



Faculty of Design

2022

## Constructivist Approaches to Sense-Making About Design Theory

Mages, Michael Arnold

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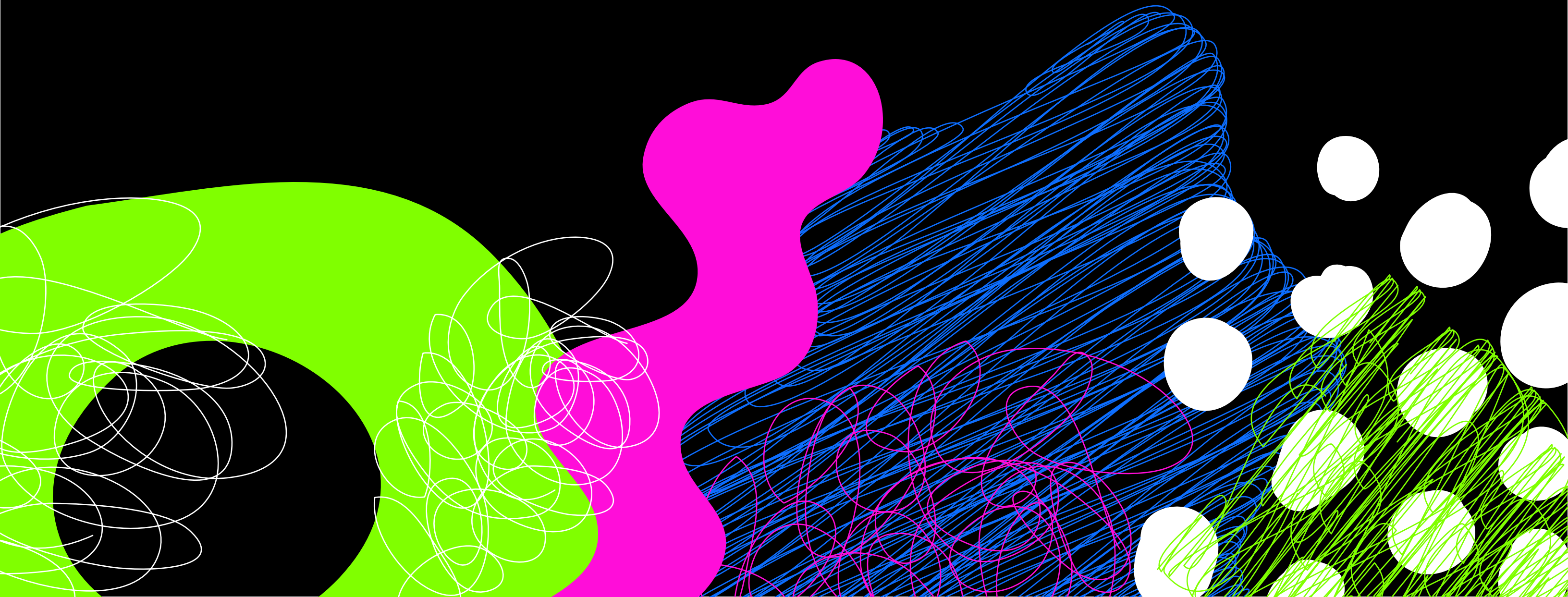
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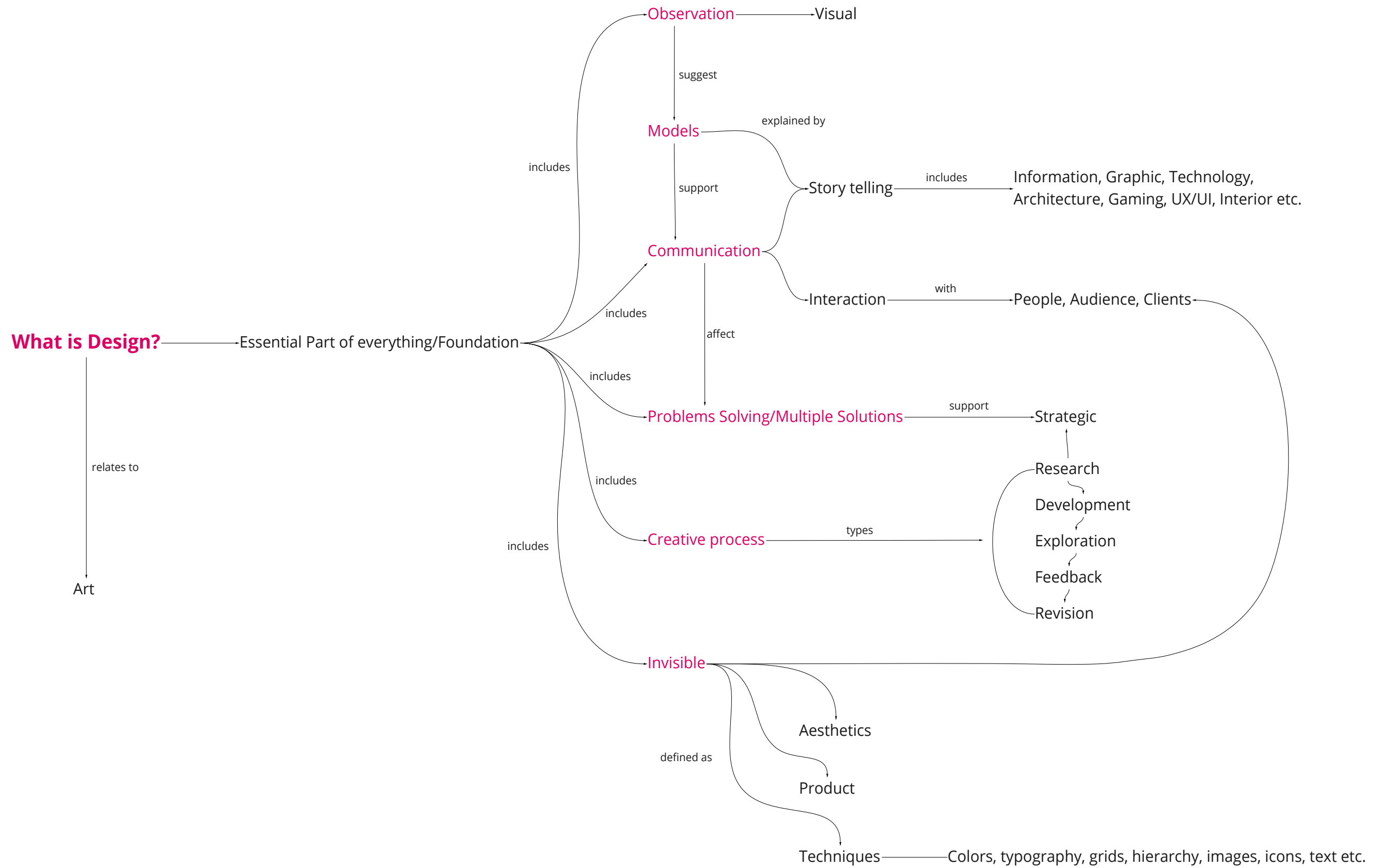
# Concept Map Book

ARTG6110  
Yixuan Ding  
April. 24. 2022

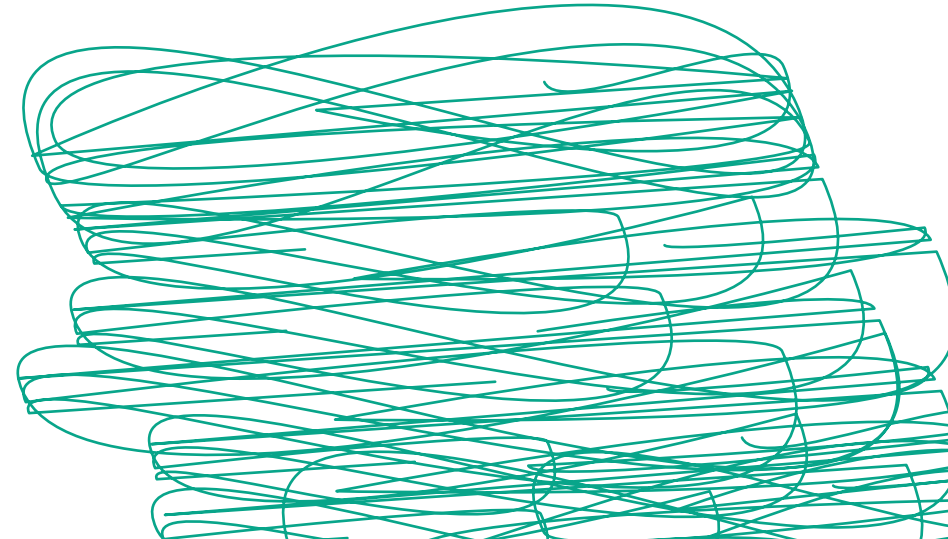
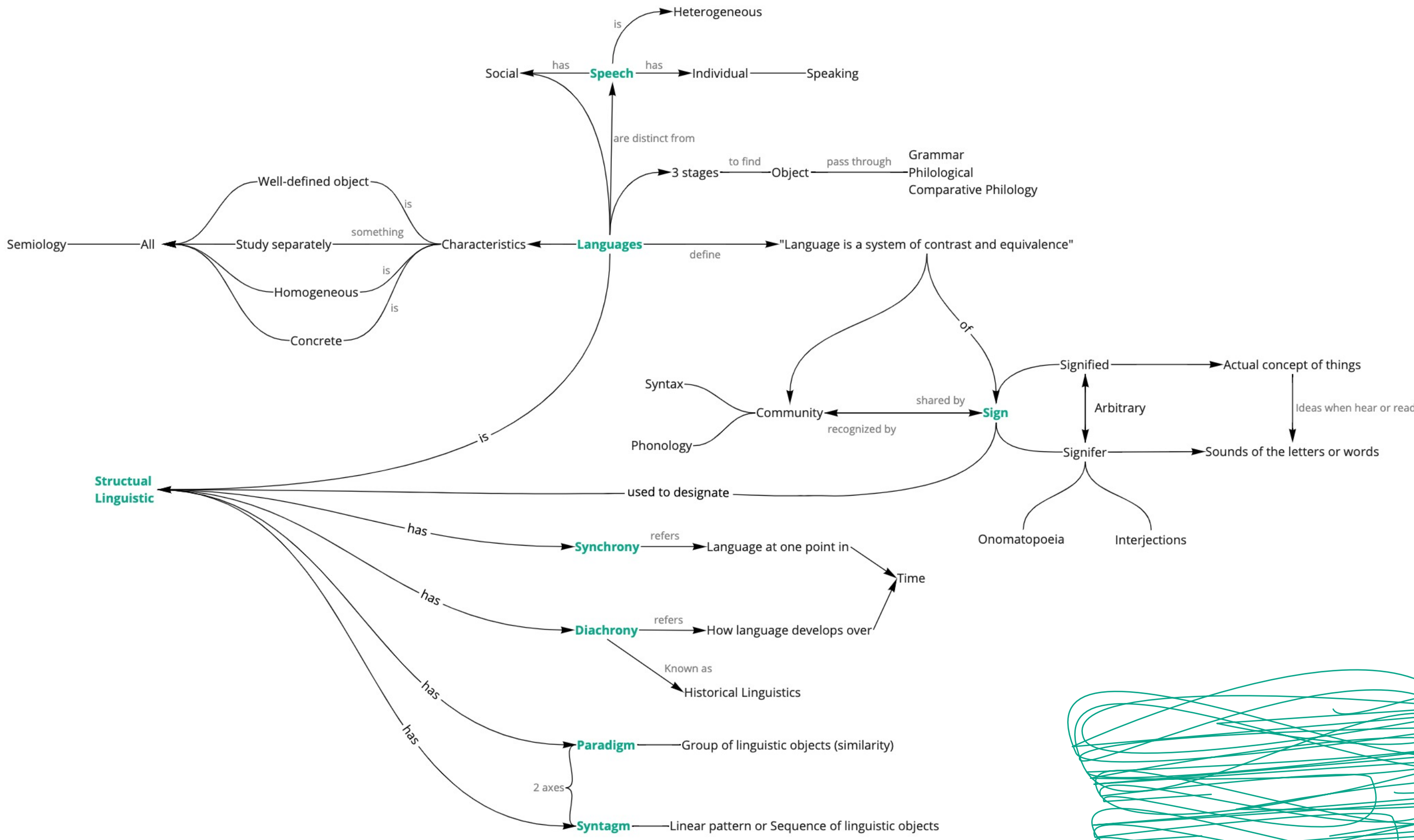


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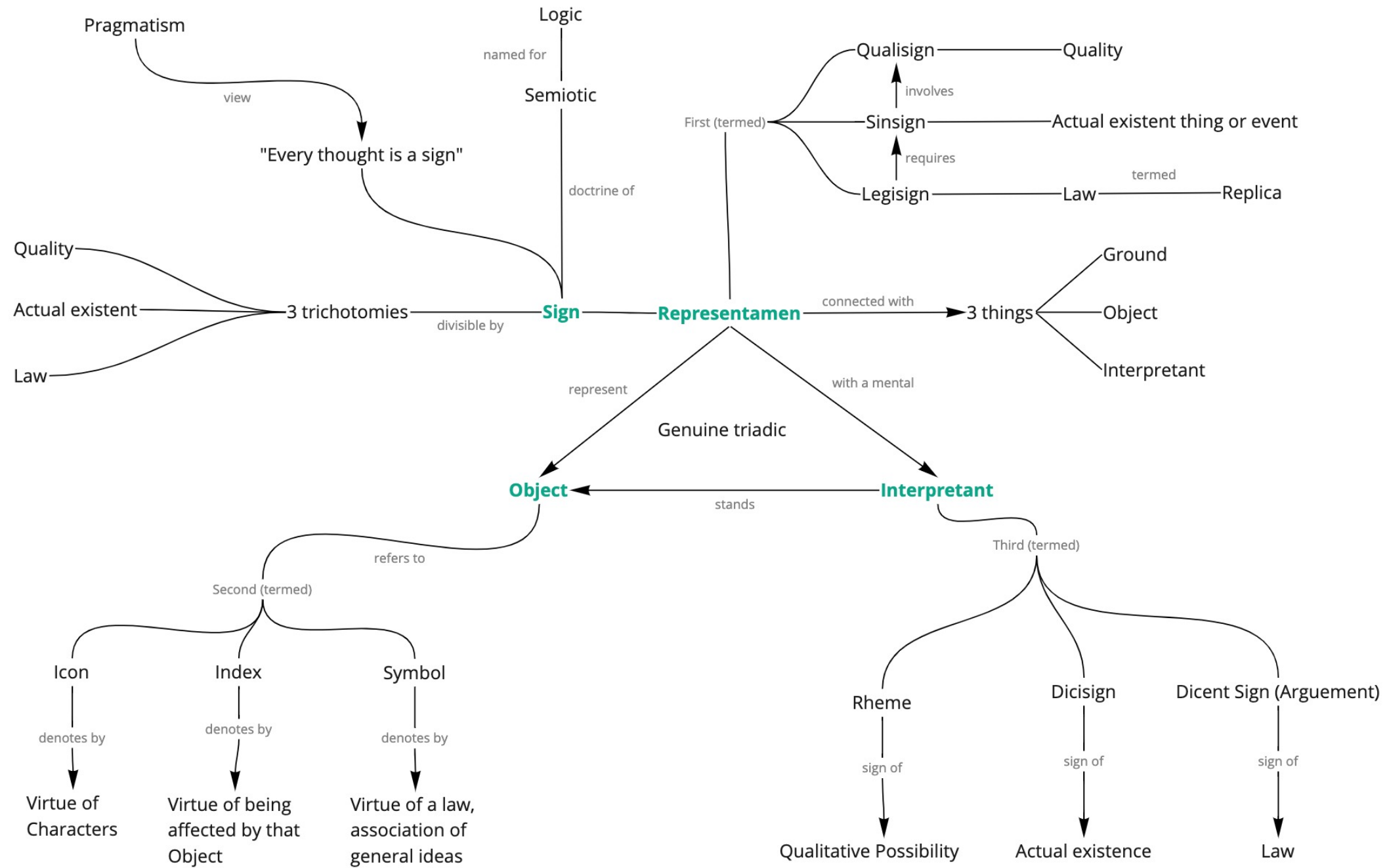
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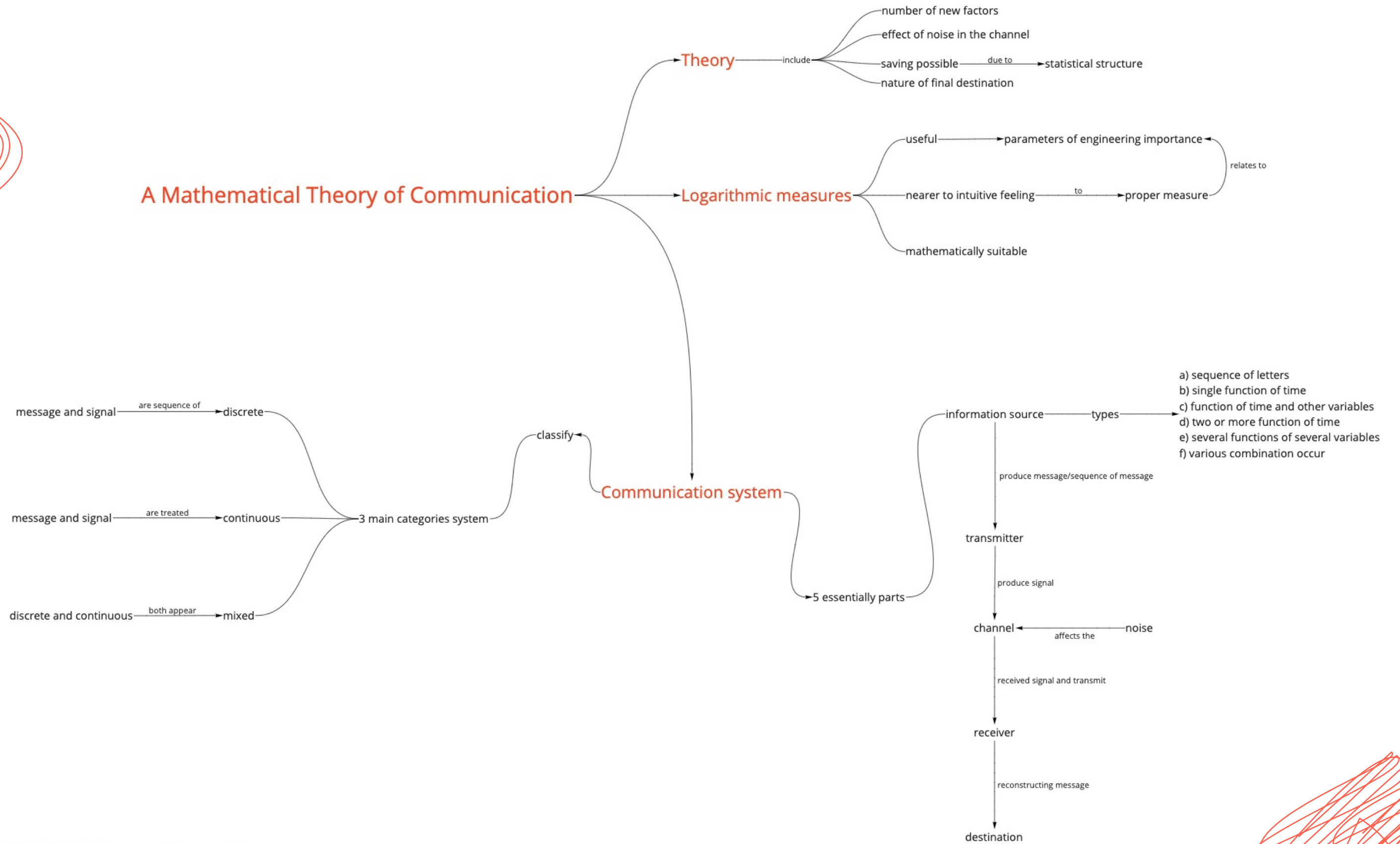


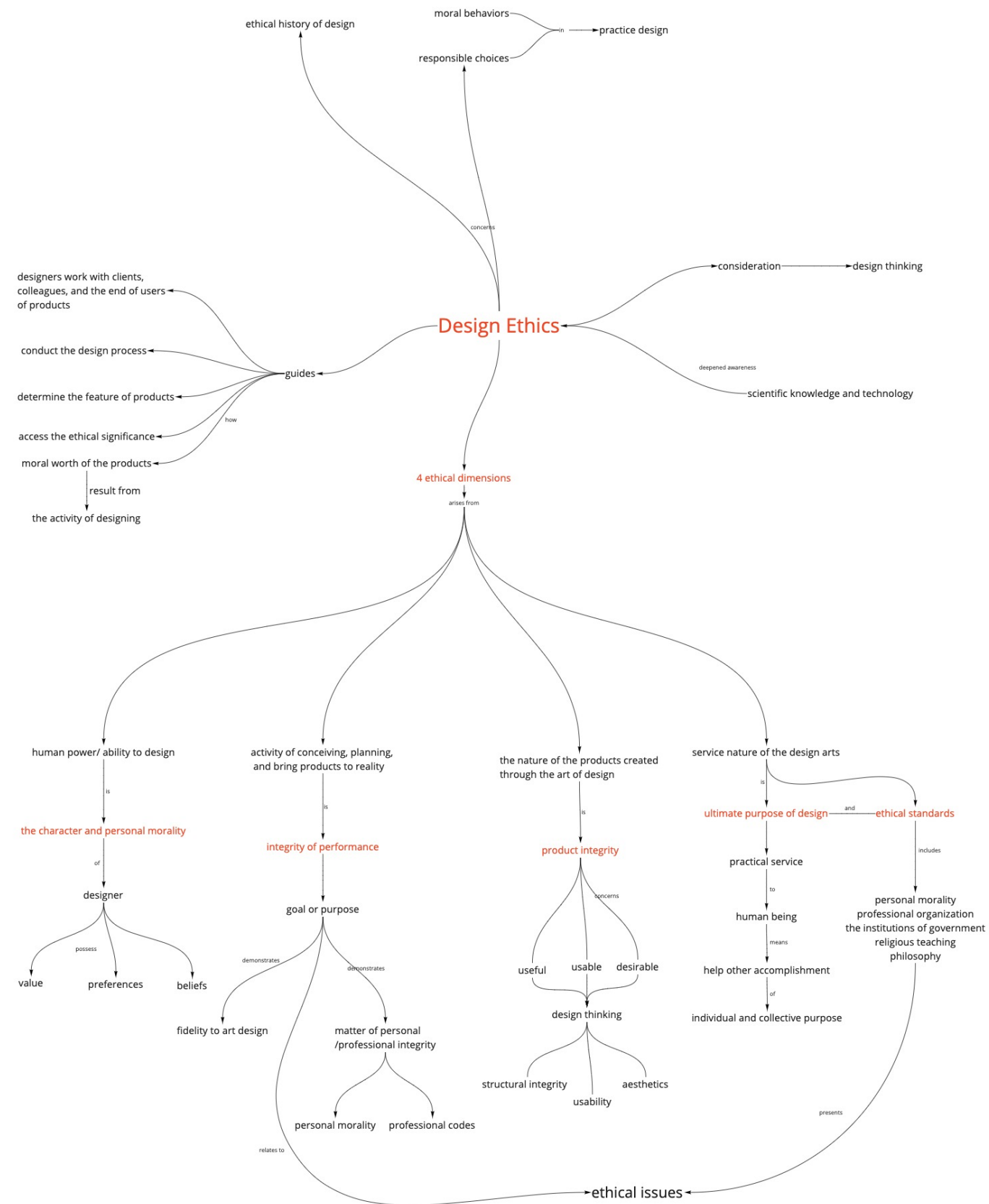


# The theory of Signs



# A Mathematical Theory of Communication

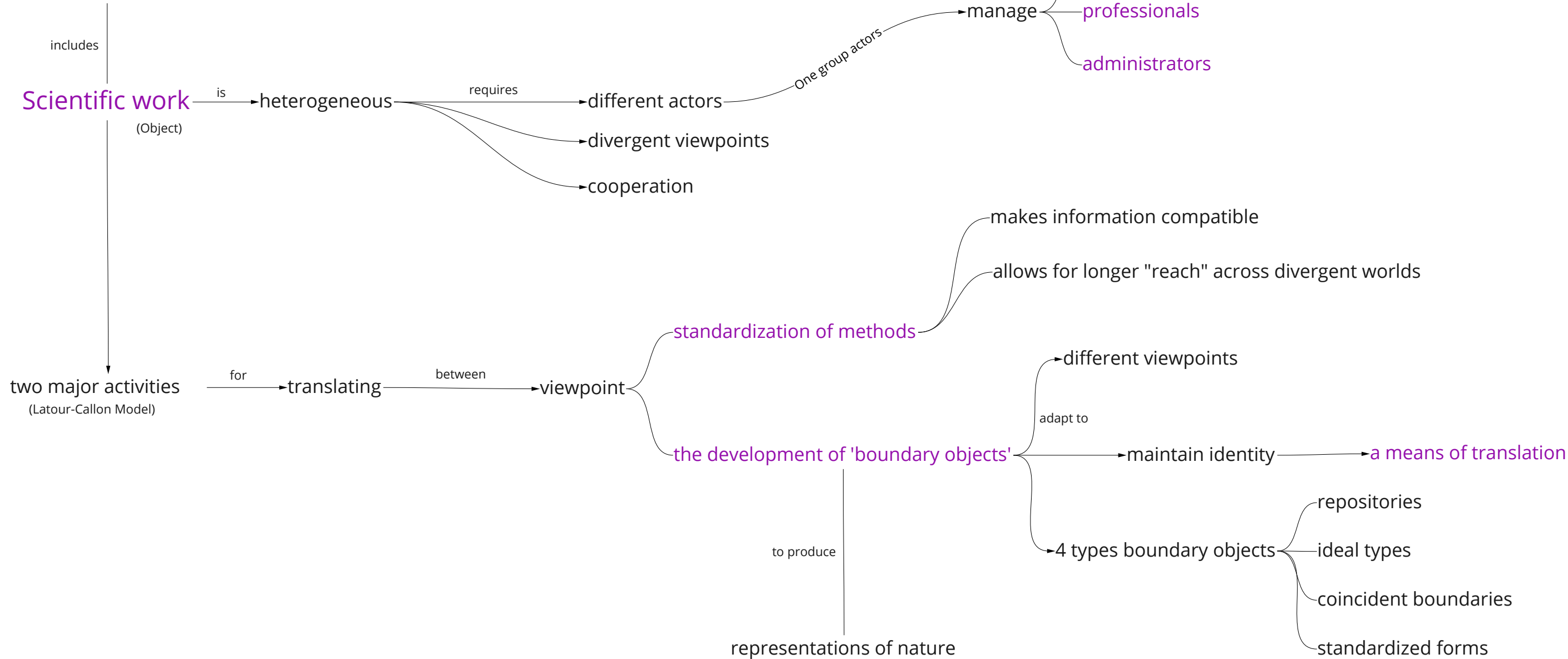


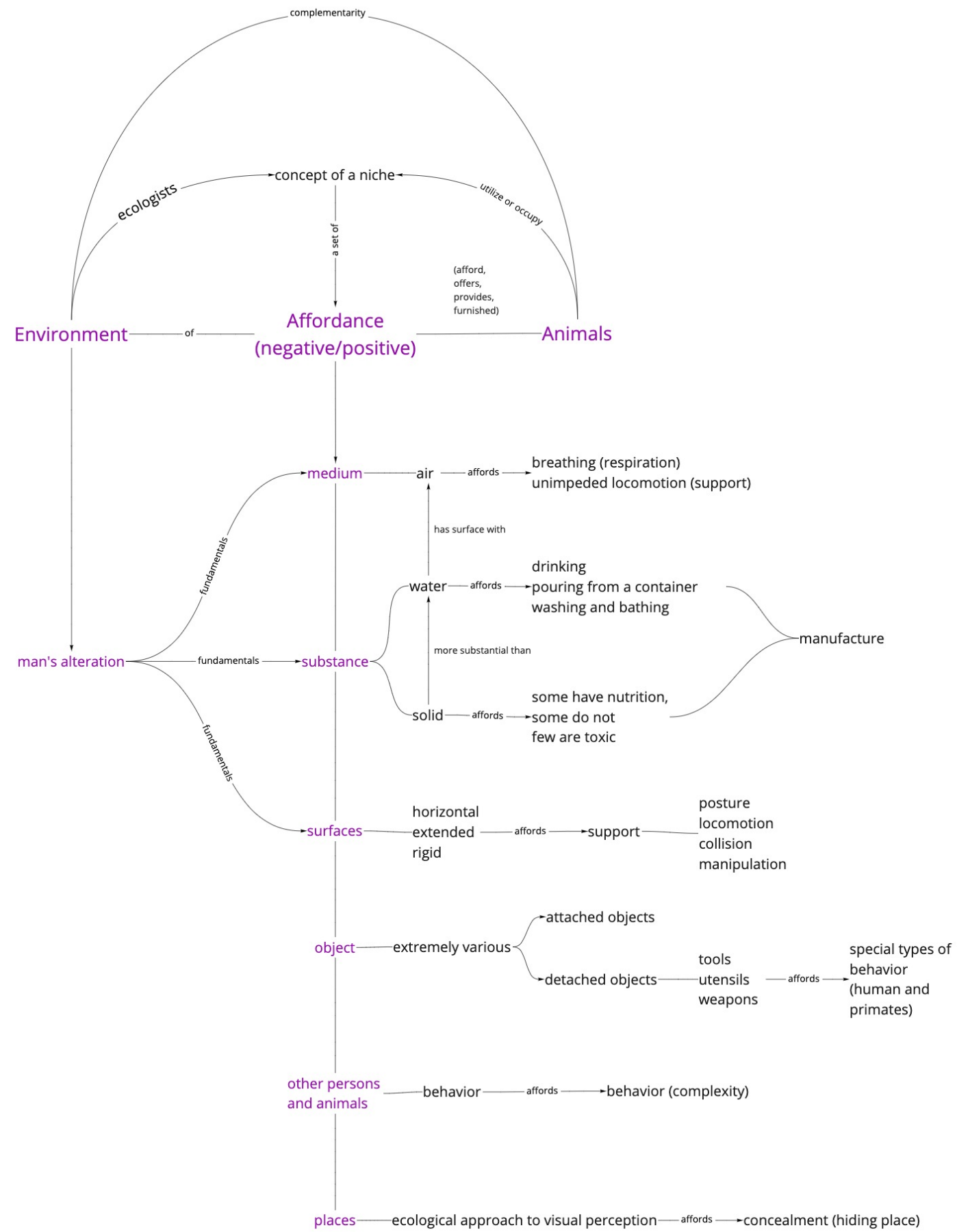


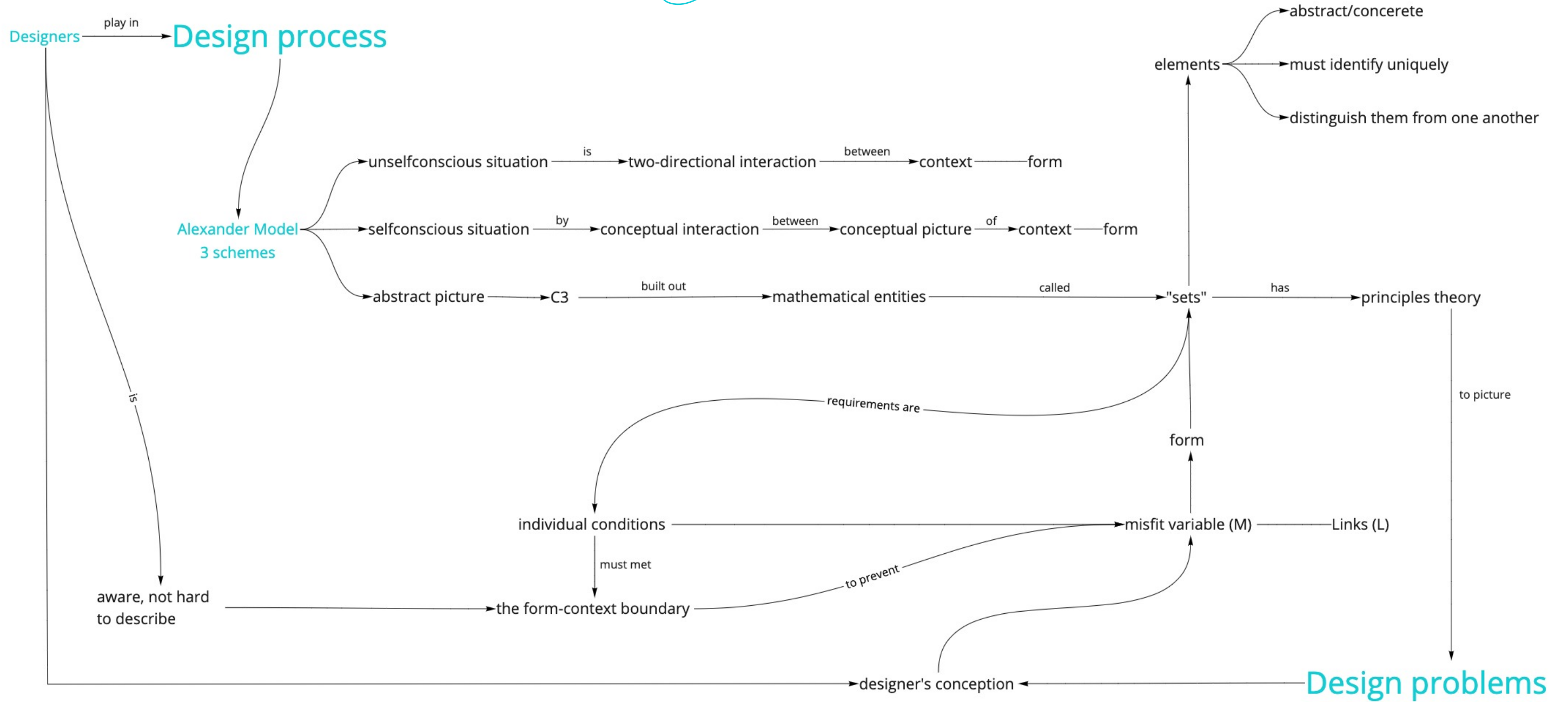




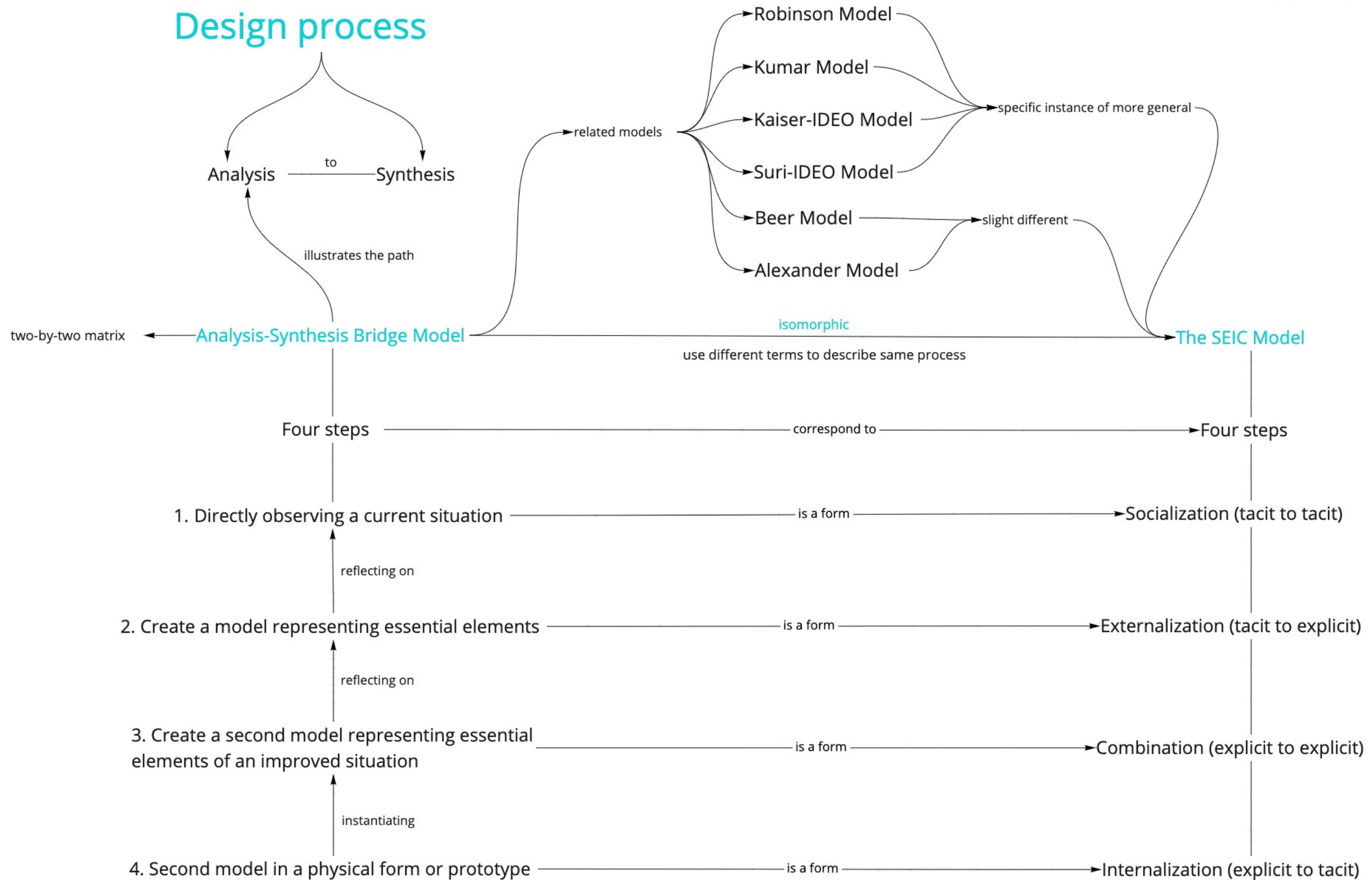
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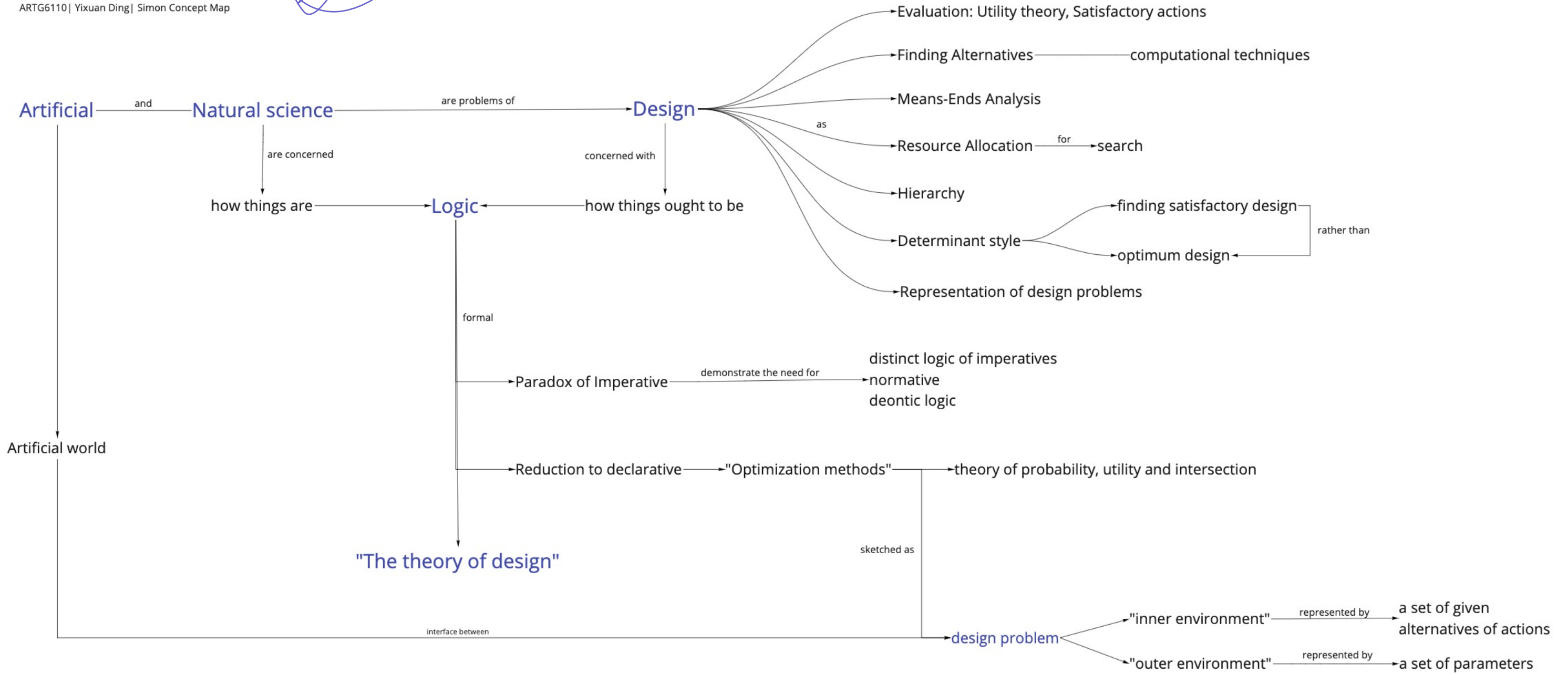


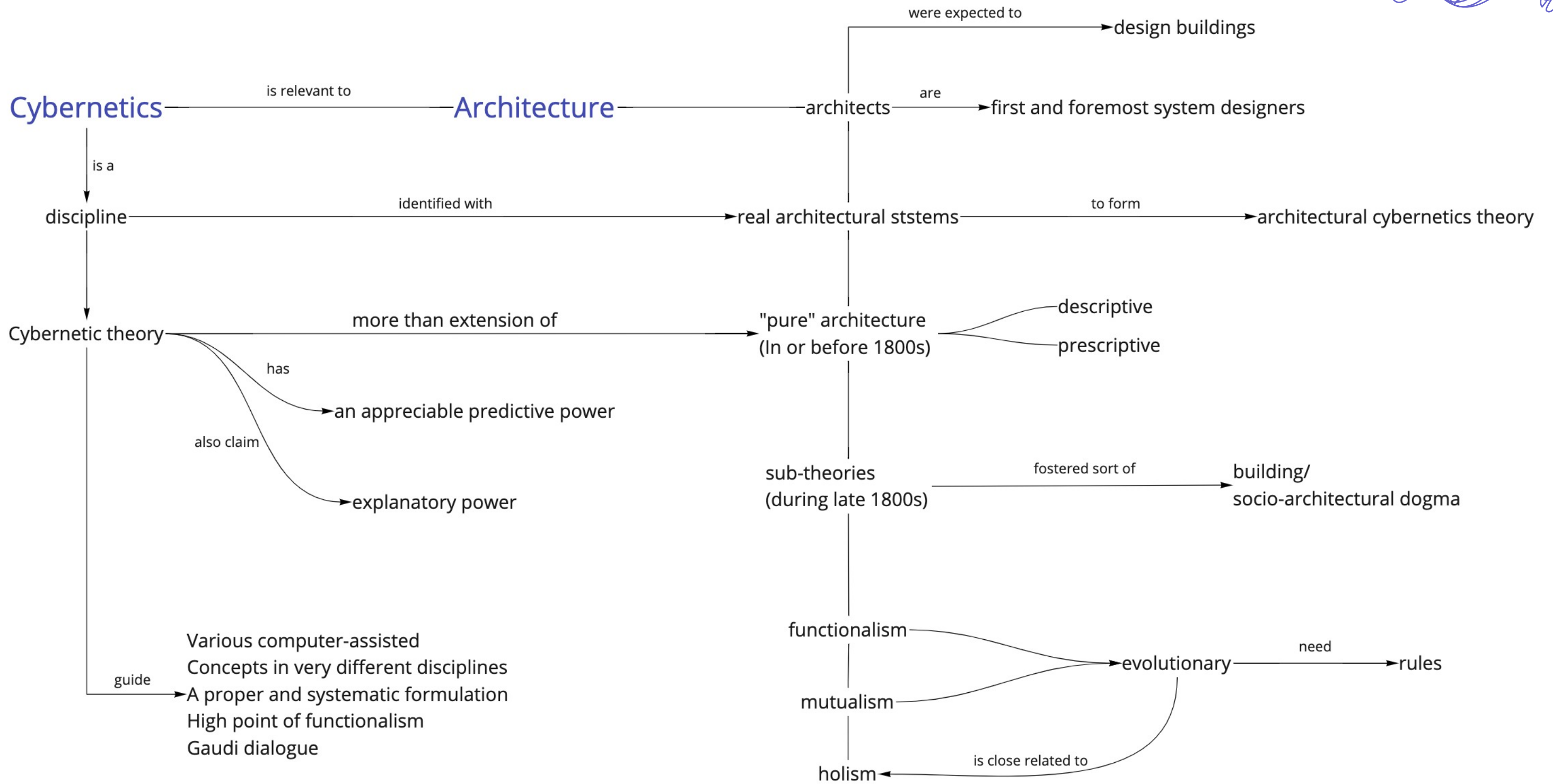


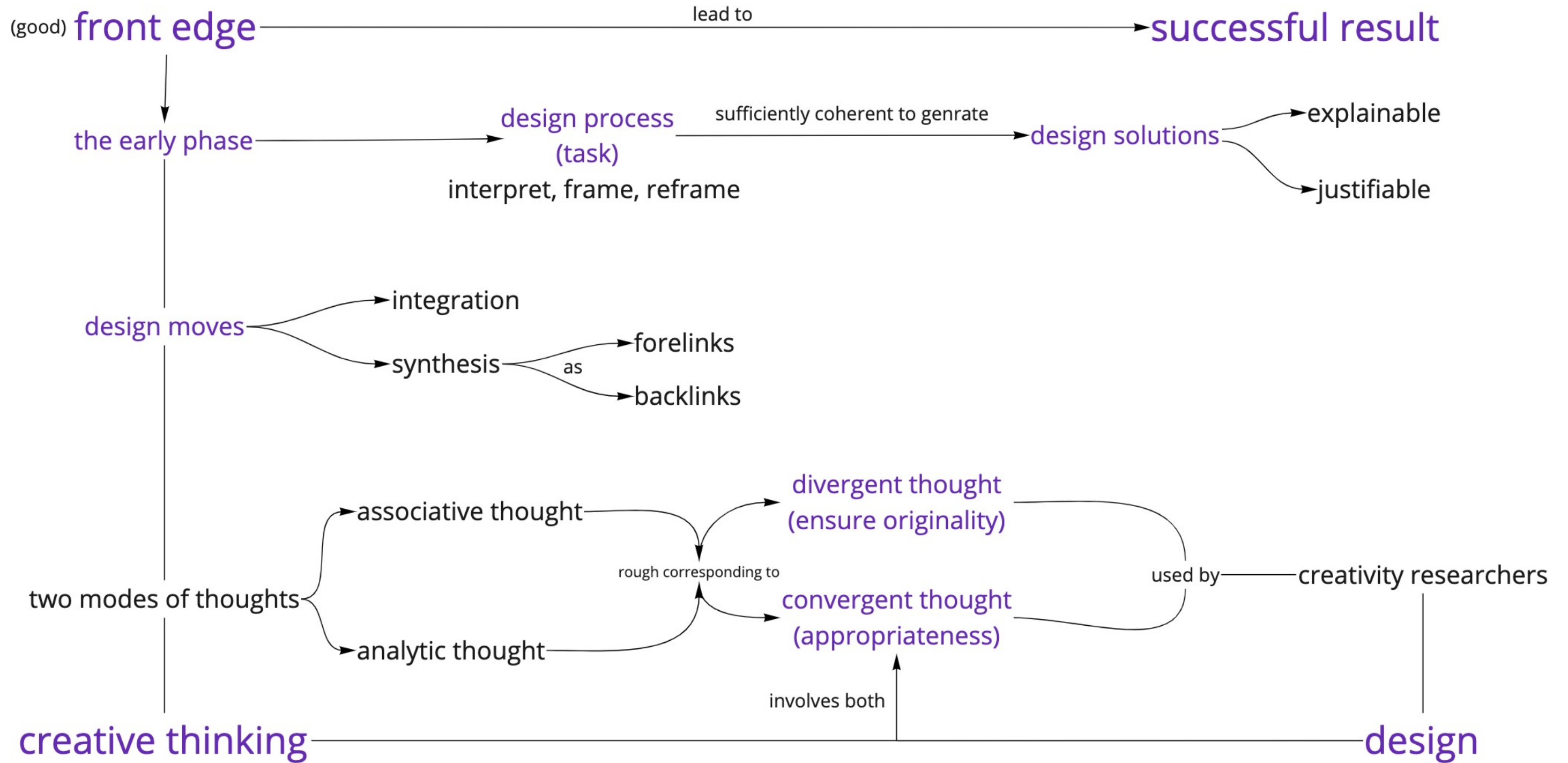
# Design process

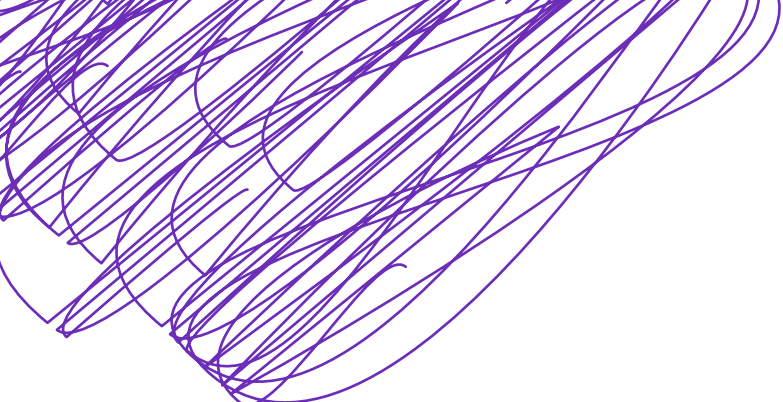




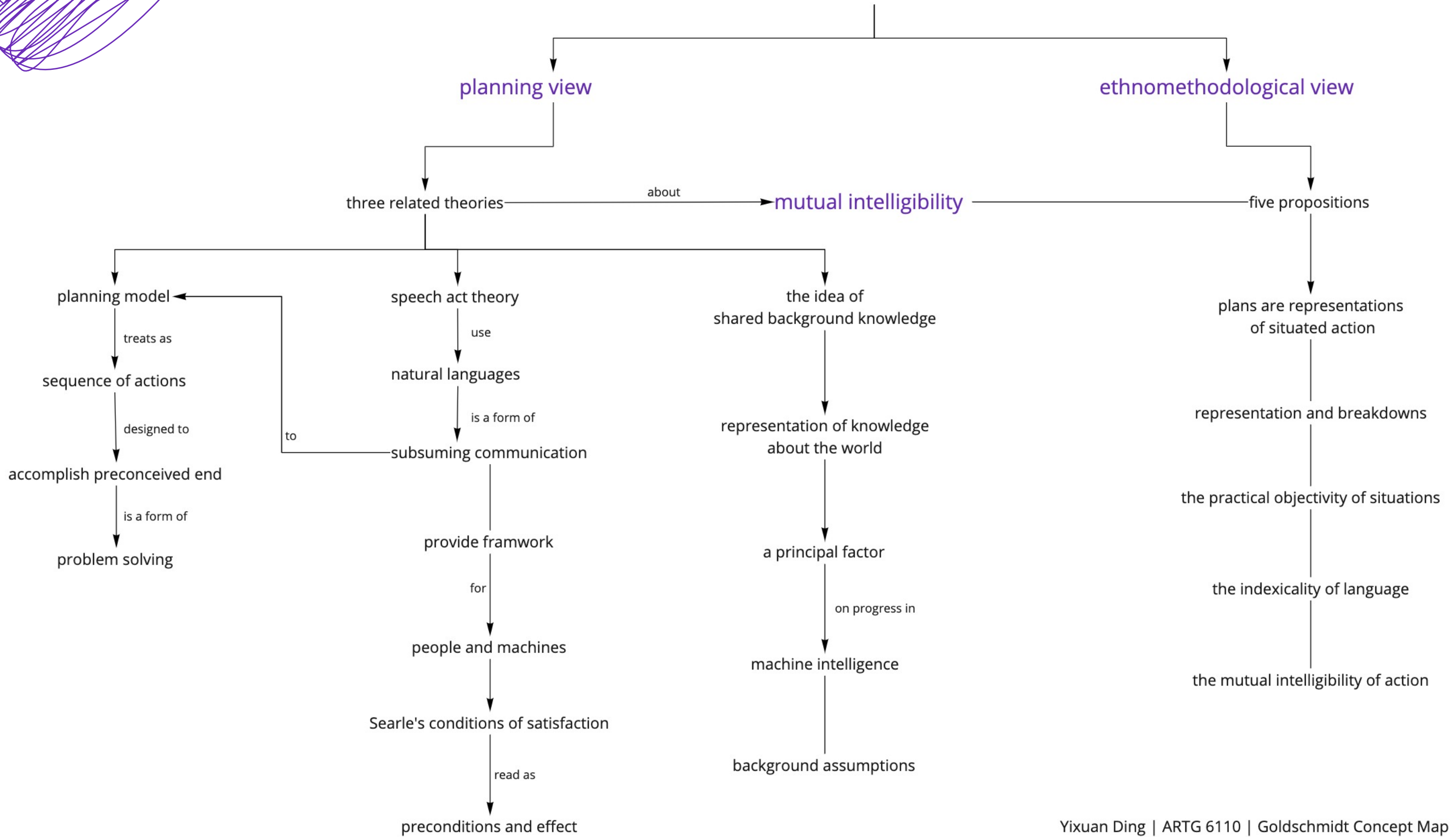




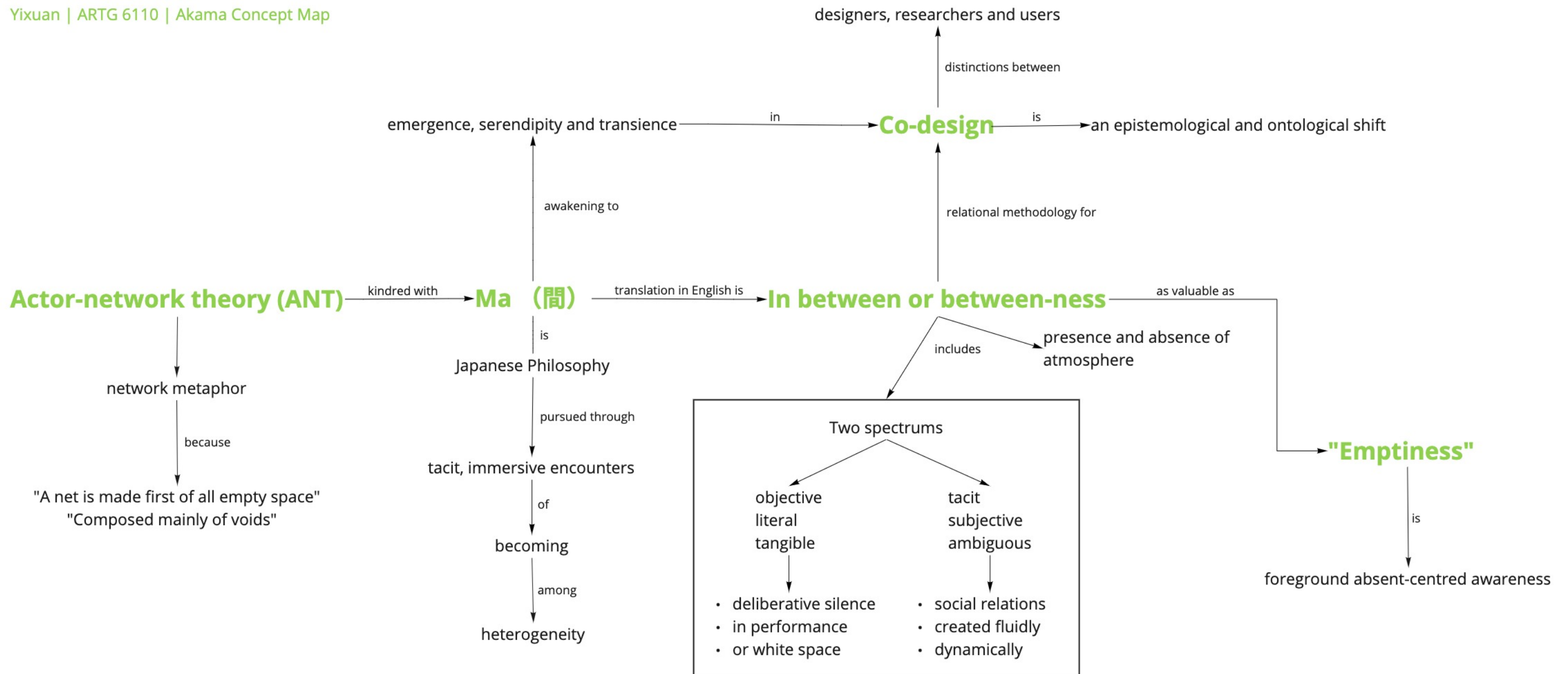


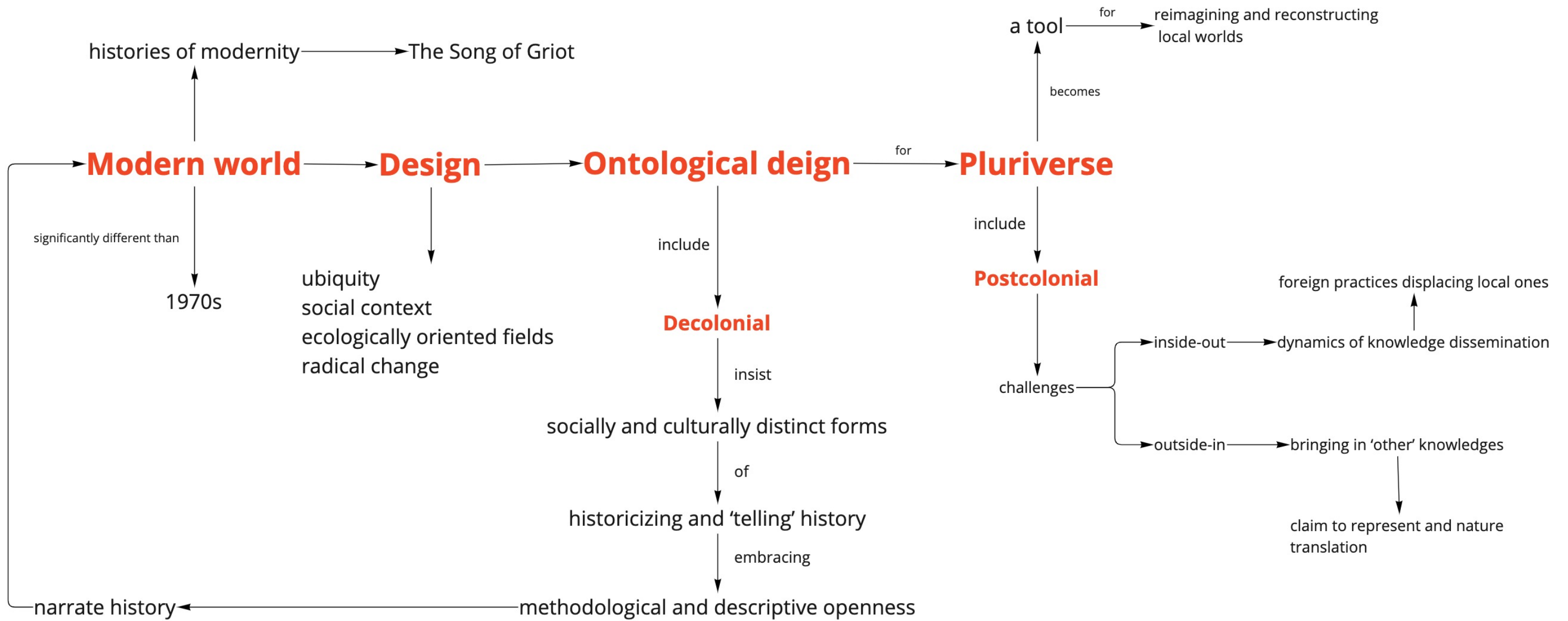


# two alternatives views of action



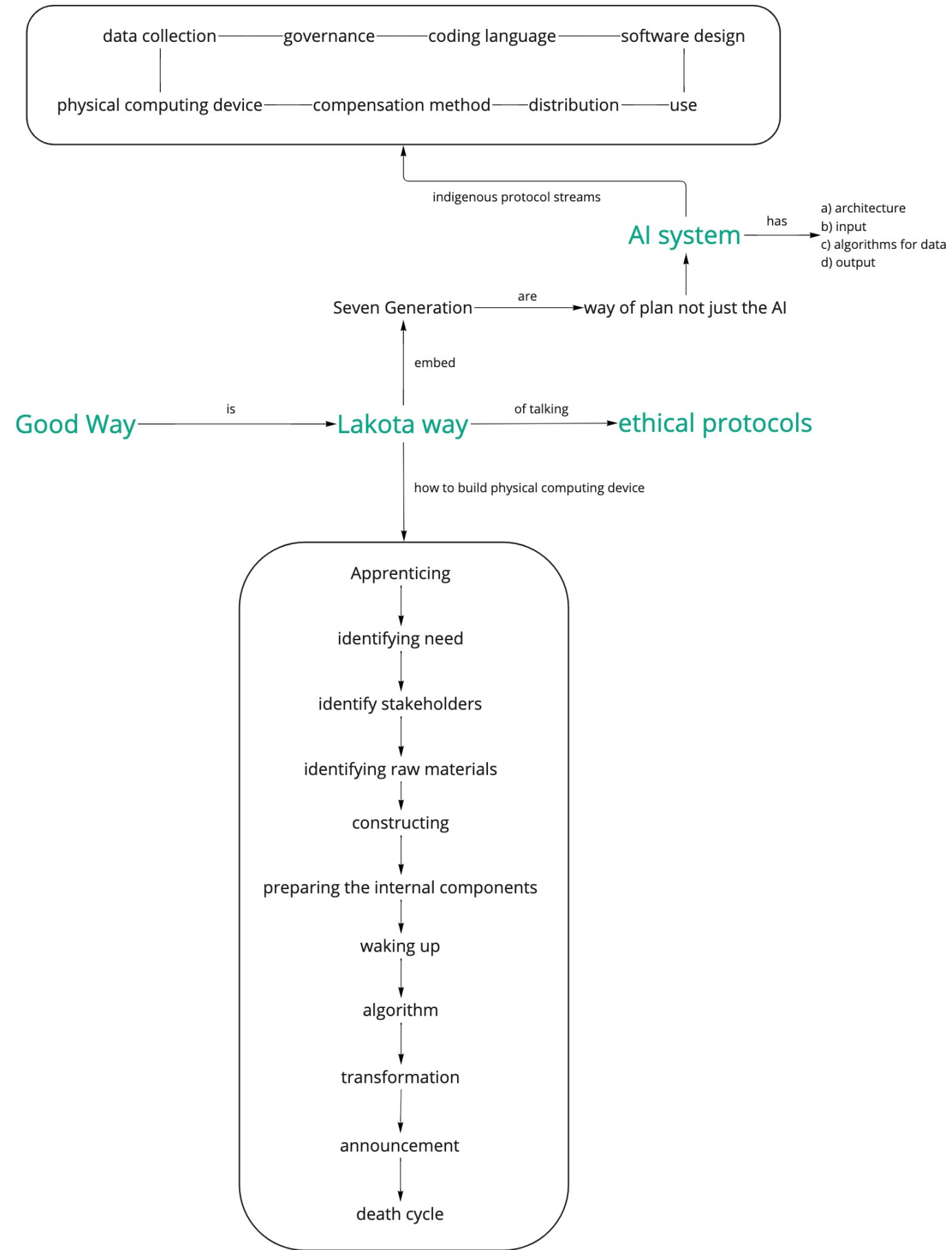






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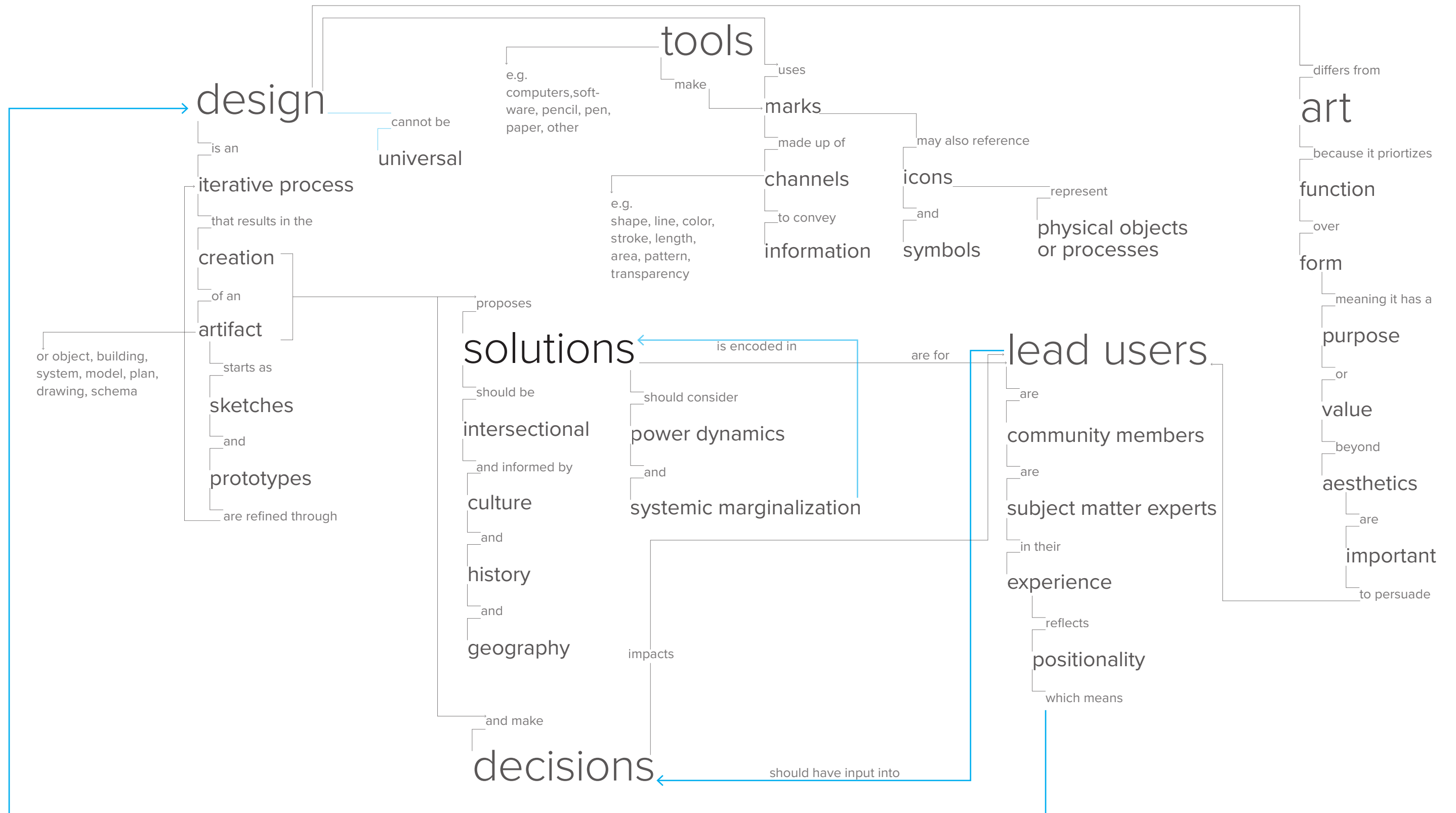
# Concept Map Book

Summarizing Critical Thinking for Information Design

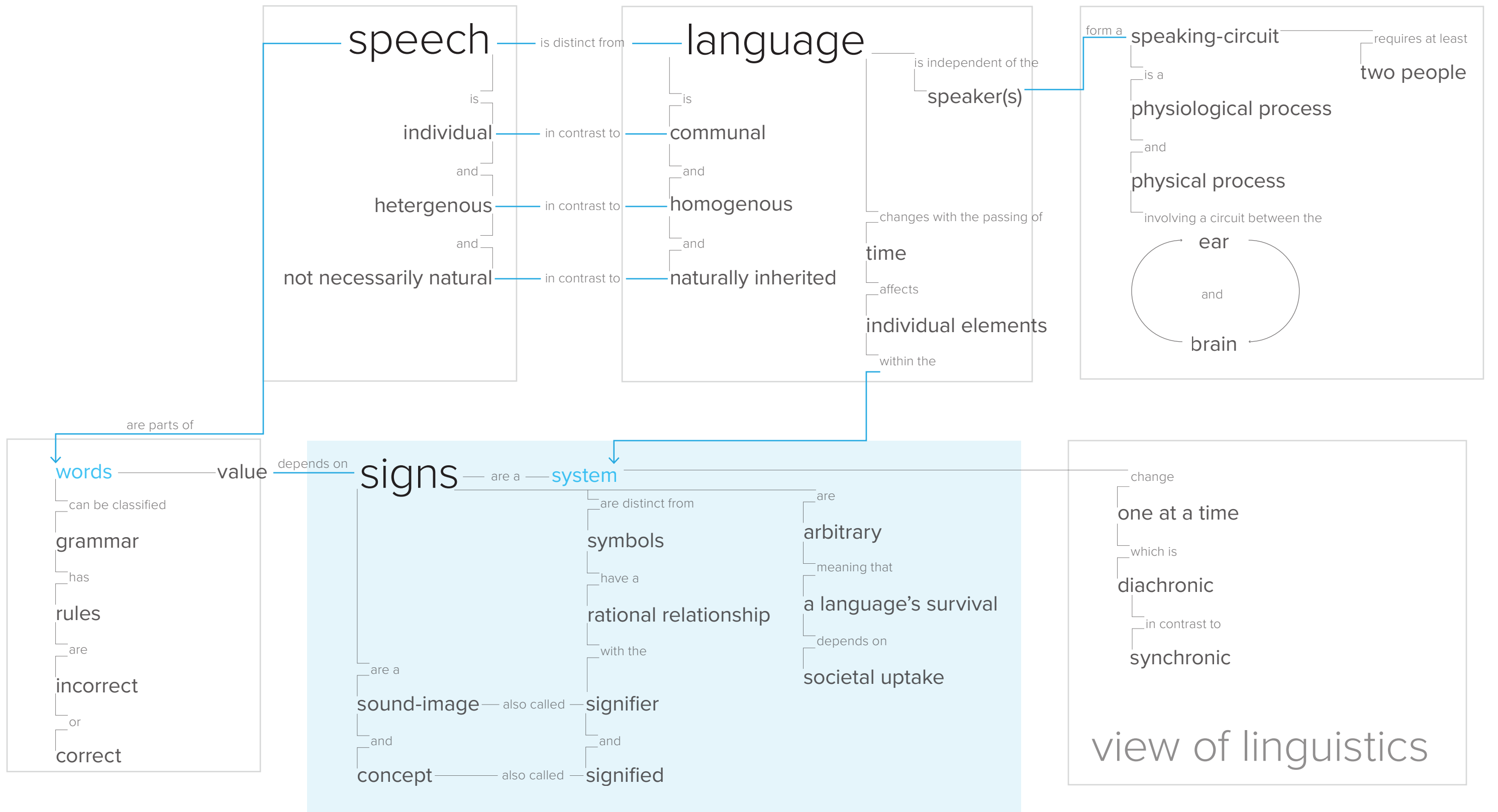


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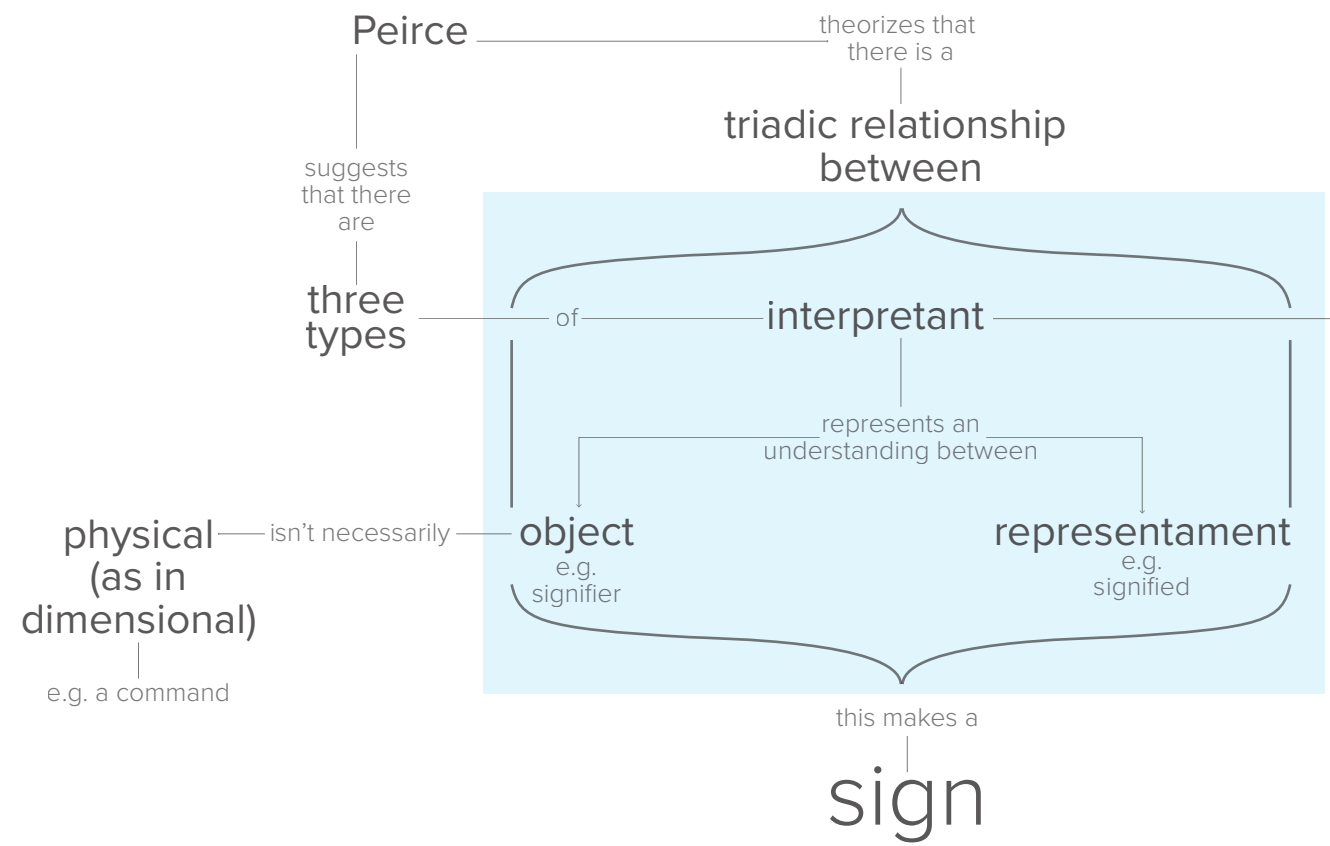
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4. Mathematical Theory of Communication by C. Shannon
5. Design Ethics by R. Buchanan
6. Institutional Ecology and Translation of Boundary Objects by S. Star
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8. Notes on a Synthesis of Form by C. Alexander
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15. Decolonial Design Practices by A. Escobar, M. Diawara, and A. Ansari
16. How to Build Anything Ethically by S. Kite



