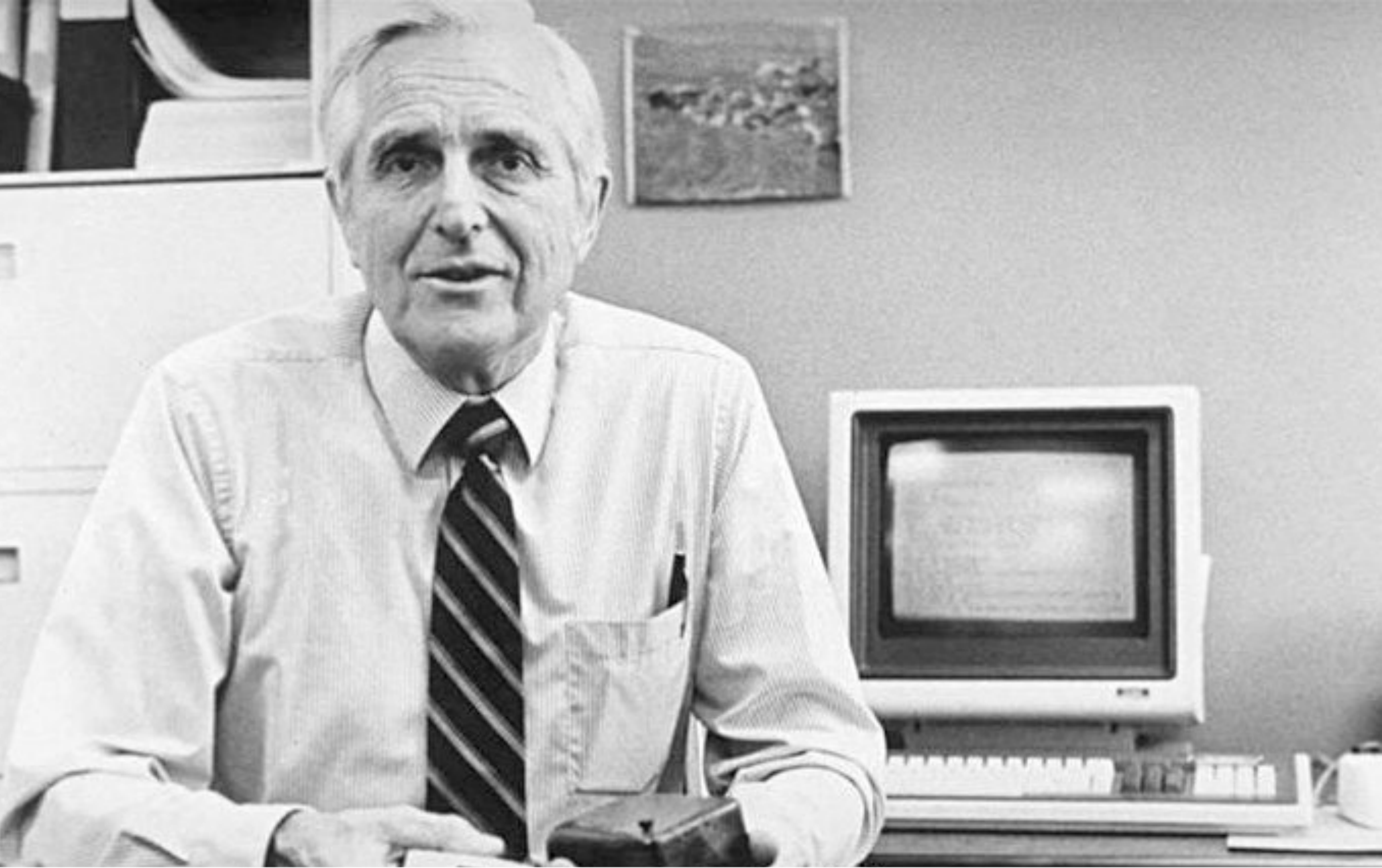# User Experience Design I (Interaction Design)

Part II:

Process Models, Elements and Usability

Douglas Engelbart

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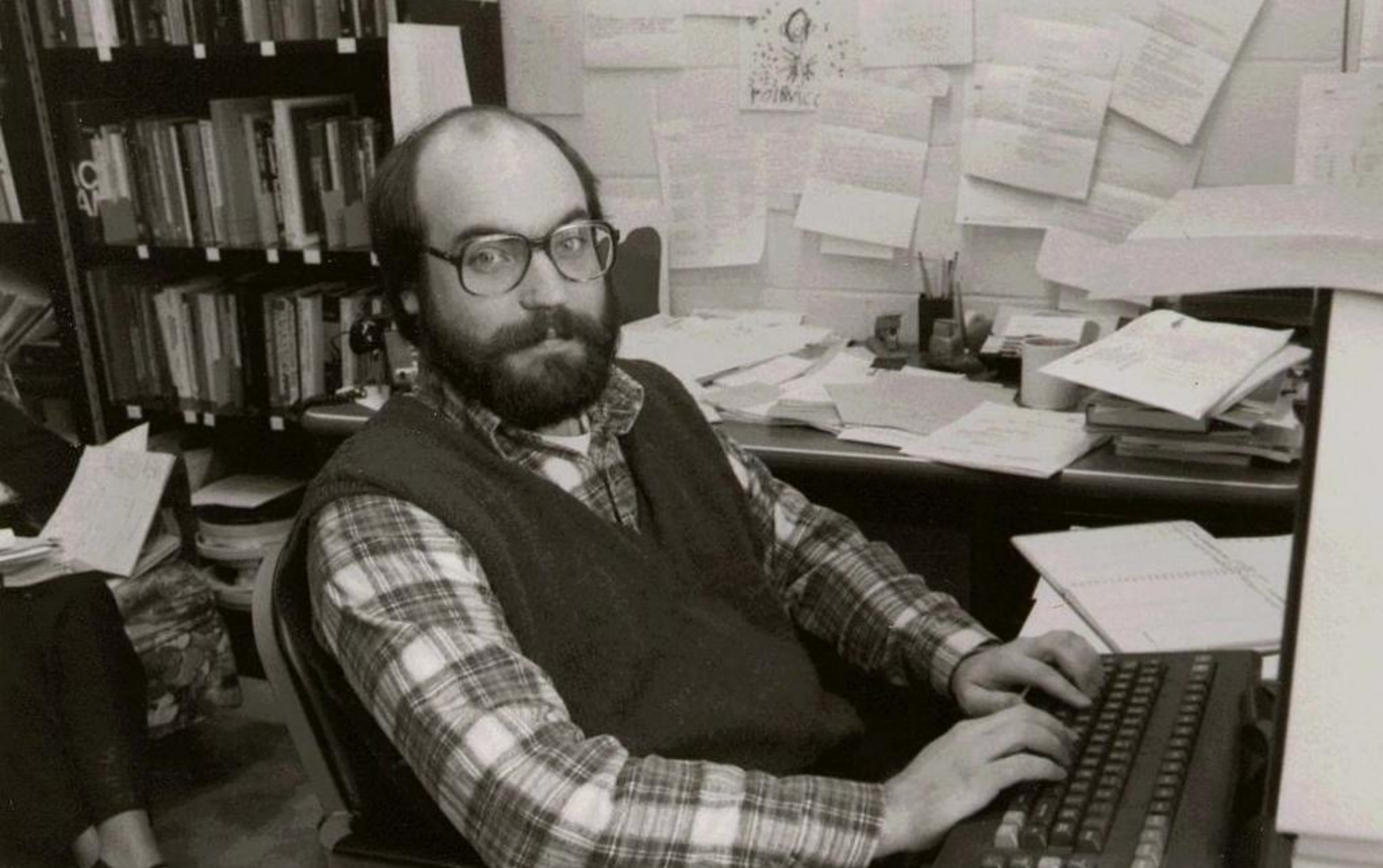
3. Methodology—the methods, procedures, and strategies with which an individual organises his goal-centred (problem-solving) activity.

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]

founded 1970 by Xerox

Marc Weiser

The Computer for the 21st Century, 1991 — Scientific American, September 1991, by Mark Weiser
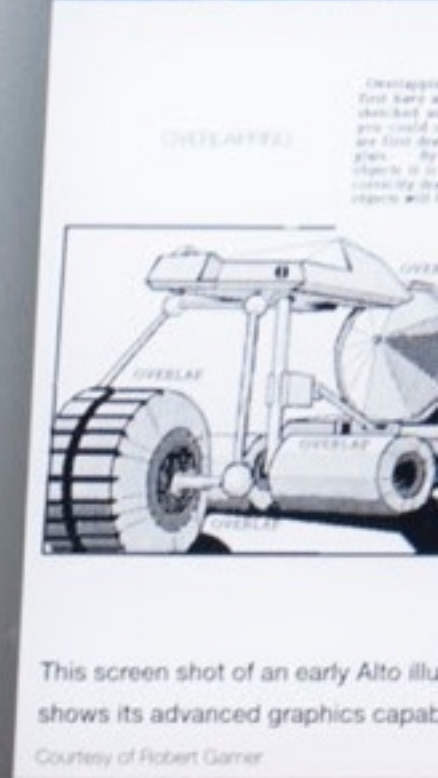
Xerox Alto 1973

This screen shot of an early Alto illu...
shows its advanced graphics capab...

Courtesy of Robert Garner

The Xerox Alto boasted the world's first "v...
you get" (WYSIWYG) editor, mouse, graph...
(GUI) and bit-mapped display. Its pop-up...
became the model for the Microsoft® Wind...
Macintosh® interfaces of today.

From the collection of The Computer Museum History Cent...
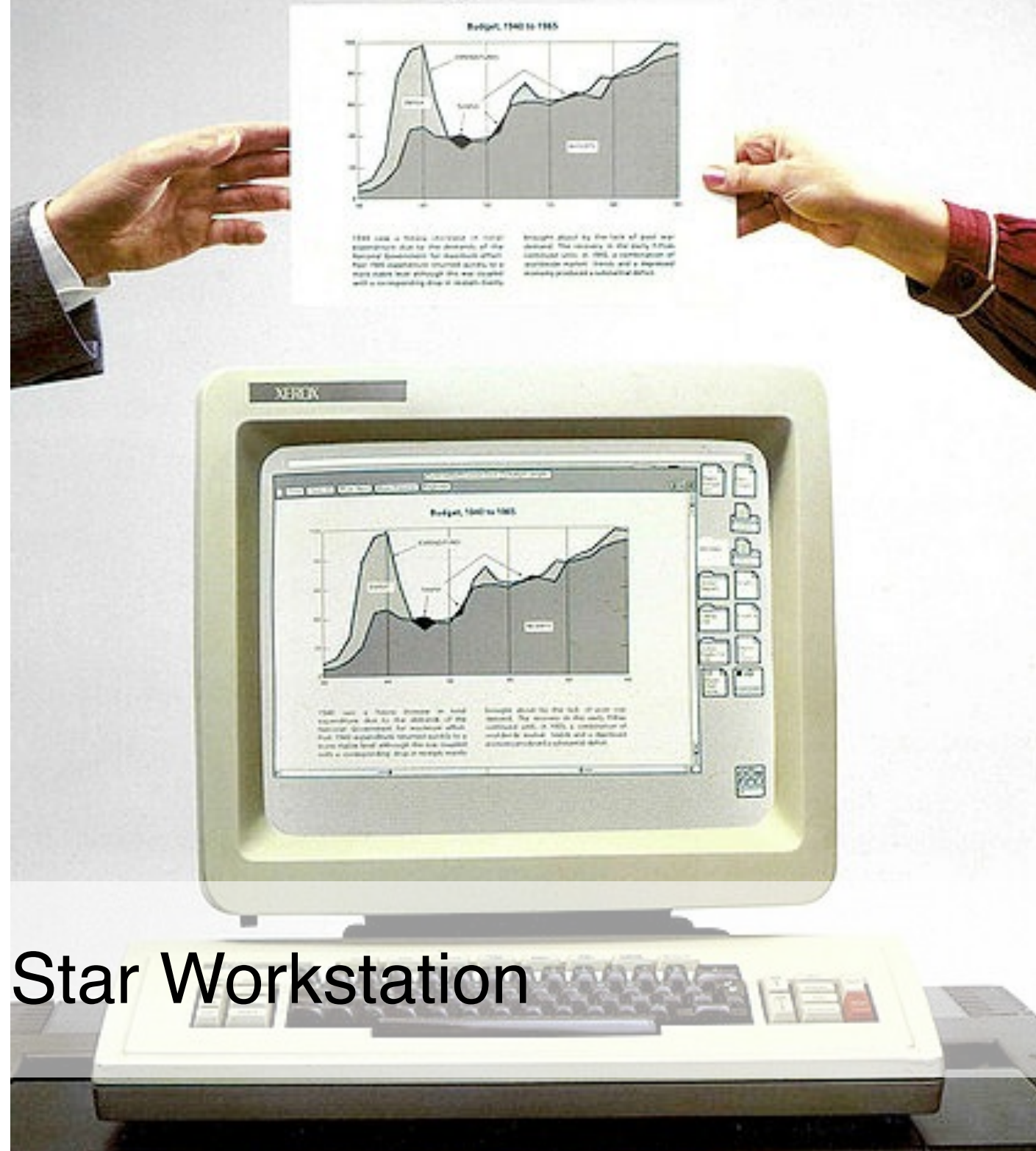
1981 Xerox Star Workstation

User Experience Design I (Interaction Design)

Day 2 (May 2nd, 2019, 9am-12pm):

