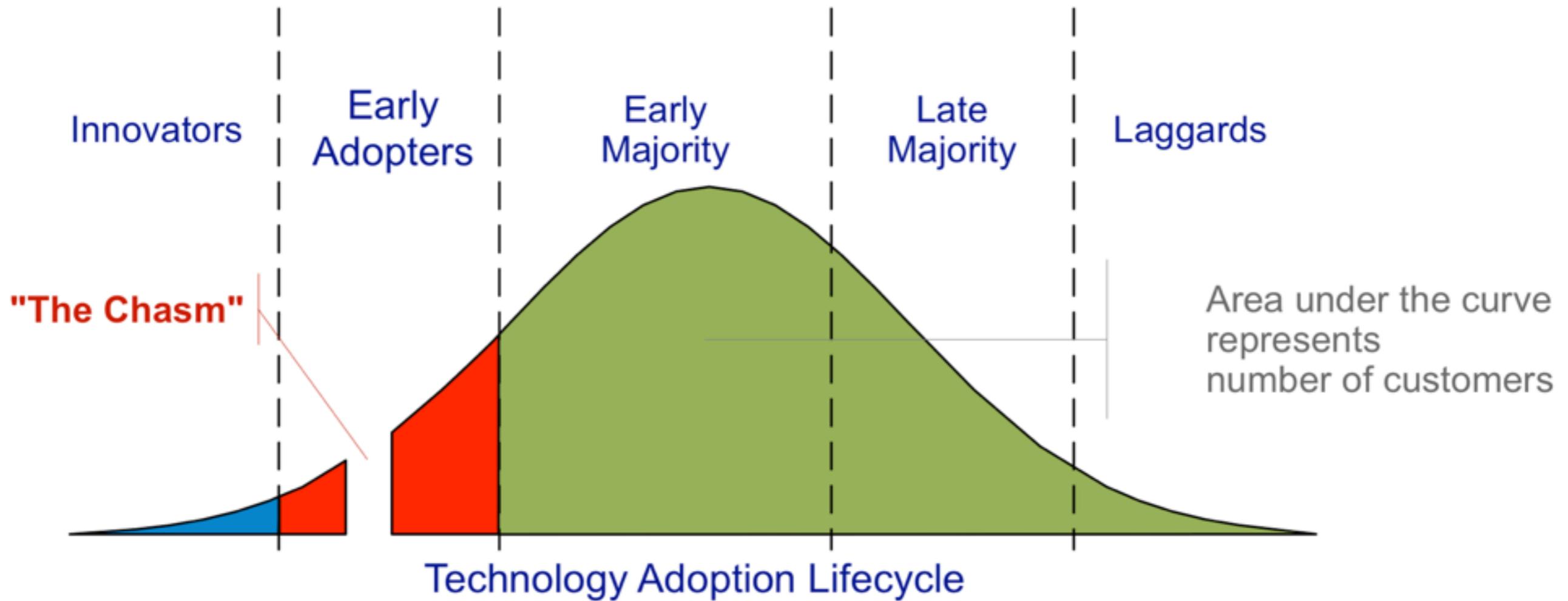
Appearance/Affordance has many variables for interaction designers to alter:

- 1. proportion**
- 2. structure**
- 3. size**
- 4. shape**
- 5. weight**
- 6. color (hue, value, saturation)**

All of these characteristics (and more) add up to appearance, and nearly every design has some sort of appearance, even if that appearance is a simple command line.

# Process Models, Elements and Technology

- Definition and Paradigms of Interaction Design
- Process Models
- Elements of Interaction Design
- Adapting Technology



We interviewed some people with beautiful and very elaborate new media systems who were quite discouraged and quite unhappy with them.

The solution from the manufacturers of consumer products was to produce the most dumbfounding, enormous remote controls. Thirty buttons was not a large number for those controls. There was a period of suppression of the adoption of the best of this technology simply because it was too complicated to use.

**David Liddle, 2003**

source: [3]

# Three Phases of Product Adaption

source: [3]

## David Liddle

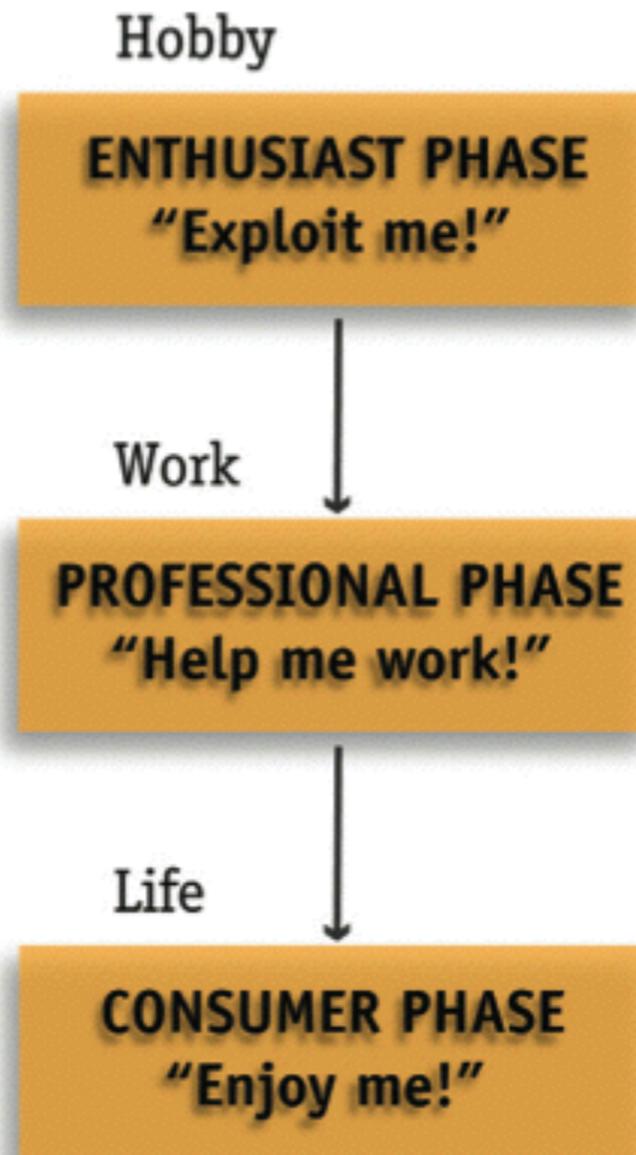
- worked at PARC
- was one of the lead designers creating the STAR workstation
- founded a company named *Metaphor Computers*
- set up a research laboratory, *Interval Research*, focused on interdisciplinary interaction design





## Looking back...

- different phases of adoption have different impacts on their usability
- controls become automated in the final (consumer) phase



source: [3]

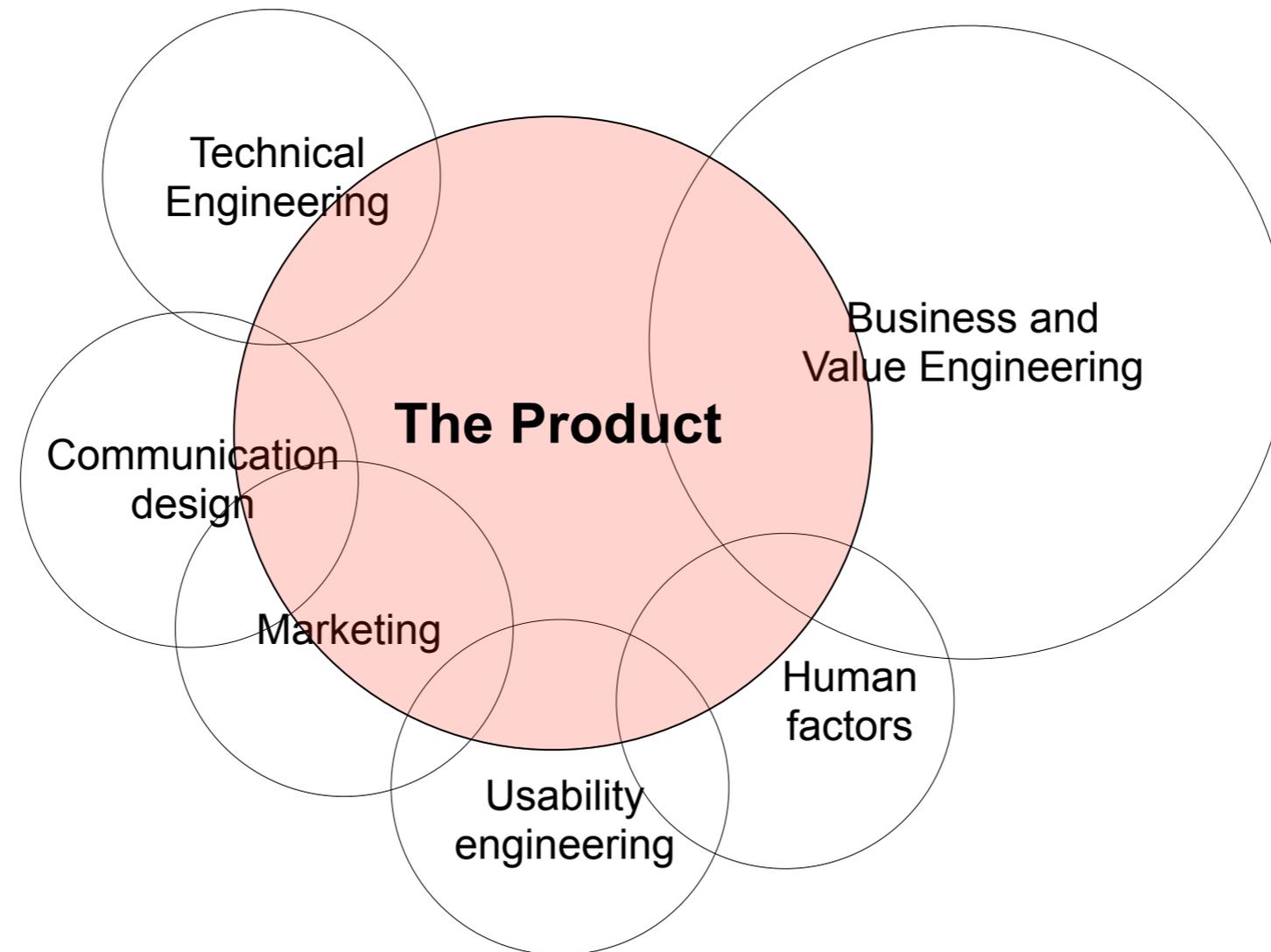
# Enthusiast

Inventors are often good at coming up with the first version of a technology and can find the “enthusiasts” to adopt the technology by creating nothing more than an innovative solution.

