

User Experience Design I (Interaction Design)

Day 2 (April 19th, 2018, 9am-12pm):
Process Models, Elements and Usability

Recap Session Day 1:

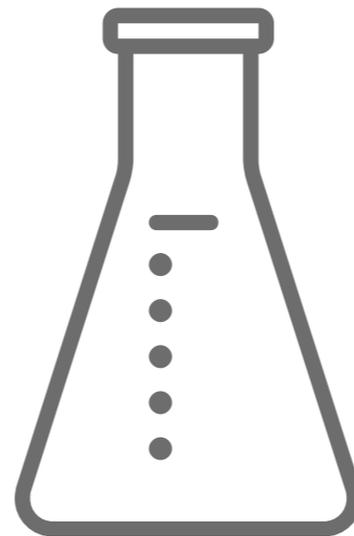
Stu Card

- joined Xerox Palo Alto Research Center (PARC) in 1974
- aimed at perfecting scientific methods to integrate with creative design
- developed a process to predict the behaviour of a proposed design, using task analysis, approximation, and calculation
- proposed a partnership between designers and scientists, by providing a science that supports design.

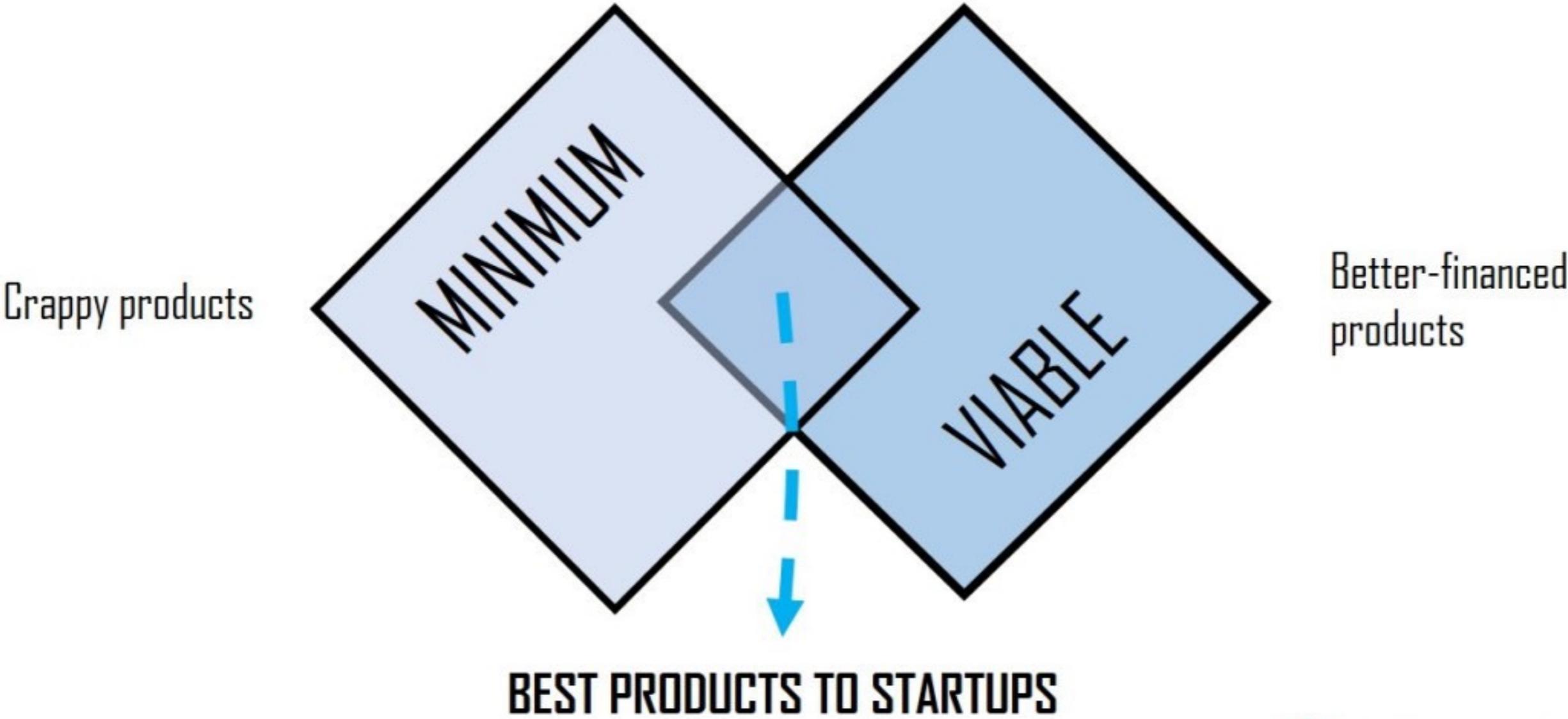


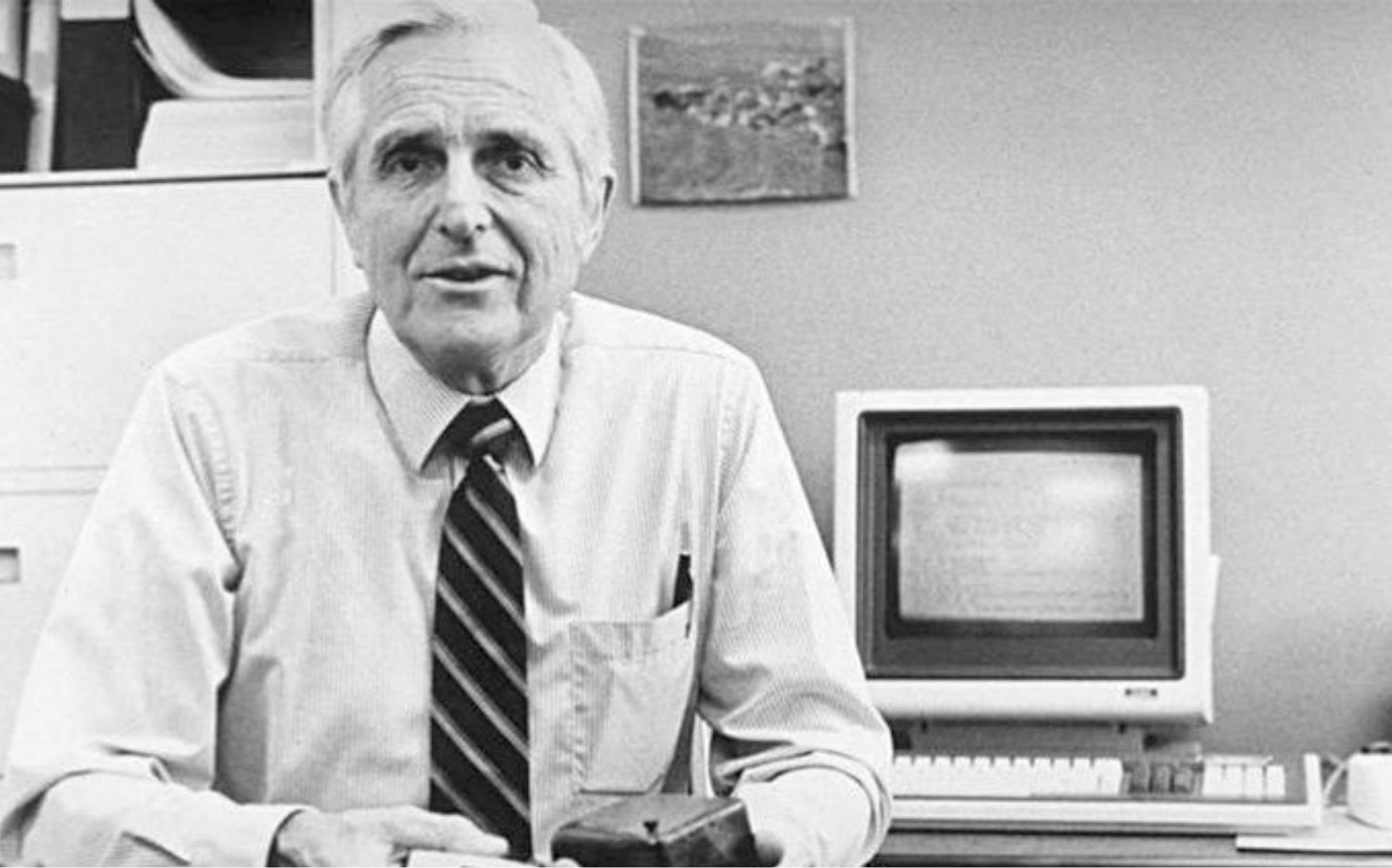
Looking back...

- exploration of the design space through the integration of industrial design
- designers and engineers had to work together (interdisciplinary approach)
- science served to constrain the design space



MINIMUM VIABLE PRODUCT





Douglas Engelbart

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

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”).

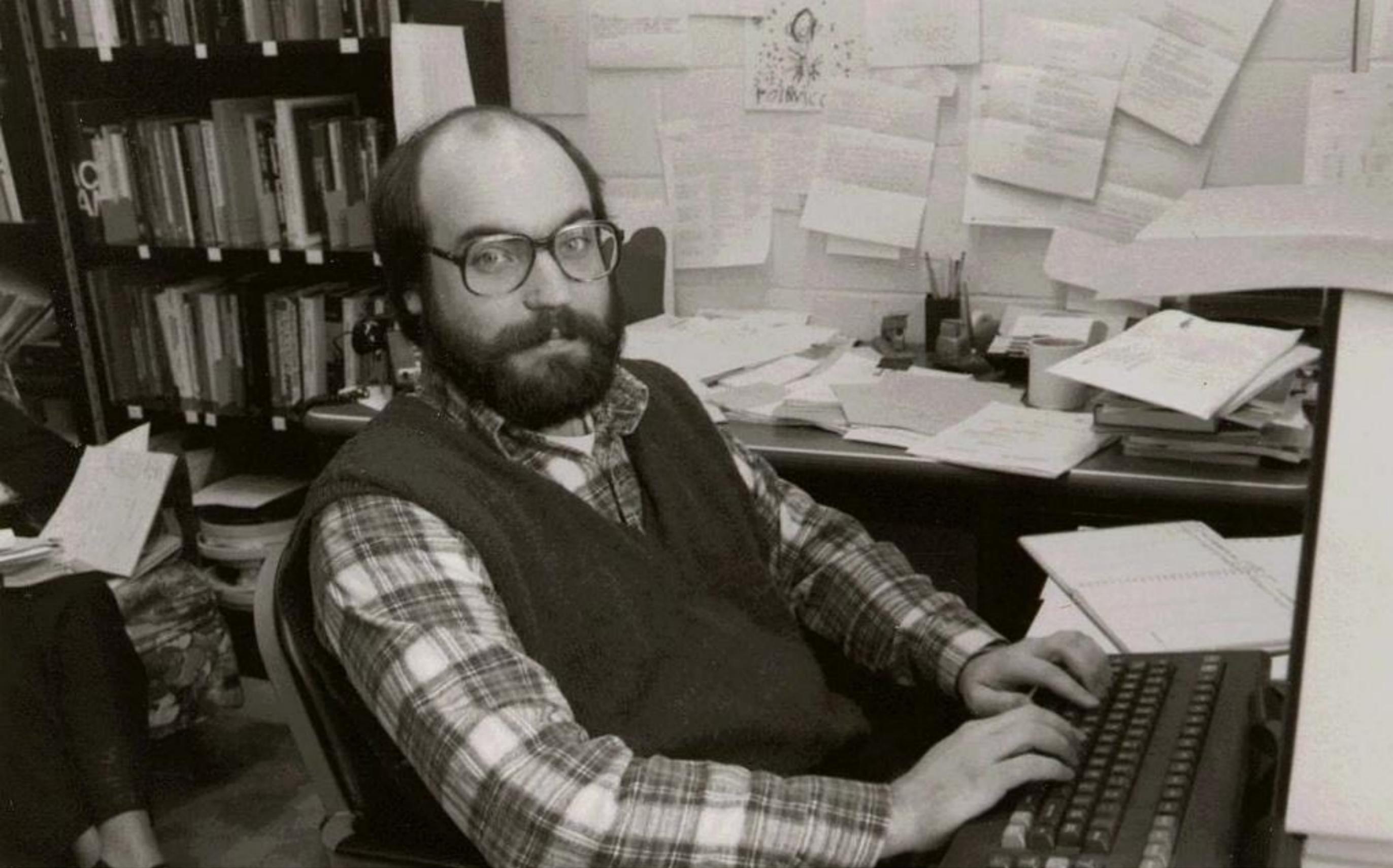
3. Methodology—the methods, procedures, and strategies with which an individual organises his goal-centred (problem-solving) activity.

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

http://www.cs.umd.edu/projects/photohistory/facultypictures_full/weiser.jpg

The Computer for the 21st Century

Specialized elements of hardware and software, connected by wires, radio waves and infrared, will be so ubiquitous that no one will notice their presence

by Mark Weiser

The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.

Consider writing, perhaps the first information technology. The ability to represent spoken language symbolically for long-term storage freed information from the limits of individual memory. Today this technology is ubiquitous in industrialized countries. Not only do books, magazines and newspapers convey written information, but so do street signs, billboards, shop signs and even graffiti. Candy wrappers are covered in writing. The constant background presence of these products of "literacy technology" does not require active attention, but the information to be transmitted is ready for use at a glance. It is difficult to imagine modern life otherwise.

Silicon-based information technology, in contrast, is far from having become part of the environment. More than 50 million personal computers have been sold, and the computer nonetheless remains largely in a world of its own. It

is approachable only through complex jargon that has nothing to do with the tasks for which people use computers. The state of the art is perhaps analogous to the period when scribes had to know as much about making ink or baking clay as they did about writing.

The arcane aura that surrounds personal computers is not just a "user interface" problem. My colleagues and I at the Xerox Palo Alto Research Center think that the idea of a "personal" computer itself is misplaced and that the vision of laptop machines, dynabooks and "knowledge navigators" is only a transitional step toward achieving the real potential of information technology. Such machines cannot truly make computing an integral, invisible part of people's lives. We are therefore trying to conceive a new way of thinking about computers, one that takes into account the human world and allows the computers themselves to vanish into the background.

Such a disappearance is a fundamental consequence not of technology but of human psychology. Whenever people learn something sufficiently well, they cease to be aware of it. When you look at a street sign, for example, you absorb its information without consciously performing the act of reading. Computer scientist, economist and Nobelist Herbert A. Simon calls this phenomenon "compiling"; philosopher Michael Polanyi calls it the "tacit dimension"; psychologist J. J. Gibson calls it "visual invariants"; philosophers Hans Georg Gadamer and Martin Heidegger call it the "horizon" and the "ready-to-hand"; John Seely Brown of PARC calls it the "periphery." All say, in essence, that only when things disappear in this way are we freed to use them without thinking and so to focus beyond them on new goals.

The idea of integrating computers seamlessly into the world at large runs counter to a number of present-day trends. "Ubiquitous computing" in this context does not mean just computers that can be carried to the beach, jungle or airport. Even the most powerful notebook computer, with access to a worldwide information network, still focuses attention on a single box. By analogy with writing, carrying a superlaptop is like owning just one very important book. Customizing this book, even writing millions of other books, does not begin to capture the real power of literacy.

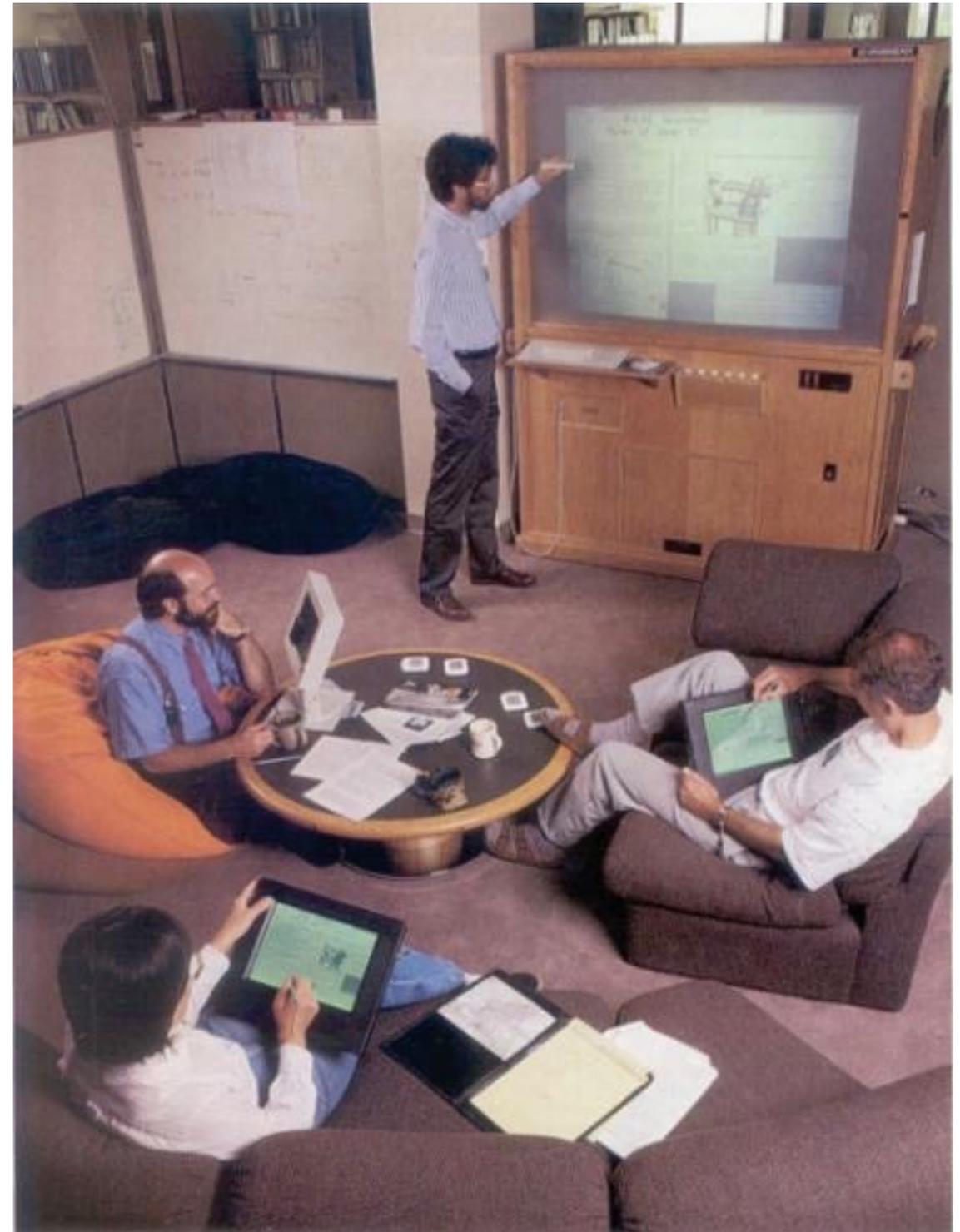
Furthermore, although ubiquitous computers may use sound and video in addition to text and graphics, that does not make them "multimedia computers." Today's multimedia machine makes the computer screen into a demanding focus of attention rather than allowing it to fade into the background.