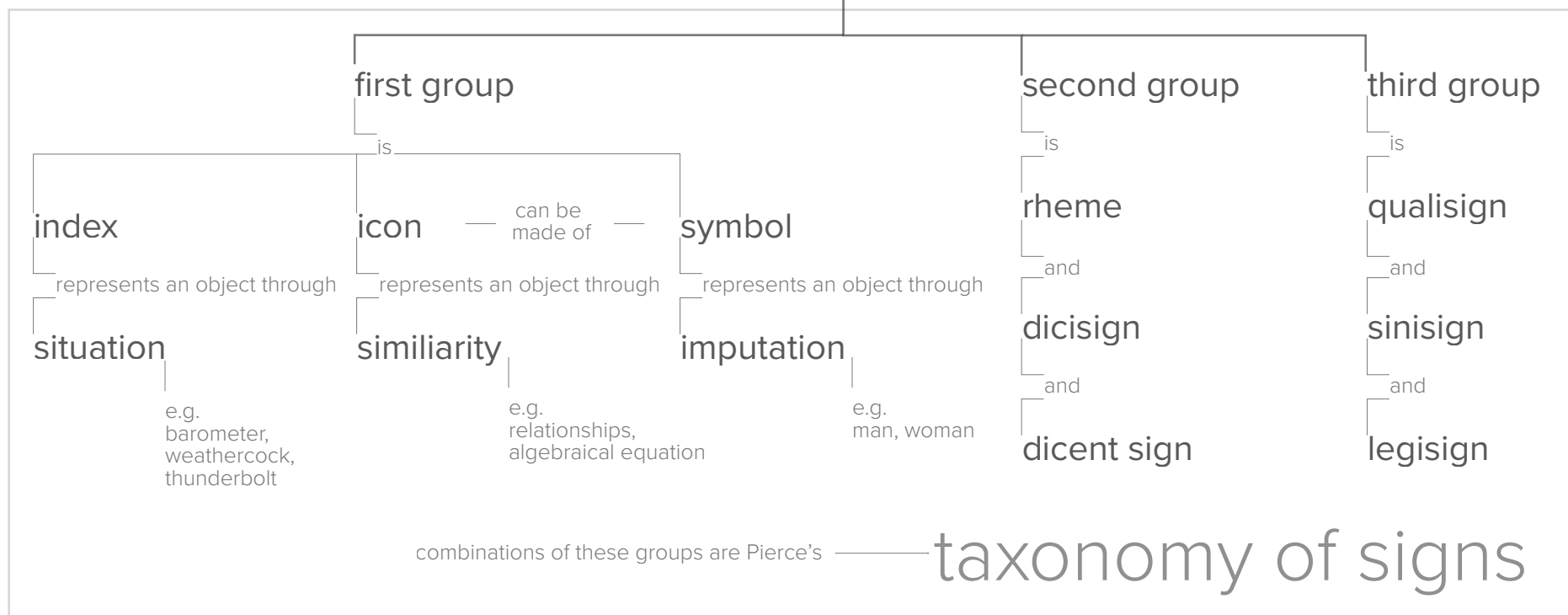
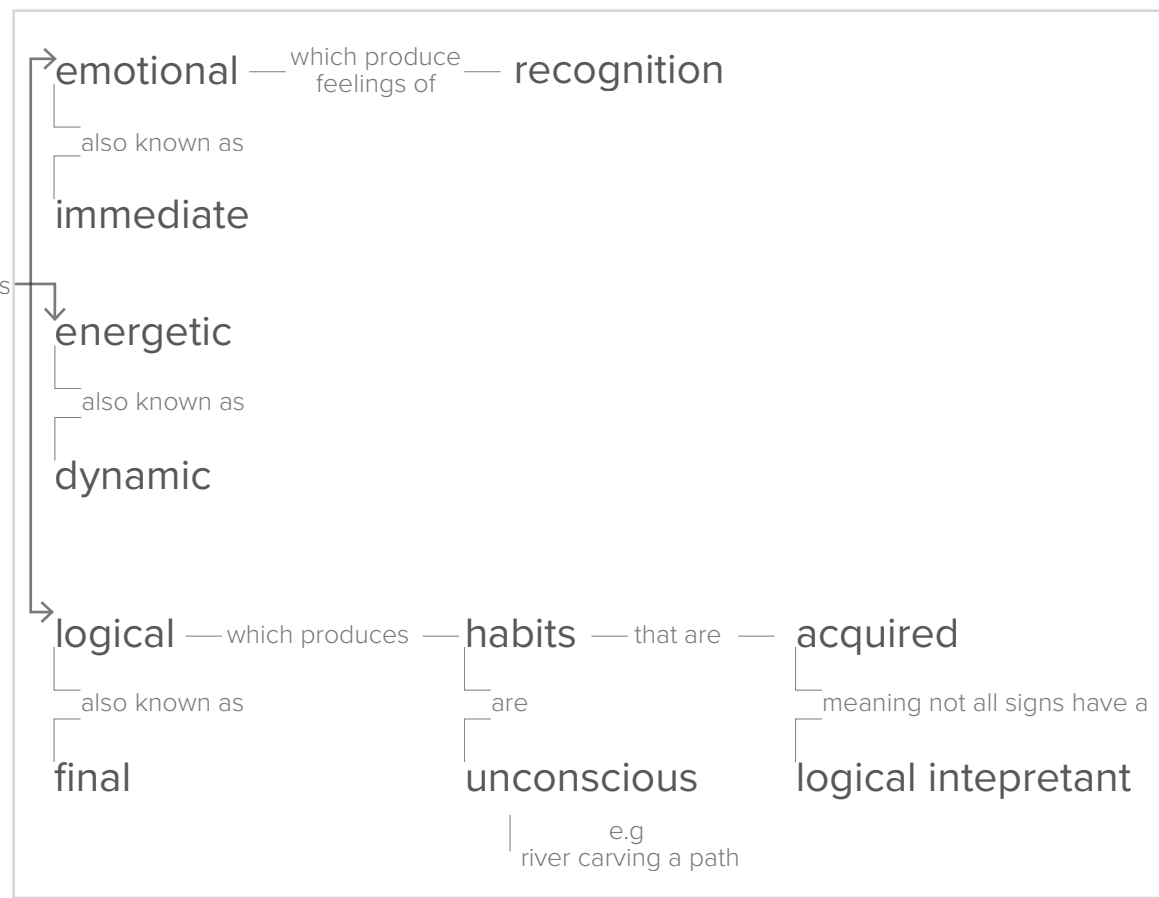
Concept Map of Design



Concept Map of Course in General Linguistics: Theory of Signs | Ferdinand de Saussure



this makes a sign



# communication system

consists of five parts

source

sends a

message

e.g.  
a sequence of letters  
a function of time  $f(t)$

to the

transmitter

system creates a signal

encodes  
information to be  
interpreted by the

receiver

decodes  
information from

delivers the signal to

destination

e.g.  
a person  
a thing

differs

semantically

from

engineering parameters

tend to be best represented

logarithmically

in that the  
message

largely this has to do with the

base 2 number system

is  
finite

used to store and measure

information

and part of a  
set

variable type

is the difference  
between these  
cases is the

of  
possibilities  
meaning it is

can be

classified

e.g.  
binary units or bits

in three ways

continuous

e.g.  
radio  
television

or

mixed

e.g.  
PCM transmission  
of speech

or

discrete

e.g.  
telegraphy

is defined by

constraints

e.g.  
no spaces follow  
each other

noise

interferes in the

channel

is the

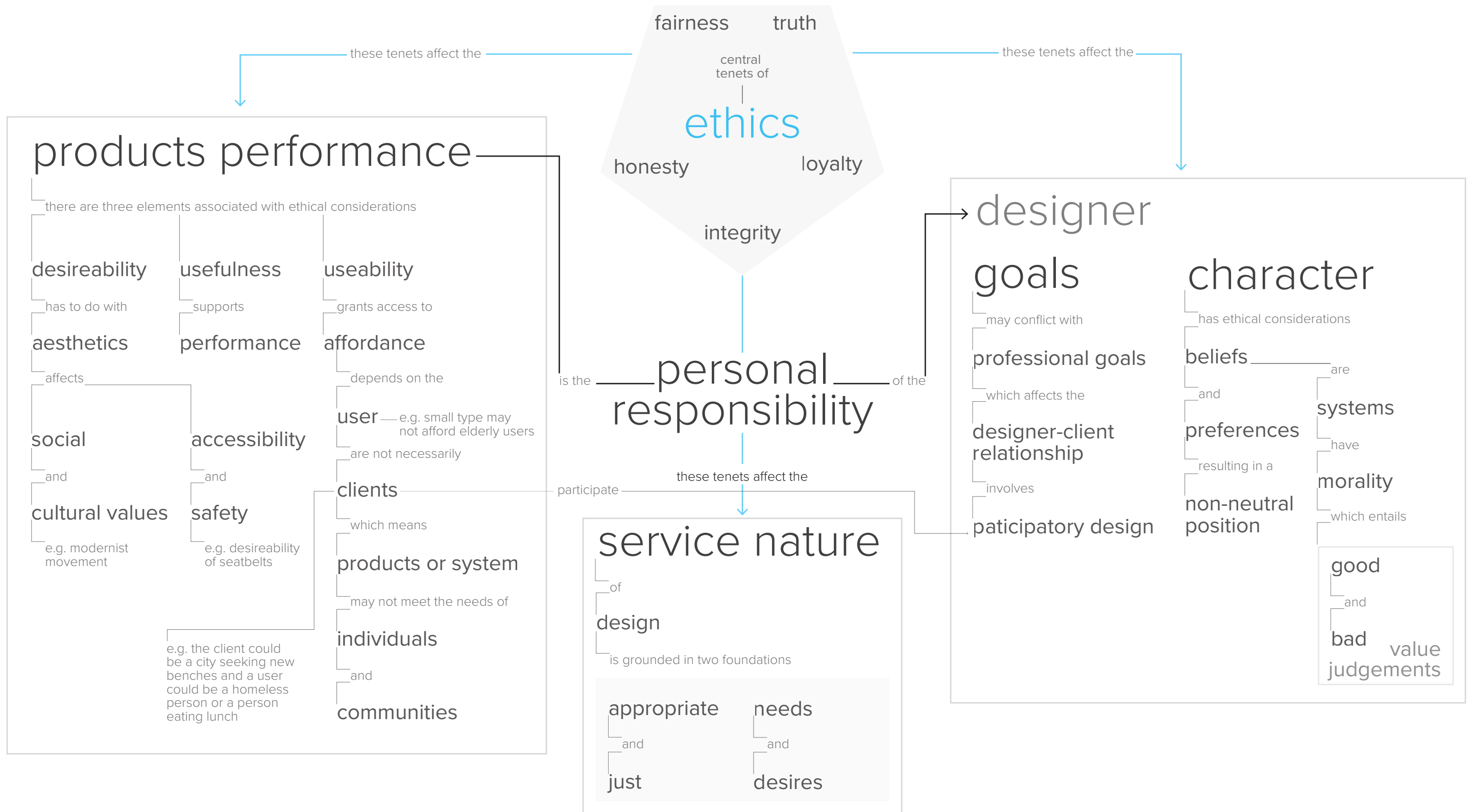
medium

e.g.  
a wire a coax  
cable a radio  
frequency a  
beam of light

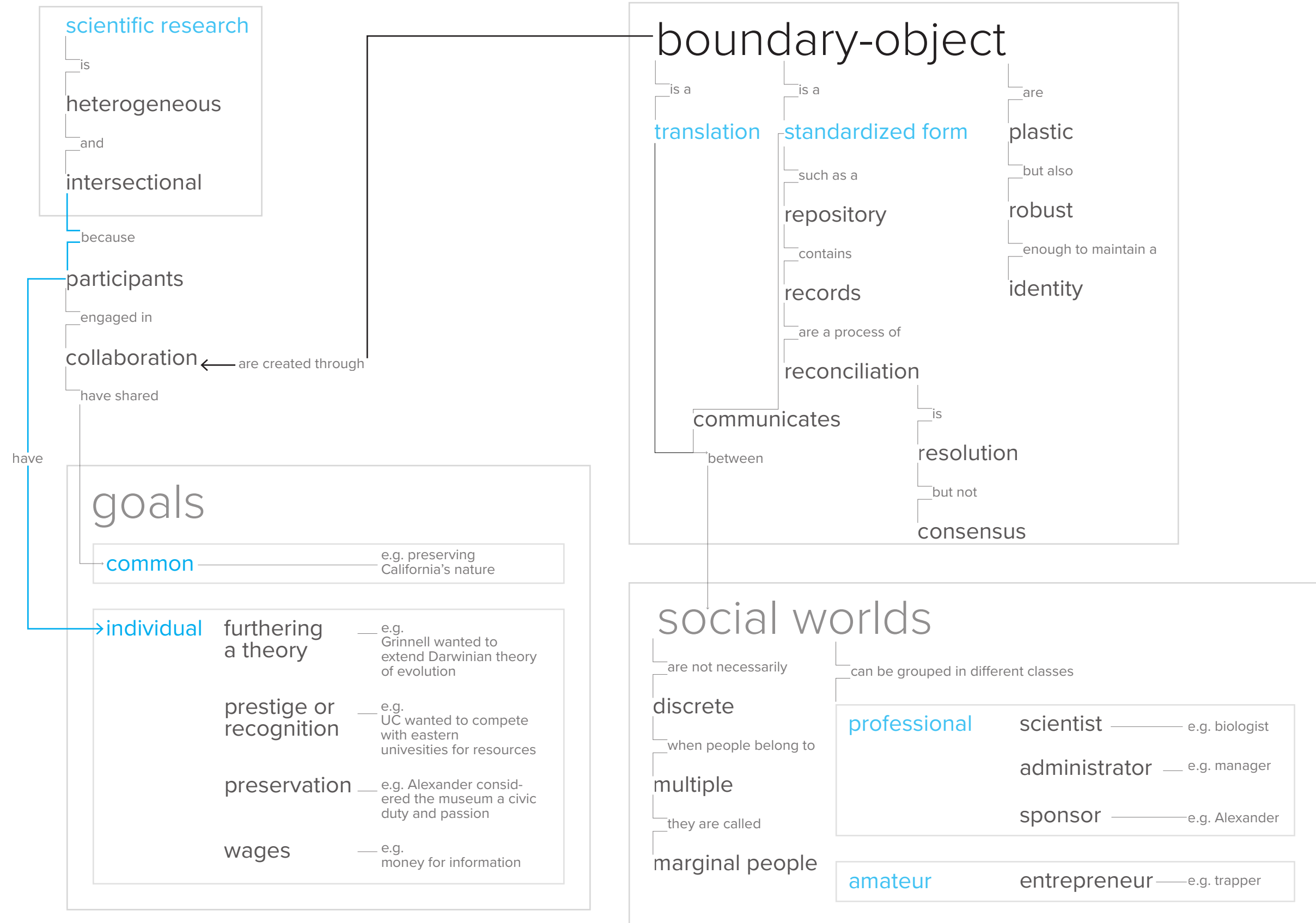
through which a

system operates

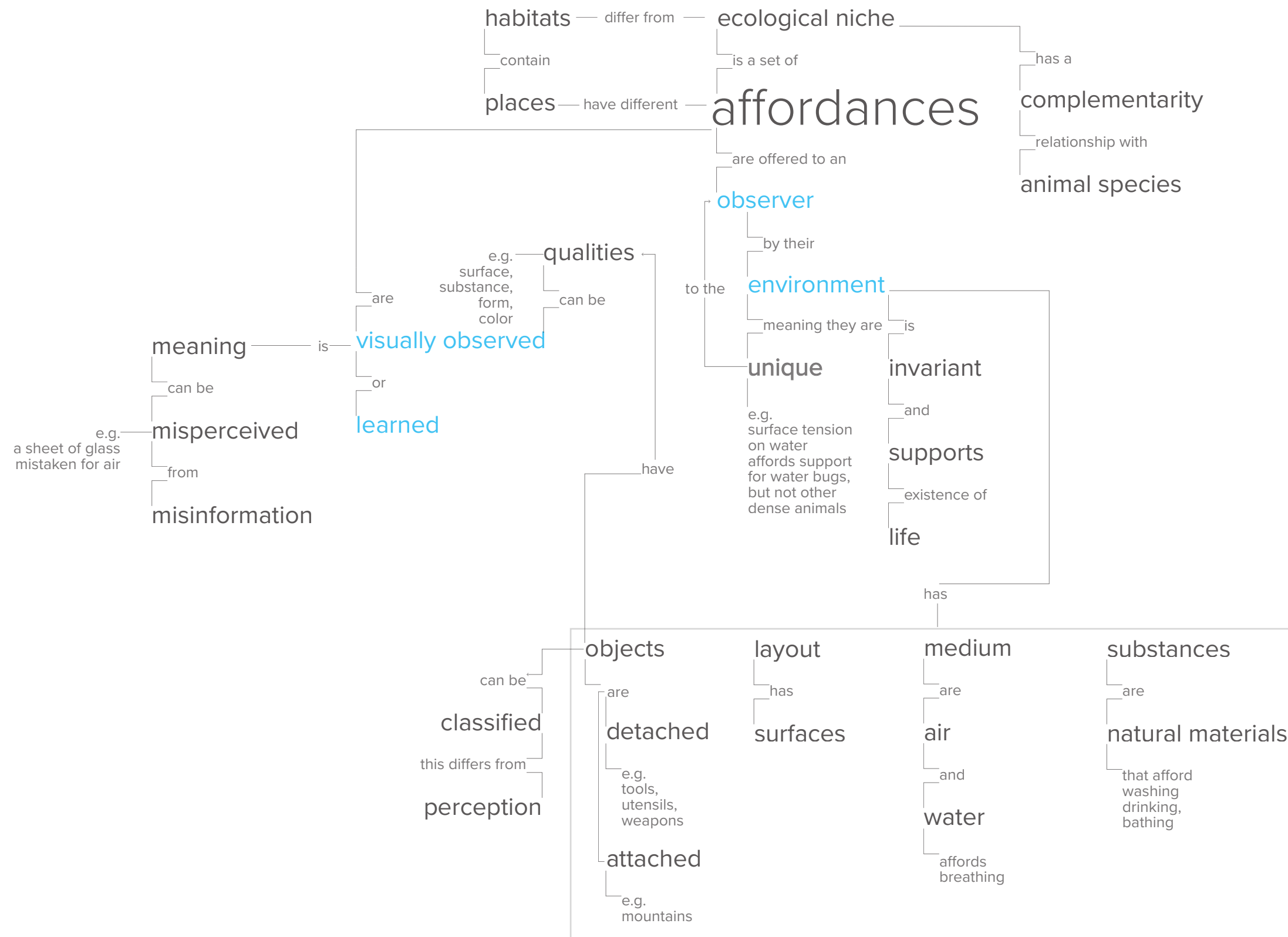


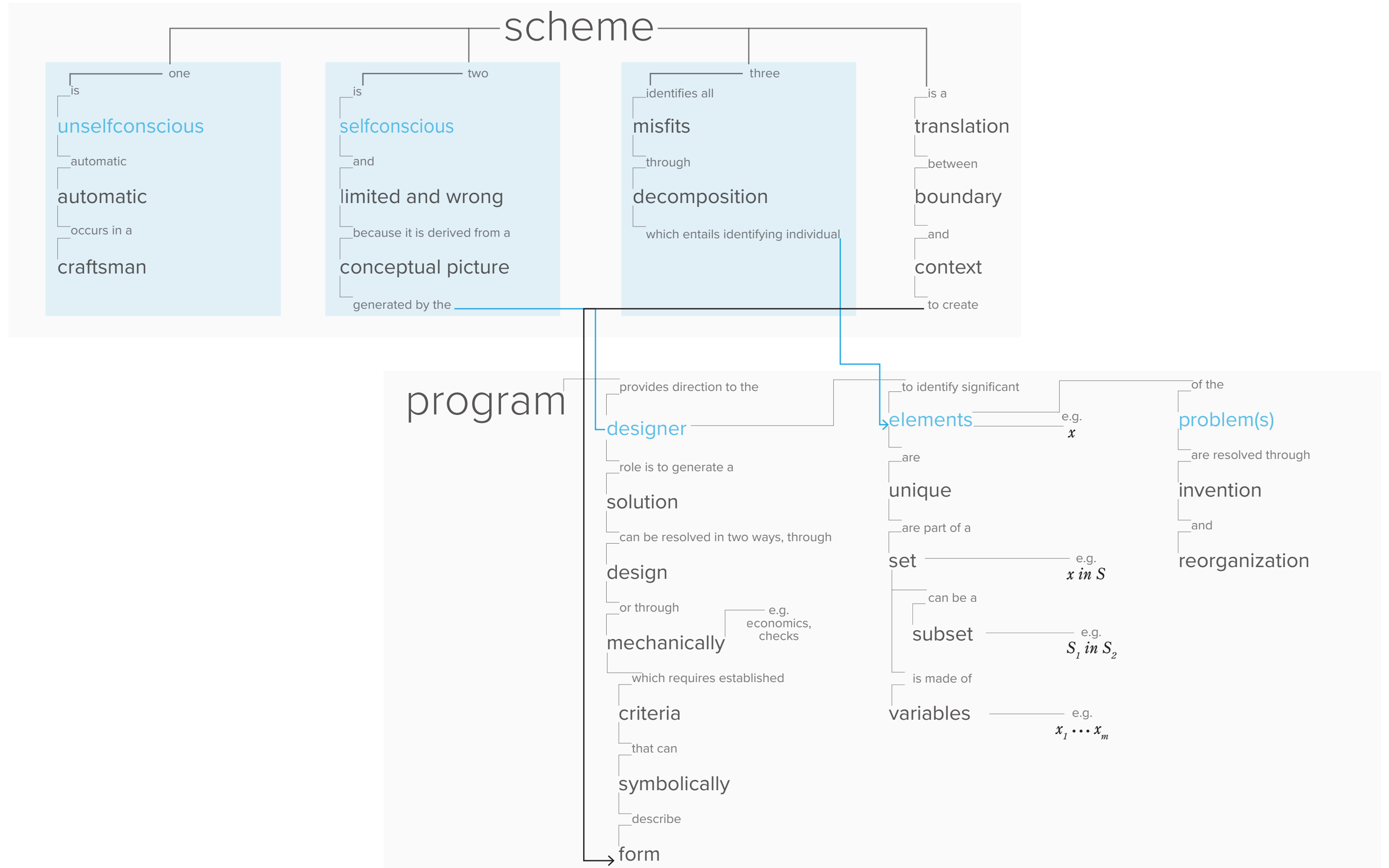


Concept Map of *Design Ethics* | Richard Buchanan

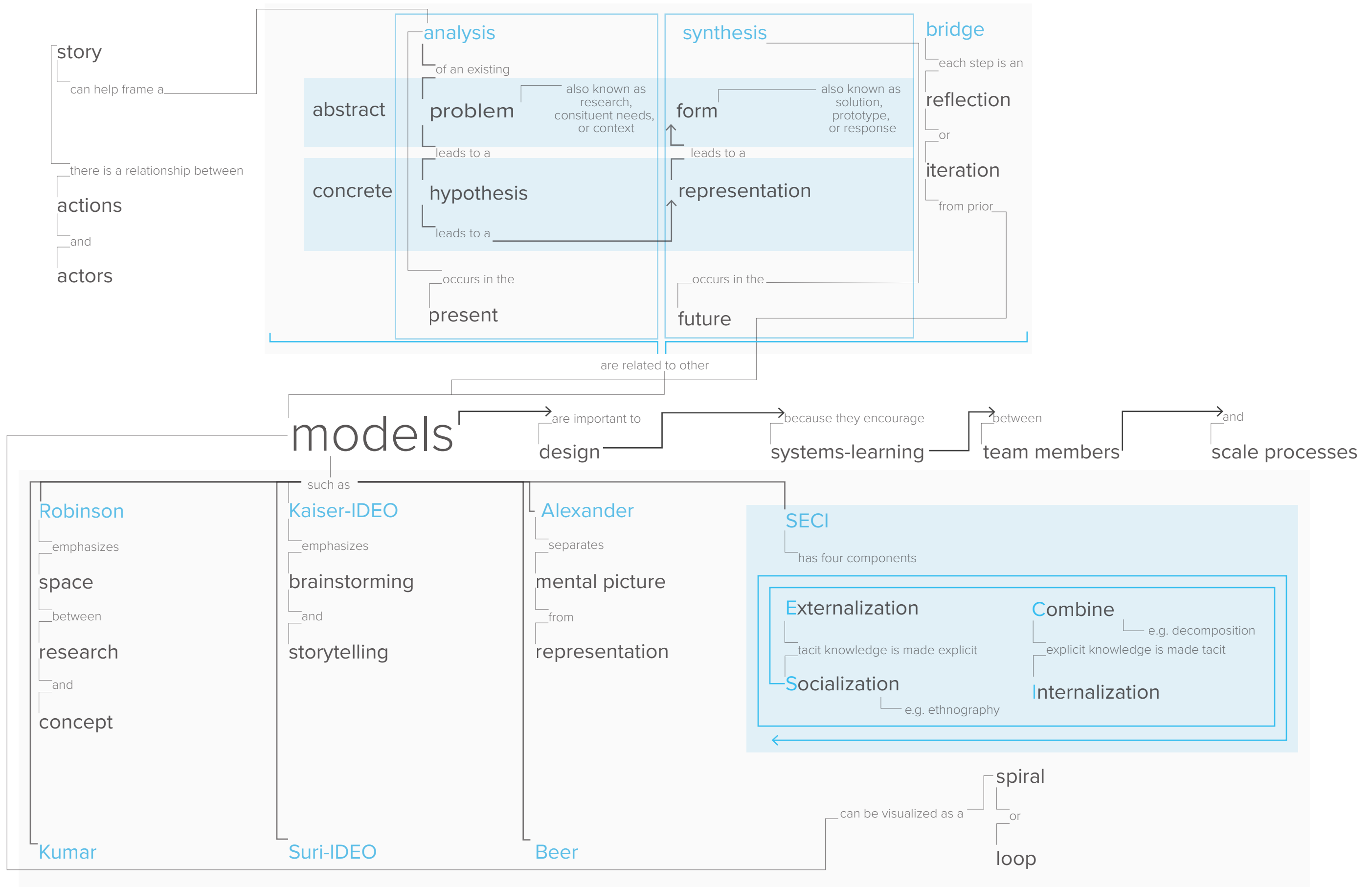


Concept Map Boundary Objects | Susan Star & James Griesemer



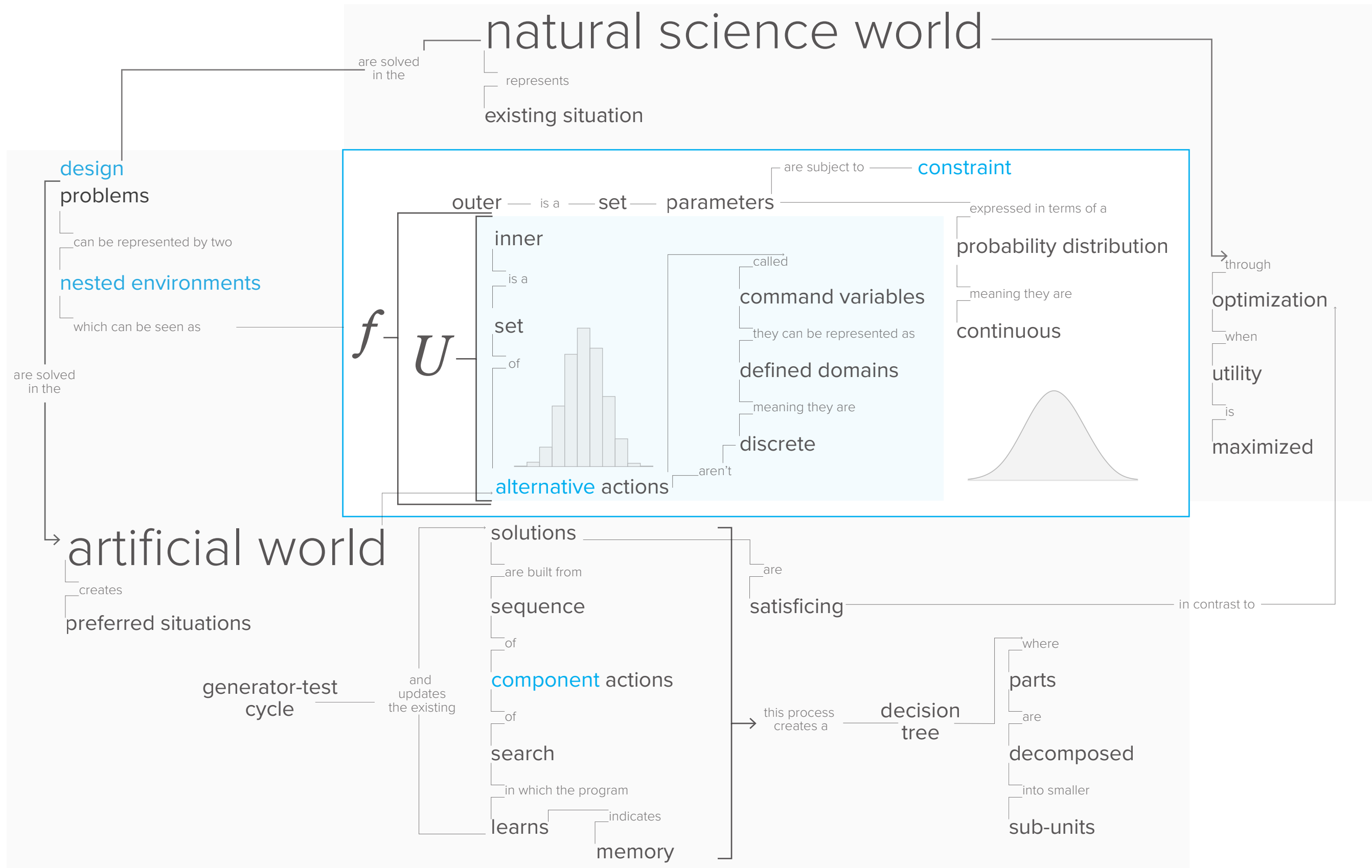


Concept Map Notes on a Synthesis of Form | Christopher Alexander

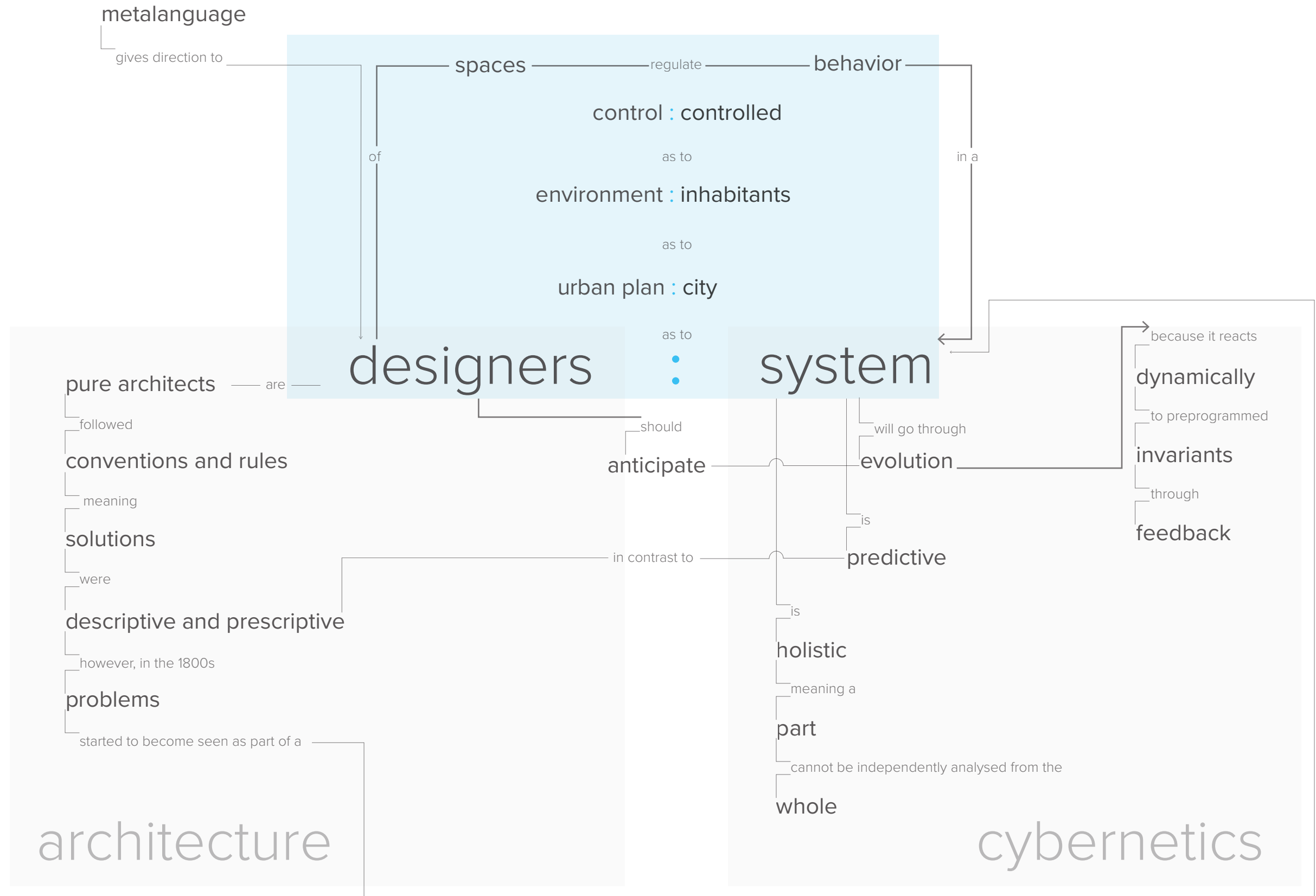


Concept Map of *The Analysis-Bridge Synthesis Model* | Hugh Dubberly

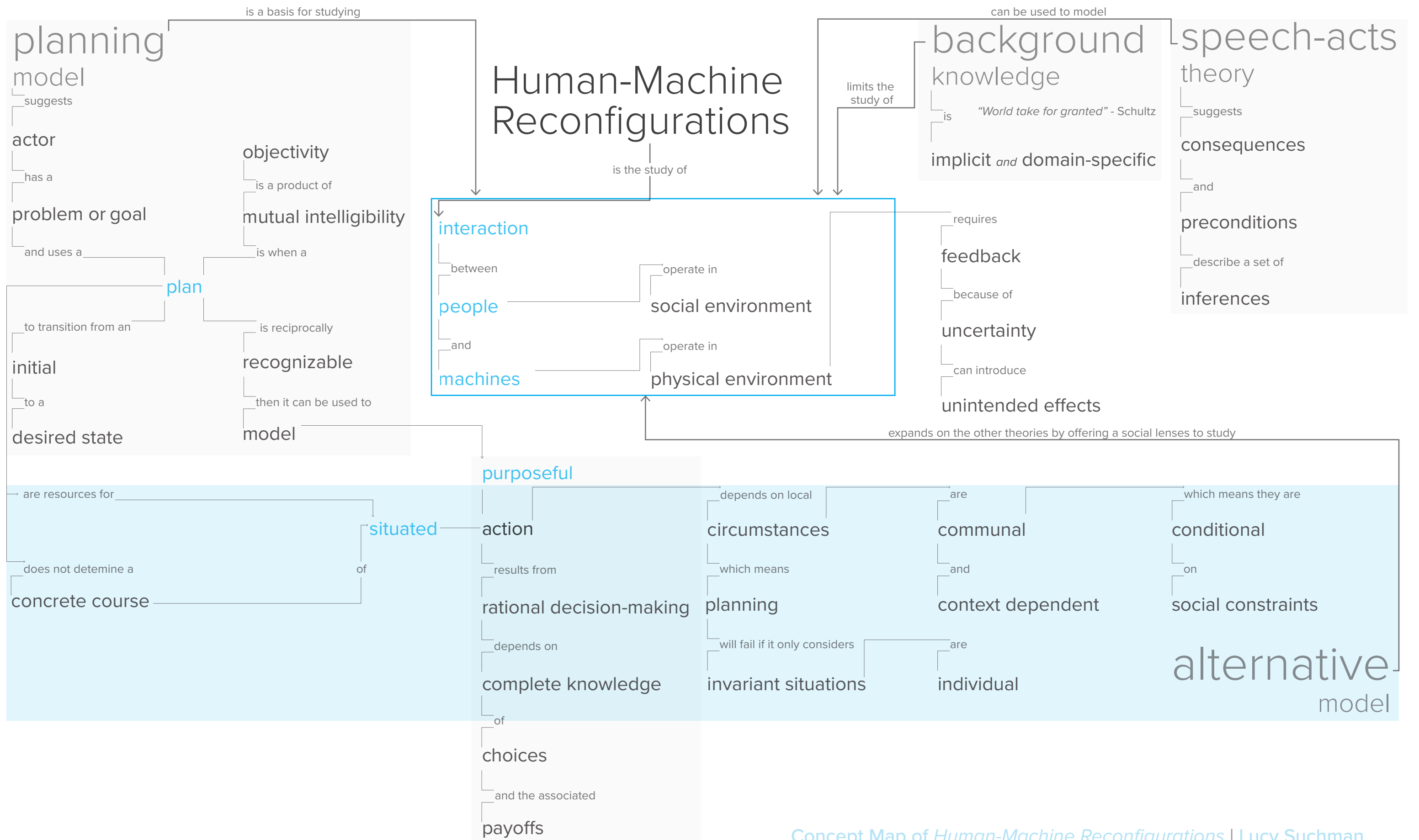




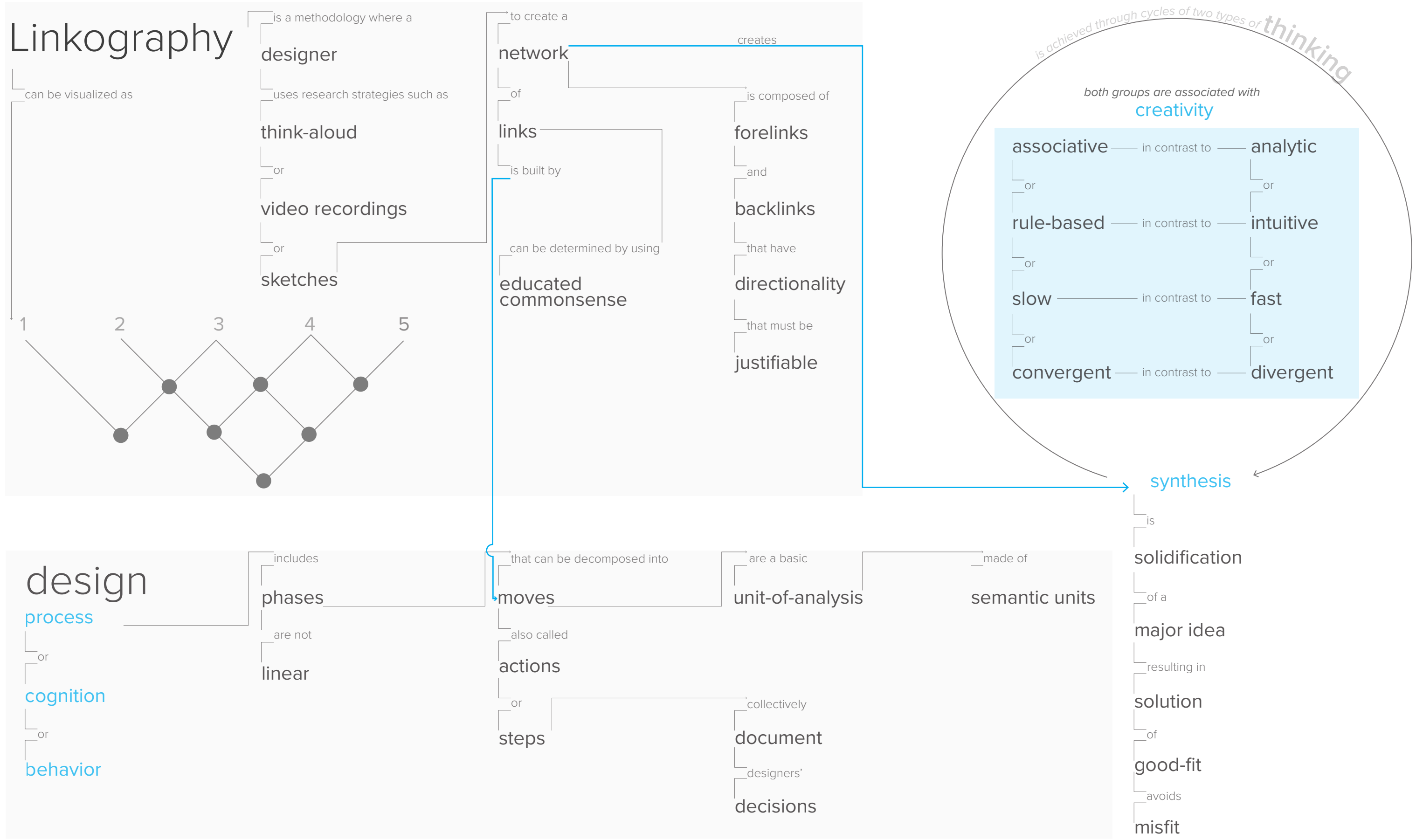
Concept Map of *The Science of the Artificial* | Herbert Simon



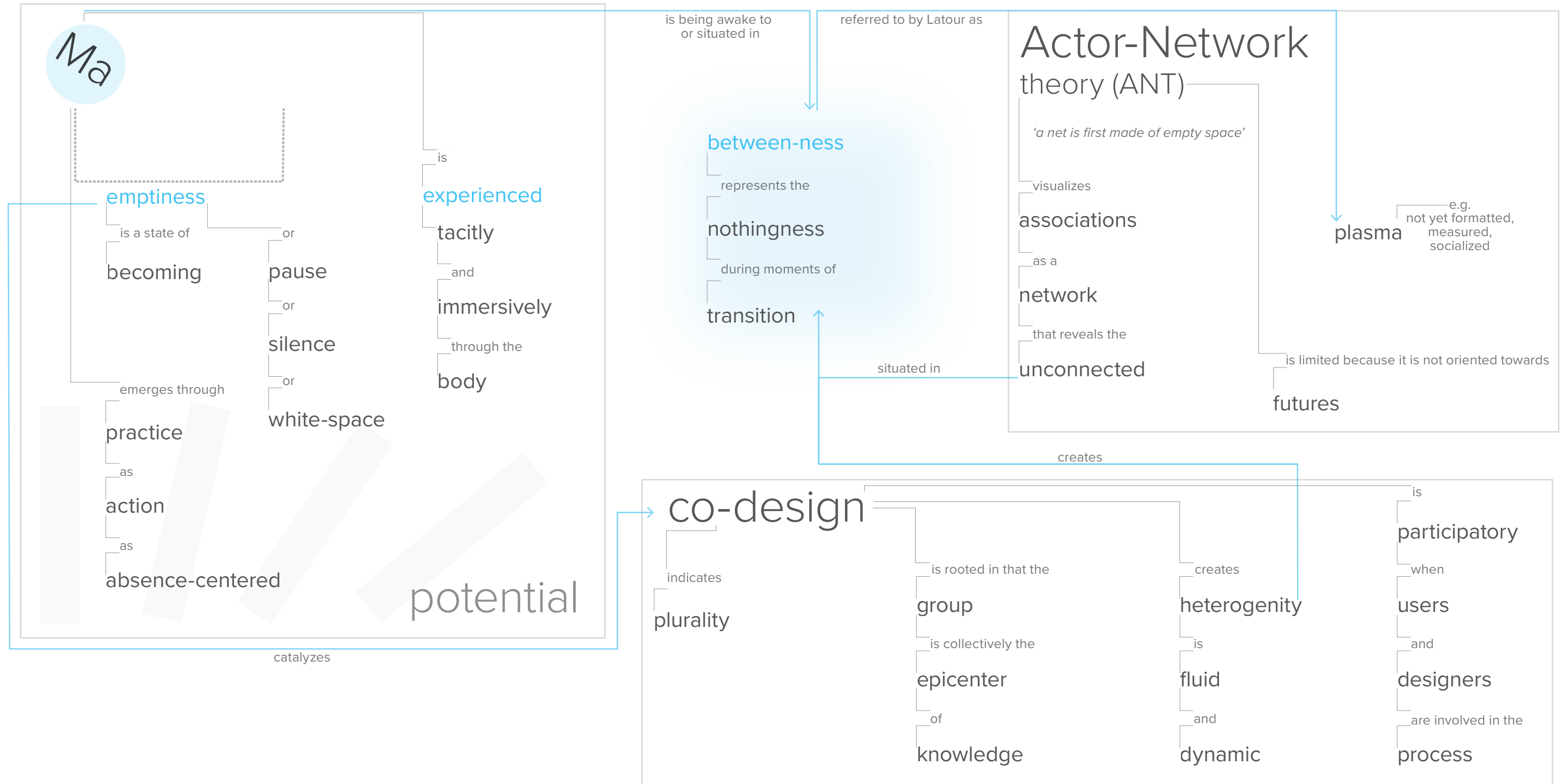
Concept Map of *The Architectural Relevance of Cybernetics* | Gordon Pask



Concept Map of Human-Machine Reconfigurations | Lucy Suchman

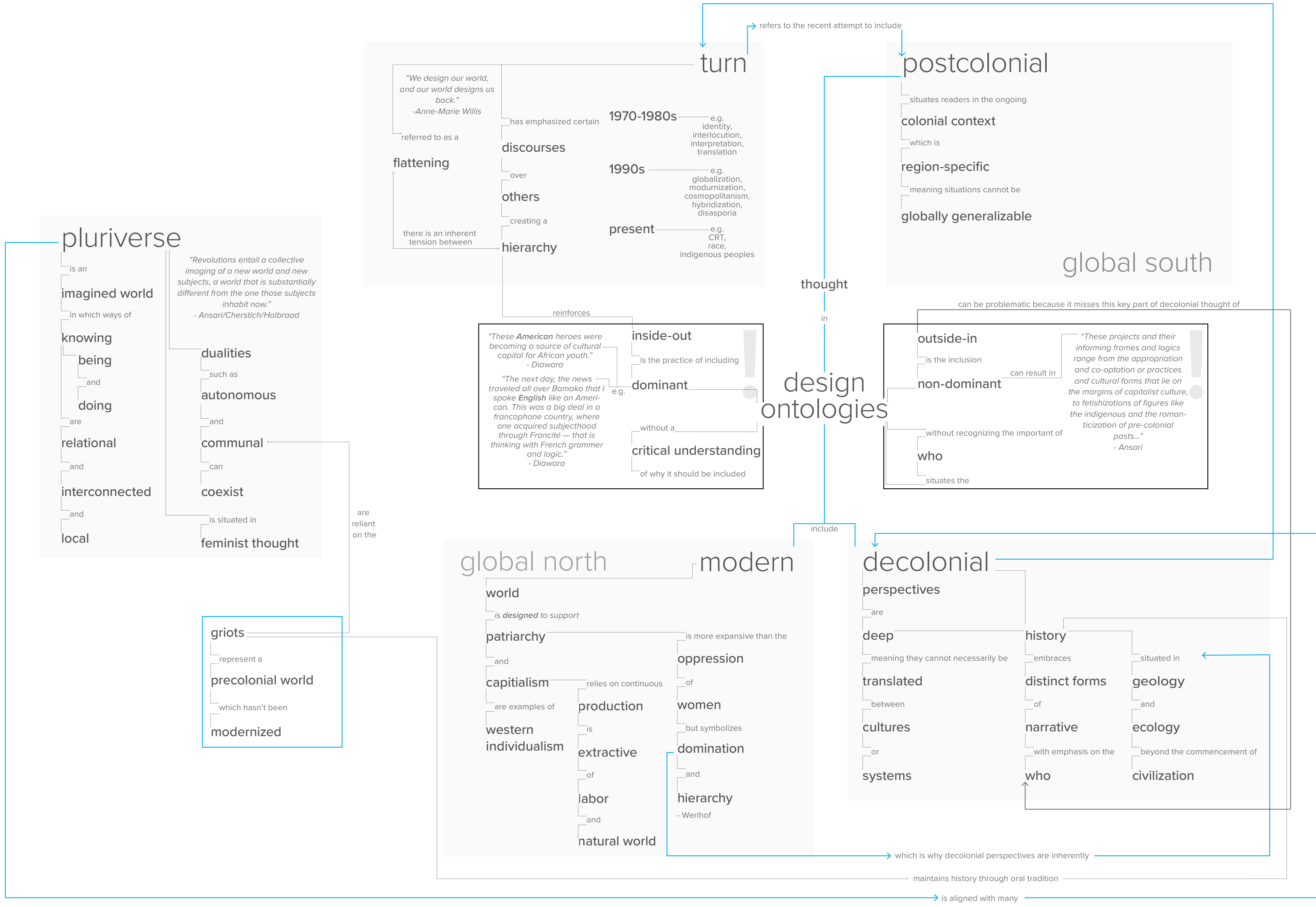


Concept Map of *Linkography* | Gabriella Goldschmidt

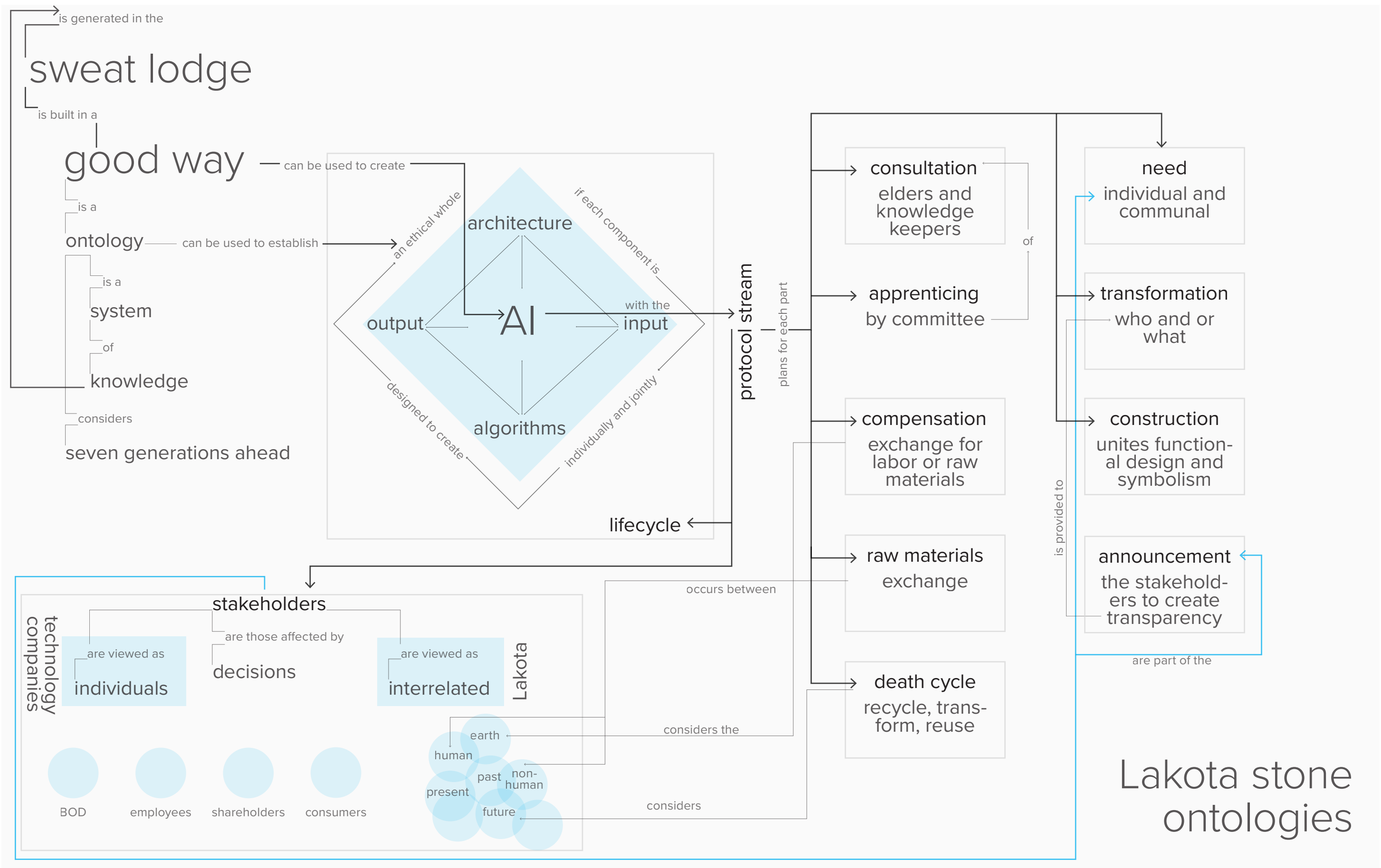


Concept Map of Being Awake to Ma | Yoko Akama





Concept Map of Decolonial Design Practices by Ansari, Escobar, and Diawara



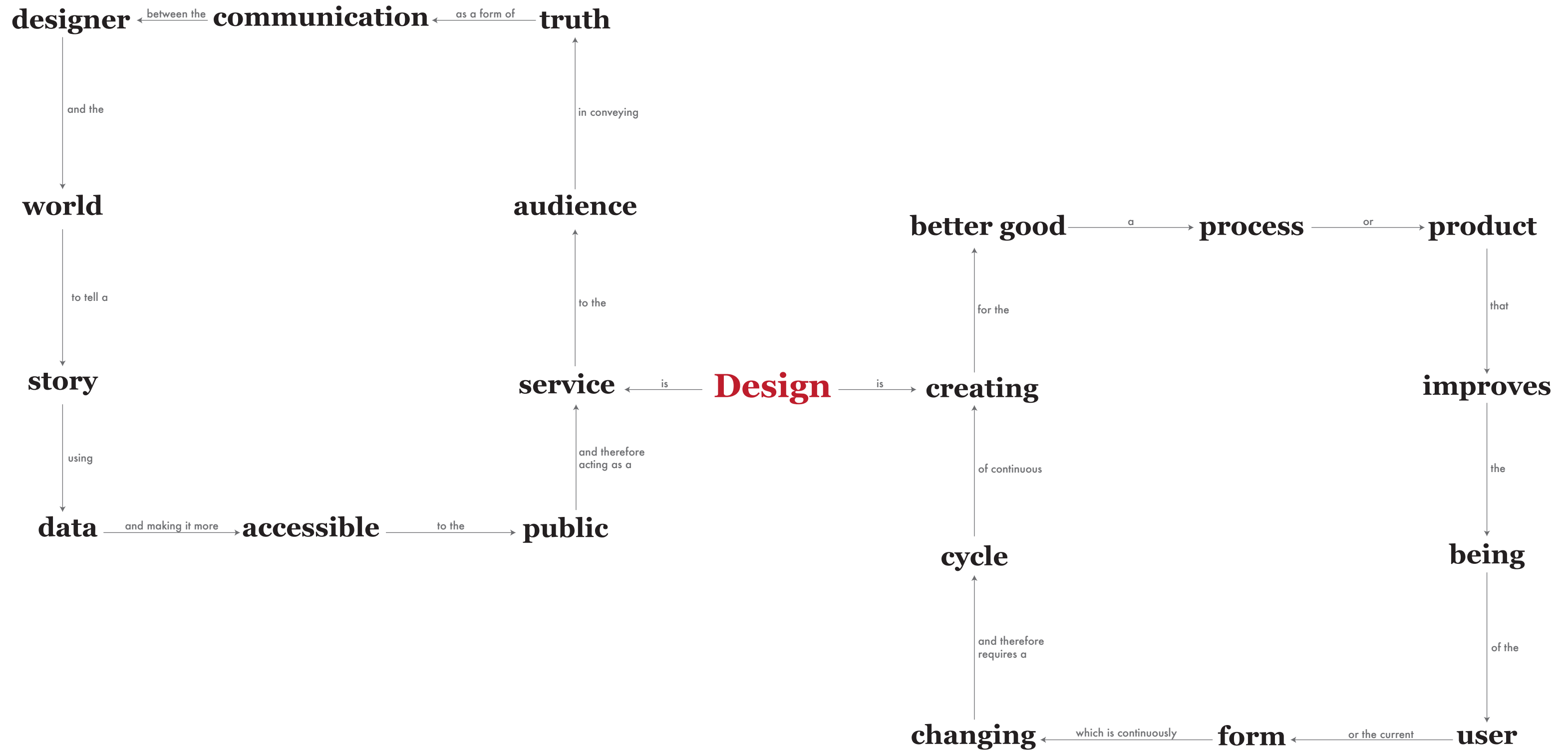
# Concept Map Book

*a culmination of learnings from*

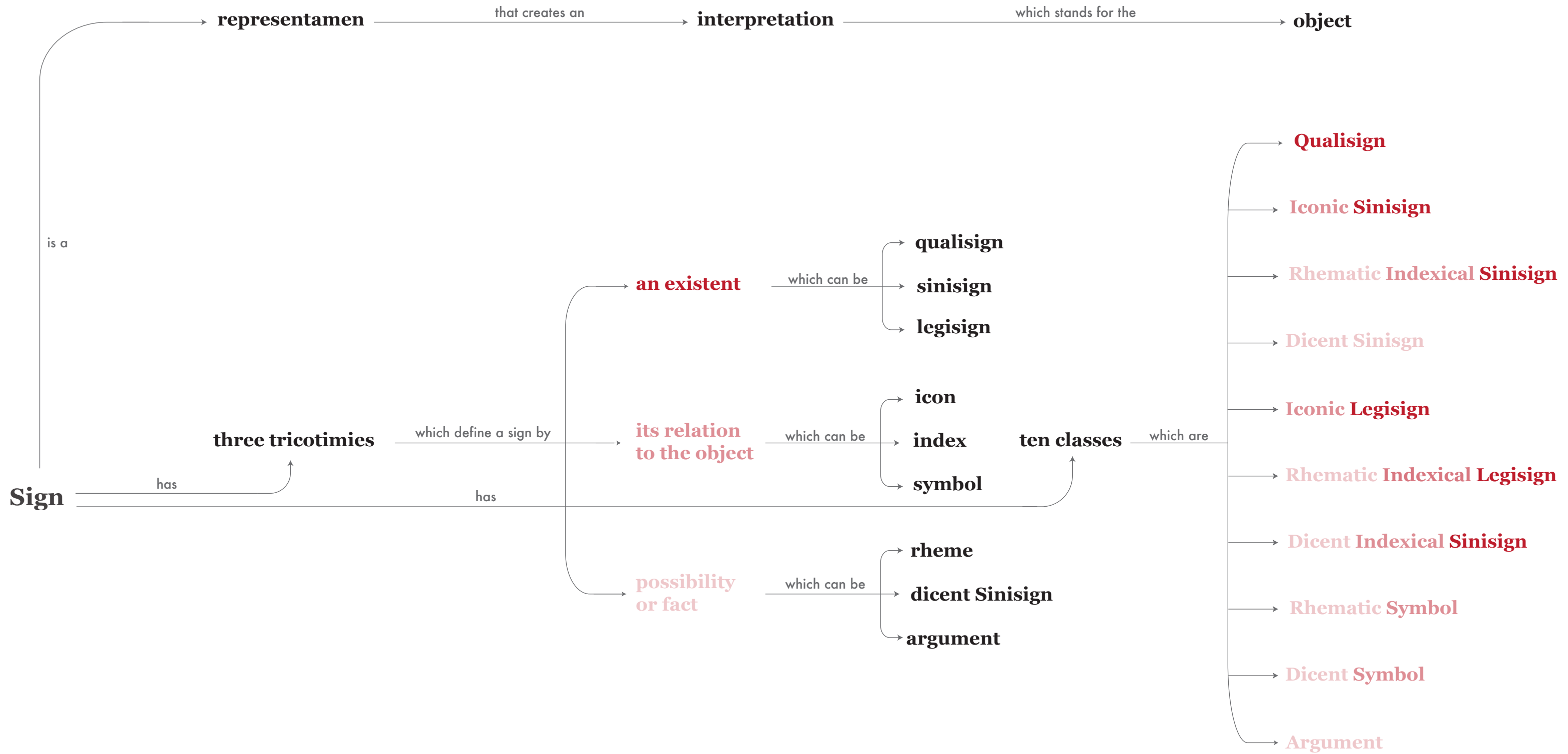
**Information Design Theory  
& Critical Thinking**

*designed by*

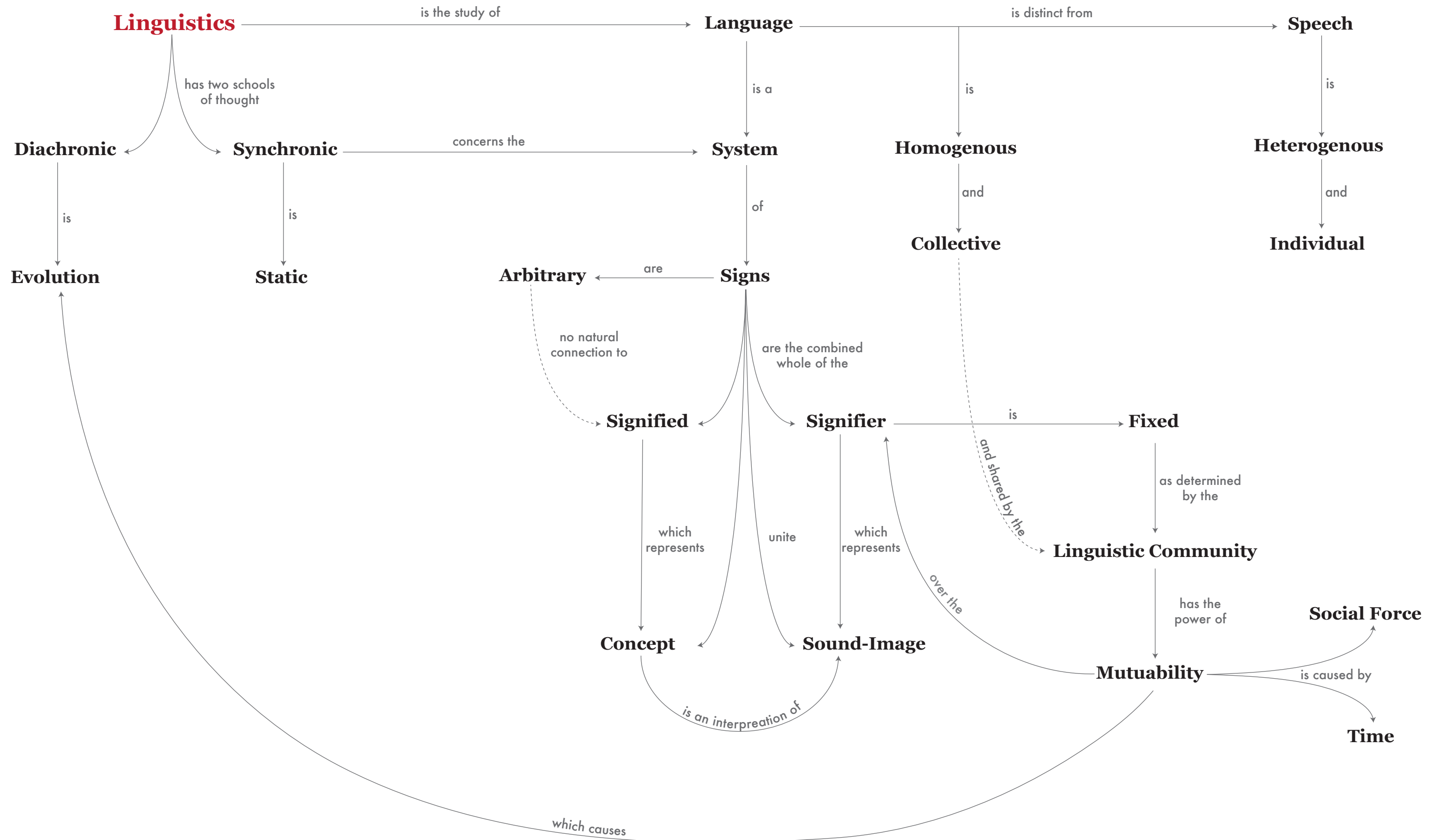
**Kathleen Foley**

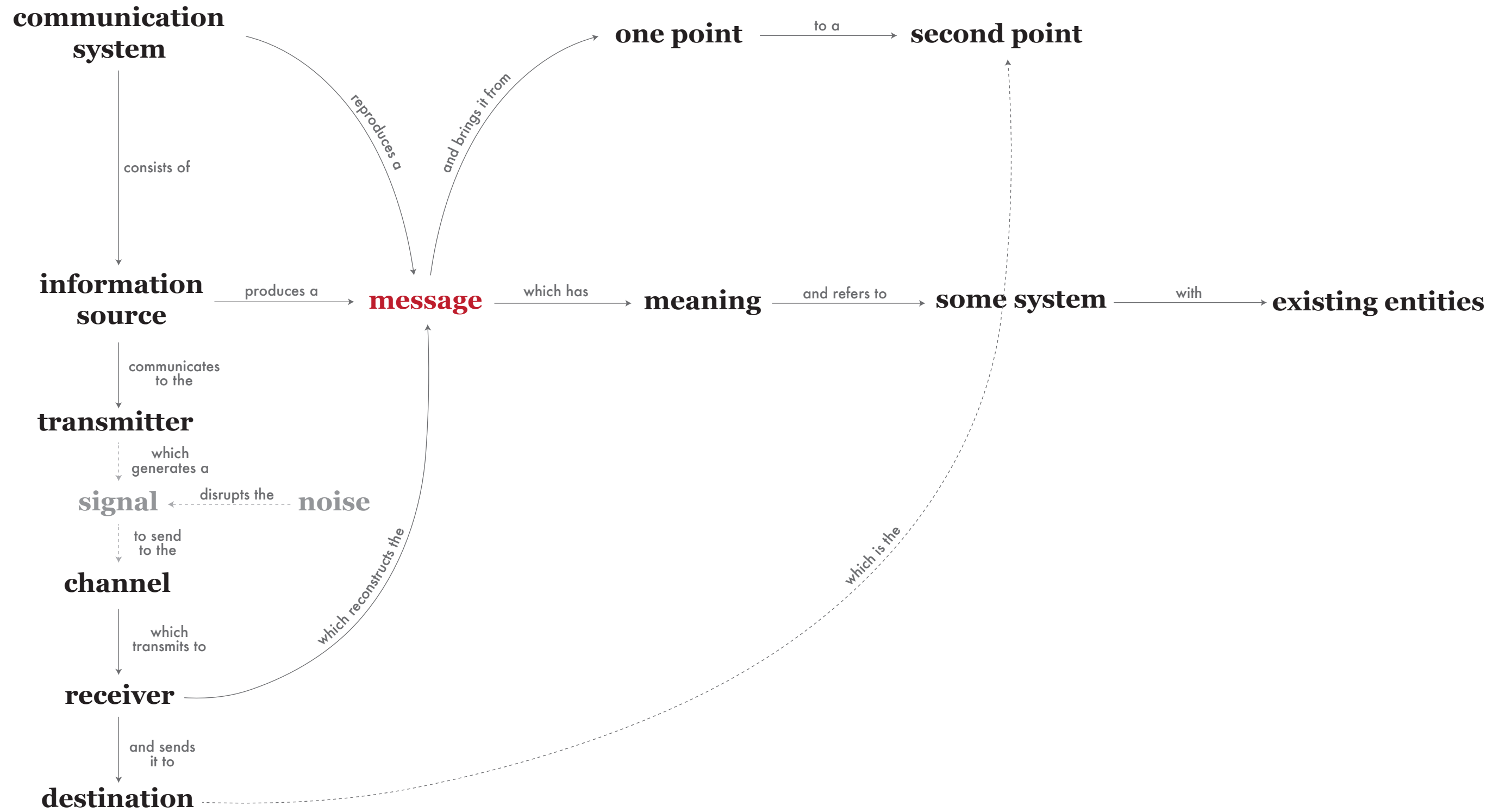


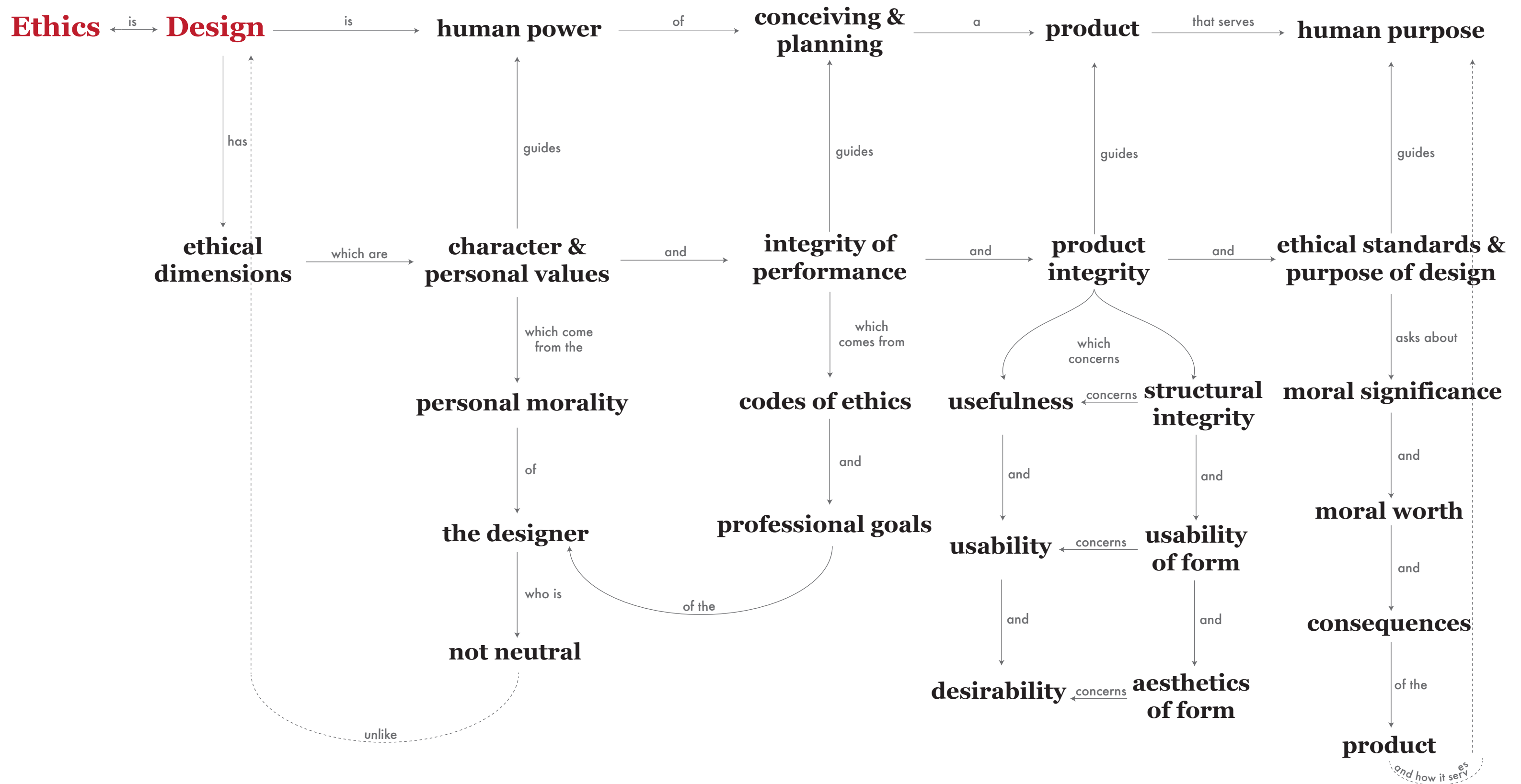
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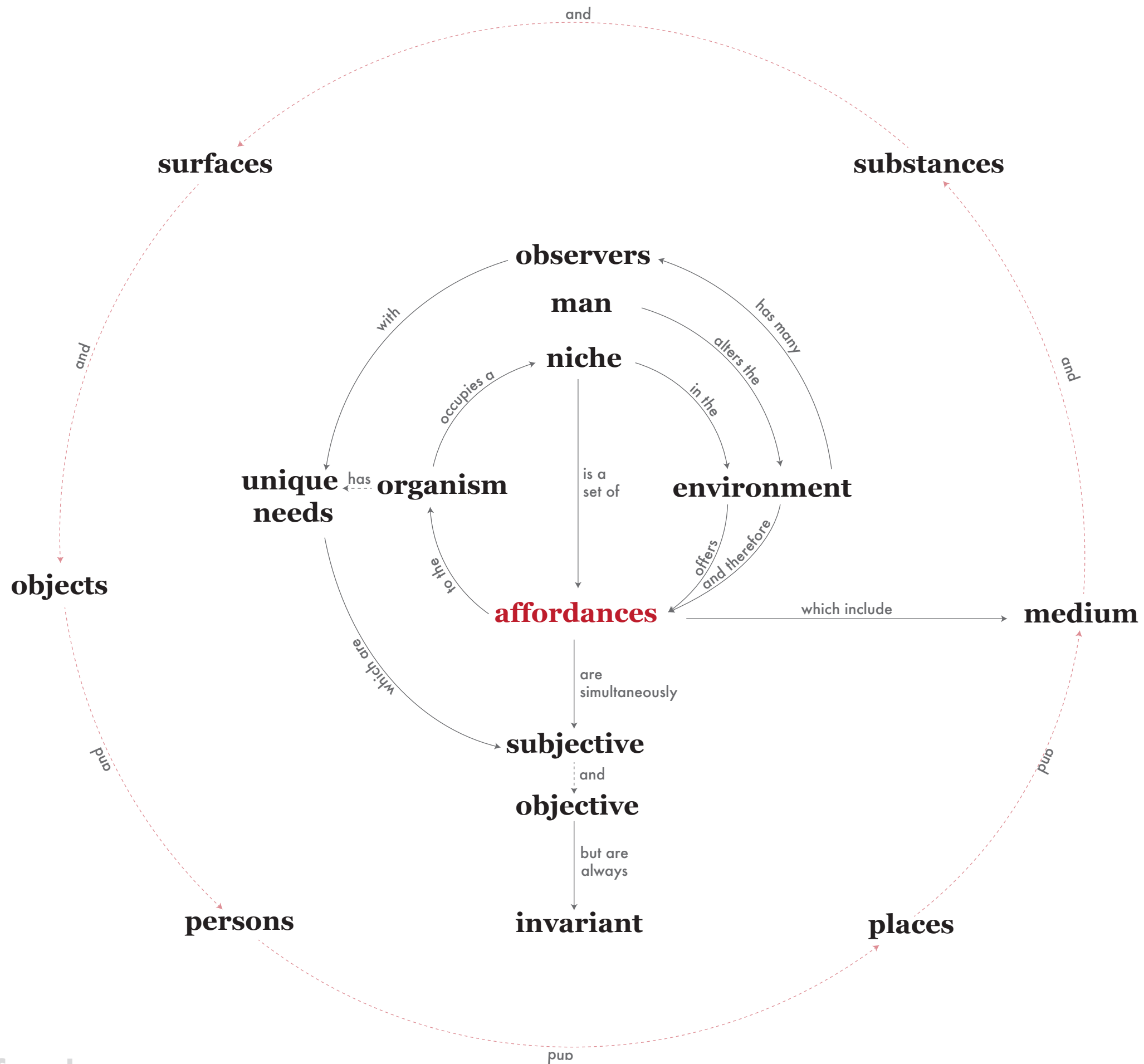