Process Models, Elements and Usability

Process Models, Elements and Usability

- **Definition and Paradigms of UX/Interaction Design**

- Process Models

- Elements of UX/Interaction Design

- Usability I

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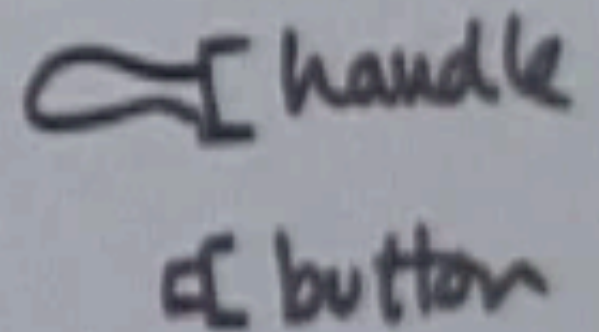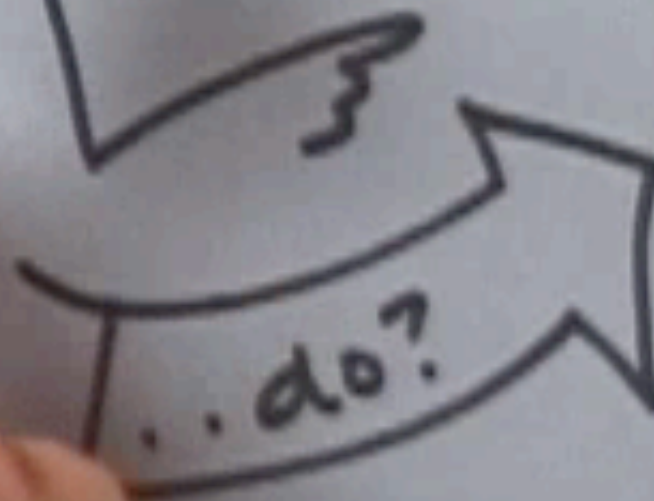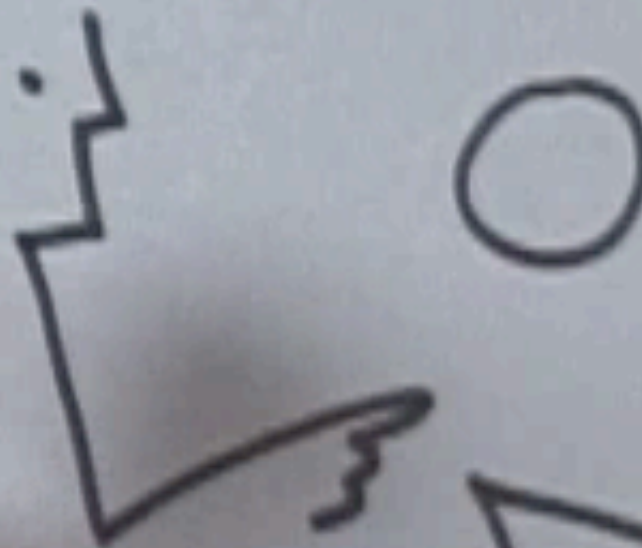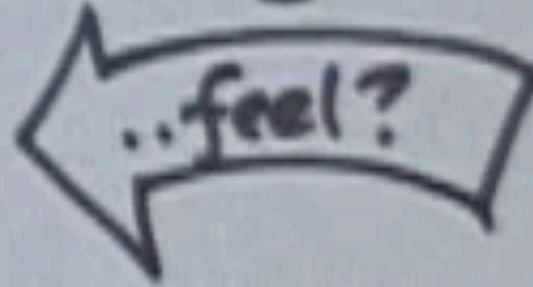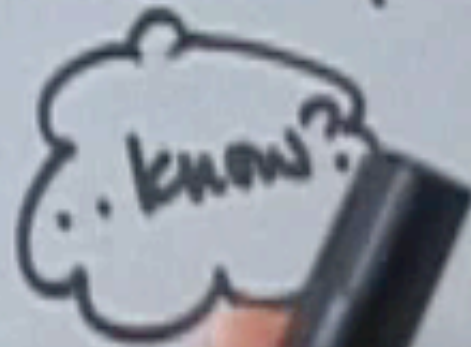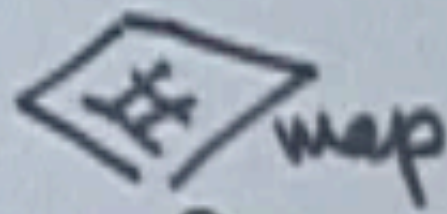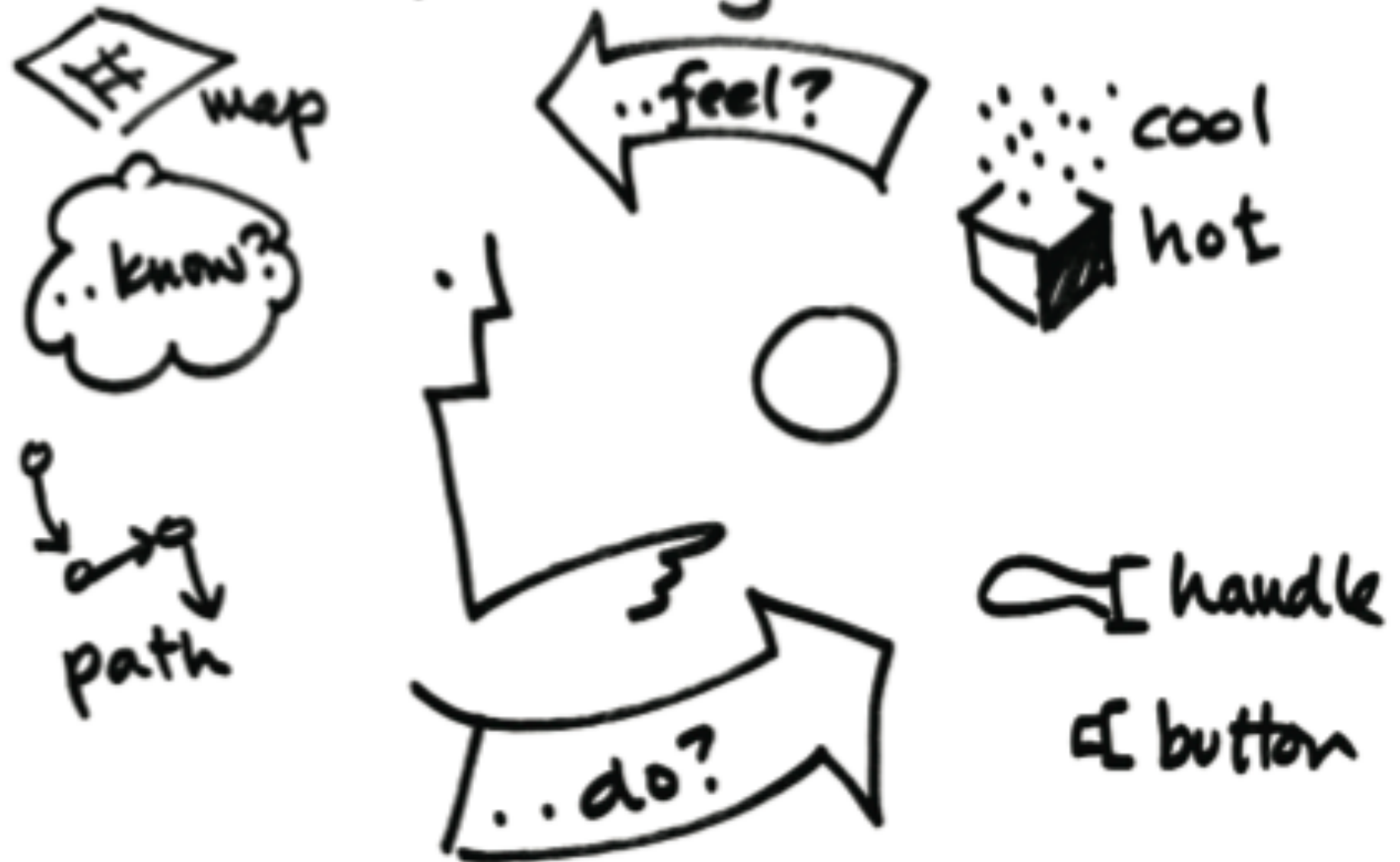
Bill Verplank
says that the interaction designer has three questions
to answer; they are all "How do you . . . ?" questions.

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

source: [3]
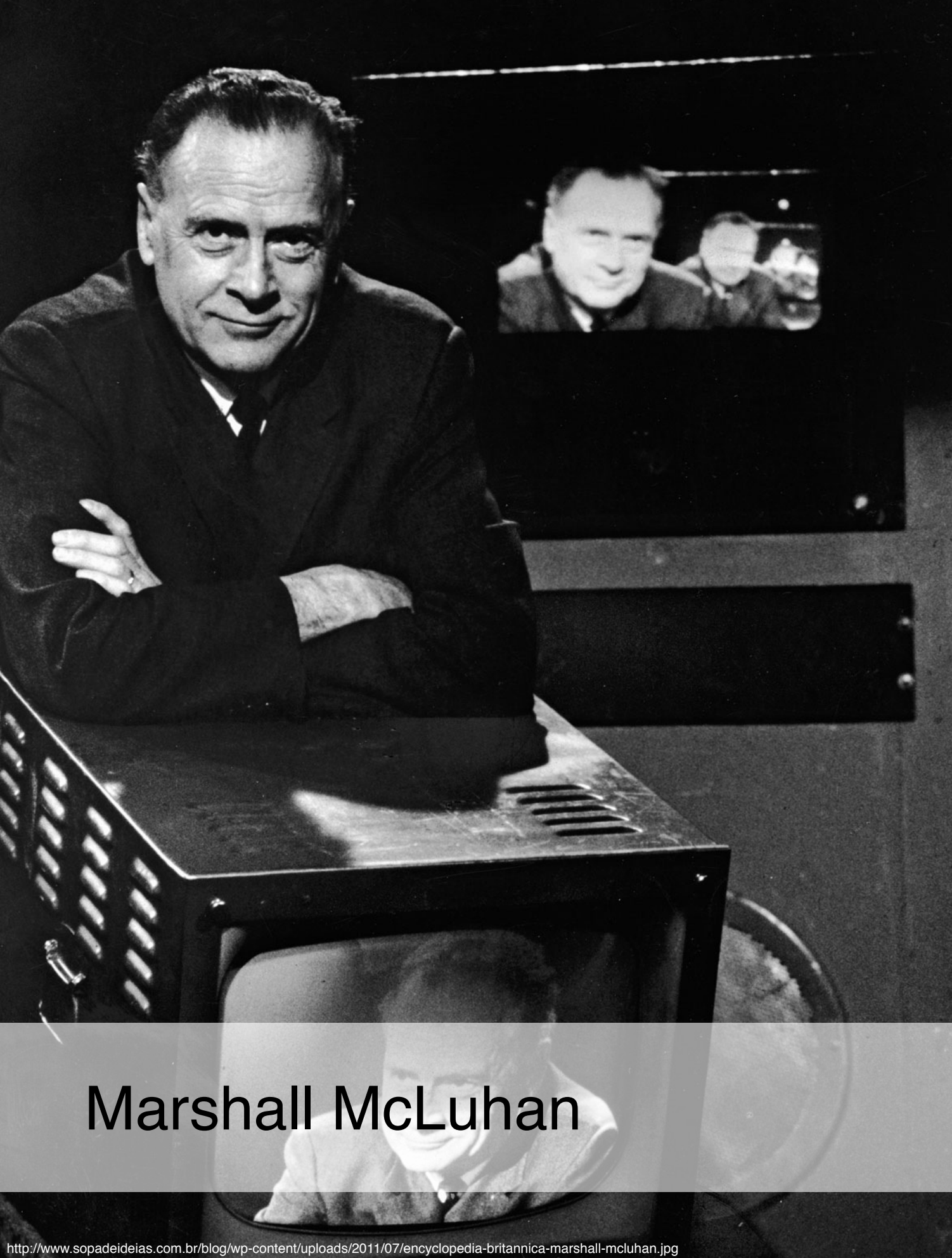
"Any hot medium allows of less participation than a cool one, as a lecture makes for less participation than a seminar, and a book for less than a dialogue."

Marshall McLuhan

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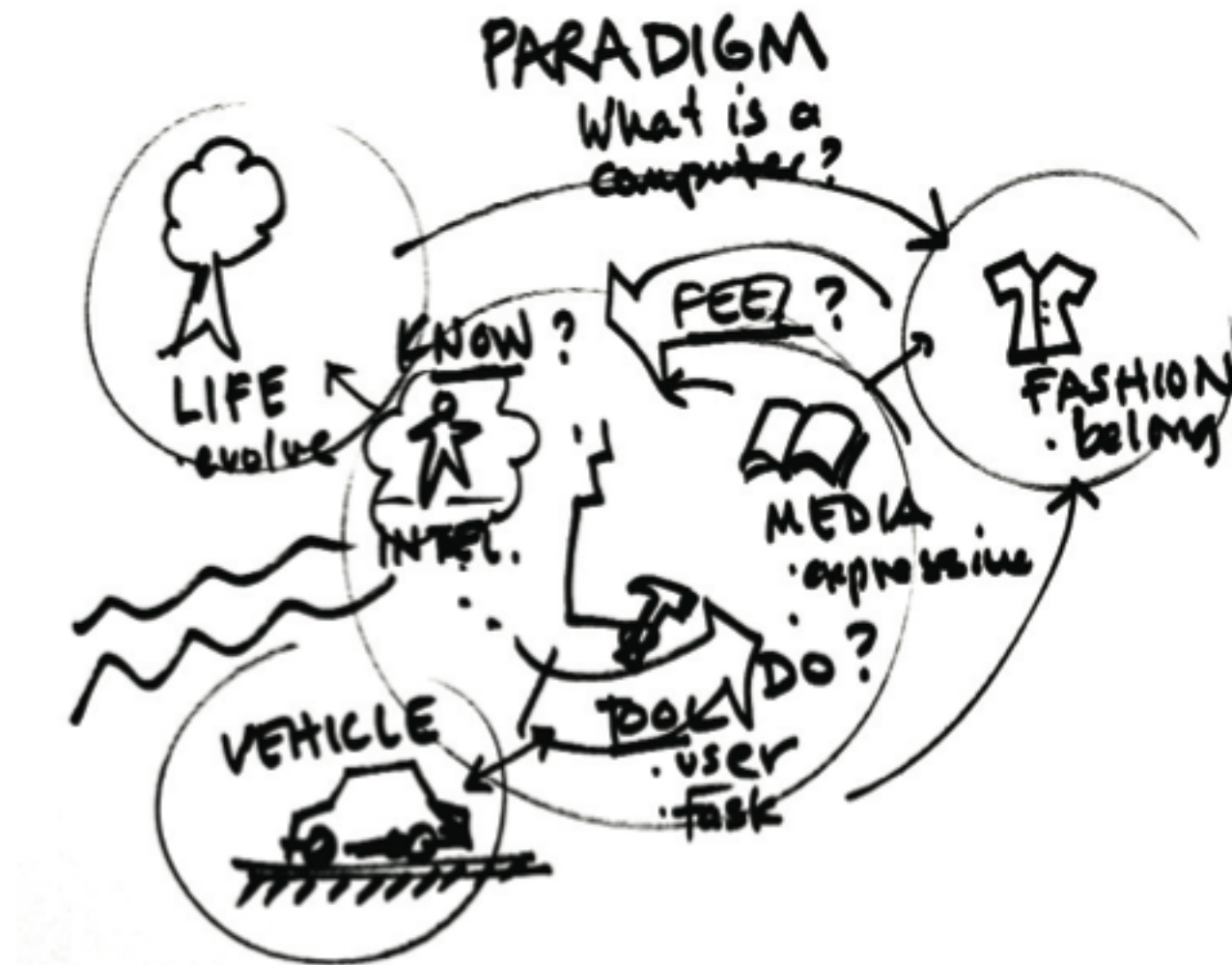
A paradigm is an example that serves as a pattern for the way people think about something.