Perhaps most diametrically opposed to our vision is the notion of virtual reality, which attempts to make a world inside the computer. Users don special goggles that project an artificial scene onto their eyes; they wear gloves or even bodysuits that sense their motions and gestures so that they can move about and manipulate virtual objects. Although it may have its purpose in allowing people to explore realms otherwise inaccessible—the insides of cells, the surfaces of distant planets, the information web of data bases—virtual reality is only a map, not a territory. It excludes desks, offices, other people not wearing goggles and bodysuits, weather, trees, walks, chance encounters and, in general, the infinite richness of the universe. Virtual reality focuses an enormous apparatus on simulating the world rather than on invisibly enhancing the world that already exists.

Indeed, the opposition between the

MARK WEISER is head of the Computer Science Laboratory at the Xerox Palo Alto Research Center. He is working on the next revolution of computing after workstations, variously known as ubiquitous computing or embodied virtuality. Before working at PARC, he was a professor of computer science at the University of Maryland; he received his Ph.D. from the University of Michigan in 1979. Weiser also helped found an electronic publishing company and a video arts company and claims to enjoy computer programming "for the fun of it." His most recent technical work involved the implementation of new theories of automatic computer memory reclamation, known in the field as garbage collection.

94 SCIENTIFIC AMERICAN September 1991

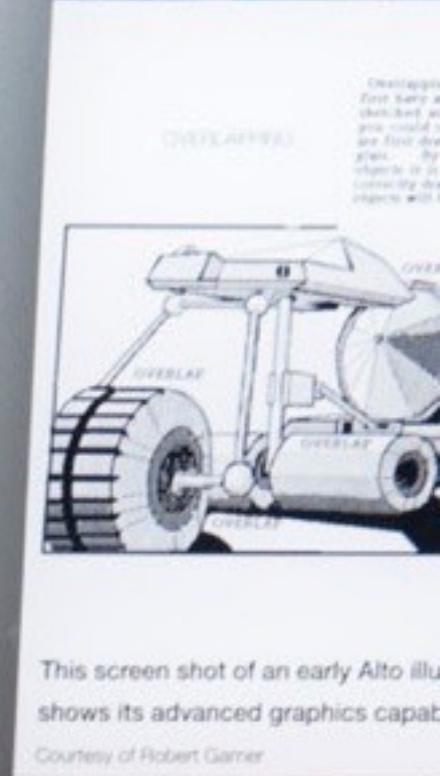


<https://www.ics.uci.edu/~corps/phaseii/Weiser-Computer21stCentury-SciAm.pdf>

The Computer for the 21st Century, 1991

<http://www.pmstudio.co.uk/pmstudio/sites/default/files/images/ubicomp1991.jpg>

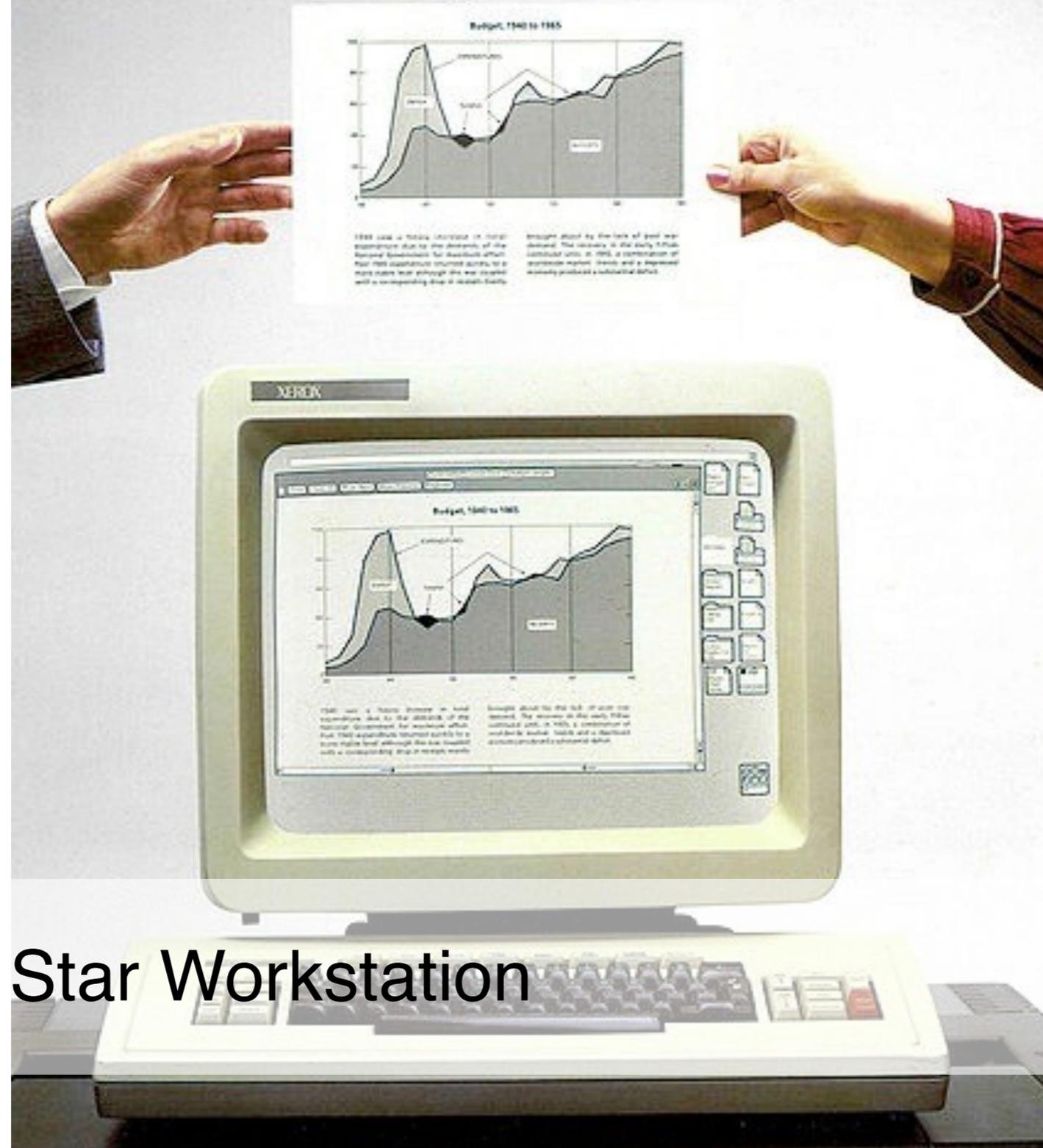
Xerox Alto 1973



This screen shot of an early Alto illustrates its advanced graphics capabilities. Courtesy of Robert Garner

The Xerox Alto boasted the world's first "what you get" (WYSIWYG) editor, mouse, graphical user interface (GUI) and bit-mapped display. Its pop-up menu became the model for the Microsoft® Windows and Apple® Macintosh® interfaces of today. From the collection of The Computer Museum History Center

Now you can create
documents with words
and pictures



1981 Xerox Star Workstation

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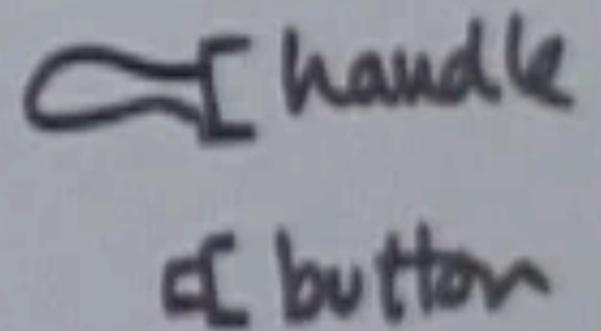
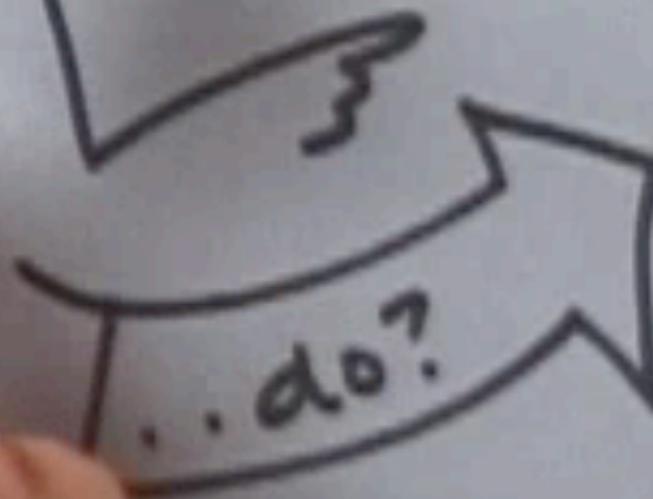
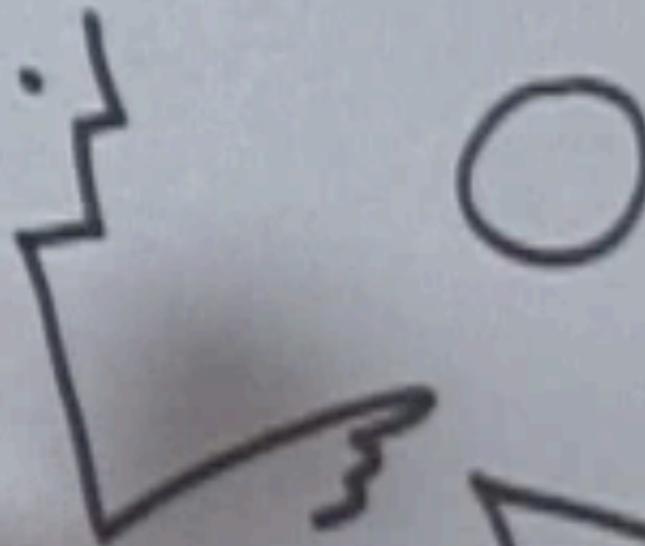
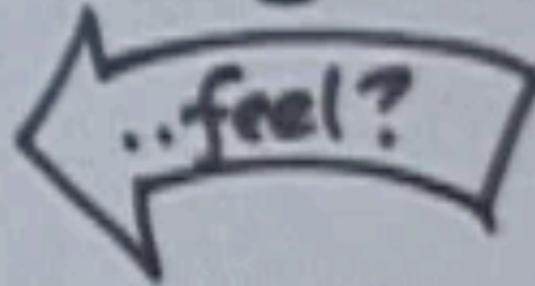
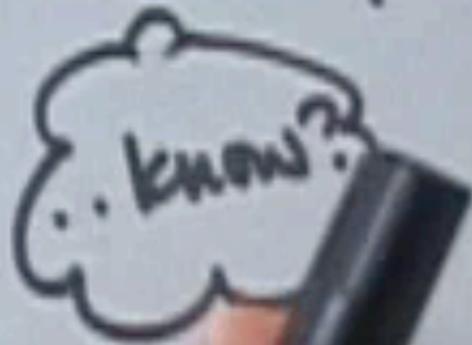
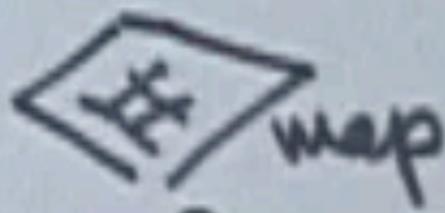
- Definition and Paradigms of Interaction Design
- Process Models
- Elements of UX/Interaction Design
- Usability Basics



Bill Verplank

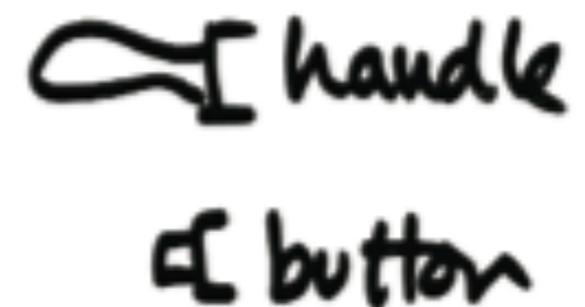
INTERACTION

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.

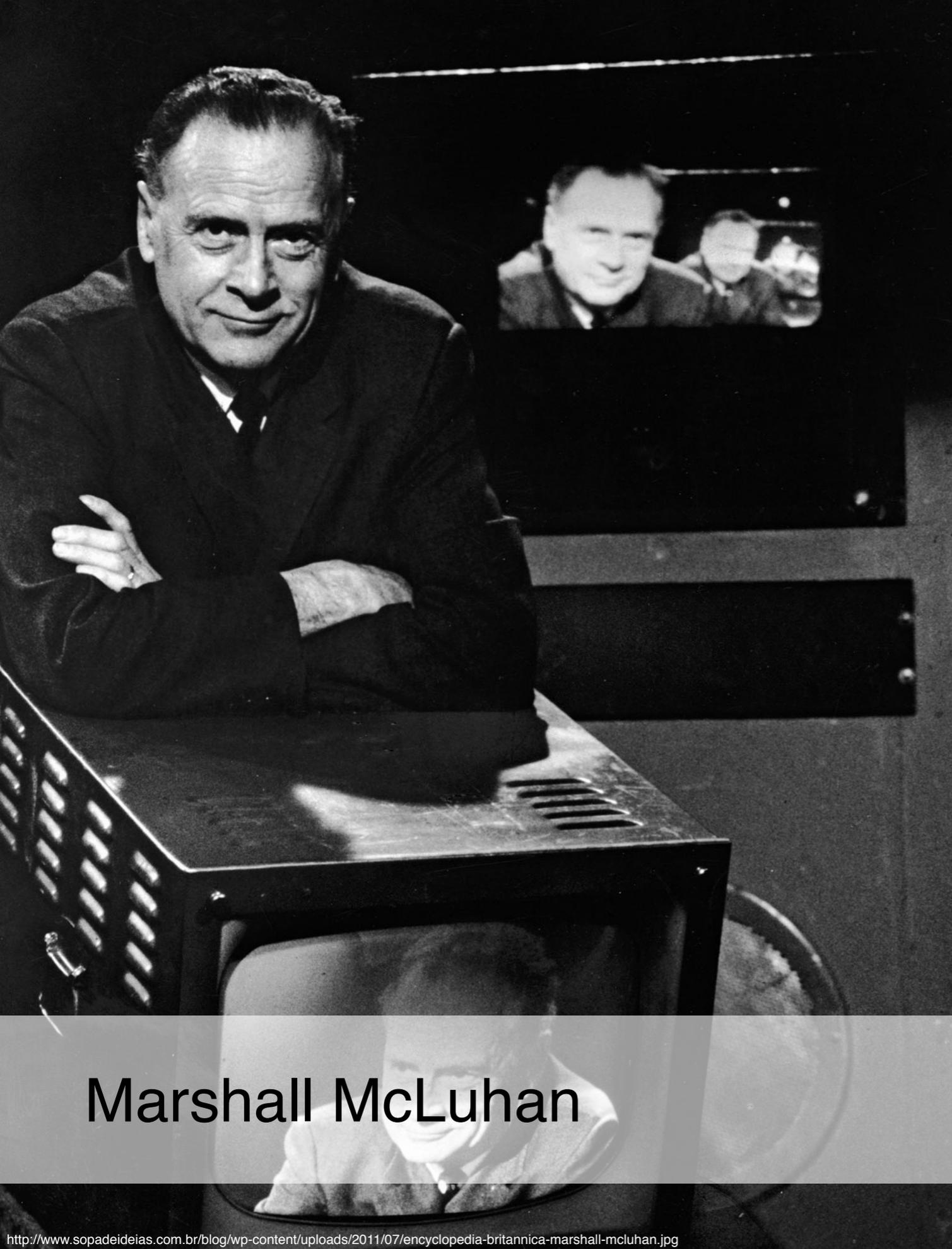
2. “How do you feel?”

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?”

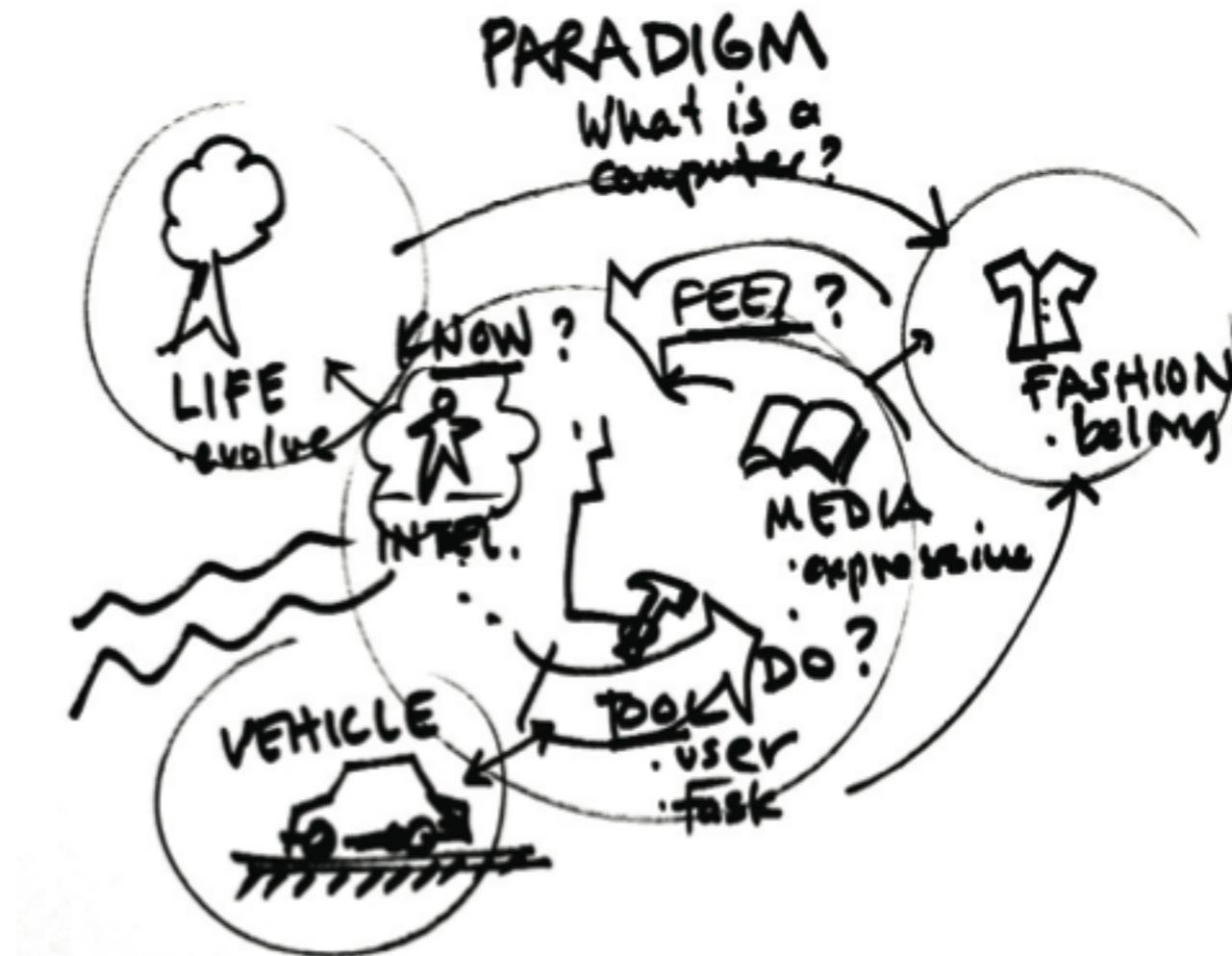
The map shows the user an overview of how everything works, and the path shows them what to do, what they need to know moment by moment



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]

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.