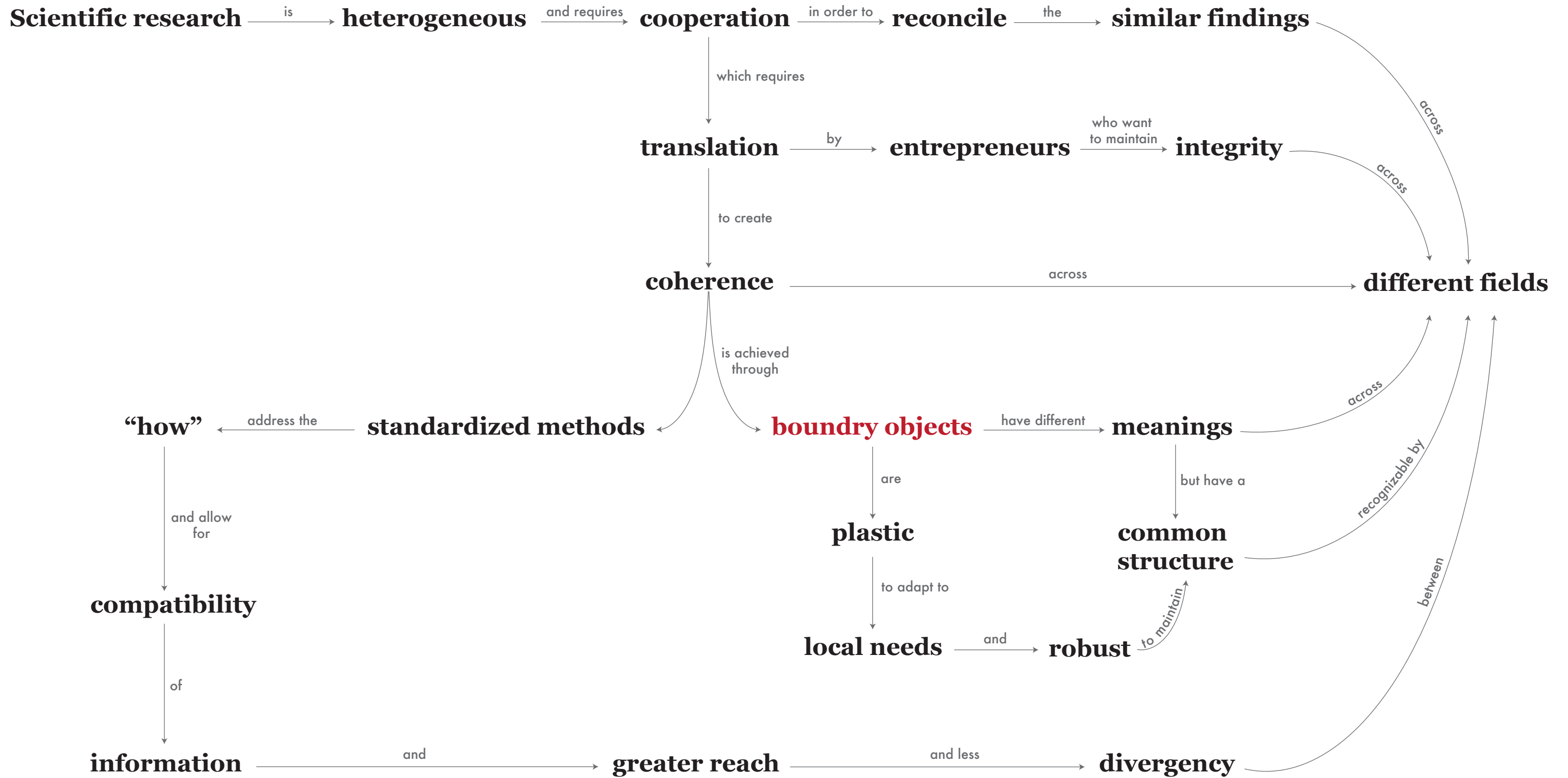




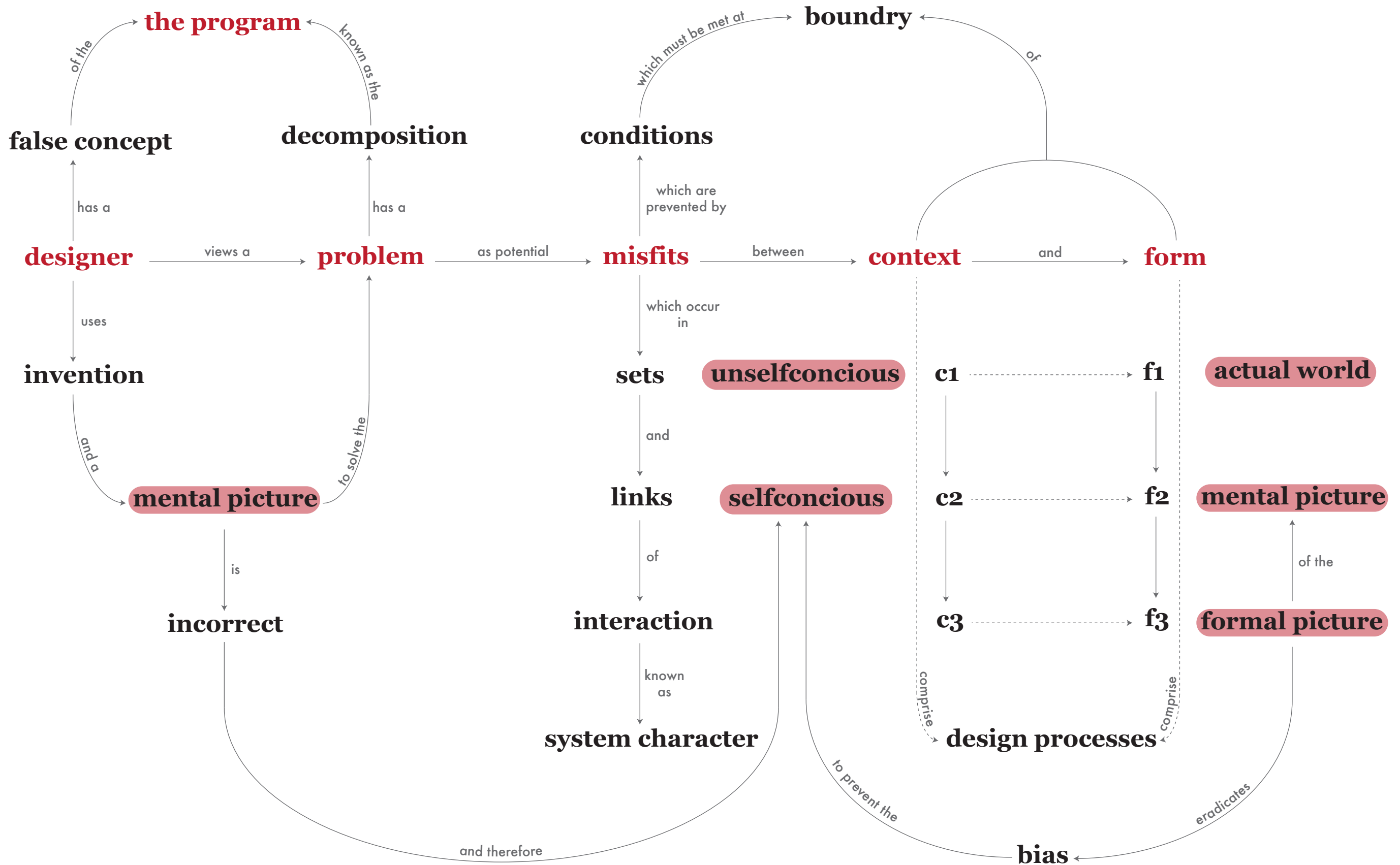








# Institutional Ecology and Translation of Boundry Objects



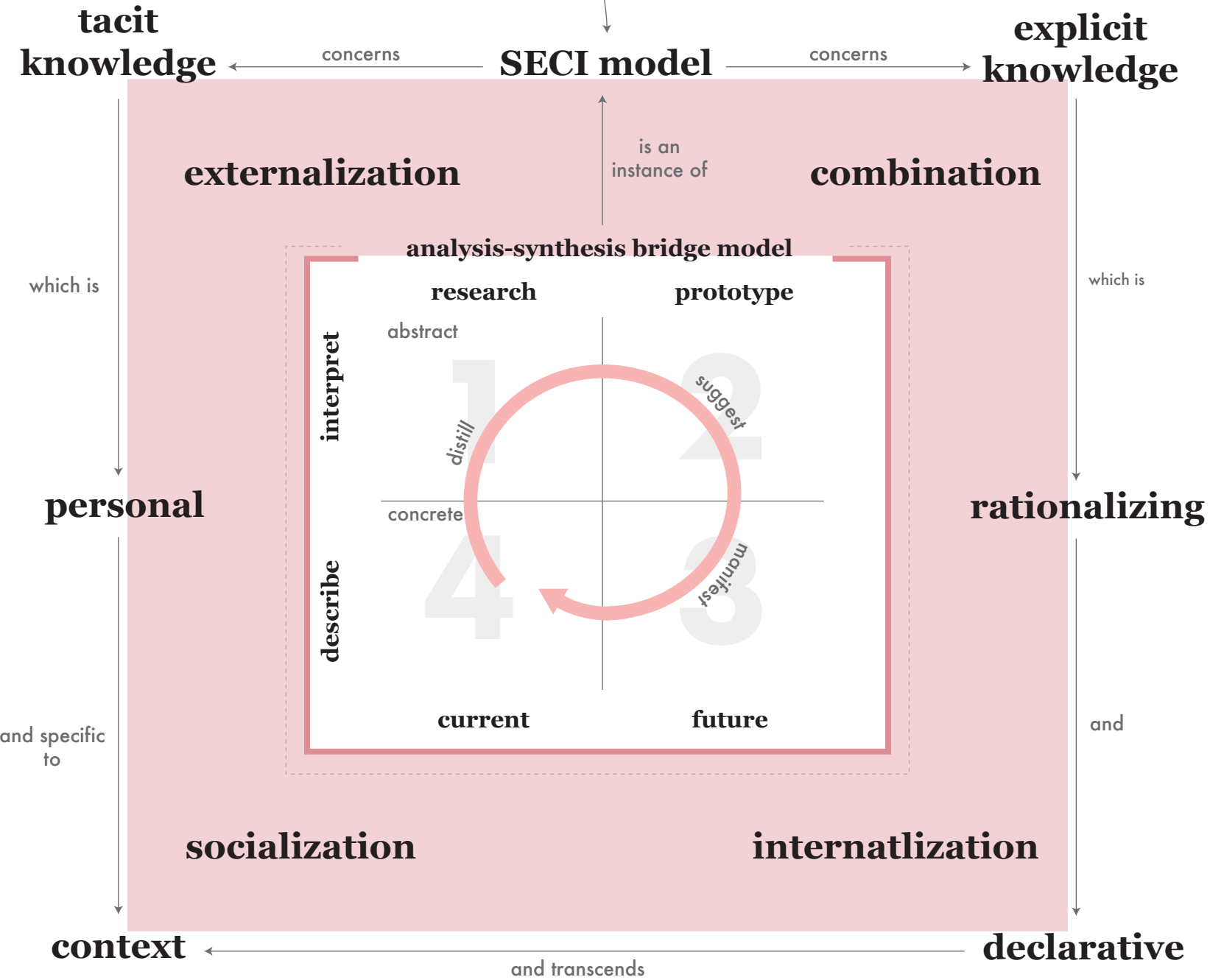


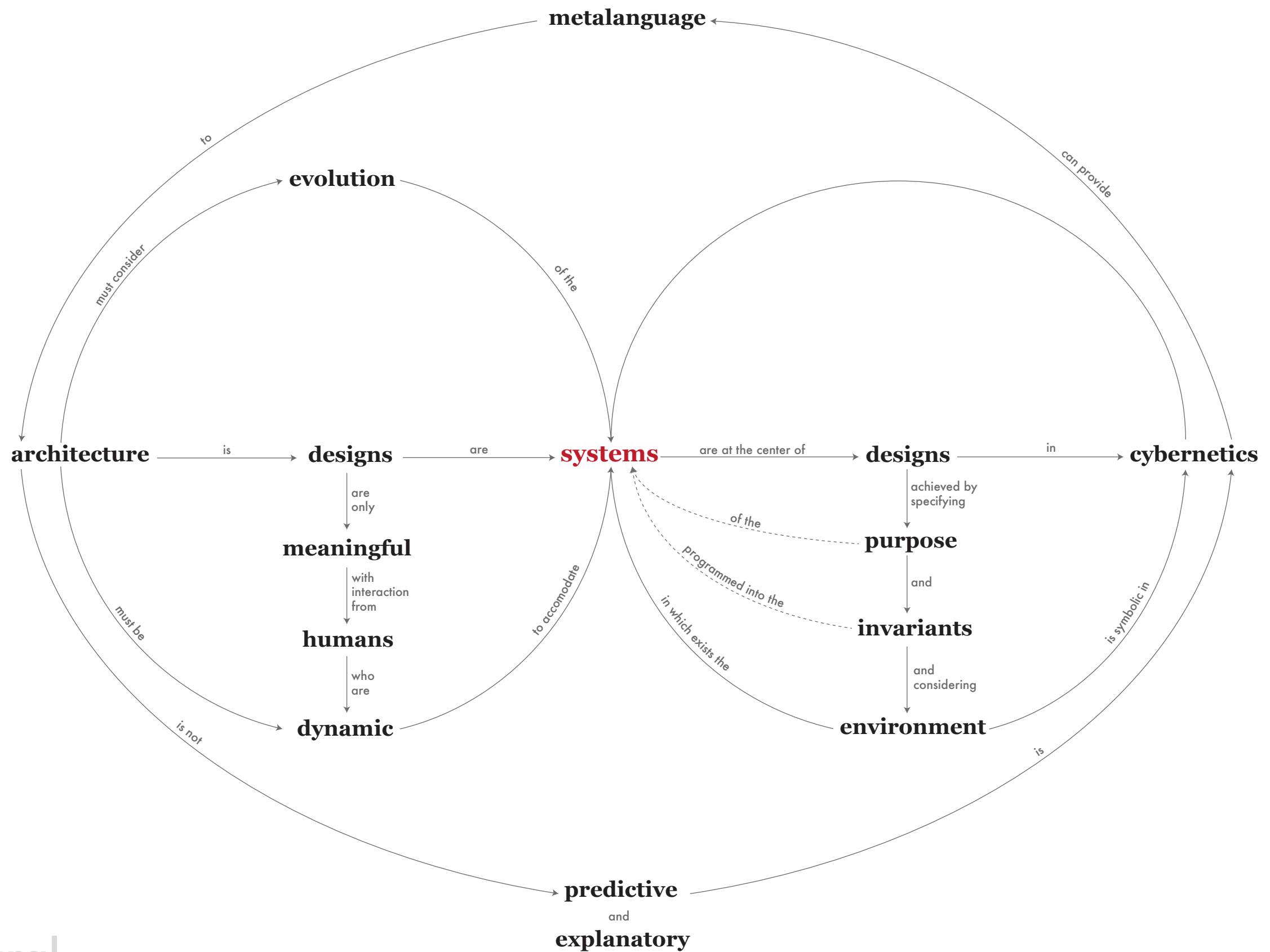
**designing**

is

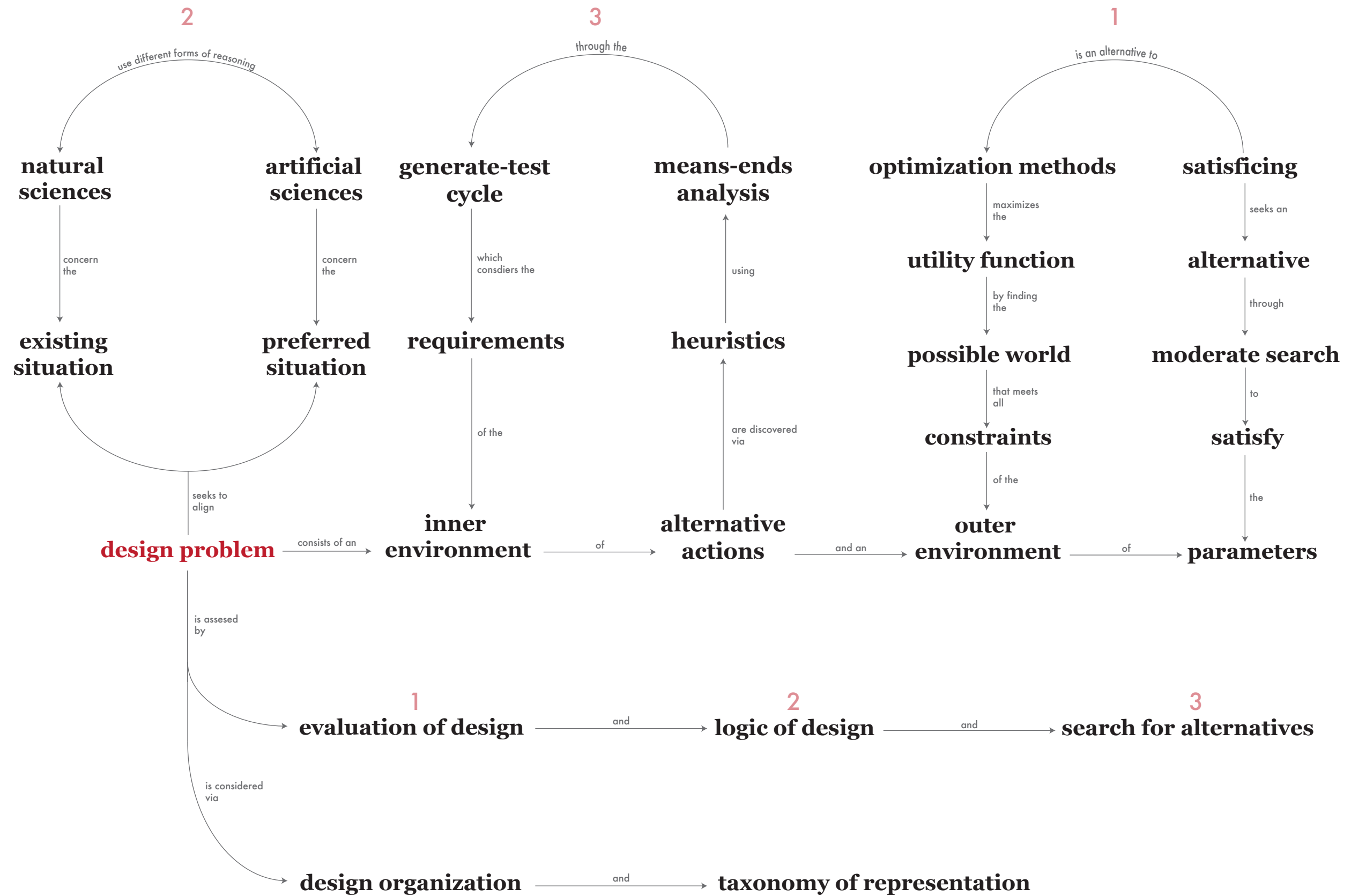
**learning**

according to



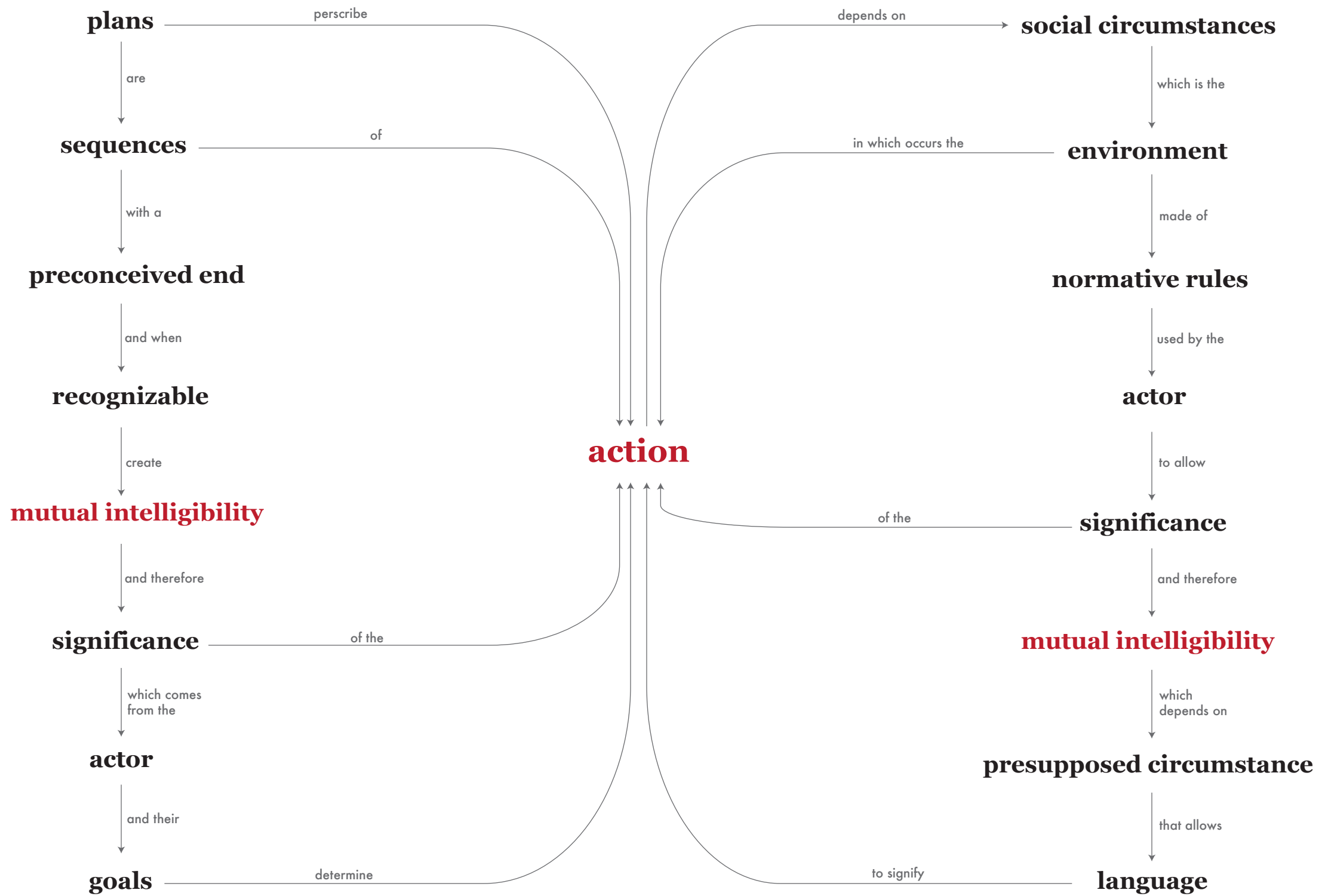


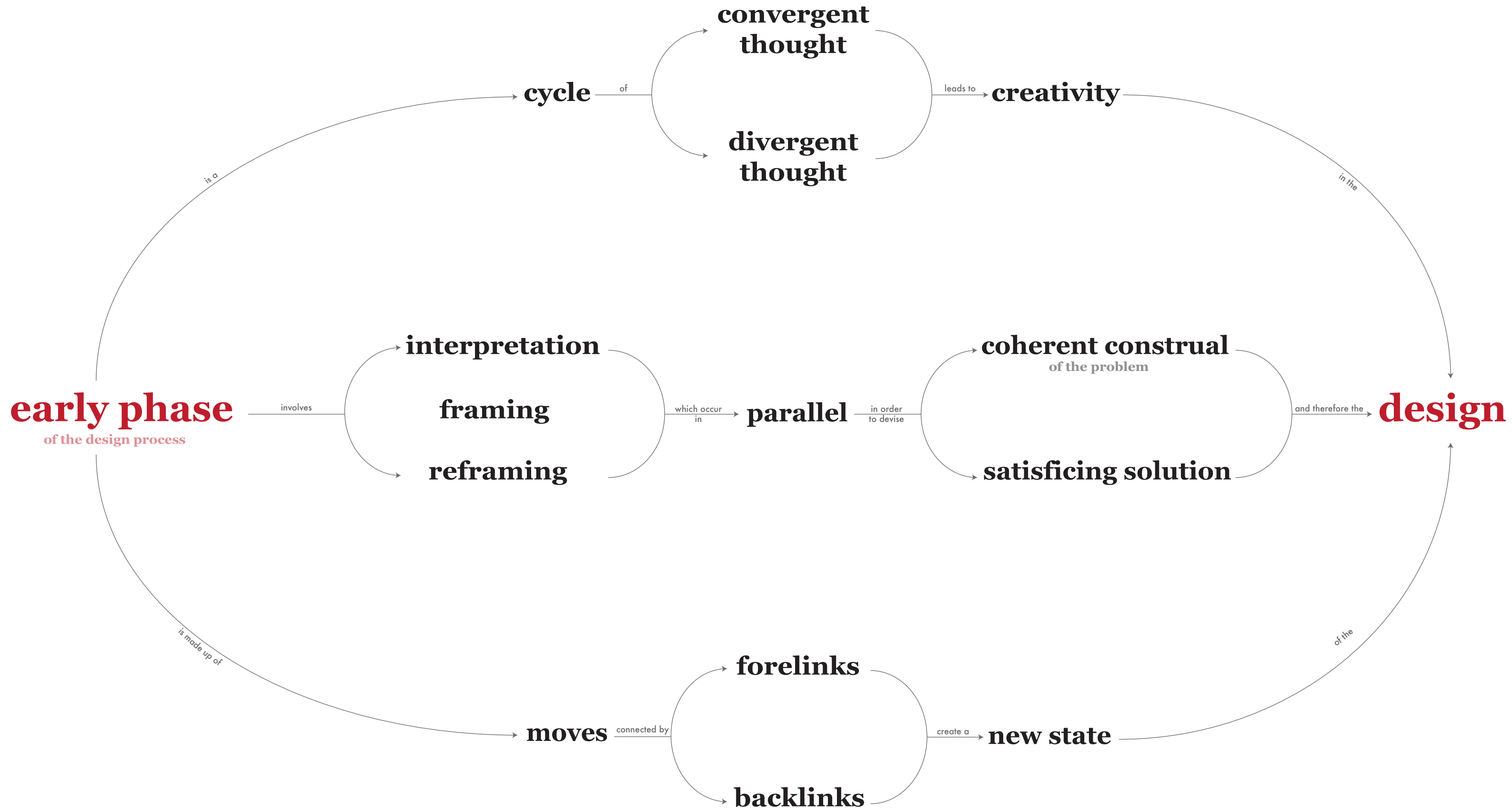
# The Architectural Relevance of Cybernetics

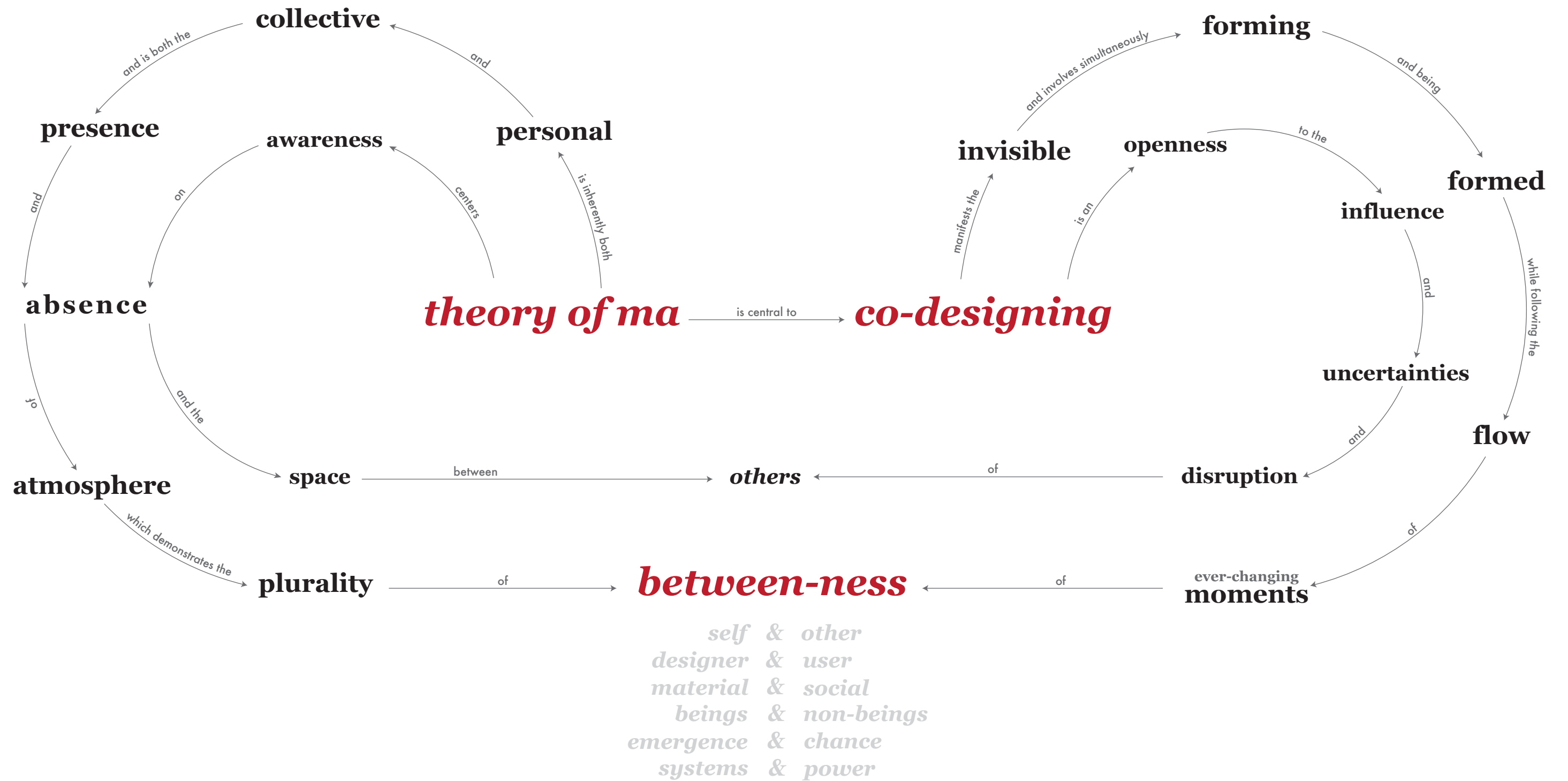


# Planning Model

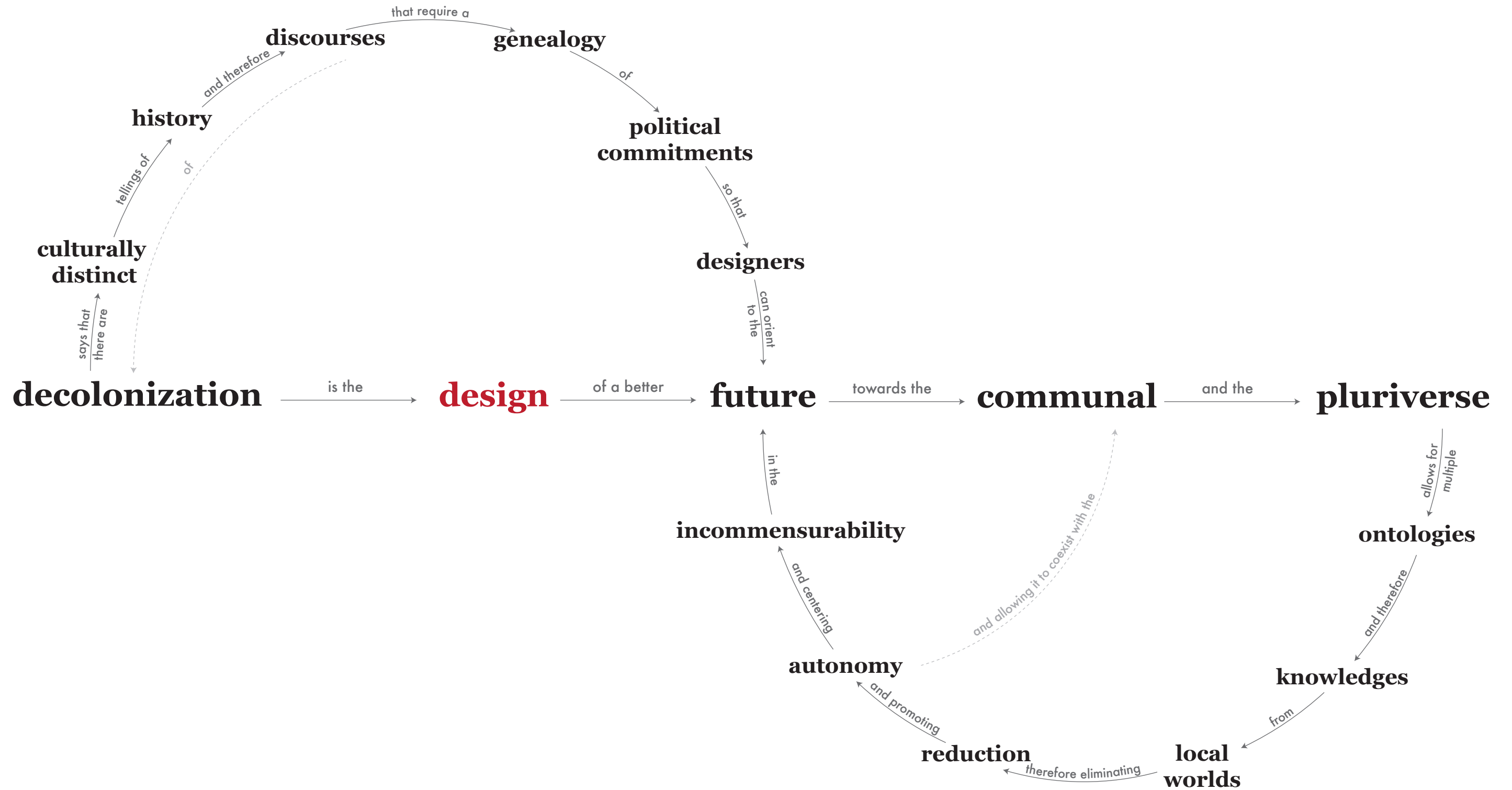
# Ethnomethodology









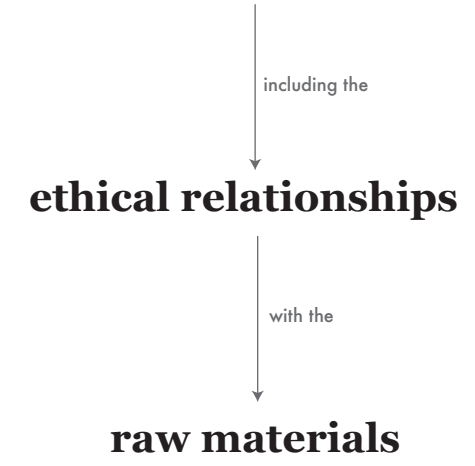
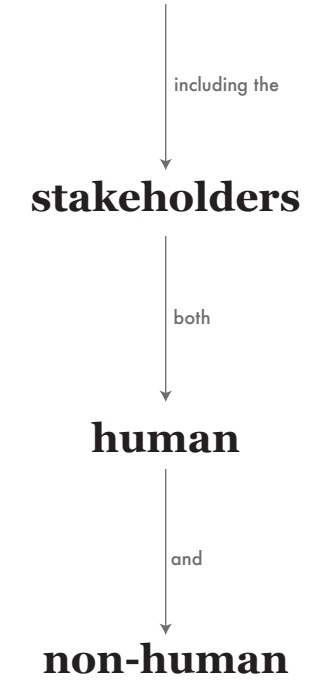
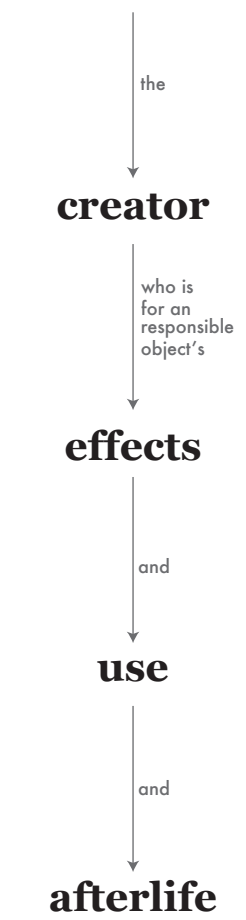
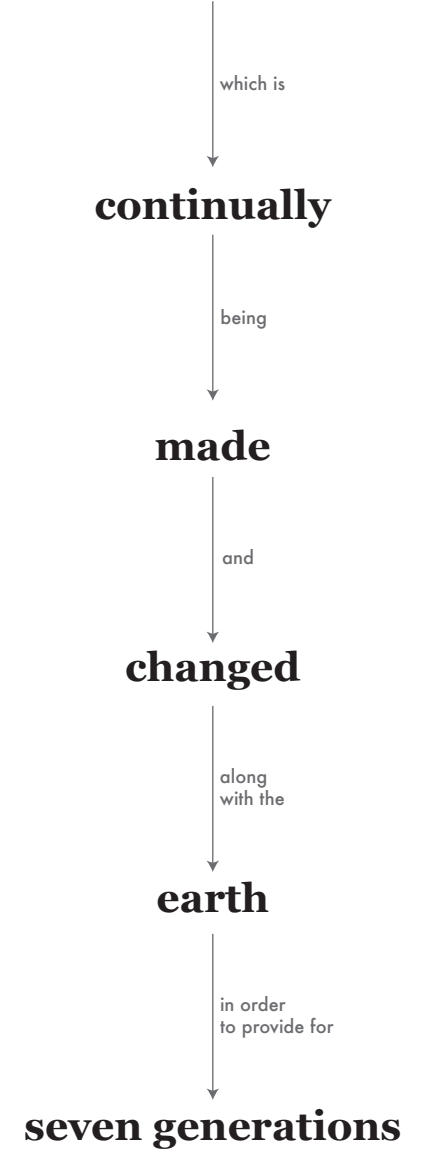
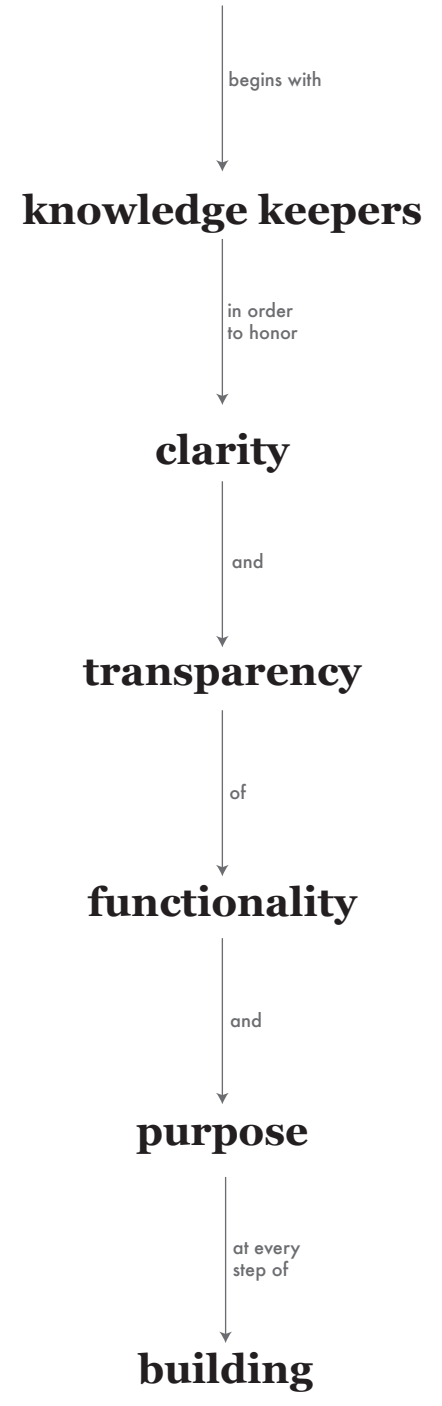


The History of Design  
& The Design of History

# the good way

of building AI systems

is an → indigenous protocol → of → decision making → which aims to reduce harm to → ourselves → and the → communities → and the → environment



How to Build Anything Ethically

# CONCEPT MAP BOOK

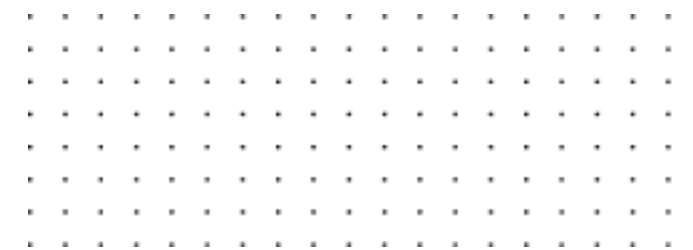
LEILA DO

Information Design Theory And Critical Thinking | Fall 2022  
Northeastern University



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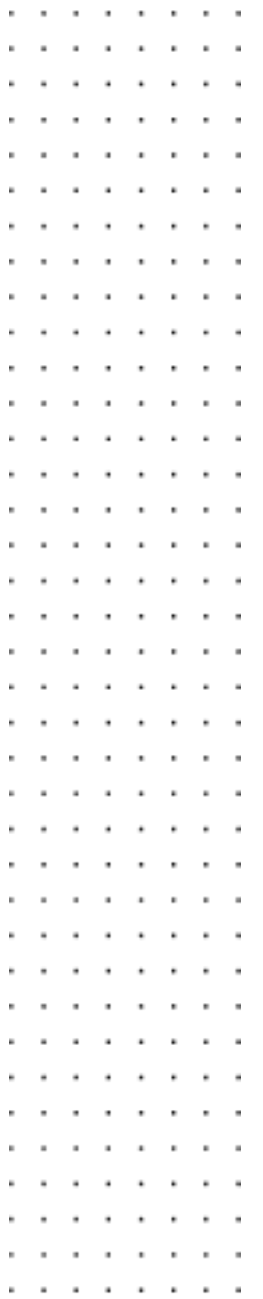
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## Introduction

Information Design Theory and Critical Thinking is a Northeastern University graduate course for students in the College of Arts, Media, and Design. In the course, we explored various topics within design theory (in semiotics, linguistics, sociology, etc.) while learning how to represent models and information through conceptual models.

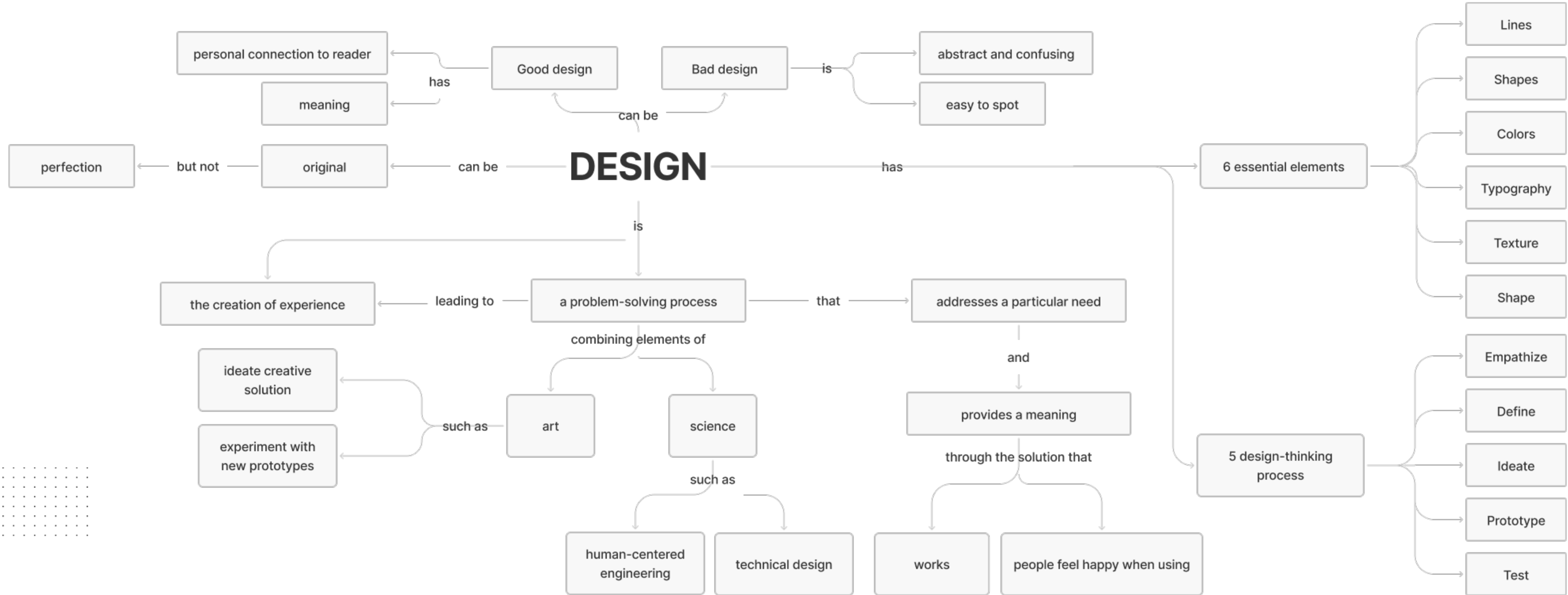
Every week, I created 2 concept maps to illustrate my understanding of the readings. This book is a compilation of the work I have done this semester, along with the description of the project and some feedback I received from classmates.



# 1. What is design?

We all talk about design, but what does design mean?

Design is a tool for problem-solving, combining the best of both worlds – the beauty of art and the logic of science. There are good and bad designs, which can significantly impact how viewers evaluate the design.



## 2. Peirce's Theory of Signs

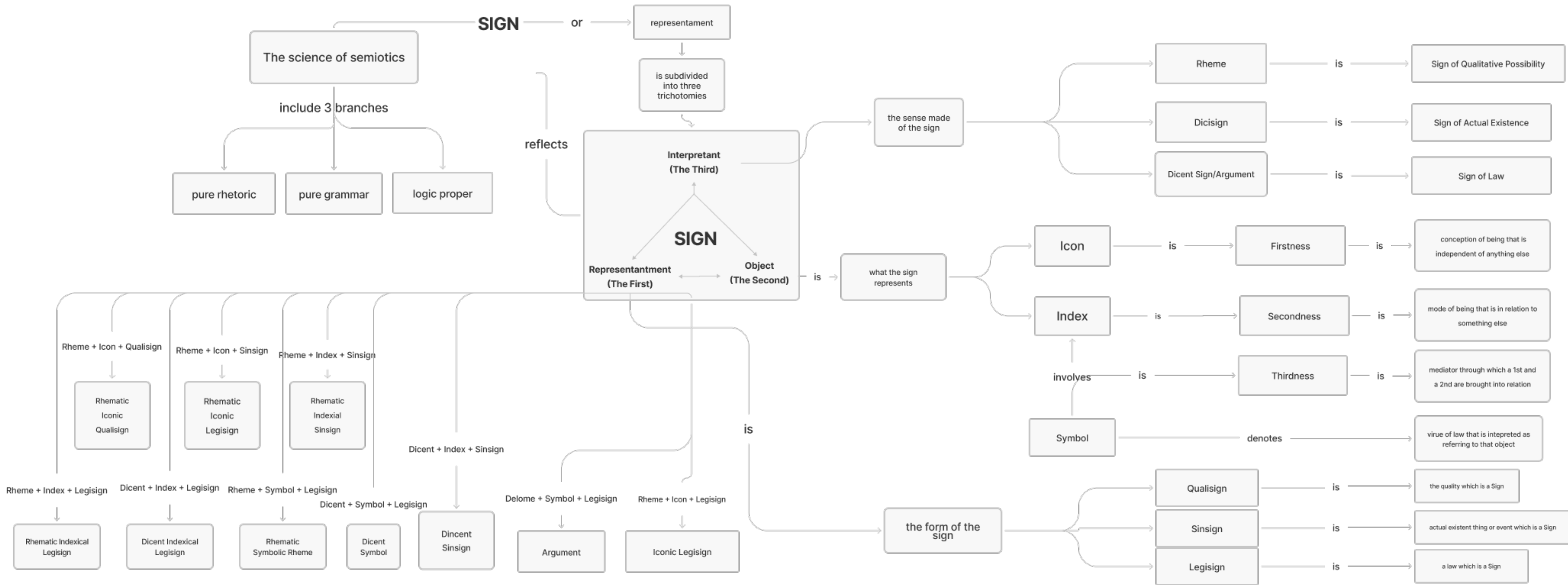
"A Sign, or Representamen, is a First which stands in such a genuine triadic relation to a Second, called its Object, as to be capable of determining a Third, called its Interpretant, to assume the same triadic relation to its Object in which it stands itself to the same Object."  
 – Page 99-100

According to Peirce, a sign stands in relation to two other things, its object and its interpretant sign. He highlighted the progression of signs from indexes, to icons, to human-created symbols.  
 – Self-reflection

"I really appreciate how thorough you are with these."

"I appreciate that you include all the explanations of interpretant, representantment and object"  
 – Comments from professor & classmates

*Philosophical Writings of Peirce, edited by Buchler, J., Dover, 1955. pages 98-119, 269-289*





### 3. Saussure's Course in General Linguistics

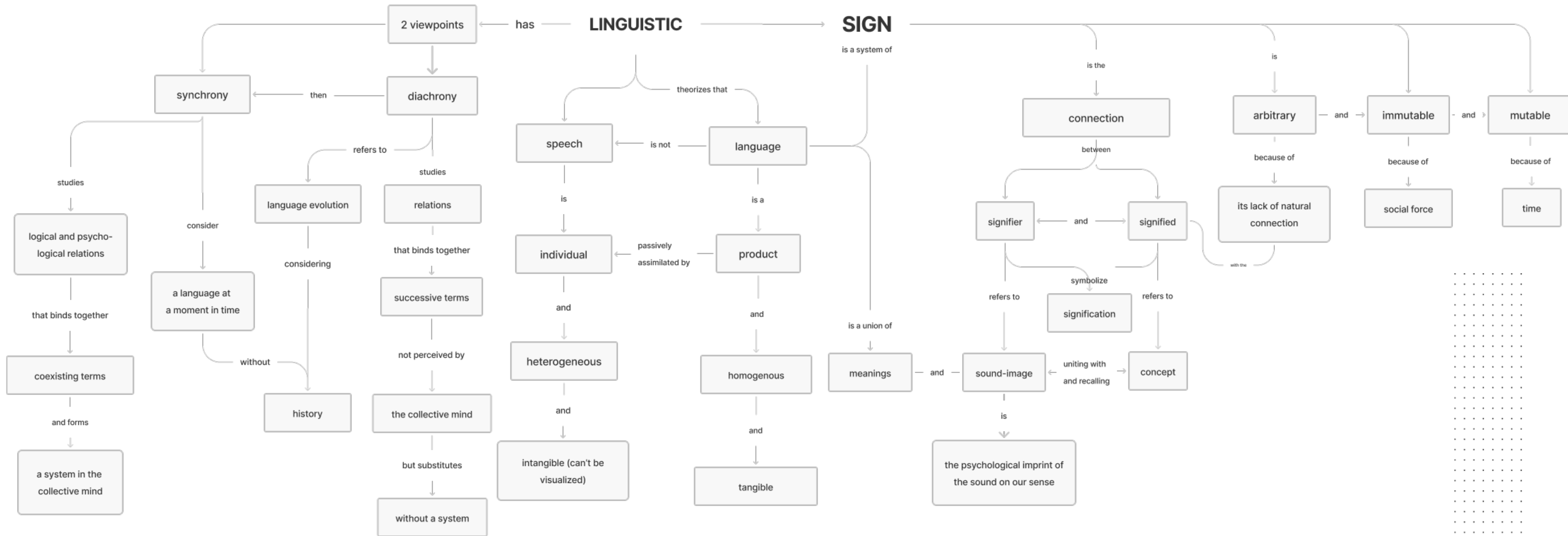
"The linguistic sign unites, not a thing and a name, but a concept and a sound-image."  
 - Page 66

Saussure's investigation and development of linguistics concerns with the history of languages and the culture and social influences throughout time.  
 -Self-reflection

"The separation of different concepts within sign is clear in the concept map"

"Good explanation and connections of concepts"  
 - Comments

Course in General Linguistics, de Saussure, F., McGraw-Hill, 1959, pages 1-17, 65-122



## 4. Buchanan's Design Ethics

"Design is the human power of conceiving, planning, and bringing to reality all of the products that serve human beings in the accomplishment of their individual and collective purposes."

– Page 504

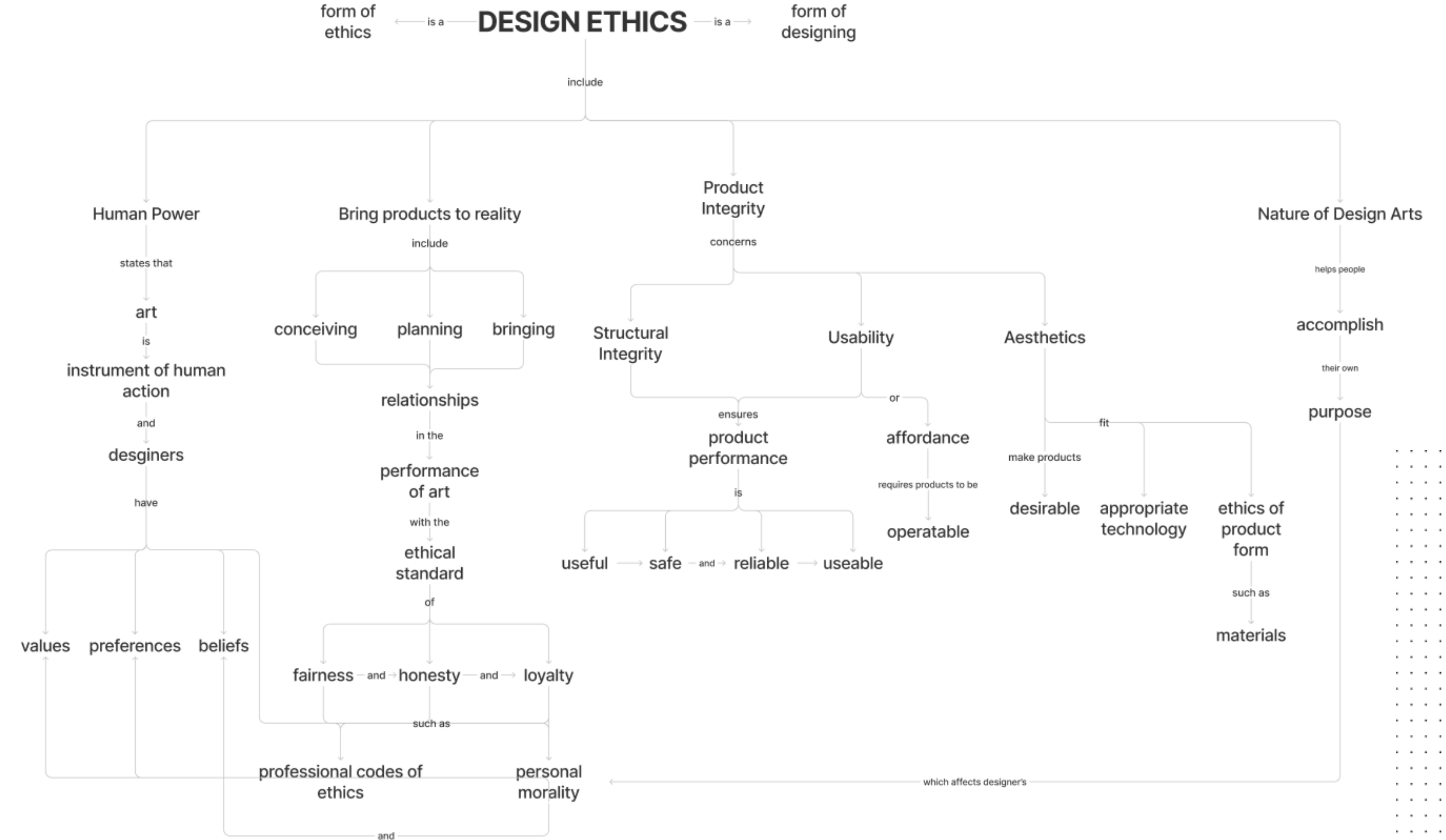
Ethics in design, for Buchanan, concern with the moral behavior and responsible choices in the practice of design. Designers need to seek out where they stand ethically.

–Self-reflection

"The concept map is clear and clean in terms of describing concepts"

"I like the hierarchy you put among concepts in terms of font sizes and spaces"  
– Comments from classmates

"Design Ethics," Buchanan, R., *Encyclopedia of Science, Technology, and Ethics*, 2005, pages 504-509



## 5. Shannon's Theory of Communications

"An information source which produces a message or sequence of messages to be communicated to the receiving terminal. The message may be various type.... A transmitter... produce a signal suitable for transmission over the channel... The channel... transmits the signal from transmitter to receiver. The receiver...reconstructs the message from the signal. The destination is the person for whom the message is intended."

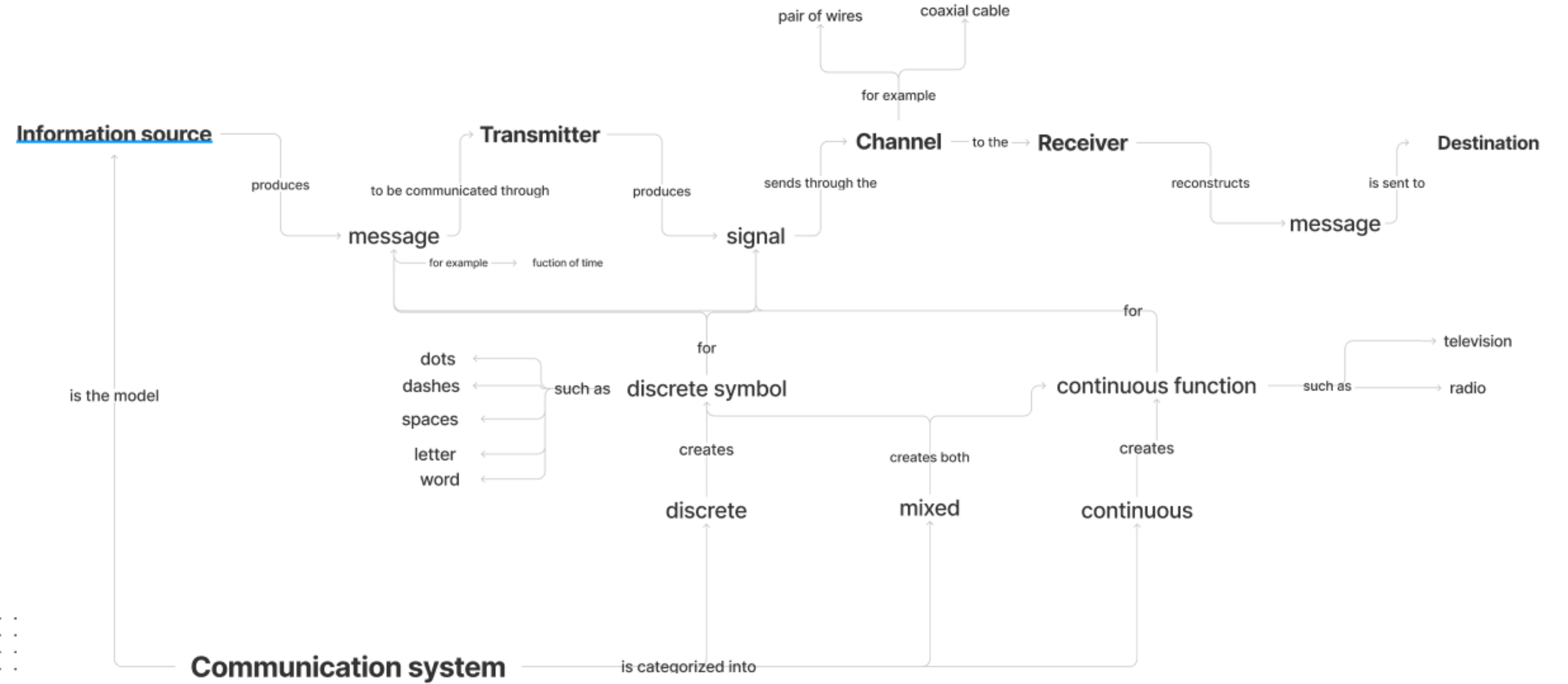
– Page 380-381

The paper laid out basic elements of communication and how people send messages, with the findings of noises that affect the message transmission across channels.

"The concept map is clean and easy to comprehend"

– Comments

"The Mathematical Theory of Communication," Shannon, C. and Weaver, W., University of Illinois, 1964, pages 379-382.