The inventor, even when supported by a band of technicians, cannot develop the technology once it enters the “professional” phase.

Usability at this stage is perceived of **low value**.

# Professional



New design values apply when people adopt the technology for practical purposes. Now the design must be **reliable**, it must **perform consistently**, it must be **priced** to offer reasonable value, and above all it must be both **useful** and **usable**.

source: [3]

# Professional

A design for the professional phase does not need necessarily to be **easy to use**, as people take pride in acquiring skill in their work; their learned skill separates them from the unskilled and allows them to feel expert.

The design does not have to be enjoyable, as people tend to take their work seriously and are willing to try hard to be productive, even if the experience is unpleasant.

Usability at this stage is perceived of **mid value**.



## Nikon F2AS

<http://www.nikon-fotografie.de/vbulletin/picture.php?albumid=9638&pictureid=198156>

# Consumer

**Usability** is of very **high value** at this stage and can result as a crucial advantage in competition.

Designs at this level should be : Enjoyable, robust and easy to use.



source: [3]

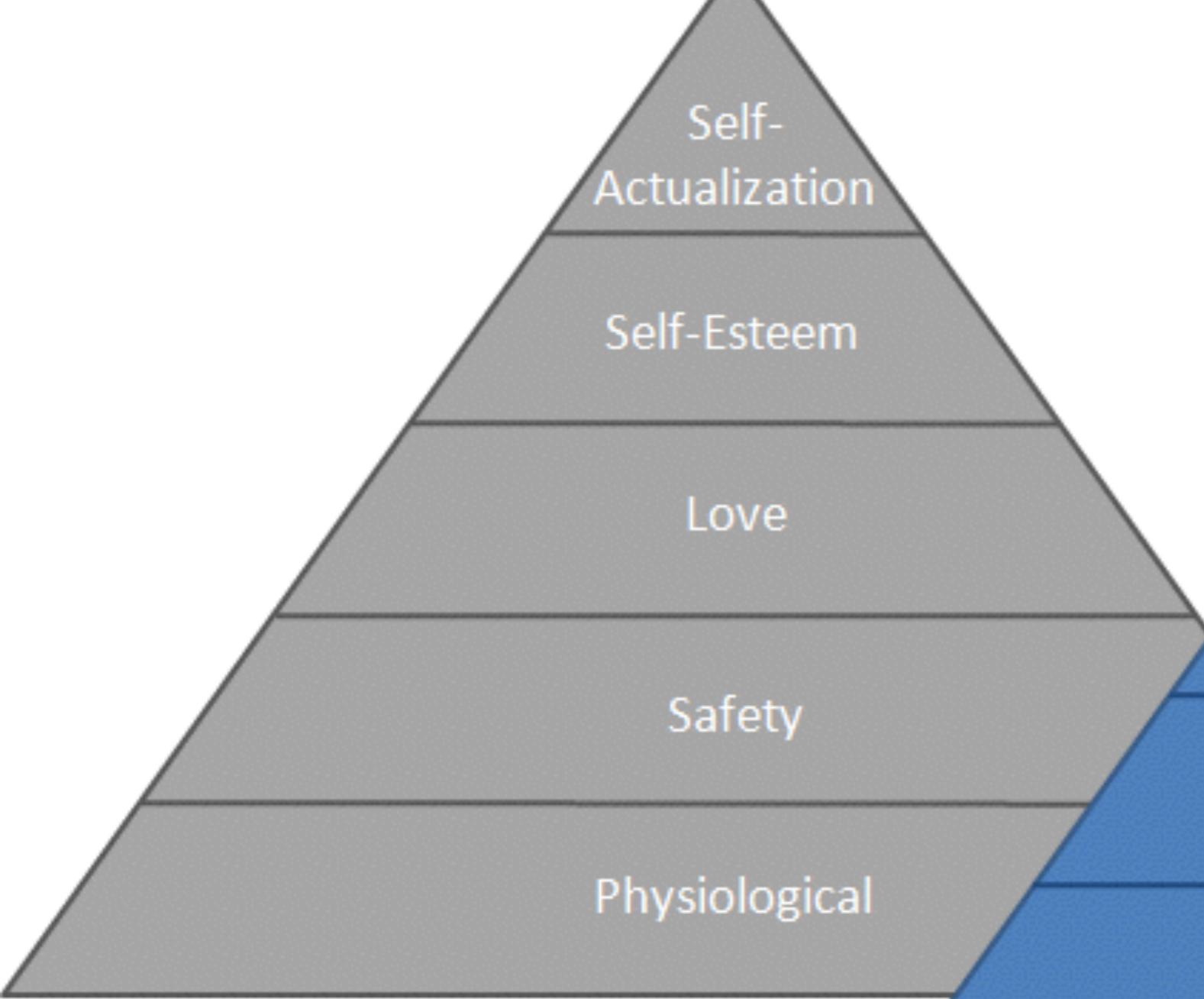


# BMW iDrive

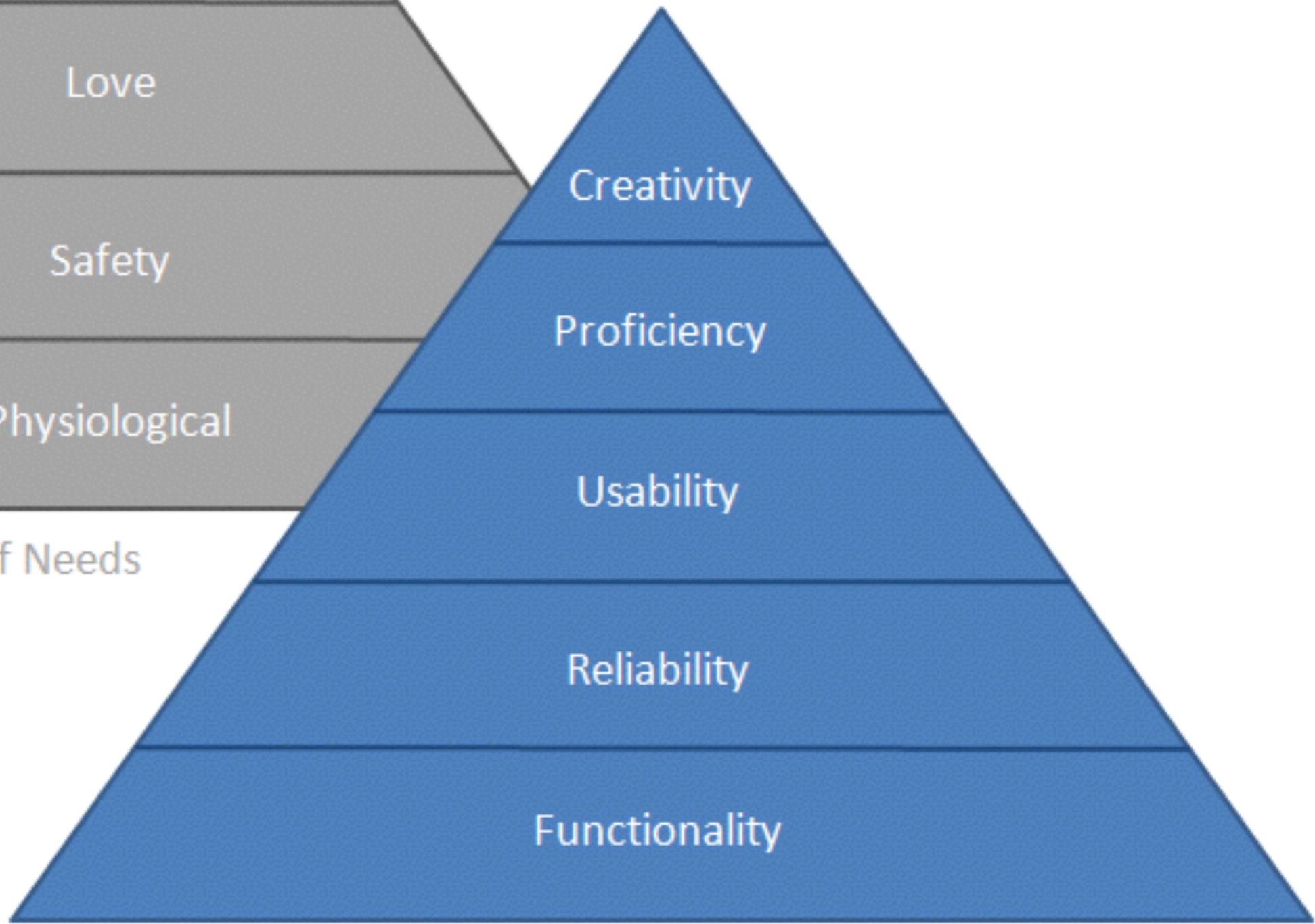
[http://www.usautoparts.net/bmw/pics/5er/10352\\_1024.jpg](http://www.usautoparts.net/bmw/pics/5er/10352_1024.jpg)

# Hierarchy of **Design Needs**

(Lidwell: Universal Principles of Design, 2003)