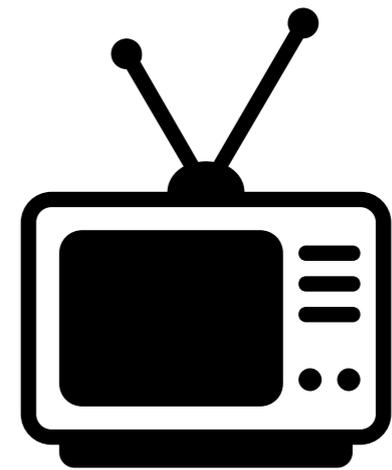


source: [3]

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.

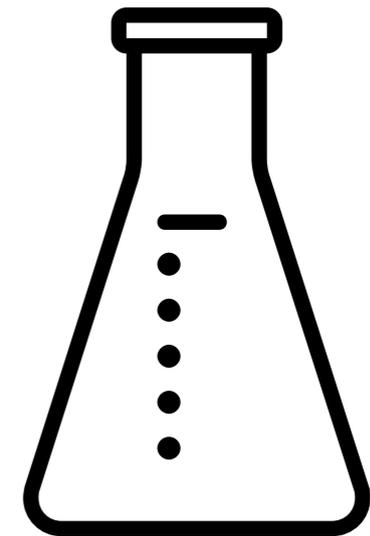


source: [3]

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.

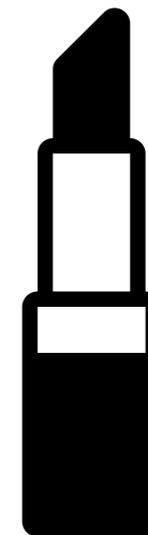


source: [3]

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.



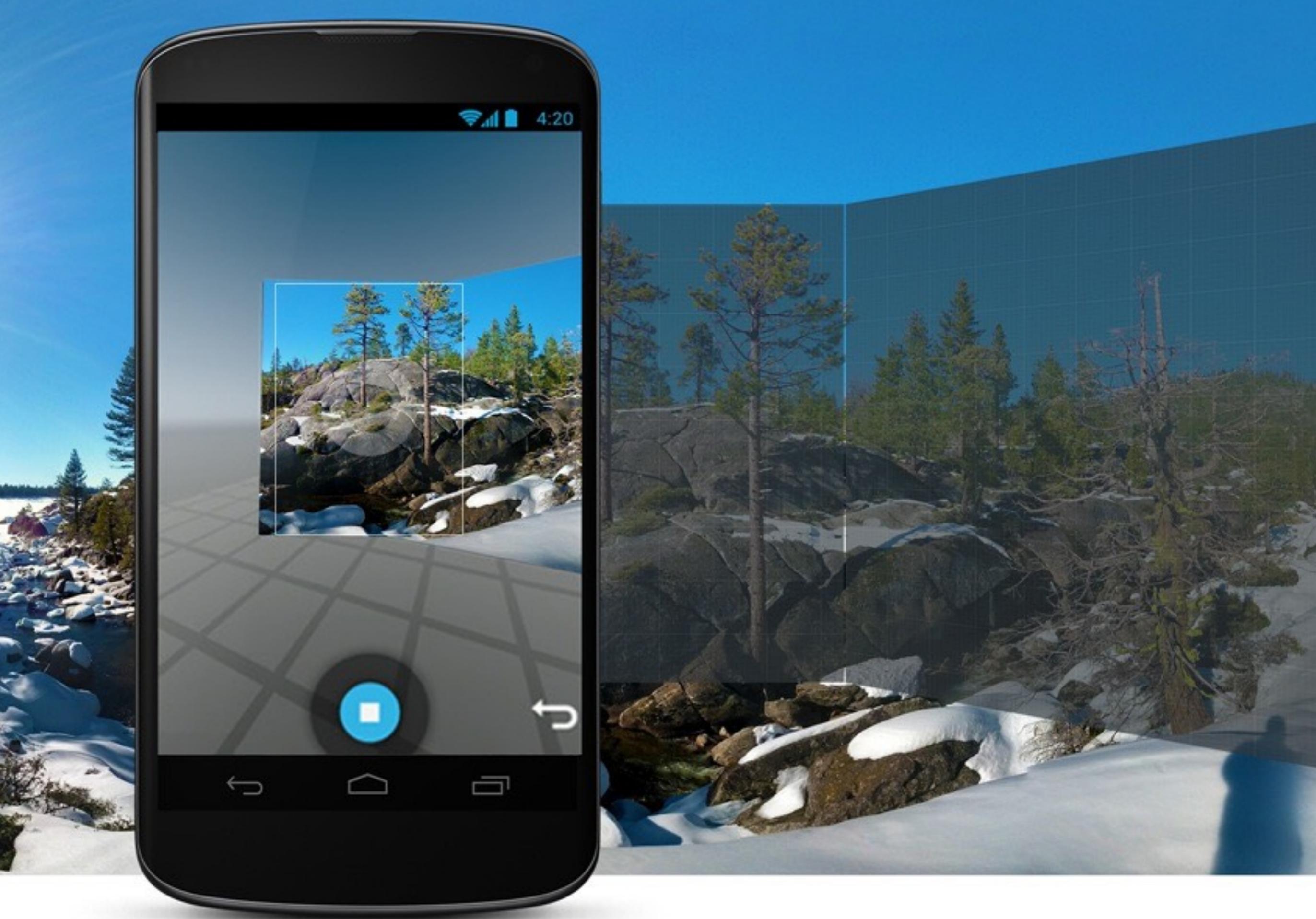
source: [3]

Process Models, Elements and Usability

- Definition and Paradigms of UX/Interaction Design
- Process Models
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User Experience Design





<https://dotmobility.files.wordpress.com/2013/12/photosphere-create.jpg>



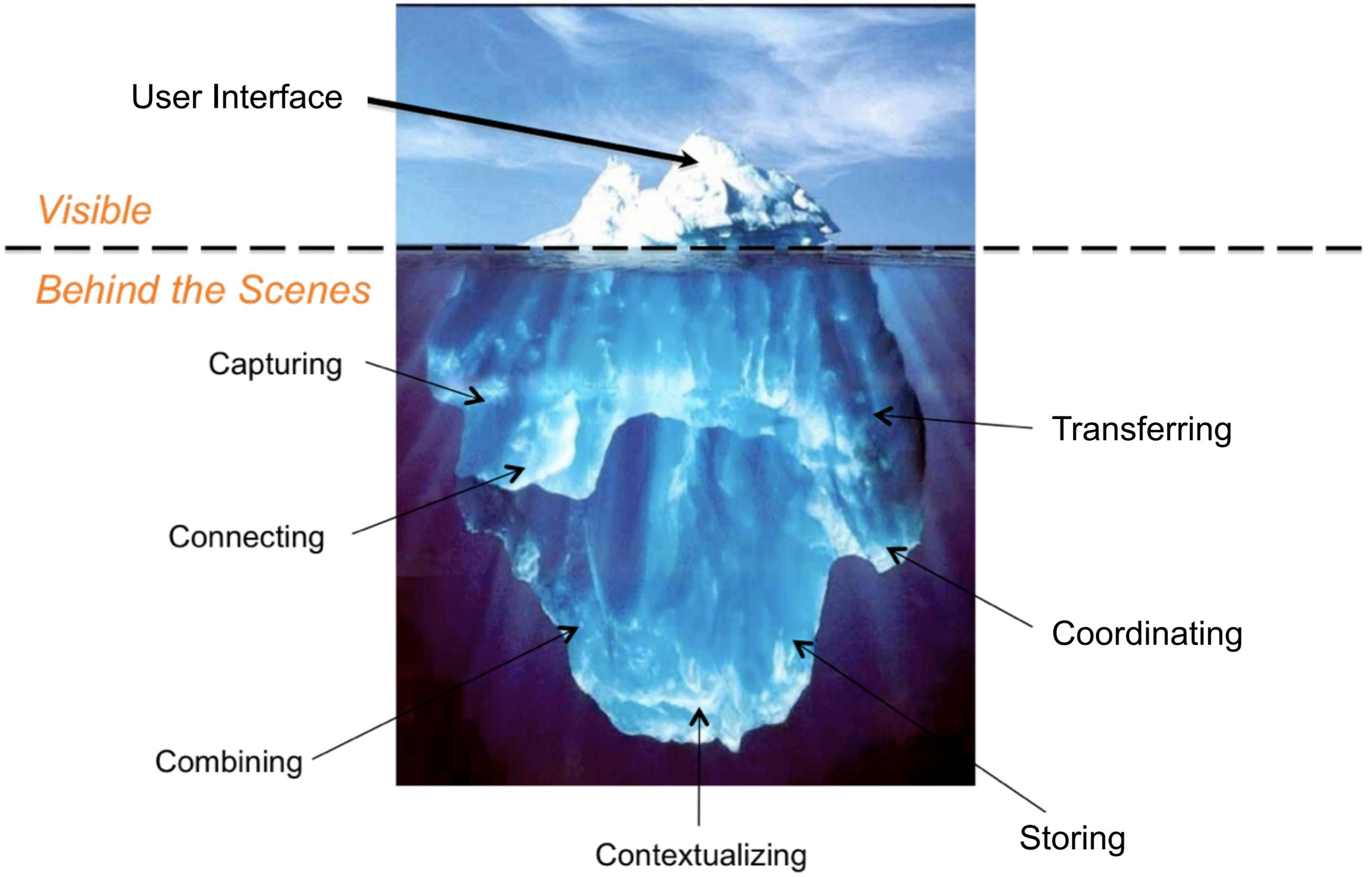
Front Stage

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

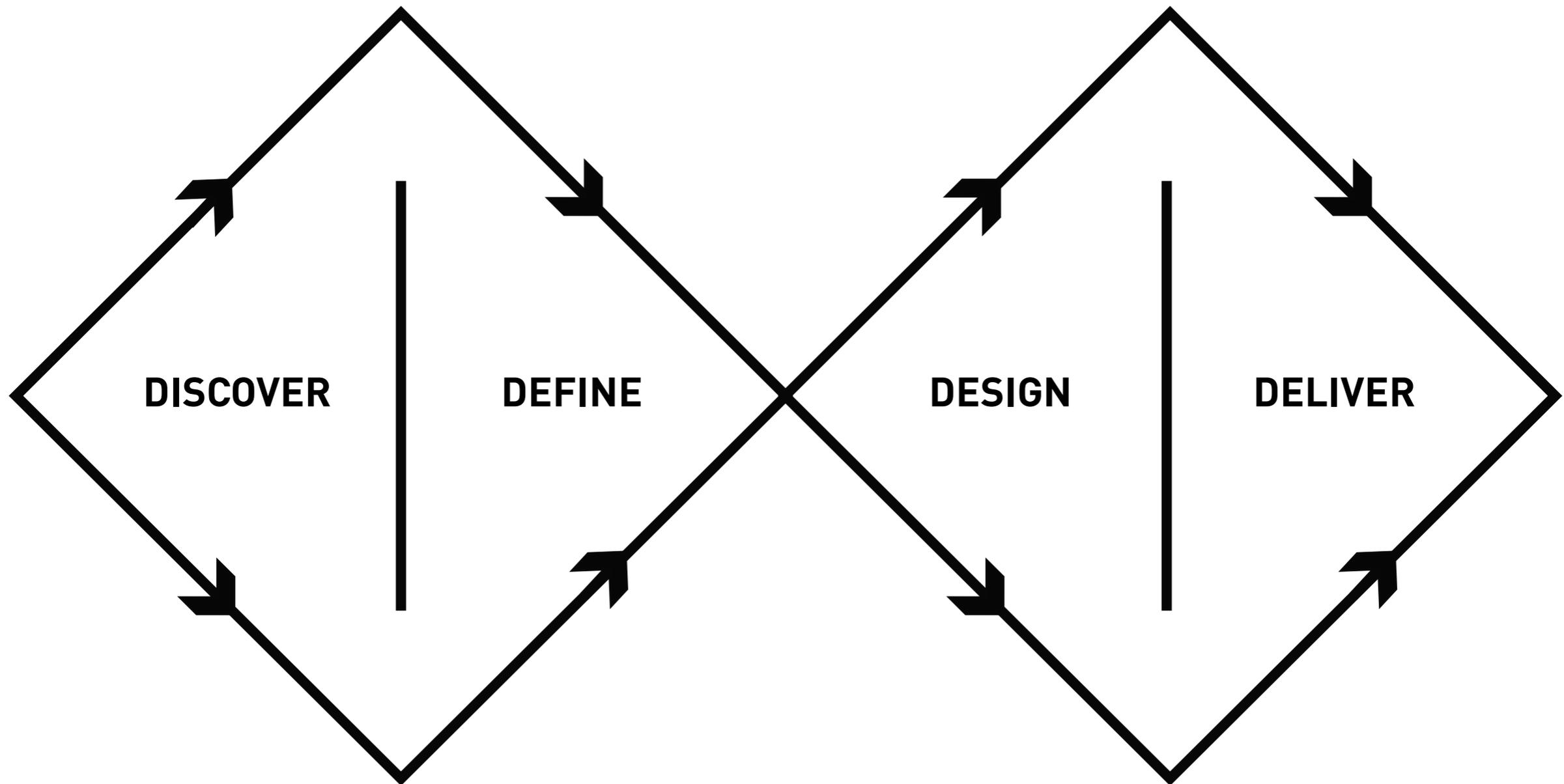


Back Stage

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

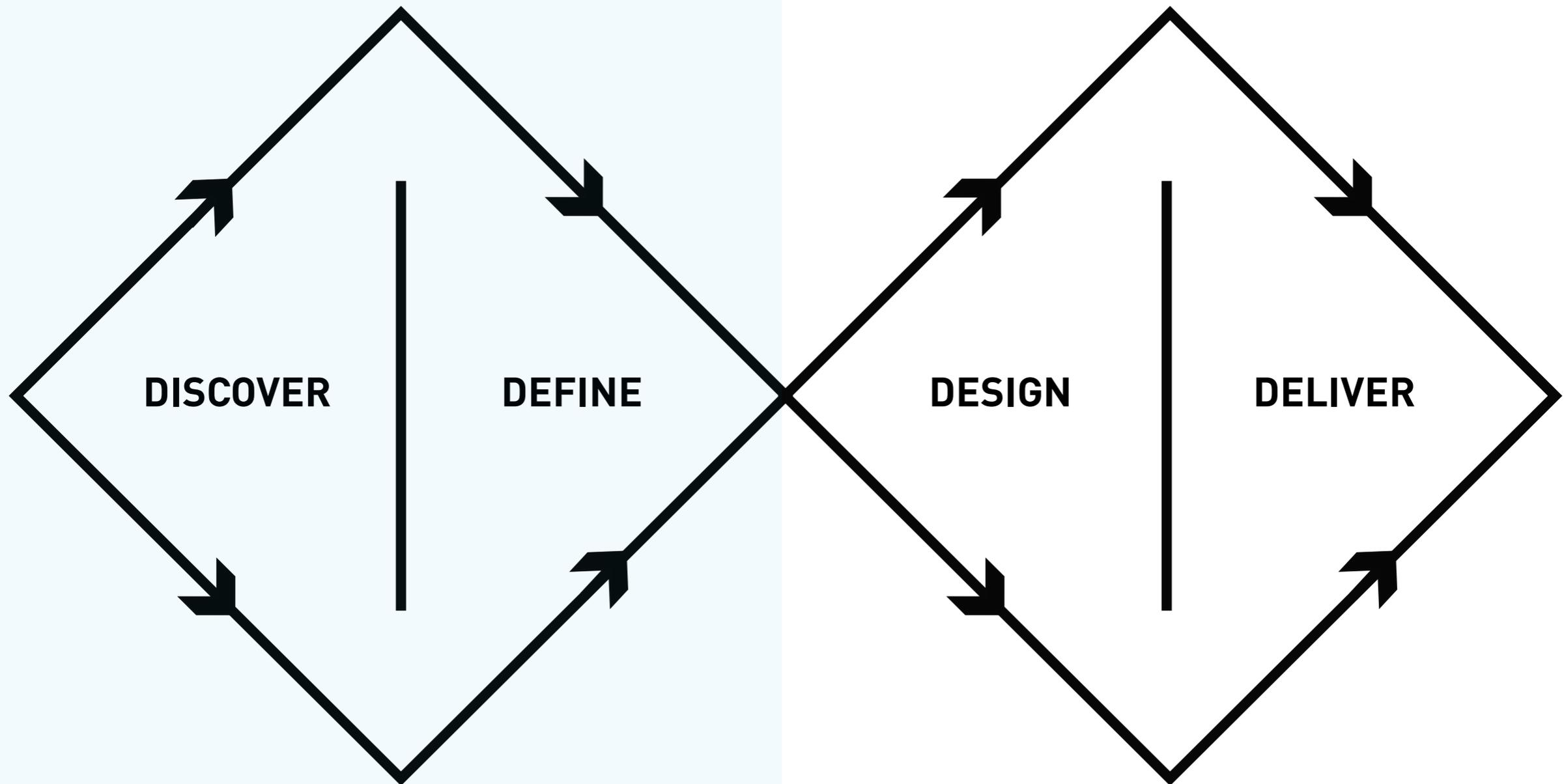


Double Diamond



source: [8]