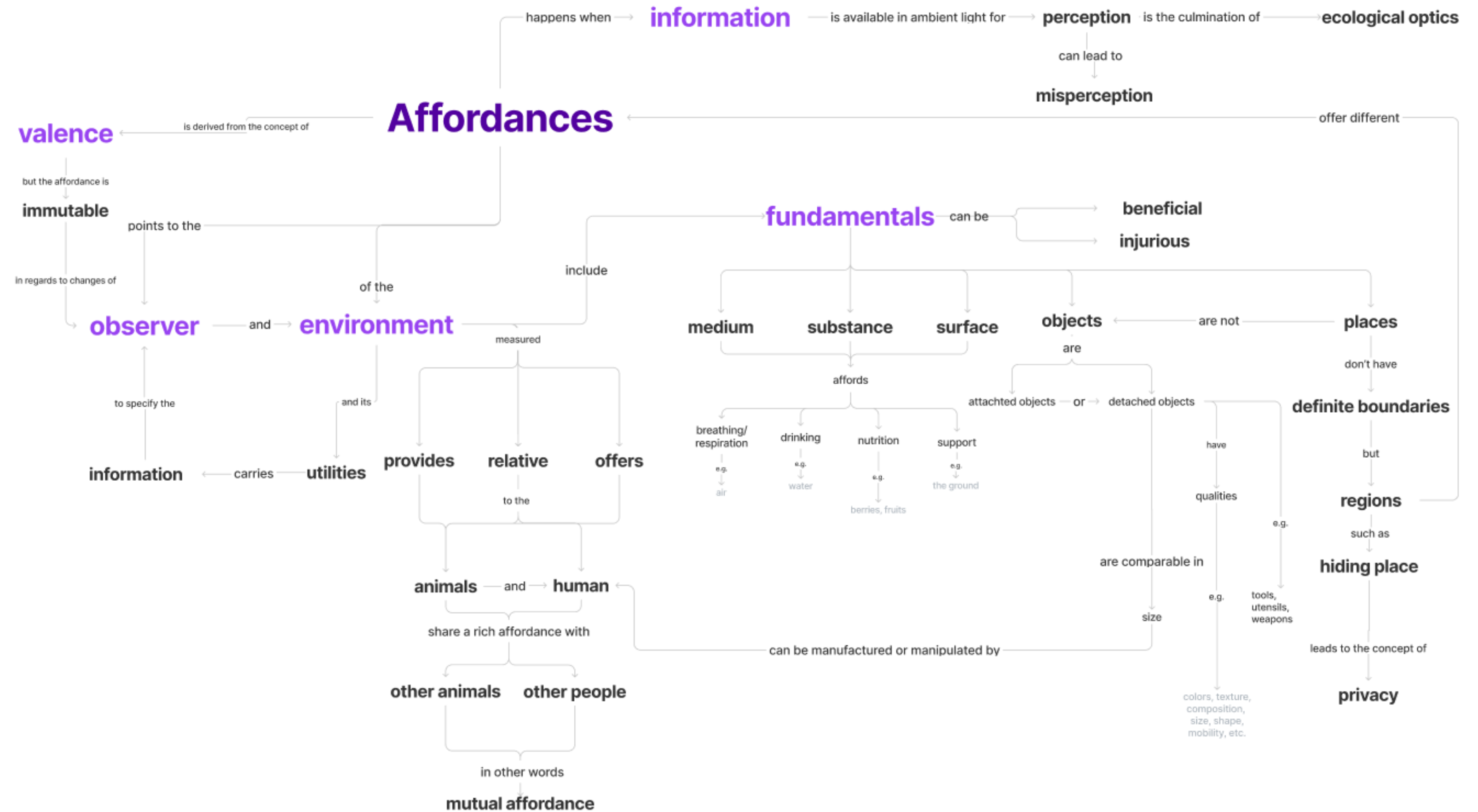
## 6. Gibson's Theory of Affordances

"The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill."  
 – Chapter 8

Gibson's theory started from ecological psychology to discuss action possibilities, and is being applied to design, especially in interaction and Human-Computer Interaction field. The theory does give suggestion for more intuitive everyday design in physical products and digital experience.  
 – Self-reflection

"The choice of colors really highlights the most important to less important concepts"  
 – Comments

"The Theory of Affordances," Gibson, James J., *The Ecological Approach to Visual Perception*, Chapter 8, pages 127-144





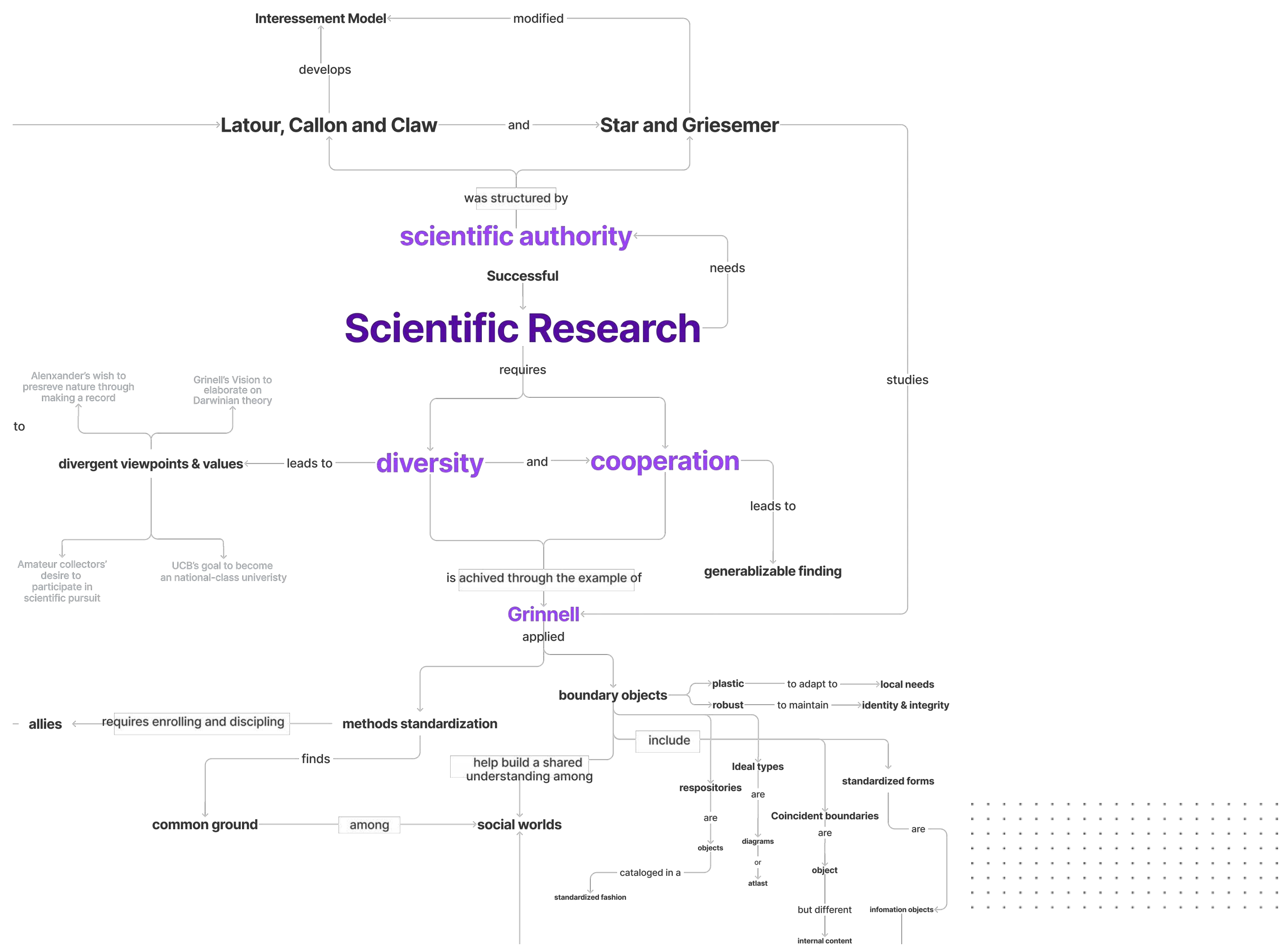
## 7. Star and Griesemer's Boundary Objects

"Scientific work is heterogeneous, requiring many different actors and viewpoints, ... and cooperation. The two create tension between divergent viewpoints and the need for generalizable findings."  
 – Page 379

The article introduced the notion of boundary object on the basis of an ethnographical study of the coordination mechanisms of scientific work.  
 – Self-reflection

"Interesting way to set up hierarchy through colors and font sizes"  
 – Comments

*Institutional Ecology and 'Translation' of Boundary Objects: Amateurs and Professionals In Berkeley's Museum of Vertebrate Zoology, 1907-39," Star, S. and Griesemer, J., Social Studies of Science, 1989, pages 387-414.*



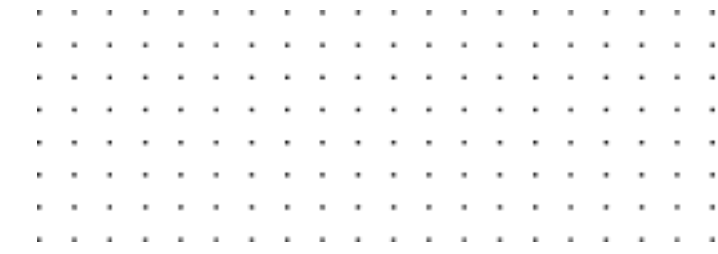
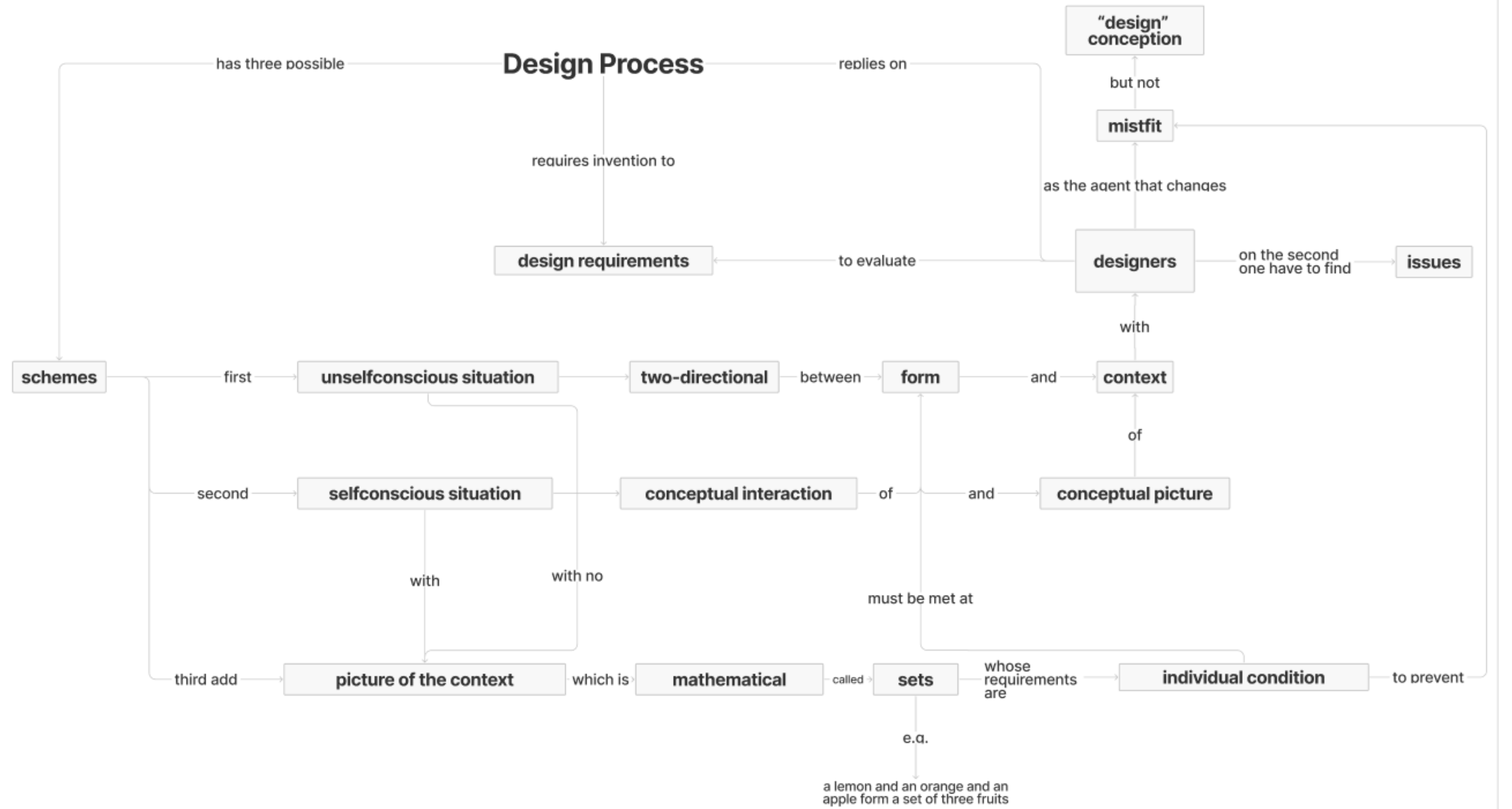
## 8. Alexander's Synthesis of Form

"The dilemma is simple. As time goes on the designer gets more and more control over the process of design. But as he does so, his efforts to deal with the increasing cognitive burden actually make it harder and harder for the real casual structure of the problem to express itself in this process."  
 – Page 73

-----  
 Alexander connected well the concept between form, problem and context. Form is the solution to the problem, and the context defines the problem. So context can't be changed, but form can.  
 – Self-reflection

-----  
 "Always appreciate the clean layout + use of space. The map was easy to read and follow"  
 – Comments

*Notes on the Synthesis of Form, Alexander, C., Harvard, 1964, Chapter 6, pages 73-83*



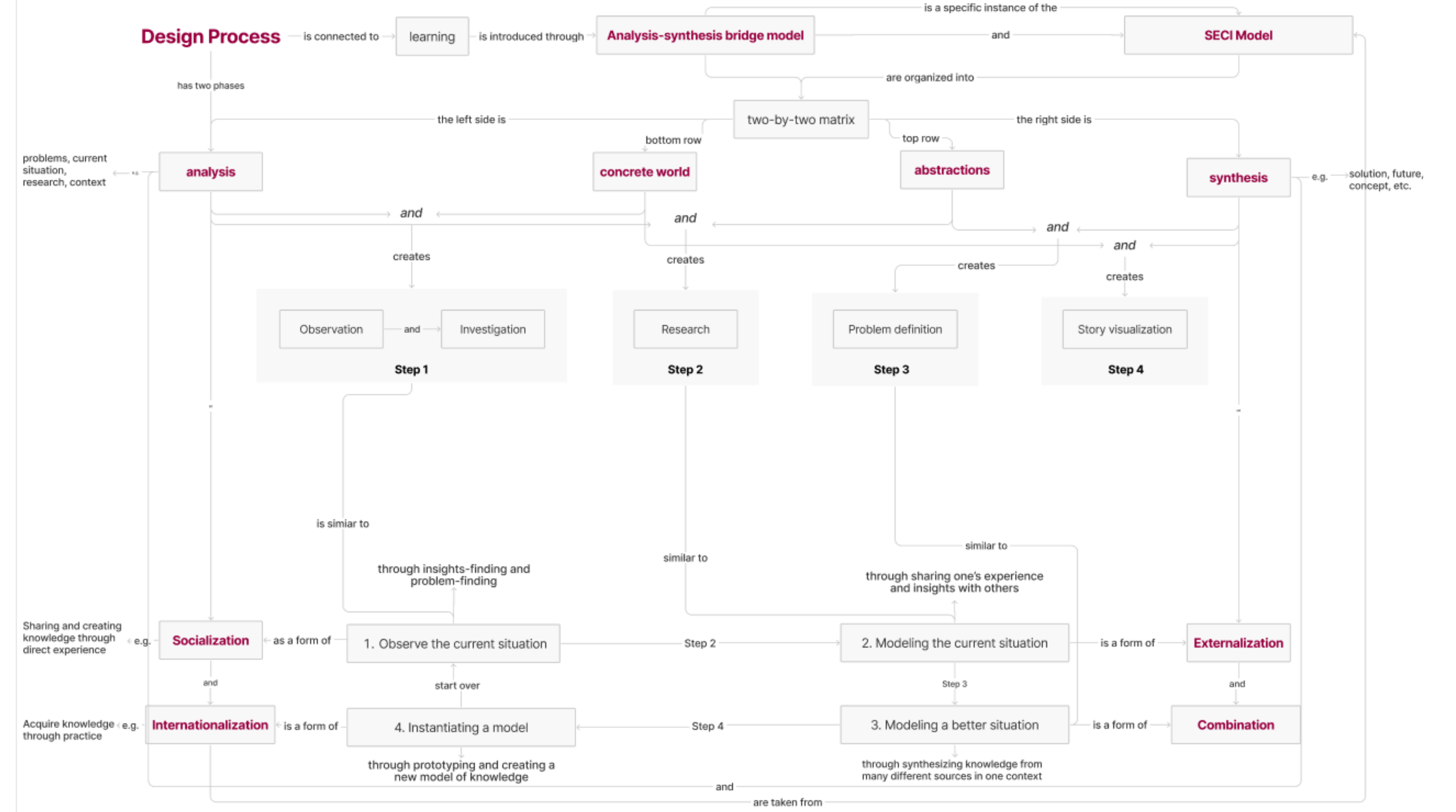
## 9. Dubberly's Analysis-Synthesis Bridge Model

"The SECI model comes out of research in knowledge management, which is related to organizational learning, business administration, and information system. SECI stands for socialization, externalization, combination, internalization - a model of knowledge creation proposed by Ikujiro Nonaka"  
 - Page 75

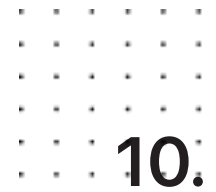
The model presented by Dubberly is helpful to apply for both business and design practice. For me personally, I enjoy learning about learning as an important part of the design process, in addition to practicing design.  
 - Self-reflection

"very detailed and well-structured, nicely done."  
 - Comments

"The Analysis-Synthesis Bridge Model," Dubberly, et al., 2008







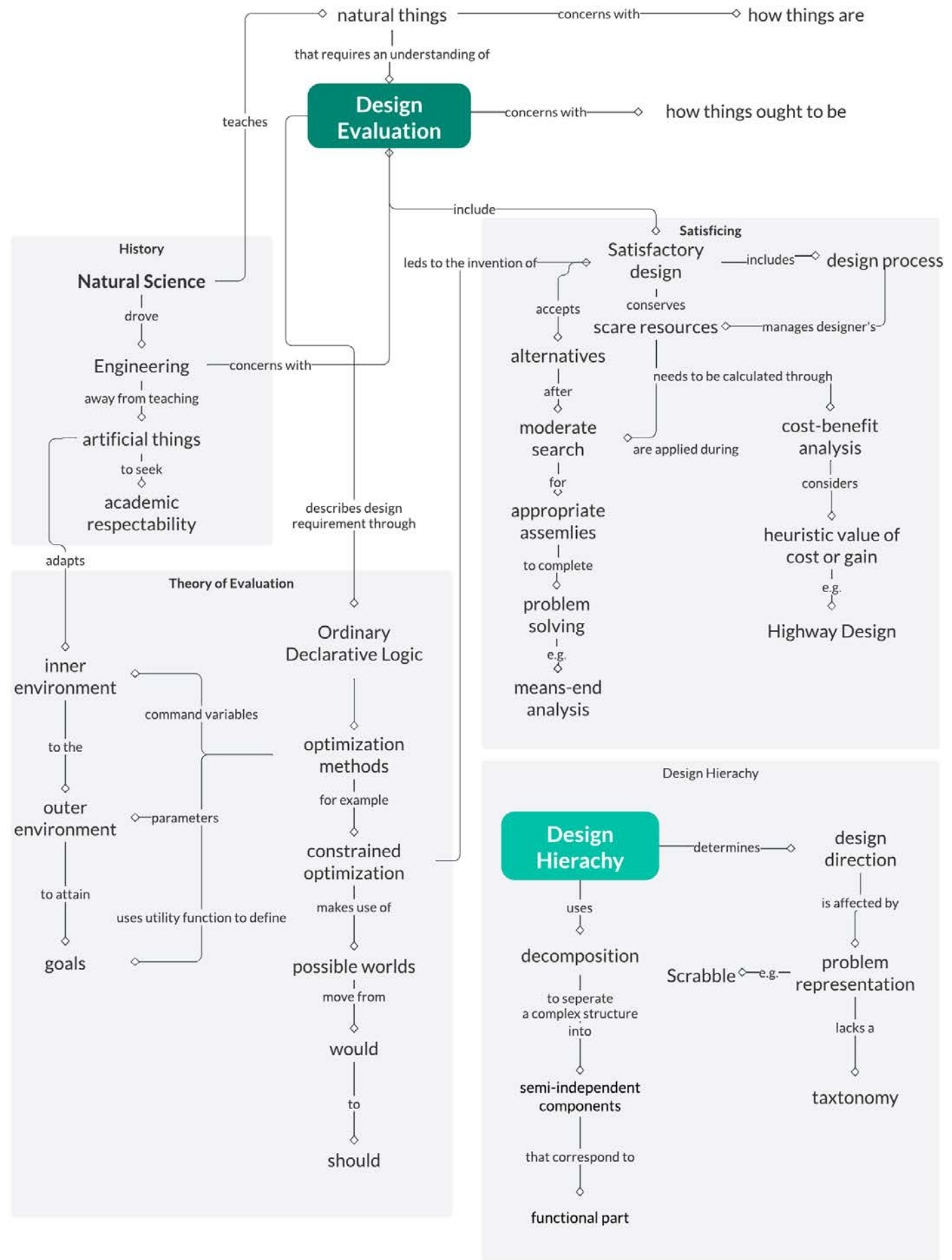
# 10. Simon's The Science of Design

"Everyone designs who devises courses of action aimed at changing existing situation into preferred one. The intellectual activity that produces material artifacts is no different fundamentally from the one that prescribes remedies for a sick patient or the one that devies a new sales plan for a company or a social welfare policy for a state"

- Page 111

-----  
The article was successful at establishing a scientific status for design compared with other scientific fields, as both focus on problem-solving as a glue.  
- Self-reflection

*The Sciences of the Artificial, Simon, H., MIT Press, 2001, Chapter 5, "The Science of Design," pages 111-138*





# 11. Pask's The Architectural Relevance of Cybernetics

"It is easy to argue that cybernetics is relevant to architecture in the same way that it is relevant to a host of other professions; medicine, engineering or law."

- Page 1

Pask points out an interesting point about communication problems because architects and designers have to adapt to the system design in addition to practicing "pure architecture."

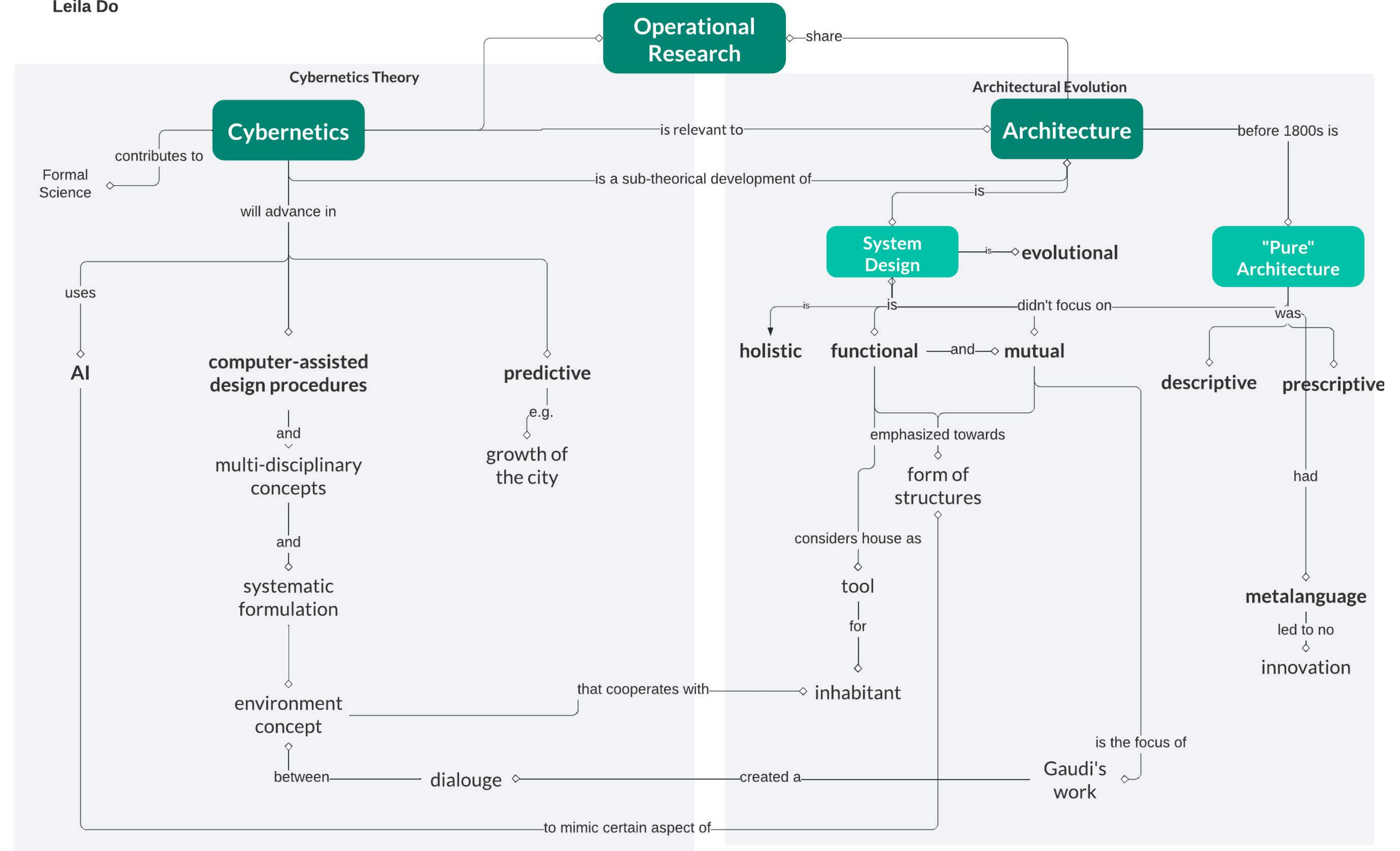
-Self-reflection

"I like how you are using diamonds and points for connect concepts. It reminds me of Harry Beck."

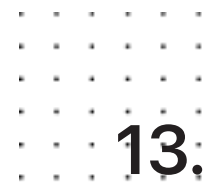
- Comments

"The Architectural Relevance of Cybernetics", Pask, G., Architectural Design, Sept. 1969, pages 494-496.

Leila Do







# 13: Goldschmidt's Linkography: unfolding the design process

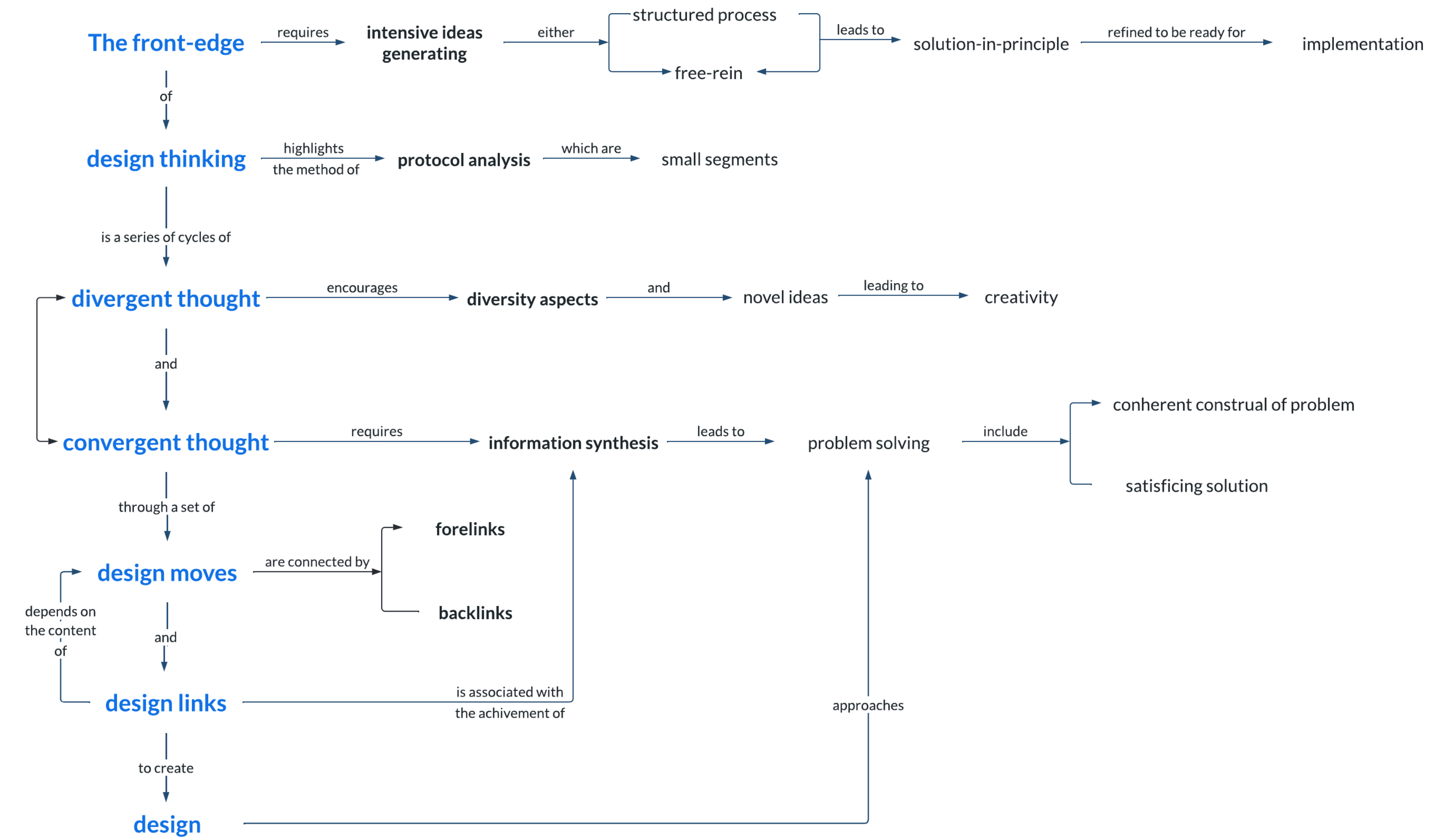
"Several psychologists subscribe to the view that we use two systems of reasoning — indeed two modes of thought — in everyday life, and that the balance between them is particularly pertinent to the understanding of creative thought."

– Page 45

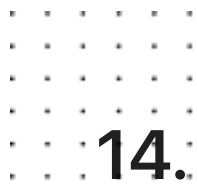
"Always a strong presentation. Watch out for the tiny details. Alignments, arrowhead, etc..."

– Comments

*Linkography: unfolding the design process., Goldschmidt, G. 2014. Chapter 3: Design Synthesis*





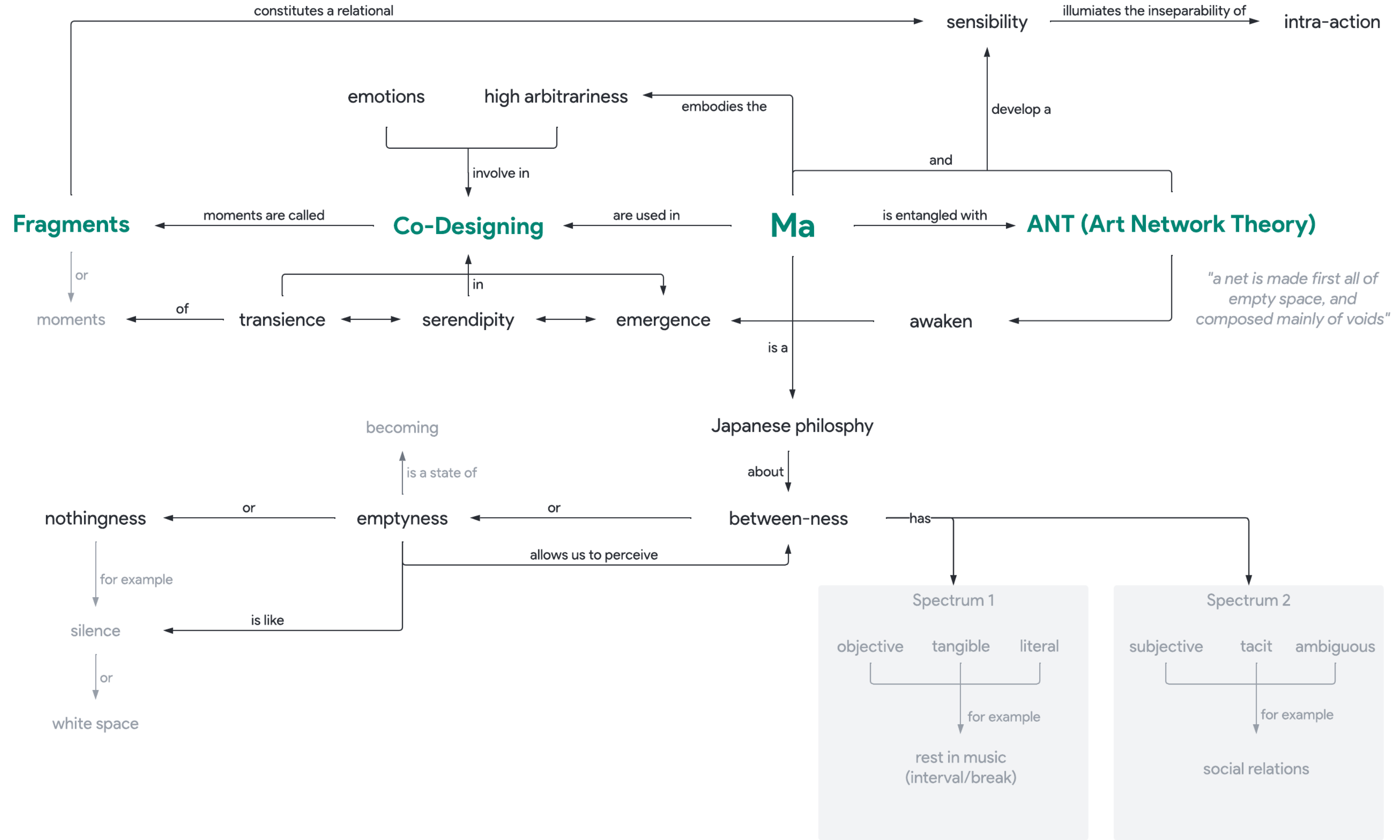


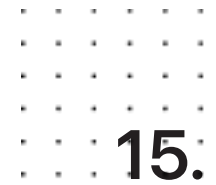
# 14. Akama's Being Awake to Ma

"Japanese philosophy of Ma as 'between-ness' explores how we are transforming and becoming together among this heterogeneity. As we design, we are embedded within and inscribed by conditions that we cannot quite touch or see visibly, yet manifests through its evolution. Awakening to this in-between presence is a necessary start because co-designing is performed and emerges from relational sensitivity."

- Page 1

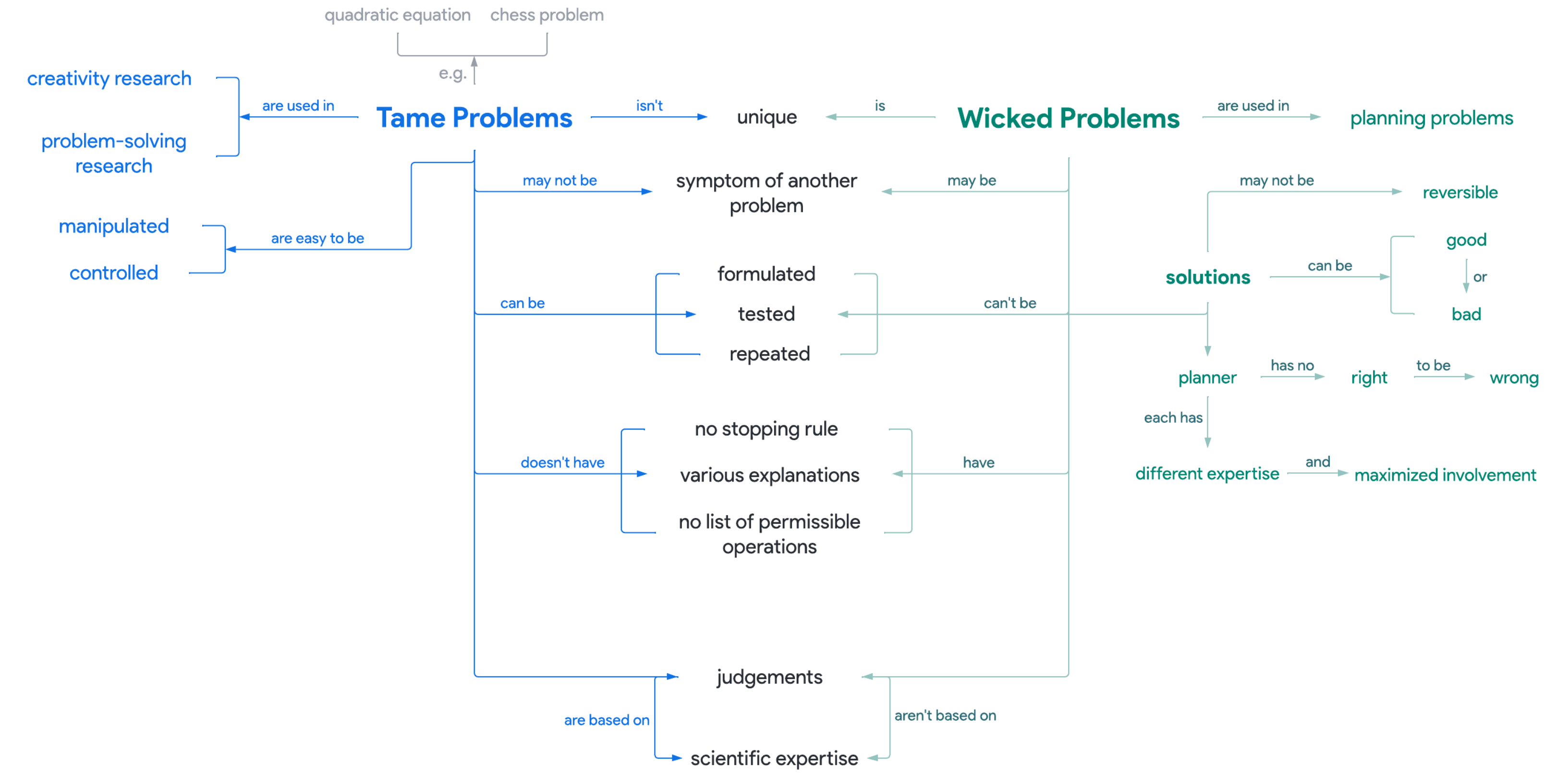
Being Awake to Ma., Akama, Y.



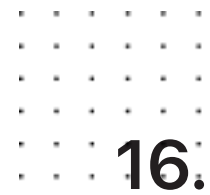


# 15. Rittle's Planning Crisis

"The search for scientific bases for confronting problems of social policy is bound to fail, because of the nature of these problems. They are "wicked" problems, whereas science has developed to deal with "tame" problems."  
- Page 1



On the Planning Crisis: Systems Analysis of the 'First and Second Generations', H.Rittle



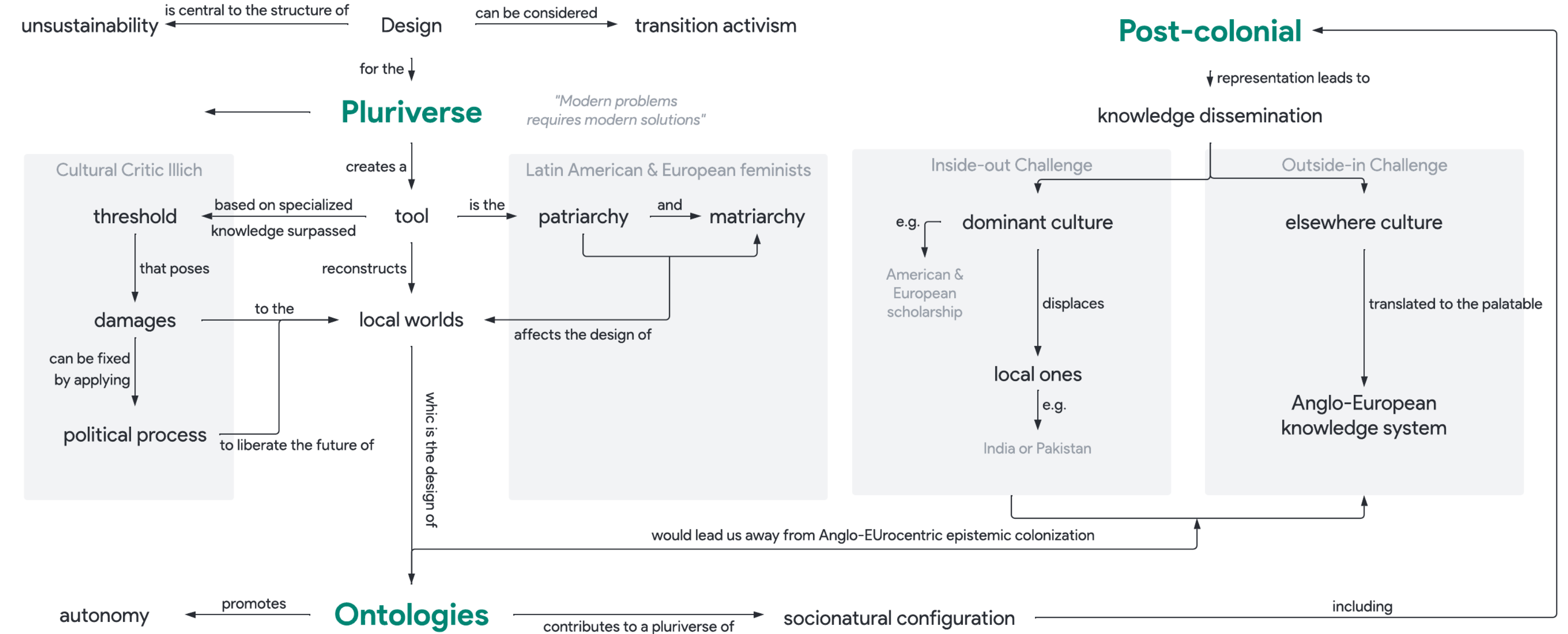
# 16. Escobar, Diawara & Ansari

“Design is the central to the structure of unsustainability that hold in place the contemporary, so called modern world... What the notion of design signals in this work—despite design’s multiple and variegated meanings—is diverse form of life and often, contrasting notions of socioability and the world”  
– Page 1

Escobar, A. (n.d.). Introduction — Designs for the Pluriverse. In *Designs for the Pluriverse*.

Diawara, M. (1997). *The Song of the Griot*. *Transition*, 74, 16–30. <https://www.jstor.org/stable/2935371>

Ansari, A. (2021). *The History of Design and the Design of History*. *Psicon*, 11, 2–3 (September), 130–146.





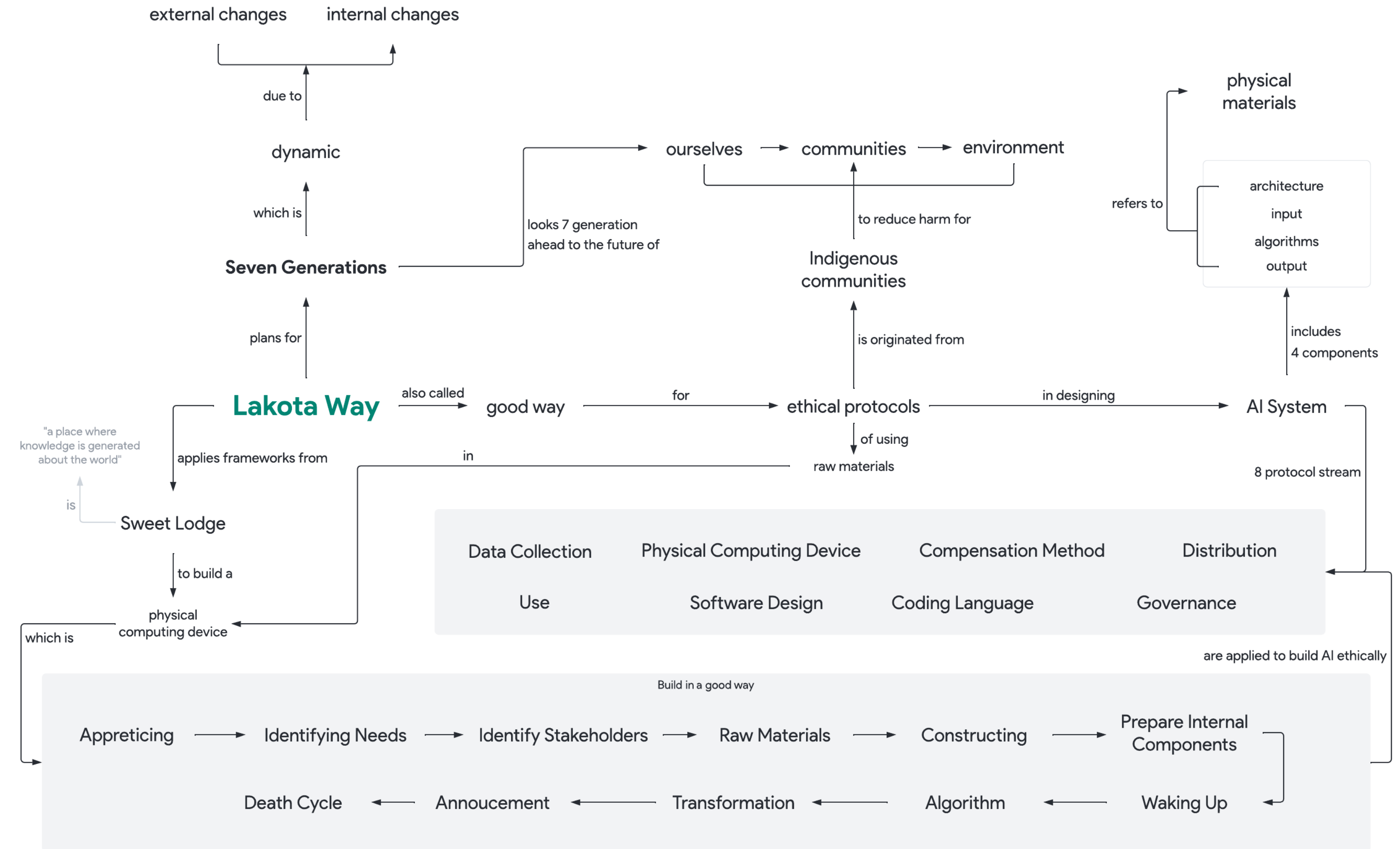
# 17. Kite et al.'s How to Build Anything Ethically

"I illustrate how protocol for building a Lakota sweat lodge can act as a framework for building a physical computing device. Next, I provide an example of how multiple streams of protocol are necessary to build an AI system as a confluence of ethics"

– Page 1

-----

Kite, S., Stover, C., Janis, M. S., & Benesii-naabandan, S. (n.d.). *How to Build Anything Ethically*.



# I read, I write, I retrospect:

## Concept Map Book

ARTG 6100

Information Design And Critical Thinking

This book is a compilation of concept maps made as a part of the curriculum at Northeastern University for Information Design and Data Visualization.

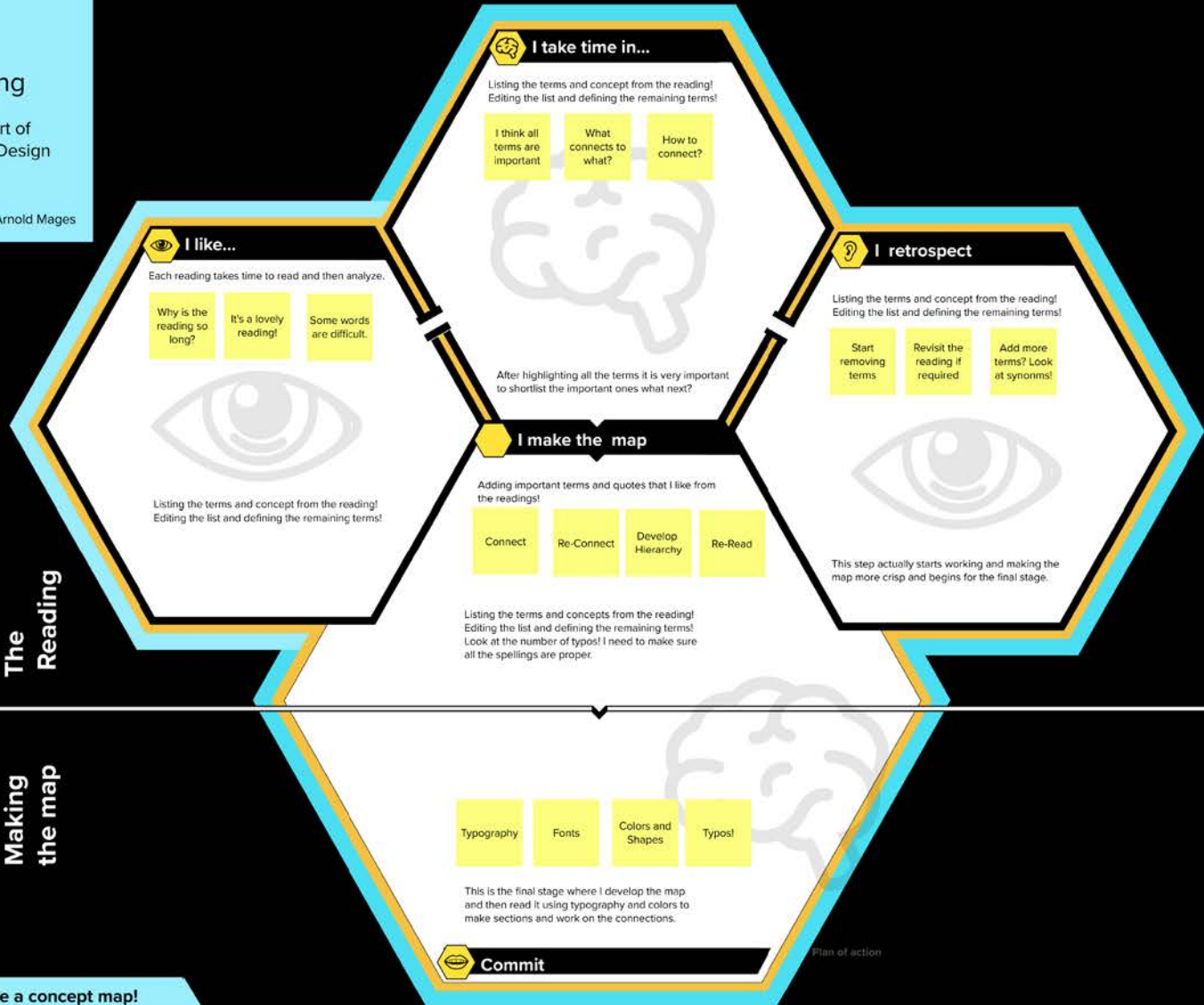
Course Taught by: Micheal Arnold Mages

The Reading

Making the map

# A process of making a concept map!

A concept map of what goes in my head when I make a concept map!



## **Foreword:**

This book contains concept maps on various design theories explaining each theory in terms of its important terms and points, connecting them to be able to understand the reading well.

The maps are comprehensive examples for understanding concepts and readings. The maps are made keeping typographic elements and using hierarchy and colors.

### **What I learn?**

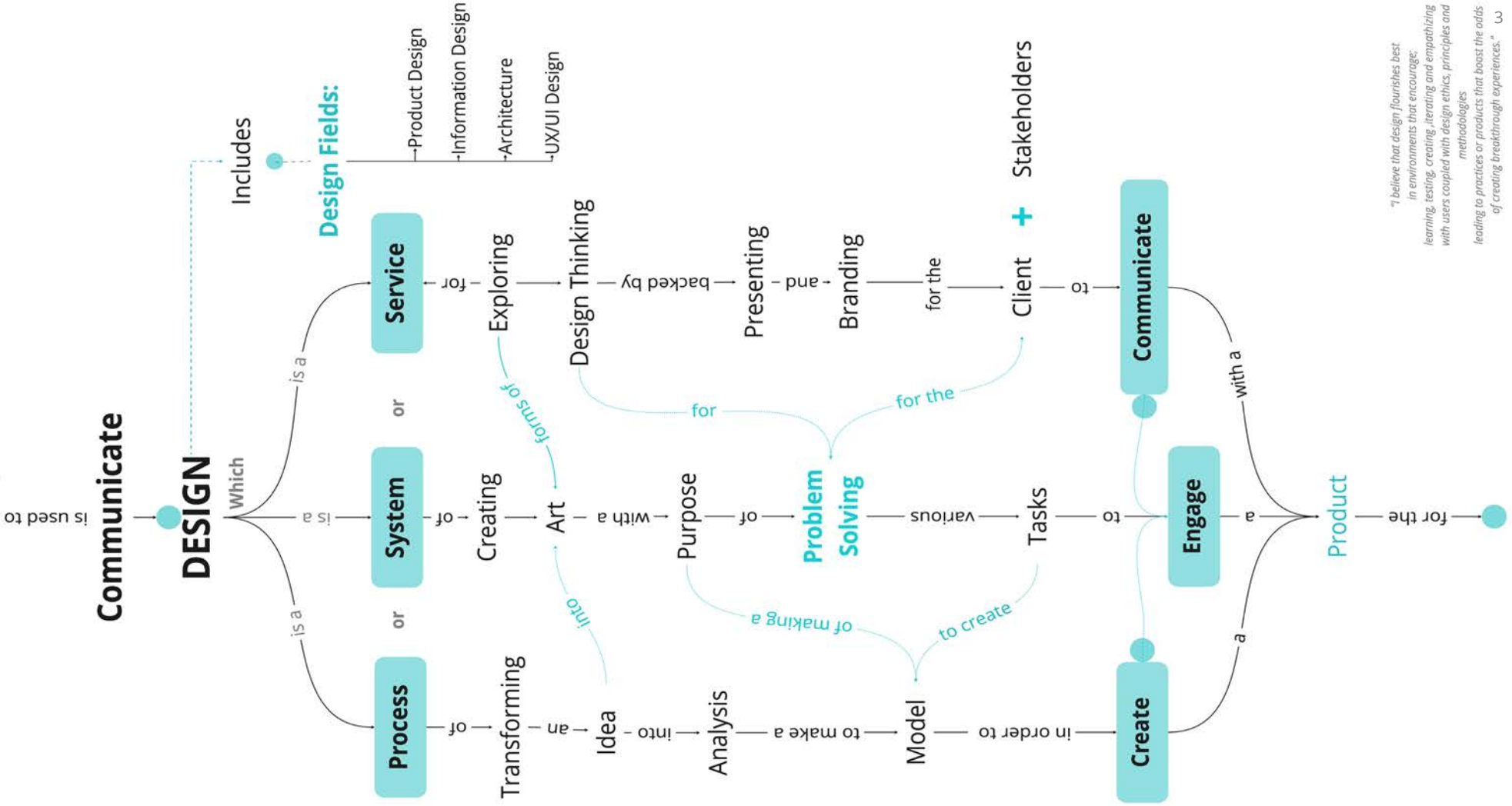
One of my major takeaways from consecutive weeks of making concept maps was to understand how complex readings can be made extremely easy to understand by making linking concept maps.

Another key takeaway was to see how each person in the course had their own unique way of shortlisting terms and then presenting them in their own style. I believe this course had helped me a lot and will definitely help me in reading large documents and further in my thesis.

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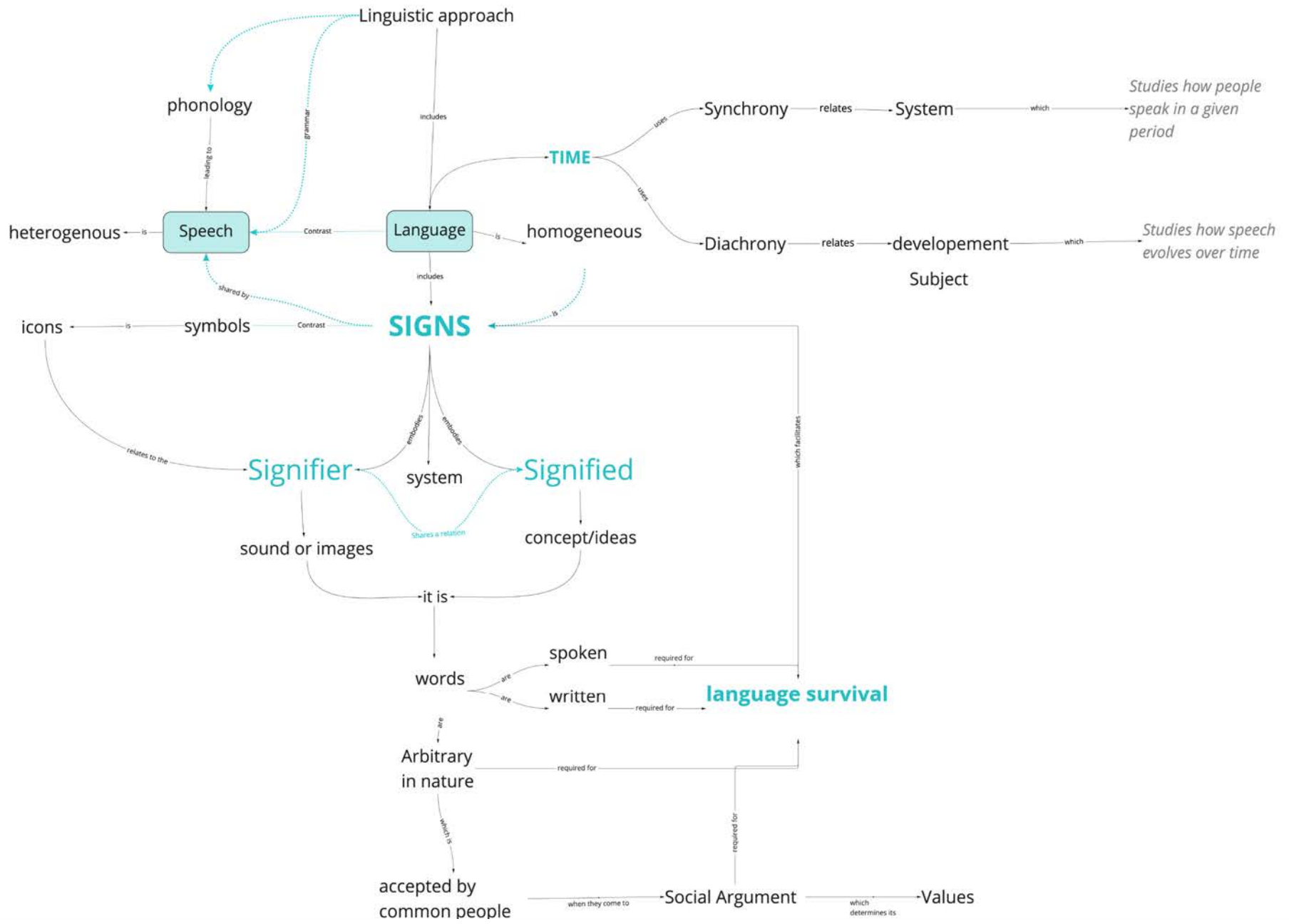
01. <b>Learning How To Learn</b> , Novak, J., and Gowin, B "Creating Concept Maps," Dubberly, H "Models of Models," Dubberly, H	3	10. <b>The Science of Design</b> , Simon	12
02. <b>Course in General Linguistics</b> , Saussure, McGraw-Hill	4	11. <b>Architectural relevance of cybernetics</b> , Pask	13
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# A story



"I believe that design flourishes best in environments that encourage learning, testing, creating, iterating and empathizing with users coupled with design ethics, principles and methodologies feeding to practices or products that boost the odds of creating breakthrough experiences."

# Users/ Audience



Science of Semiotics

is an  
Idea  
to  
Represent  
an  
Object  
with  
Linguistic approach  
of the

**Signs**

Representamen (Representation) is a mental interpretant for the receiver

01 Fact

- Rheme — connects with —> Quality
- dicisign — connects with —> Law
- dicent sign — connects with —> Existence

Trichotomies of signs

03 Existence

Mental Interpretant

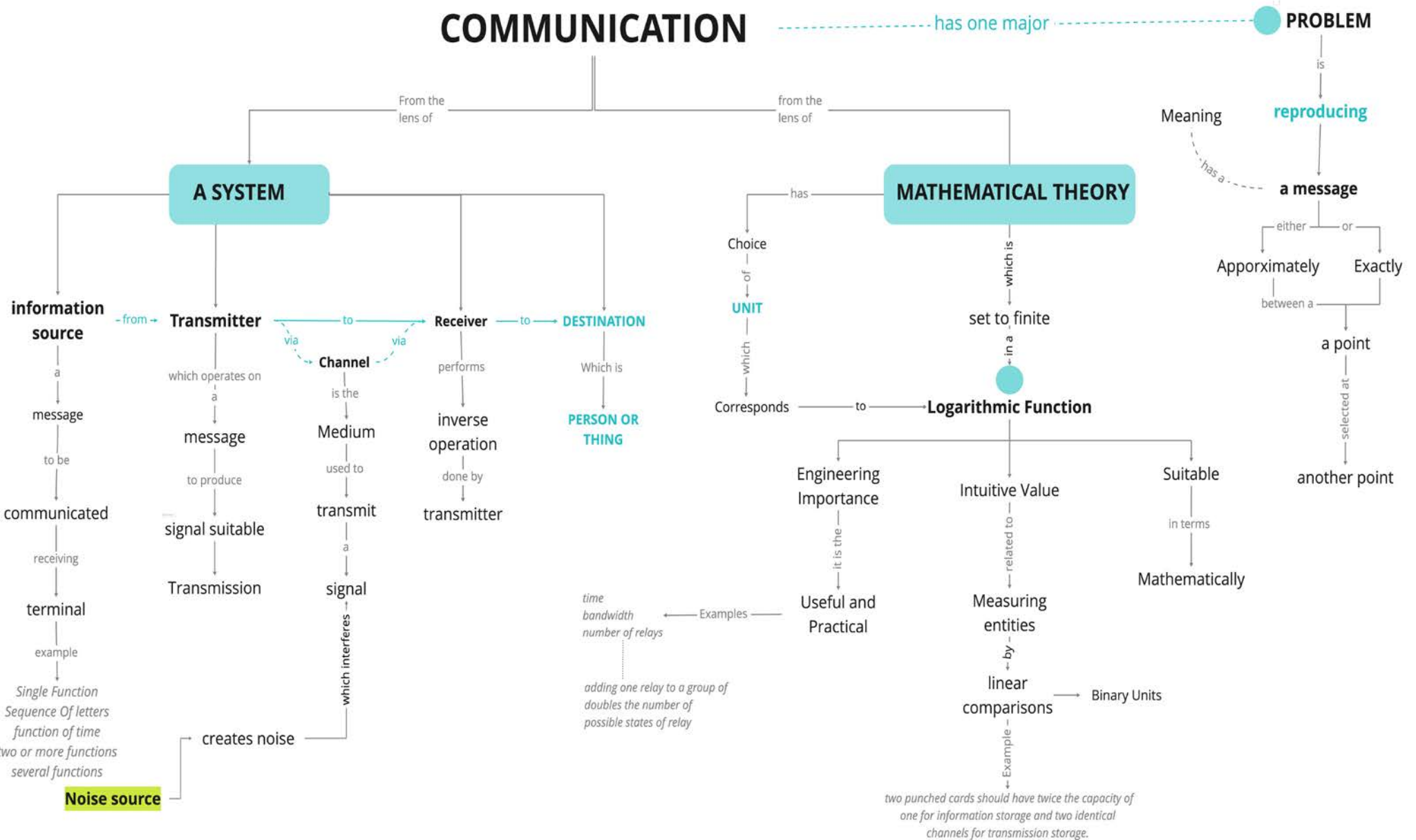
- Qualisign — means —> Quality of the sign
- Sinsign — involves —> existing thing or event, Replica
- Legisign — requires a —> Law —> Conventional signs

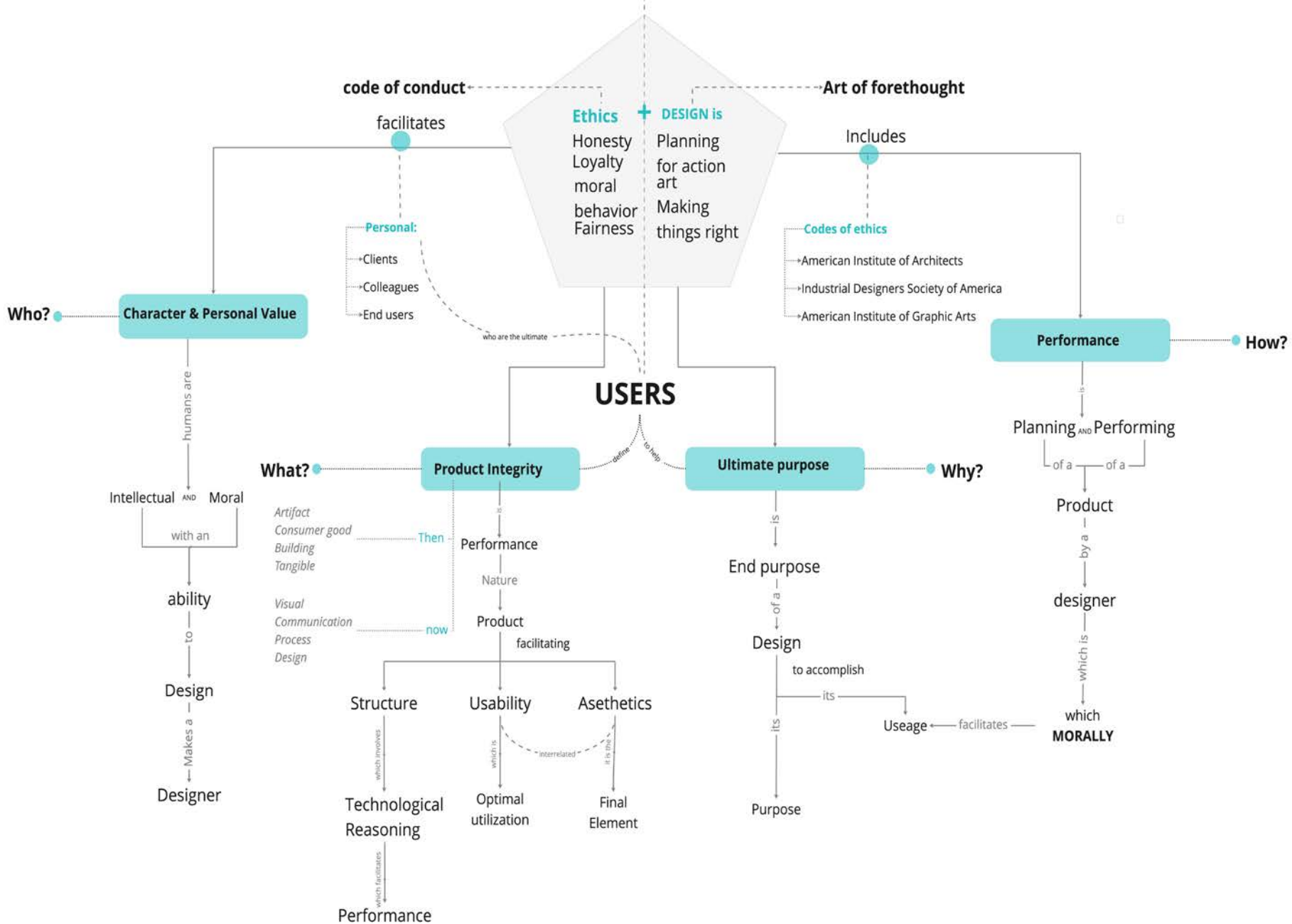
02 Object

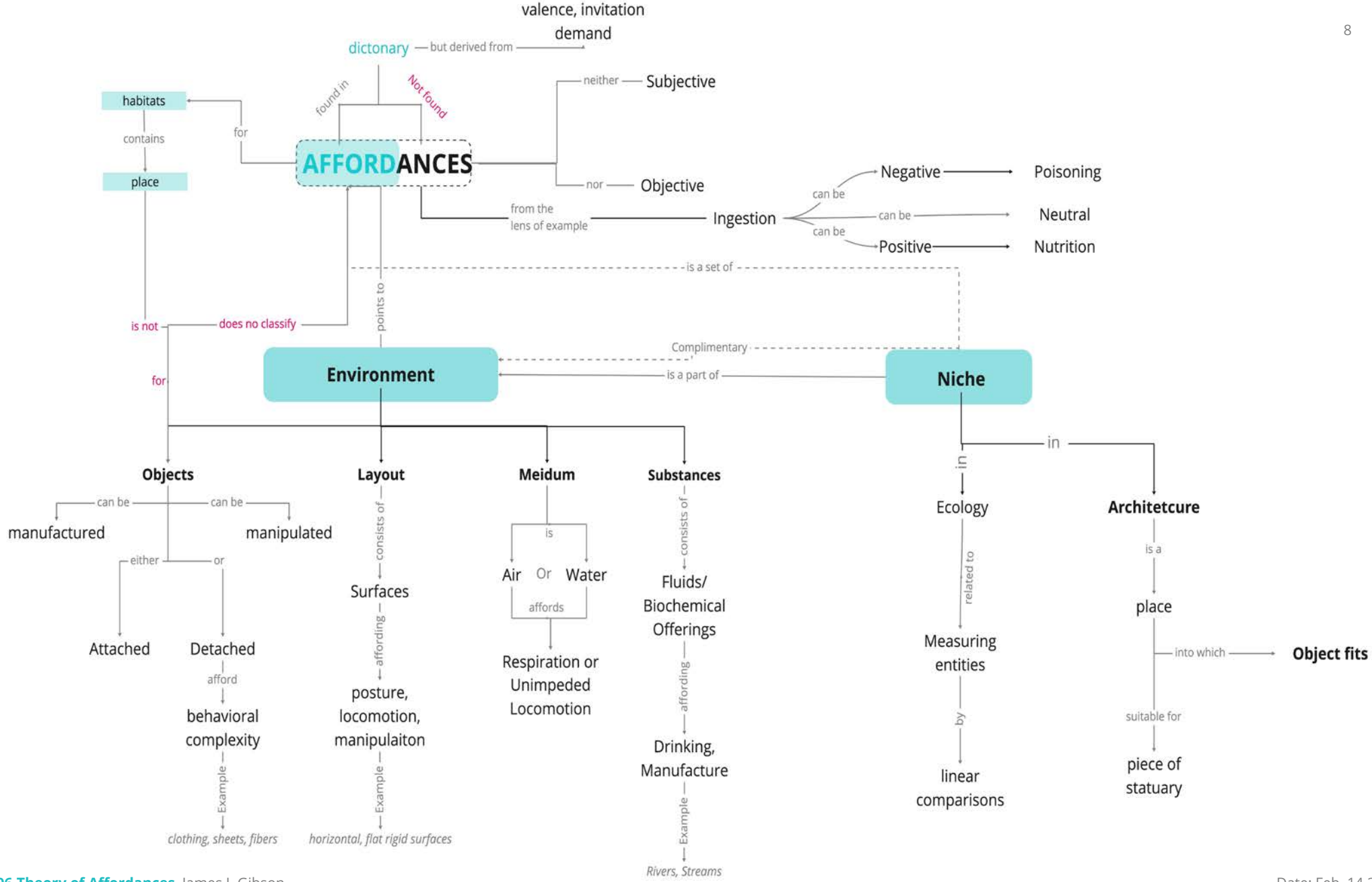
- Icon — Refers to —> Object — with —> thing used as a sign — defined by —> Characters  
sentence  
Potential Mood —> eg: algebraic expression
- Index — Refers to —> Object — by —> modification of the object — defined by —> Being affected by the object  
sentence  
Imperative Mood —> eg: air-gauge, thermometer, barometer
- Symbol — Refers to —> Object — virtue of —> law —> Traffic lights, national flags



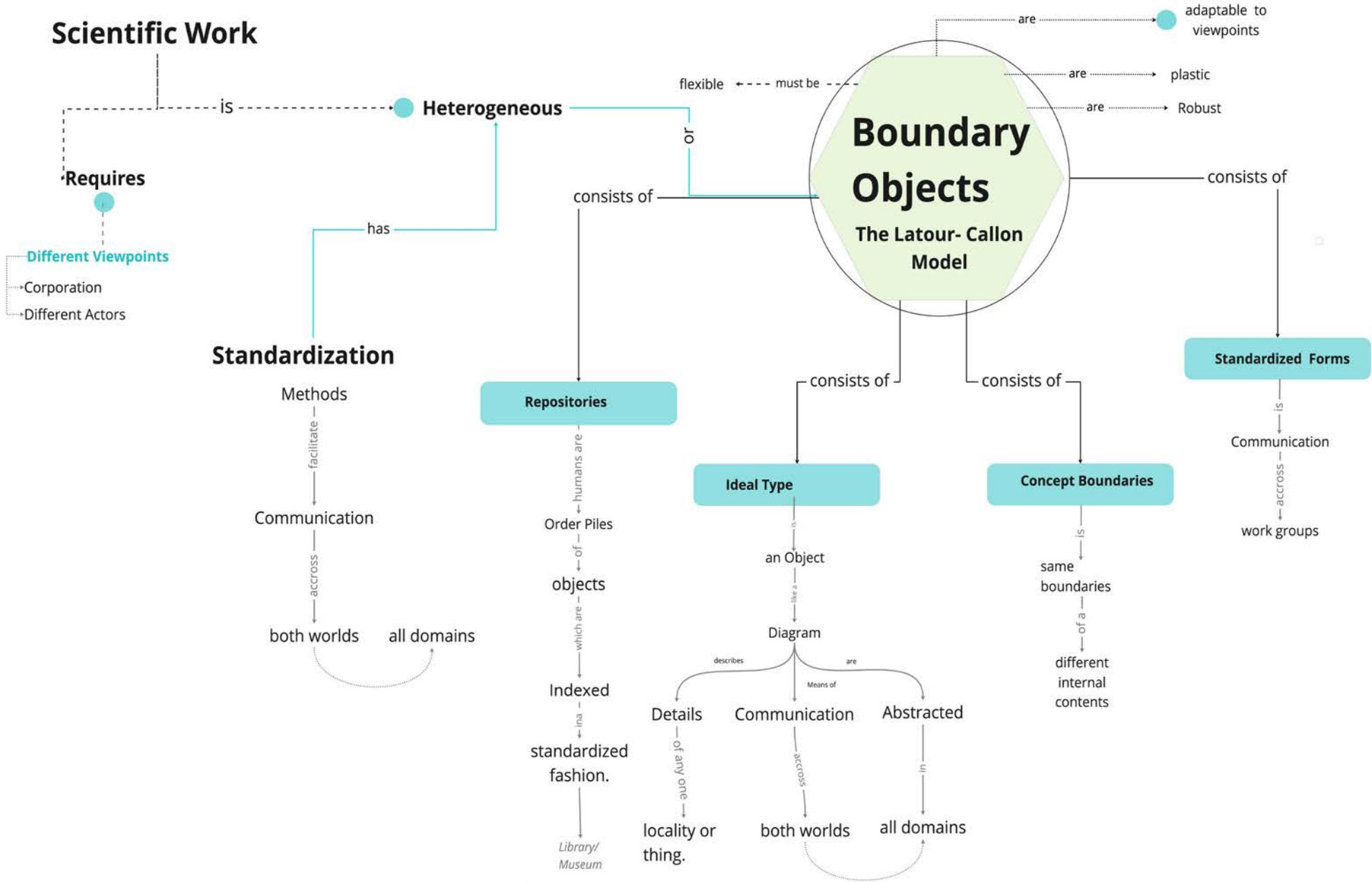
# COMMUNICATION

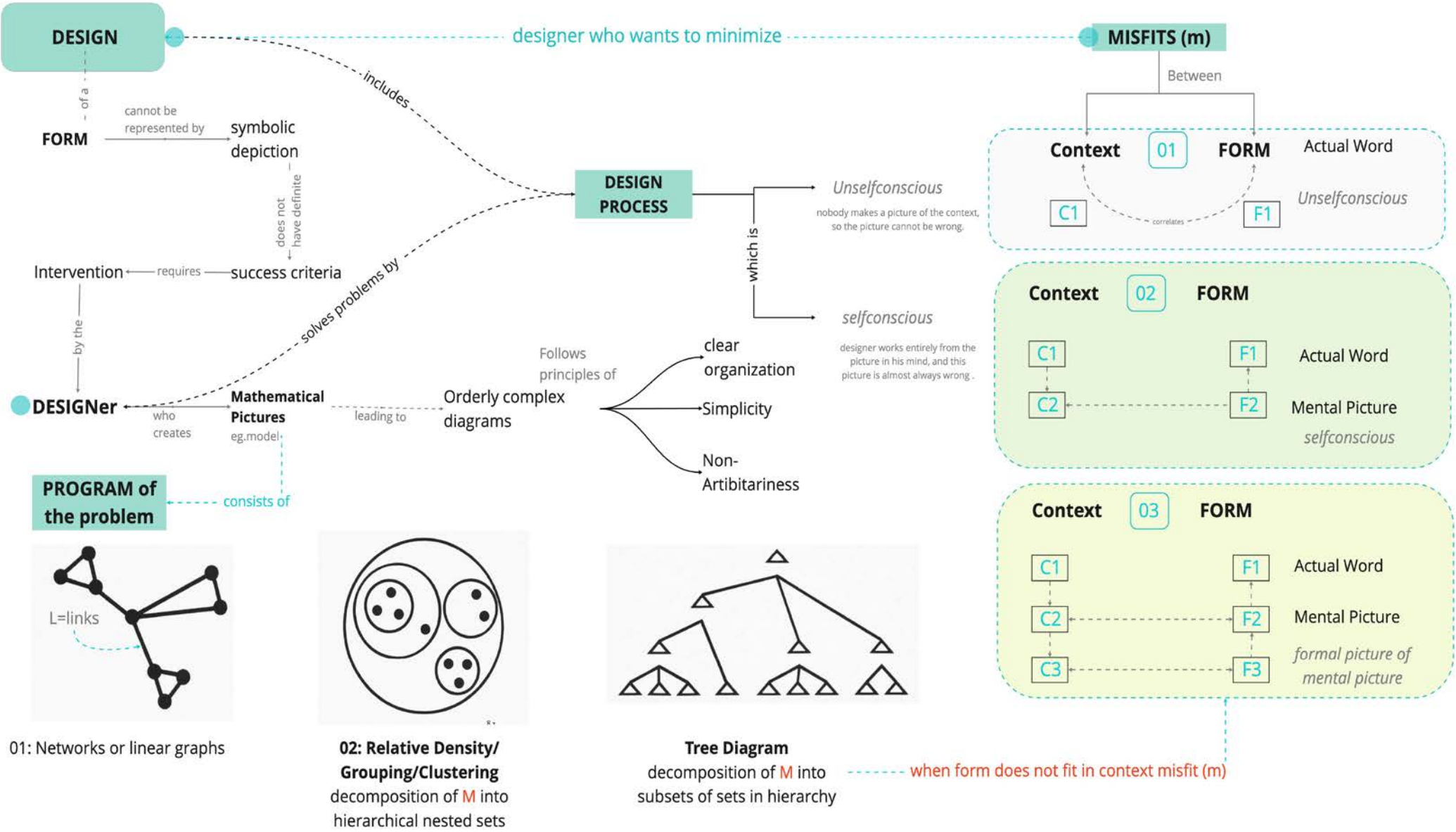




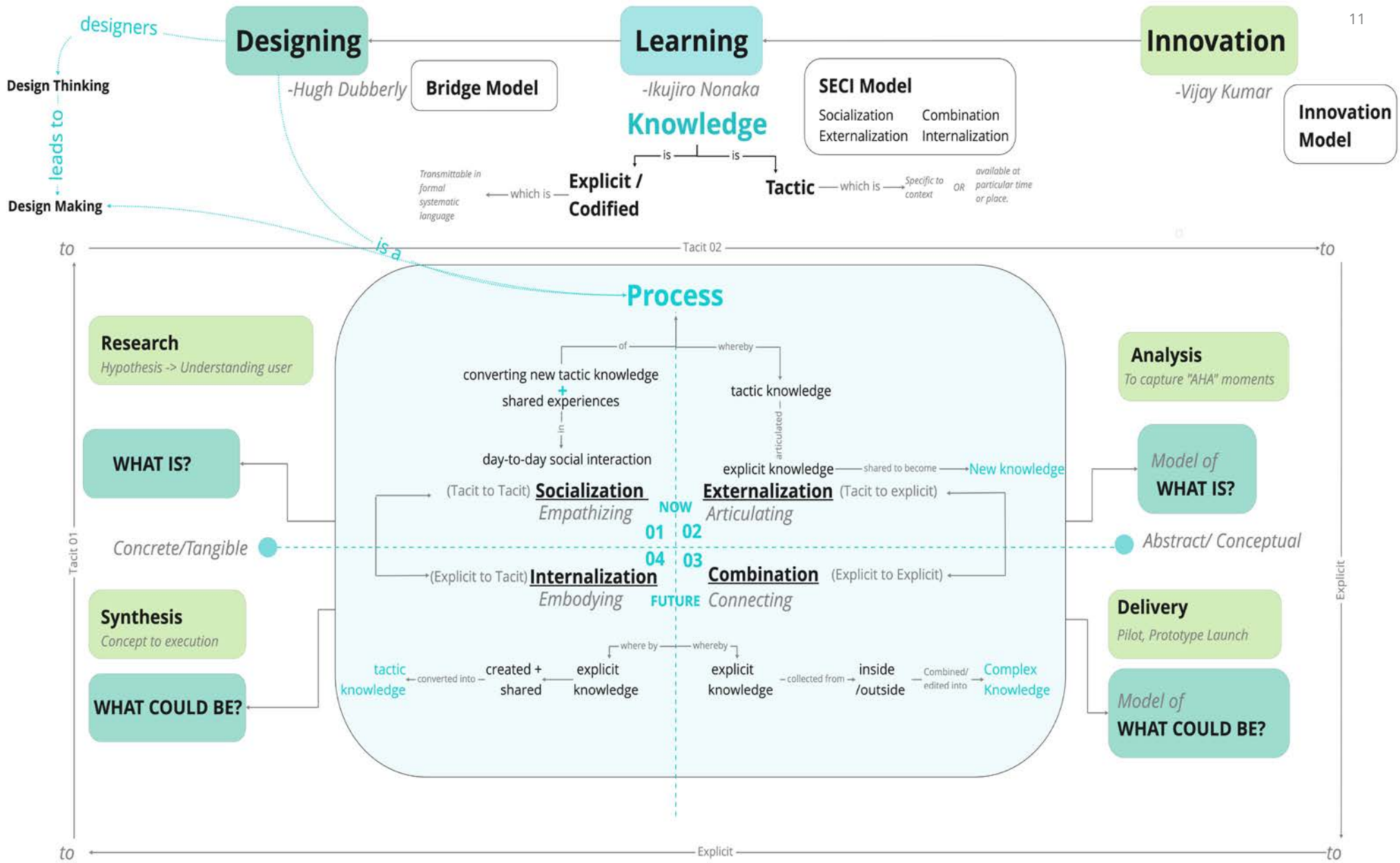


# Scientific Work



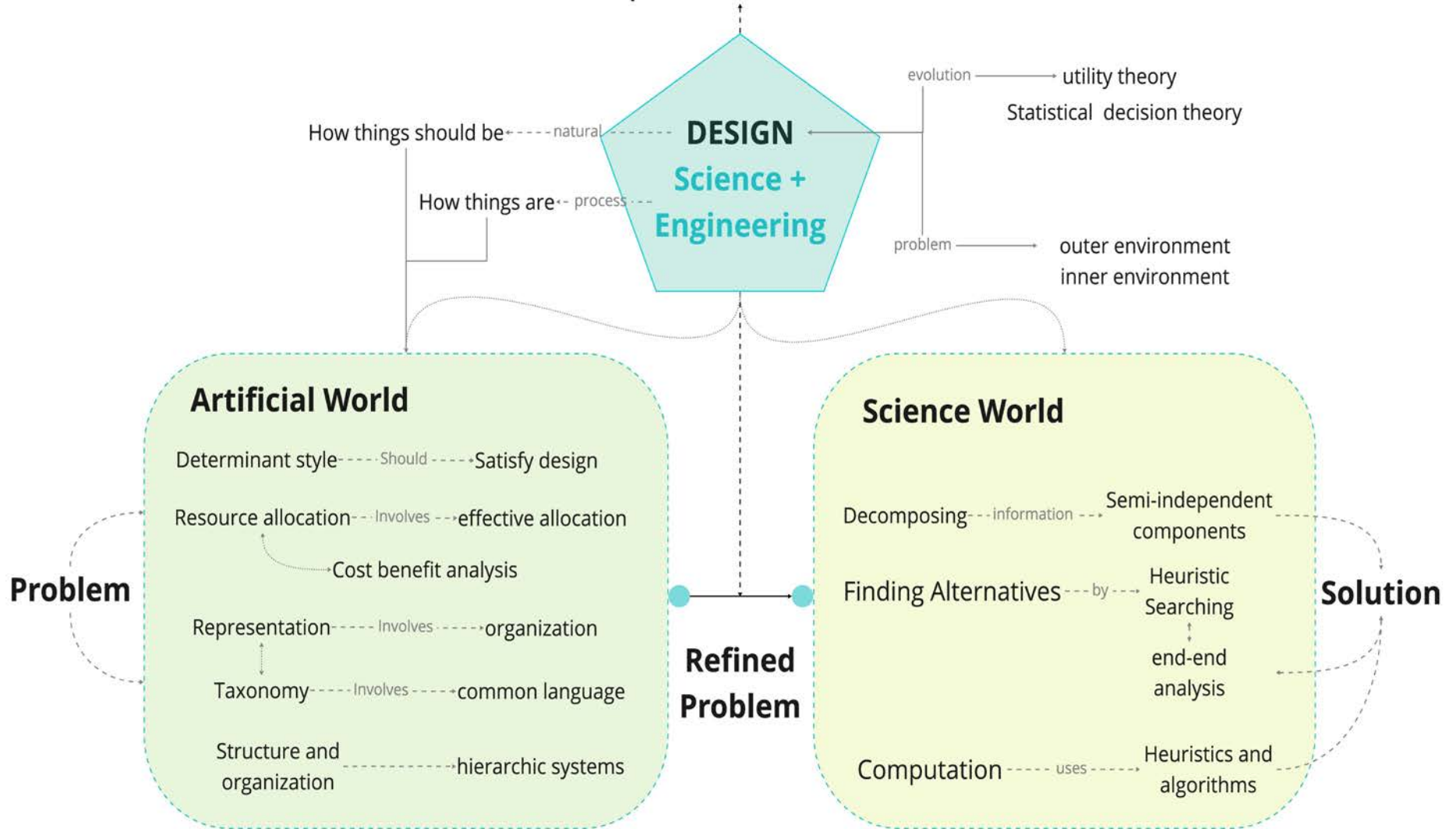




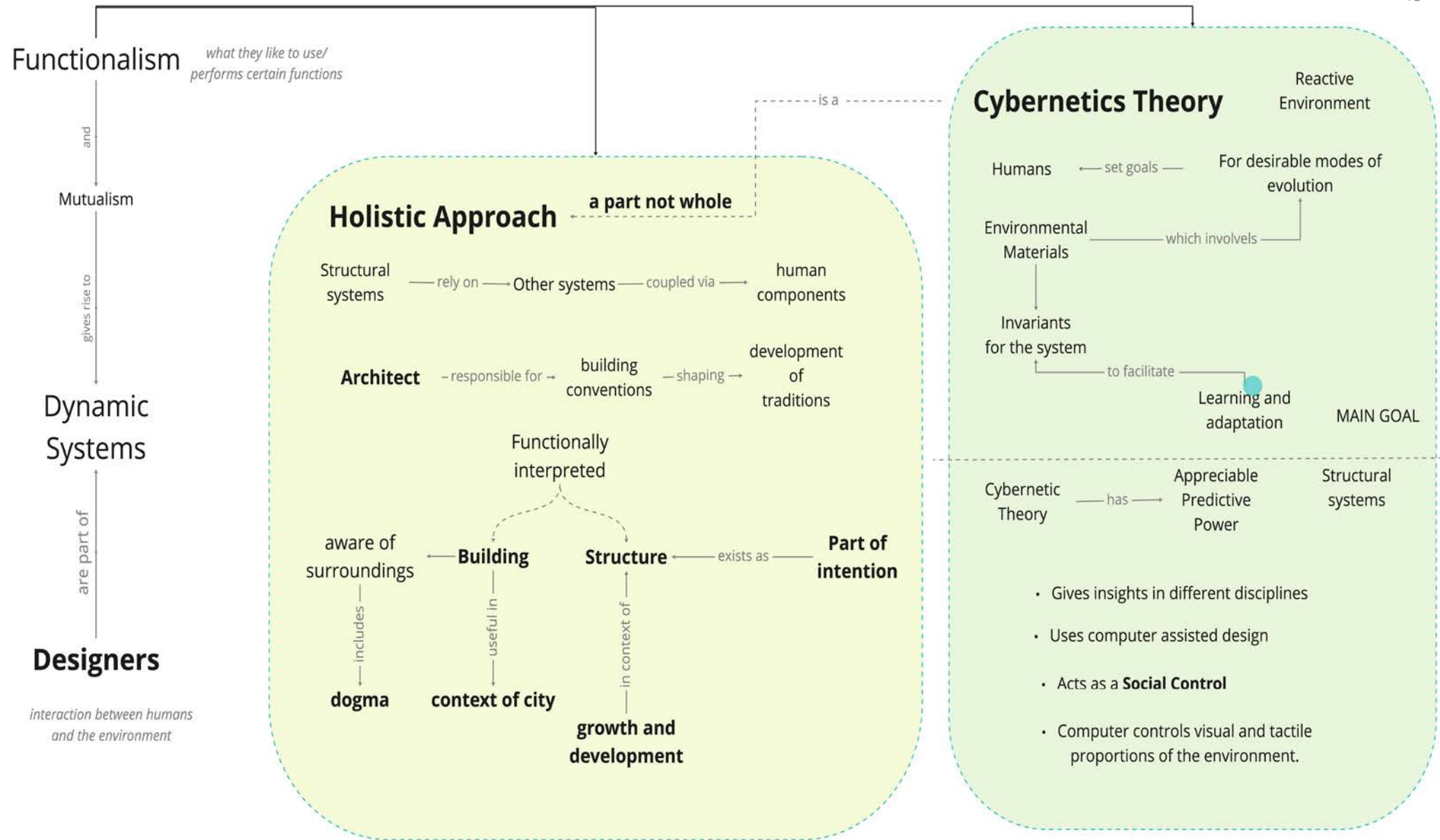


Engineering schools-- became --> School of Physics & Mathematics  
 Medical schools---- became ----> School of biological science  
 Business schools---- became ----> School of finite Mathematics