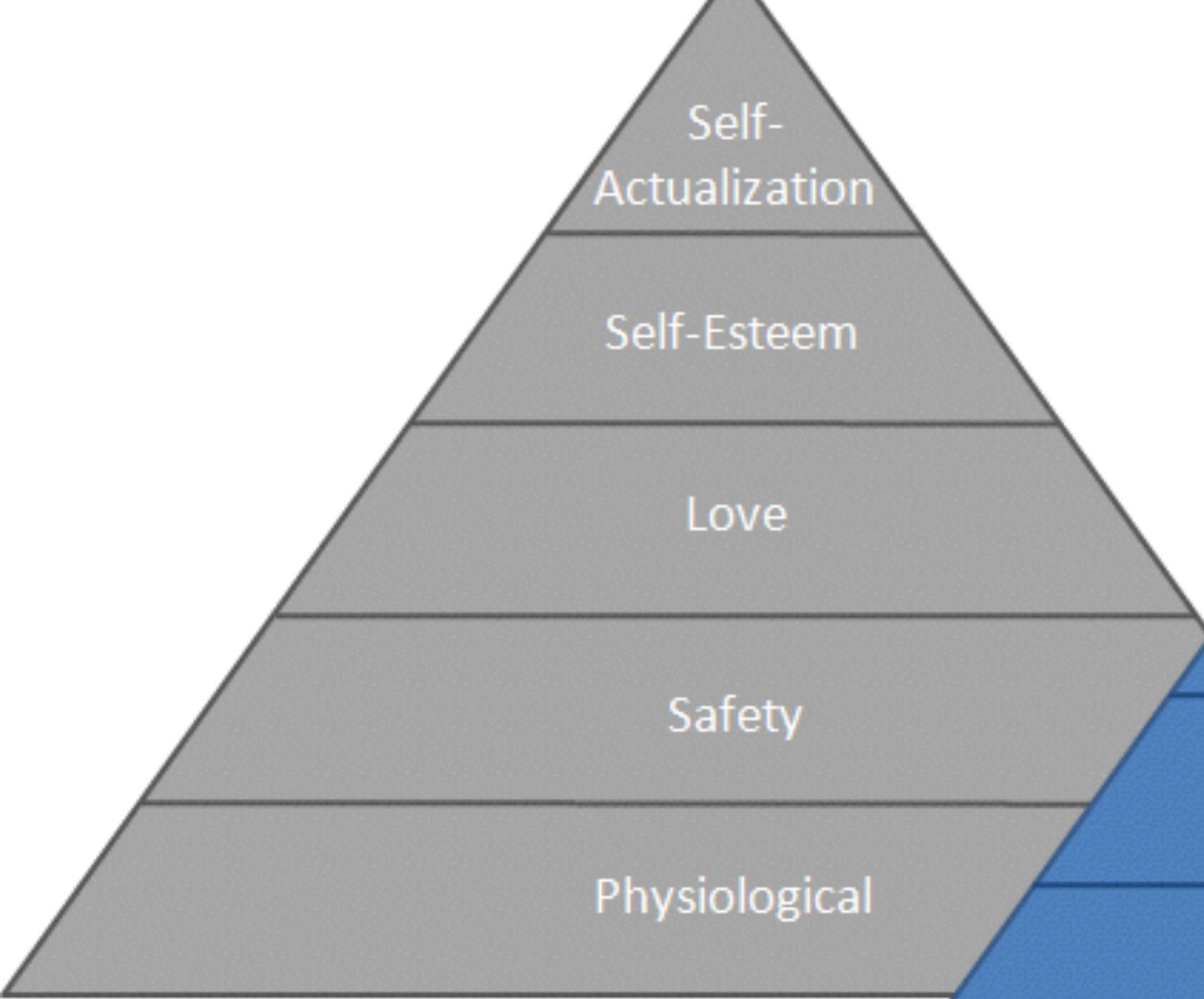


Maslow's Hierarchy of Needs

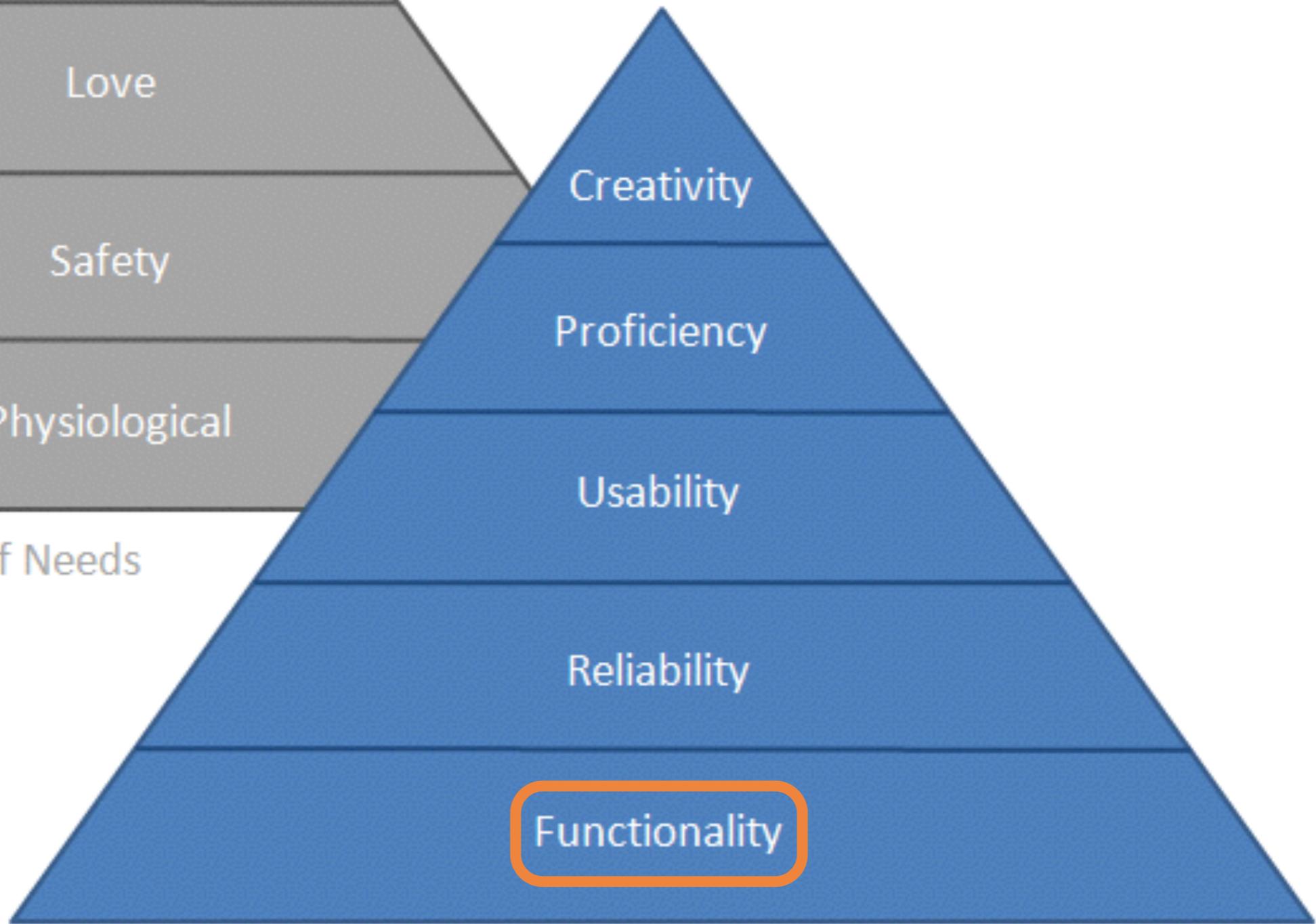


Design Hierarchy of Needs

source: [7]