Double Diamond



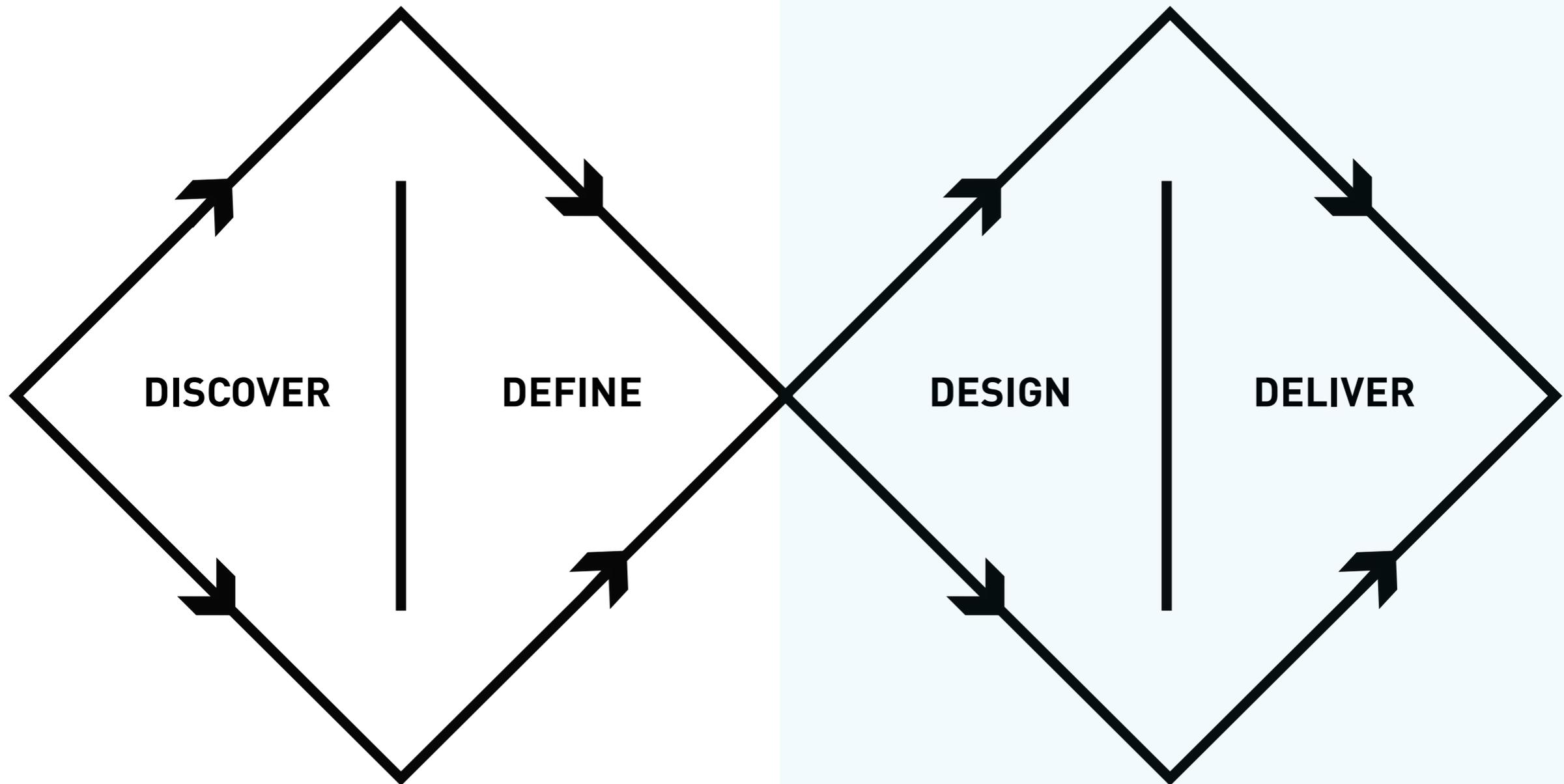
Why? and How?

source: [8]

Getting the right Design and the Design right...

Bill Buxton - Sketching User Experiences

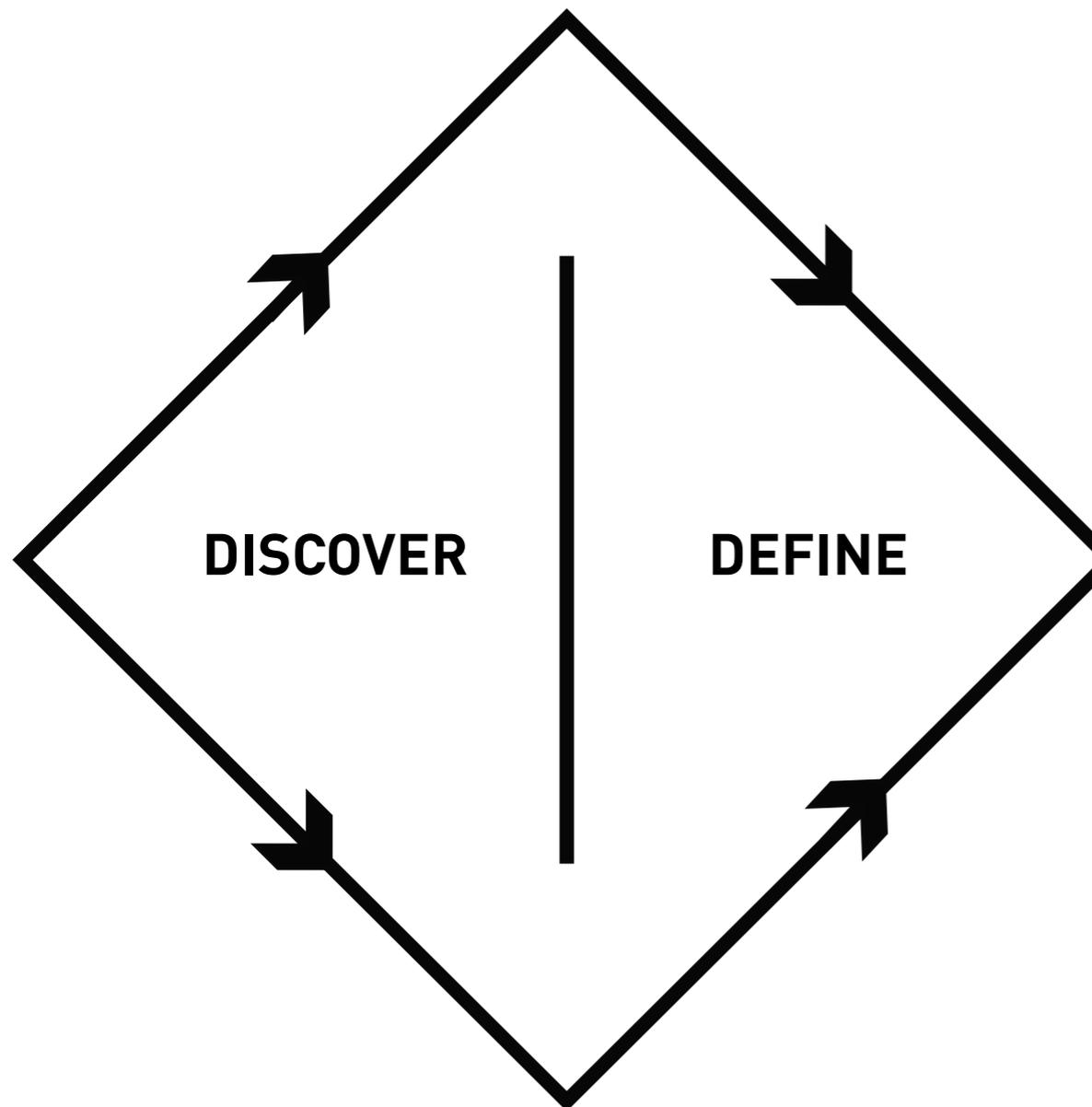
Double Diamond



What?

source: [8]

Double Diamond

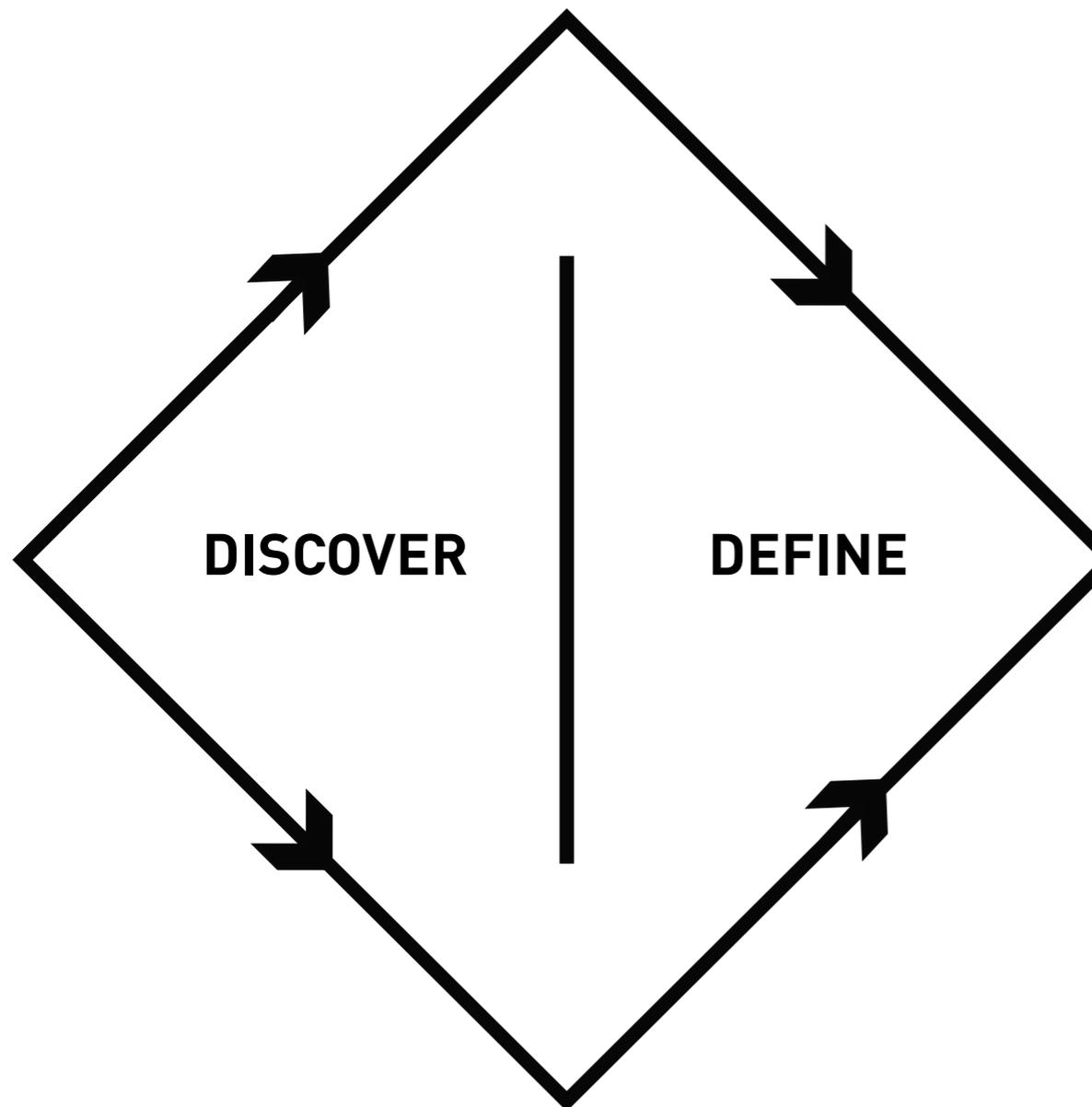


DISCOVER STAGE

- 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

source: [8]

Double Diamond



DEFINE STAGE

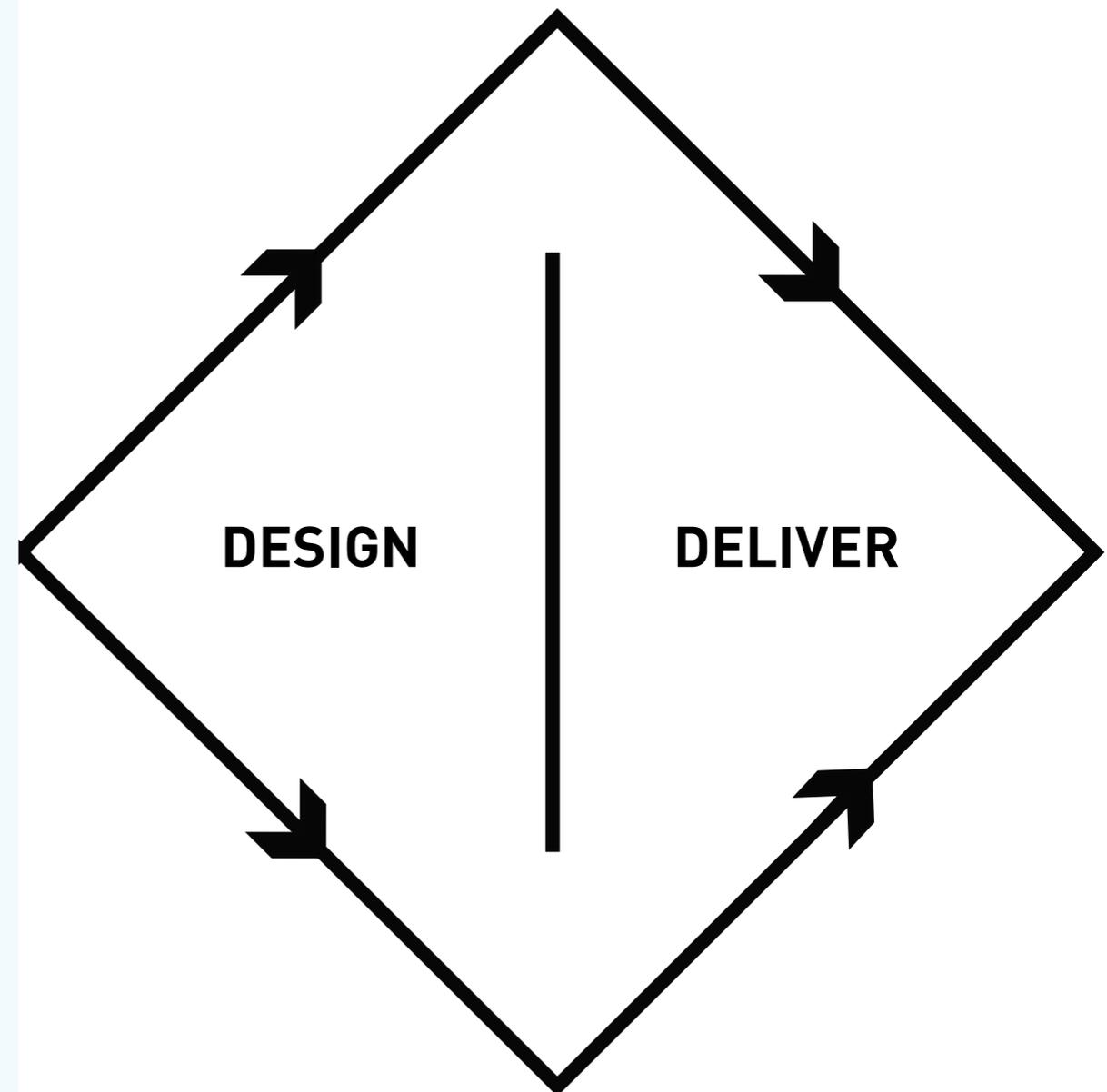
- The generation of initial ideas and project development
- Ongoing project management
- Corporate objectives agreed and project sign-off

source: [8]

Double Diamond

DESIGN STAGE

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



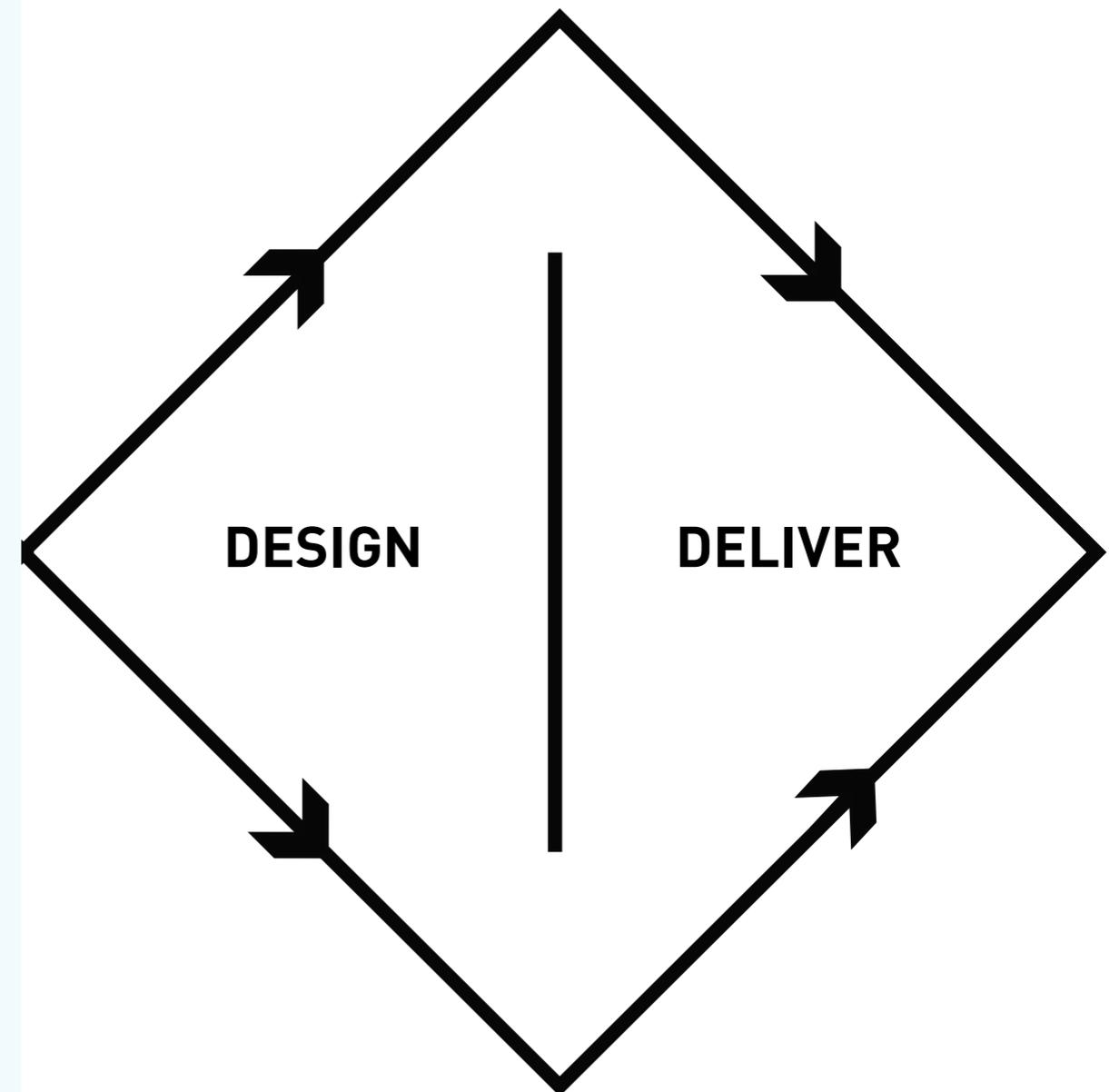
What?