**Principal mark that distinguishes  
all professions from sciences**



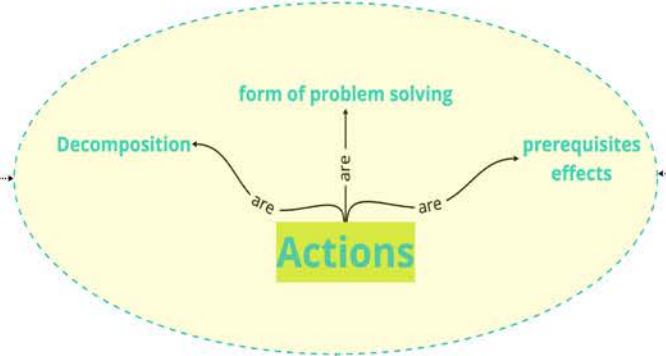
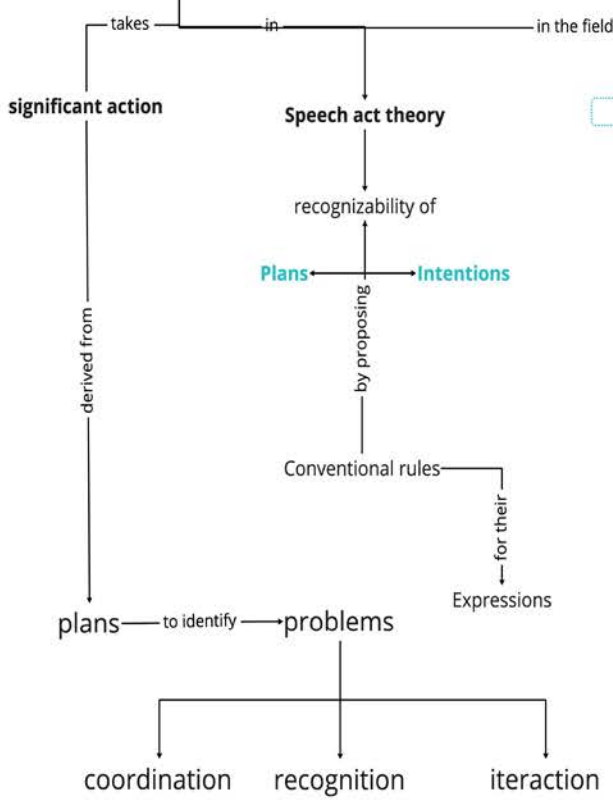




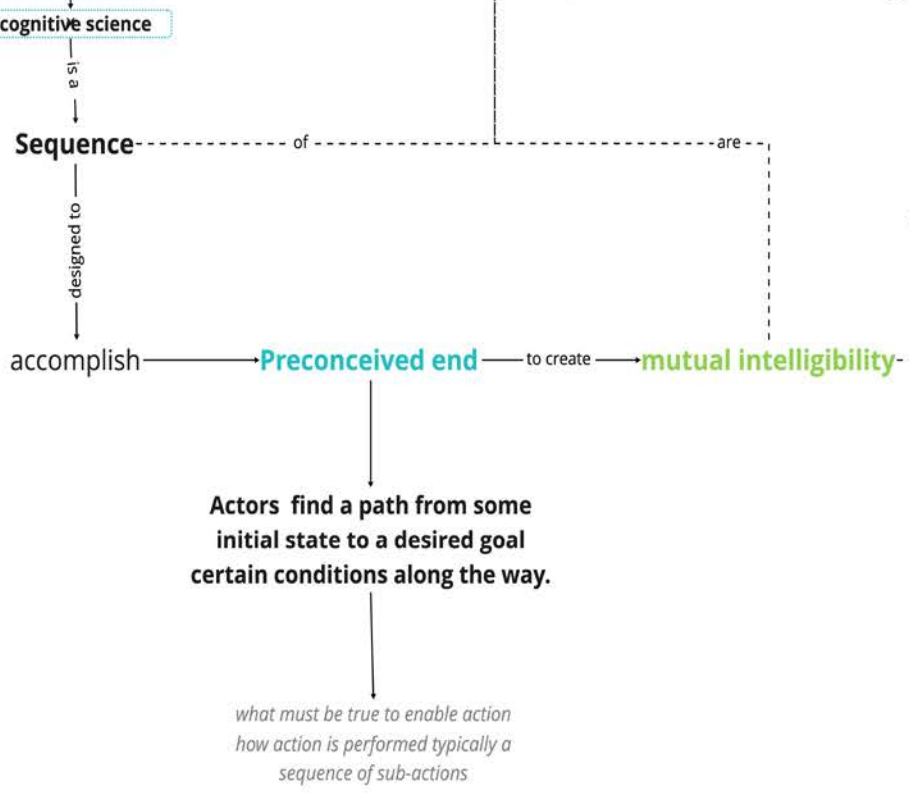
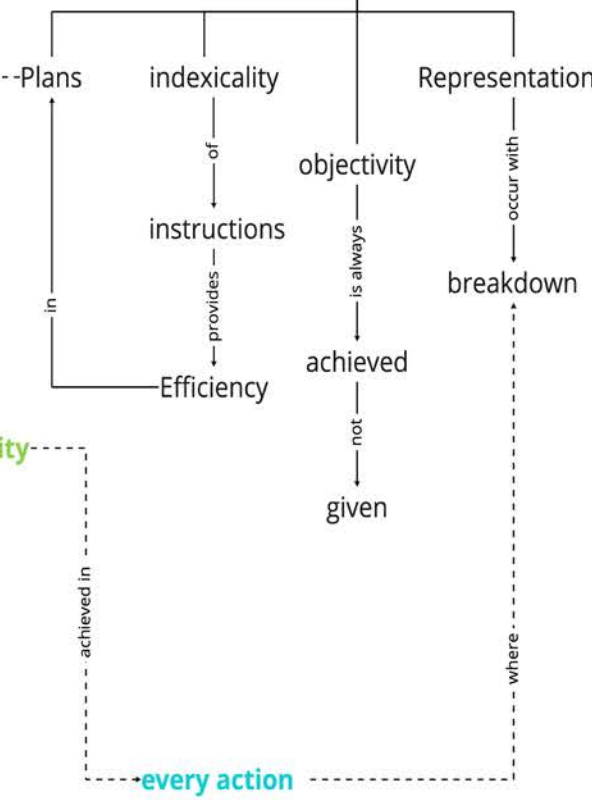
**PLANS**  
 prerequisite to and prescribe action  
 of every level of detail.  
 Organization and significance of  
 human action is underlying plans.

In Problem Solving systems:

**Planning model**



**Situated action view:  
 Ethnomethodology**



### COGNITIVE PERSPECTIVE

## DESIGN THINKING

## FRONT END

### HOW DESIGN MOVES?

Small increments of thought

### Content based strategy

STEP > ACTION > MOVEMENT > MOVE  
STEP > ACT > OPERATION > TRANSFORMS > DESIGN SITUATION

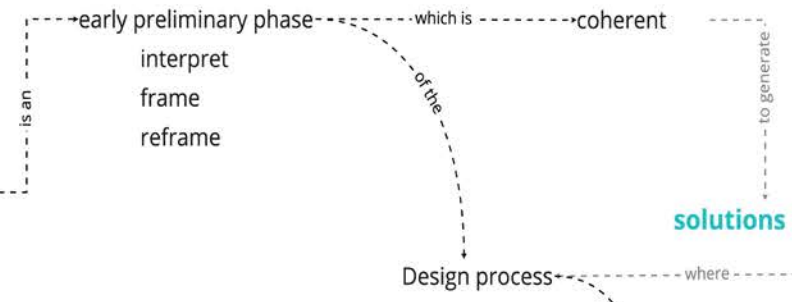
### protocol analysis

- is generated in

+ Additional points:

- Puzzle Making** John Archea (1987)
- Good FIT \ MISFITS** Alexander 1964

The deep underlying premise of those models was that the design process comprises separate phases and designers progress from one phase to another, with backtracking where it is necessary. The process of clarification and framing and the process of searching for a solution are not sequential; rather, they occur in parallel (Dorst and Cross 2001).



- Backlinks < *direction is backward in terms of a linear sequence in time.*
  - Forelinks > *direction is forward-bound in terms of a linear sequence in time.*
- a step in the process that changes the situation.

NOT smallest unit can be

Constituent arguments

*I would try to have an important element.  
I would therefore make the axis I mentioned before, this one.*

**associative system** *makes use of visual representations when they are relevant, and design is a case in point;*

**Rule Based System** *the rule-based system specifies a rationale.*



# Co-designing

- Change glimpsed in fragments
- Activity based on emergence.
- Developed from reflective thoughts combined with reflections.

## Fragment 1

MA

Reveals fields stretching beyond boundaries of time and place as distinct by collapsing.

### Key Findings:

- Lacked Specificity** (as per old man)
- Specifics didn't matter** (as per woman)
- 2 Interactives** (workshop and Neighborhood)
- Recalling past** for future scenarios

Captured moment of deliberative change  
 Created Ambiguity and curiosity  
 Effectiveness Provoked discomfort

## Fragment 2

MA

personal and collective sensing of betweenness like atmosphere.

### Key Findings:

- Anticipatory Effects** (as per old man)
- Sumartojo** freighted with individual shared memory/experience contributing to **ATMOSPHERE.**

Shows incremental Change  
 Encountered oddity and bemusement

# ANT (Art Network Theory)

- perceived through Tacit,
- immersive actions of becoming

Absence of color  
 Absence of sound or movement  
 accentuating awareness of totality

# MA

is mutually evolved alongside not immediate created and senses in action and practice cannot just be read, written, thought about

## Japanese Culture

Ambiguous concept - colloquial in nature  
 Seen in Taosim, Shinto, Zen buddhism.  
 re-situate us in emergence and continuity

## In Design

- Manifesting in spaces that are reconfigurable by sliding, semi-opaque screens in traditional
- Corridors/entrances inside and outside blurring such boundaries.
- is a merging of distinctions of Grayness - in between white and black (Color)
- Implies Rational Sensitivity

## Lost in Translation

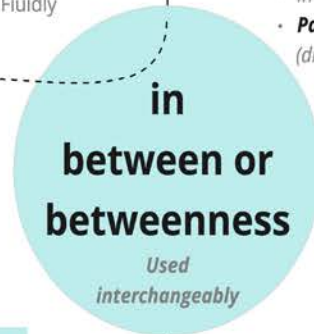
- Intersubjective nuances lost in descriptions of designing over tangible and defined methodology.
- It's facilitation is centrally immersed within and emerged from very complex rational dynamics.
- Small moments lost in description
- deals with felt visceral intuited and intimate)

## TACIT (SUBJECTIVE / AMBIGUOUS)

- Applies to **who and how we are with others** (affinity, intimacy, animosity, strangeness)
- **Social Relations** > Experienced > Fluidly

## TANGIBLE (OBJECTIVE)

- Space contained by structure (room/volume)
- As interstice (gap ,slit, opening)
- In music (interval/break)
- **Pause** when delivering a speech or punchline (dramatic effect)



In Zen

It's nature can be ambiguous and obscure, so it makes little sense unless it emerges from practice and returns to practice, anchored in action.

## Perspectives on MA

means light shifting through gap shutters (In Chinese)

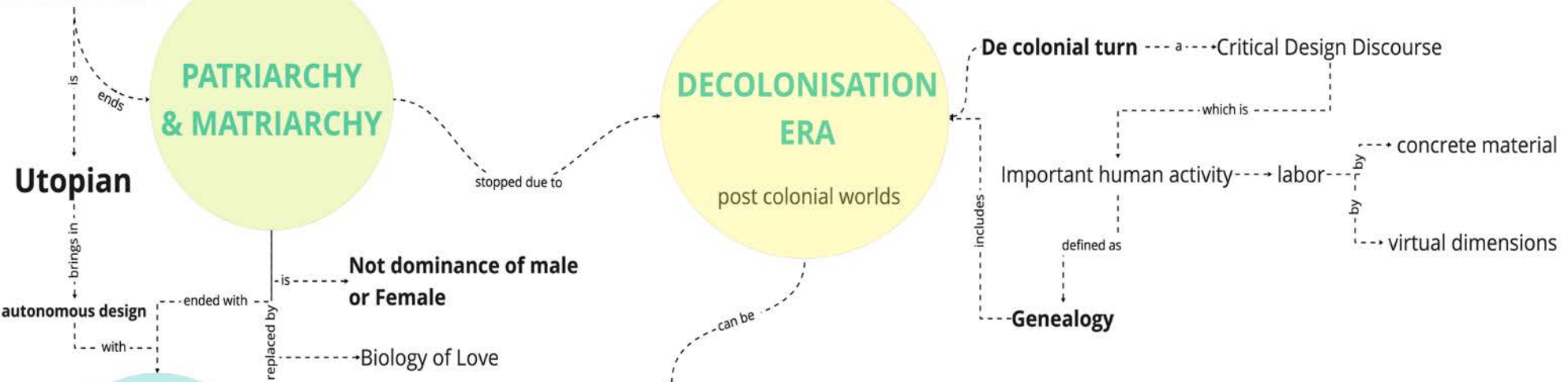
- **Isozaki** - attention given to those invisible things and denies the position of a fixed subject.
- **Pilgrim** - pregnant nothingness: includes deliberative silence in performance or white space used in visual composition.
- **Derrida** - Says Ma is untranslatable. A way of seeing deeply related to sense of balance in daily life/key idea-decoding aspect

noun

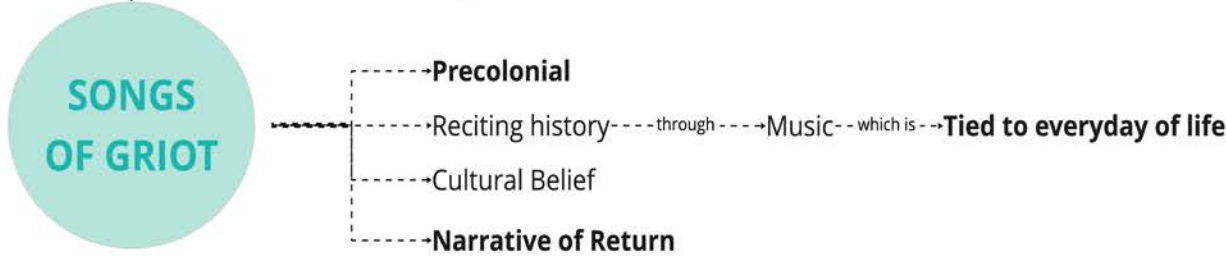
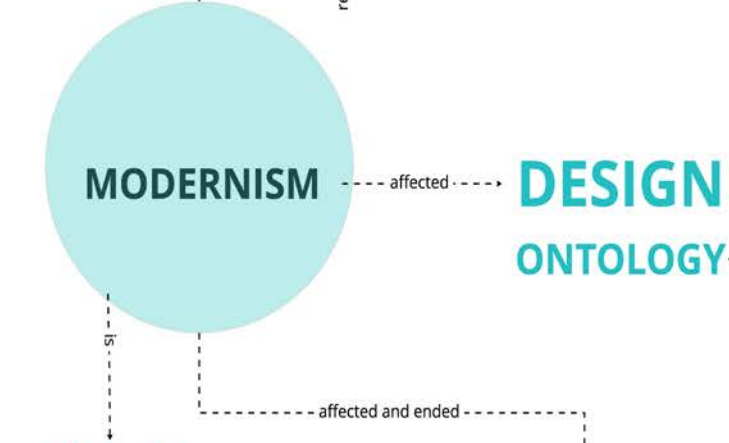
adjective

as as

# Pluriverse



**Postcolonial** or **Beyond the colonial** a world where many worlds fit.



14. Designs for the Pluriverse, Escobar  
The song of the Griot, Diawara  
Design History, Ansari

# HOW TO BUILD ANYTHING THE GOOD WAY? THE LAKOTA WAY!

## Indegenious Protocols

with  
↓  
relationships with world  
↓  
in  
↓  
Ethical Ways  
↓  
to build

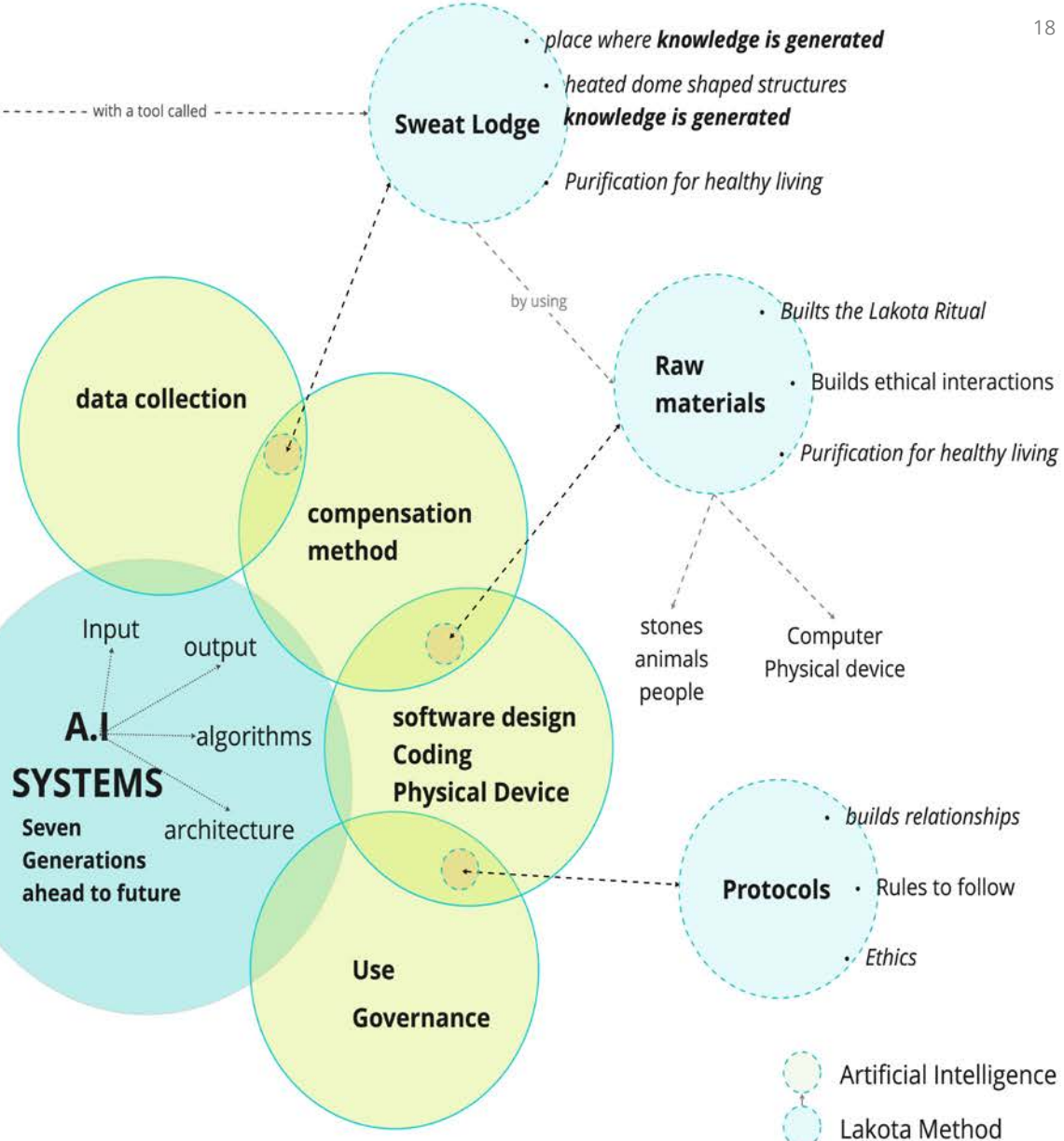
## GOOD WAY

### PROTOCOL

- Appreciating ----- who are the elders?
- Identifying Needs ----- members
- Identifying Stakeholders ----- Who is needed to create this process
- Identifying Raw Materials ----- what is needed
- Constructing ----- methods to contrsuct
- transformation ----- how to complete

### ASK QUESTIONS?

- who are the elders?
- members
- Who is needed to create this process
- what is needed
- methods to contrsuct
- how to complete



**Thank You.**

Book by Purti Hardikar.  
Softwares Used:  
Adobe Indesign, Illustrator, Miro



Concept Map Book

ARTG 6110 | Information Design Theory and Critical Thinking

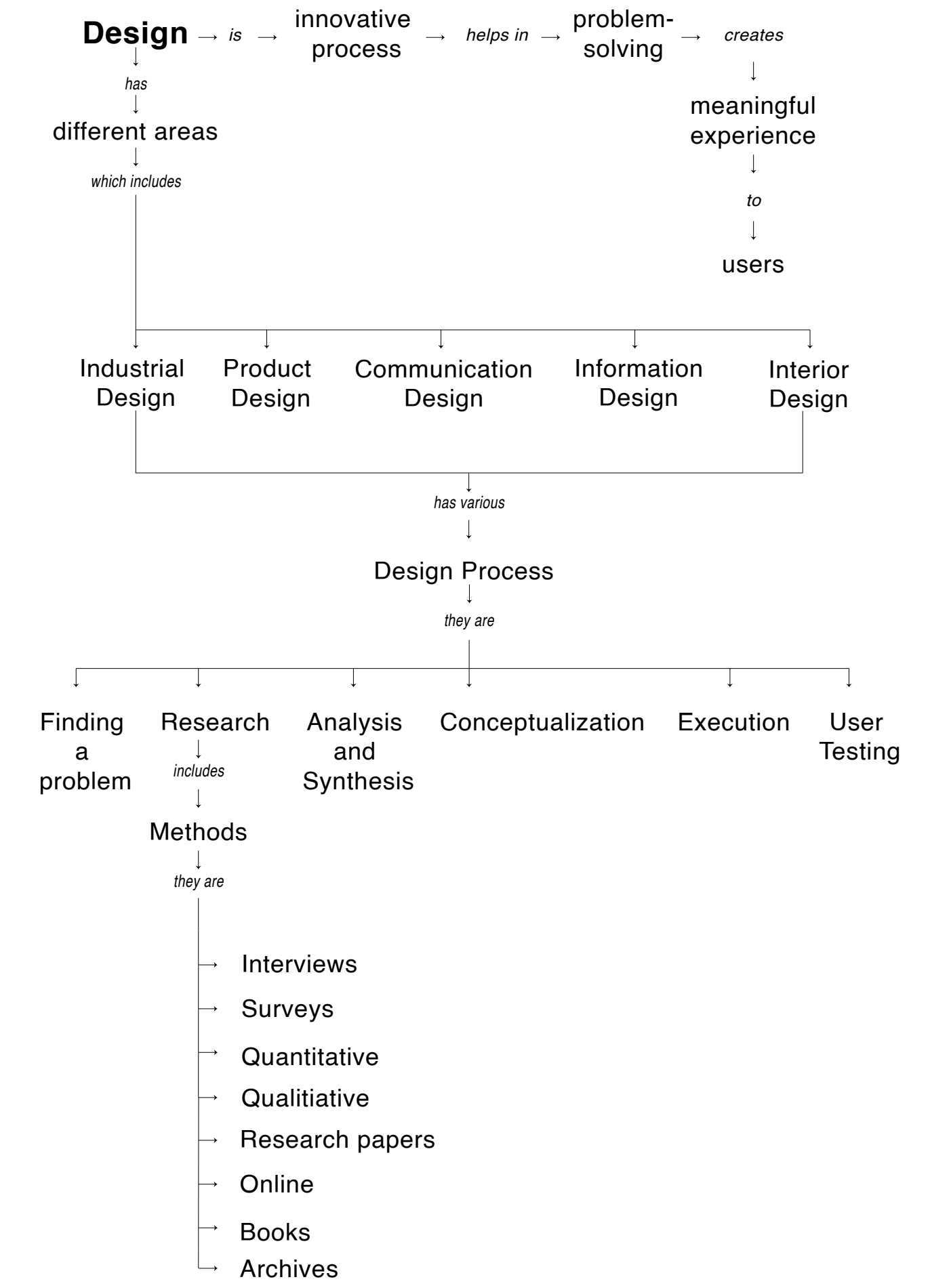
Anushka Harne

## 00. About the book

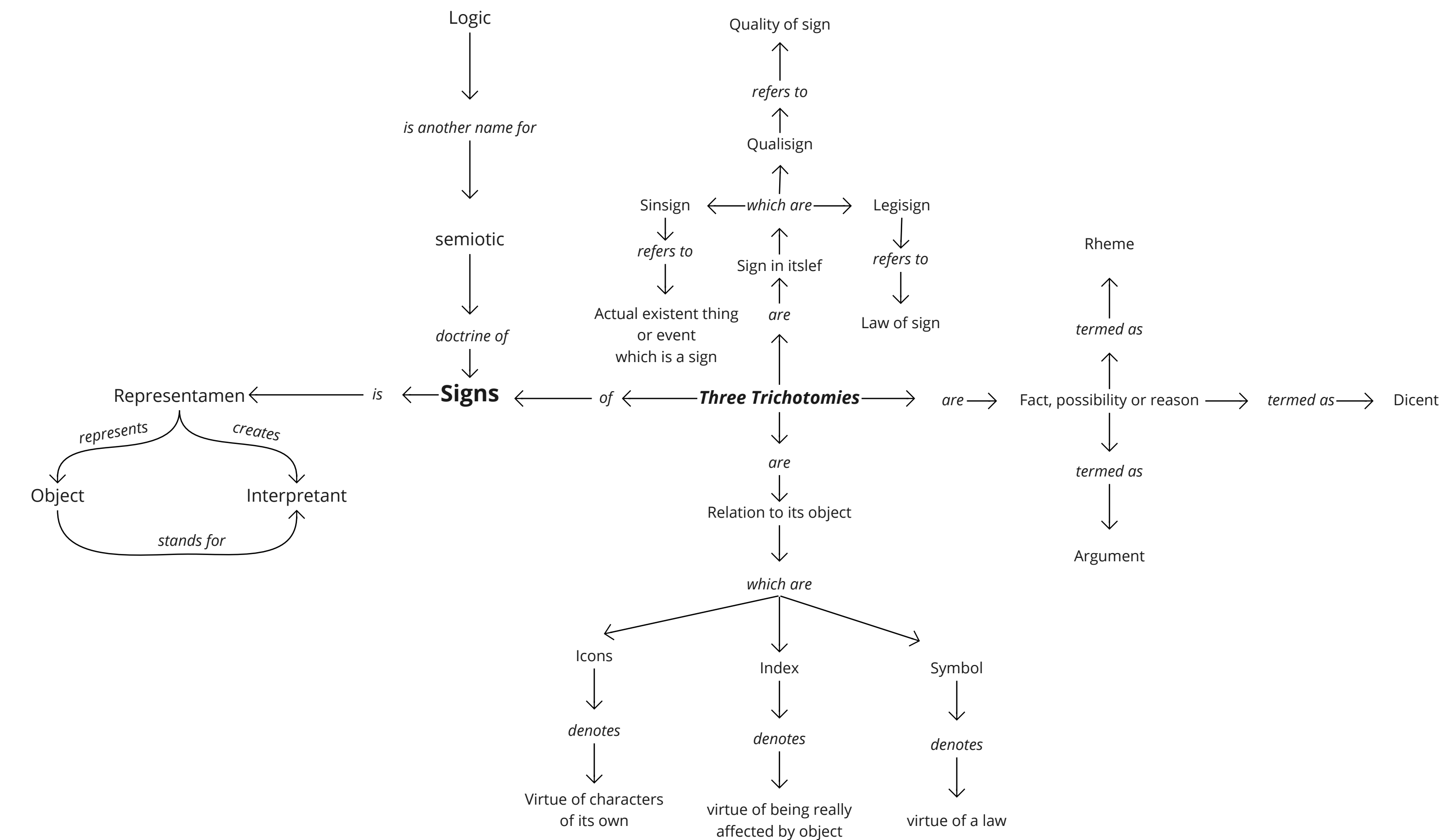
The Concept Map book for the course Information Design and Critical Thinking by Professor Michael Arnold Mages is a compilation of all the concept maps we did during the semester.

The main aim of creating the concept maps was to highlight the key points from the reading and connect those points, providing a visual summary of the reading.

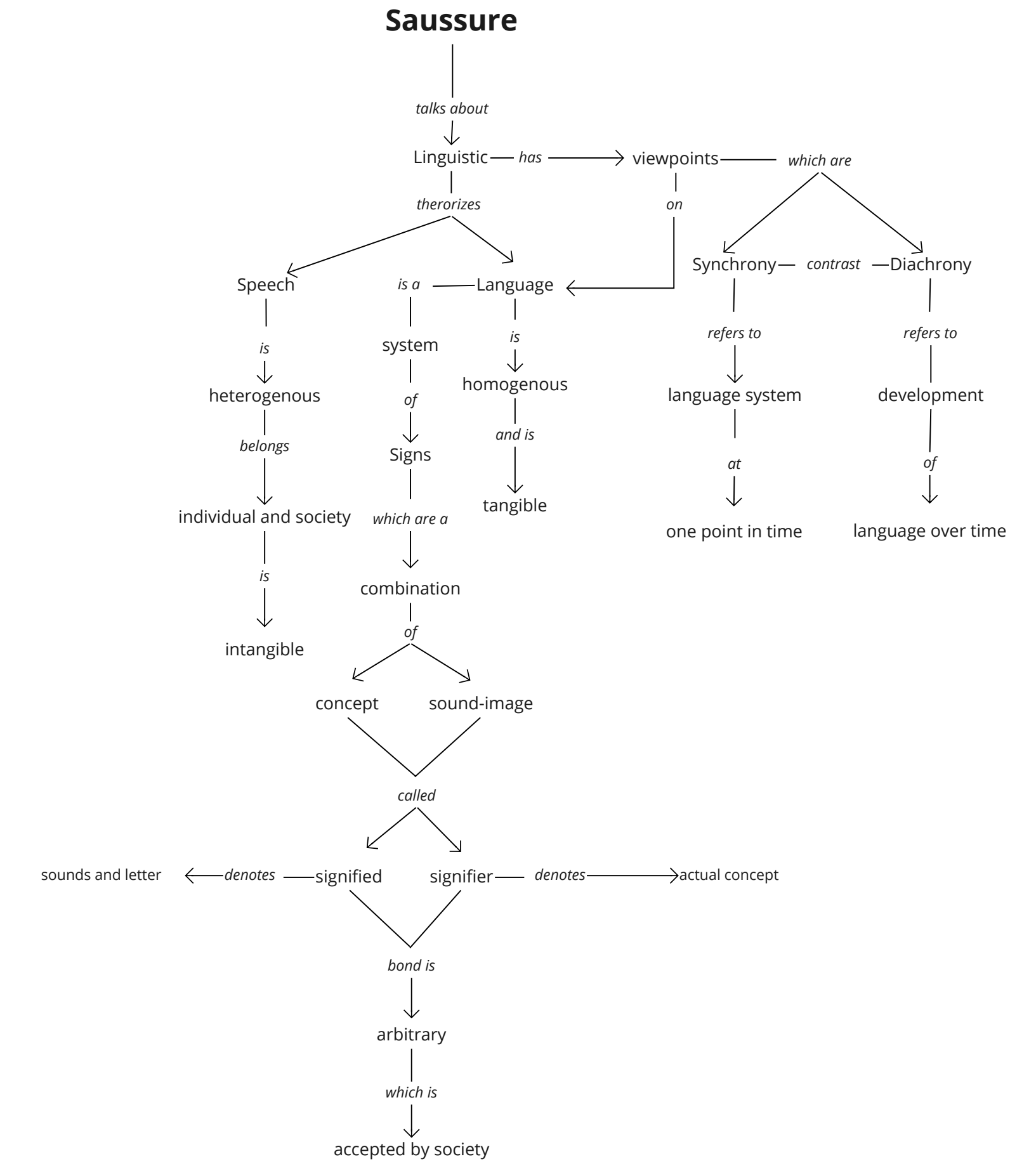
Initially, I struggled a bit with linking the terms, which terms are important, and how to visually layout the map. But, as the class proceeded further, I got a better understanding of focusing on the part that I wanted to highlight from the reading. As a result, my maps got into much better shape, and you could see the journey as you look further through my book.



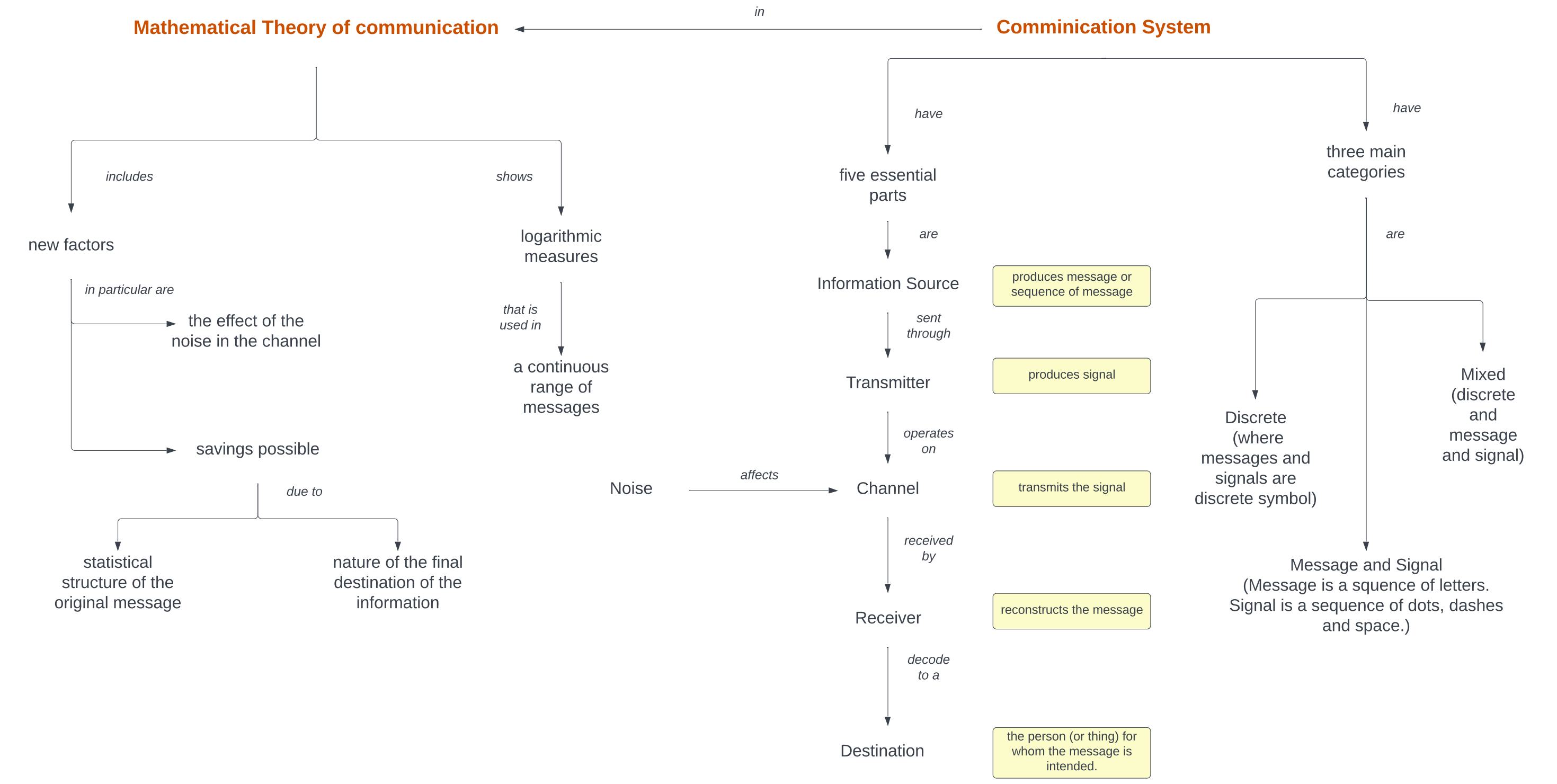
## OI. What is Design



O2. Philosophical Writing of Peirce, Pierce

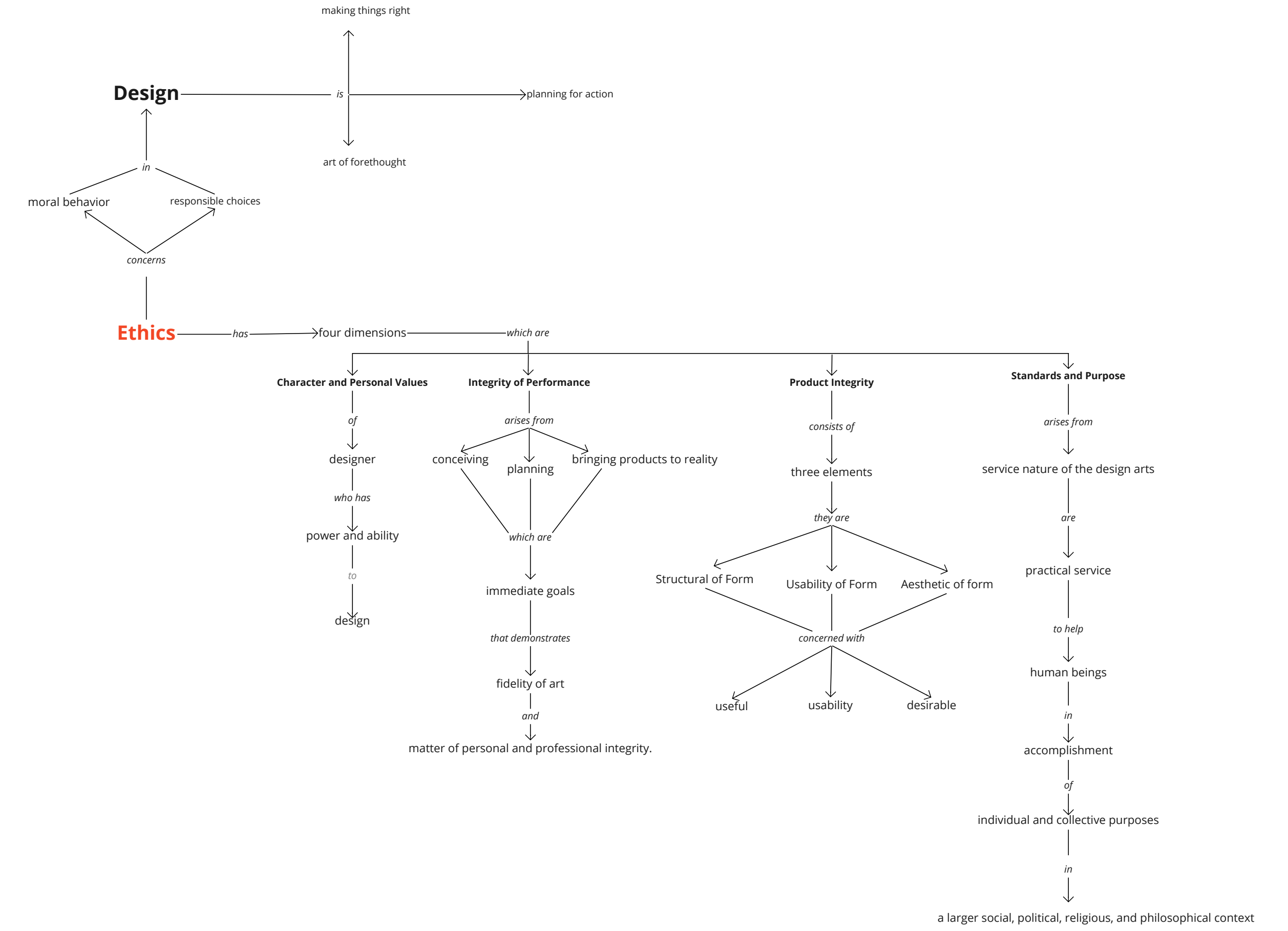


03. Course in General Linguistics, de Saussure

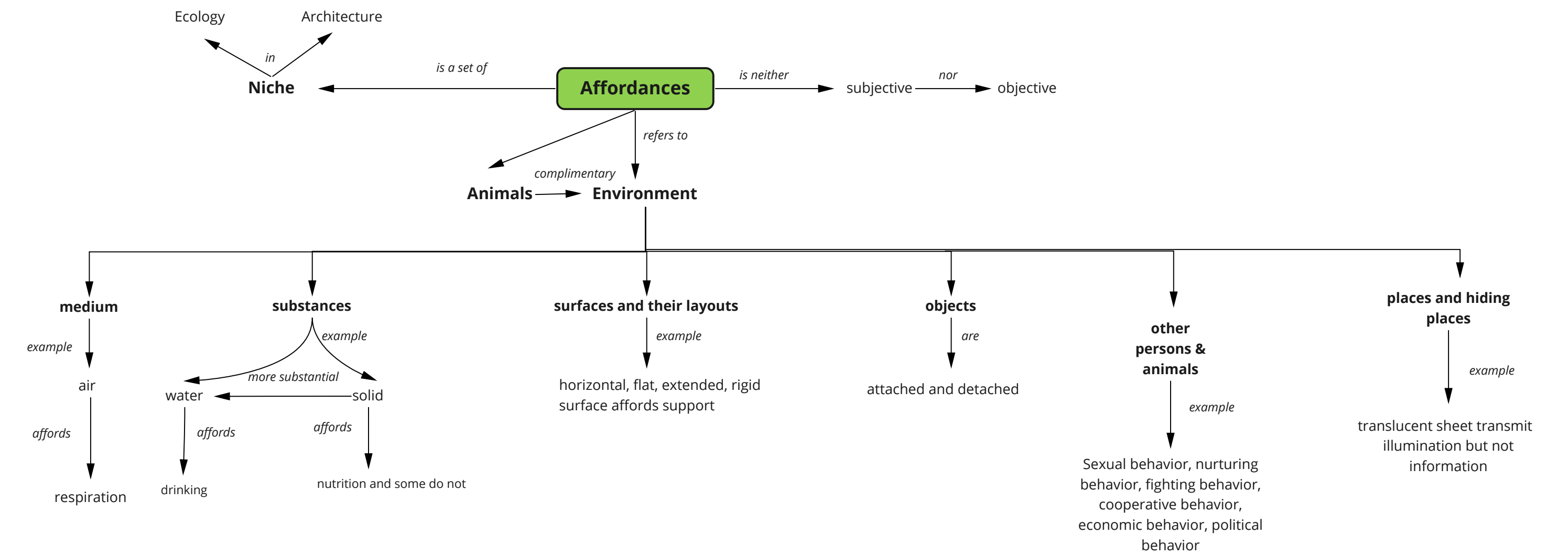


04. The Mathematical Theory of Communication, Shannon, C. and Weaver, W.

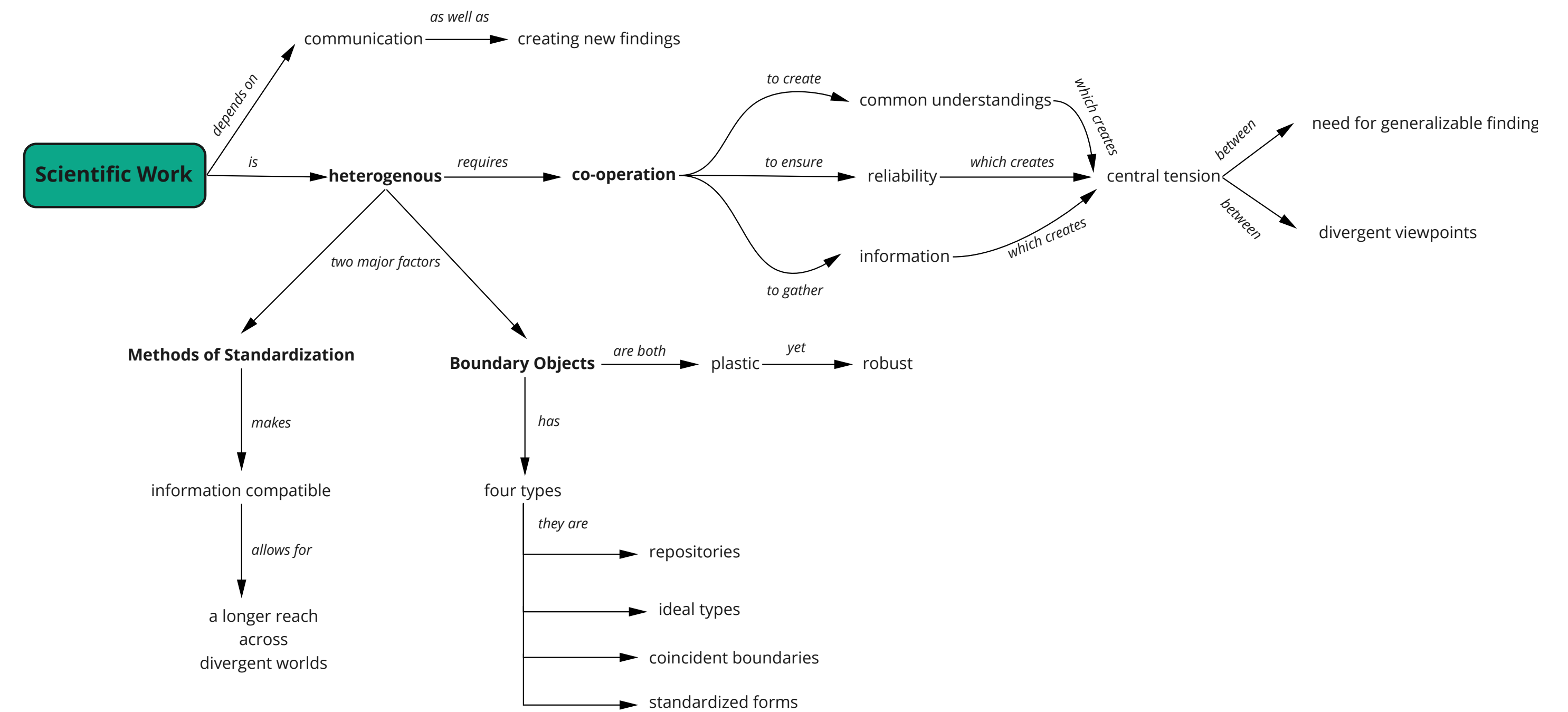




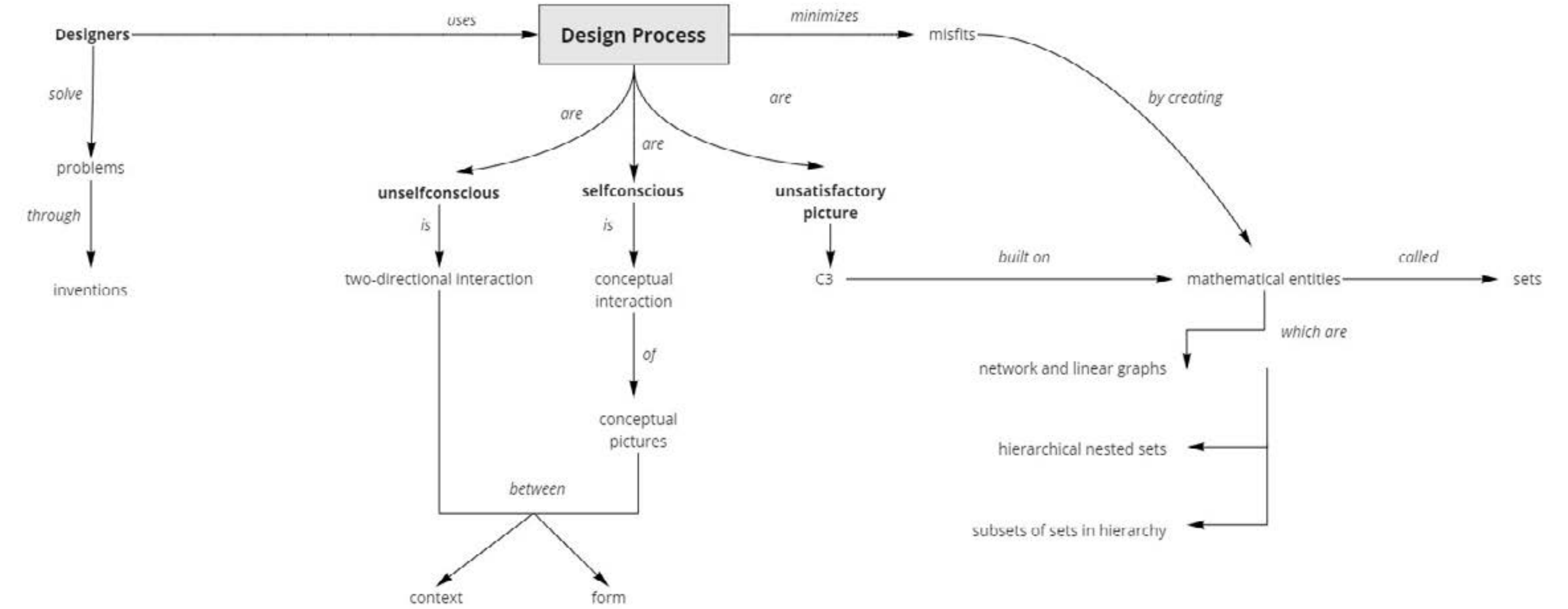
05. Design Ethics, Buchanan, R



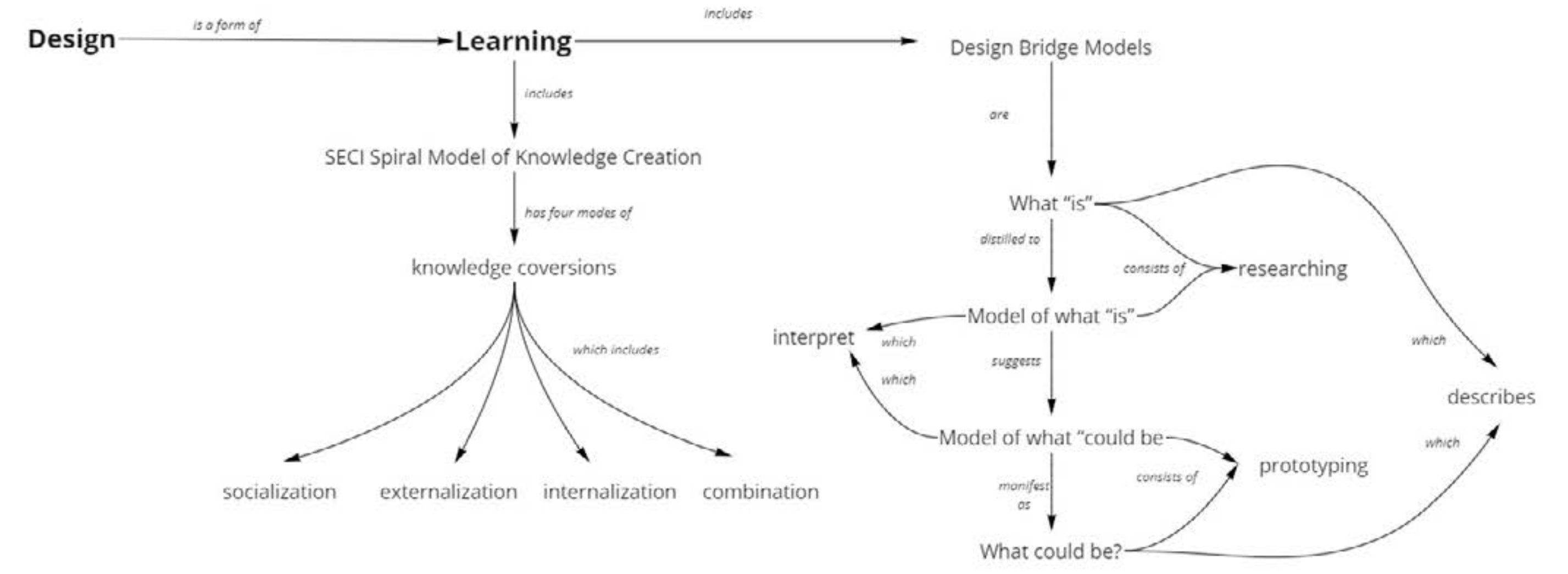
06. Theory of Affordances, Gibson, James J.



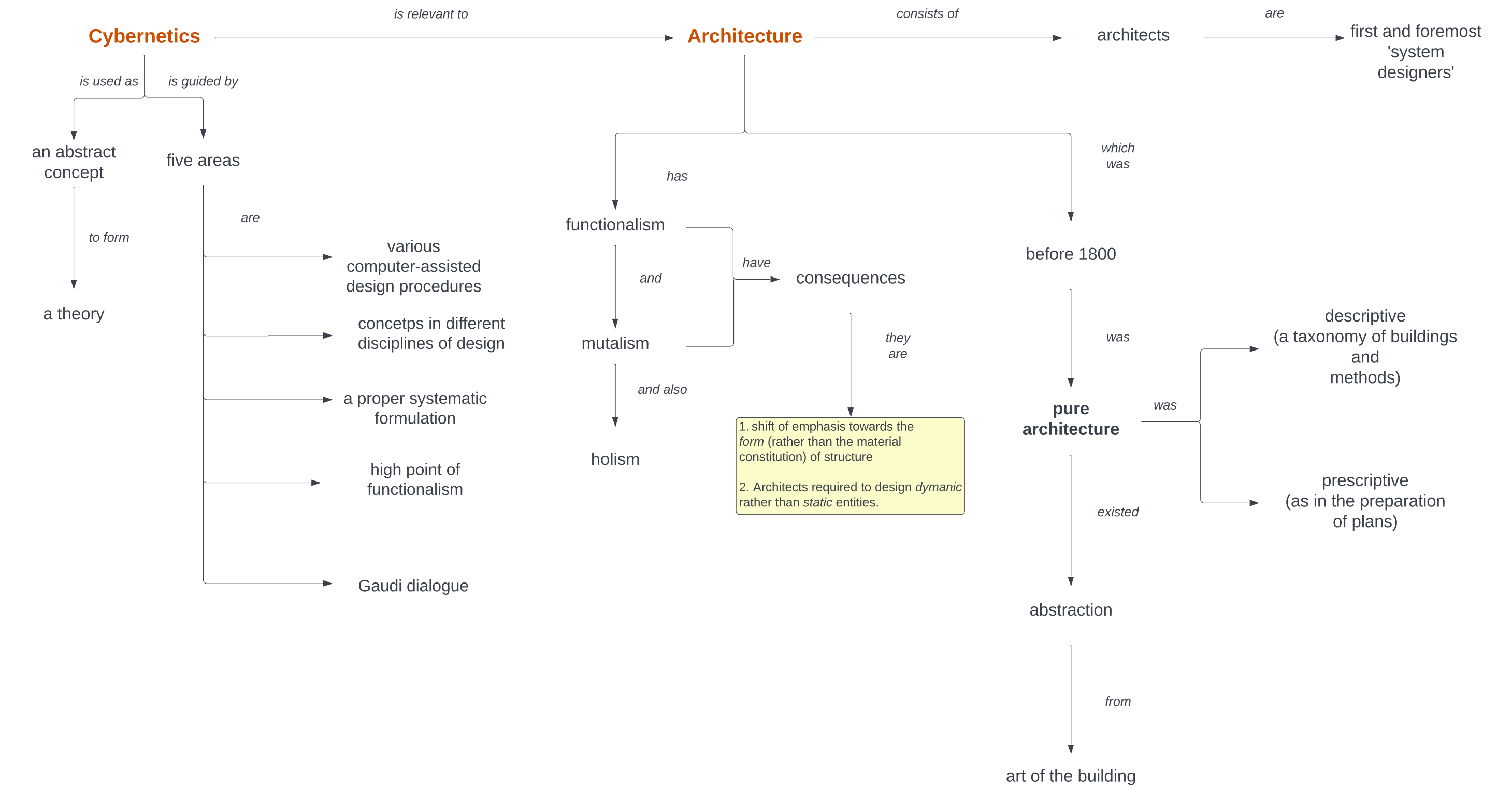
07. Institutional Ecology and Translation Boundry of Objects, Star, S. and Griesemer, J



08. Synthesis of Forms, Alexander, C.

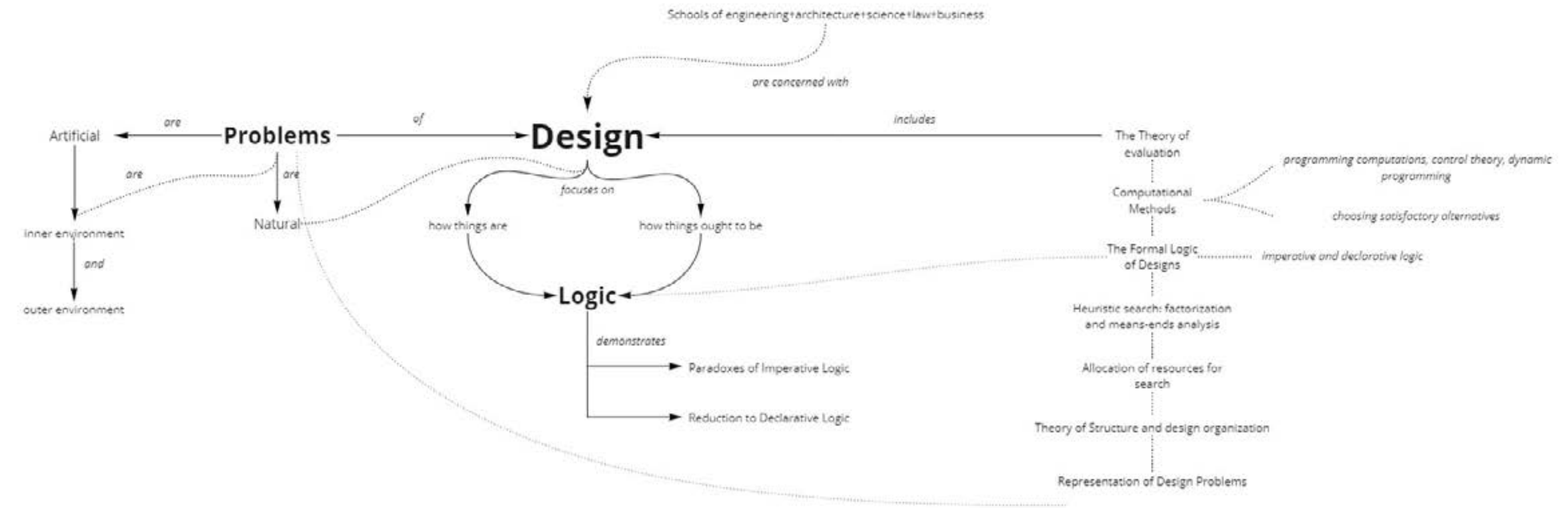


09. Designing as Learning, Dubberly & Dubberly and Evenson

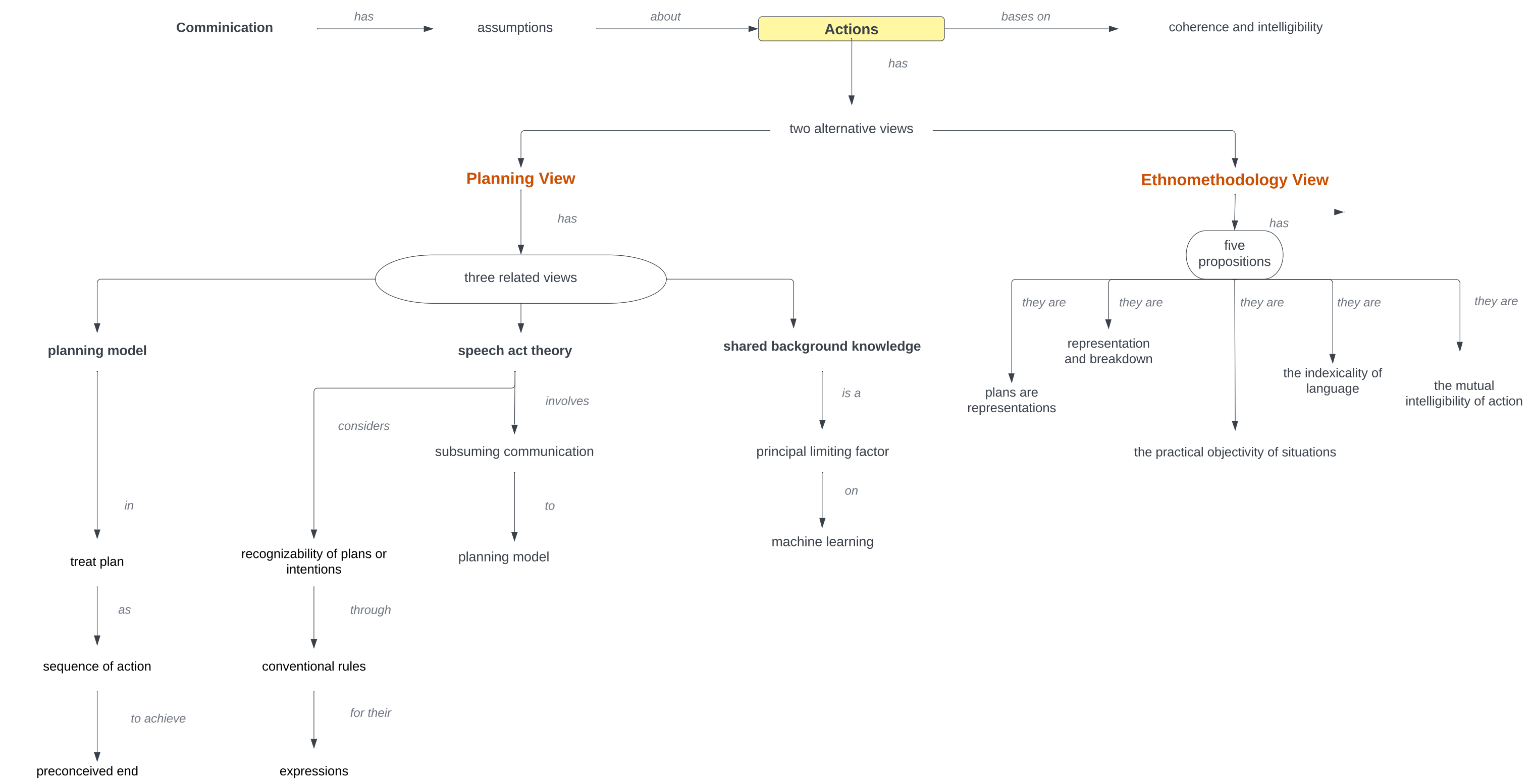


IO. The Architectural Relevance of Cybernetics, Pask, G.

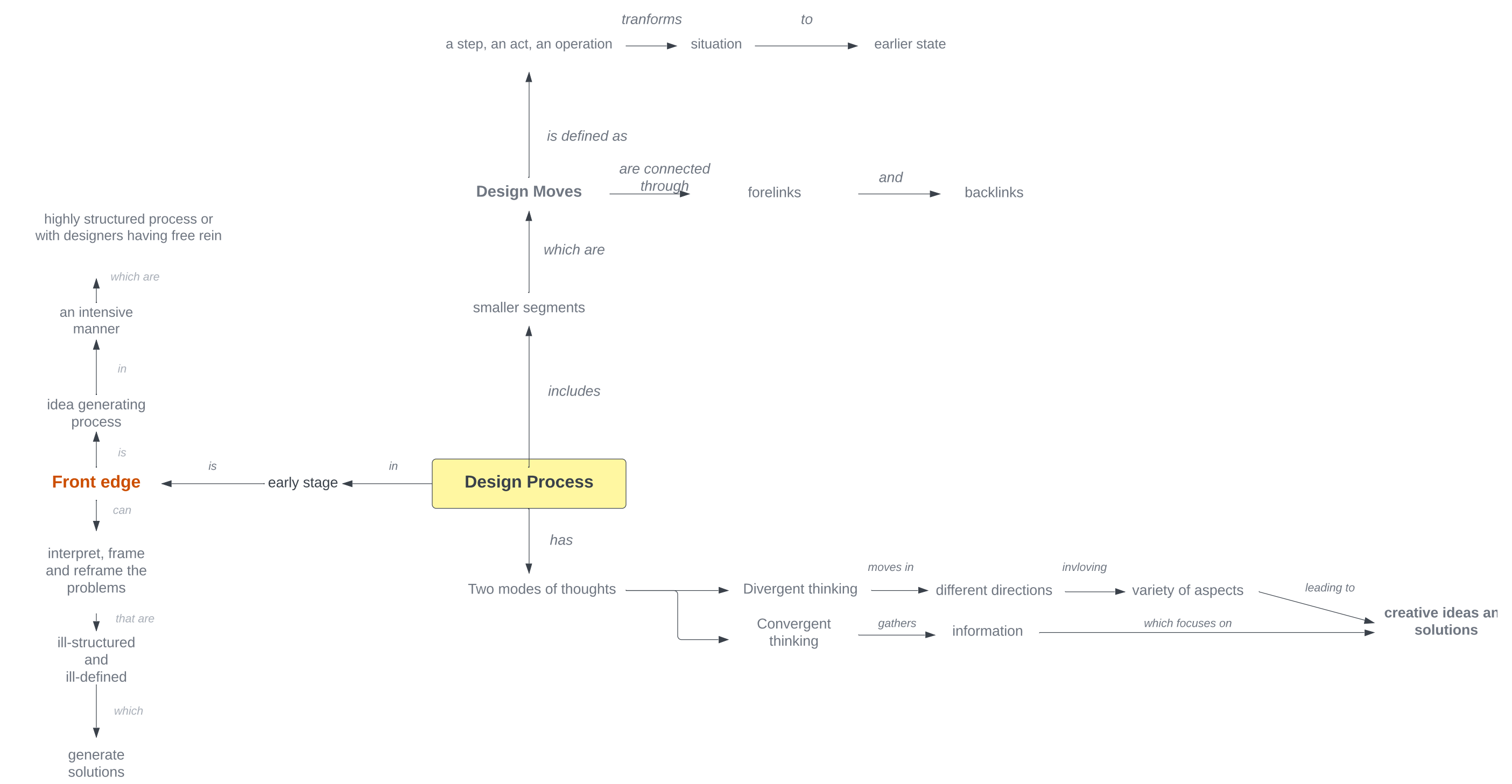




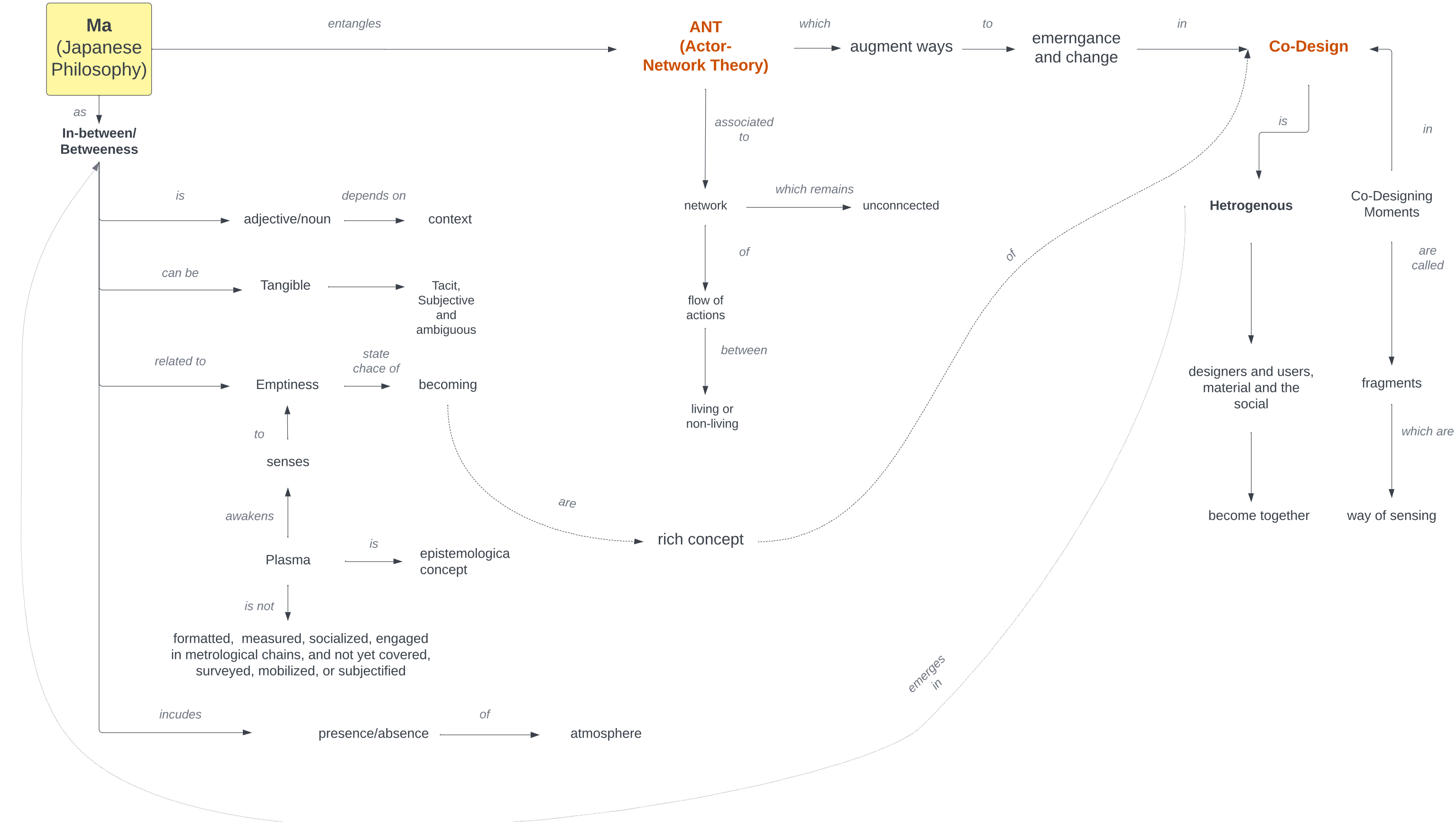
## II. The Science of Design, Simon, H.