Maslow's Hierarchy of Needs

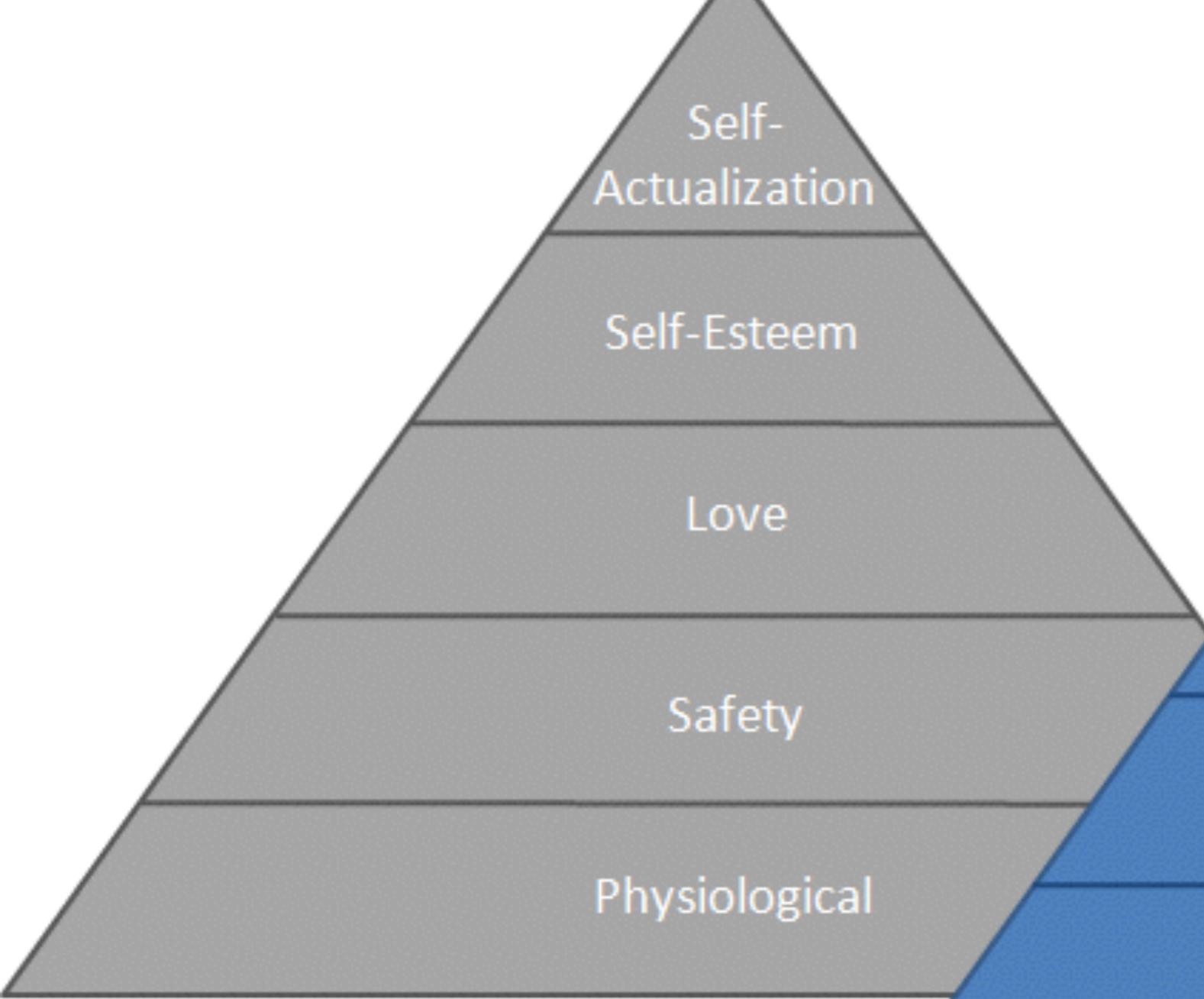


Design Hierarchy of Needs

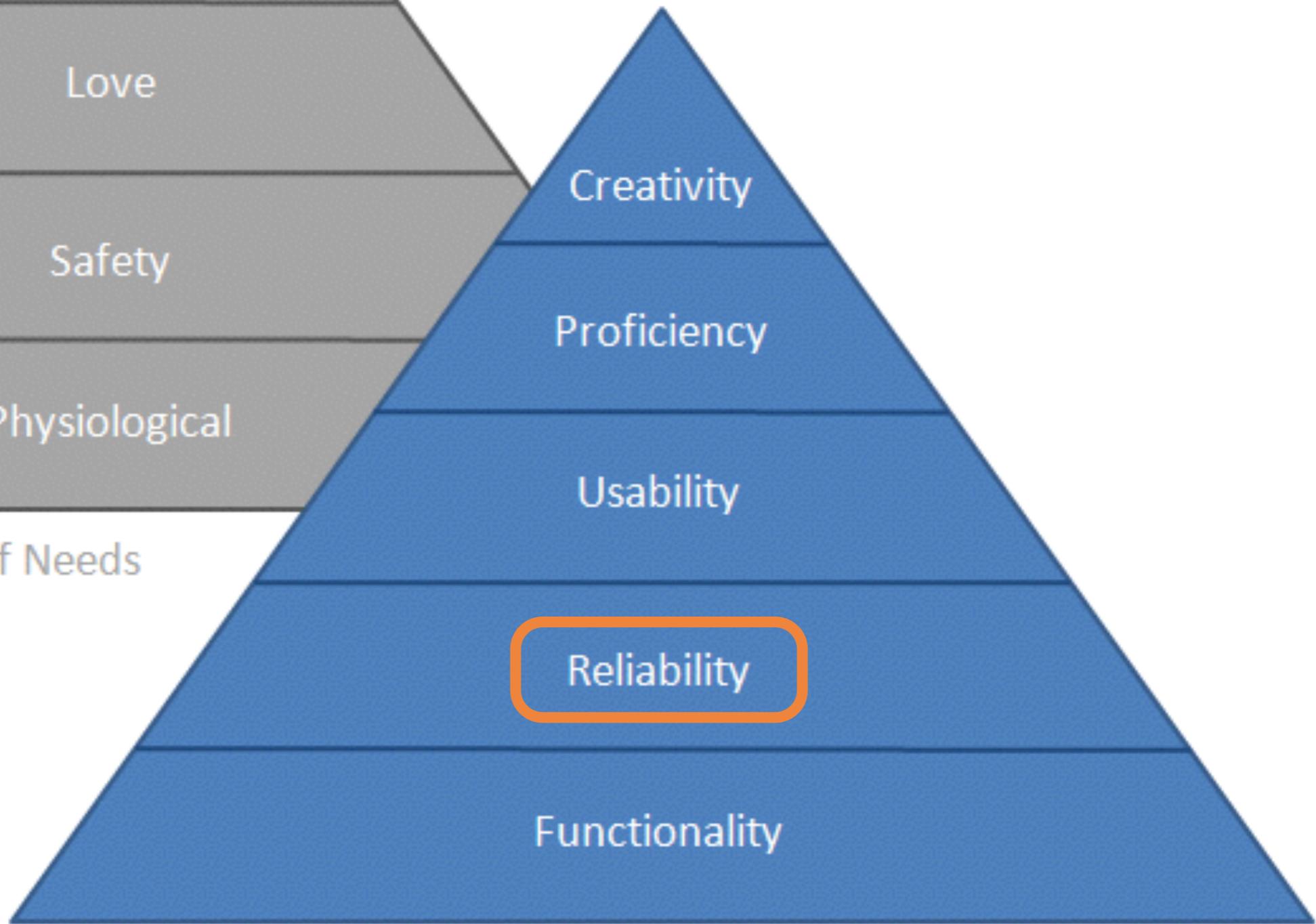
source: [7]

**Functionality needs** have to do with meeting the most basic design requirements.

For example a DVD recorder must, at minimum, provide the capability to record play, and review recorded programs. Designs at this level are perceived to be of little or no value.



Maslow's Hierarchy of Needs

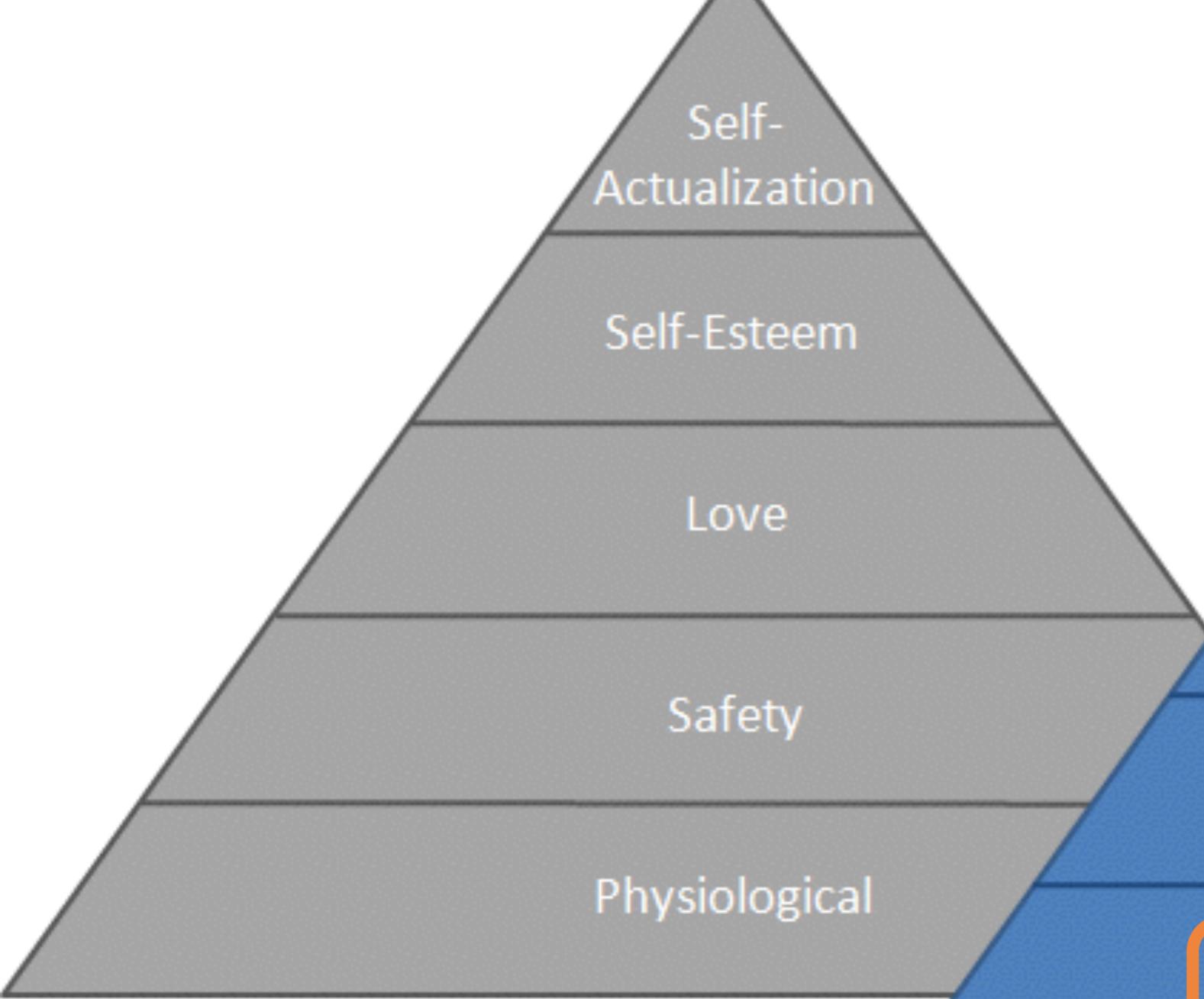


Design Hierarchy of Needs

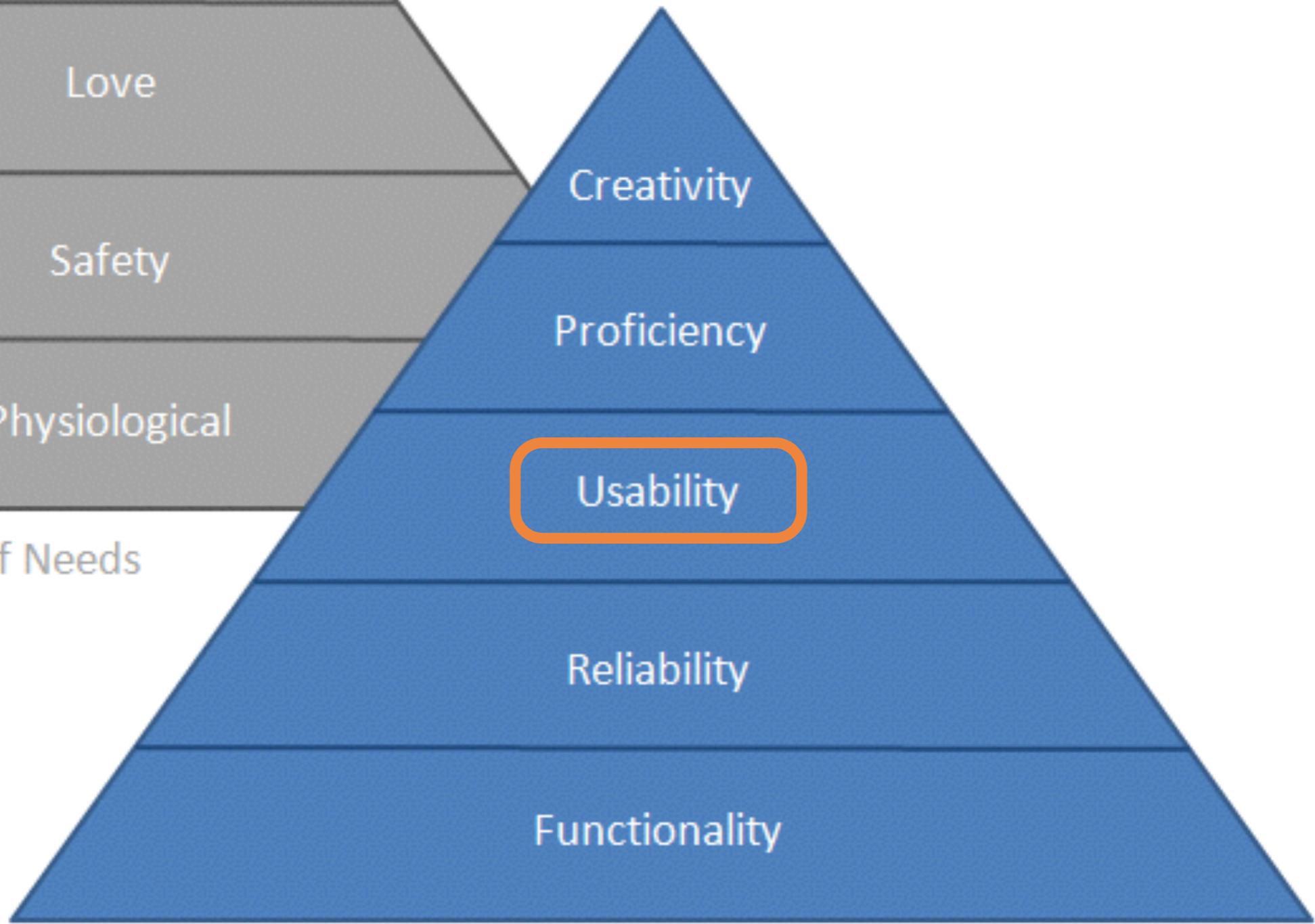
source: [7]