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]

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.
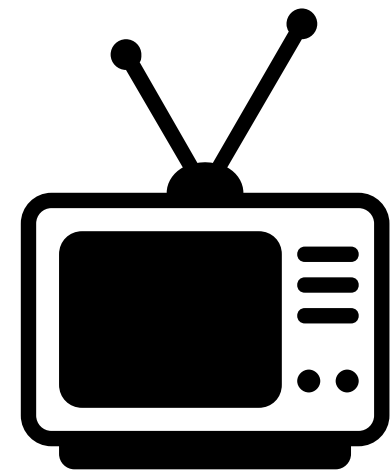
source: [3]

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.
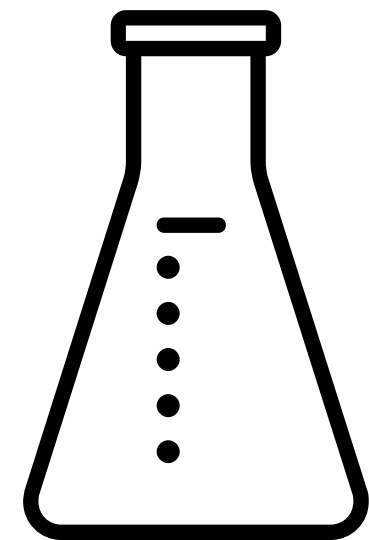
source: [3]

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.
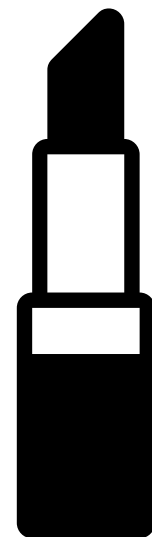
source: [3]

Process Models, Elements and Usability

- Definition and Paradigms of UX/Interaction Design

- Process Models

- Elements of UX/Interaction Design

- Usability I

User Experience Design

source: [3]

Front Stage

Back Stage

http://blog.entrepreneurthearts.com/etablog/wp-content/uploads/2010/08/backstage.jpg

User Interface

Visible

Behind the Scenes

Capturing

Transferring

Connecting

Coordinating

Combining

Storing

Contextualizing

Double Diamond

DISCOVER | DEFINE | DESIGN | DELIVER

Double Diamond

DISCOVER | **DEFINE** | **DESIGN** | **DELIVER**
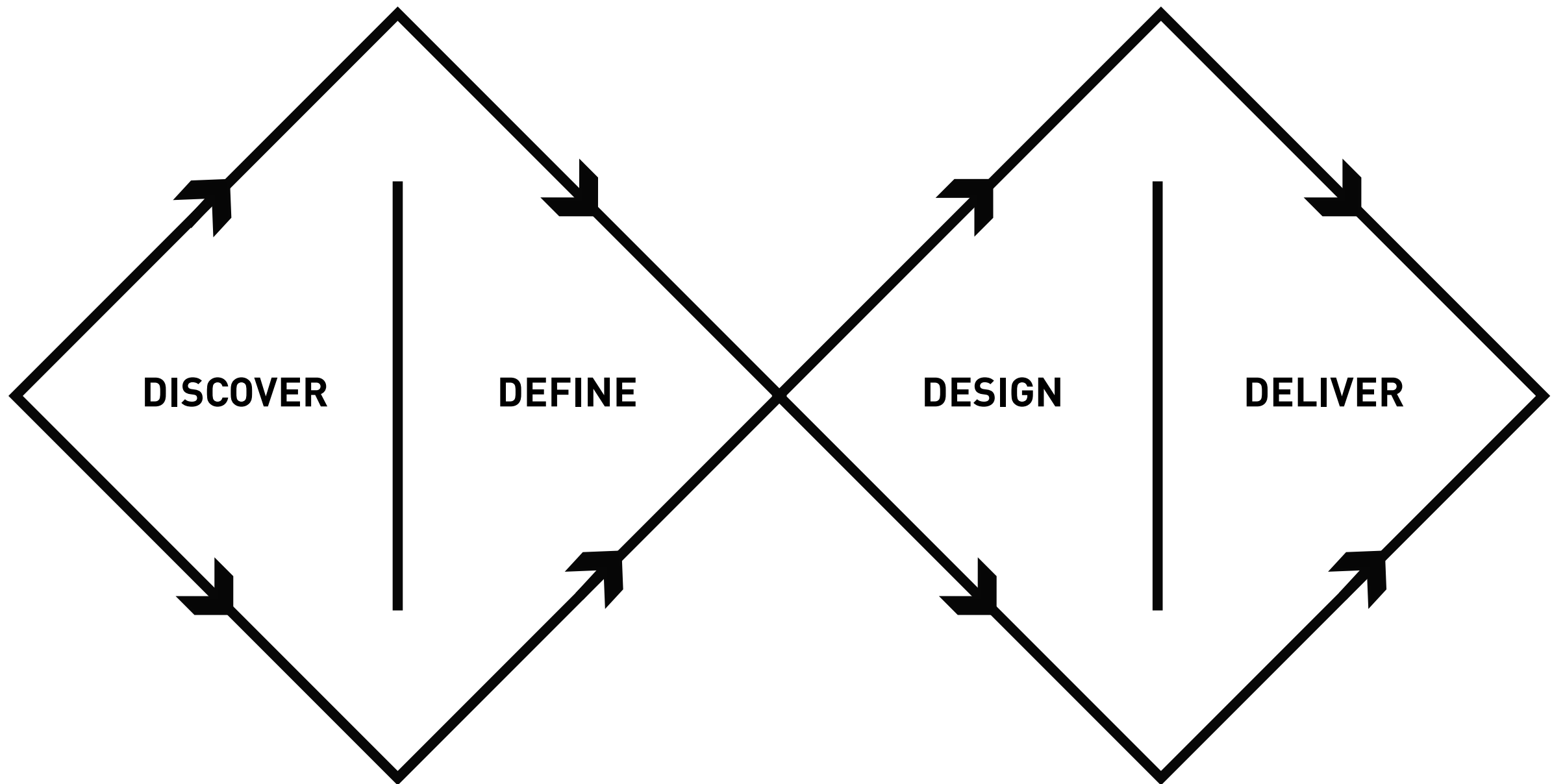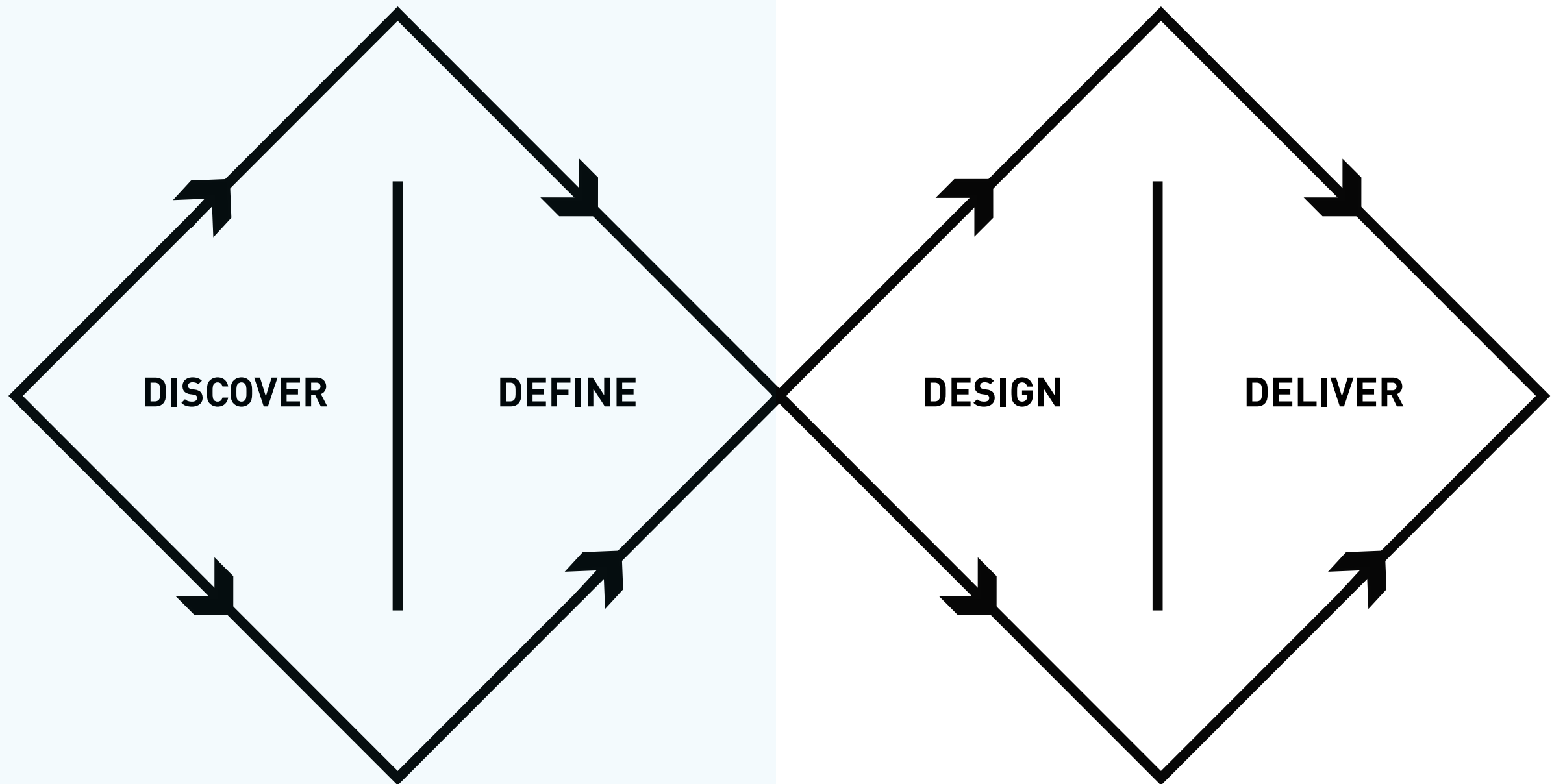
Why? and How?

source: [8]

Getting the right Design and the Design right...

Bill Buxton - Sketching User Experiences

Double Diamond

DISCOVER | DEFINE   DESIGN | DELIVER

What?

source: [8]

Double Diamond

DISCOVER | DEFINE
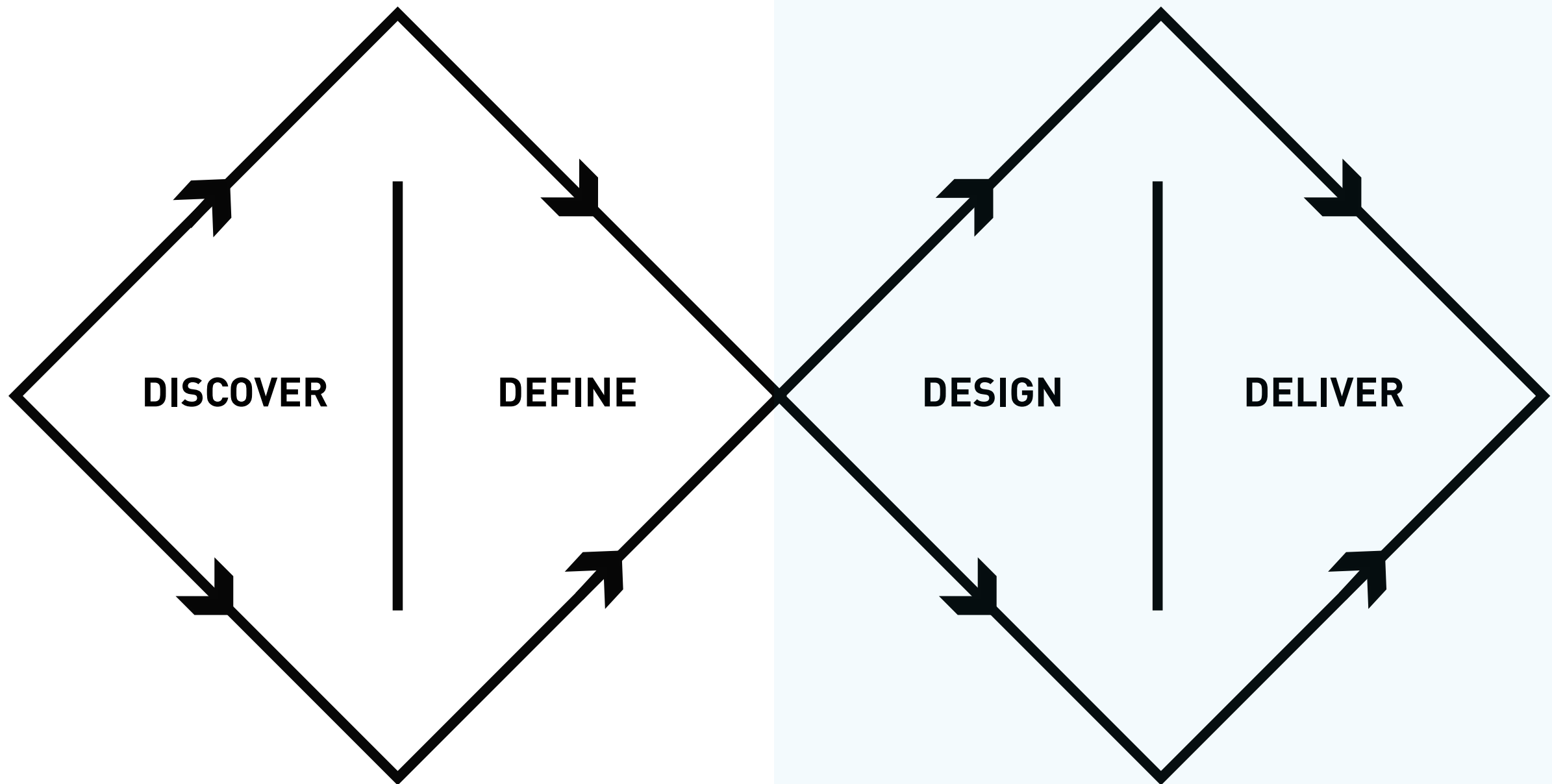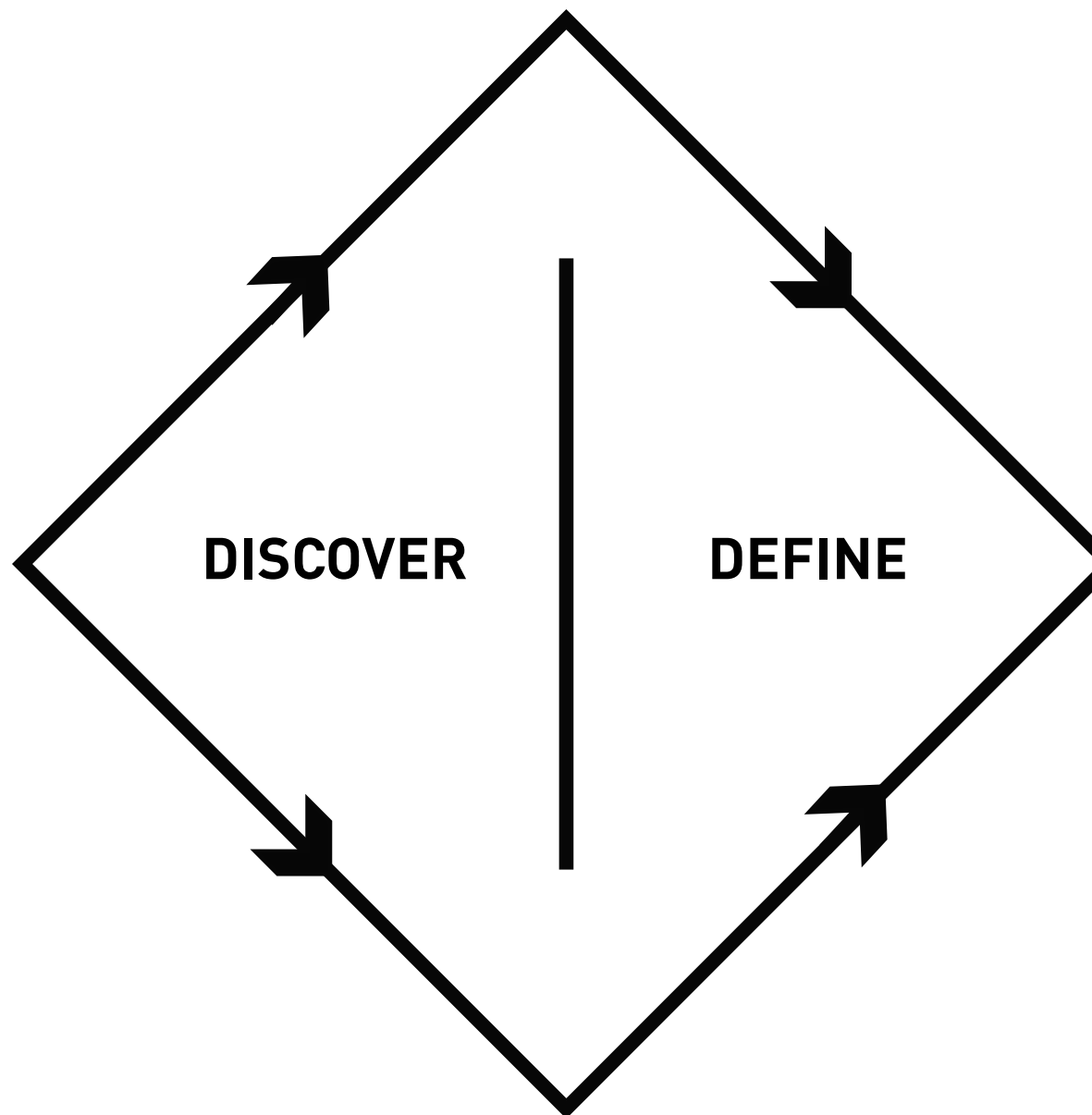
DISCOVER STAGE