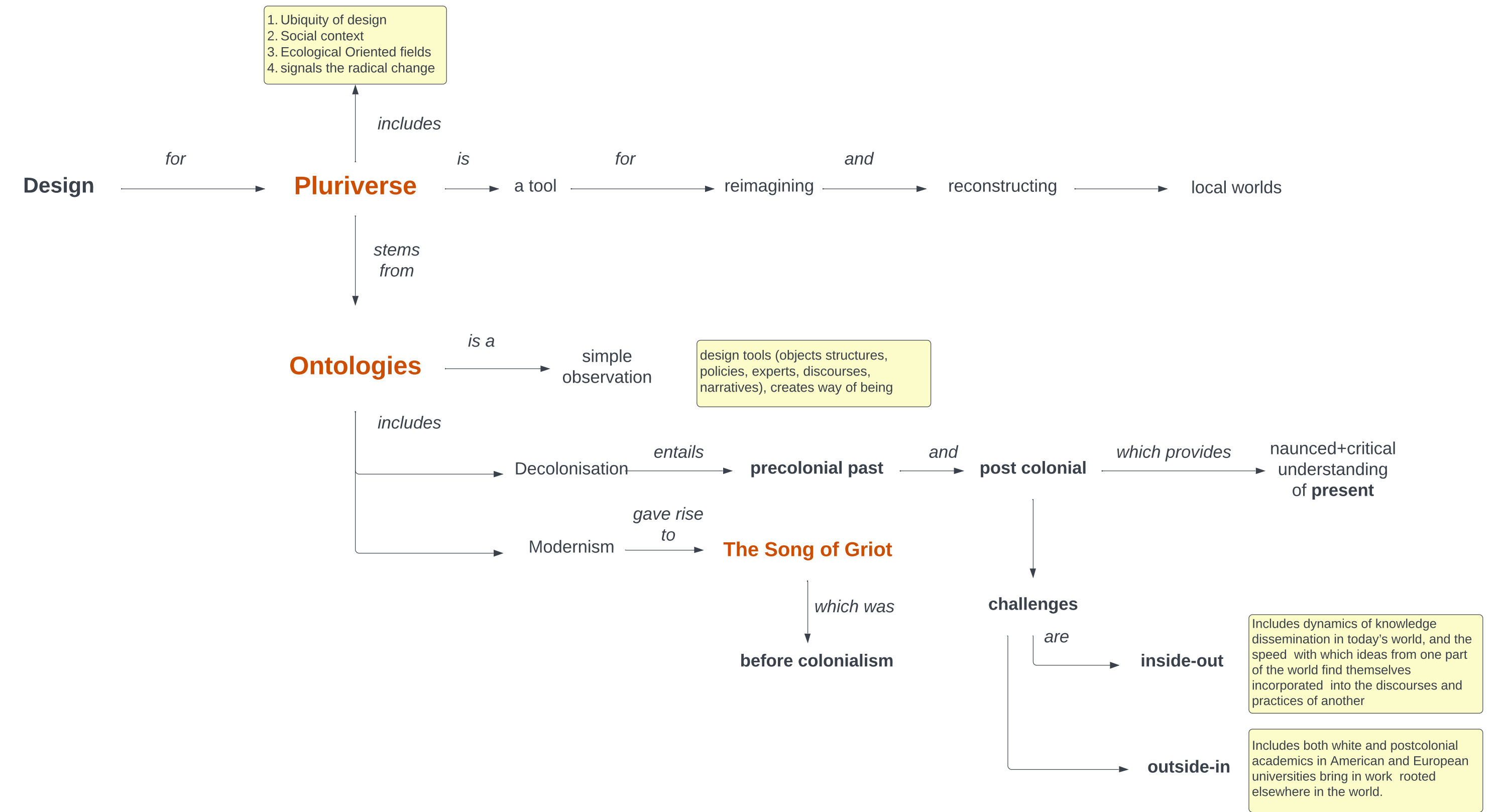
I2. Human–Machine Reconfiguration, Suchman, L.



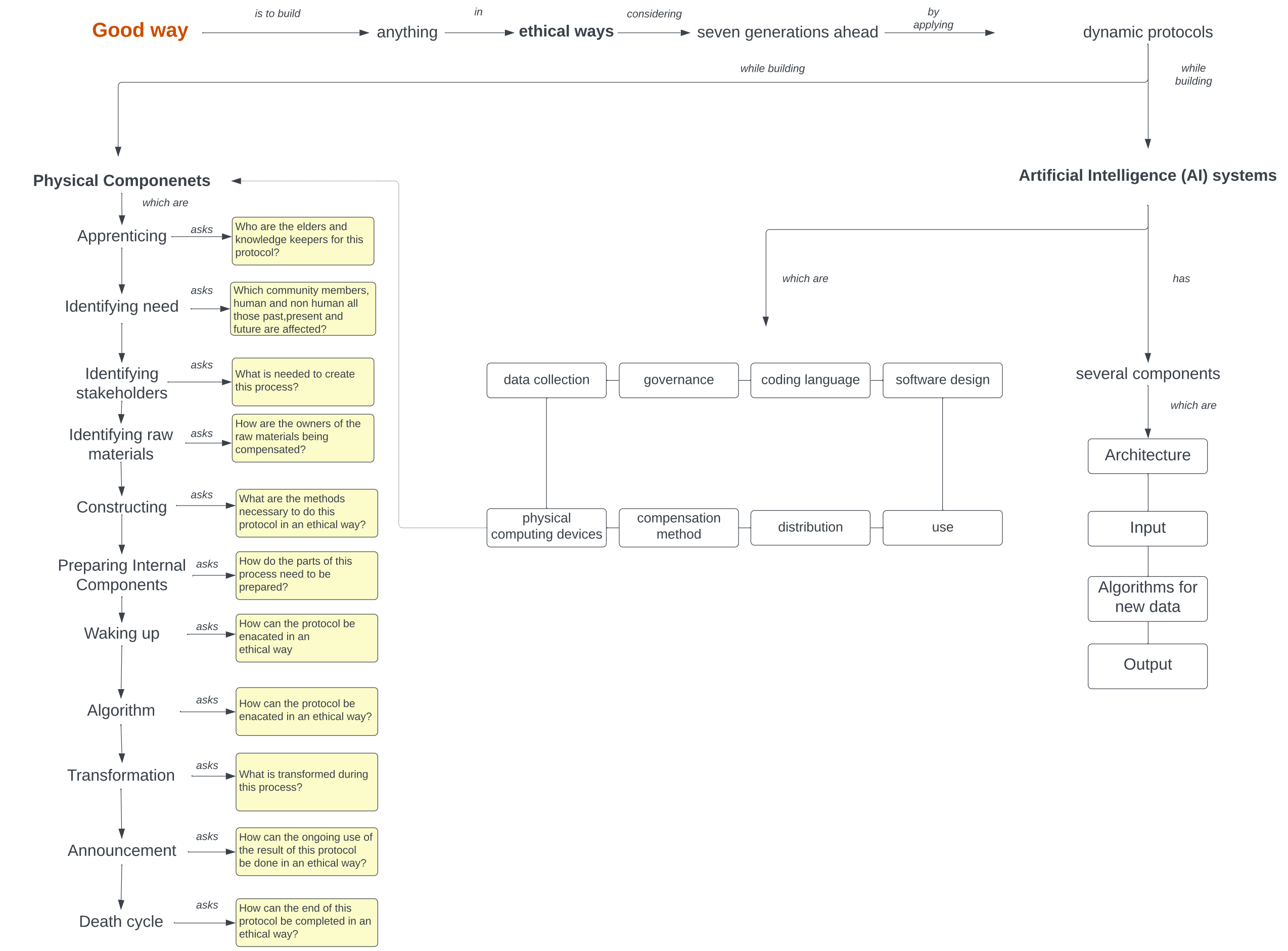
I3. Design Synthesis, Goldschmidt, G.



I4. Being Awake to Ma, Akama, Y.



15. The History of Design and Design of Design of History, Ansari, A., Diawara, M., Escobar, A.

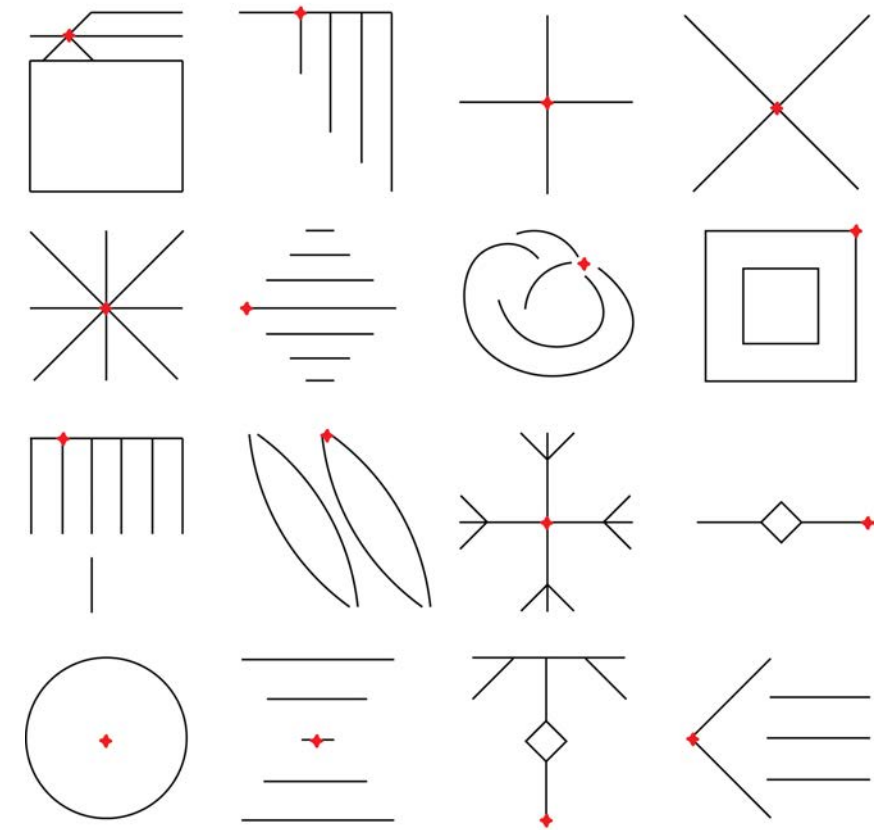


16. How to Build Anything Ethically, Kite, S., Stover, C., Janis, M. S., & Benesiinaabandan, S.



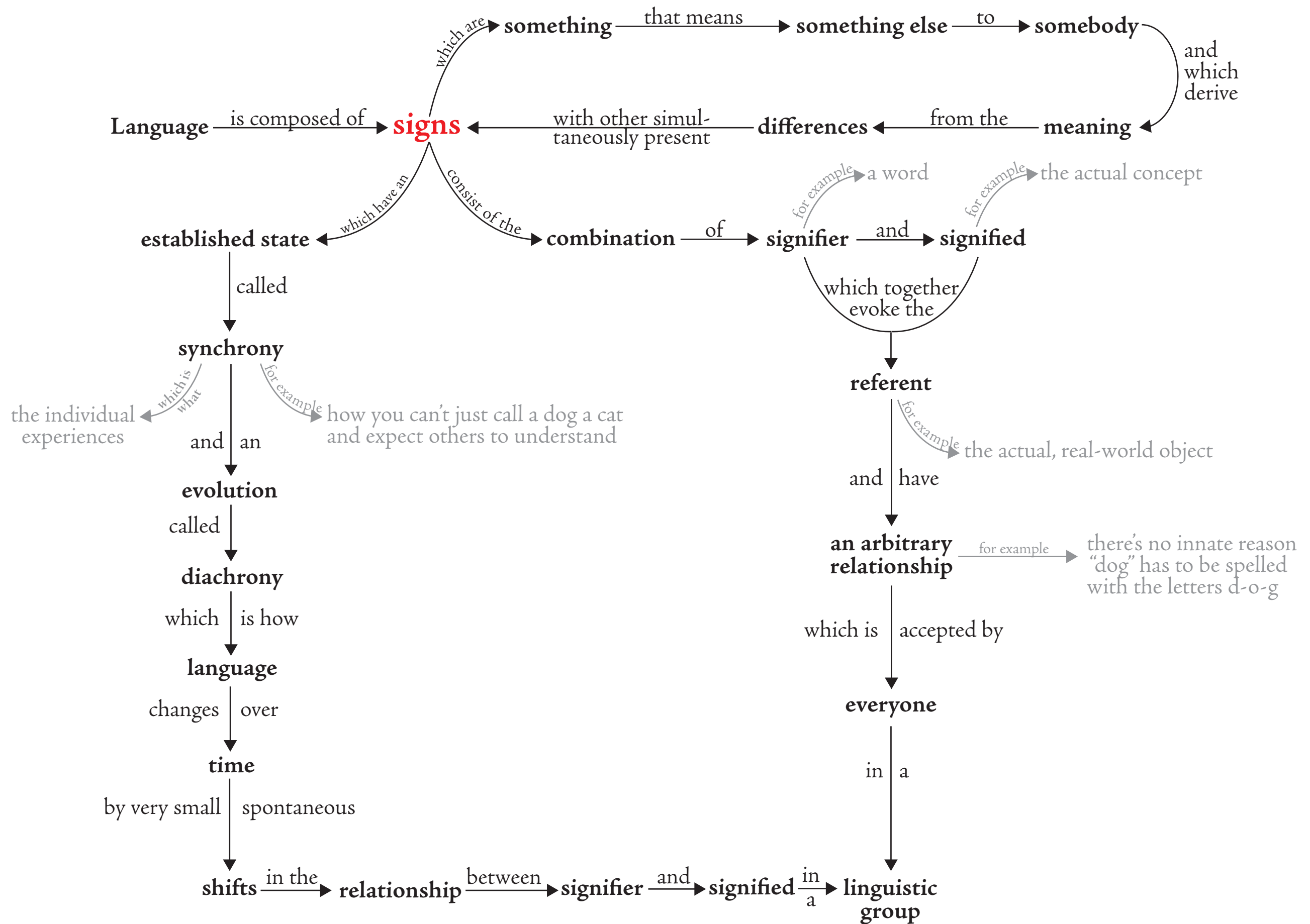
information design theory  
& critical thinking  
an introduction

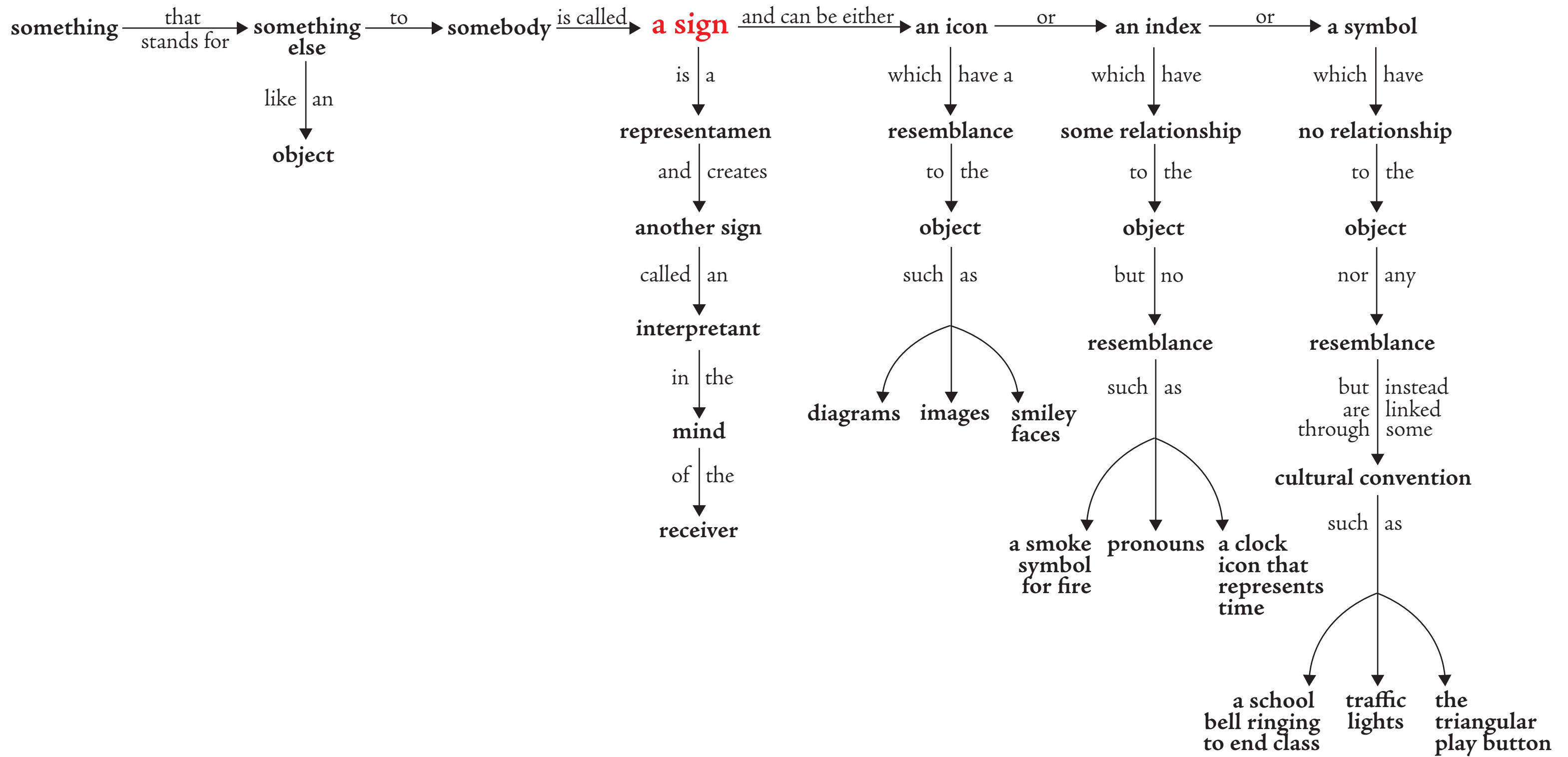
andrew noe

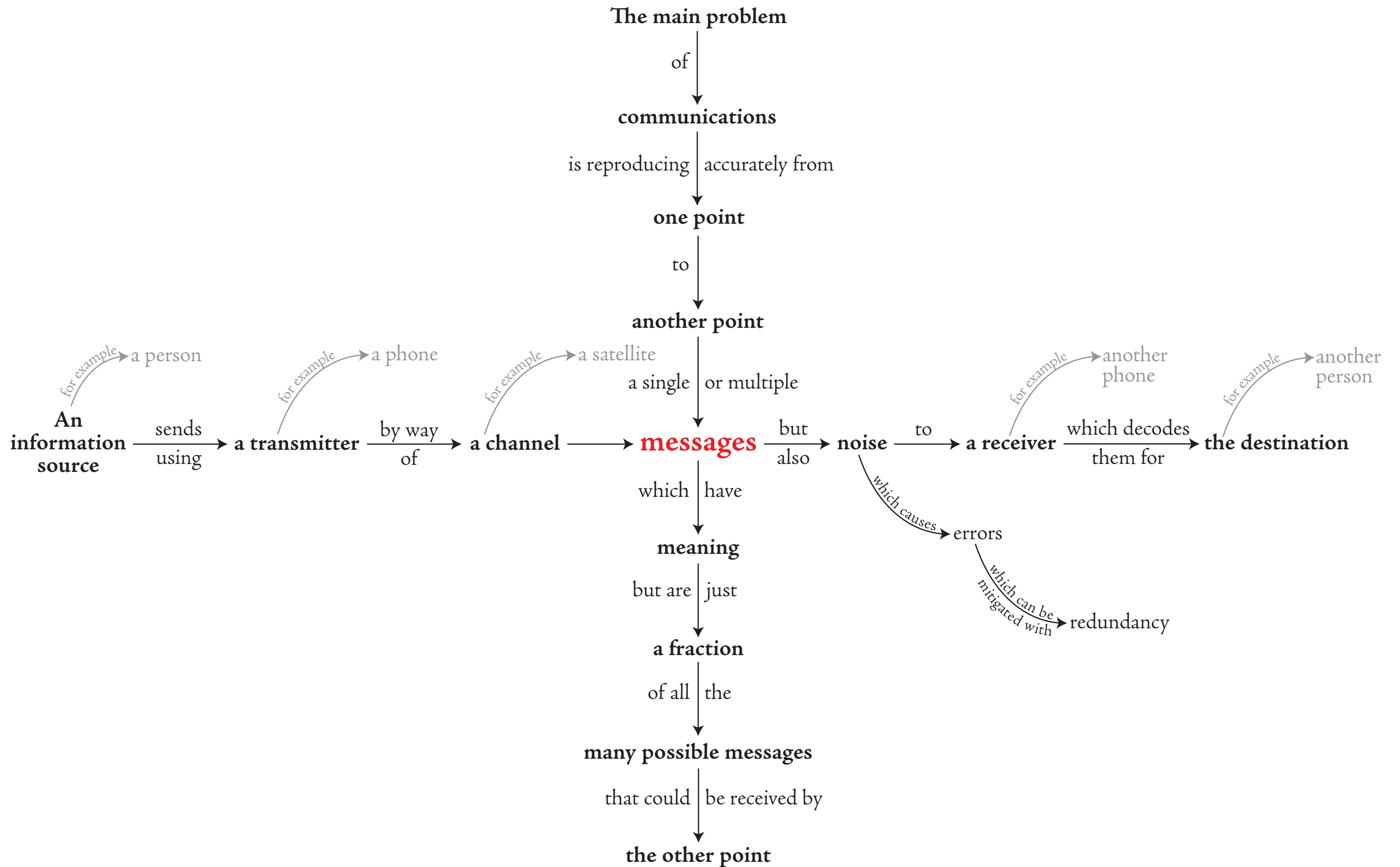


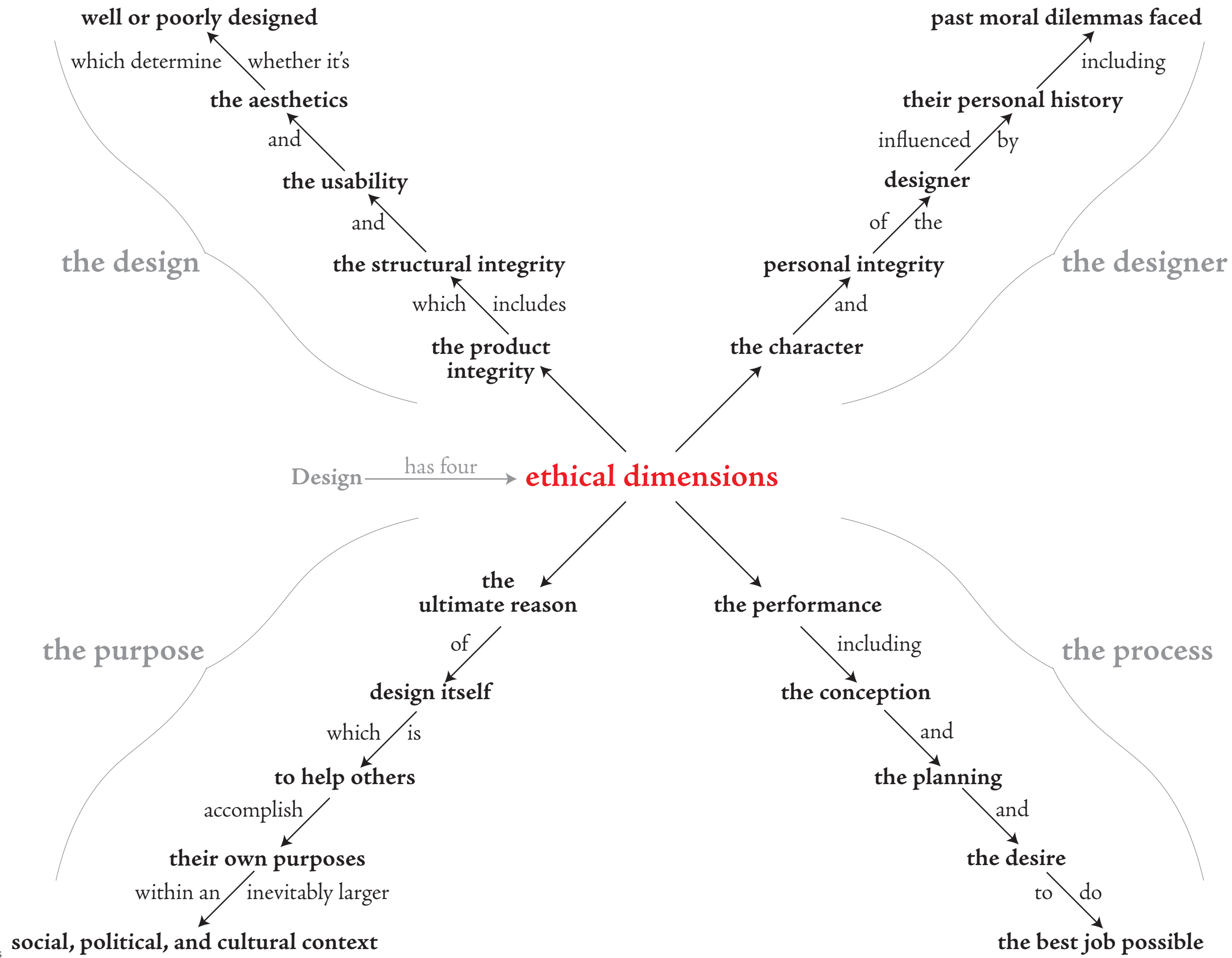
information design theory  
& critical thinking

i.	nature of the linguistic sign	ferdinand de saussure
ii.	the theory of signs	charles peirce
iii.	a mathematical theory of communication	claud shannon
iv.	design ethics	richard buchanan
v.	institutional ecology, translations, and boundary objects	s. leigh star & james griesemer
vi.	the theory of affordances	james gibson
vii.	notes on the synthesis of form	christopher alexander
viii.	the analysis-synthesis bridge model + the SECI model	hugh dubberly
ix.	the sciences of the artificial	herbert simon
x.	the architectural relevance of cybernetics	gordon pask
xi.	plans and situated actions	lucy suchman
xii.	linkography	gabriela goldschmidt
xiii.	being awake to ma: designing in between-ness	yoko akama
xiv.	the pluriverse + the song of the griot + history of design	escobar, diawara, & ansari
xv.	how to build anything ethically	suzanne kite
xvi.	what is design?	andrew noe

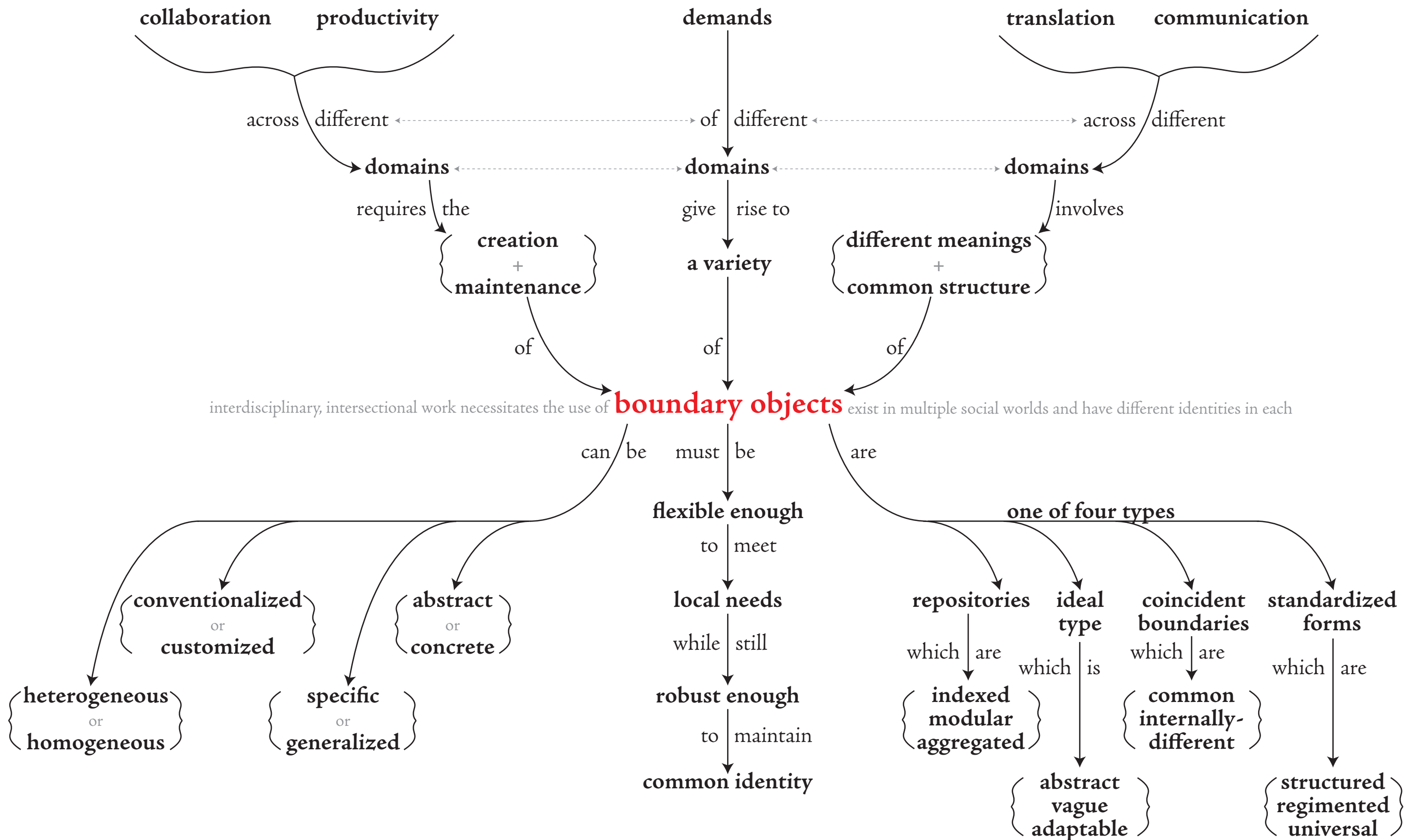


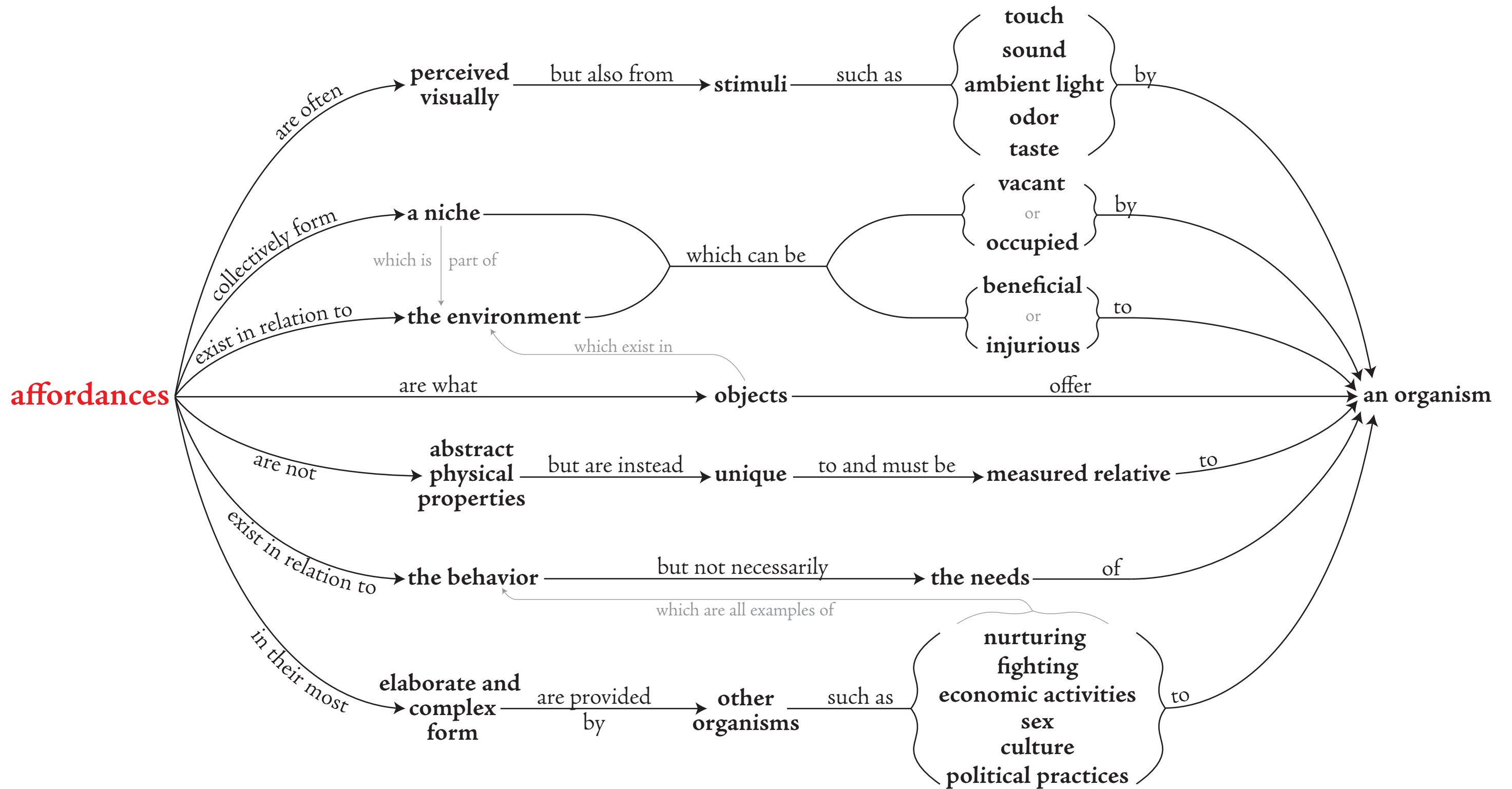


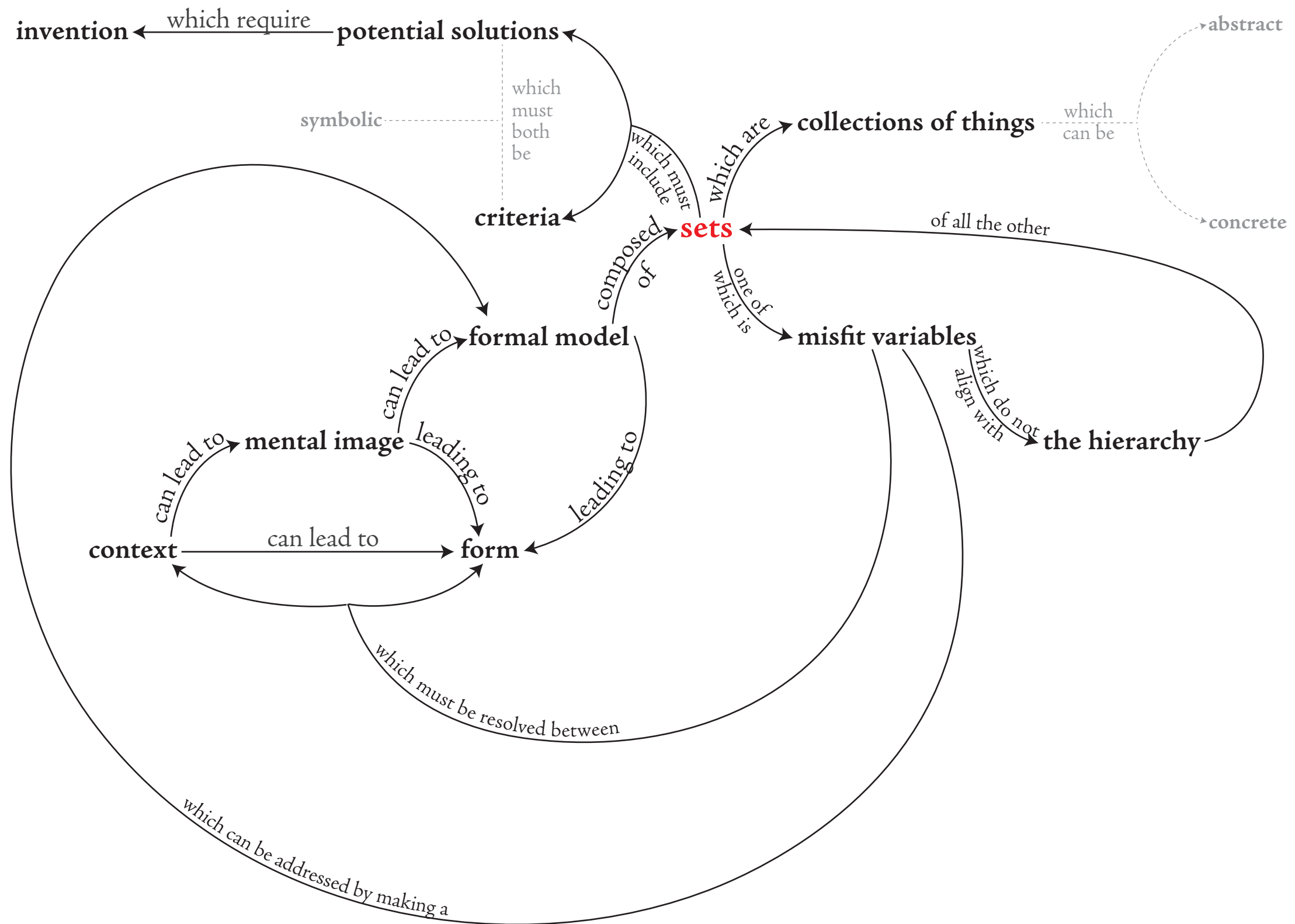


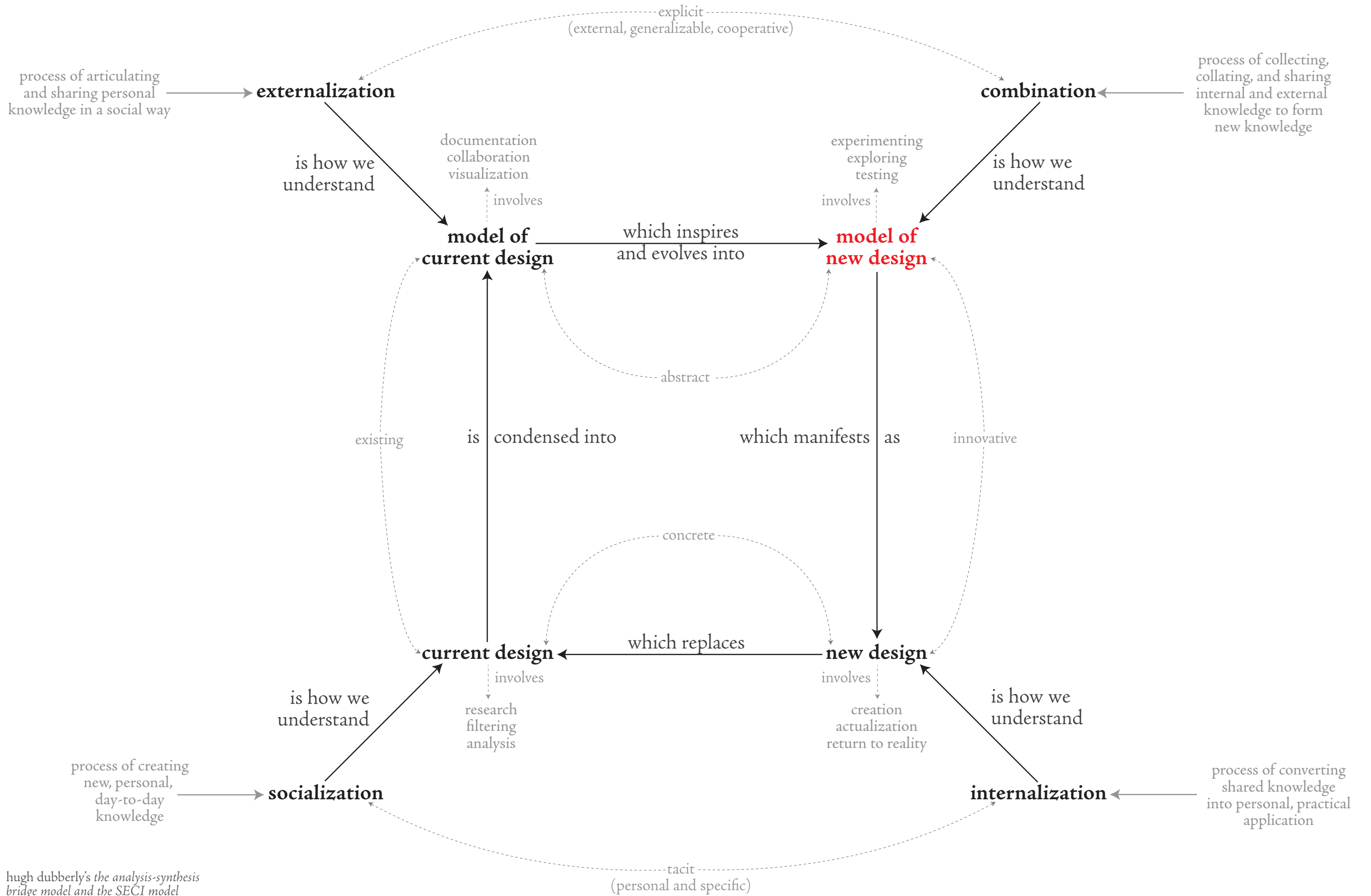


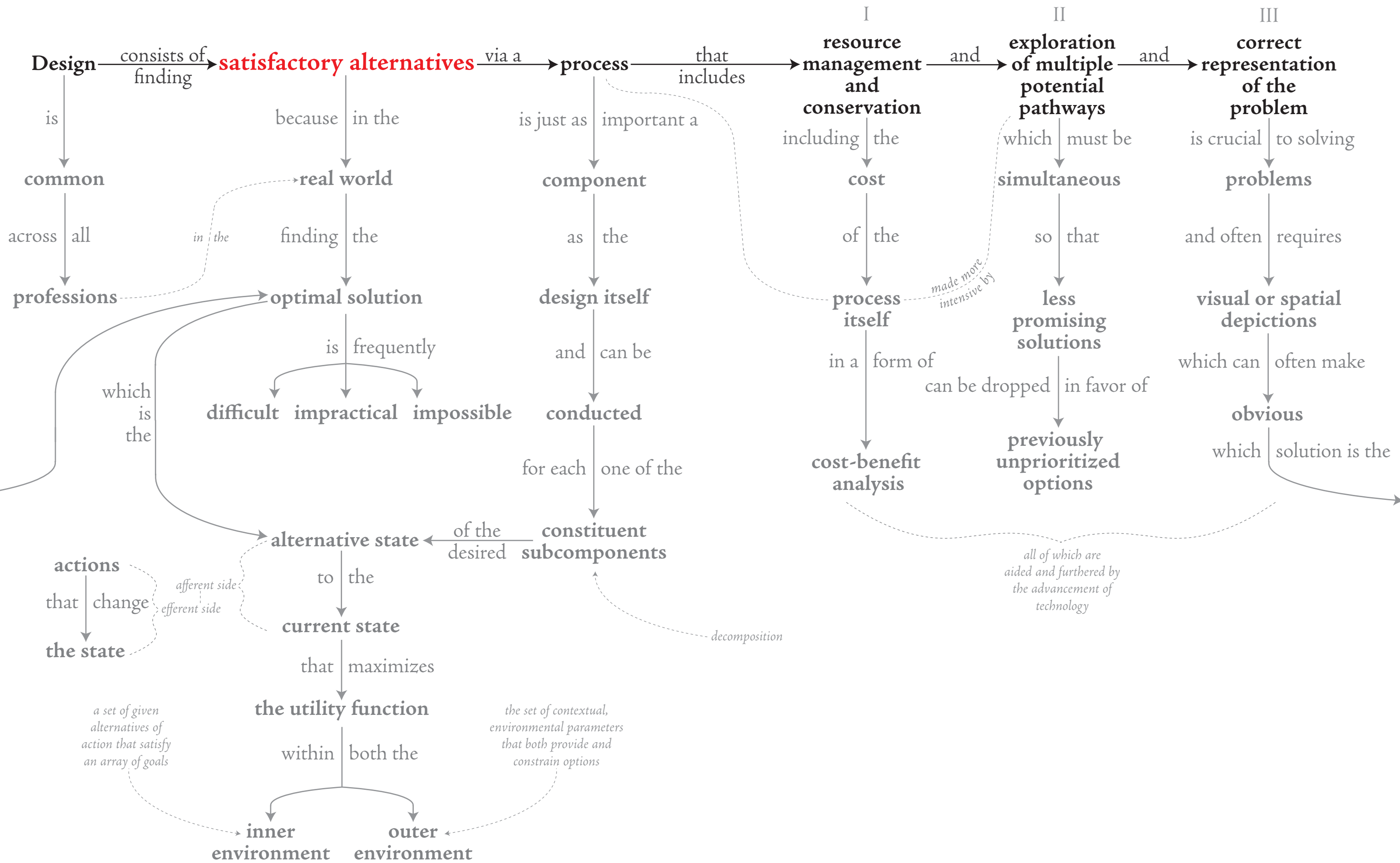


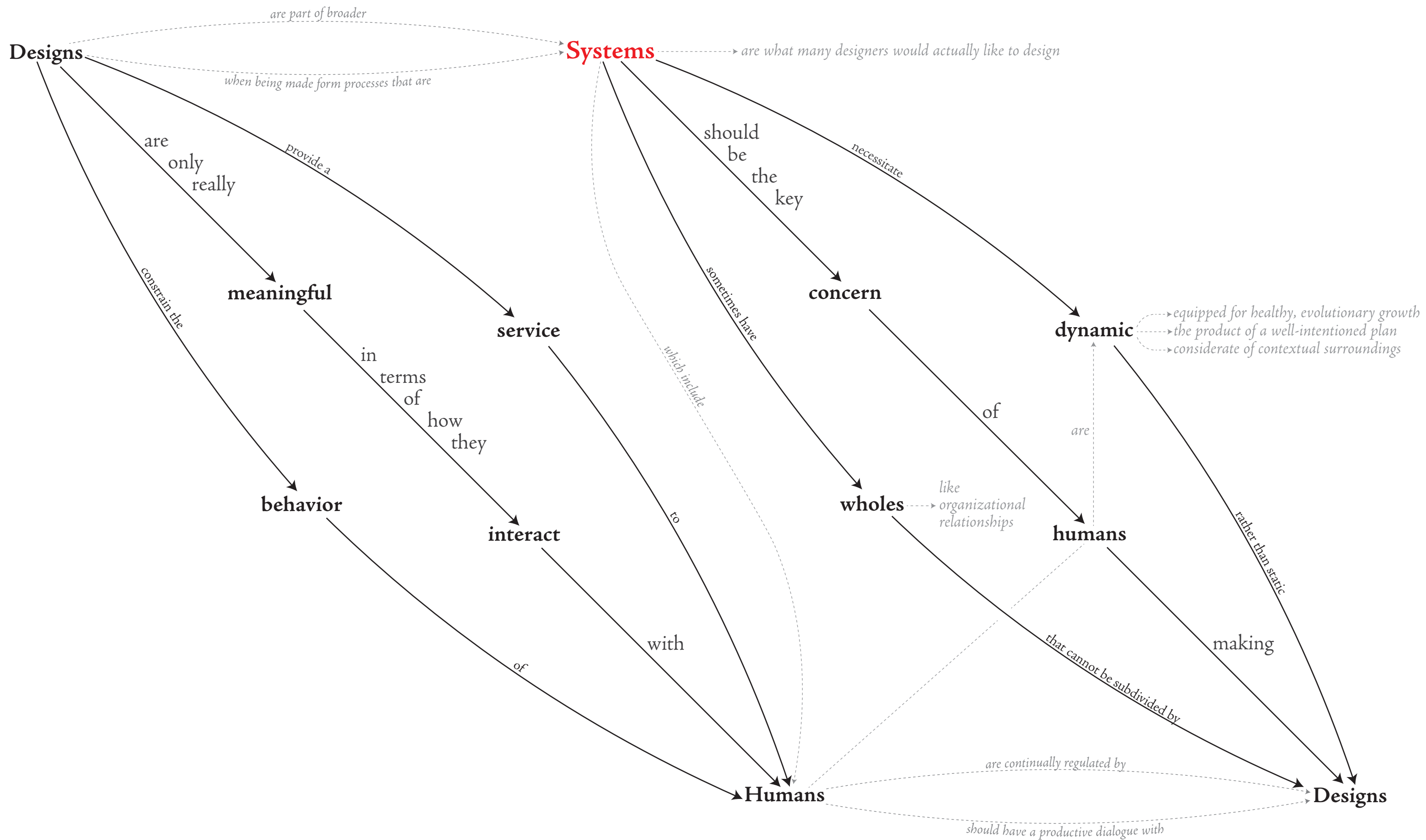


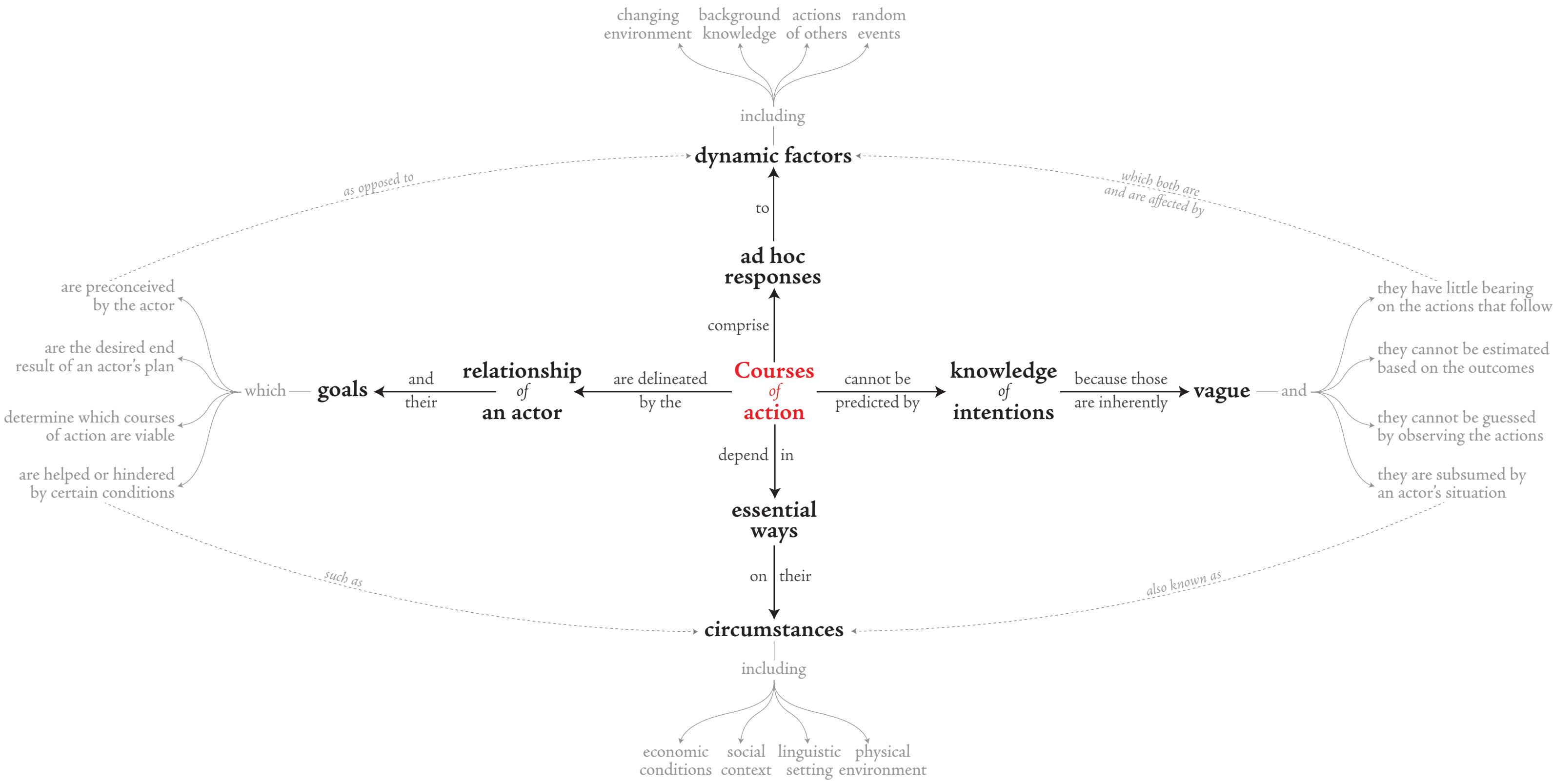




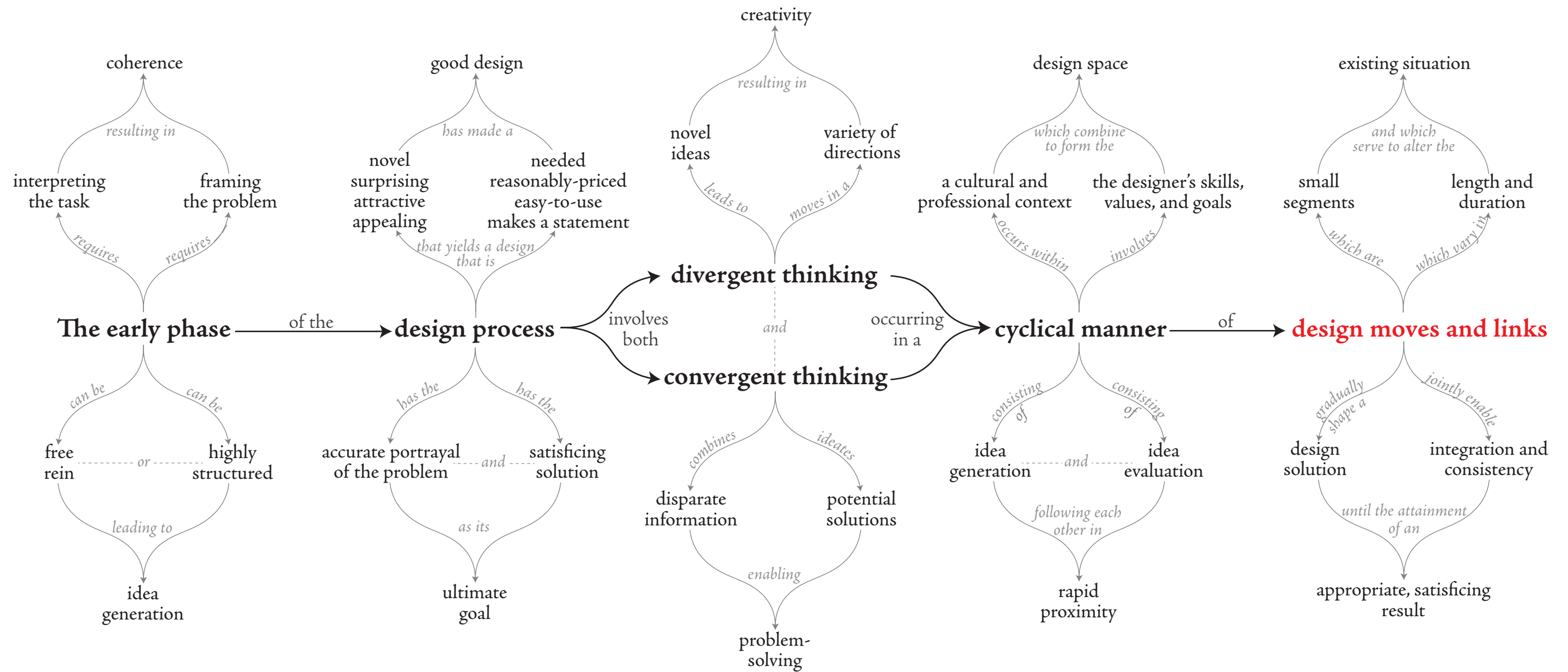


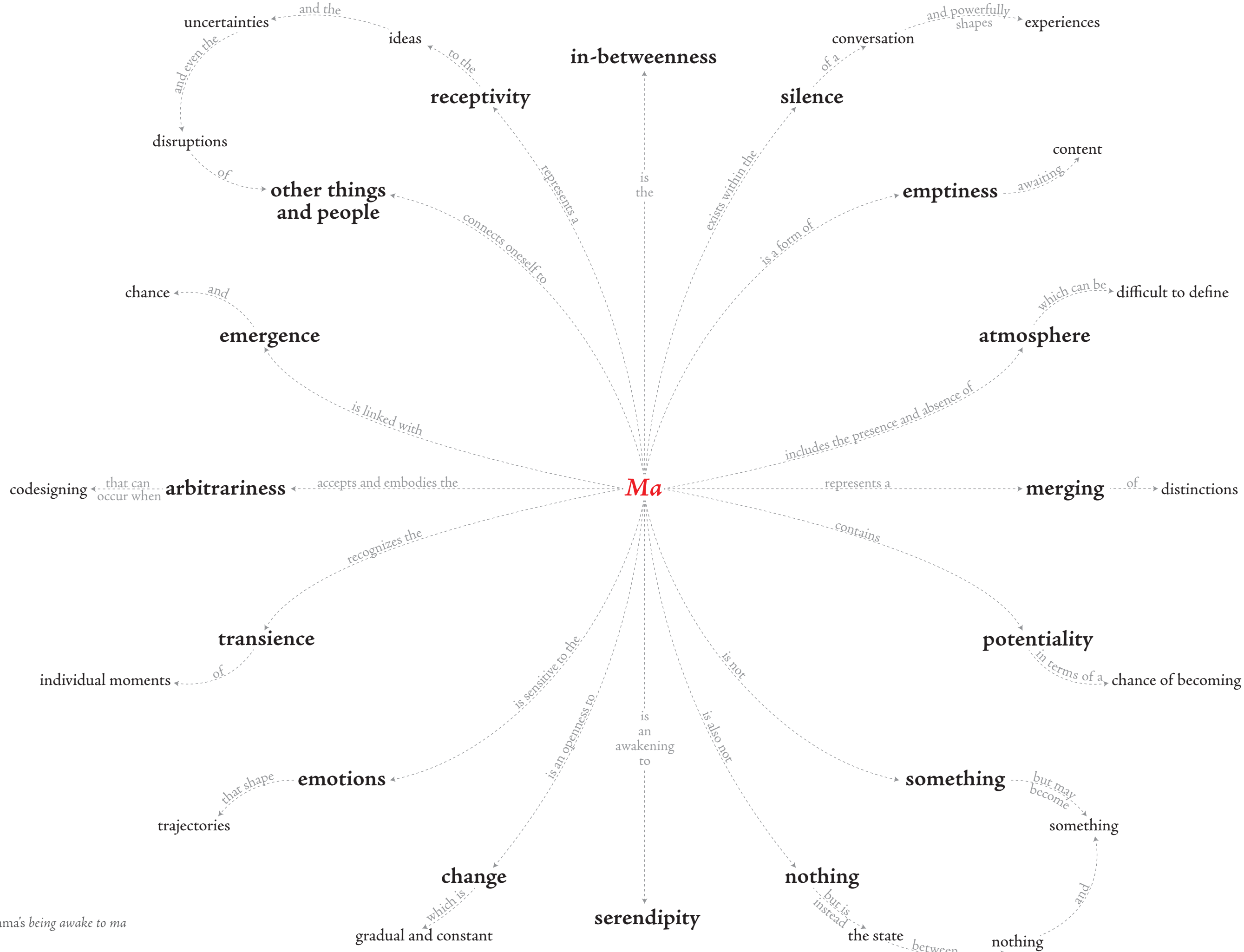


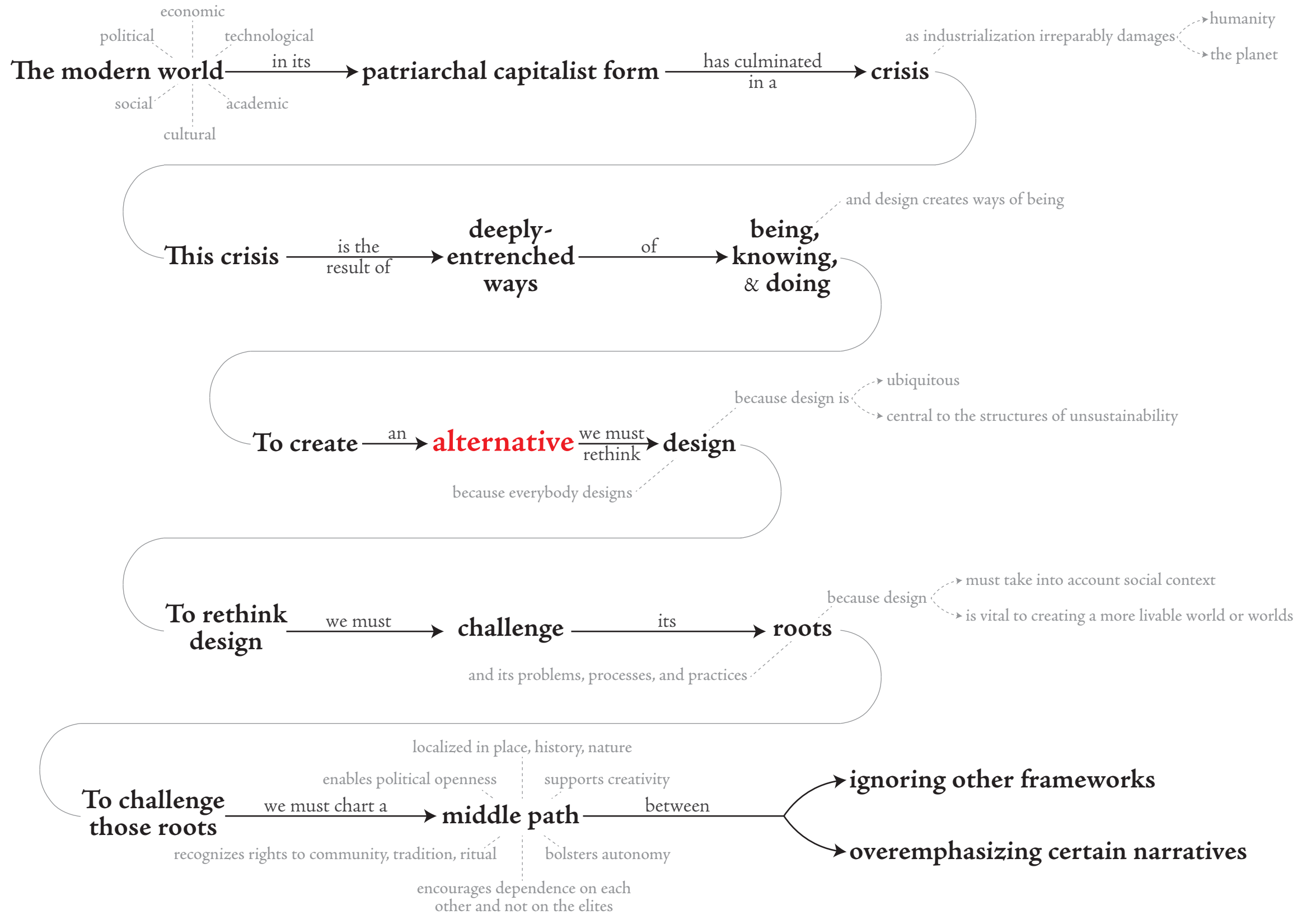


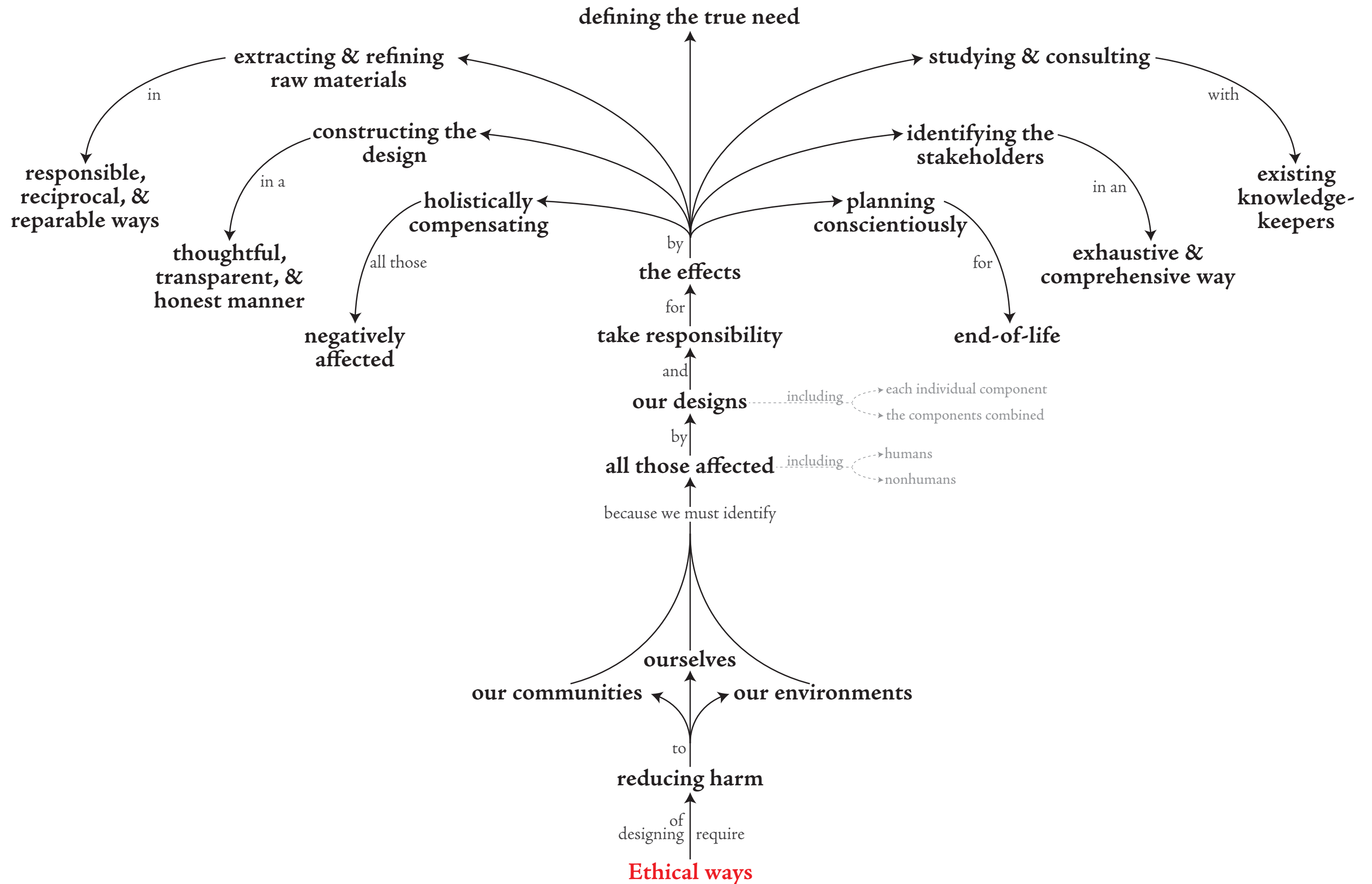


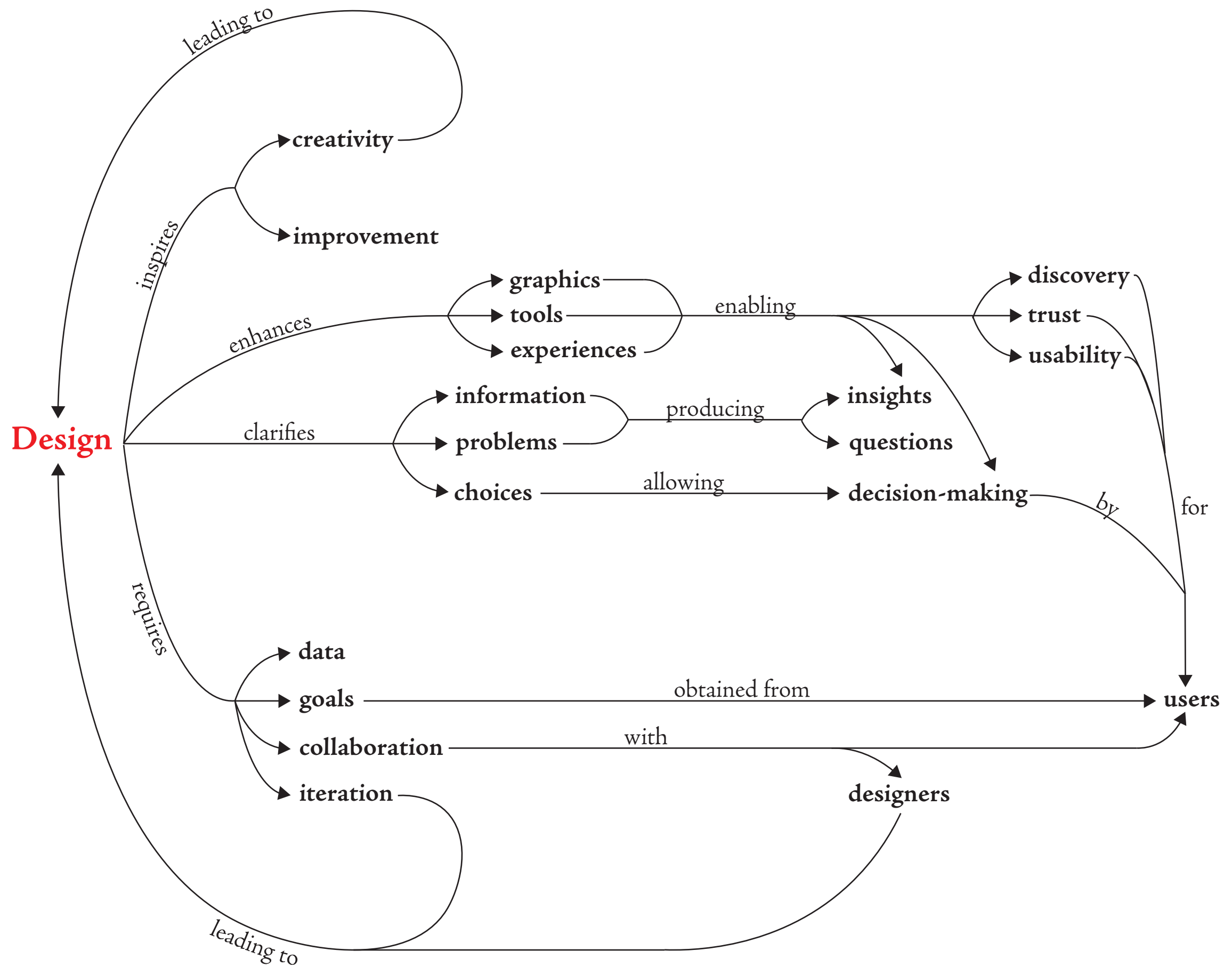


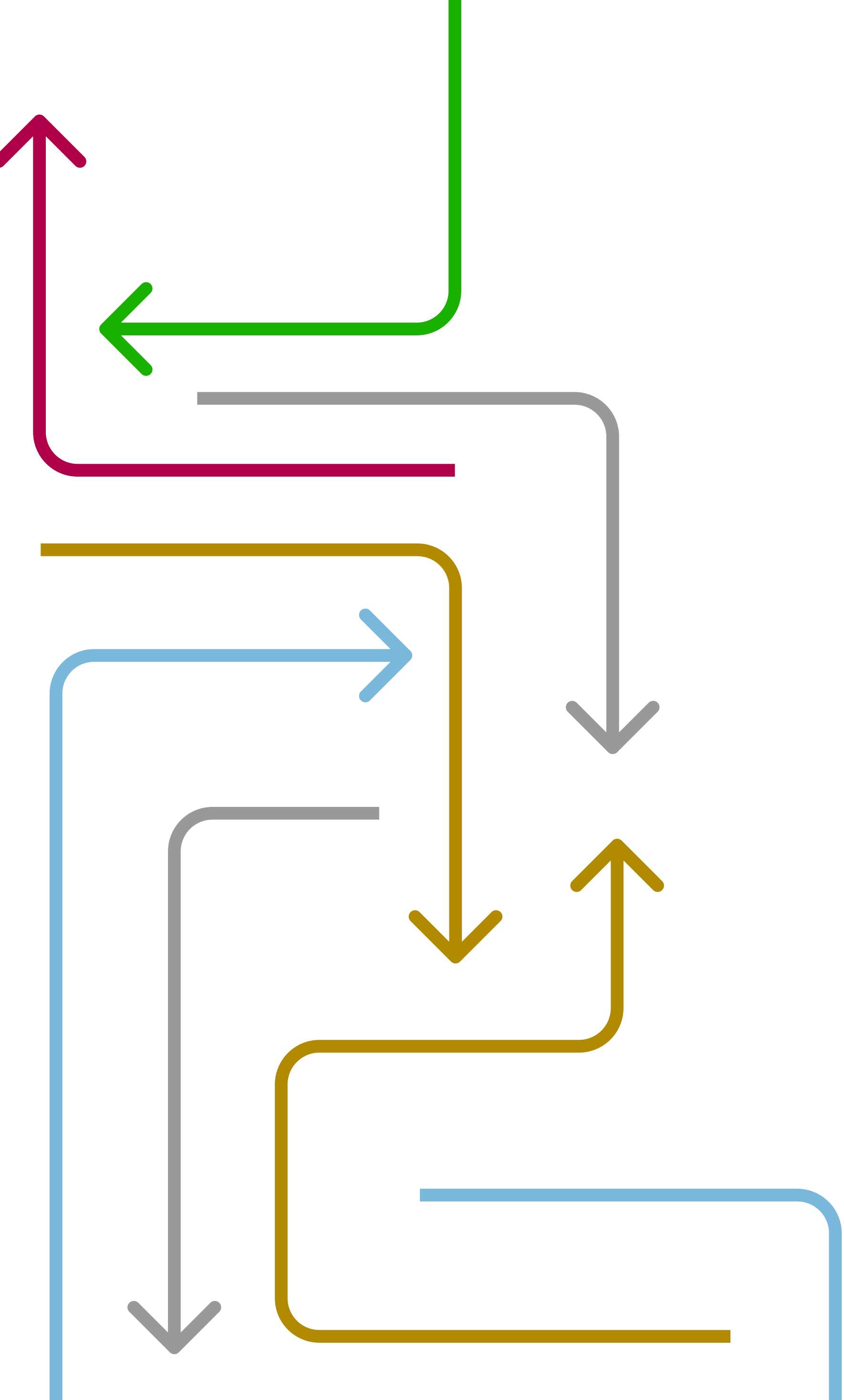












# Concept Maps

Naveen kumar

Information Design Theory and Critical Thinking

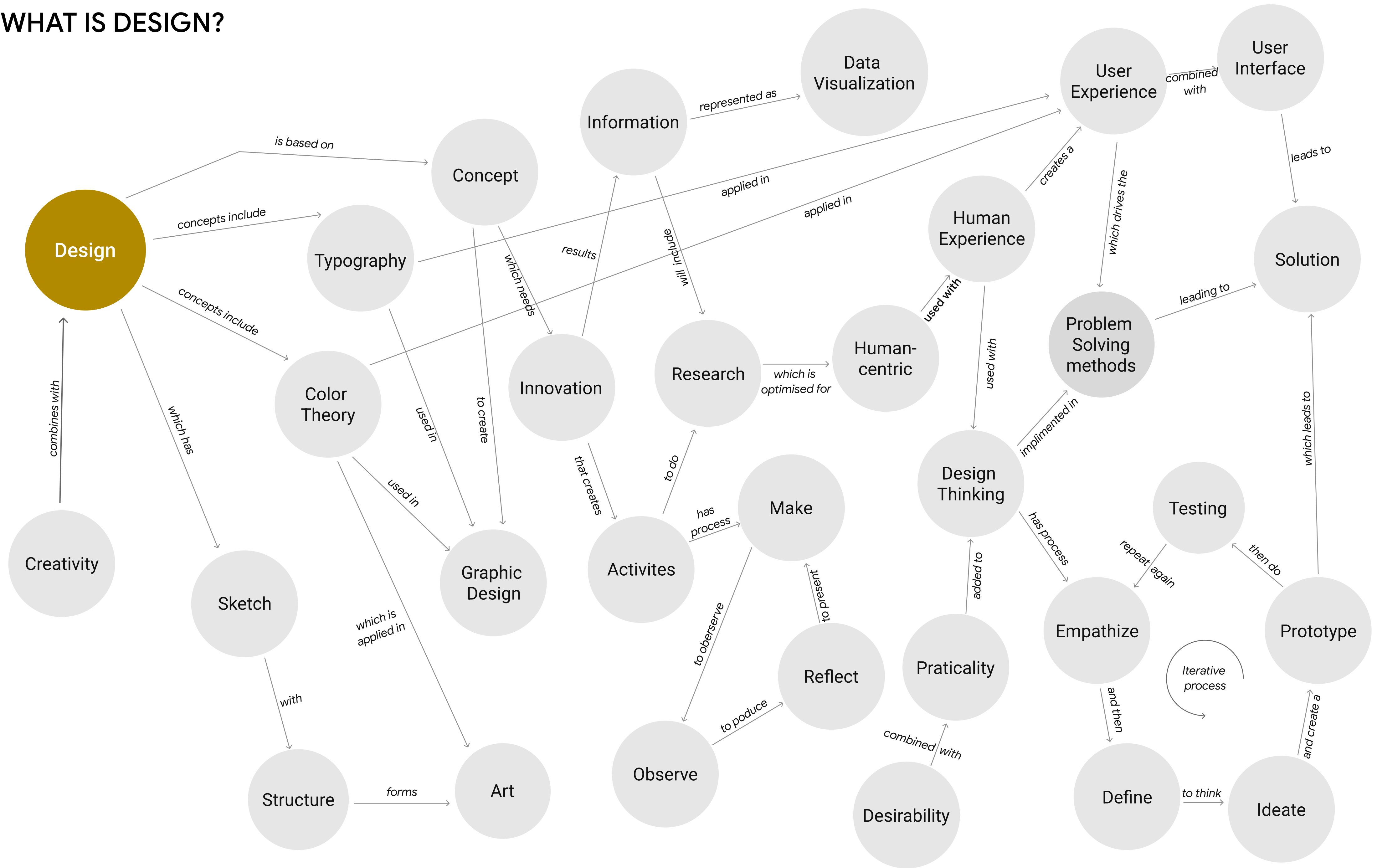
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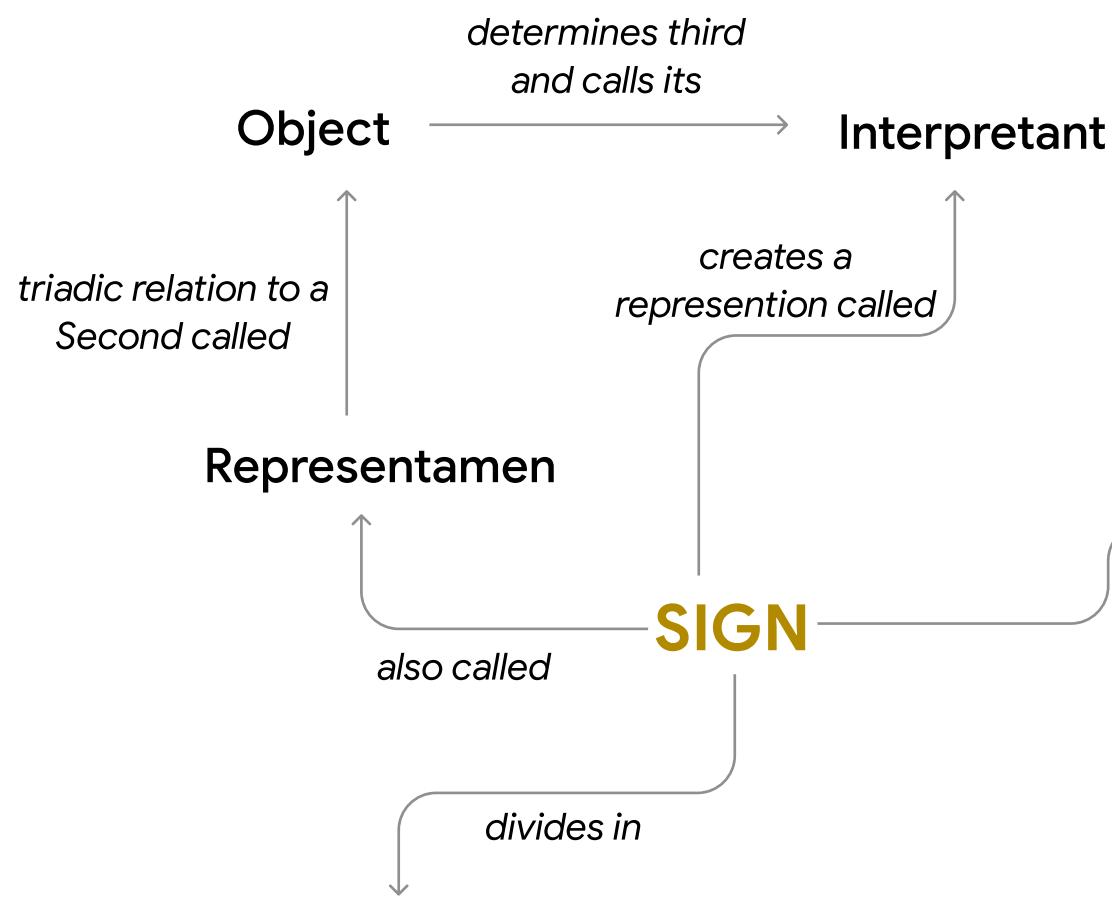