**Reliability needs** have to do with establishing stable and consistent performance.

For example a DVD recorder should perform consistently and play back recorded programs at an acceptable level of quality. If the design performs erratically, or is subject to frequent failure, reliability needs are not satisfied. Designs at this level are perceived to be of low value.



Maslow's Hierarchy of Needs



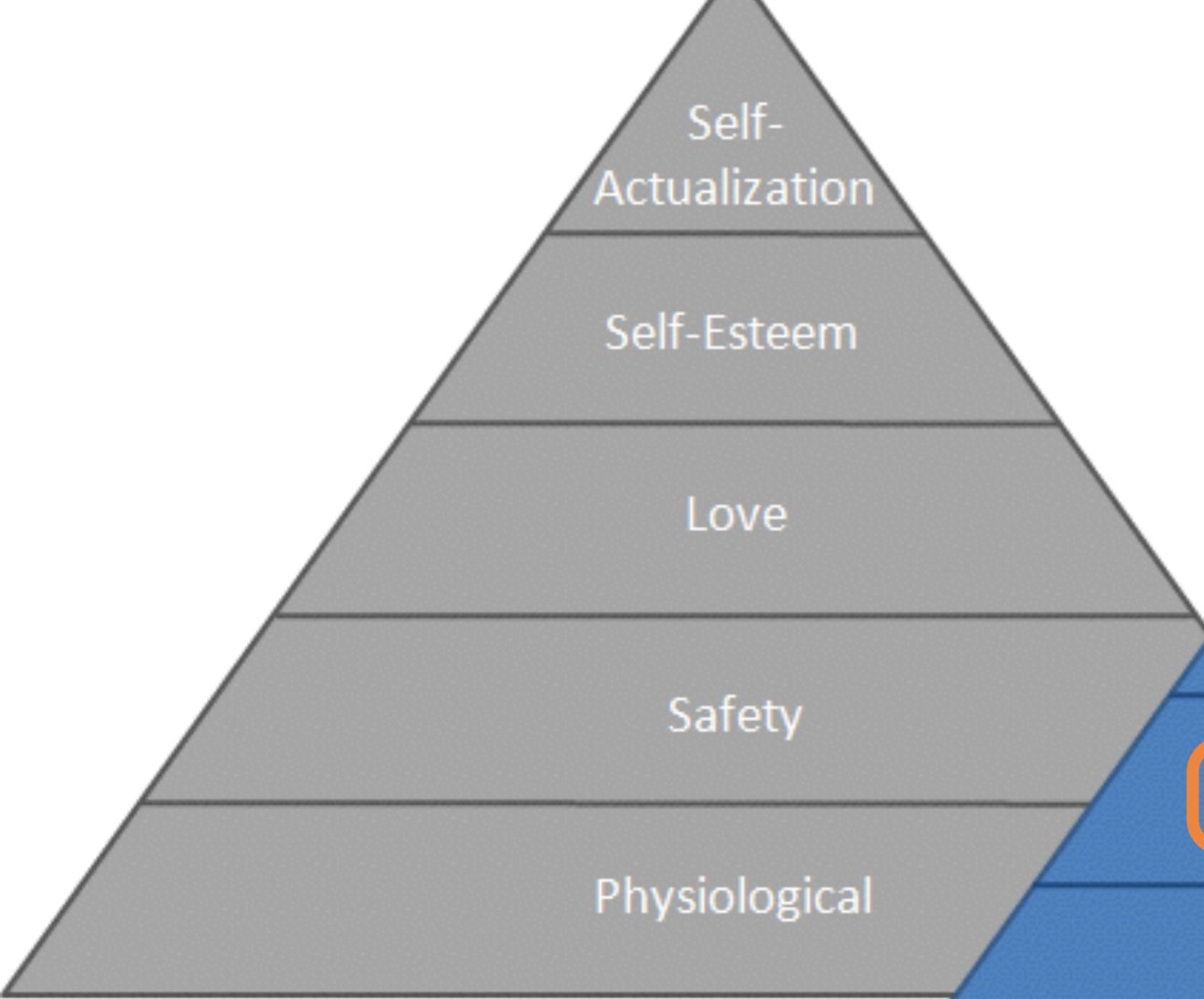
Design Hierarchy of Needs

source: [7]

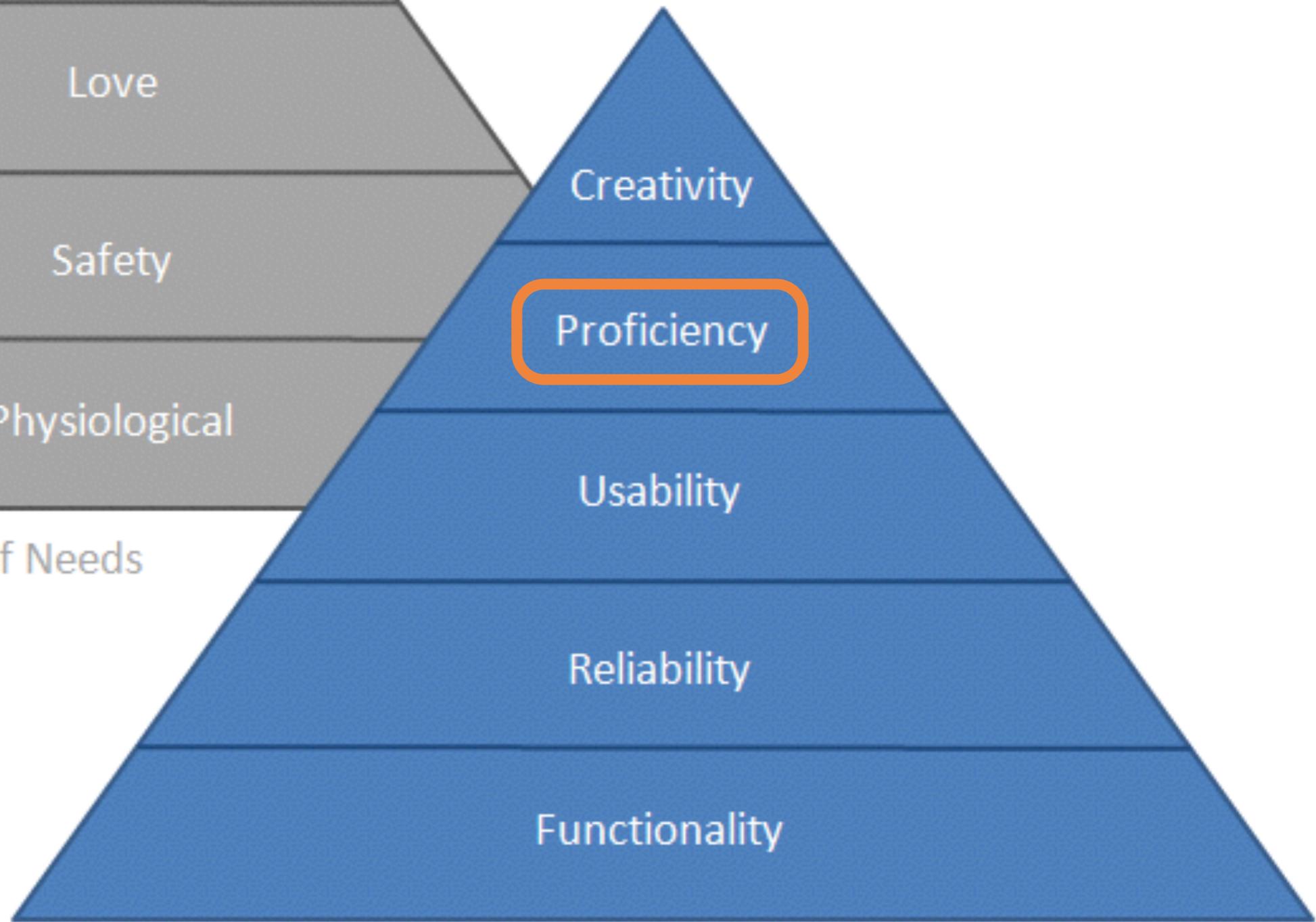
**Usability needs** have to do with how easy and forgiving a design is to use.