- Consumer behaviour and preferences in relation to the product or service offered by the company
- New modes of communication
- New service needs that may emerge on the basis of social, economic or environmental changes

The Discover stage helps to identify the problem, opportunity or user need that should be addressed, and introduces the space within which design can provide a solution – the playing field for design. It is important that the design process used in the company allows for ideas to be captured and developed in this way, and fosters this type of creative environment among designers and other staff.

source: [8]

Double Diamond

DISCOVER | DEFINE
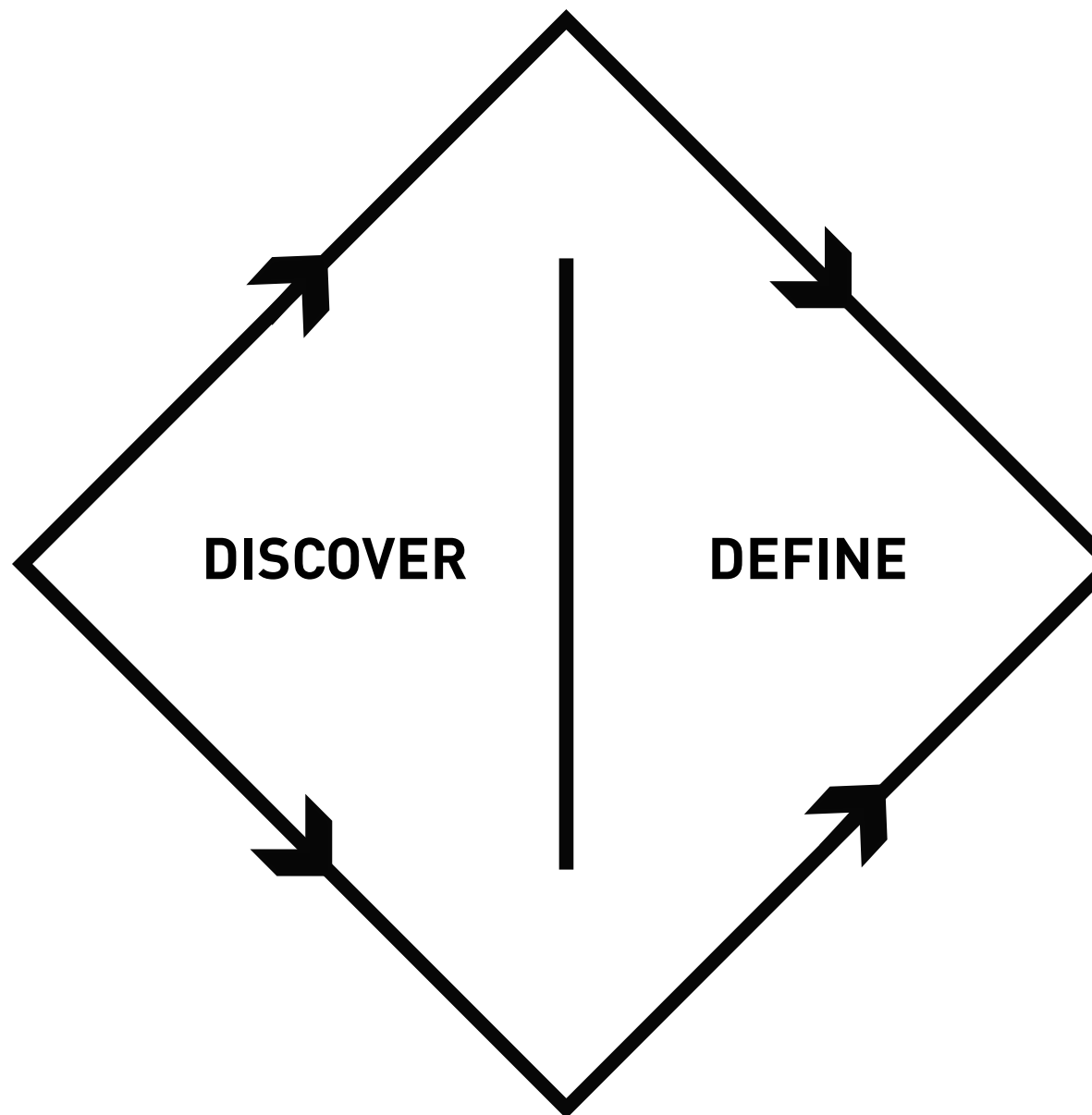
DEFINE STAGE

- The generation of initial ideas and project development
- Ongoing project management
- Corporate objectives agreed and project sign-off

At the Define stage, a combination of the ideas or directions identified during the Discover stage are analysed and synthesised into a brief with actionable tasks related to new and existing product or service development. The Define stage ends with a clear definition of the problem(s) and a plan for how to address this through a design-led product or service. In practice, the Define stage ends in a project go-ahead through corporate level sign-off.

source: [8]

Double Diamond

DESIGN STAGE

- Multi-disciplinary working and dependencies with other departments
- Visual management
- Development methods
- Testing

DESIGN | **DELIVER**
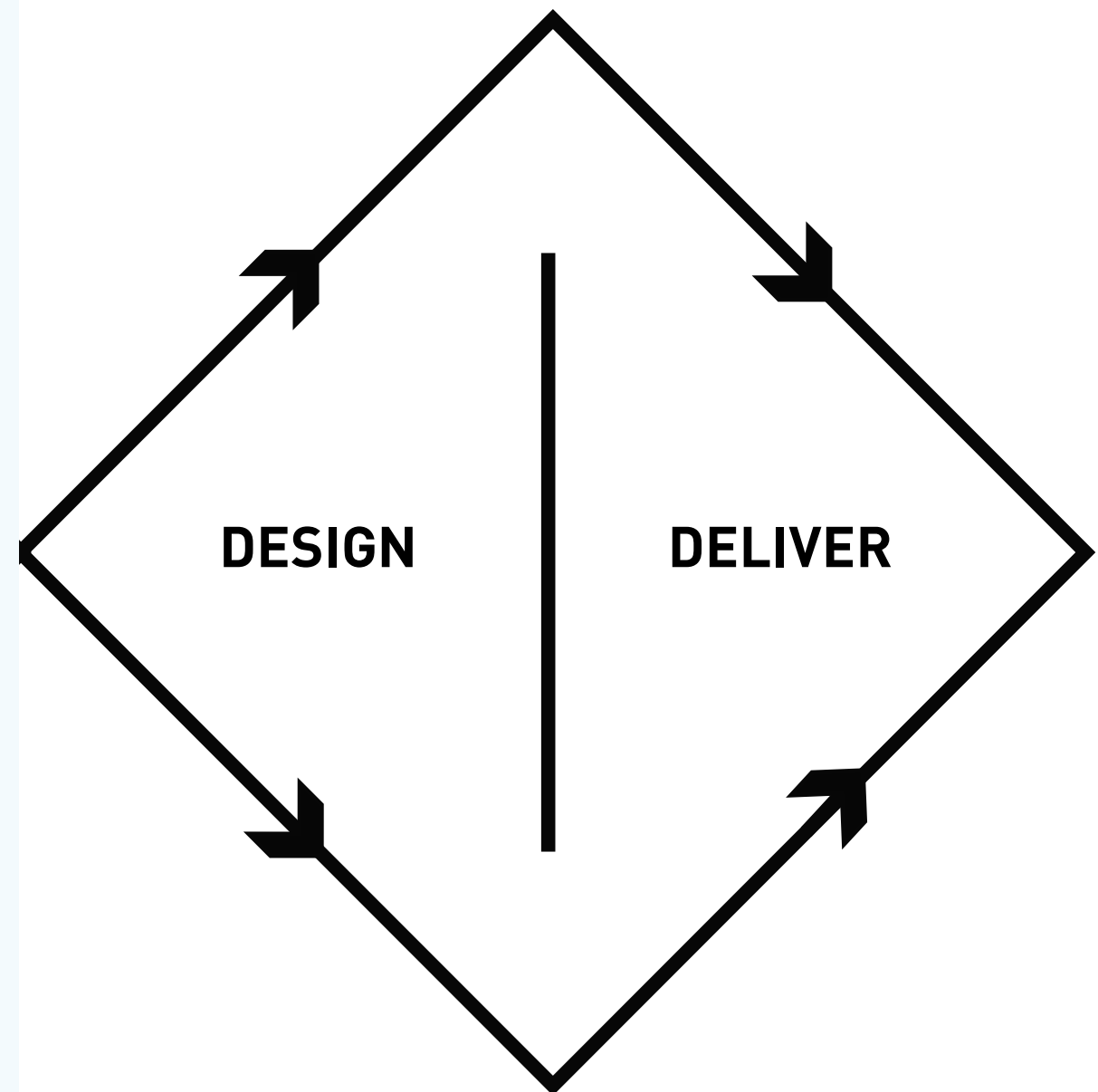
What?

source: [8]

Double Diamond

DELIVER STAGE

- Final testing, approval and launch
- Targets, evaluation and feedback loops.