source: [8]

Double Diamond

DELIVER STAGE

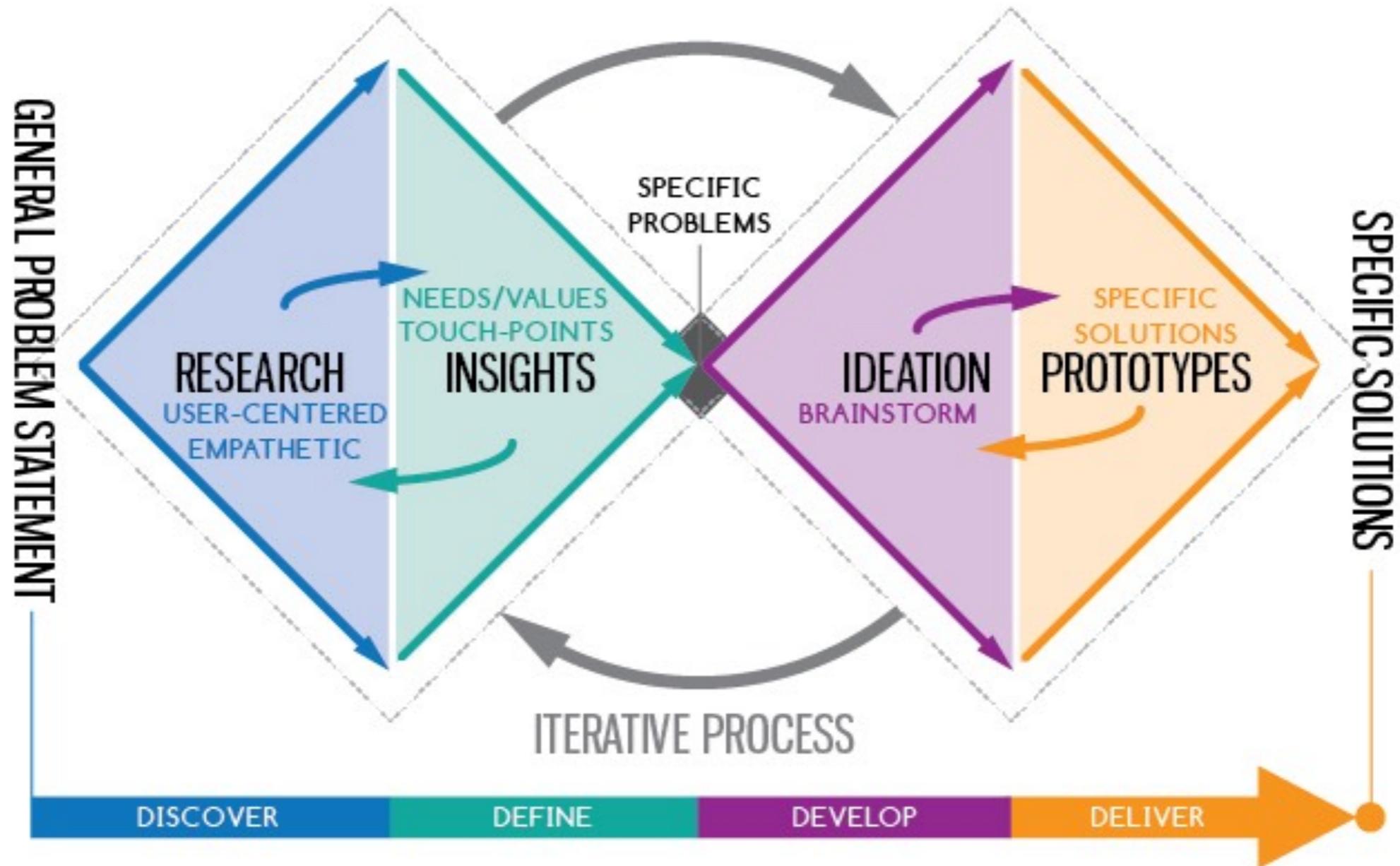
- Final testing, approval and launch
- Targets, evaluation and feedback loops.



What?

source: [8]

Double Diamond DESIGN PROCESS

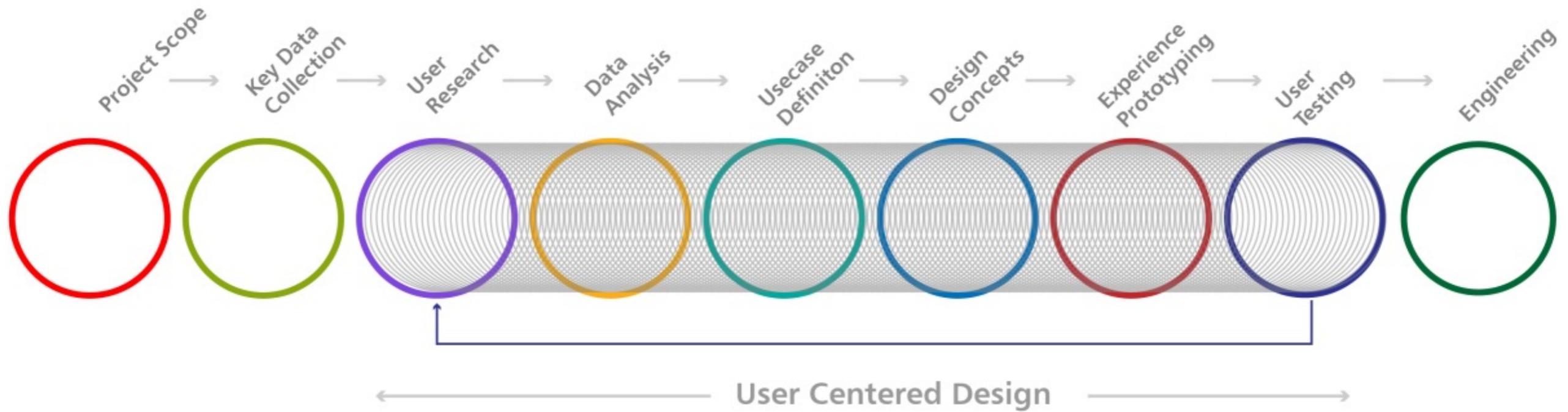


Service Design Double Diamond Process by Kaishin Chu is licensed under a Creative Commons Attribution-Non Commercial-No Derivatives 4.0 International License. Based on a work at <http://kaishinchu.com>. Permissions beyond the scope of this license may be available at <http://creativecommons.org>

Service Design Vancouver
building innovation + value for businesses and people

source: [8]

UCD Design Process Model



source: [4]

Process Models, Elements and Usability

- Definition and Paradigms of UX/Interaction Design
- Process Models
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- Usability Basics

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]

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





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





Space

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

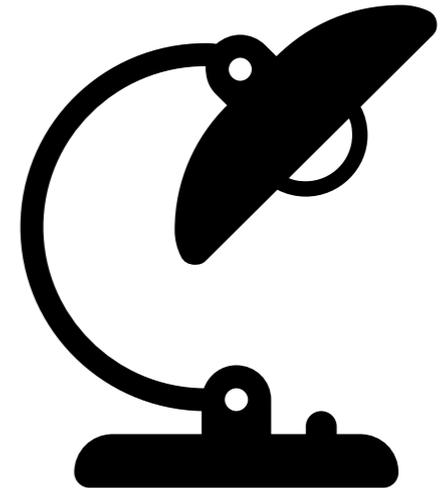
Space

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/>

GRAPHIC
DESIGN



2D

PRODUCT
DESIGN



3D

+Z-axis
(spatial depth)

INTERACTION
DESIGN



4D

+T-axis
(temporal dimension)

SERVICE
DESIGN



5D

+W-axis
(multi-local simultaneity)

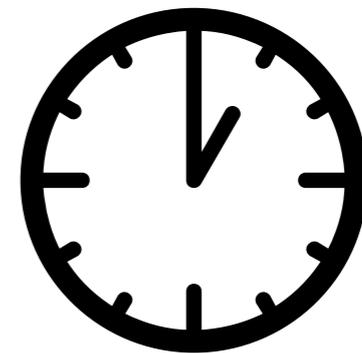
Time

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]



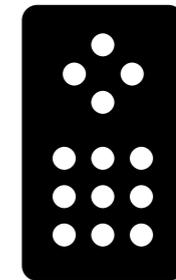
Appearance/Affordances

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]

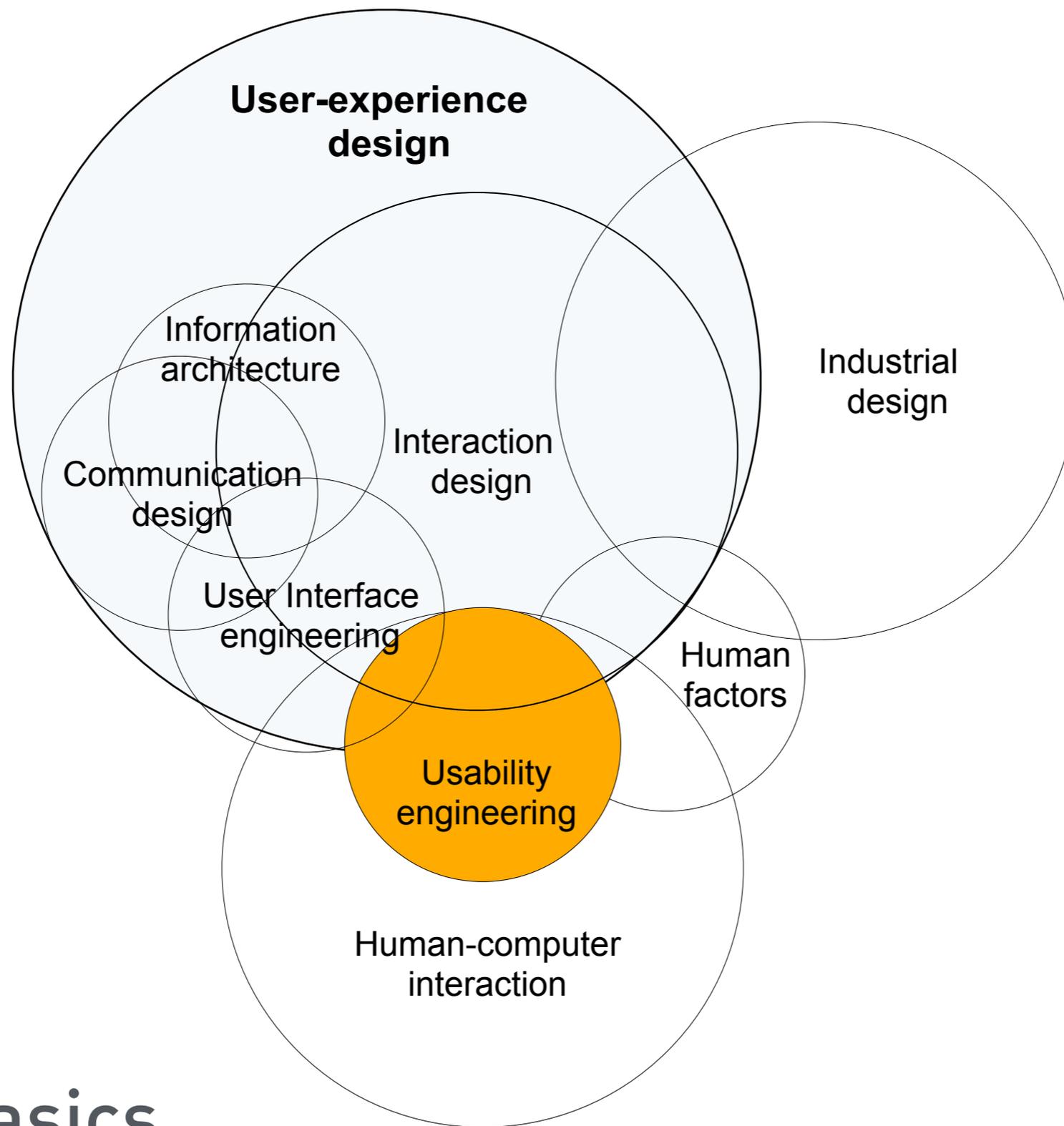
Appearance/Affordance has many variables for interaction designers to alter:

- 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.

Process Models, Elements and Usability

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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

EXIT TICKET WITH YOU

Thank You!

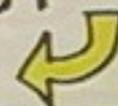


PRESS HERE TO
START

COINS



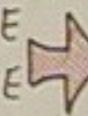
PRESS
GREY BOX
FIRST



BILLS



CHANGE
MACHINE



CREDIT
CARDS



NO COINS IN
HERE

2

PAY AMOUNT
ON SCREEN

Parking Machine

Defrost High Med Low

10	1	10	1
Defrost	High	Med	Low
Cancel		Start	

Panasonic

Microwave



Copier



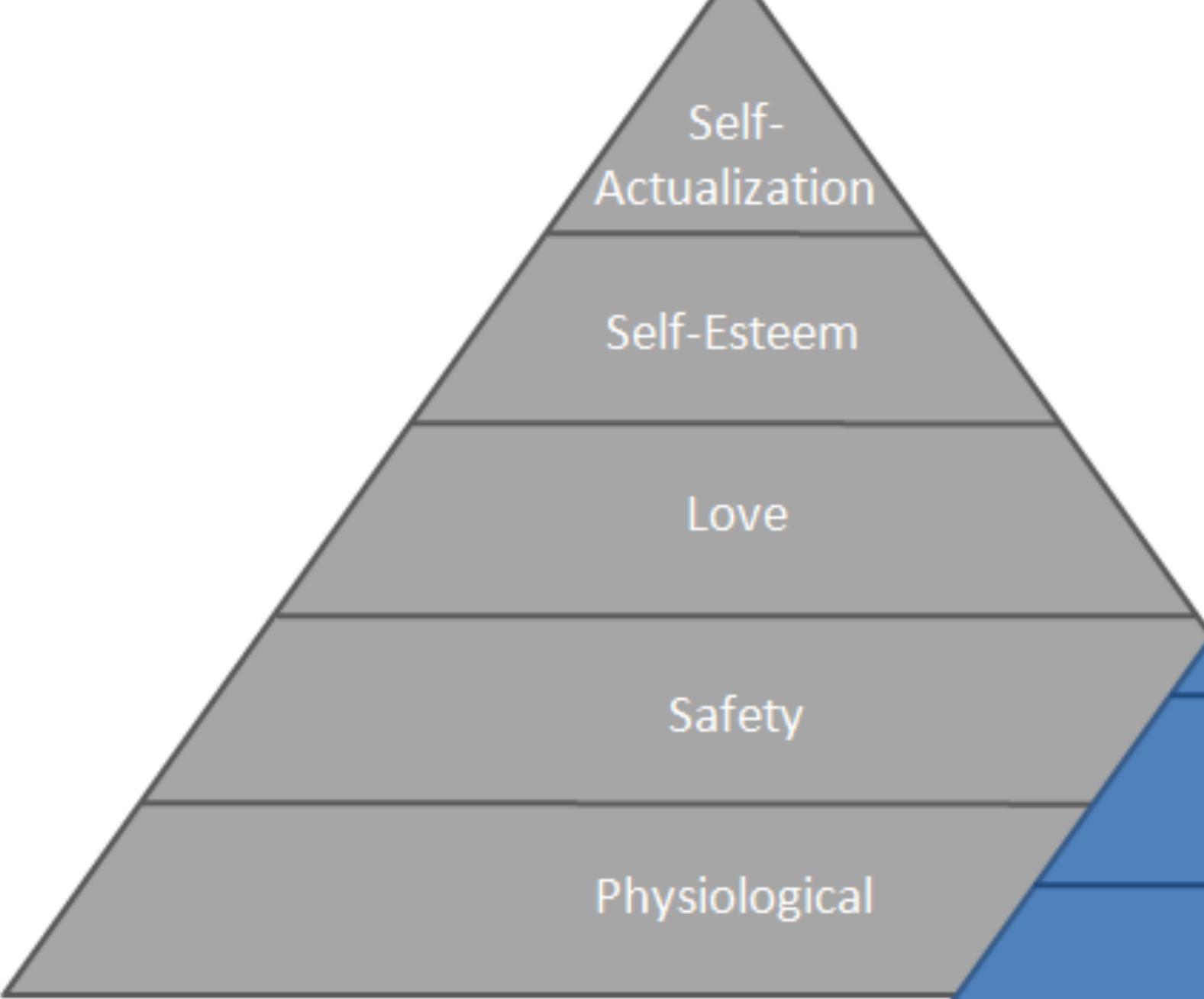
Remote Control



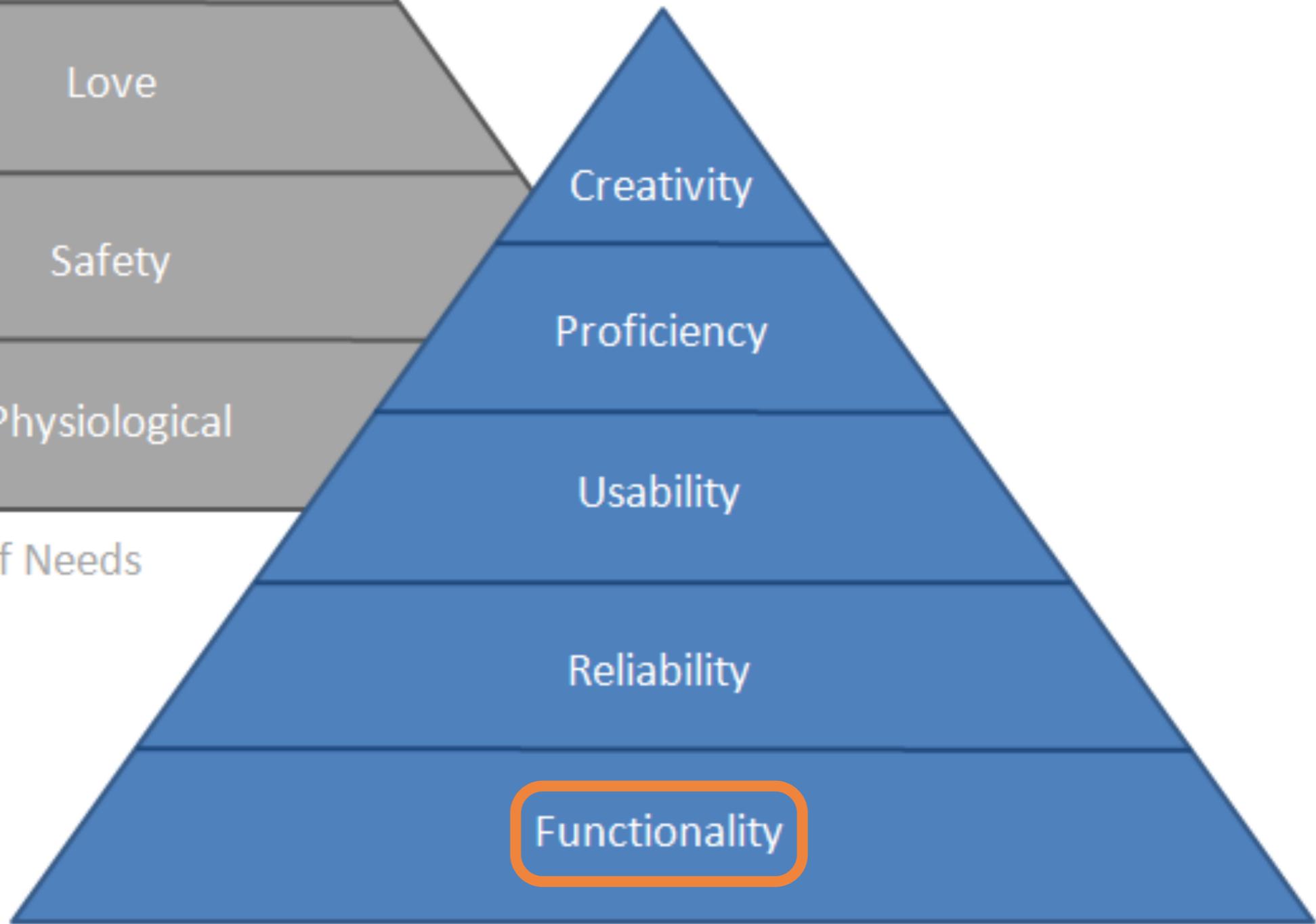
Remote Control

Hierarchy of **Design Needs**

(Lidwell: Universal Principles of Design, 2003)