For example, configuring a DVD recorder to record programs at a later time should be easily accomplished, and the recorder should be tolerant of mistakes. If the difficulty is too great, or the consequences of simple errors too severe, usability needs are not satisfied. Designs at this level are perceived of moderate value.

source: [7]



Maslow's Hierarchy of Needs

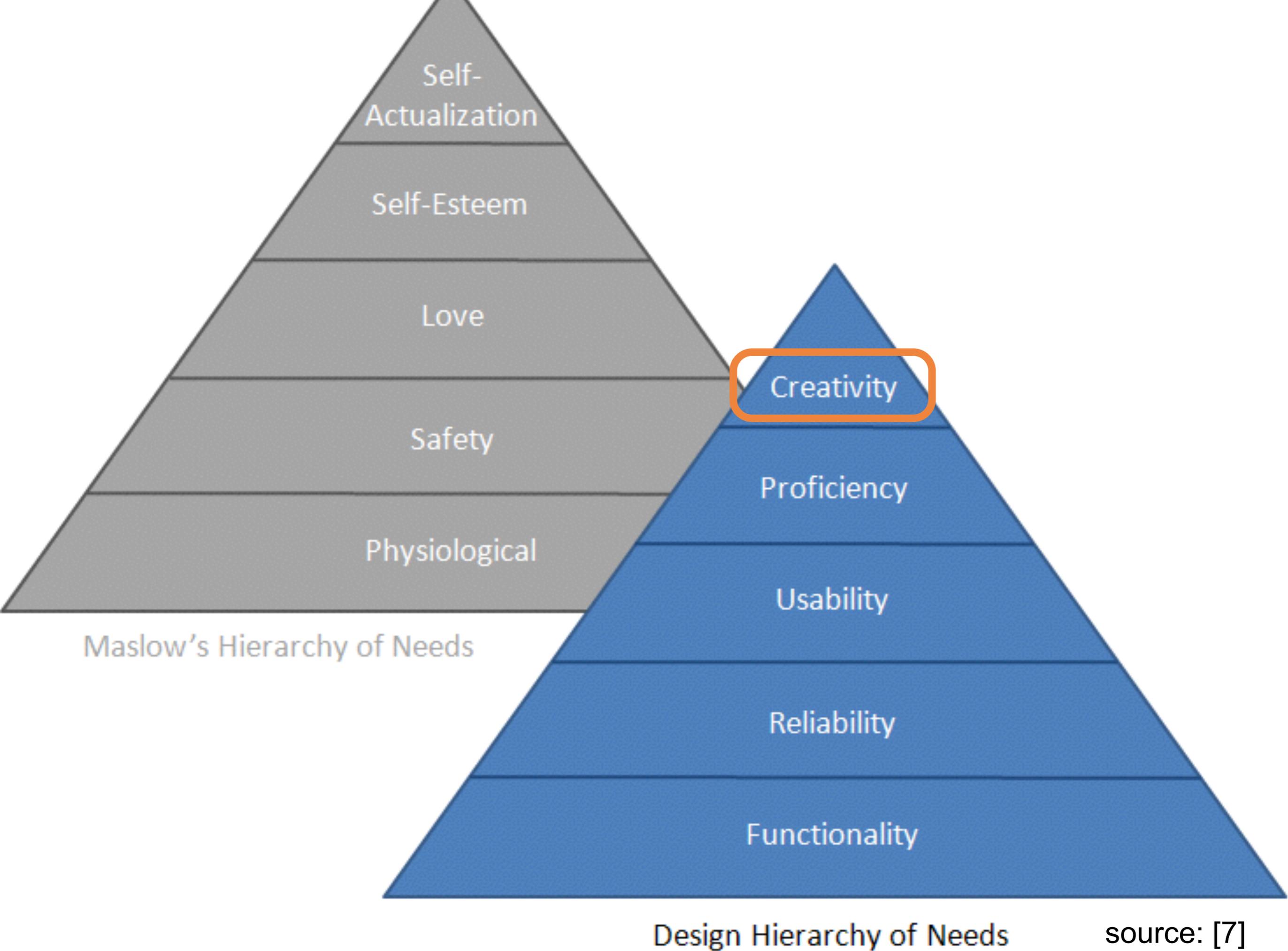


Design Hierarchy of Needs

source: [7]

**Proficiency needs** have to do with empowering people to do things better than they could previously.

For example, a DVD recorder that can seek out and record programs based on keywords is a significant advance in recording capability, enabling people to do things not previously possible. Designs at this level are perceived to be of high value.



Maslow's Hierarchy of Needs

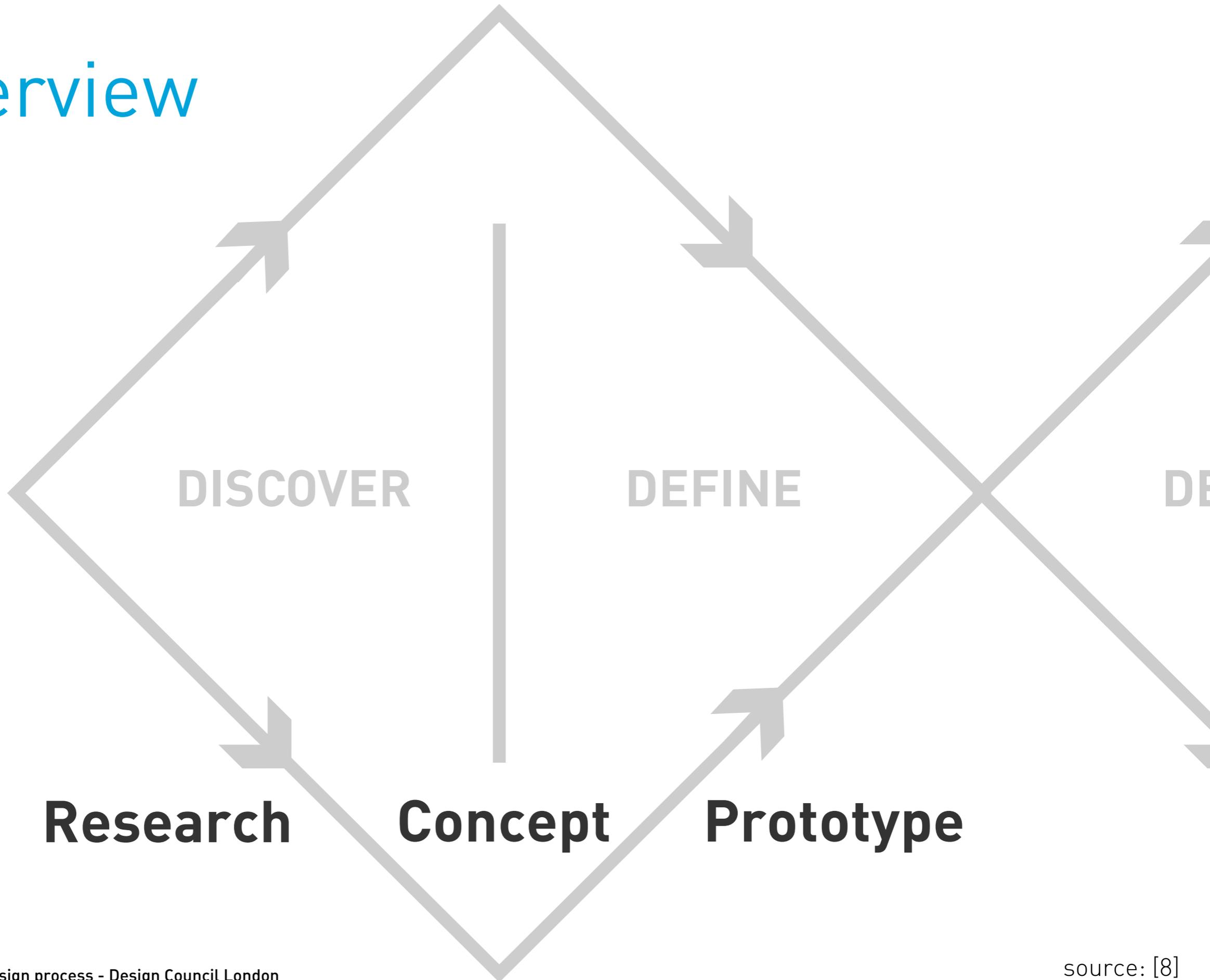
Design Hierarchy of Needs

source: [7]

**Creativity** is the level in the hierarchy where all needs have been satisfied and people begin interacting with the design in innovative ways. The design, having satisfied all other needs, is now used to create and explore areas that extend both the design and the person using the design.

Design at this level is perceived to be of the highest value, and often achieve cult-like loyalty among users.

# Overview



## Mat Hunter

- received an MA in interaction design from the RCA
- joined IDEO in 1995
- was key to develop an interaction architecture for kodak
- head of interaction design at IDEO London
- now with the Design Council London



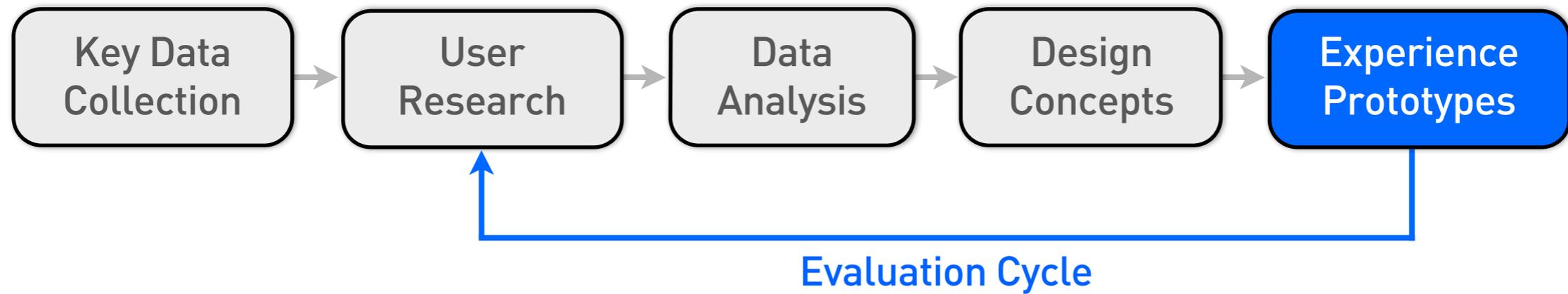


**Looking back...**

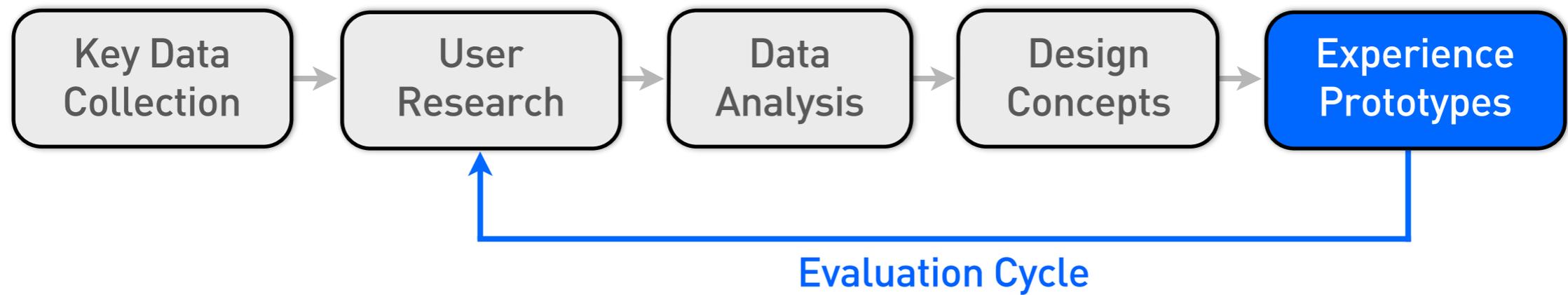
## Looking back...