It will result in a product or service that successfully addresses the problem identified during the Discover stage. It will also include processes for feeding back lessons from the full design process to inform future projects, including methods, ways of working and relevant information.
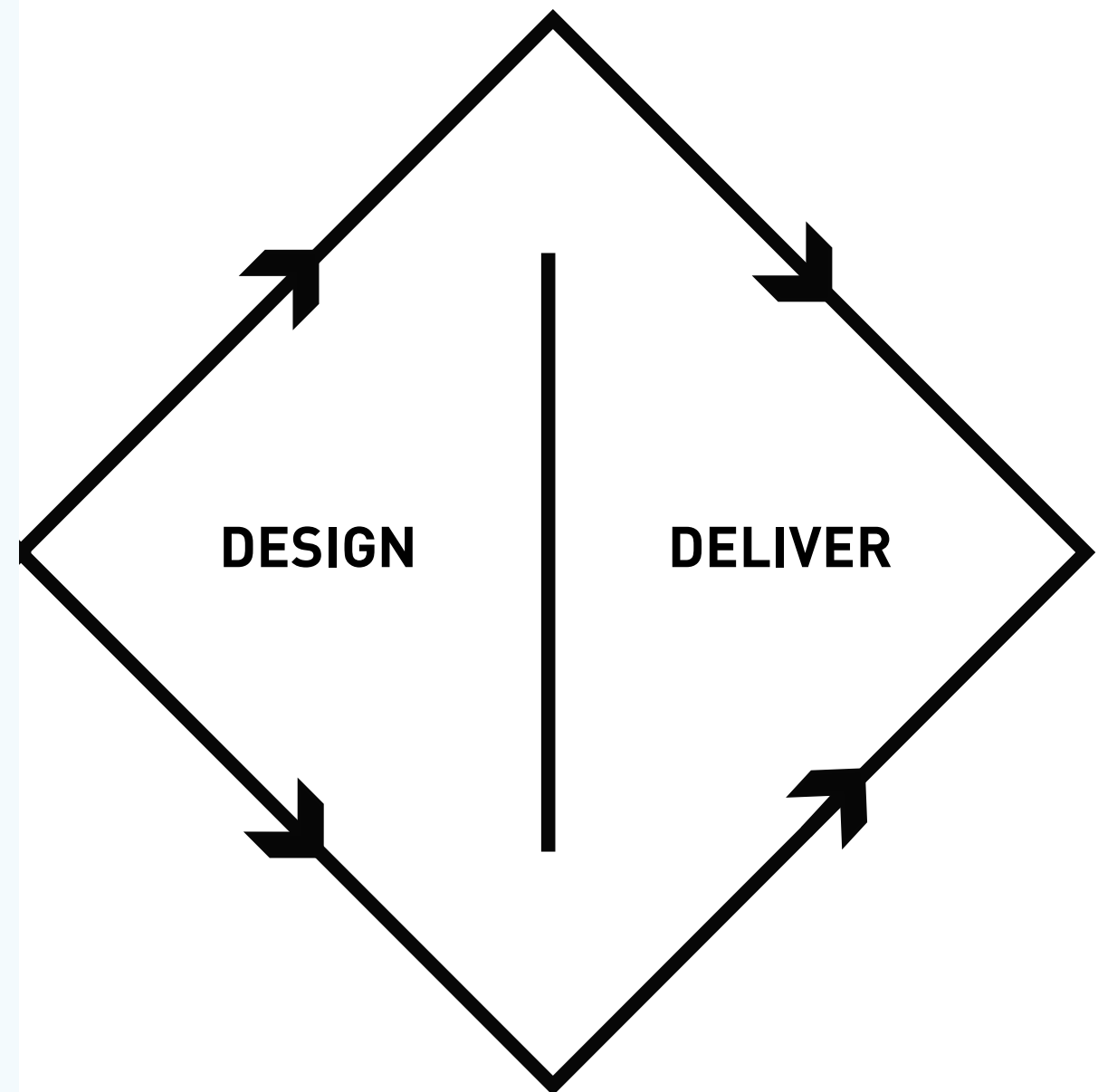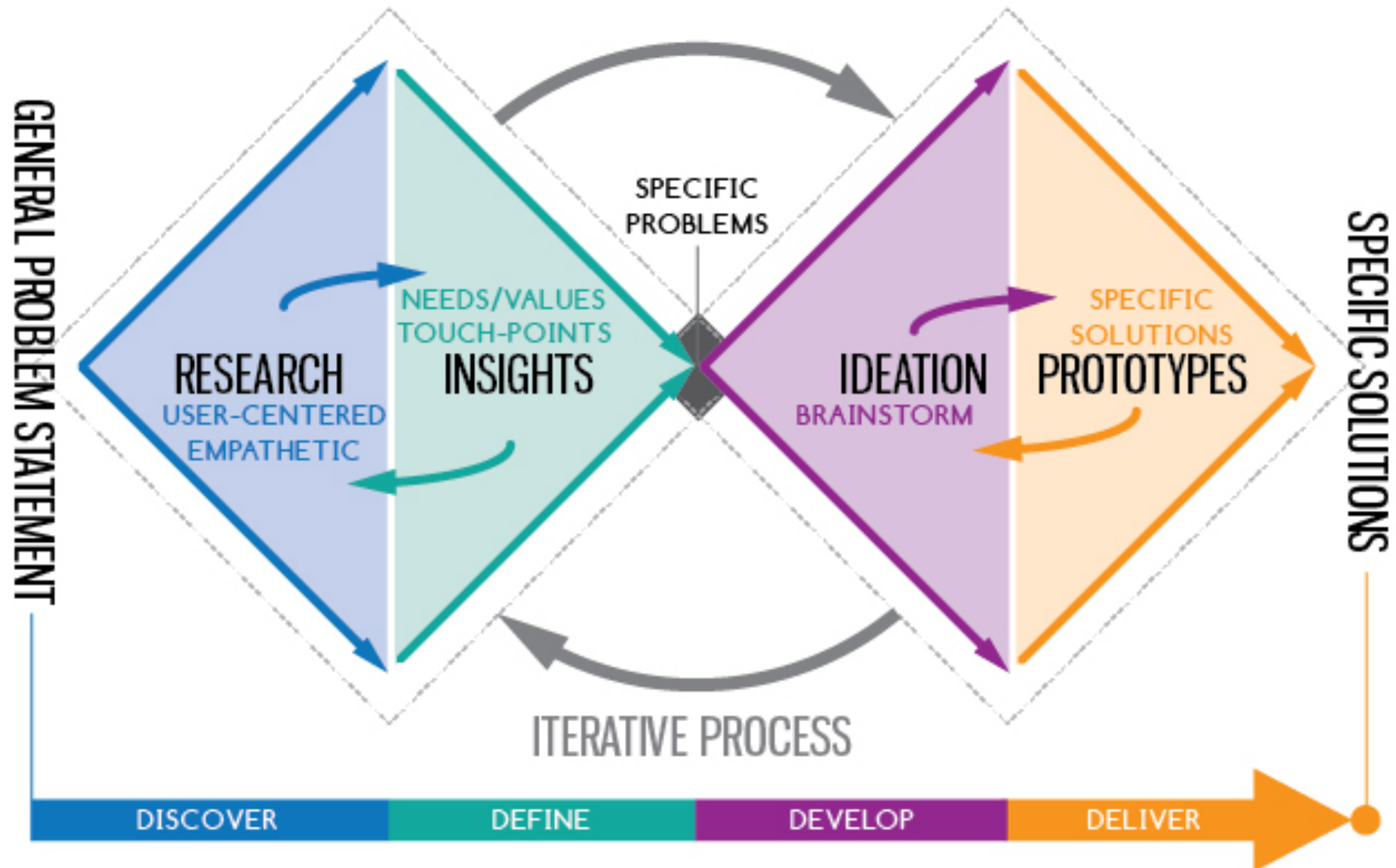
DESIGN   **DELIVER**

What?

source: [8]

source: [8]

http://servicedesignvancouver.ca/wp-content/uploads/2014/11/DoubleDiamond.jpg
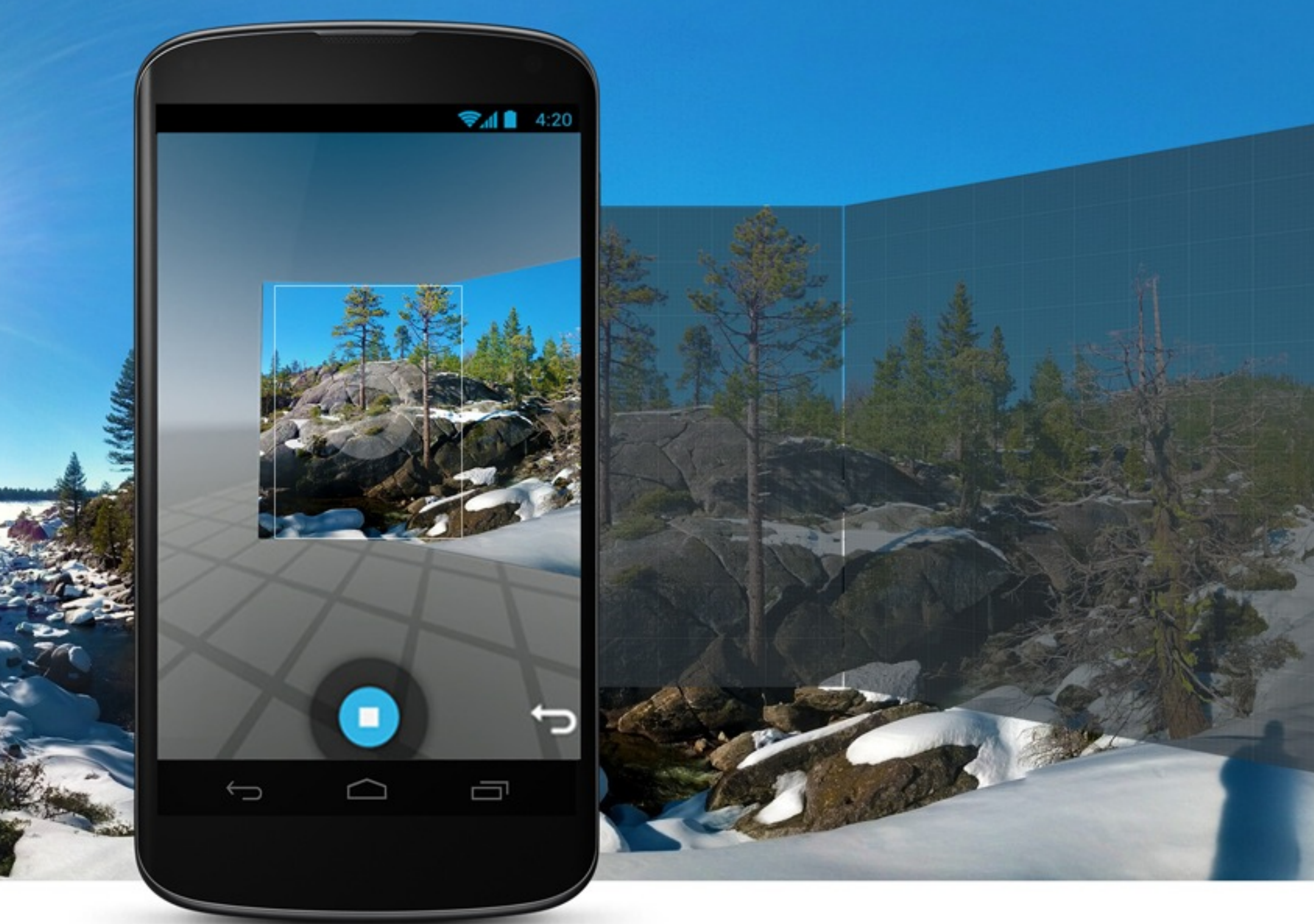
UCD Design Process Model
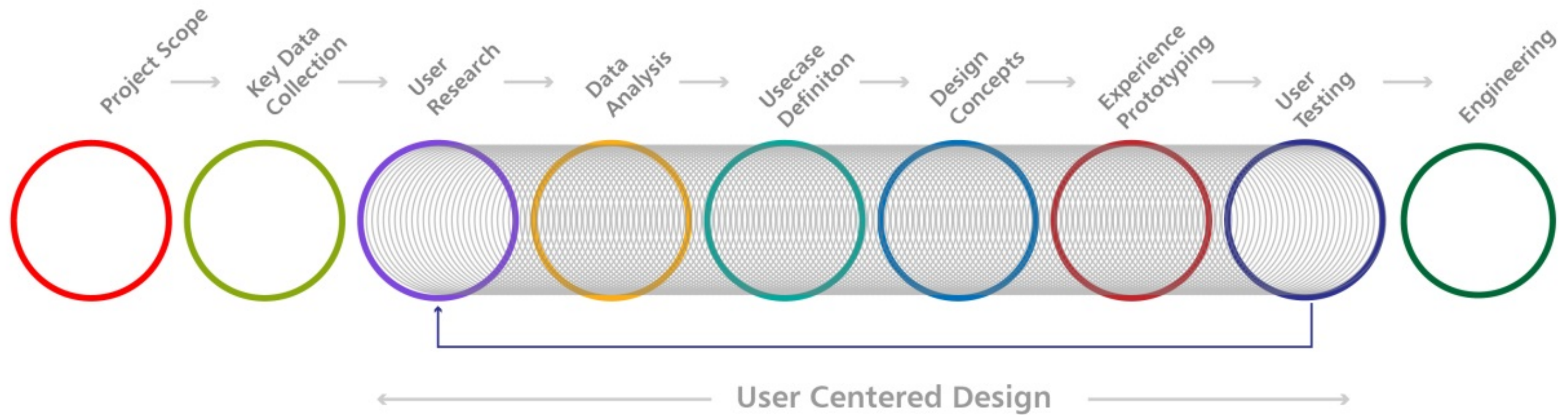
source: [4]

Process Models, Elements and Usability

- Definition and Paradigms of UX/Interaction Design

- Process Models

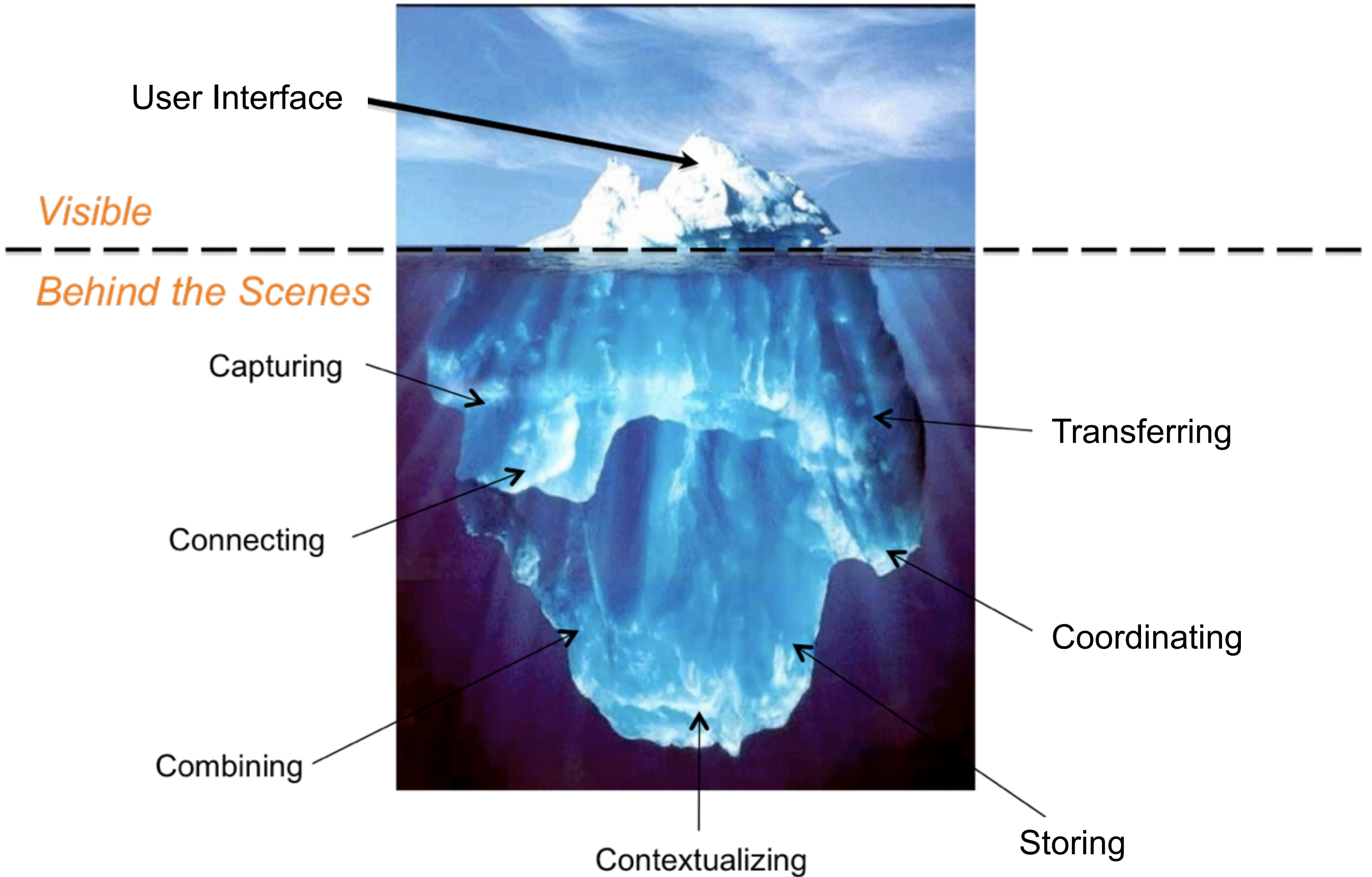- Elements of UX/Interaction Design

- Usability I

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

source: [5]

One could describe Design as a plan for arranging elements to accomplish a particular purpose.