# WHAT IS DESIGN?



# THE PHILOSOPHY OF PEIRCE



## 10 Classes of signs

- A Qualisign  $\xrightarrow{\text{example}}$  a feeling of "red"
- An Iconic Sinsign  $\xrightarrow{\text{example}}$  an individual diagram
- A Rhematic Indexical Sinsign  $\xrightarrow{\text{example}}$  a spontaneous cry
- A Dicent Symbol  $\xrightarrow{\text{example}}$  a weathercock
- An Iconic Legisign  $\xrightarrow{\text{example}}$  a diagram
- A Rhematic Indexical Legisign  $\xrightarrow{\text{example}}$  a demonstrative pronoun

A Dicent Indexical Legisign

a street cry

A Dicent Sinsign

a general idea

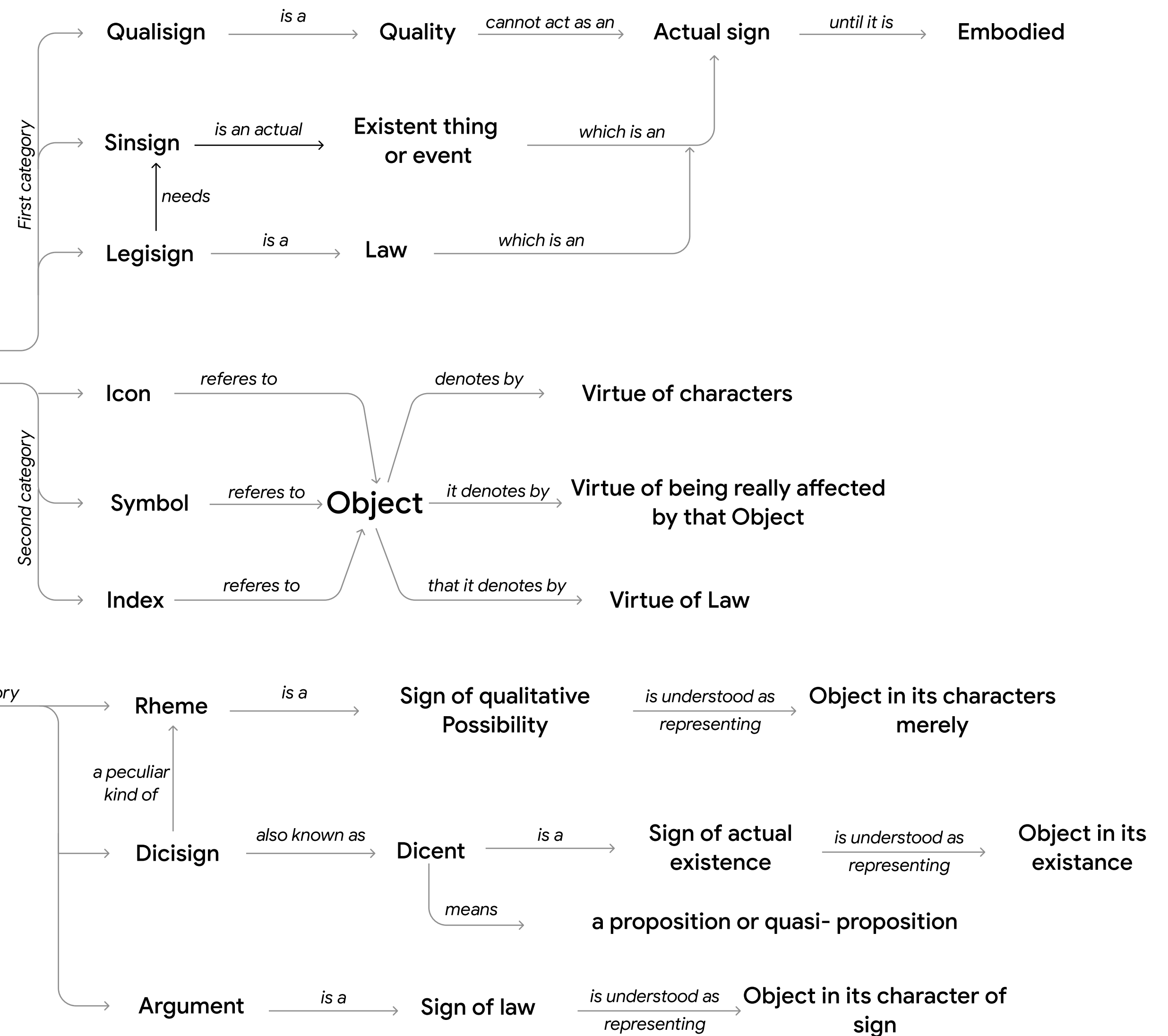
A Rhematic Symbol or Symbolic Rheme

a common noun

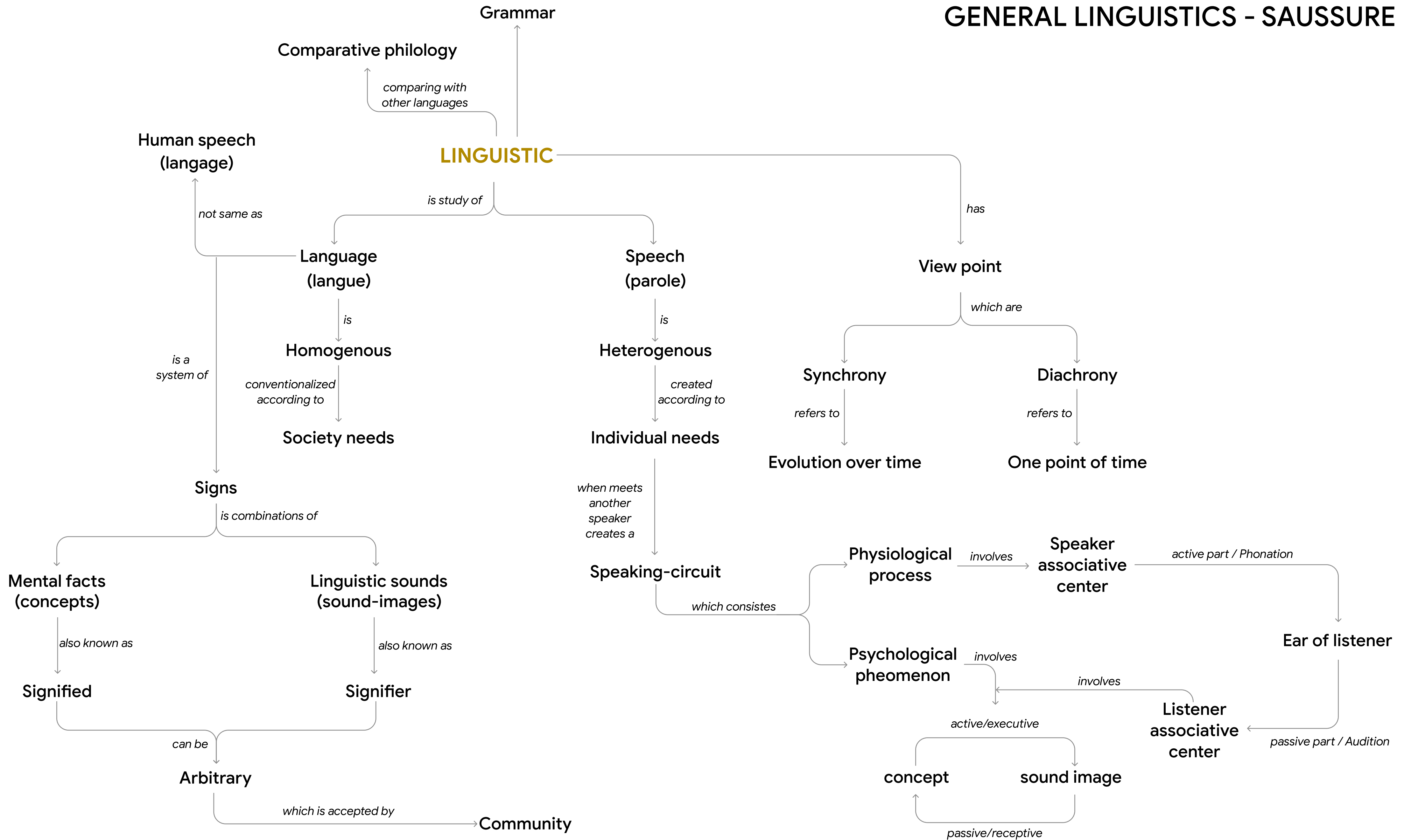
Argument Symbolic Legisign

an argument

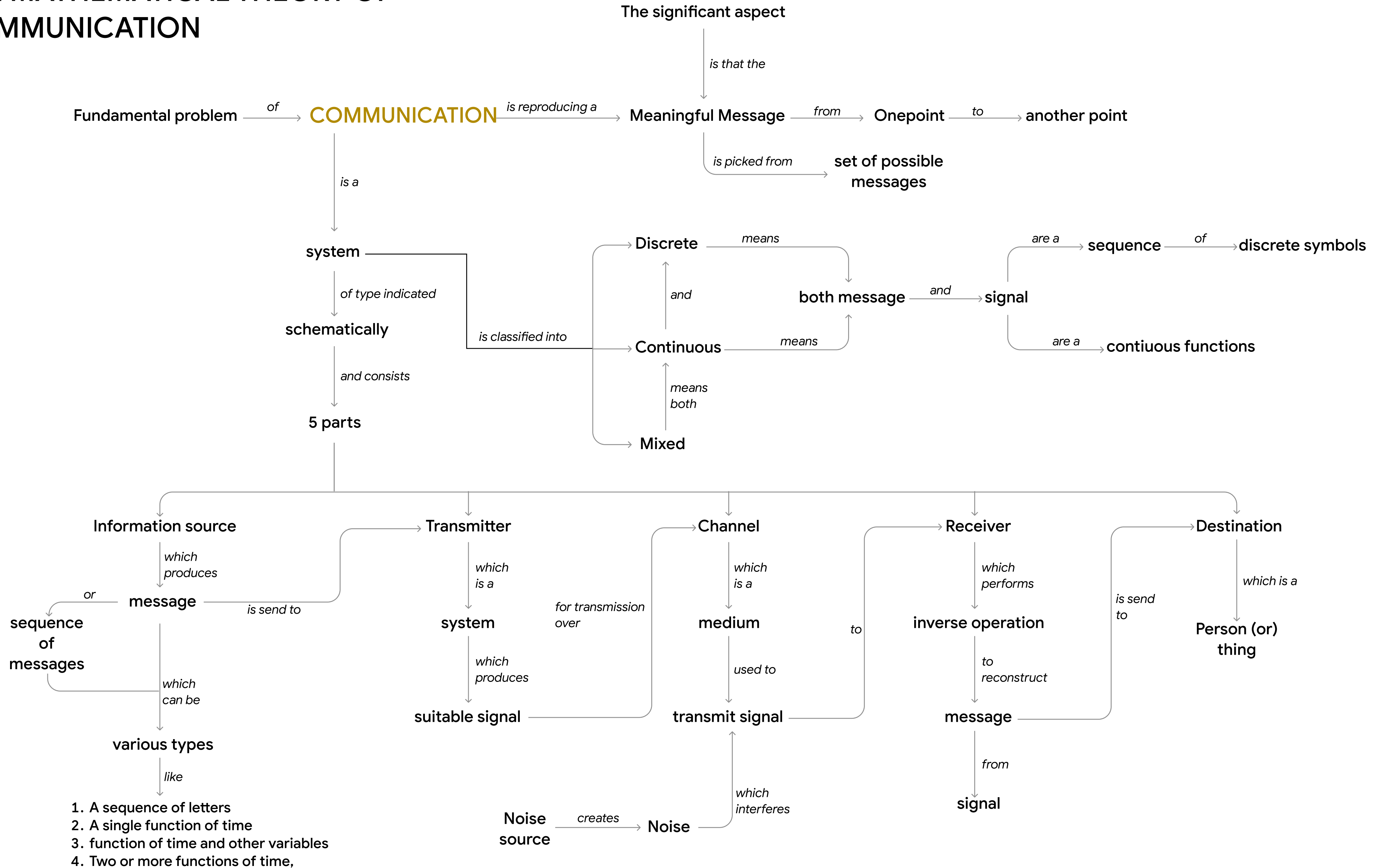
## Three Trichotomies of Sign



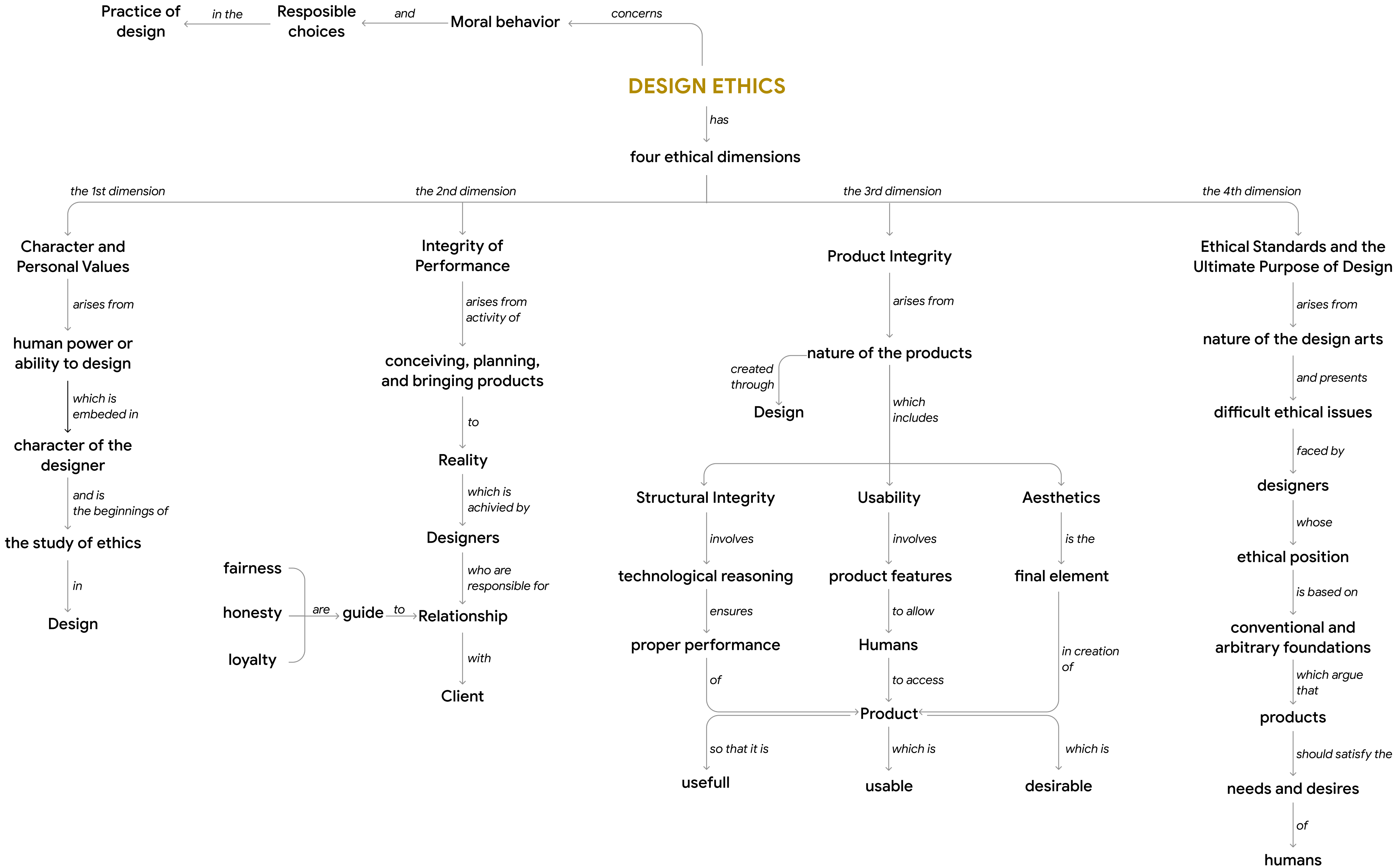
# GENERAL LINGUISTICS - SAUSSURE



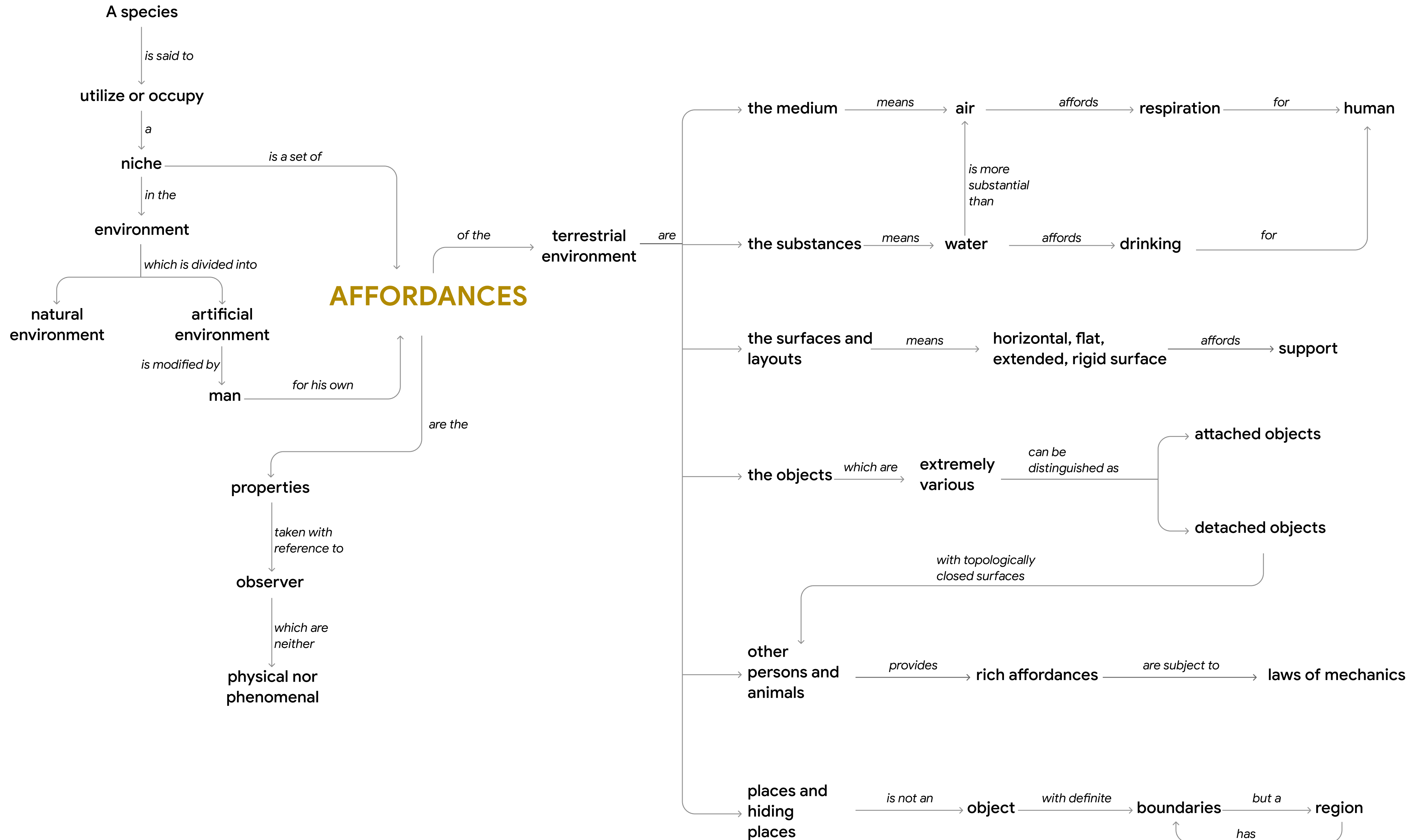
# THE MATHEMATICAL THEORY OF COMMUNICATION



# DESIGN ETHICS



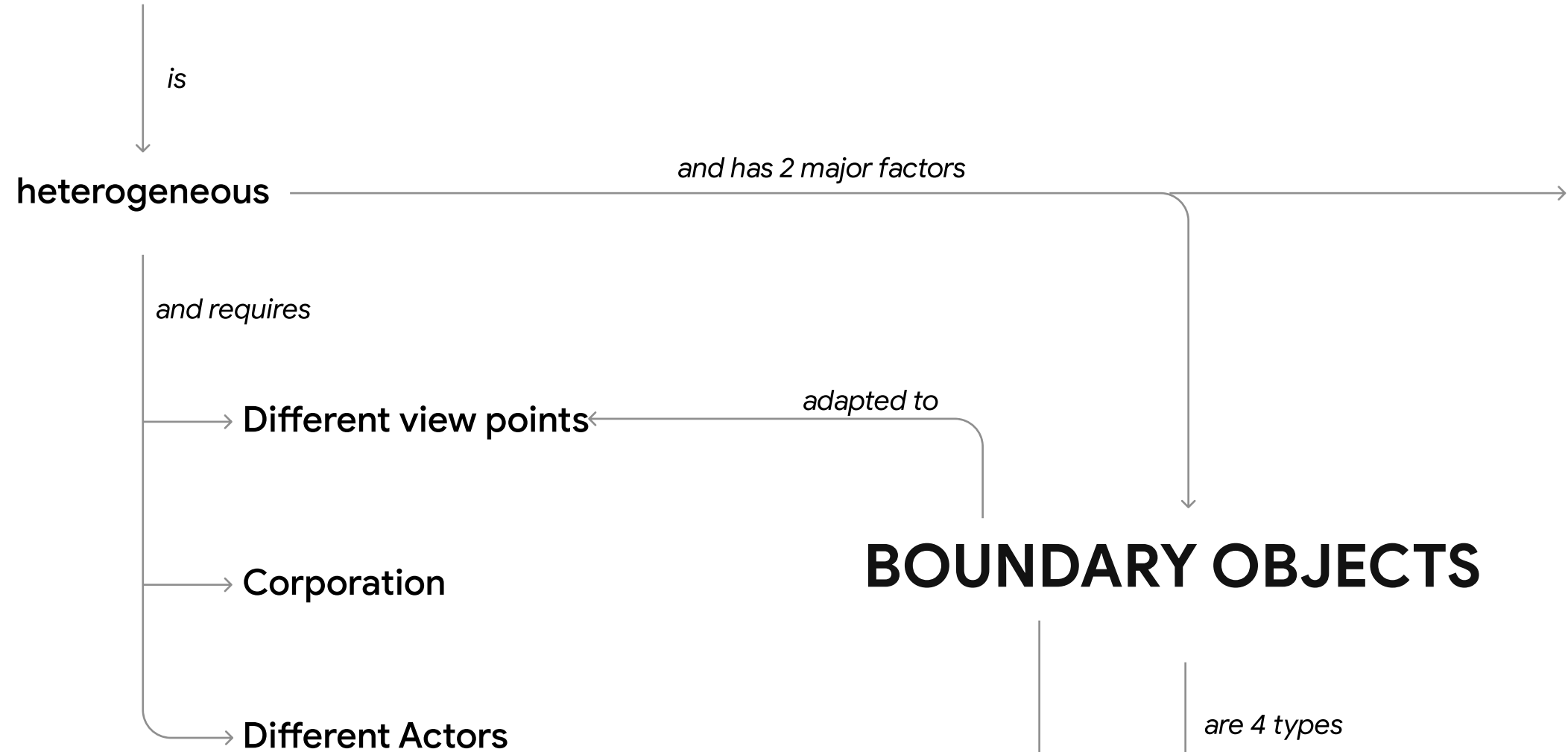
# THE THEORY OF AFFORDANCES



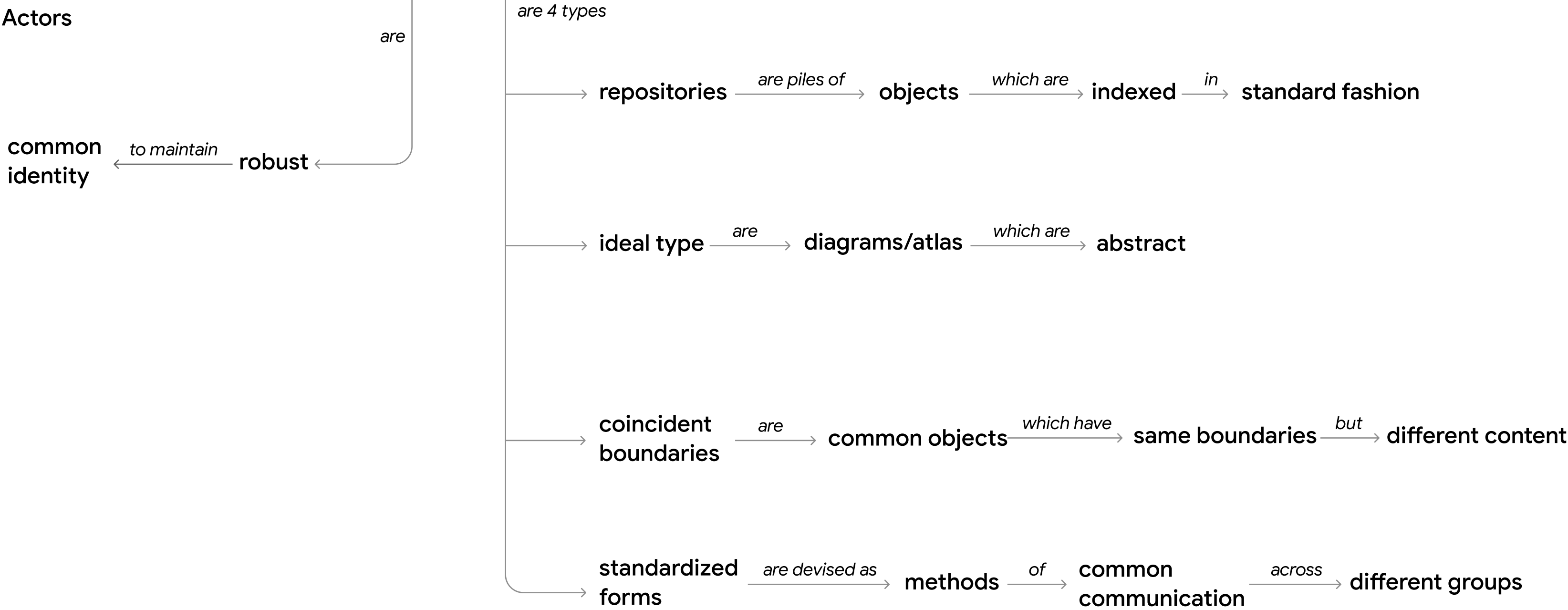
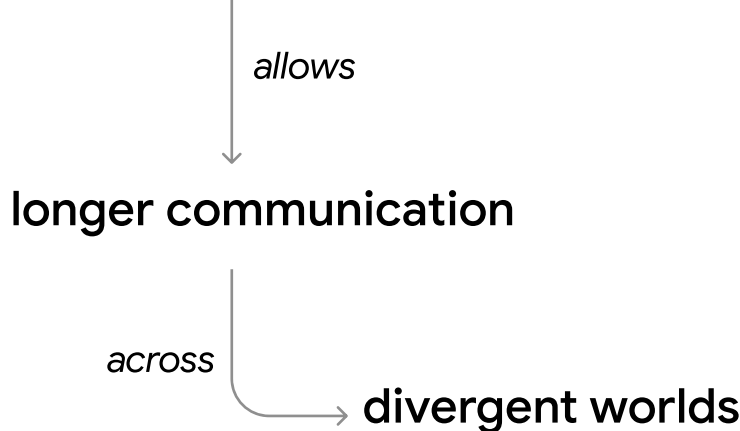


# TRANSLATIONS AND BOUNDARY OBJECTS

## SCIENTIFIC WORK

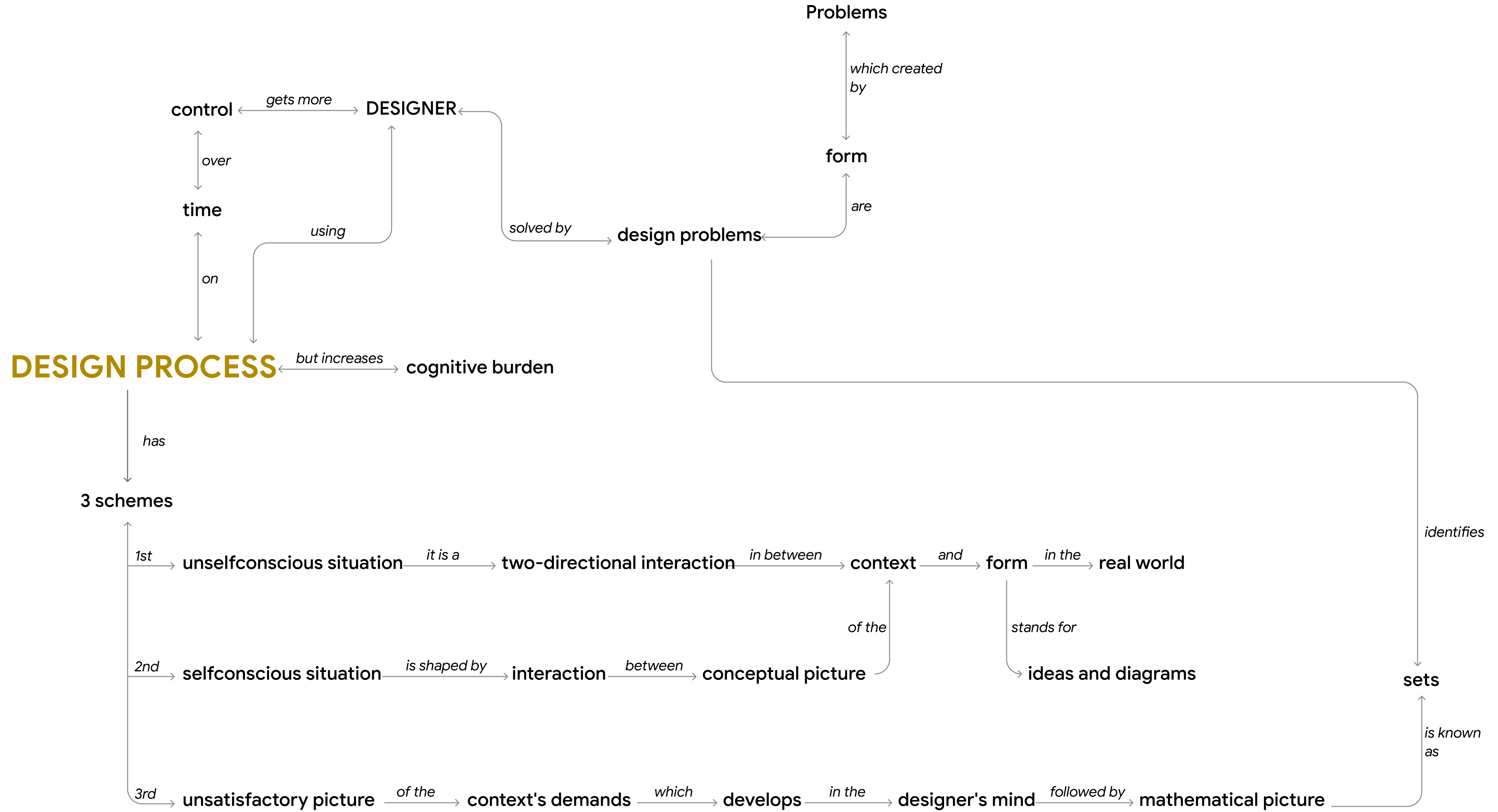


## METHODS OF STANDARDIZATION





# SYNTHESIS OF FORM



# DESIGN AS LEARNING OR “KNOWLEDGE CREATION”

**LEARNING** ← *is a form of* **DESIGN**

*is represented by*

*is represented by*

**SECI Spiral Model of Knowledge Creation**

**Analysis-Synthesis Bridge Model**

*postulates  
4 modes  
of*

*has 4  
steps*

**knowledge conversion**

**Socialization**

**Externalization**

**Combination**

**Internalization**

**What “is”**

**Model of what “is”**

**Model of what “could be”**

**What “could be”**

**researching a  
current situation**

**prototyping a  
future situation**

*known as*

*known as*

*known as*

*known as*

*distilled to*

*are a part of*

*is a process of*

*is a process of*

*is a process of*

*is a process of*

*suggest*

*are a part of*

**Sharing and  
creating tacit  
knowledge**

**Articulating  
tacit knowledge**

**Systemizing  
and applying**

**Learning and acquiring  
tacit knowledge**

**direct experience**

**dialogue  
and  
reflection**

**explicit knowledge**

**information**

**practice**

*through*

*through*

*the*

*in*

*manifest as*

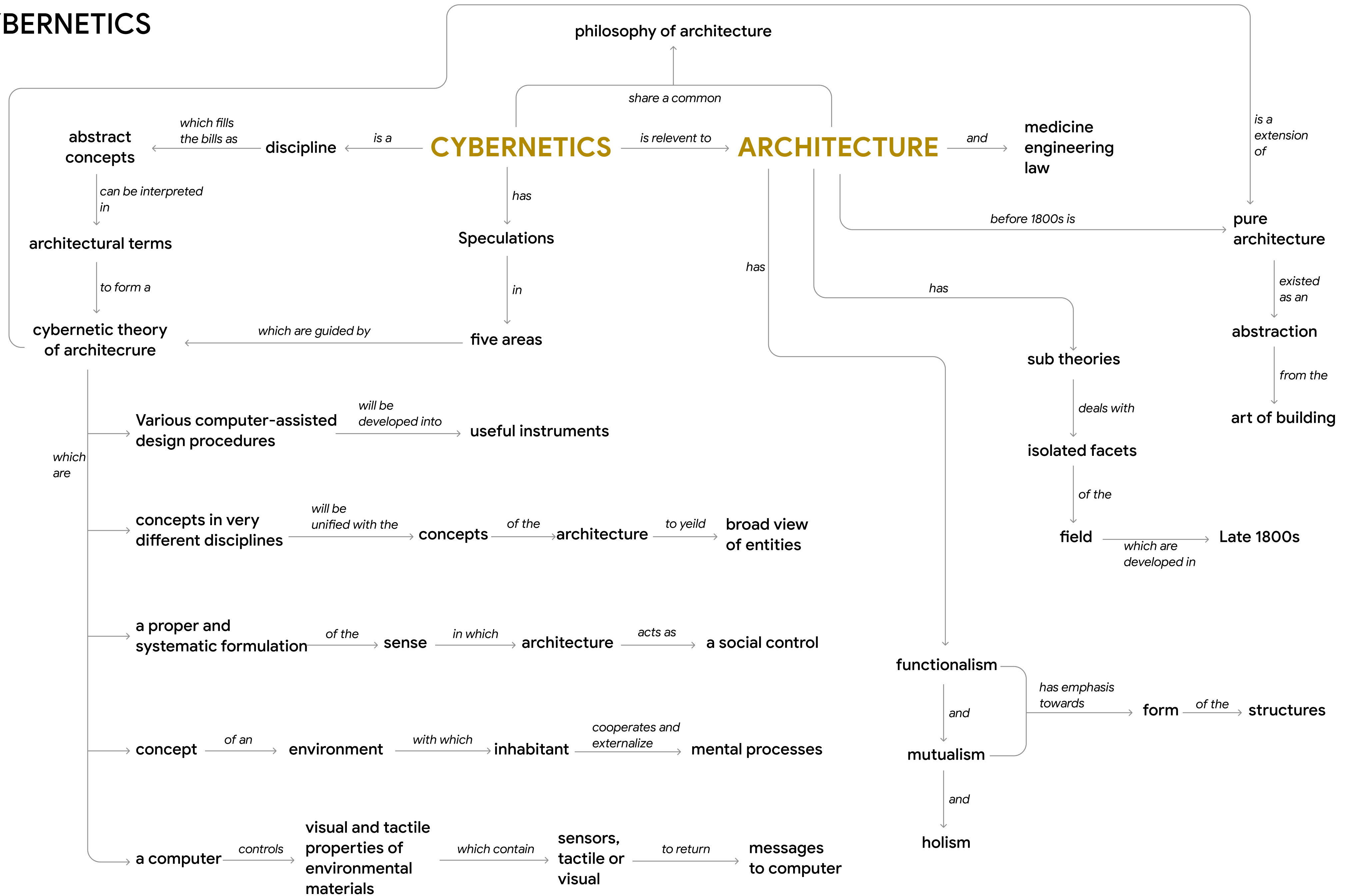
*are a part of*

*and*

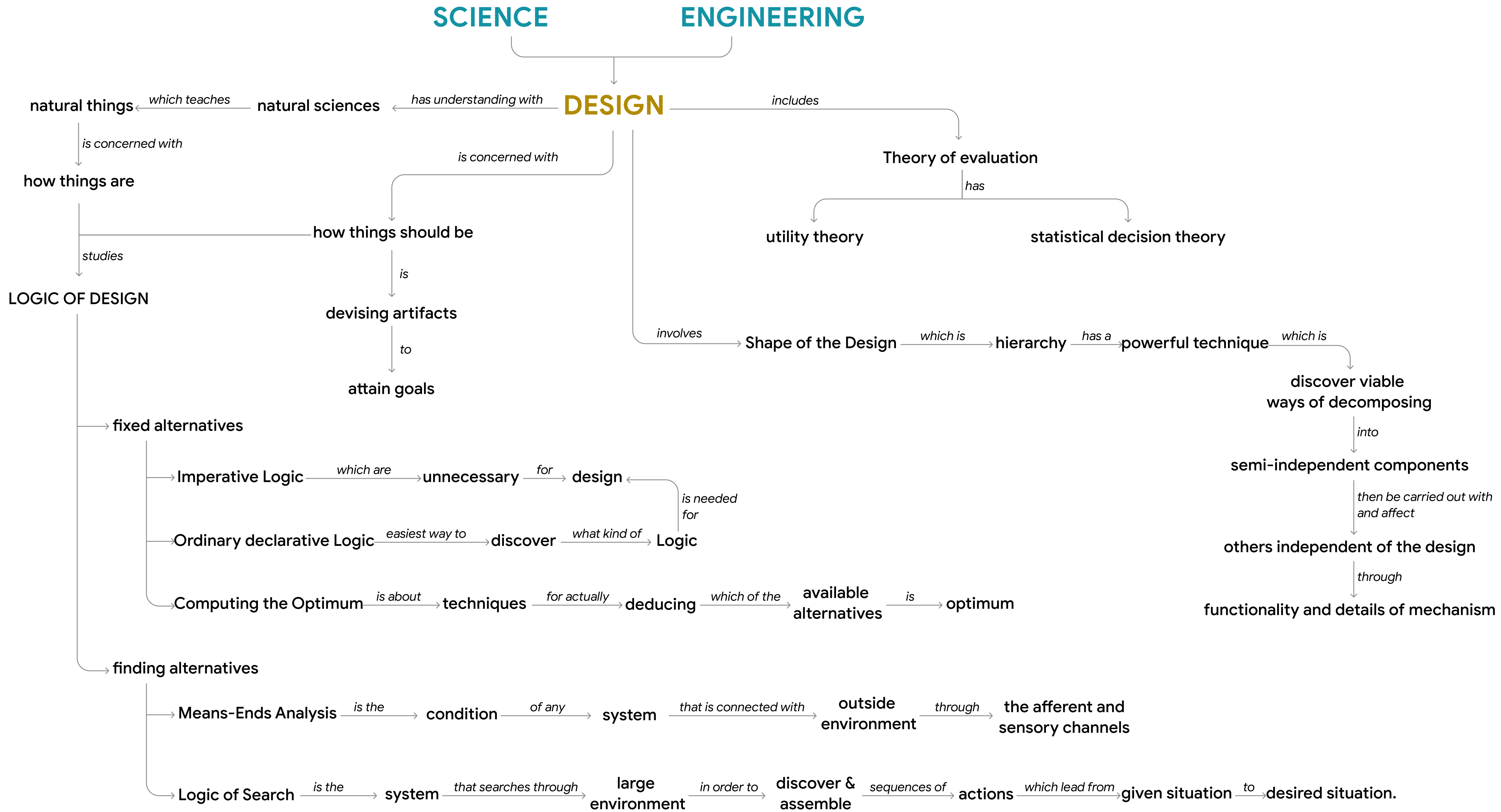
*is aligned with*



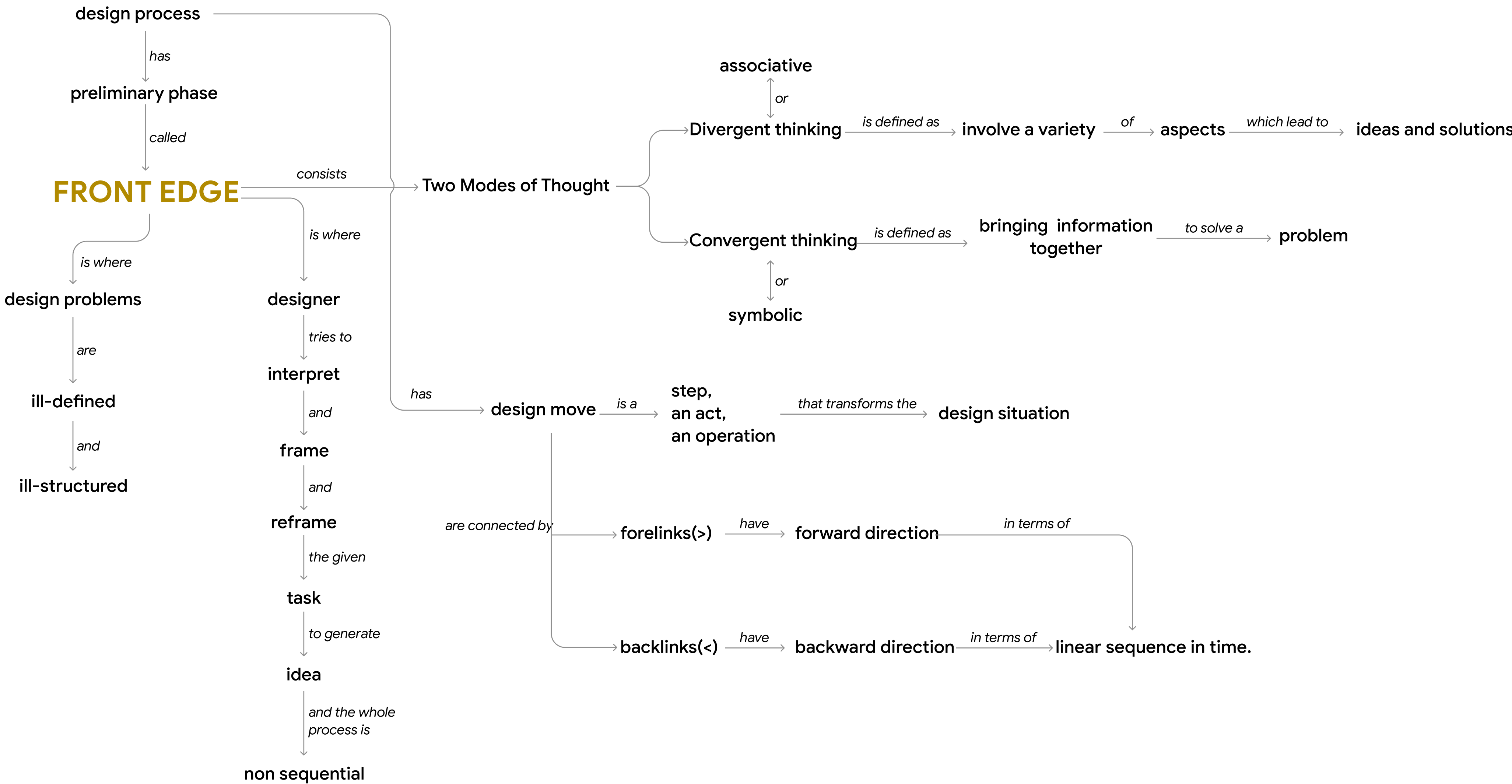
# THE ARCHITECTURAL RELEVANCE OF CYBERNETICS



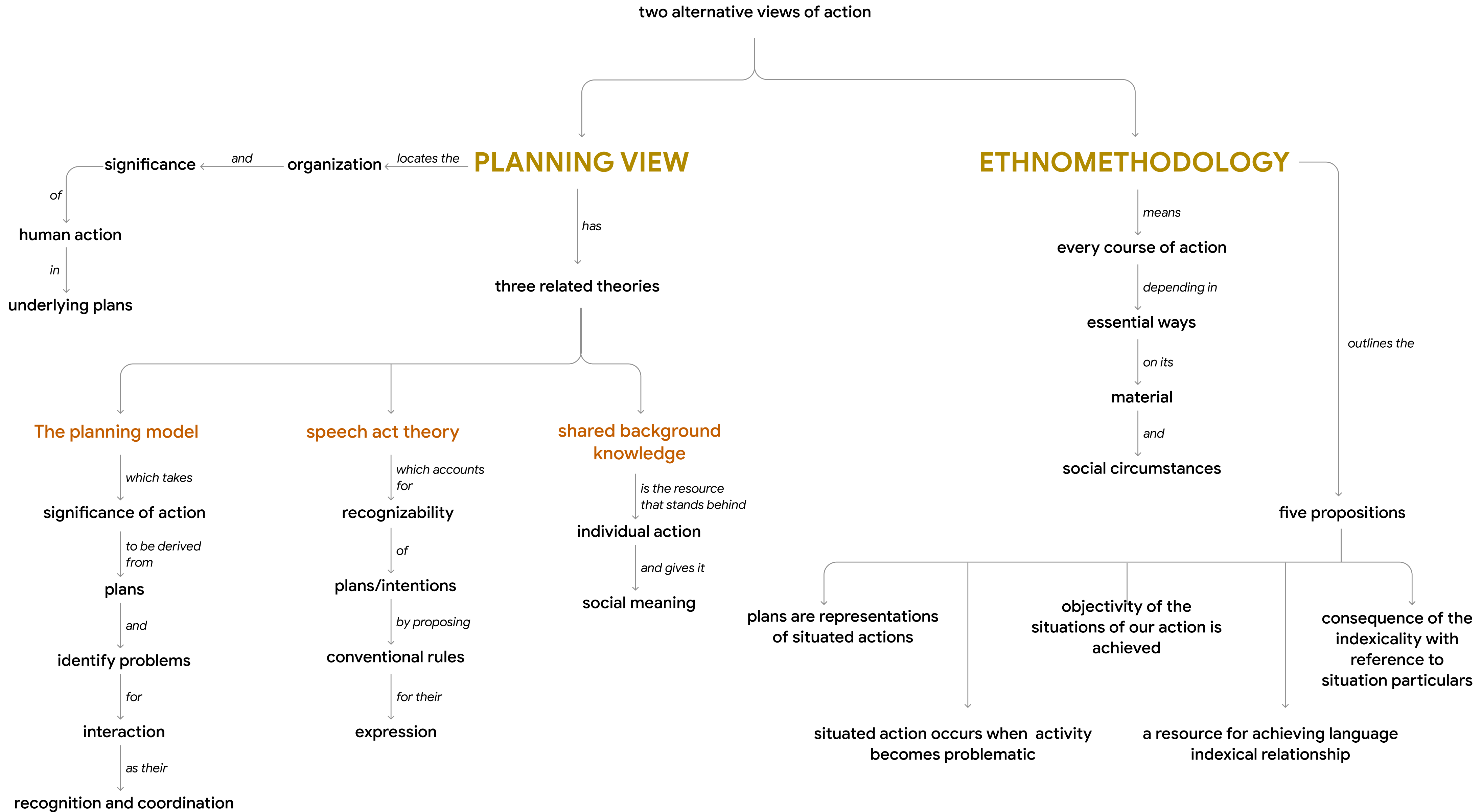
# THE SCIENCE OF DESIGN: CREATING THE ARTIFICIAL



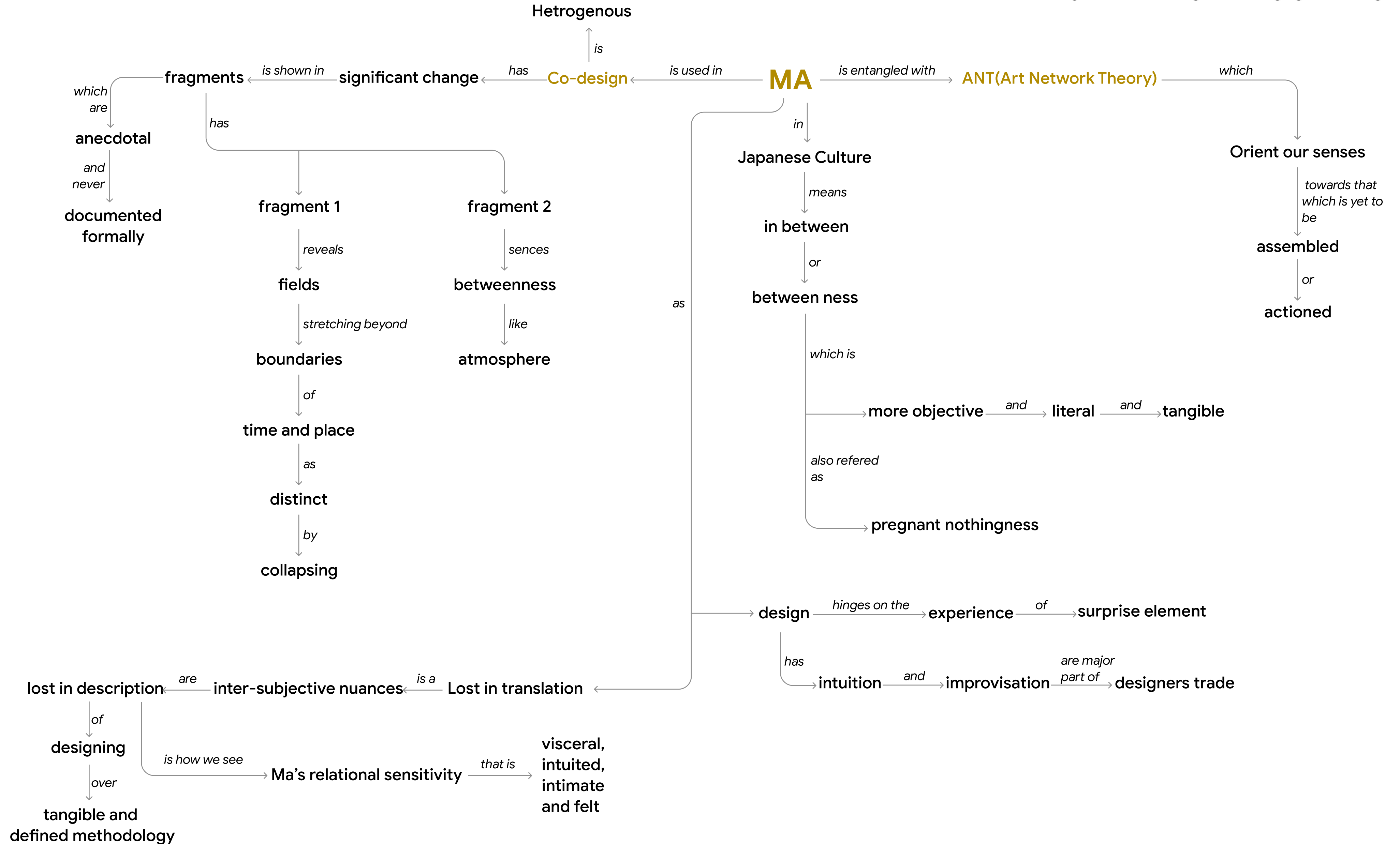
# DESIGN PROCESS



# HUMAN-MACHINE RECONFIGURATIONS



# BEING AWAKE TO MA: DESIGNING IN BETWEEN-NESS AS A WAY OF BECOMING WITH

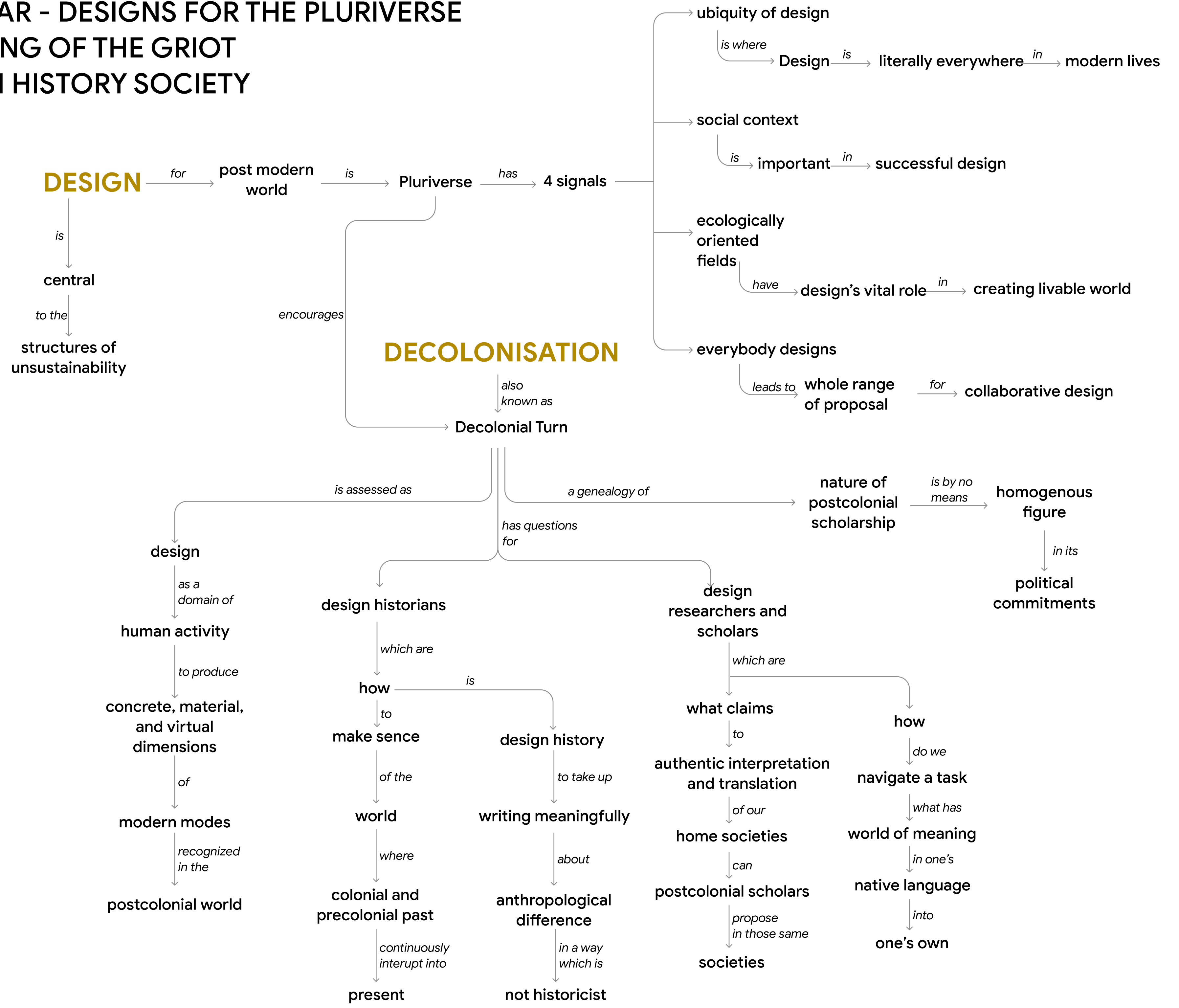




# ESCOBAR - DESIGNS FOR THE PLURIVERSE

## THE SONG OF THE GRIOT

### DESIGN HISTORY SOCIETY



# HOW TO BUILD ANYTHING ETHICALLY

A good way *is the* **LAKOTA WAY** *way of talking about* ethical protocols

*to build a*

**AI system**

*has several*

*has protocols for*

**7 generations**

*has protocols for*

**build AI ethically**

**components**

*which are*

- architecture
- input
- algorithms
- output

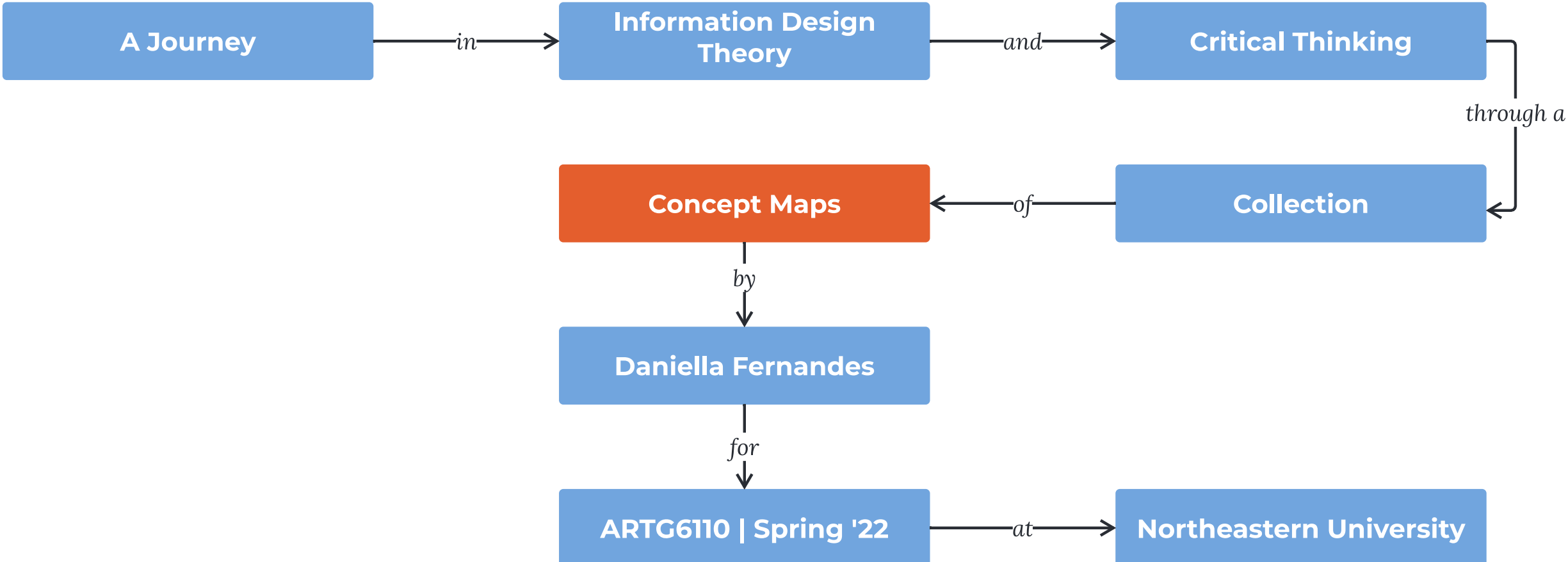
**physical computing device**

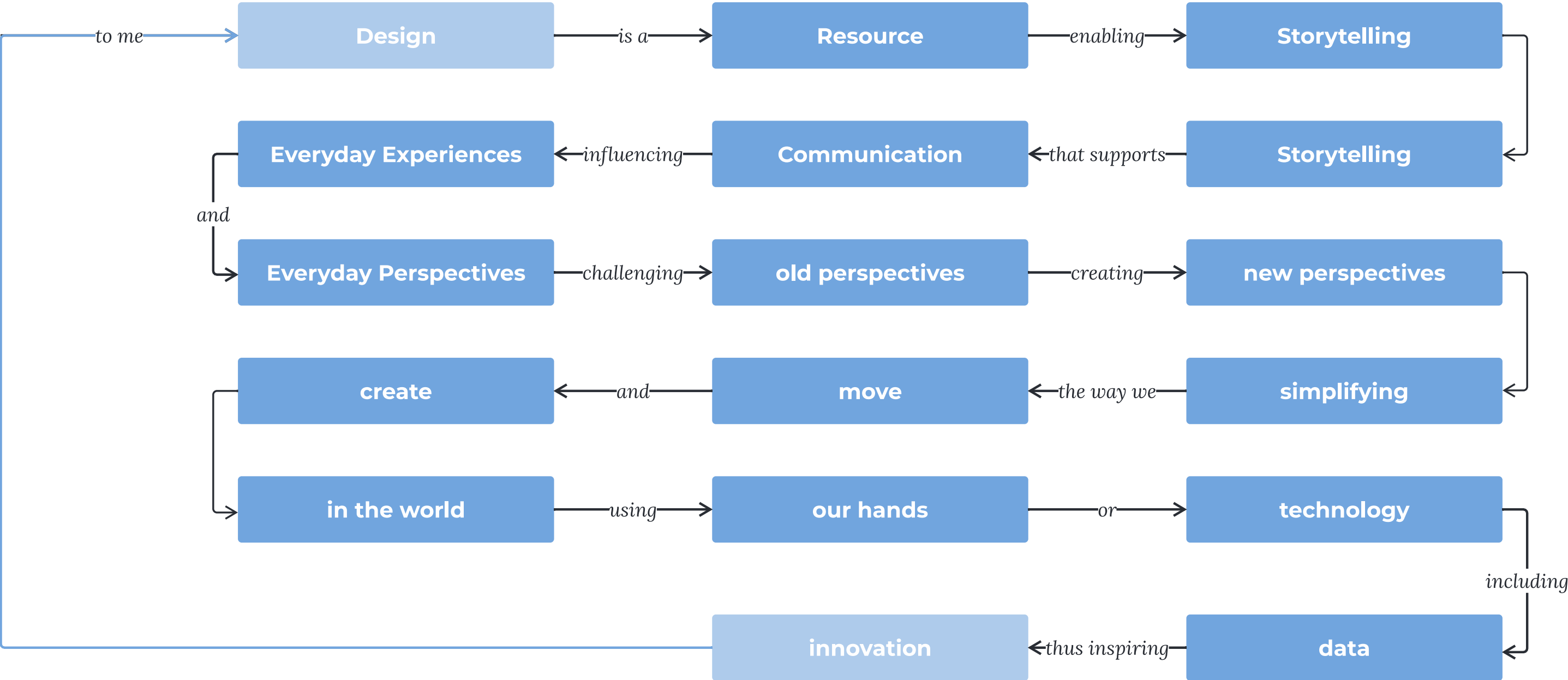
*has steps*

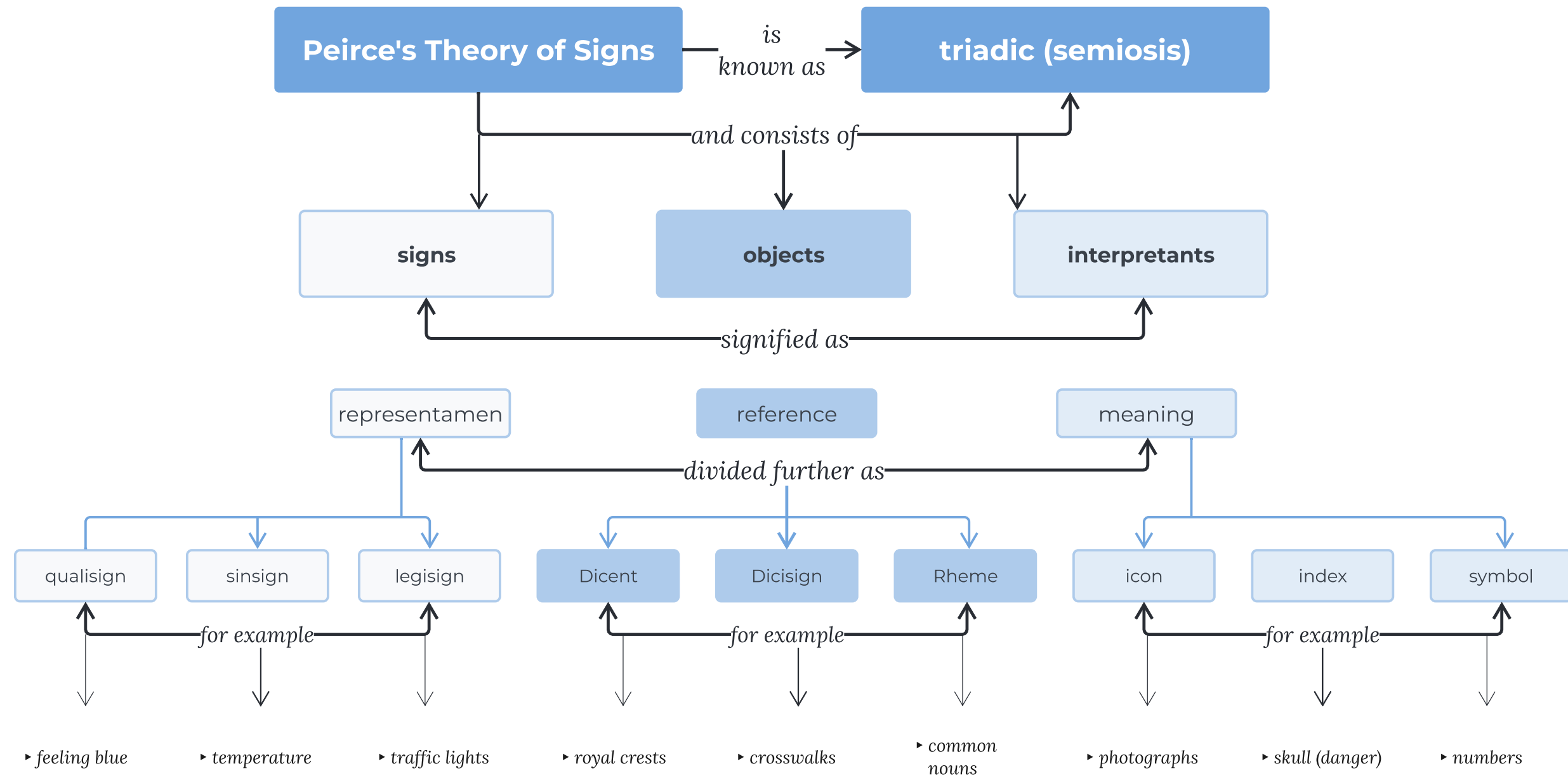
- **Appreticing** *ask* → Who are the elders and knowledge keepers for this protocol
- **Identifying Needs** *ask* → Which community members, human and non human all those past,present and future are affected
- **Identify Stakeholders** *ask* → What is needed to create this process
- **Identify Raw Materials** *ask* → How are the owners of the raw materials being compensated
- **Constructing** *ask* → What are the methods necessary to do this protocol in an ethical way
- **Prepare Internal Components** *ask* → How do the parts of this process need to be prepared
- **Waking up** *ask* → How can the protocol be enacated in an ethical way
- **Algorithm** *ask* → What is transformed during this process
- **Transformation** *ask* → How can this protocal be completed in a way that provides transparency to those affected
- **Annoucement** *ask* → How can the ongoing use of the result of this protocol be done in an ethical way
- **Death Cycle** *ask* → how can the end of this protocol be completed in an ethical way