- conventional technology being replaced by electronics
- increased product functionality (capture and review)
- user insights lead to concepts (scenarios)
- considering taking photos and storing them as a social activity
- building an experience prototype to emulate the “look & feel” of an interaction and to communicate the idea further

# Strategic (IxD) Concept Generation: From User Insights to Experience Prototype



# Research and Analysis



## 1. Readiness to capture

### Insight:

The professional photographer travels with cases full of lenses, camera bodies, tripods, and lighting equipment.

### Analysis:

The team predicted that when digital photography is adopted by the general public, cameras will include a broad range of devices, from the traditional professional kit at the top end, through simple cameras with built-in lenses, to devices such as cell phones, or wearable cameras that would look like jewelry.

## 2. Information at capture

### Insight:

The real-time feedback of the screen on the back of the camera would emerge as a highly valued feature of the digital camera, so you could see immediately if the shot looked promising or disappointing.

### Analysis:

Information about when a picture was taken could also be recorded, along with the technical details of the image, and perhaps a voice annotation.

### **3. Creative control**

#### **Insight:**

In traditional photography, the composition of the shot and the choice of lighting happens in the camera, but there is another set of opportunities for creative control that happens later in processing and printing.

#### **Analysis:**

The team realised that digital photography is not so sequential. Any time during the process, you can apply filters, pixilate, choose sepia, add picture frames, text, and so on.

## 4. Organisation

### Insight:

There are well-organized albums of photographs that people use to remember an event or a trip, or to recount the story to their friends, but there are also countless boxes full of unsorted photographs in almost every home.

### Analysis:

Digital photography offers the opportunity to sort using the “information at capture,” but also to recognise images from small thumbnails. iPhoto from Apple has made excellent use of our ability to scan tiny versions of images to recognise the one we are looking for, leveraging the fact that we remember images best by a visual representation rather than by which shoe box we put it in.

## 5. Ways to display

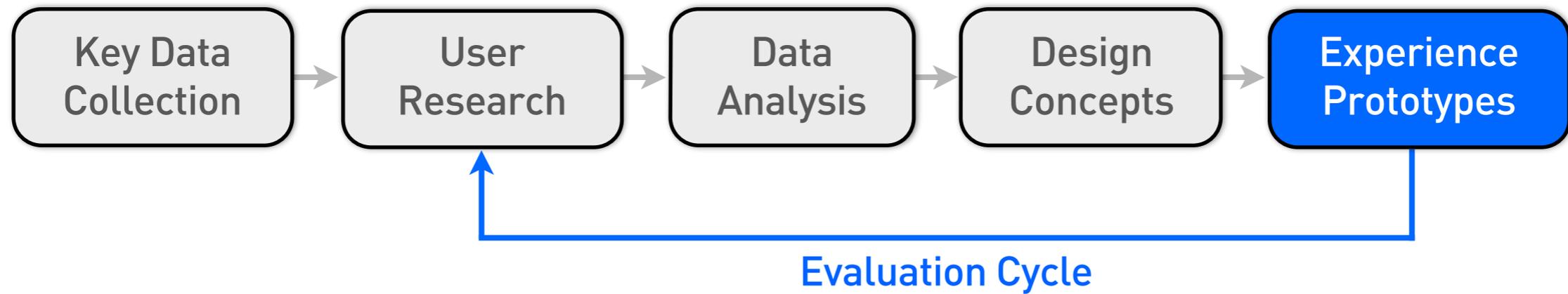
### Insight:

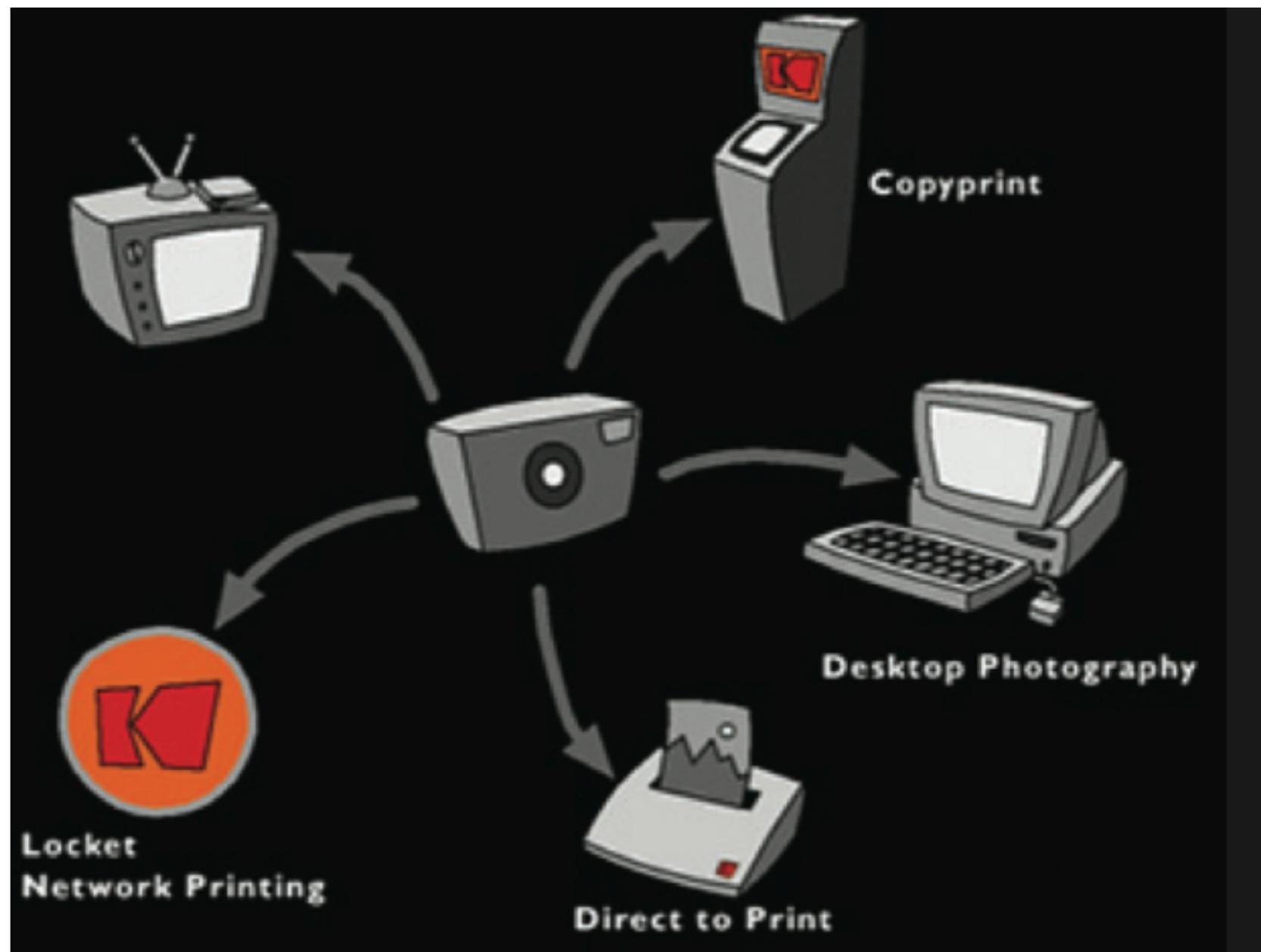
Pictures mean very little unless you can see them, so one of the great potentials of digital photography is to increase the diversity of means of display.

### Analysis:

Prints and transparencies are still valuable, and indeed a whole industry has grown up around printing, but there are also many new possibilities. Electronic displays include the television, computer screen, the electronic picture frame, the e-wallet, fridge door display, and cell phone, as well as others that will emerge in time. As digital images become more ubiquitous, it is interesting to see how we use them more habitually to illustrate a point in a conversation with a friend or to remember a piece of information. When the images are displayed electronically, they can be captured and shown at no incremental cost, so they spread into all sorts of unexpected places.