Charles Eames

**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

source: [3]

GRAPHIC
DESIGN

Aa

2D

PRODUCT
DESIGN

3D
+Z-axis
(spatial depth)

INTERACTION
DESIGN

Contact

4D
+T-axis
(temporal dimension)

SERVICE
DESIGN

Snap

5D
+W-axis
(multi-local simultaneity)
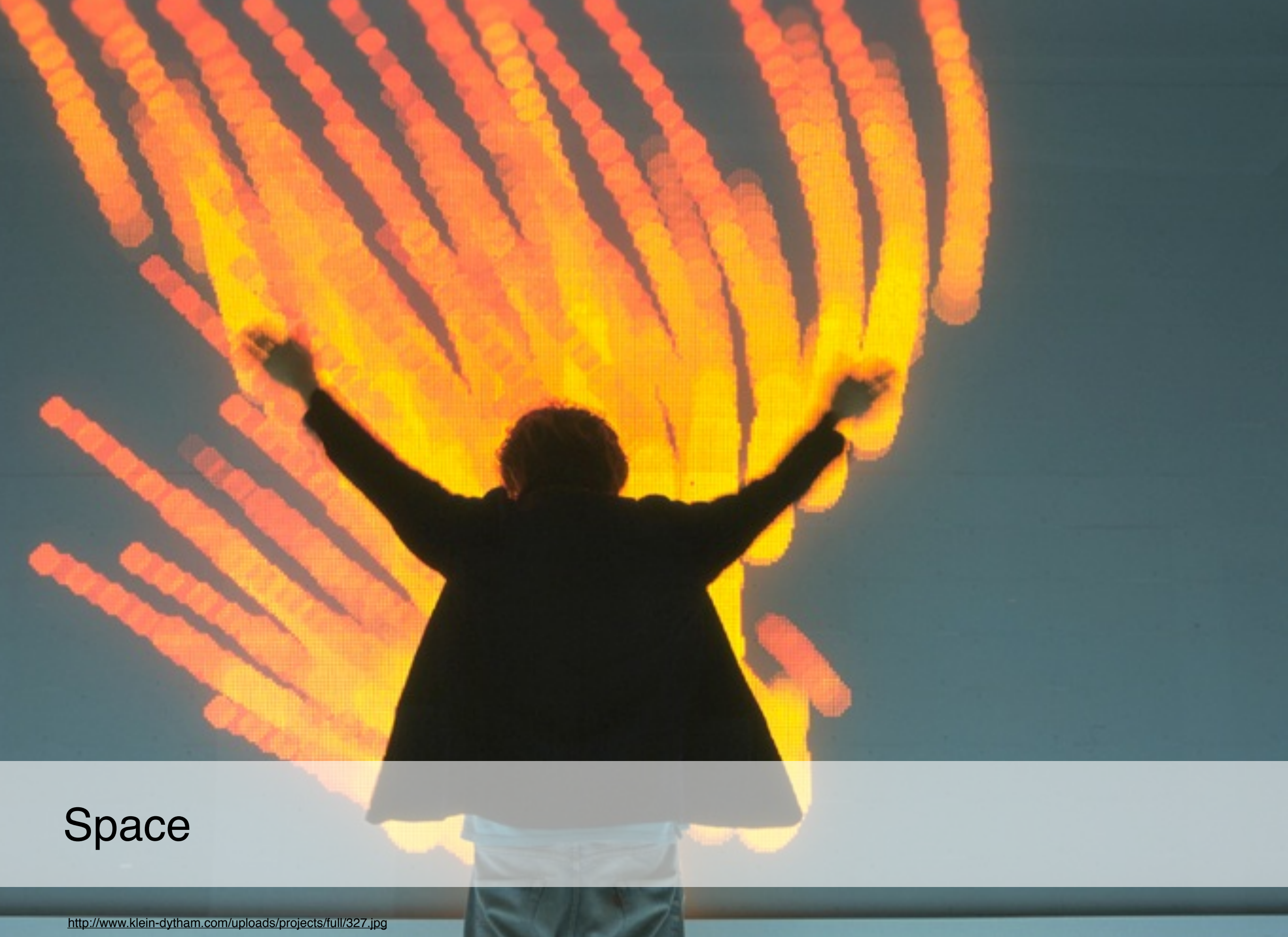
Space

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.
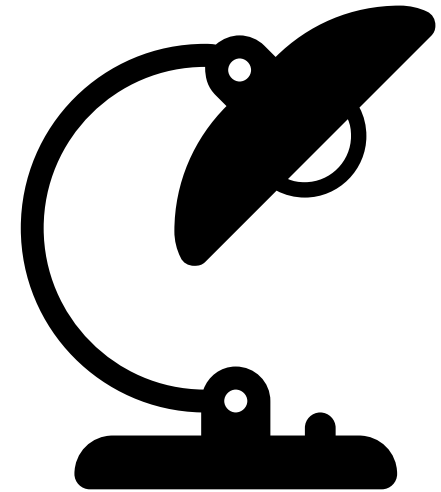
source: [5]
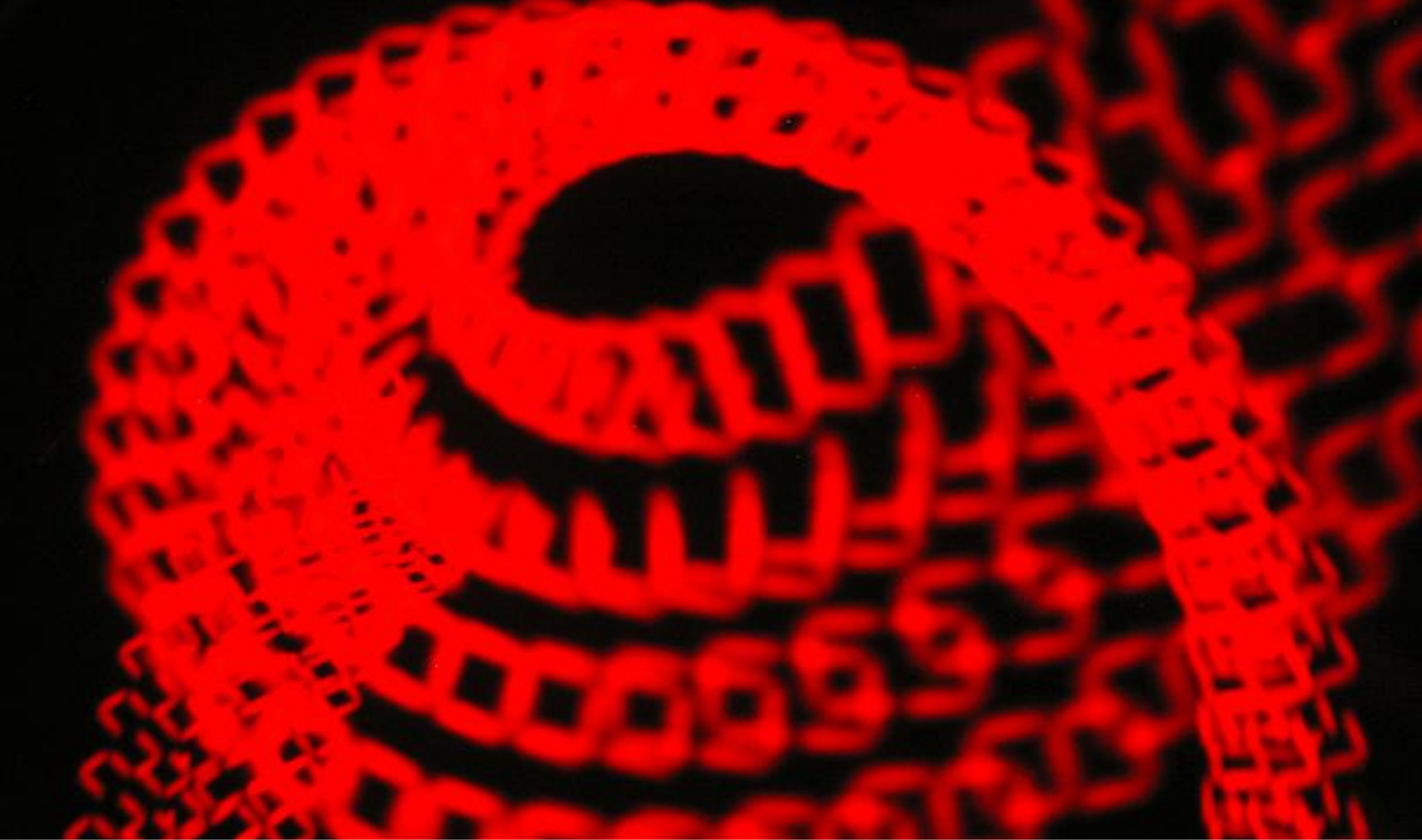
Time

Time

Movement through space takes time to accomplish.

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

Time creates rhythm.
(e.g. wait time, intended delays, unintended delays, battery, etc,)
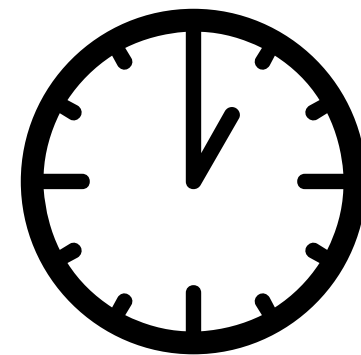
All interactions take place over time.

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.
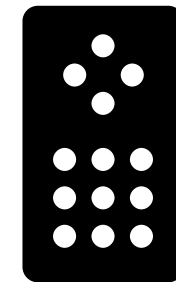
source: [2&5]

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.

source: [5]

Process Models, Elements and Usability

- Definition and Paradigms of UX/Interaction Design

- Process Models

- Elements of UX/Interaction Design
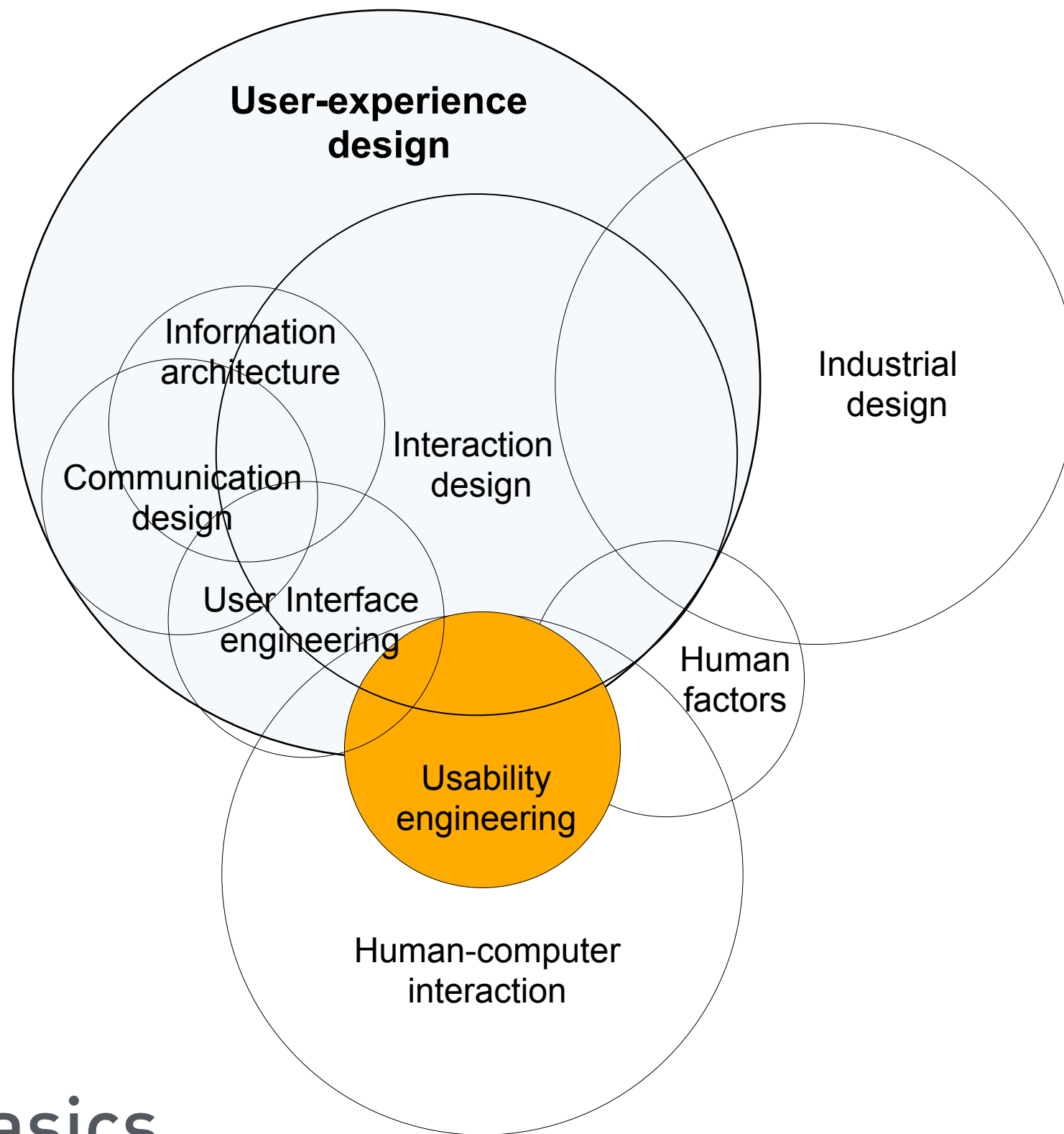
- Usability I

Usability Basics

Usability is a term used to denote the ease with which people can employ a particular tool or other human-made object in order to achieve a particular goal.