Maslow's Hierarchy of Needs

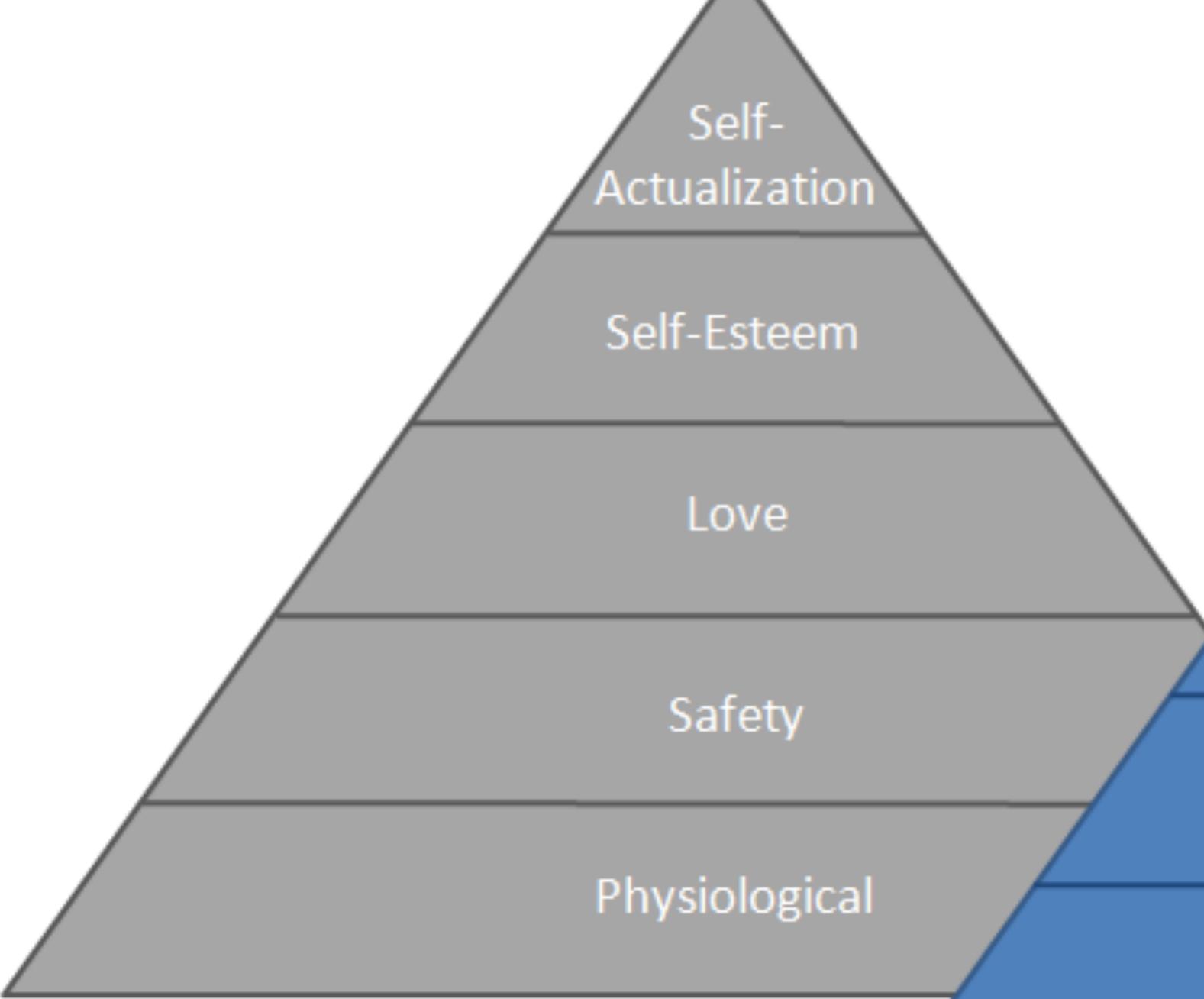


Design Hierarchy of Needs

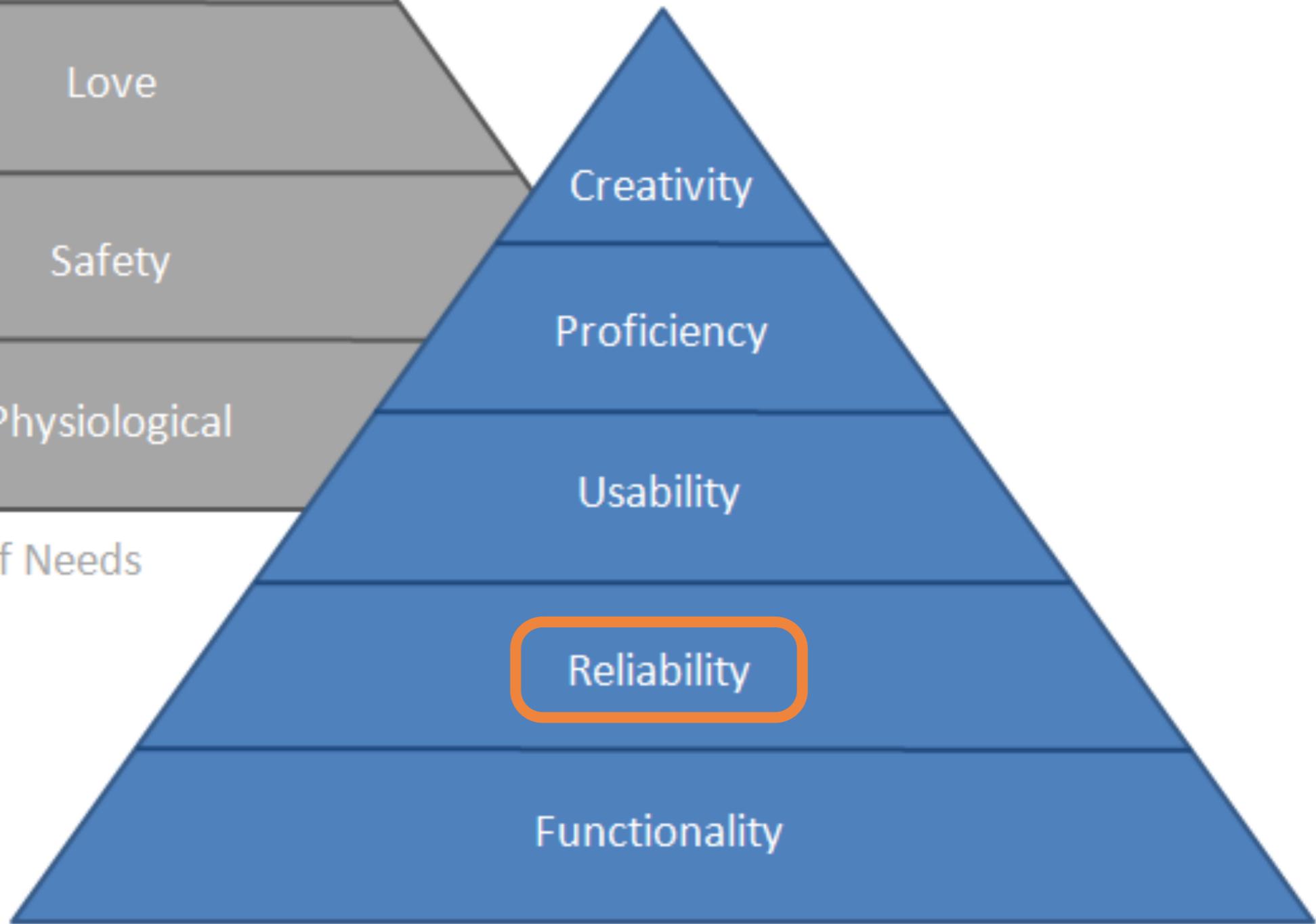
source: [7]

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

For example a 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

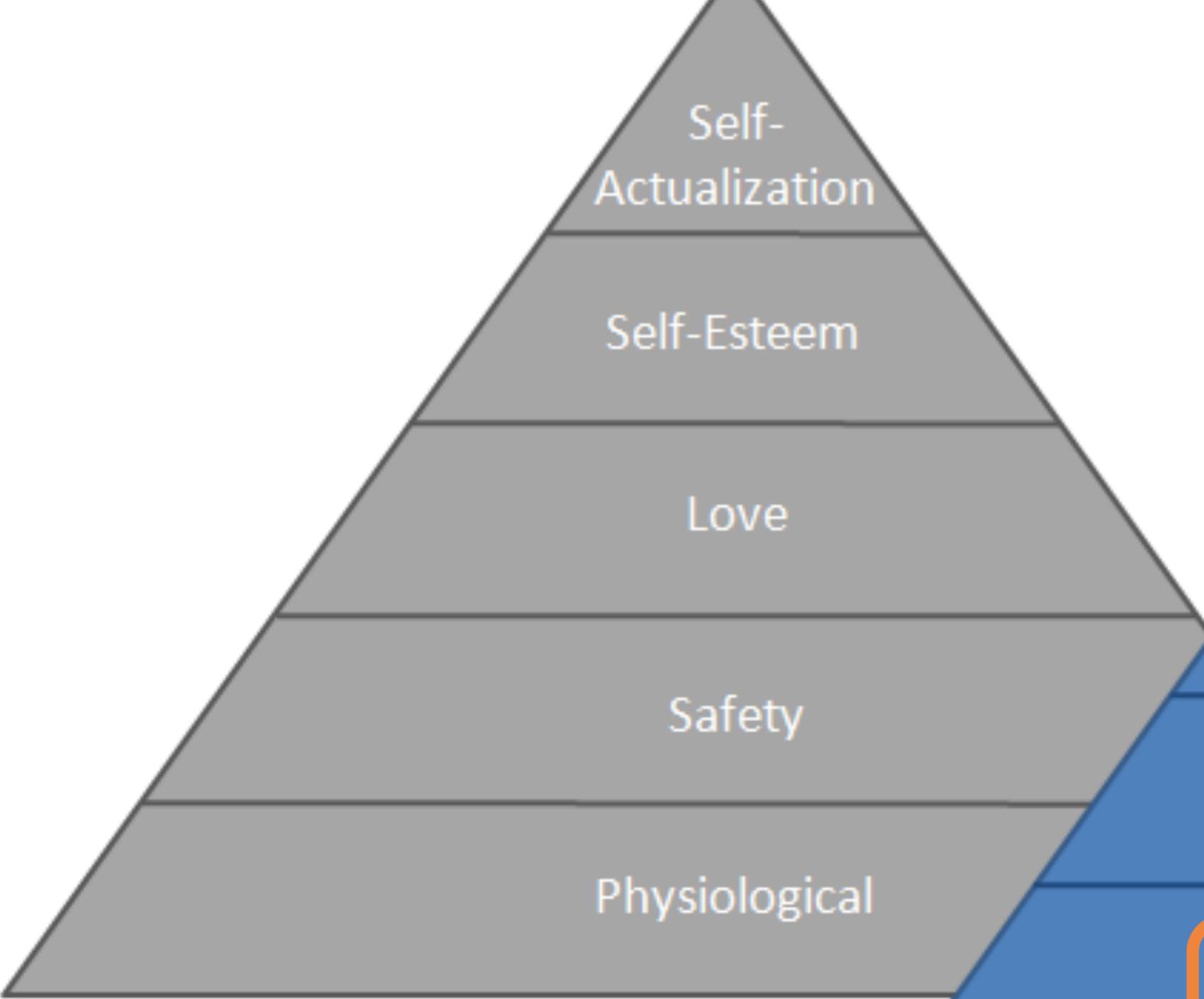


Design Hierarchy of Needs

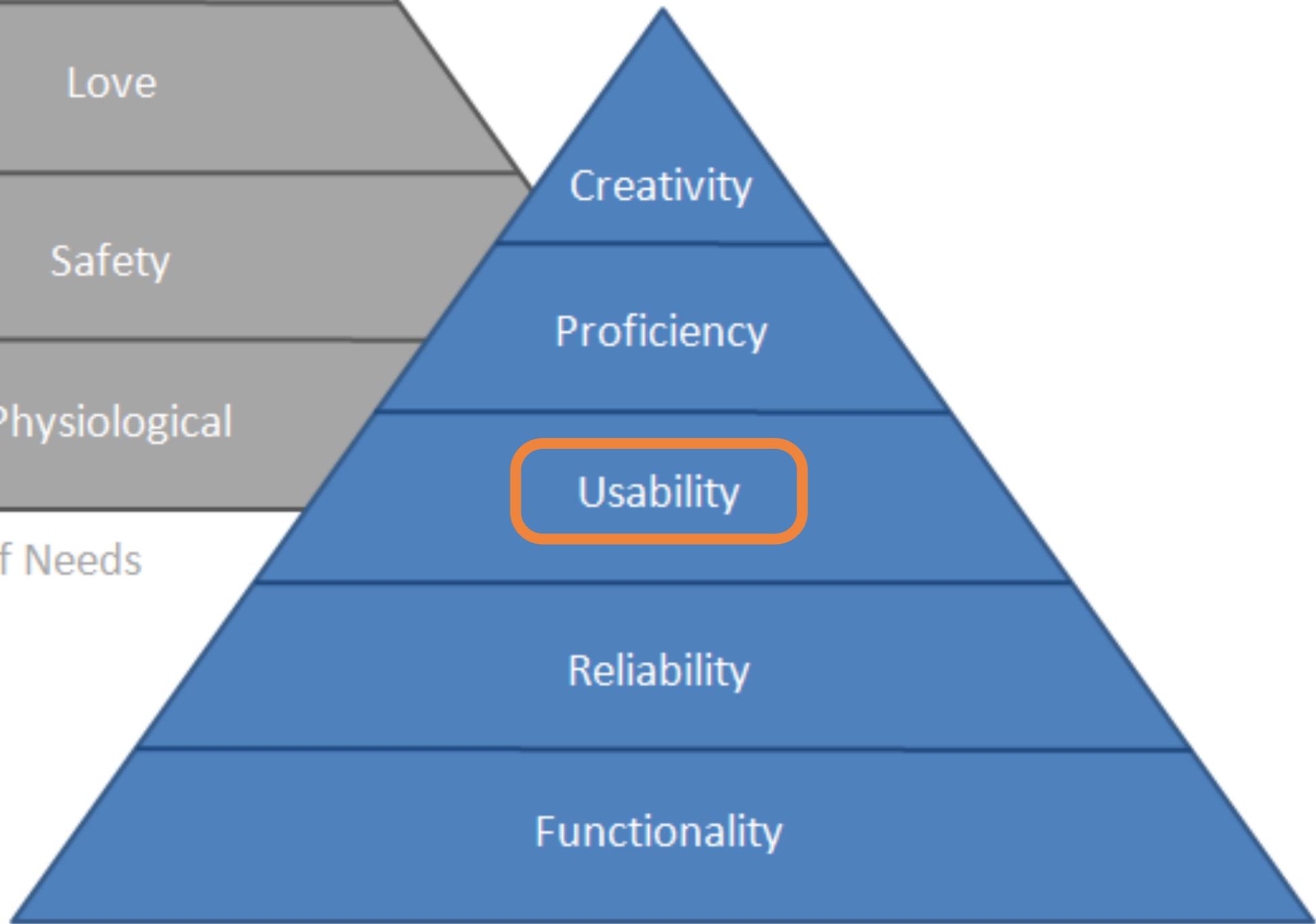
source: [7]