# Concepts

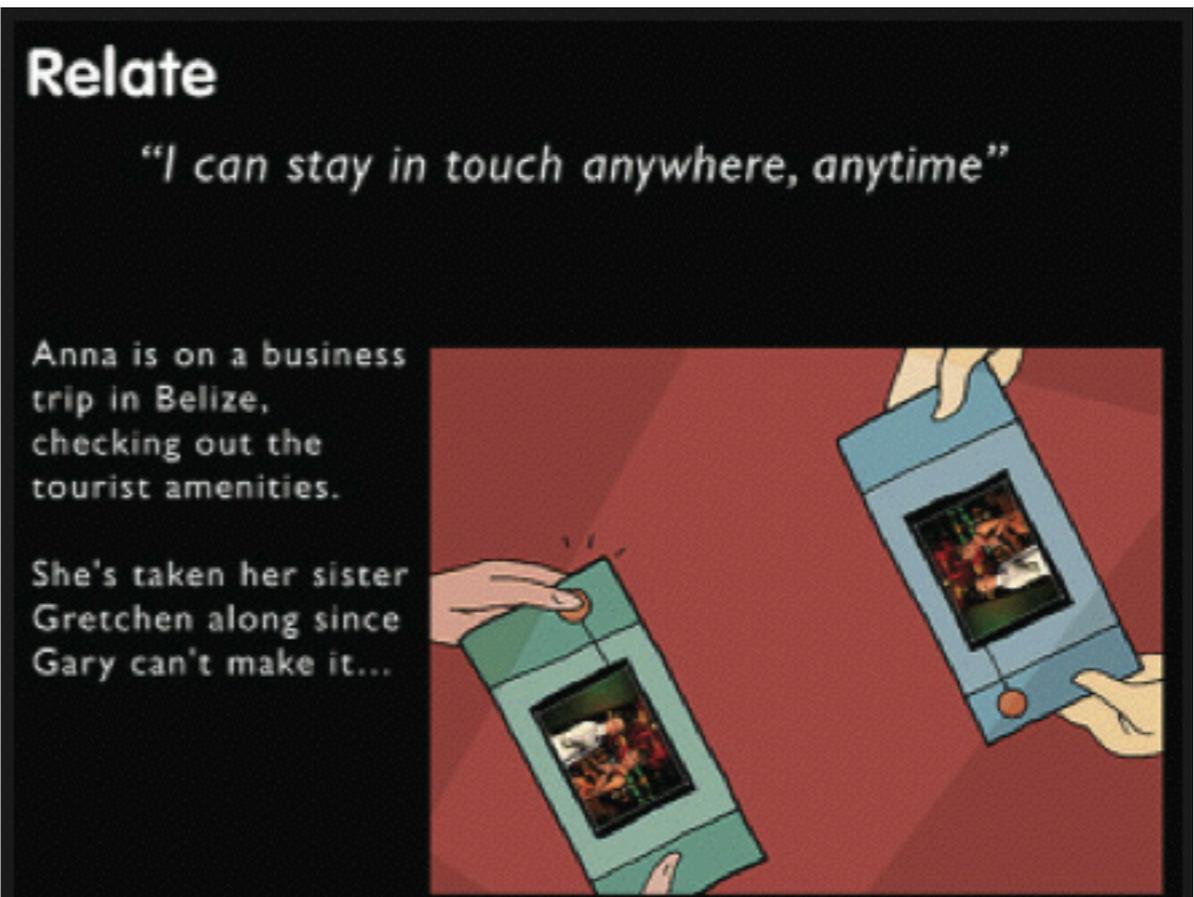
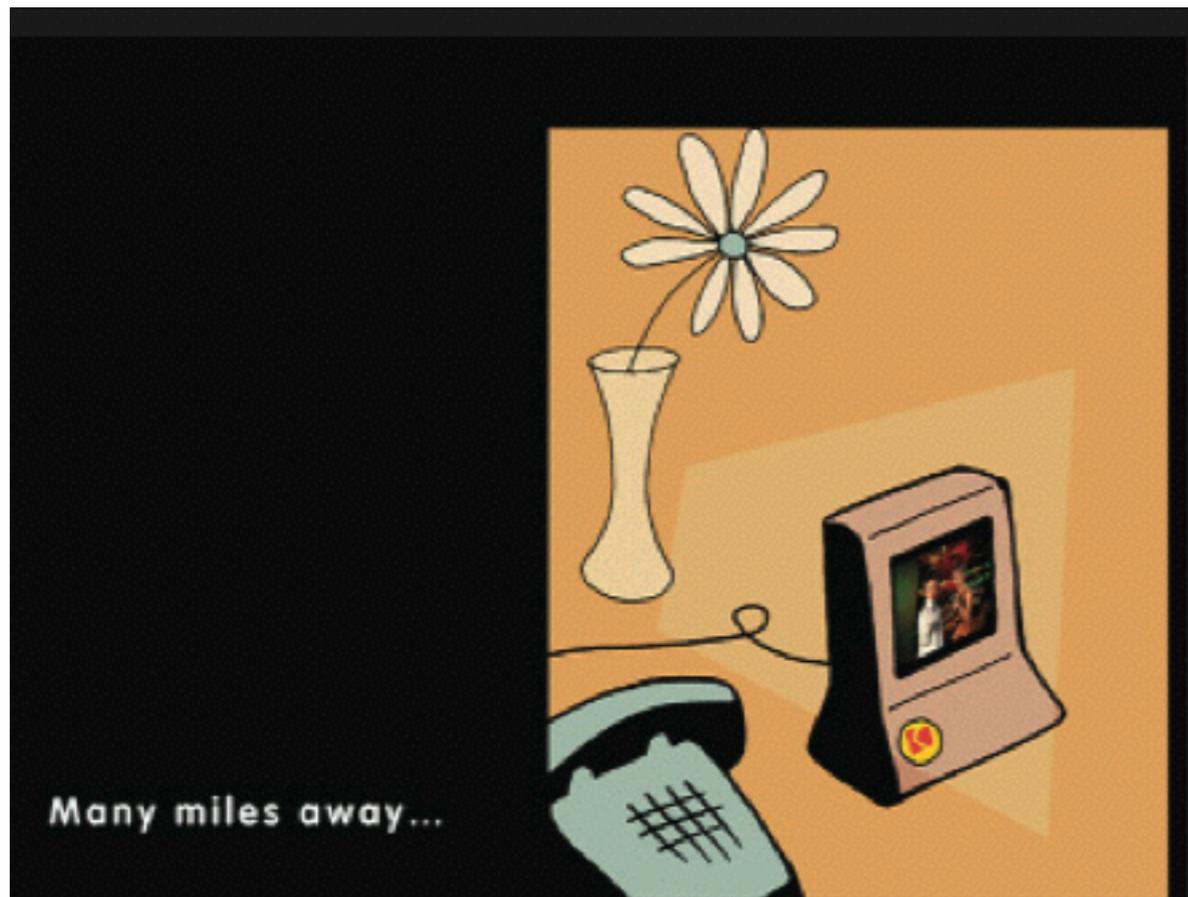




## At the System Perspective (Zoomed Out)

A system perspective was summarised by putting the camera at the center, with connections to the computer for editing, to the printer for output, to the television for display, to online resources and agencies for sending to other people and for remote printing, and to kiosks in public places for copying and printing.

source: [3]



## Concepts/Scenarios at User Perspective (Zoomed In)

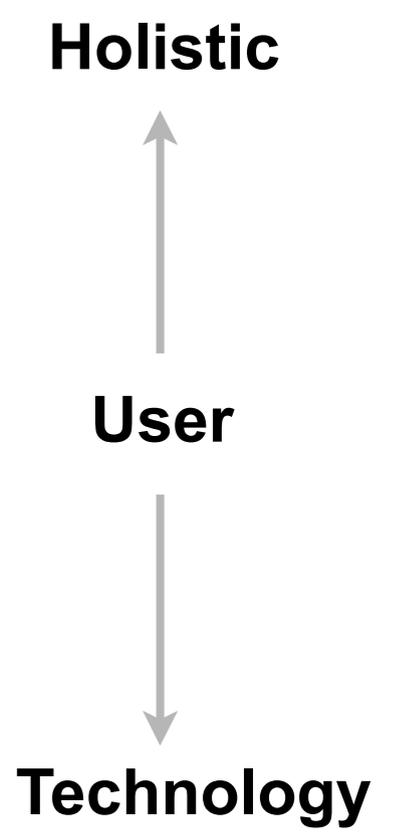
Scenarios were developed to bring the design opportunities to life. These lists of highlights were used to develop patterns of value that would appeal to Kodak's customers and formed the basis of design for the interaction architecture for the system as a whole, as well as potential business cases for analysis.

source: [3]

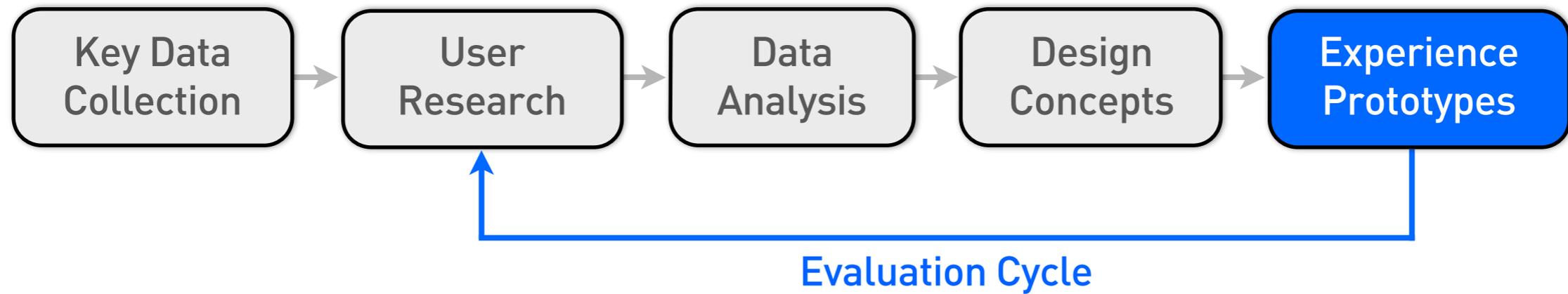
## **Zoomed Out vs. Zoomed In**

**'Zoom Out vs. Zoom In'** is not a method. It's a way of design thinking. Interactions designers are often facing increasingly complex situations.

**Zooming in and out** makes them flexible and helps to define on which level to intervene.



# Experience Prototypes





## Experience Prototype

A book of guidelines would be the conventional approach, but however interesting and beautiful they could make a book, diagrams and text would not be a very compelling form of communication. They came up with the idea of creating a working prototype of an archetype for the interaction behaviour, so that the members of the development teams could experience the behaviours directly.

source: [3]

## References (Books):

- [1] Buxton, W. Sketching User Experiences, *Morgan Kaufmann* 2007.
- [2] Norman, D. The Psychology of Everyday Things, *Basic Books* 2013.
- [3] Moggridge, B. Designing Interactions, *MIT Press*, 2006.
- [4] Rogers, Y., Preece, J. & Sharp, H. Interaction Design, *Wiley & Sons* 2011.
- [5] Saffer, D. Designing for Interaction, *New Riders* 2009.
- [6] Greenberg et al. Sketching User Experiences - The Workbook, *Morgan Kaufmann* 2012.
- [7] Lidwell, W.,: Universal Principles of Design, *Rockport*, 2003.