Benefits of usability testings

- Higher revenues through increased sales
- Increased user efficiency
- Reduced development costs
- Reduced support costs
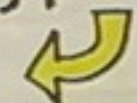
Parking Machine

Microwave

Copier

Remote Control

Remote Control

Hierarchy of **Design Needs**
(Lidwell: Universal Principles of Design, 2003)

source: [7]

Maslow's Hierarchy of Needs

- Self-Actualization
- Self-Esteem
- Love
- Safety
- Physiological

Design Hierarchy of Needs

- Creativity
- Proficiency
- Usability
- Reliability
- Functionality

source: [7]

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

For example a HDD 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

- Self-Actualization
- Self-Esteem
- Love
- Safety
- Physiological

Design Hierarchy of Needs

- Creativity
- Proficiency
- Usability
- Reliability
- Functionality

source: [7]

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

For example a HDD 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

source: [7]

Maslow's Hierarchy of Needs

Self-Actualization

Self-Esteem

Love

Safety

Physiological

Design Hierarchy of Needs

Creativity

Proficiency

Usability

Reliability

Functionality

source: [7]

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

For example, configuring a HDD 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]

Self-Actualization

Self-Esteem

Love

Safety

Physiological

Maslow's Hierarchy of Needs

Creativity

Proficiency

Usability

Reliability

Functionality
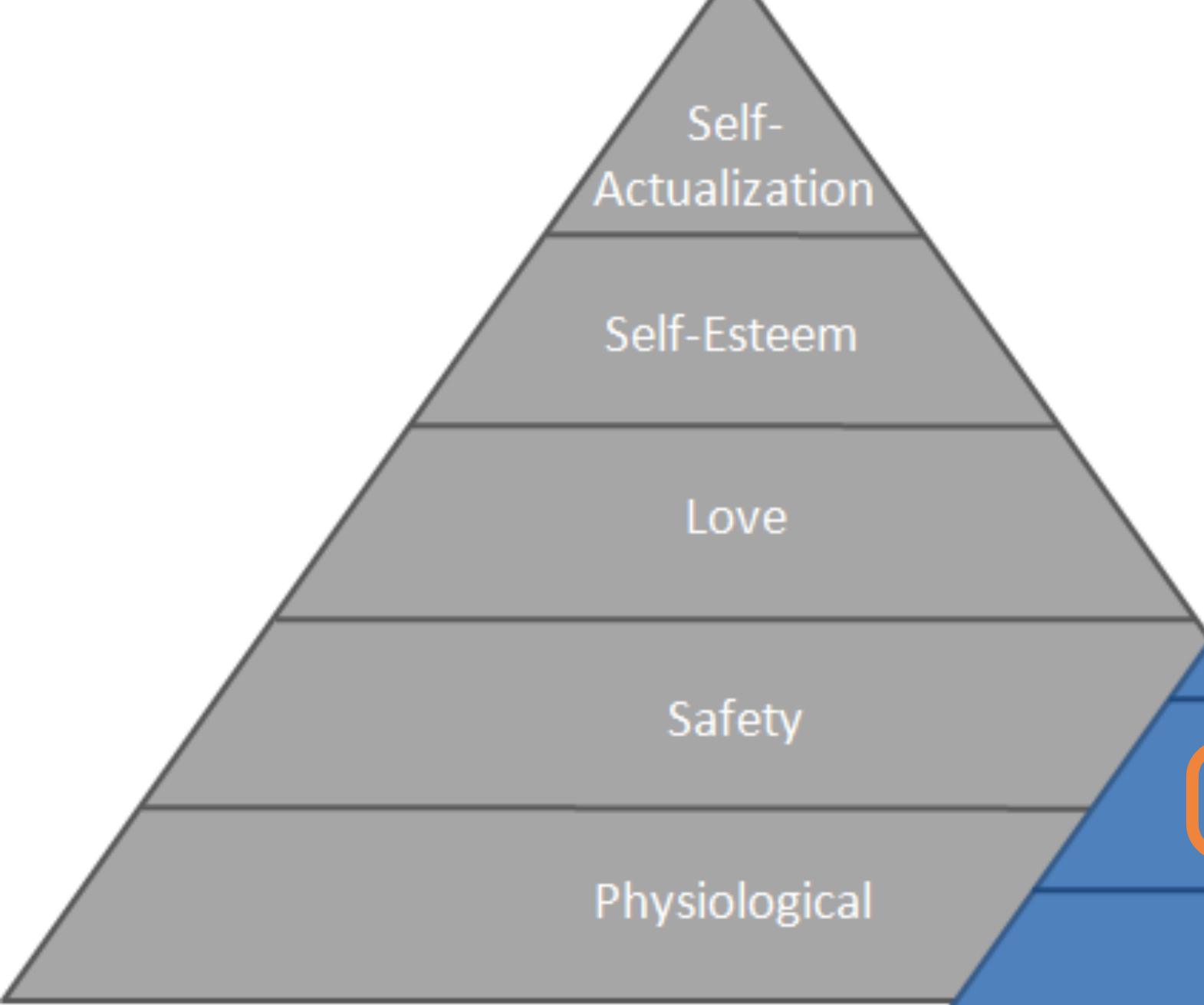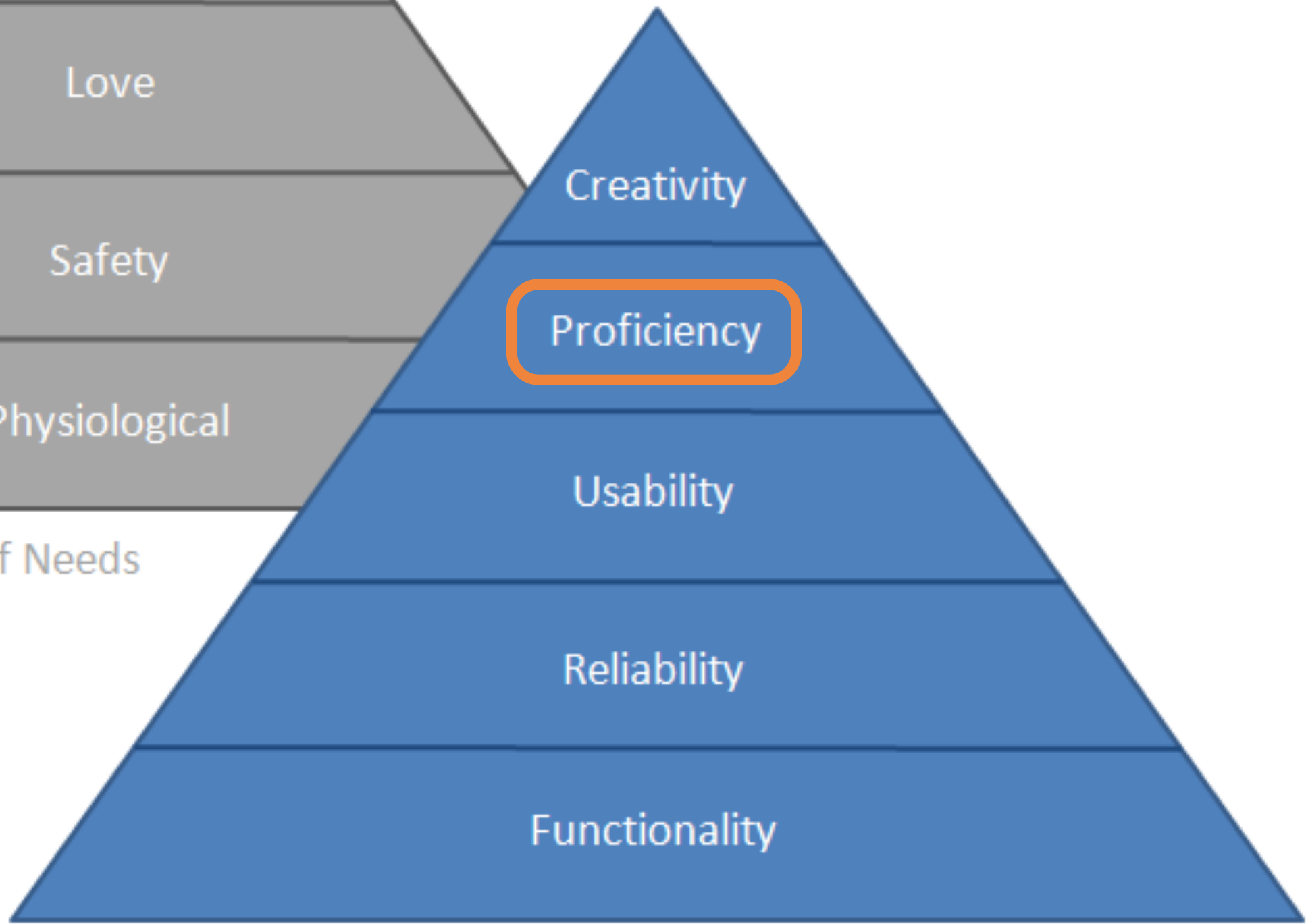
Design Hierarchy of Needs

source: [7]

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

For example, a HDD 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.

source: [7]

Maslow's Hierarchy of Needs

- Self-Actualization
- Self-Esteem
- Love
- Safety
- Physiological

Design Hierarchy of Needs

- Creativity
- Proficiency
- Usability
- Reliability
- Functionality

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

source: [7]

Aesthetic–Usability Effect

Aesthetic designs are perceived as easier to use than less-aesthetic designs.
Aesthetic designs look easier to use and have a higher probability of being used, whether or not they actually are easier to use.

source: [7]

Flexibility-Usability Tradeoff

source: [7]

The flexibility-usability tradeoff is exemplified in the well known maxim "jack of all trades, master of none". Flexible designs can perform more functions than specialised designs, but they perform the functions less efficiently.

source: [7]

Flexibility-Usability Tradeoff

source: [7]

Navigation

Navigation

How did I get here.....?

How did I get here.....?

iPhone

Navigation gives us something "to hold on"

It tells us what we´ll find and establishes a level of trust between the user and the people who build the system

USABILITY IN EVERYDAY LIFE!
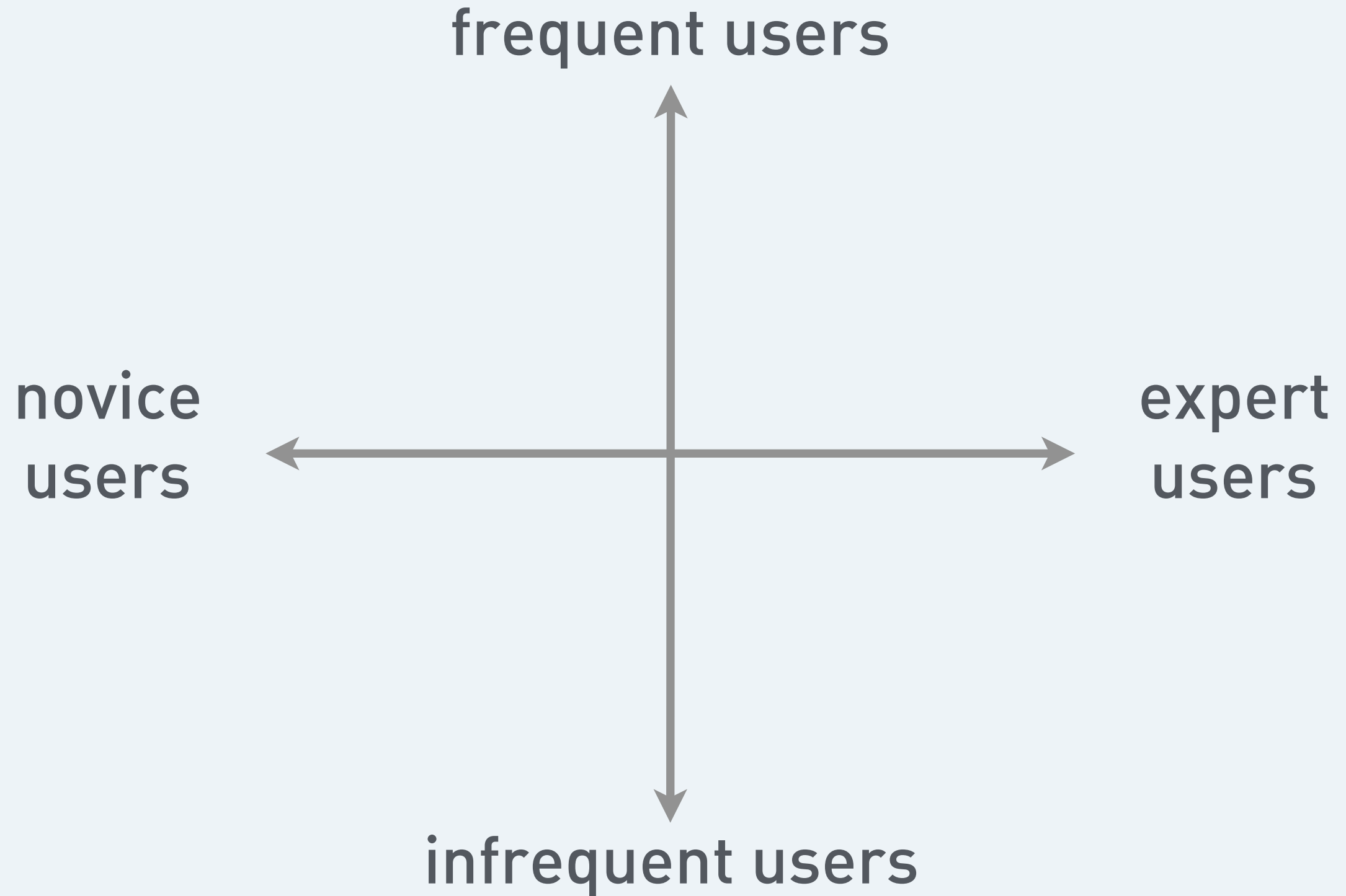
Audi A4 Series Cockpit
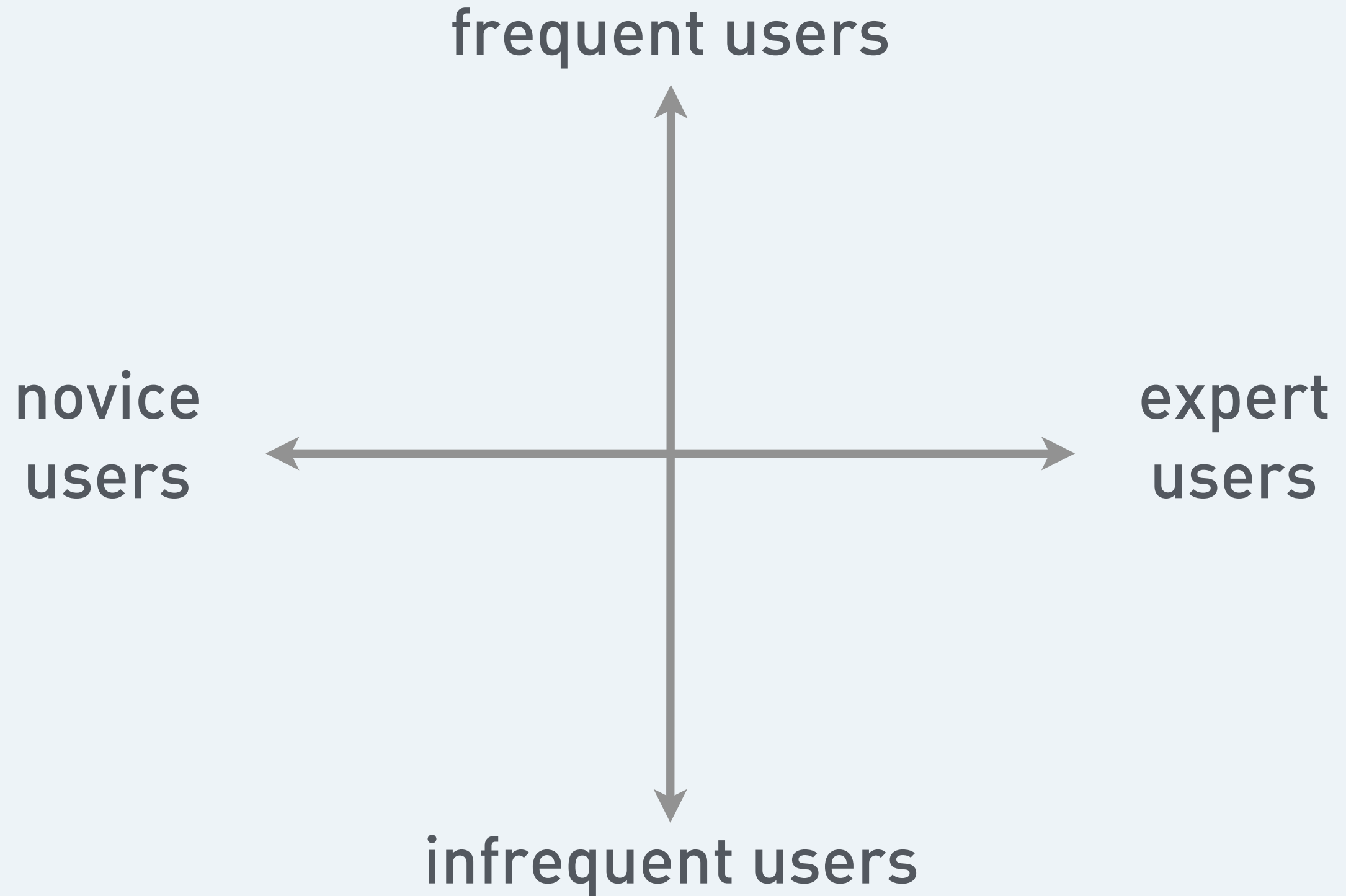
frequent users

novice users

expert users

infrequent users

Audi R15 Racing Cockpit

It is relatively easy to design for the perfect cases, when everything goes right, or when all the information required is available in proper format.