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



Maslow's Hierarchy of Needs

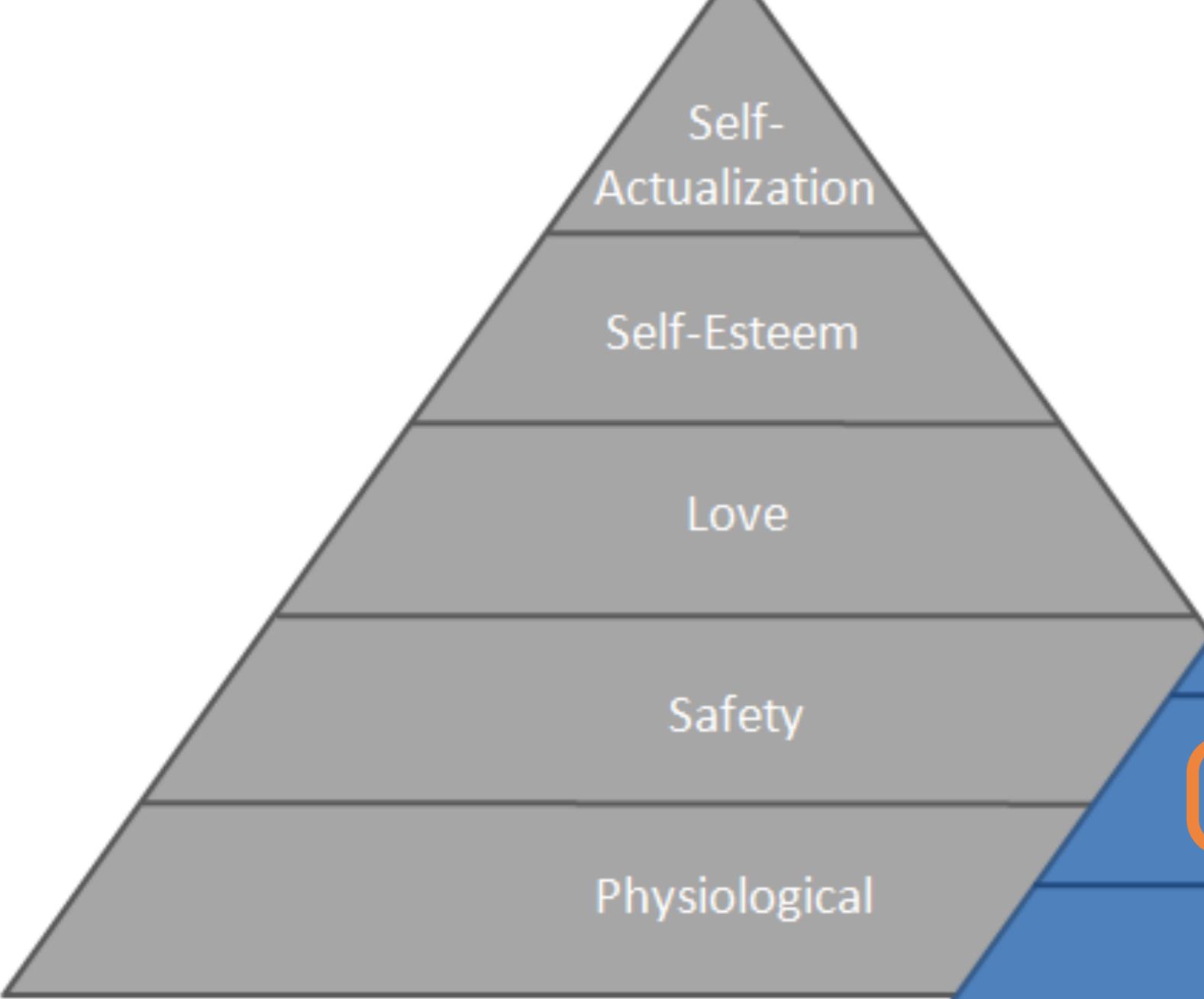


Design Hierarchy of Needs

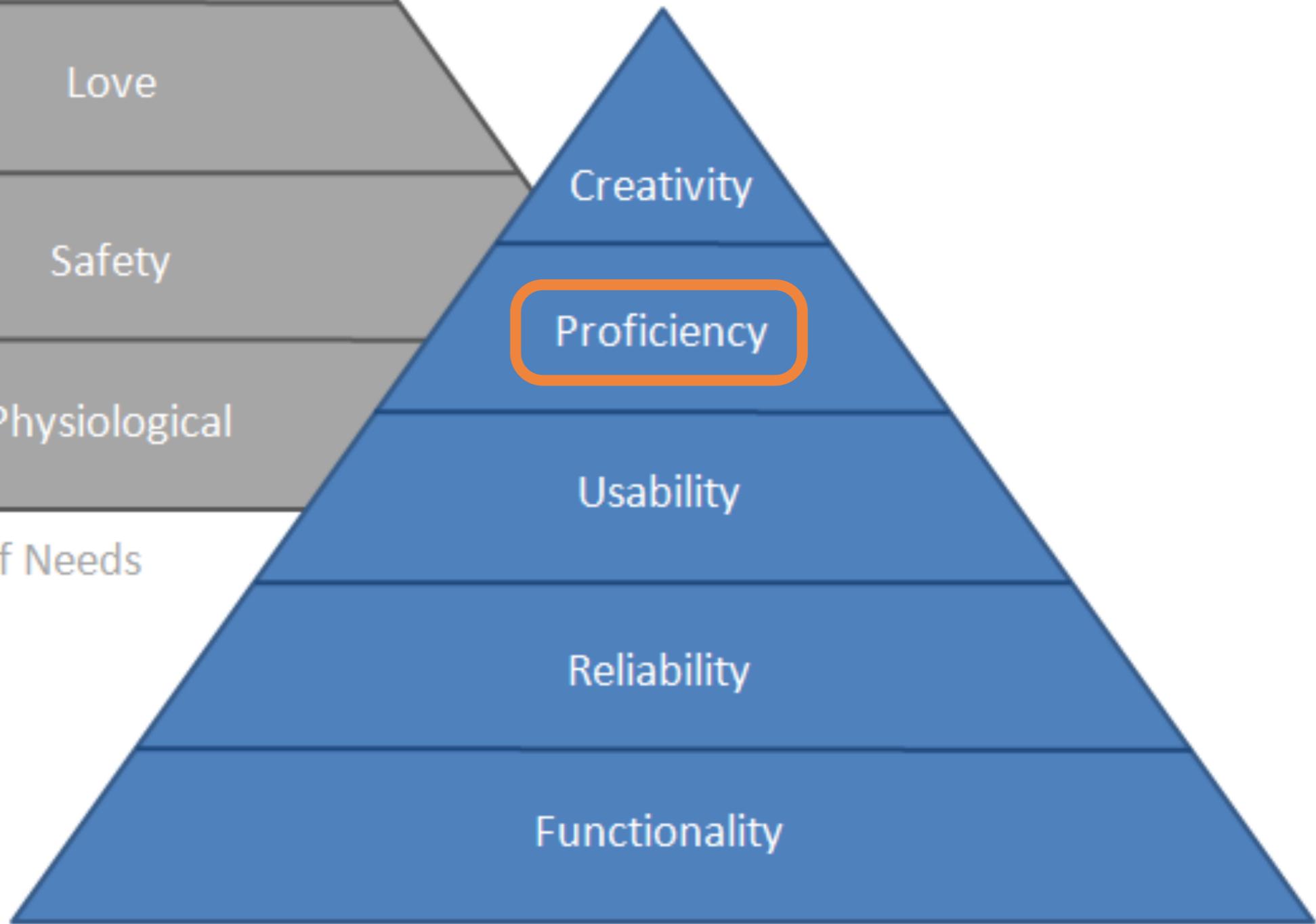
source: [7]

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

For example, configuring a 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.



Maslow's Hierarchy of Needs

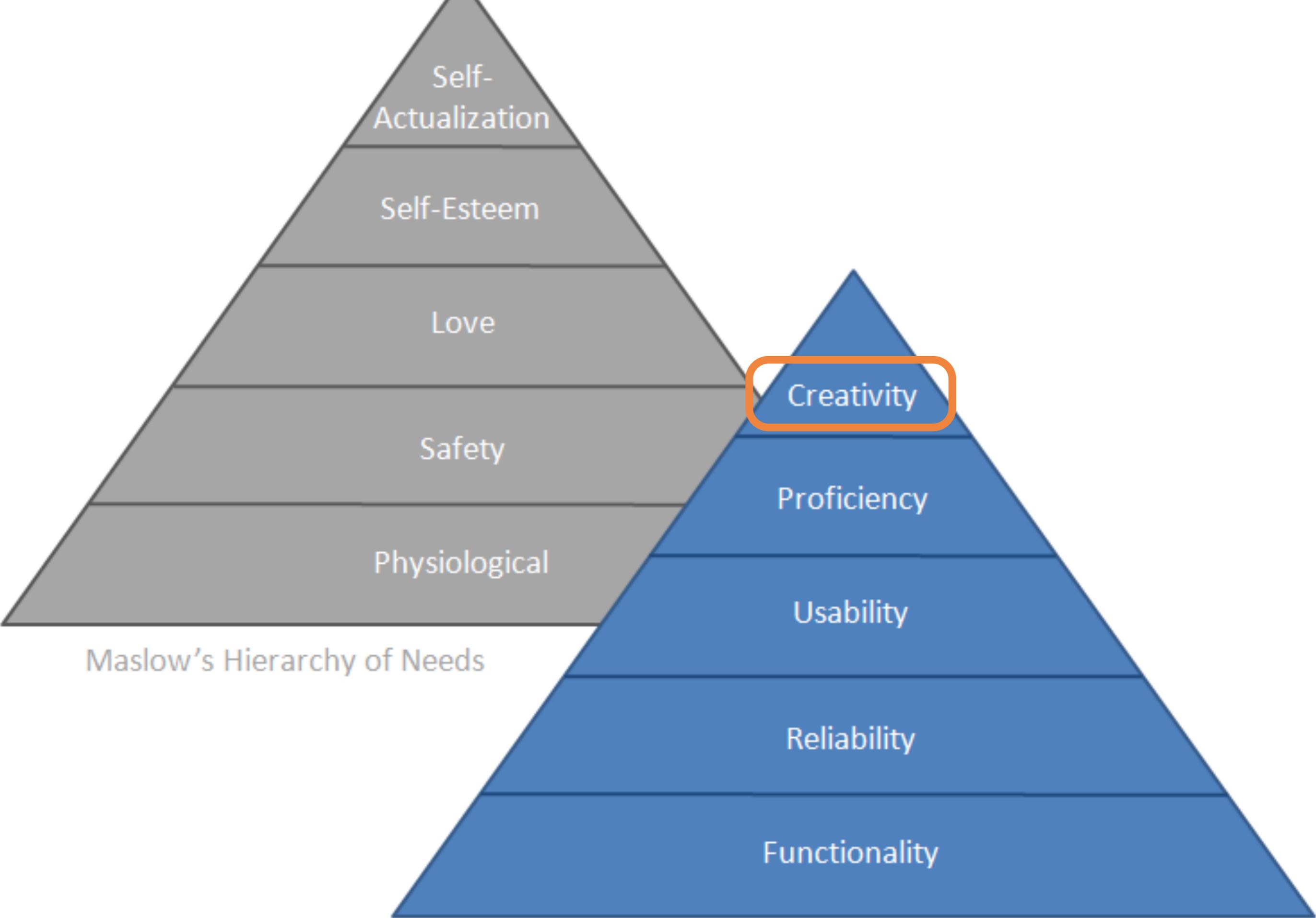


Design Hierarchy of Needs

source: [7]

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

For example, a 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.



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. 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



Flexibility-Usability Tradeoff

source: [7]

Usability



Navigation

SANITÄRKERAMIK u. ZUBEHÖR
WC-SITZE / ARMATUREN

4

HANDWERKZEUG / DRAHT
FAHRRAD-u. AUTOZUBEHÖR / ÖLE

LÜFTUNG / SANITÄR
BAD - u. HEIZUNGSZUBEHÖR

5

DÜBEL / SCHRAUBEN / NÄGEL
REGALZUBEHÖR

FLIESENKLEBER / FUGENMÖRTEL
SILIKONE / REINIGUNG

6

LÖTEN / SCHWEISSEN
BESCHLÄGE / KETTEN / SEILE

MÖRTEL / BEDACHUNG

7

ELEKTRO / TAPETEN

DACHRINNE / PÄNEELE
LÄMINAT

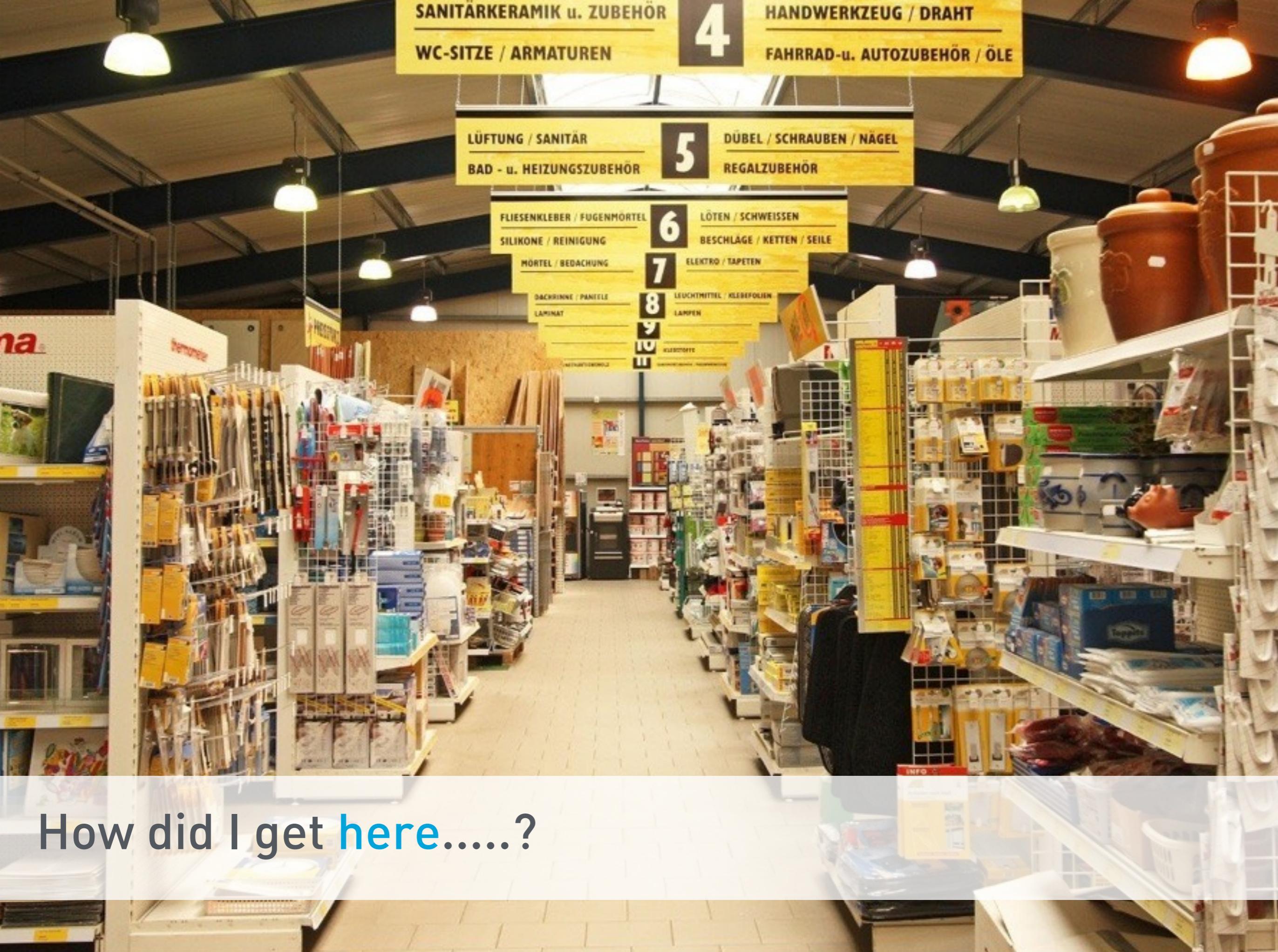
8

LEUCHTMITTEL / KLEBEFOLIEN
LAMPEN

9

KLEBSTOFFE

Navigation



SANITÄRKERAMIK u. ZUBEHÖR
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LÄMINAT

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KLEBSTOFFE

How did I get **here**.....?