Don Norman

- Heuristic evaluation
- Heuristic estimation
- Cognitive walkthrough
- Pluralistic walkthrough
- Feature inspection
- Consistency inspection
- Standards inspection
- Formal usability

- Heuristic evaluation
- Heuristic estimation
- Cognitive walkthrough
- Pluralistic walkthrough
- Feature inspection
- Consistency inspection
- Standards inspection
- Formal usability

Jakob Nielsen (NN Group)

Usability Lab @ Sun Microsystems

Heuristic (hyủ-ˈris-tik) is a method to help solve a problem, commonly an informal method. It is particularly used to rapidly come to a solution that is reasonably close to the best possible answer, or 'optimal solution'.

Visibility of system status

Match between system and the real world

User control and freedom

Consistency and standards

Error prevention

Recognition rather than recall

Flexibility and efficiency of use

Aesthetic and minimalist design

Help users recognize, diagnose,
and recover from errors

Help and documentation

Upload the file or Cancel

Basecamp

picnik Fluffing clouds....

Picnik

Your password has been emailed.

Theresa Neil sign in

Tick

Visibility of system status

Match between system and the real world

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Help users recognize, diagnose,
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Help and documentation

PRIMARY ACTION   SECONDARY ACTION

Example: "Web Design, Filling the Blanks"

Yammer

Quelle: [3,7]

Visibility of system status

Match between system and the real world

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Help users recognize, diagnose,
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Help and documentation

Common Shortcuts

Add Action	Return
New Window	⌘N
Synchronize with Server	^⌘S
Clean Up	⌘K
Planning Mode	⌘1
Context Mode	⌘2
Inbox	⌥⌘1
Quick Entry	^⌥Space

Quick Entry's shortcut can be customized in Preferences

Omnifocus

Show All Bookmarks	⌥⌘B
Add Bookmark to Menu	⇧⌘D
Add Bookmark For These Tabs...	
Add Bookmark Folder	⇧⌘N
Bookmarks Bar	▶

Mac OSX 10.5

(Accelerators)

Visibility of system status

Match between system and the real world

User control and freedom

Consistency and standards

Error prevention

Recognition rather than recall

Flexibility and efficiency of use

Aesthetic and minimalist design

Help users recognize, diagnose,
and recover from errors
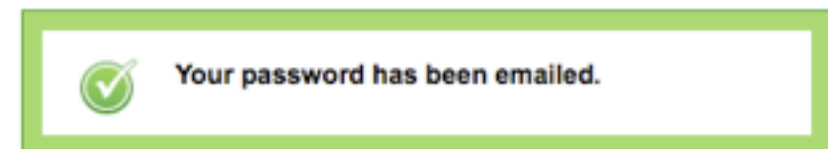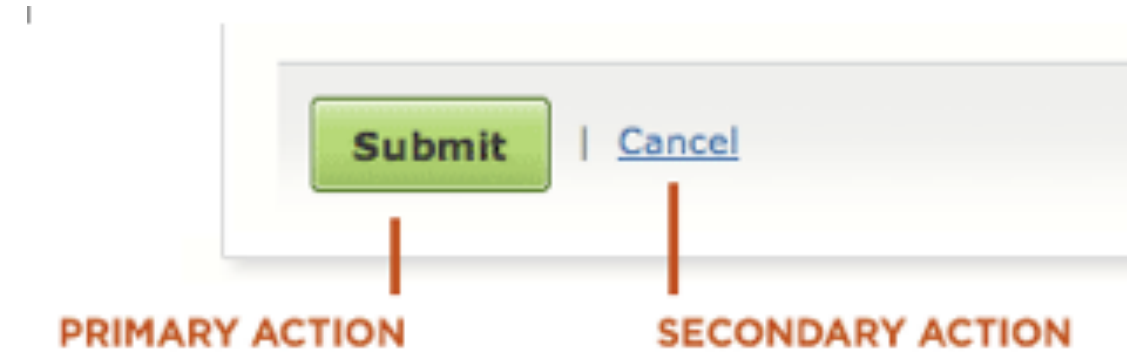
Help and documentation

Kontain

Visibility of system status

Match between system and the real world

User control and freedom

Consistency and standards
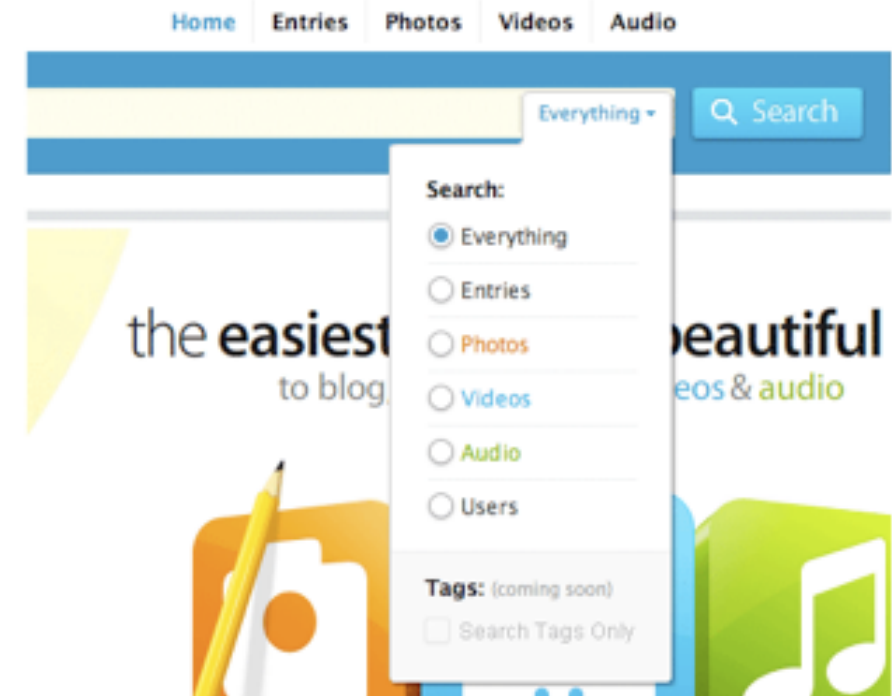
Error prevention

Recognition rather than recall

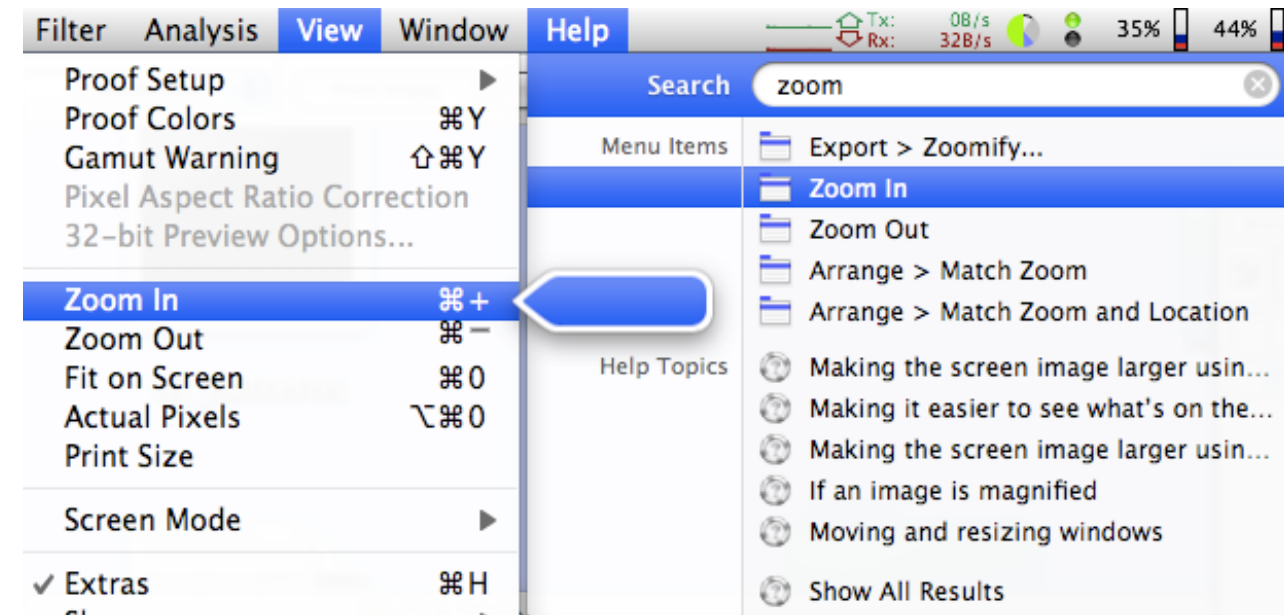Flexibility and efficiency of use

Aesthetic and minimalist design

Help users recognize, diagnose,
and recover from errors

Help and documentation

Mac OSX 10.5 (Screenshot)
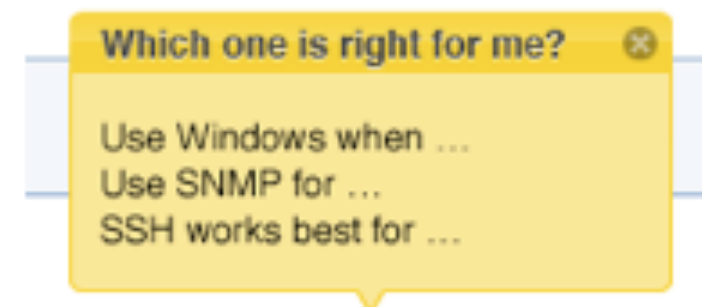
Zenoss

USABILITY Testing Applied

Mobile Usability Lab

Eye-Tracking Glasses
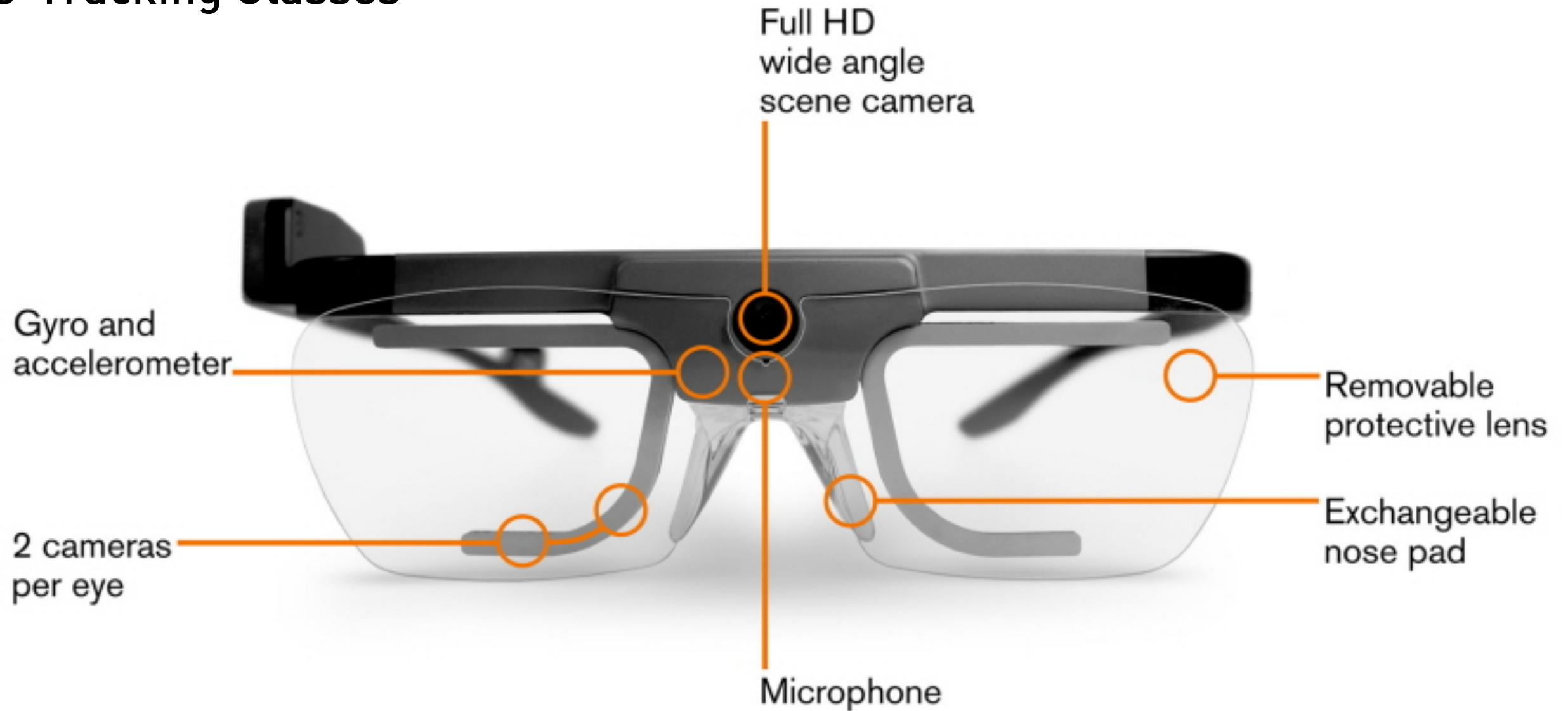
Full HD wide angle scene camera

Gyro and accelerometer

2 cameras per eye

Removable protective lens

Exchangeable nose pad

Microphone

Usability Testing in the Field

Usability Testing in the Field

Usability Testing

Report contains:

- Study Design
- User Profiles
- Questionnaire Results
- Interview Quotes
- Summarised Findings
- Design Recommendations

User Experience Design

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http://semanticstudios.com

source: [3]

Eric Schaffer

-CEO of Human Factors International, Inc. (HFI)
-In the UX field since 1977
-global evangelist for UX and has been the core driver for work on institutionalisation of UX

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