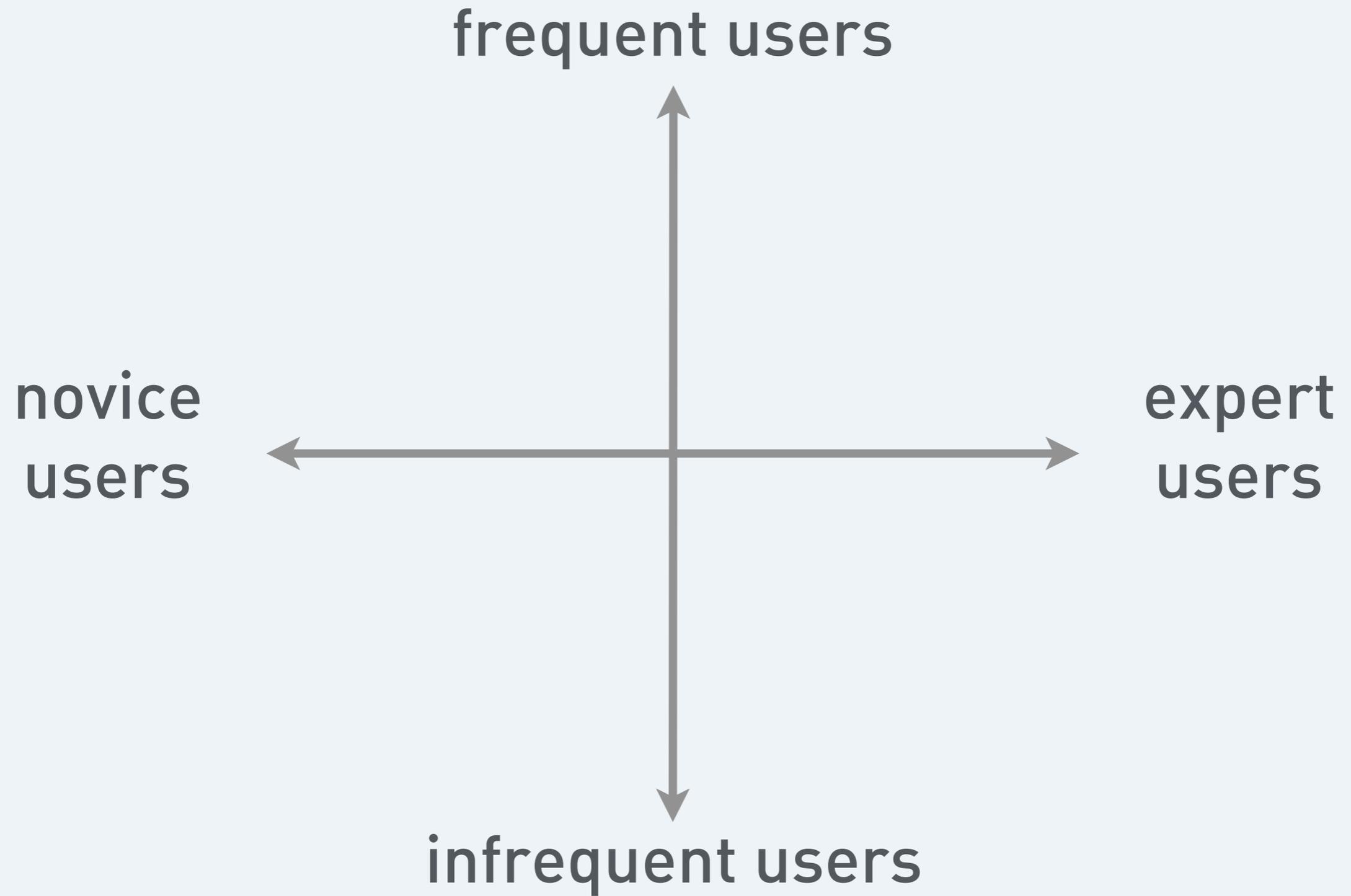


iPhone

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

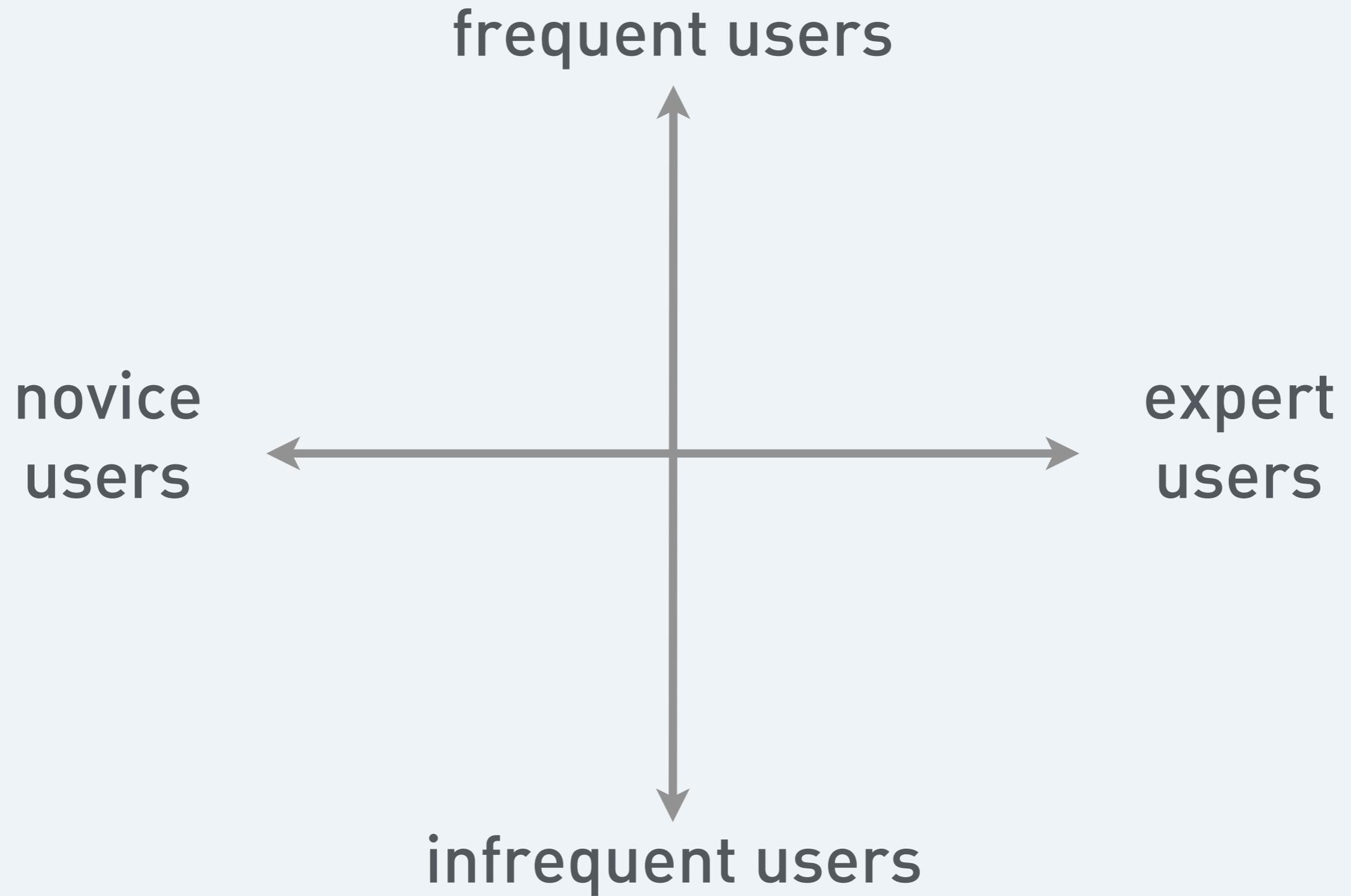
USABILITY IN EVERYDAY LIFE!





Audi A4 Series Cockpit

<http://www.audicomparisons.com/wp-content/uploads/2013/10/2014-Audi-A4-interior.jpg>





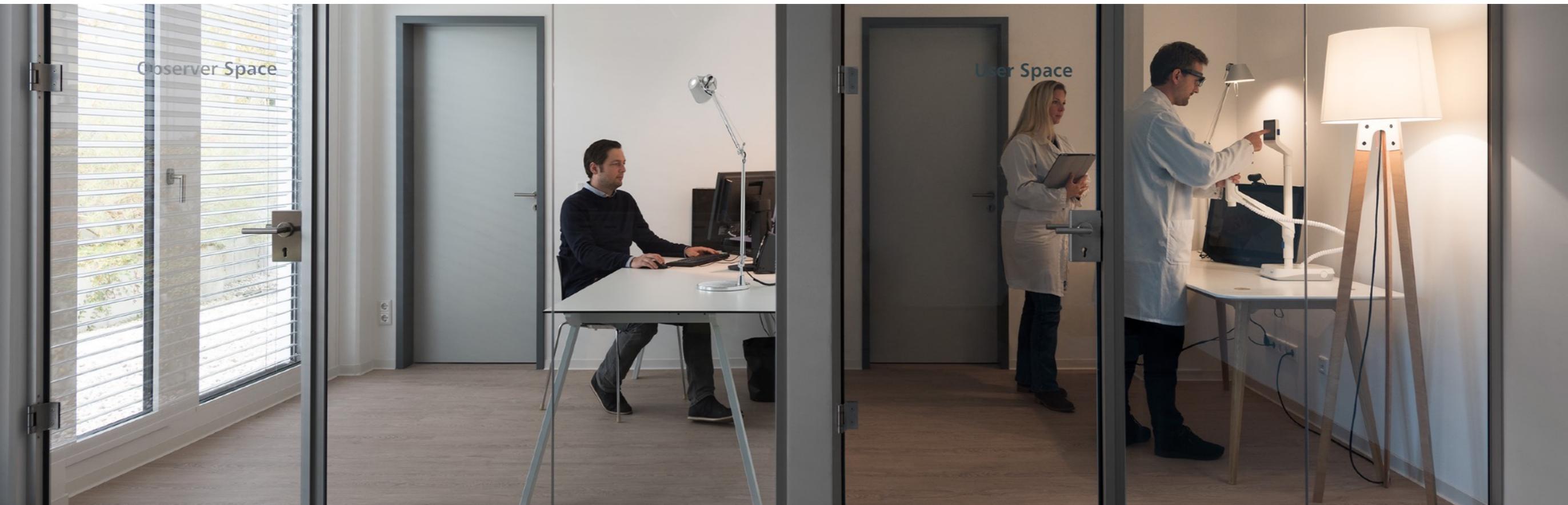
Audi R15 Racing Cockpit

http://2.bp.blogspot.com/_SM9A_sqVGgM/S9XON6I_WtI/AAAAAAAAADww/HcrQgfpuHgl/s1600/Audi+R15+Plus+Cockpit.jpg

454 807

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



Usability Inspection Methods....

Specifically constructed testing room

...instrumented with data collection devices

Separate observation room

...usually connected to the testing room by one-way mirror and audio system / data recording and analysis

Test users perform prepared scenarios

...and use the "Think aloud" technique

Problem

...very artificial setting

→ bias in test results

- 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)

https://s3.amazonaws.com/media.nngroup.com/media/people/high-res-photos/jakob_mouse_big.jpg



Usability Lab @ Sun Microsystems

https://c1.staticflickr.com/1/230/489963693_22221f92f1_b.jpg

Heuristic (hyū-'ris-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

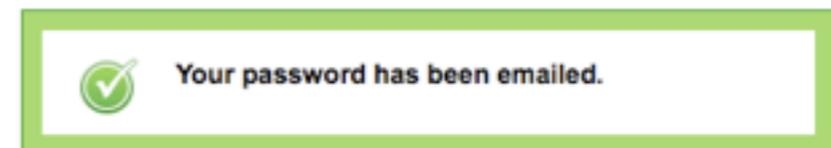
Upload the file or [Cancel](#)



Basecamp



Picnik



Theresa Neil sign in

Tick

Visibility of system status

Match between system and the real world

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Consistency and standards

Error prevention

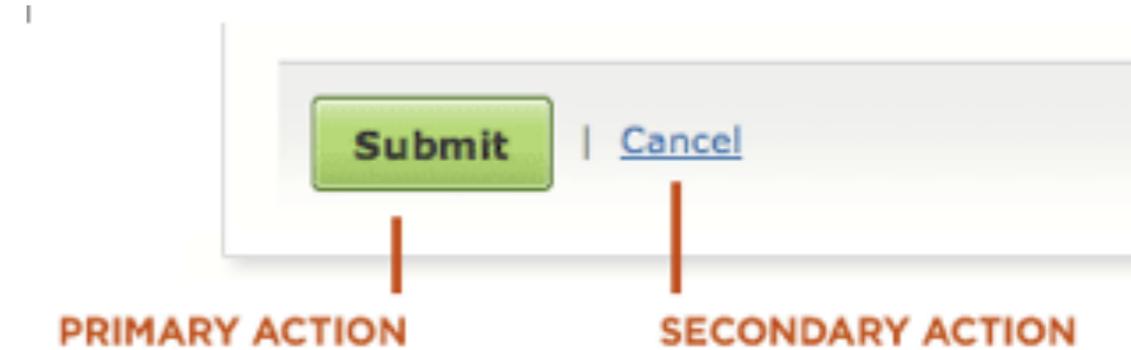
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Example: "Web Design, Filling the Blanks"



Yammer

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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)

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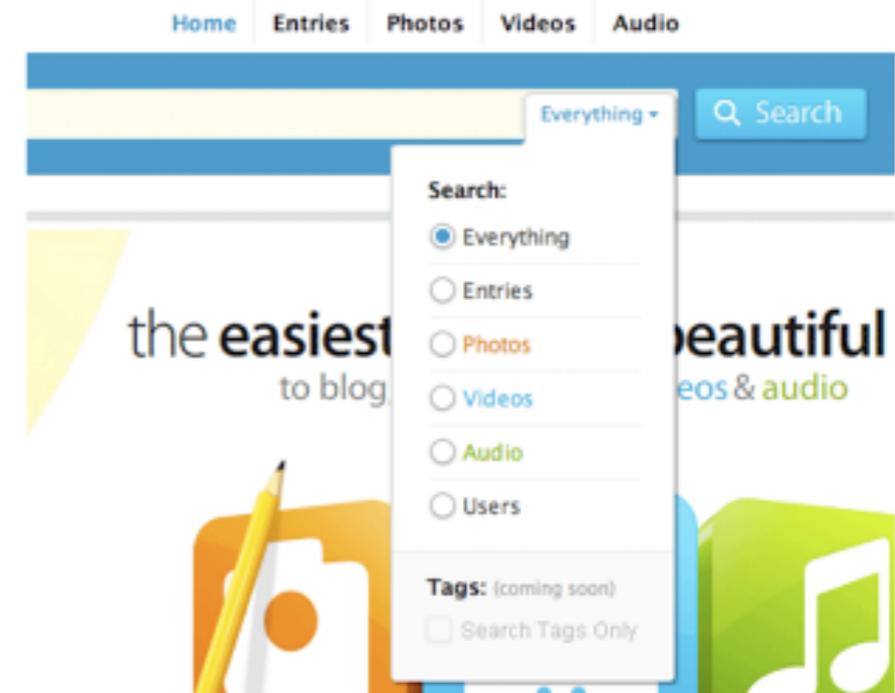
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Kontain



Visibility of system status

Match between system and the real world

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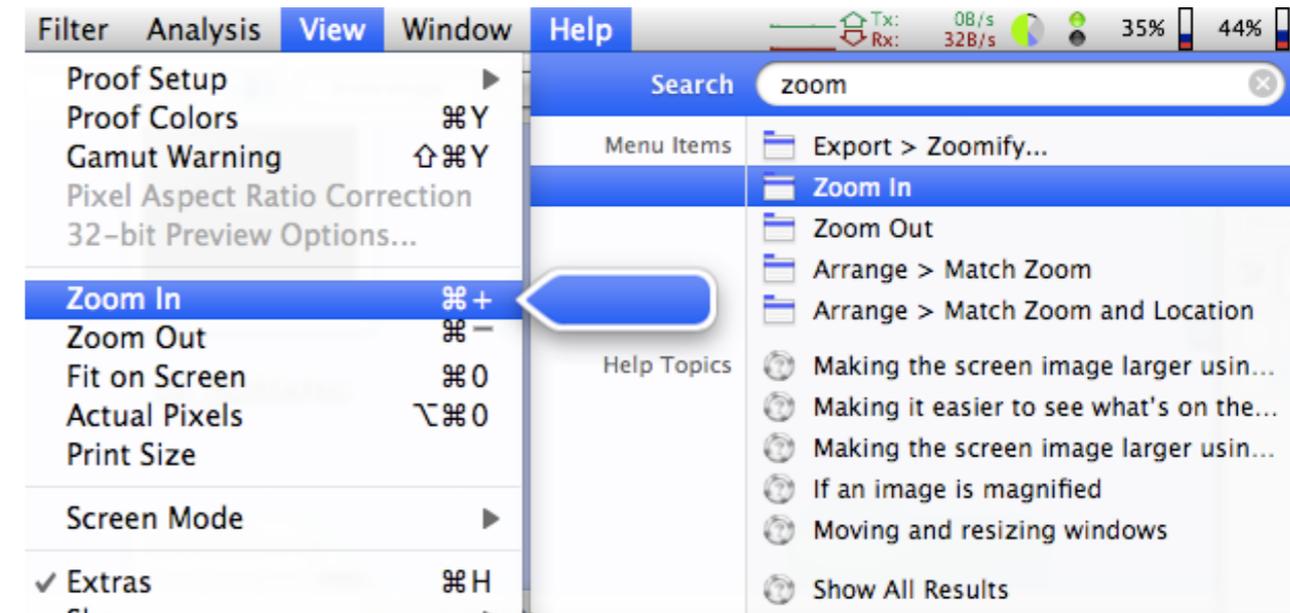
Recognition rather than recall

Flexibility and efficiency of use

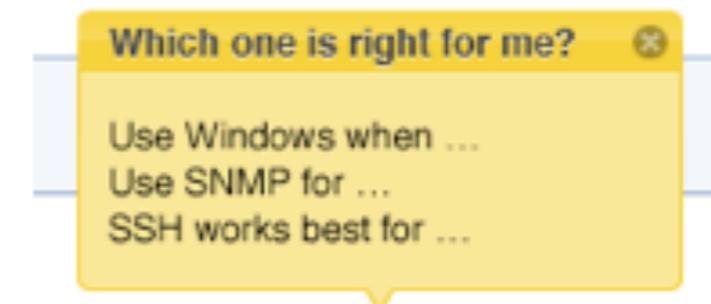
Aesthetic and minimalist design

Help users recognize, diagnose,
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Mac OS X 10.5 (Screenshot)



e following: 

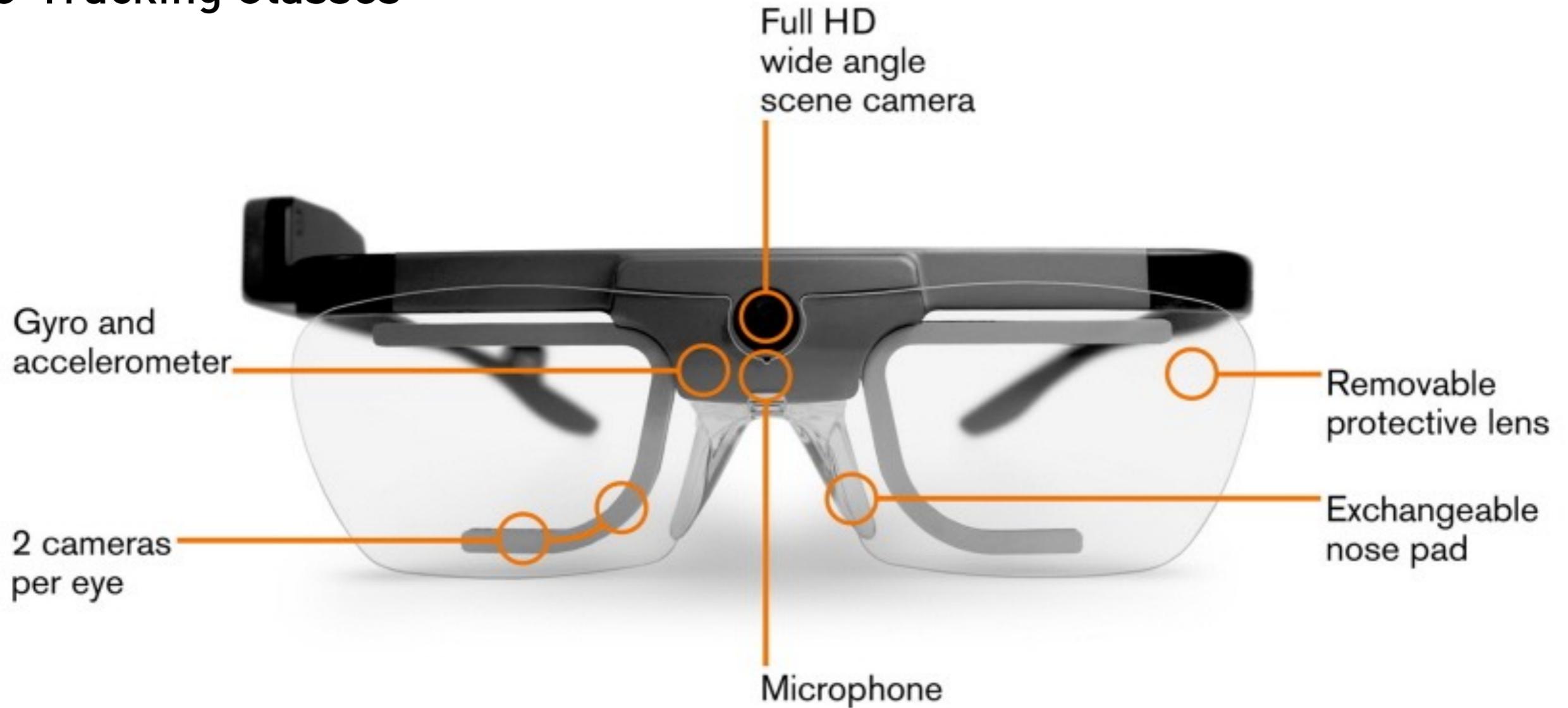
Zenoss

USABILITY Testing Applied

Mobile Usability Lab



Eye-Tracking Glasses



Usability Testing in the Field



Usability Testing in the Field



Video Overview: Usability Testing in the Field



Usability Testing

Report contains:

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



References (Books):

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- [7] Lidwell, W.,: Universal Principles of Design, *Rockport*, 2003.
- [8] Design Council London: A Study of the Design Process 2008