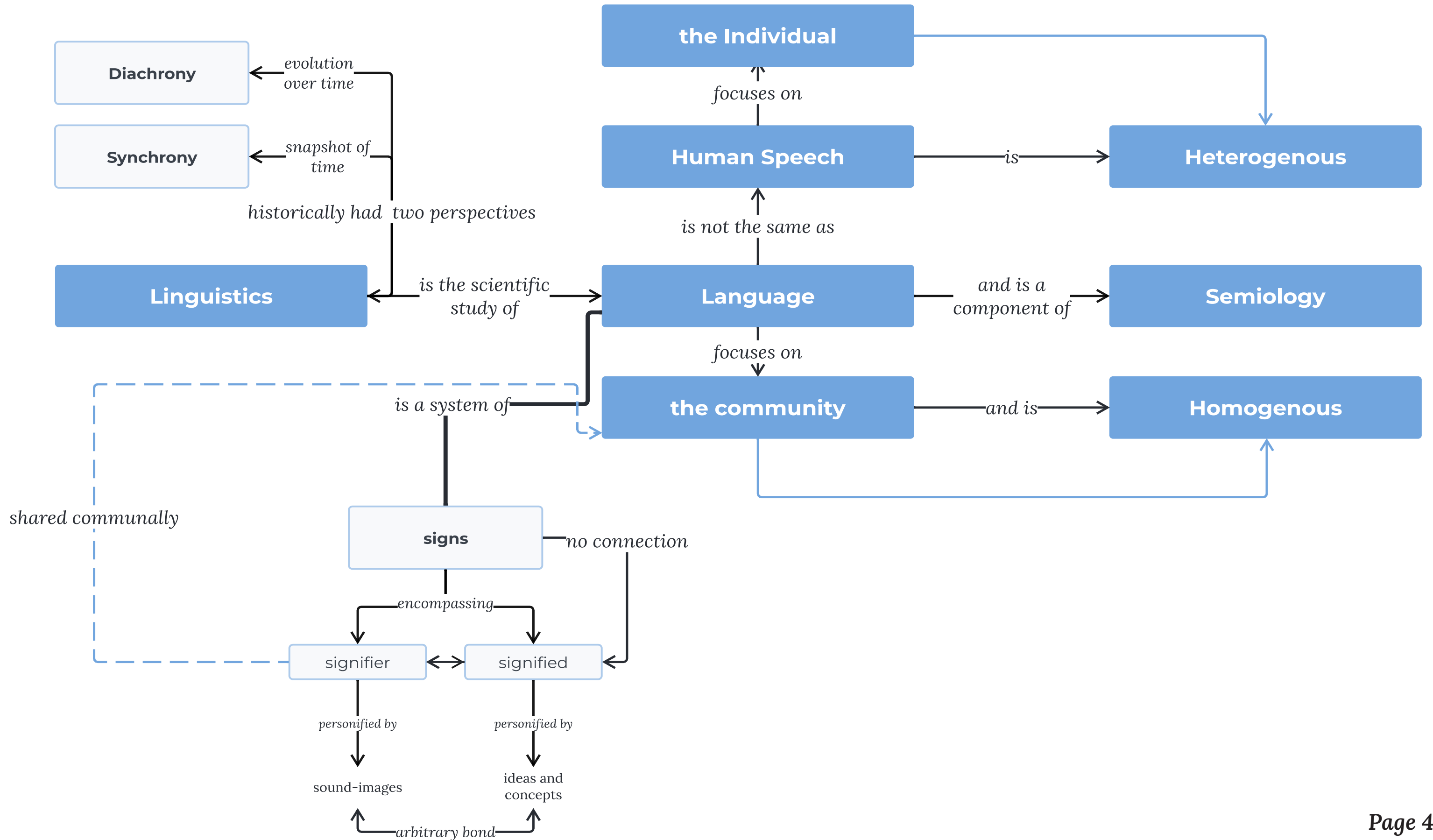
*has steps*

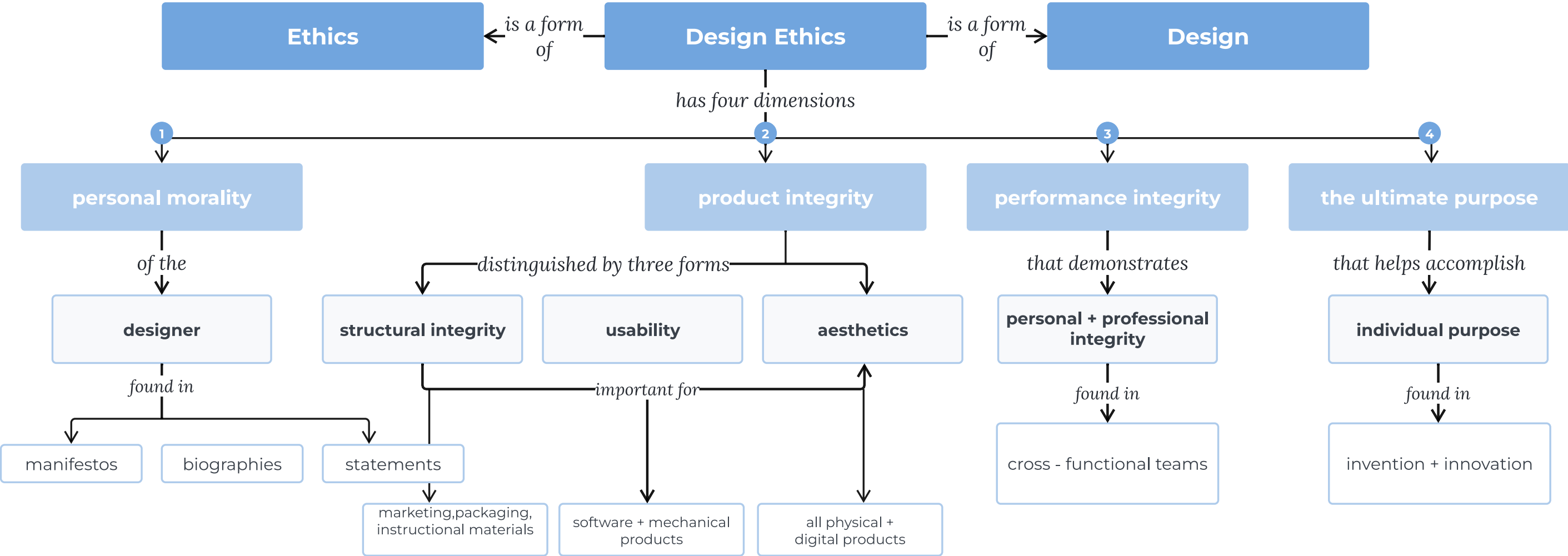
- governance
- data collection
- physical computing device
- compensation method
- distribution
- use
- coding language
- software design



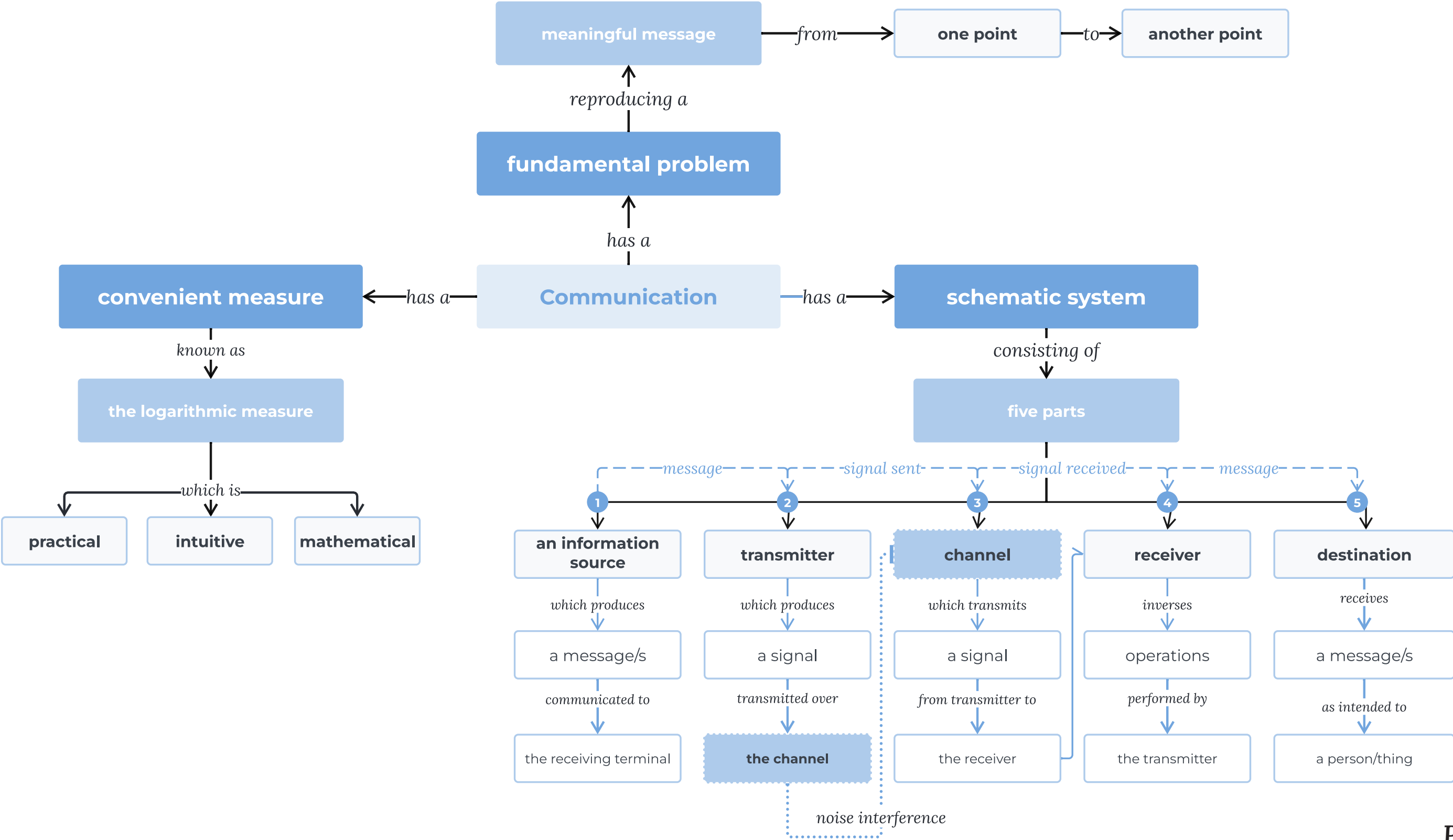


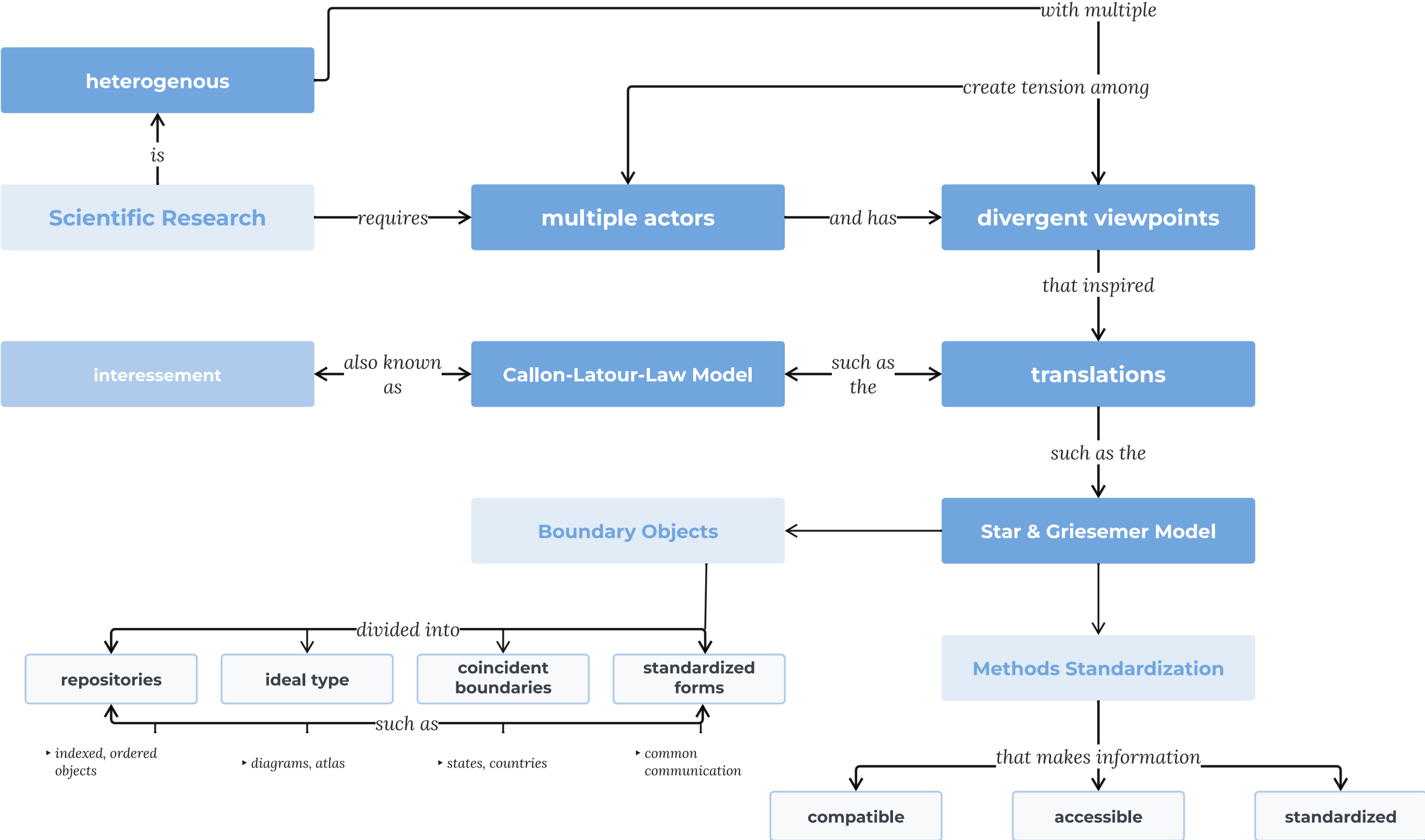




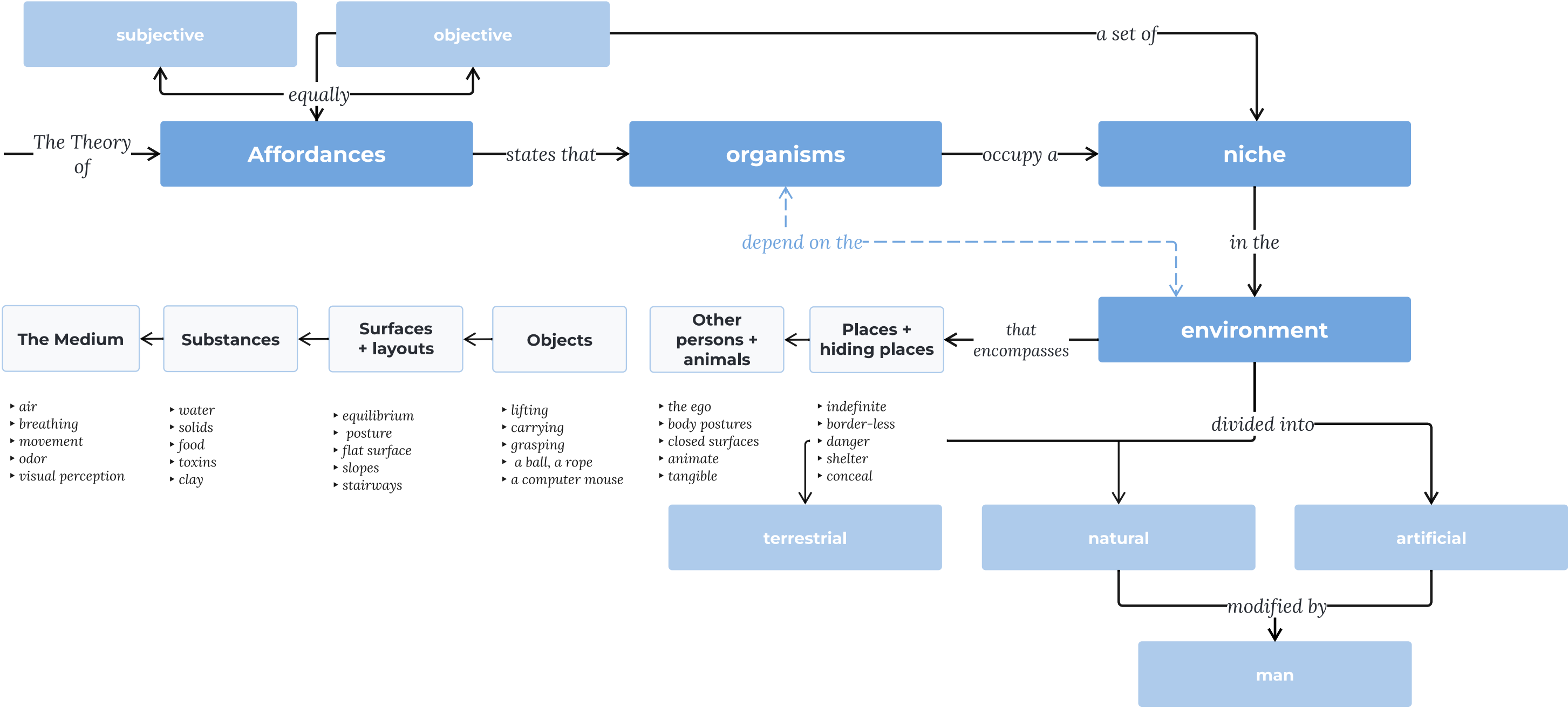


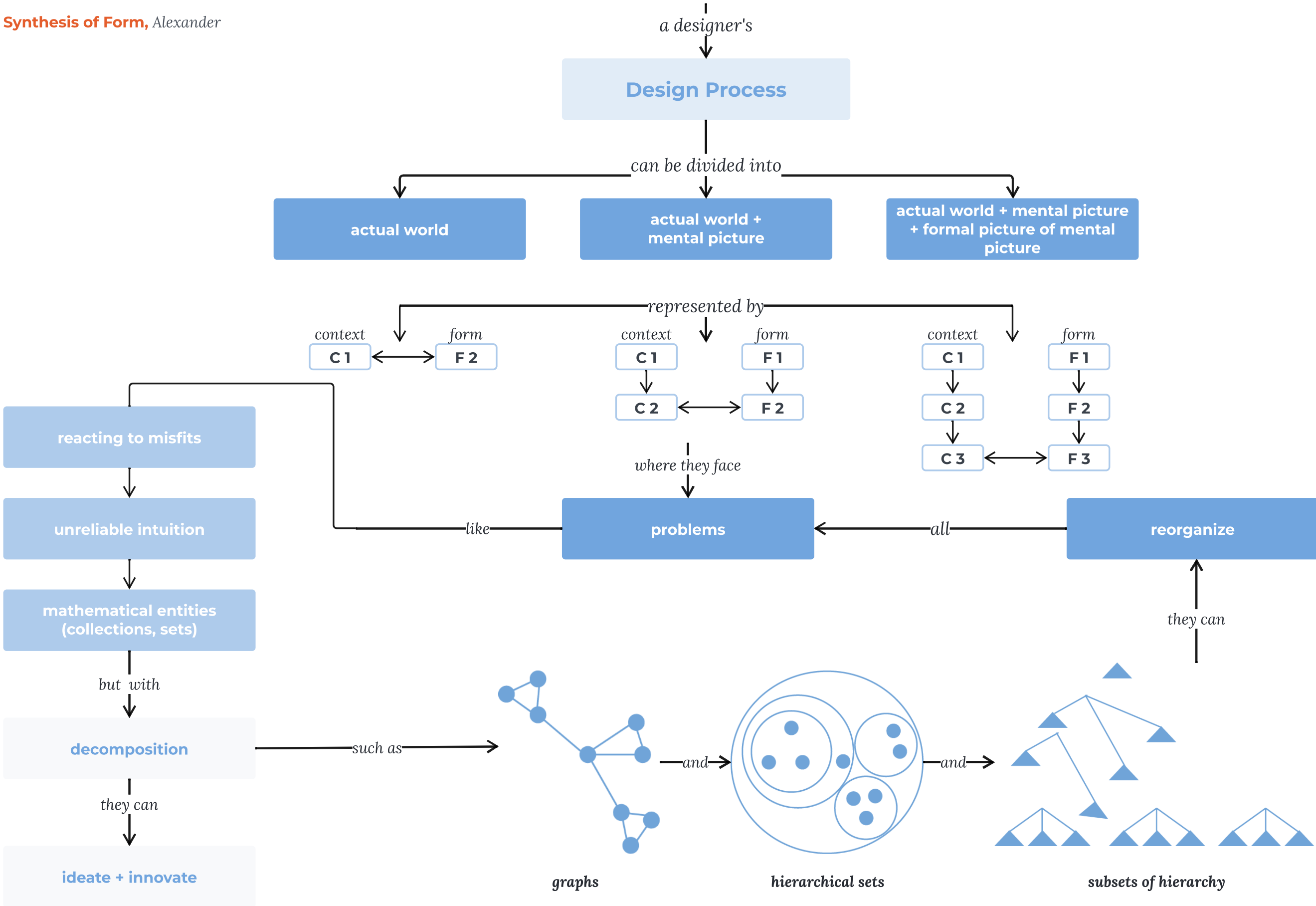


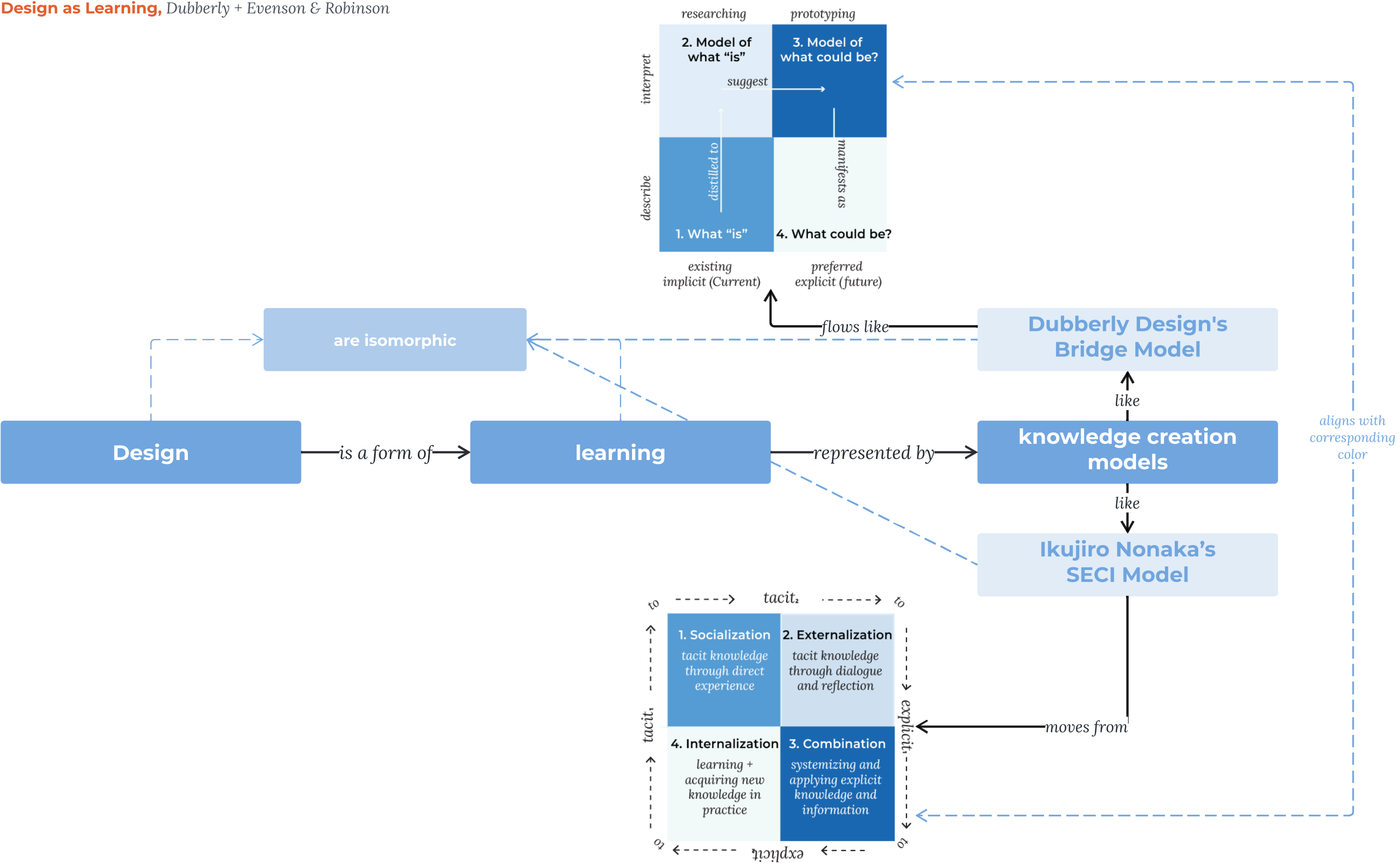


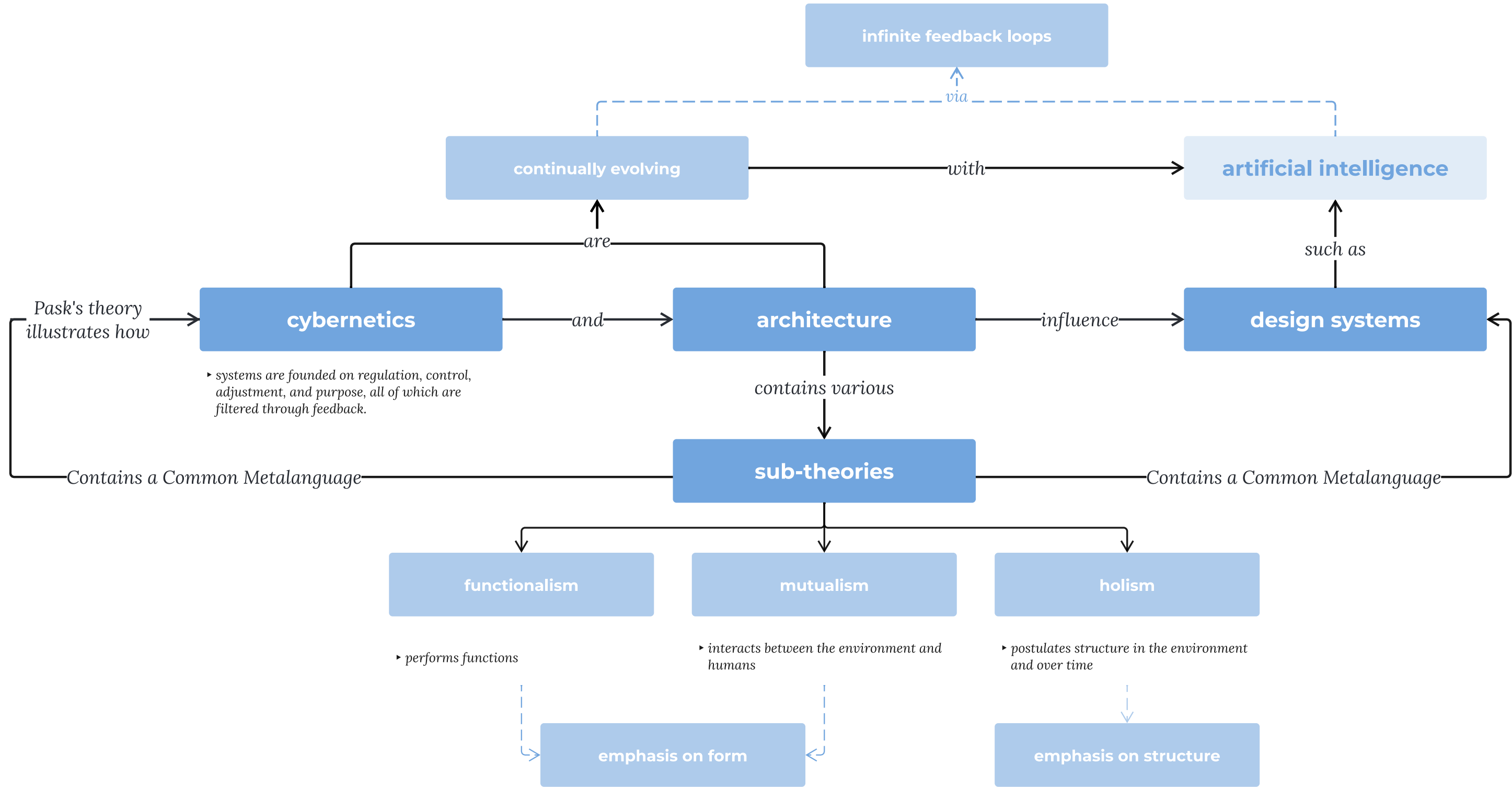


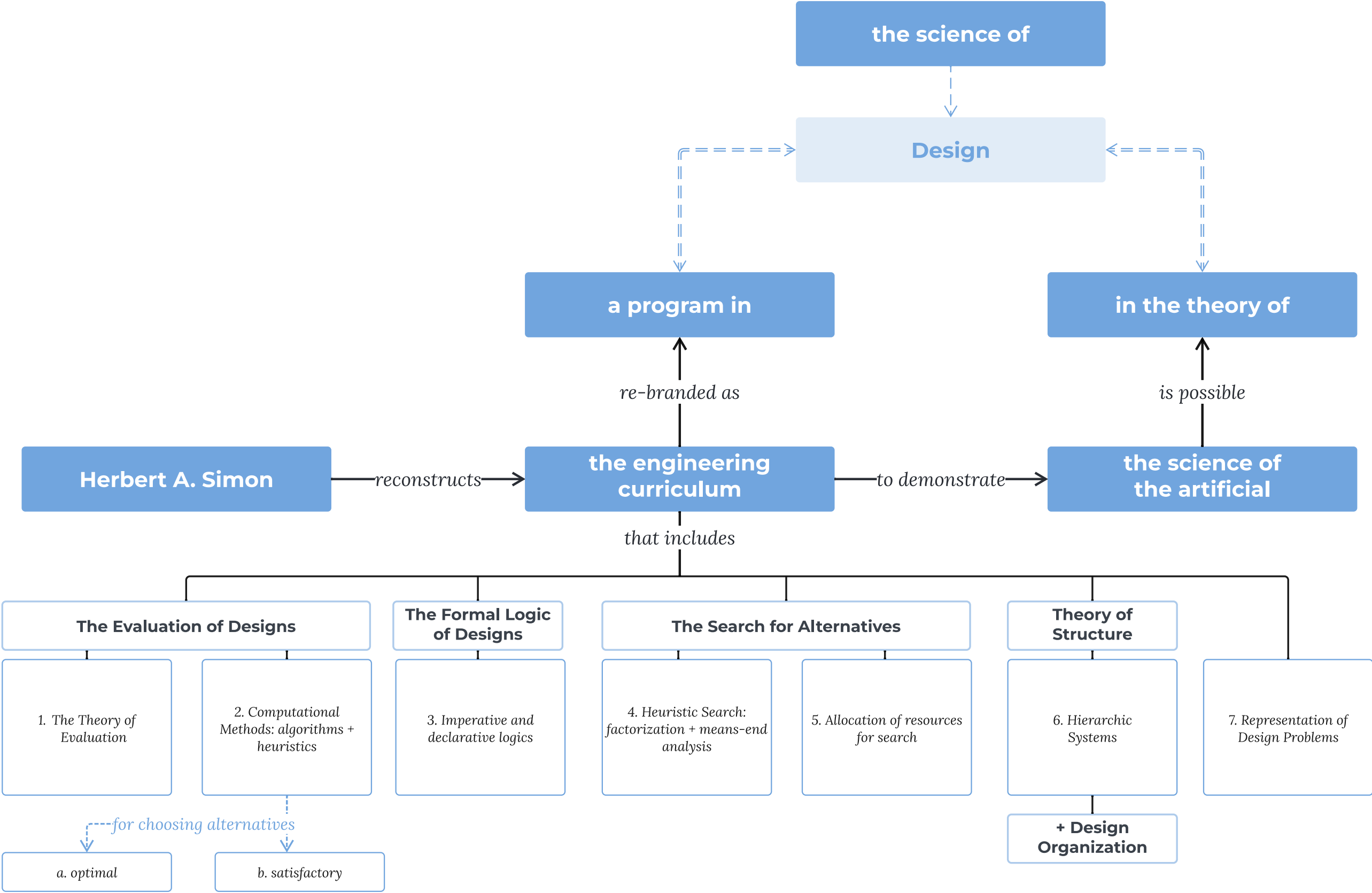
Theory of Affordances, Gibson



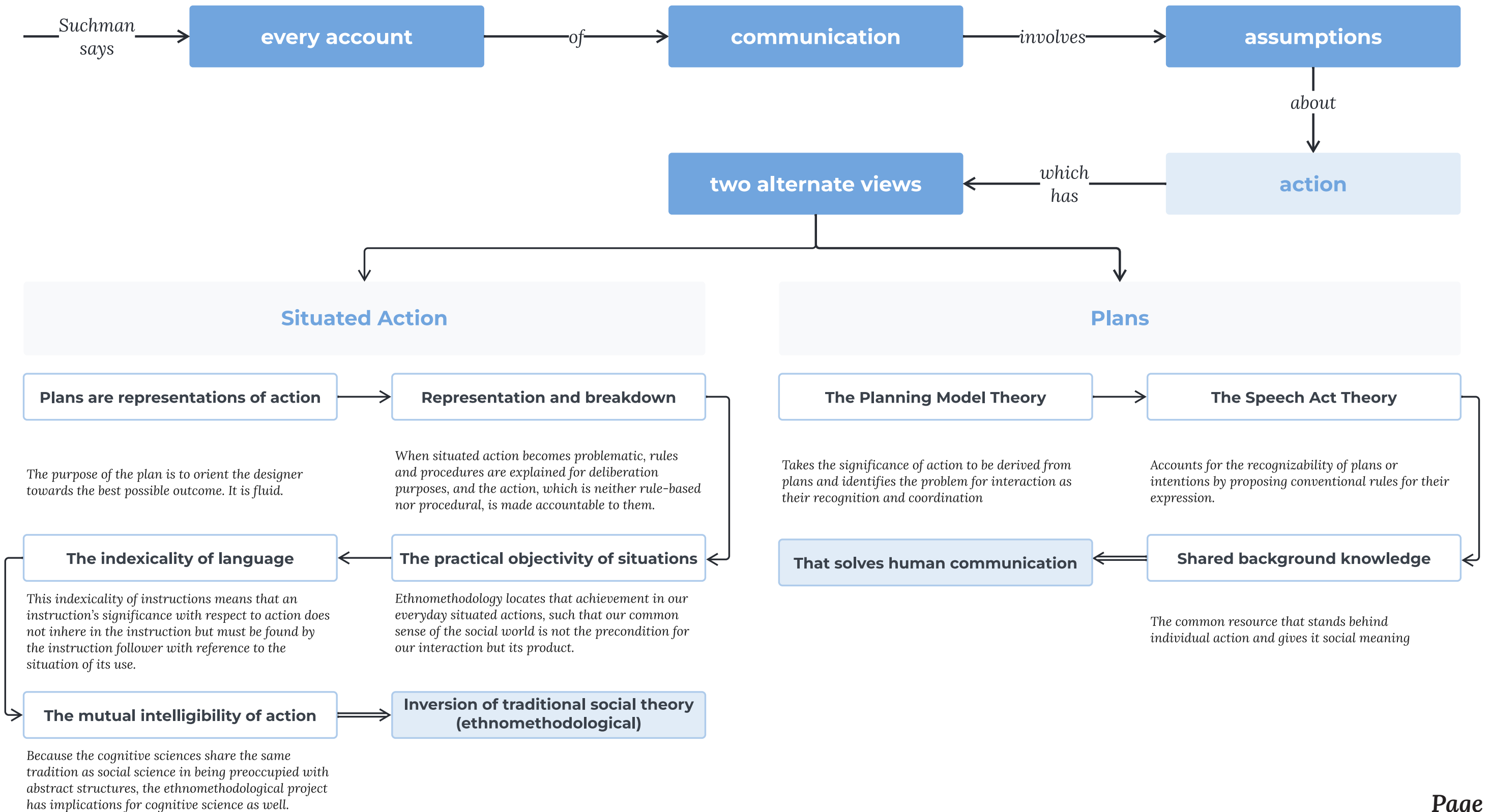


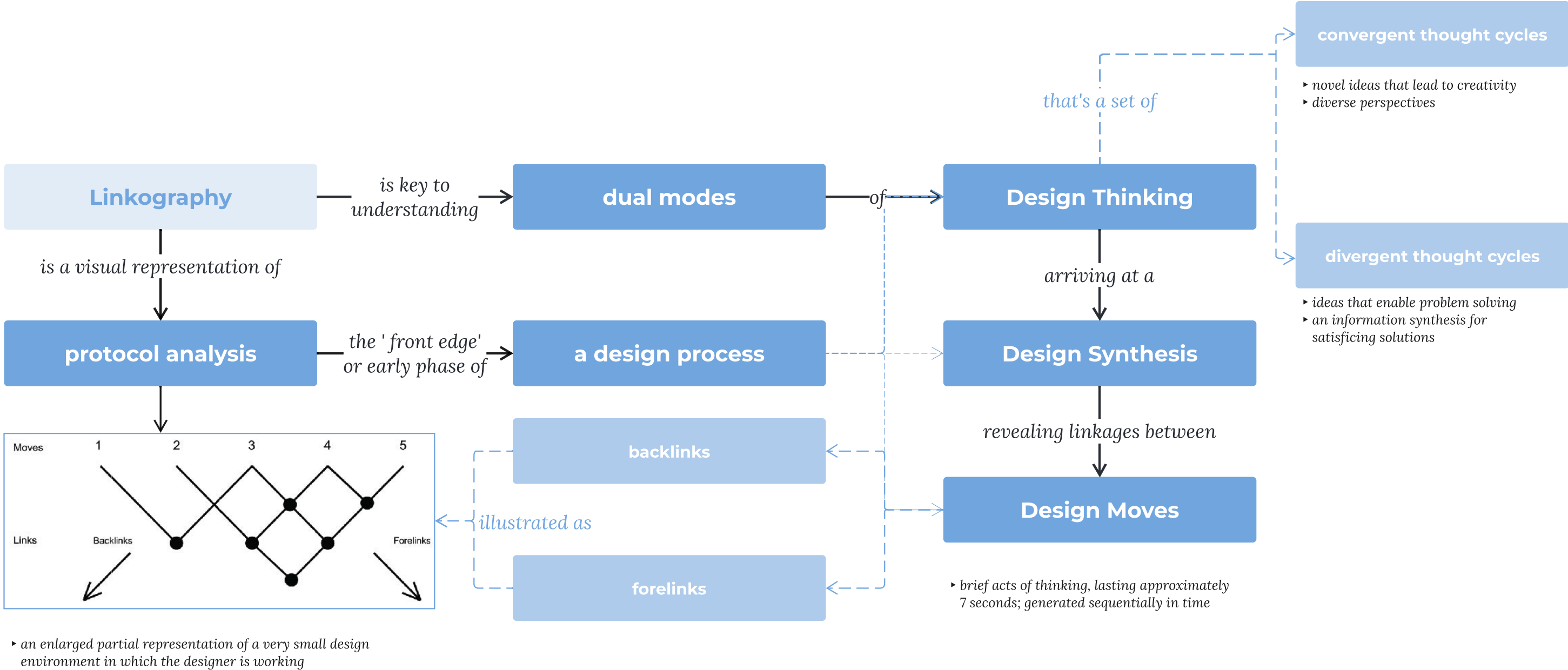




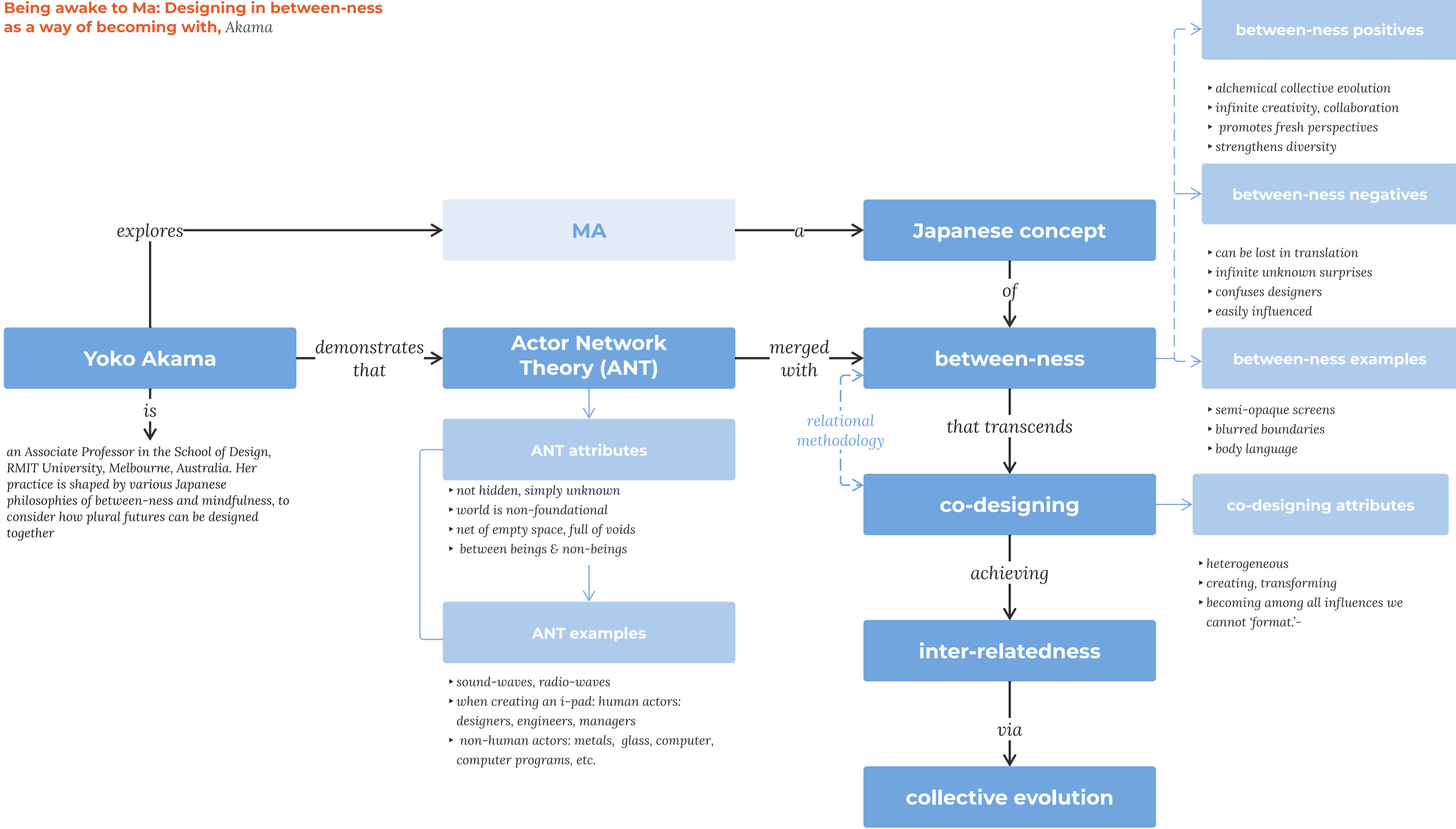






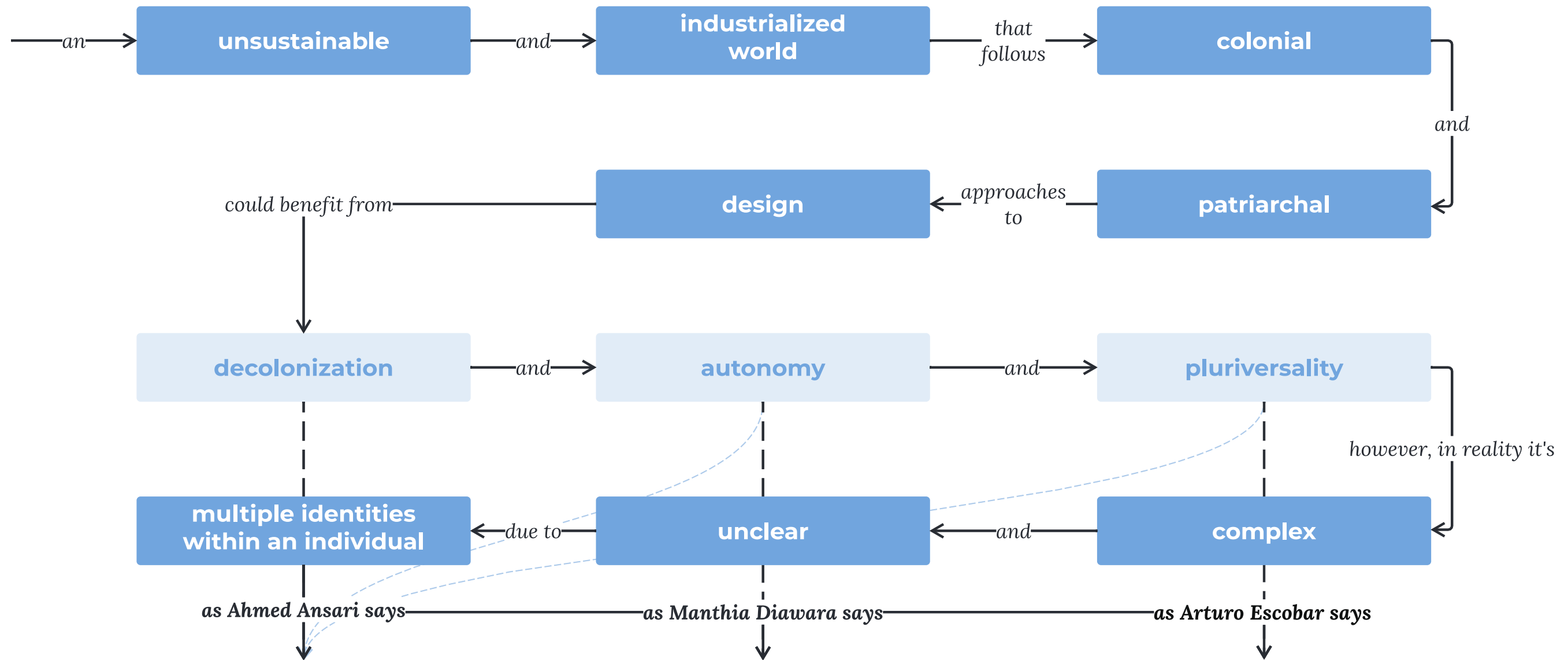


**Being awake to Ma: Designing in between-ness as a way of becoming with, Akama**



an Associate Professor in the School of Design, RMIT University, Melbourne, Australia. Her practice is shaped by various Japanese philosophies of between-ness and mindfulness, to consider how plural futures can be designed together

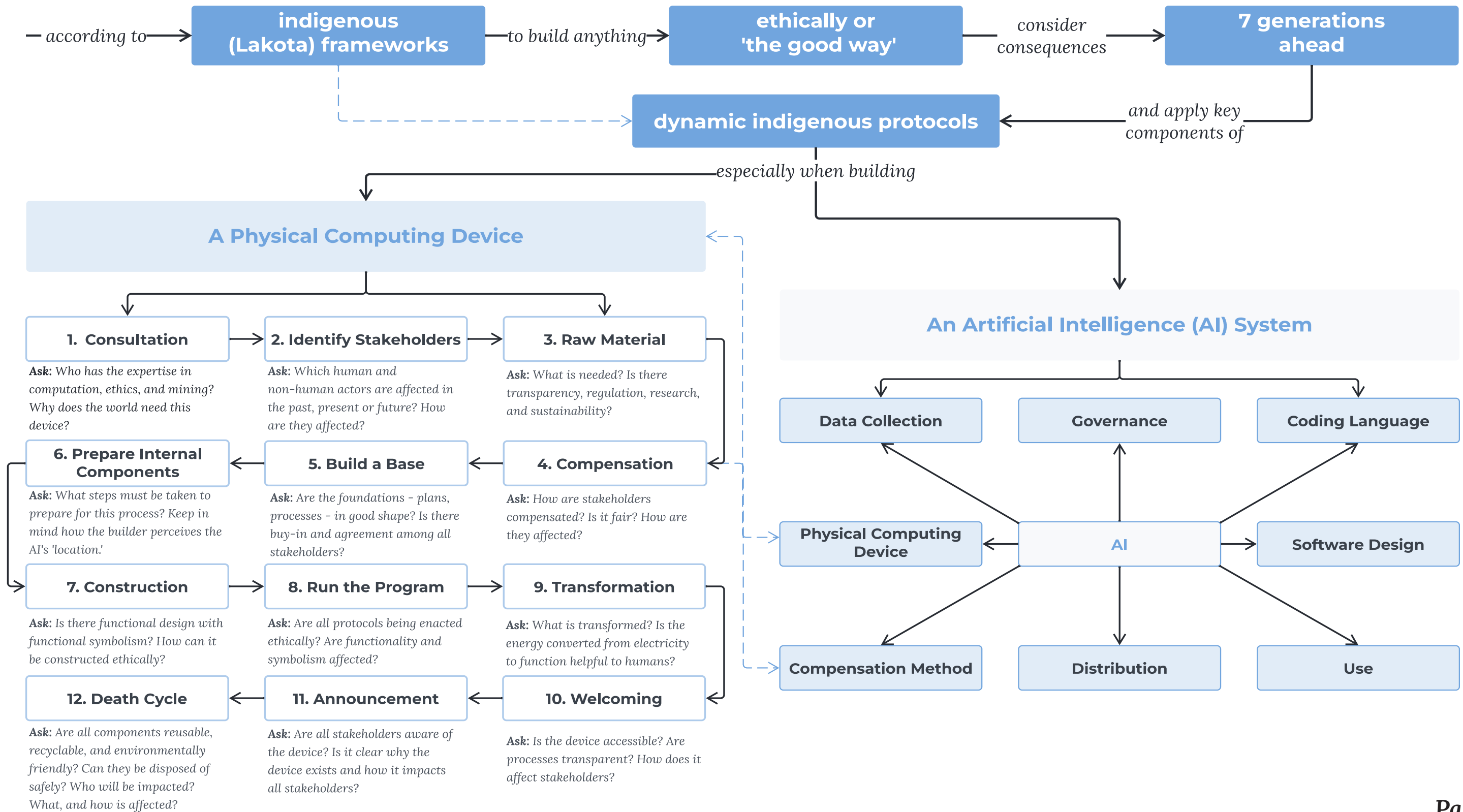
## Design Historians Say:



*“In practice... it is less clear how pluriversality and autonomous design can develop into something that speaks to tens, if not hundreds, of millions of people that all see themselves as national ‘natives.’”*

*“As individuals and communities we have different identities...We can be dishwashers in the present but kings in history, in song, in culture.”*

*“The notion of oww [One-World World] signals the predominant idea in the West that we all live within a single world, made up of one underlying reality (one nature) and many cultures. This imperialistic notion supposes the West’s ability to arrogate for itself the right to be ‘the world,’ and to subject all other worlds to its rules, to diminish them to secondary status or to nonexistence, often figuratively and materially. It is a very seductive notion [...]”*



Dear Michael,

Thank you for being such an excellent instructor this semester.

Thank You for stretching our minds wide, and helping us see the world in a way we didn't and perhaps, wouldn't before.

Thank You for all the conversations, the laughs, and those incredibly delicious cookies.

Here's hoping our paths cross, again.

With lots of gratitude and memories,  
Daniella



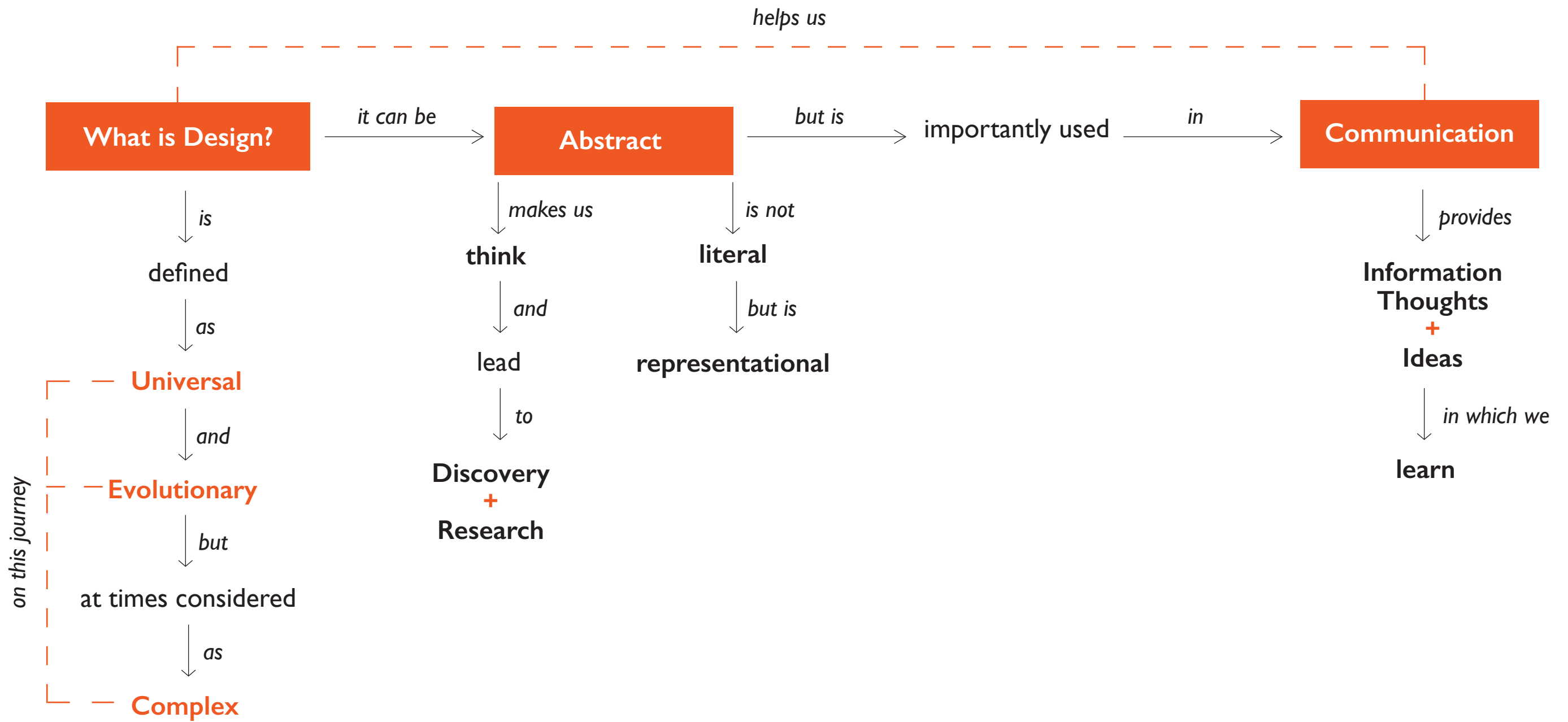
# **CONCEPT MAP** **BOOK 2022**

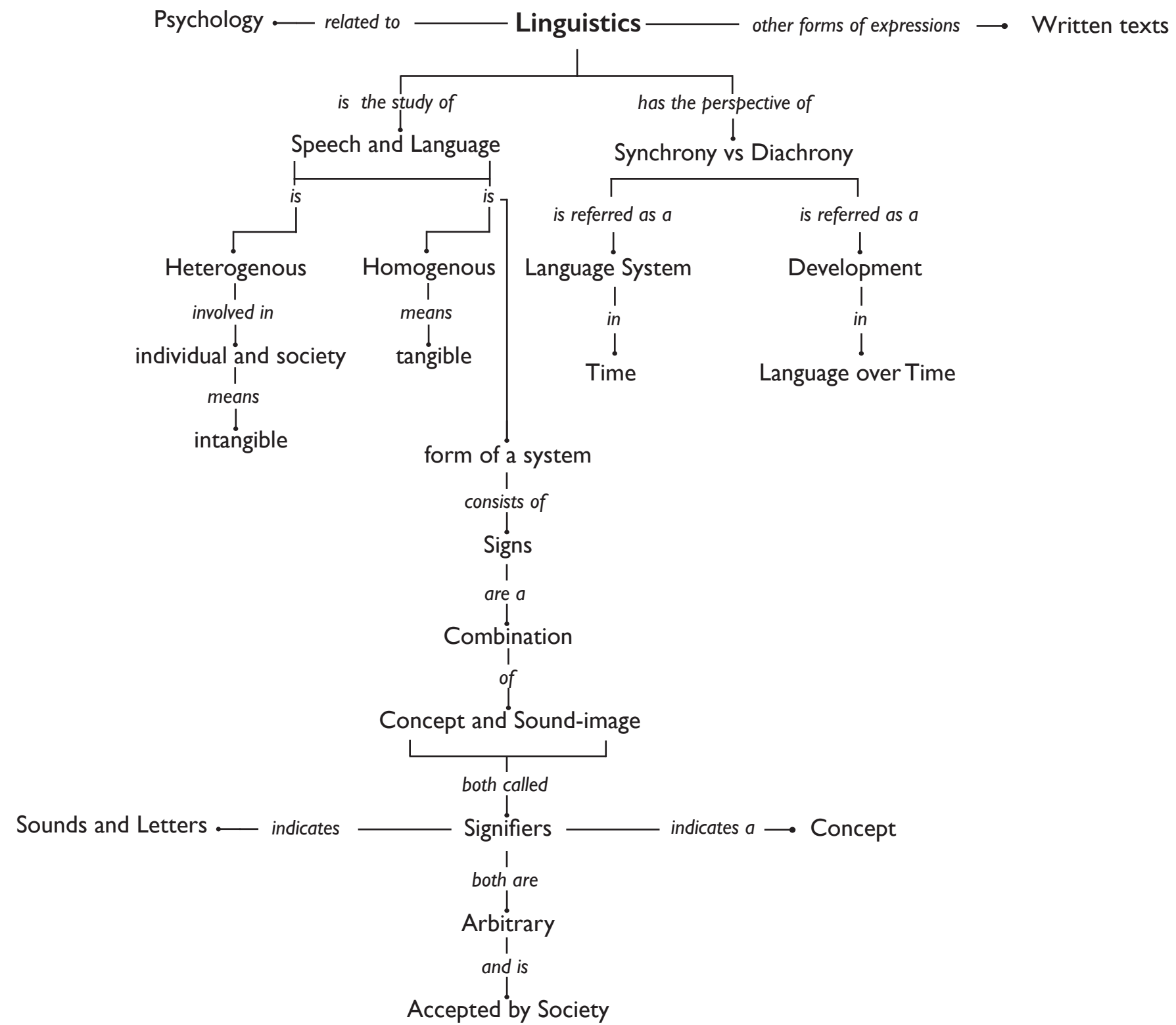
+ Dominique Alvarado



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12	Simon		
13	Pask		
14	Suchman		
15	Goldschmidt		





Traffic Lights  
Four Leaf Clover  
"goodluck"  
+  
Rainbow means  
"happiness"

↑ like

Pronouns  
Green means  
"GO"  
+  
Blue represents  
"cold"

← like no similarity ← but an object ← to relationship ← some An Index + A Symbol → no relationship → to an object → but no similarity → to cultural convention

↑ or

an object ← to similarity ← has an icon ← also **A Sign** → is something → that stands → for something else → to someone

↓ like

Diagrams  
Images  
+  
Emojis

↓ is

an representamen

↓ like

an object

↓ which

creates

↓ another

sign

↓ an

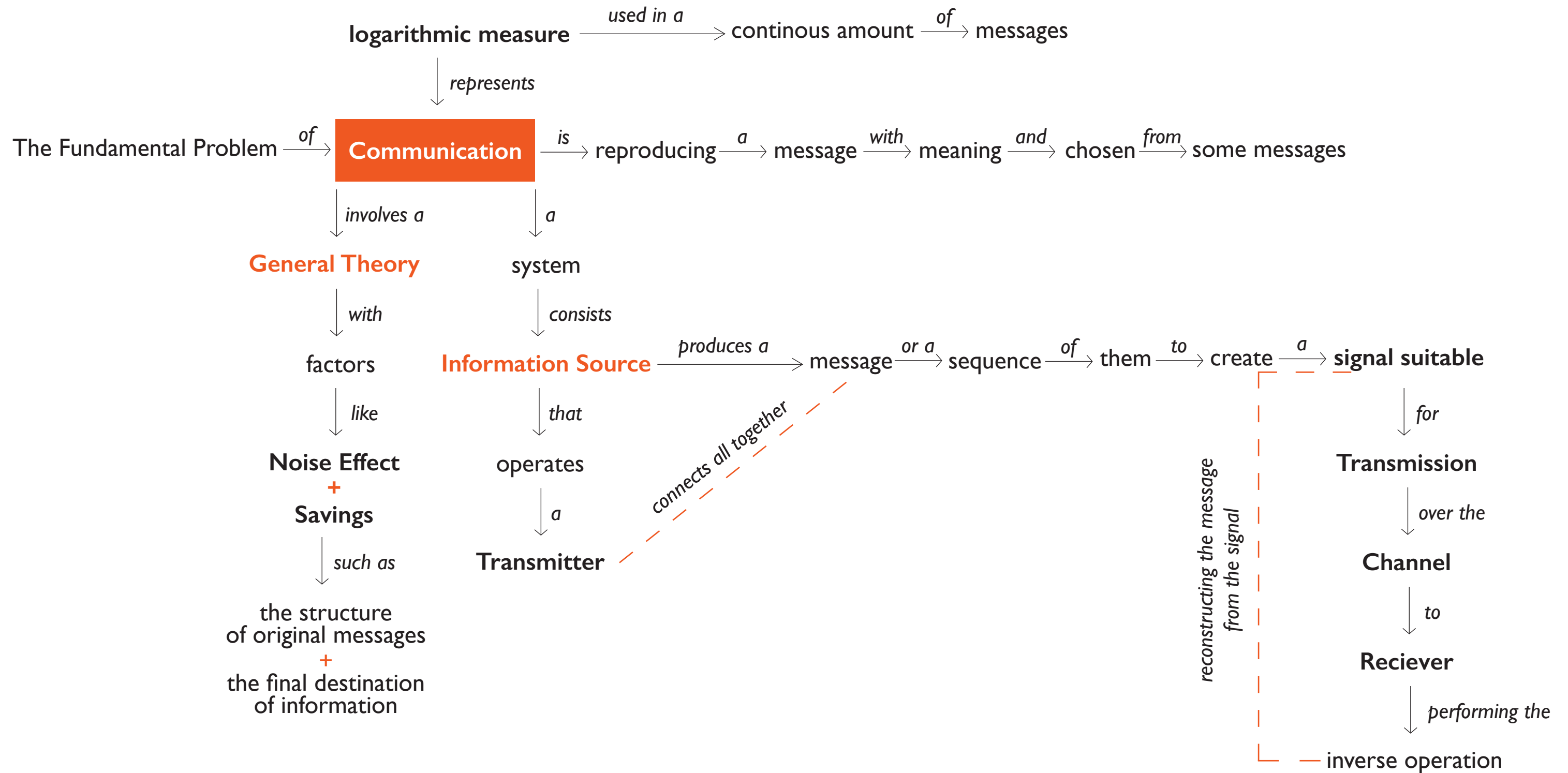
interpretant

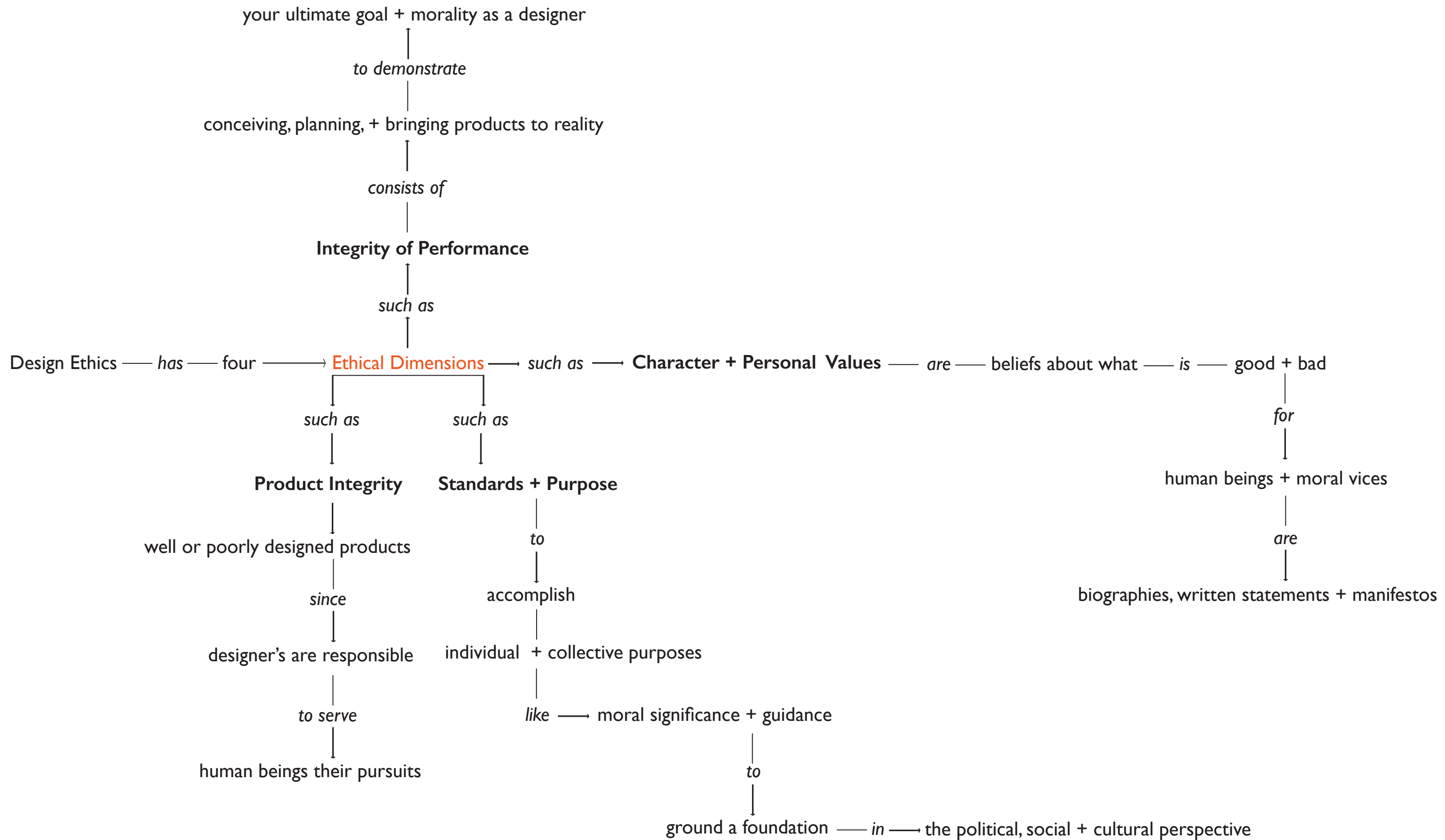
↓ in the

mind

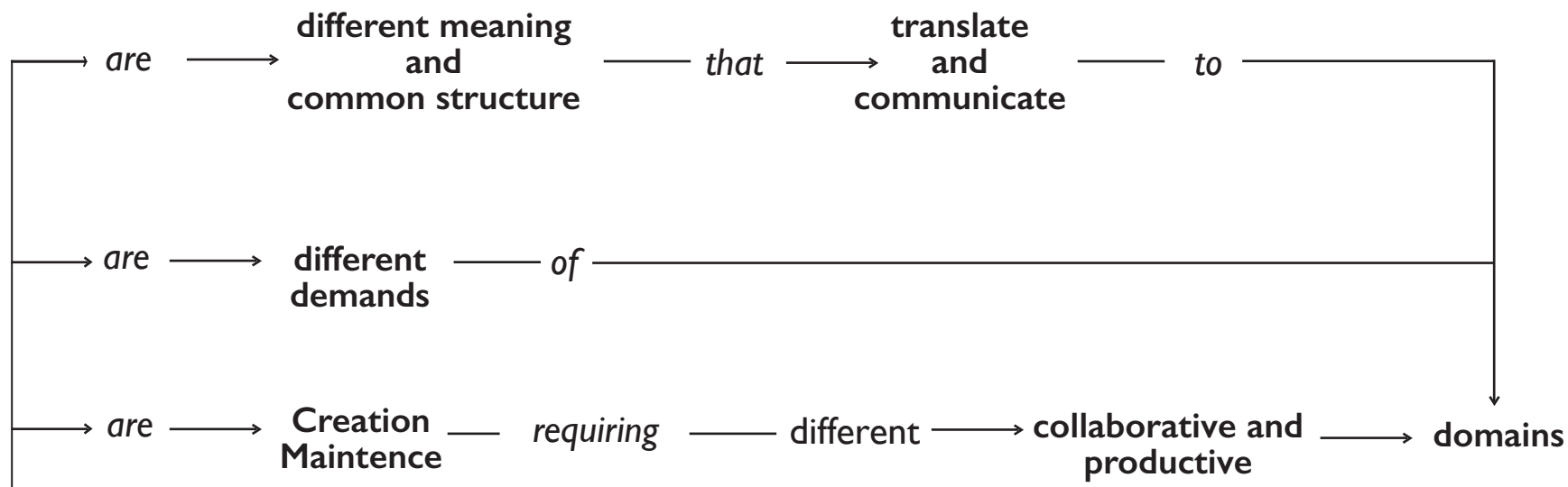
↓ of a

reciever

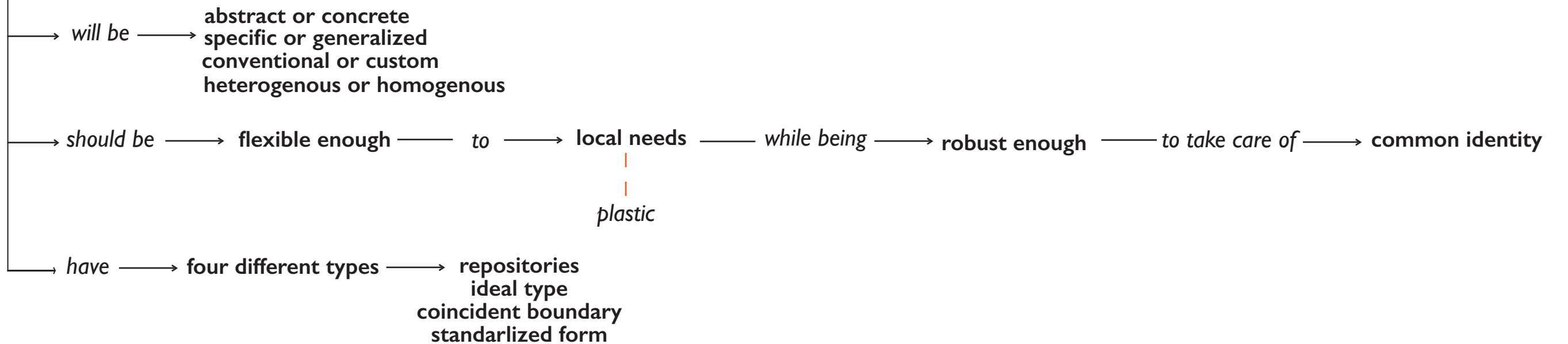




**Scientific Works** *are* relying *on* **Communication + Create New Findings**



**Boundary Objects**

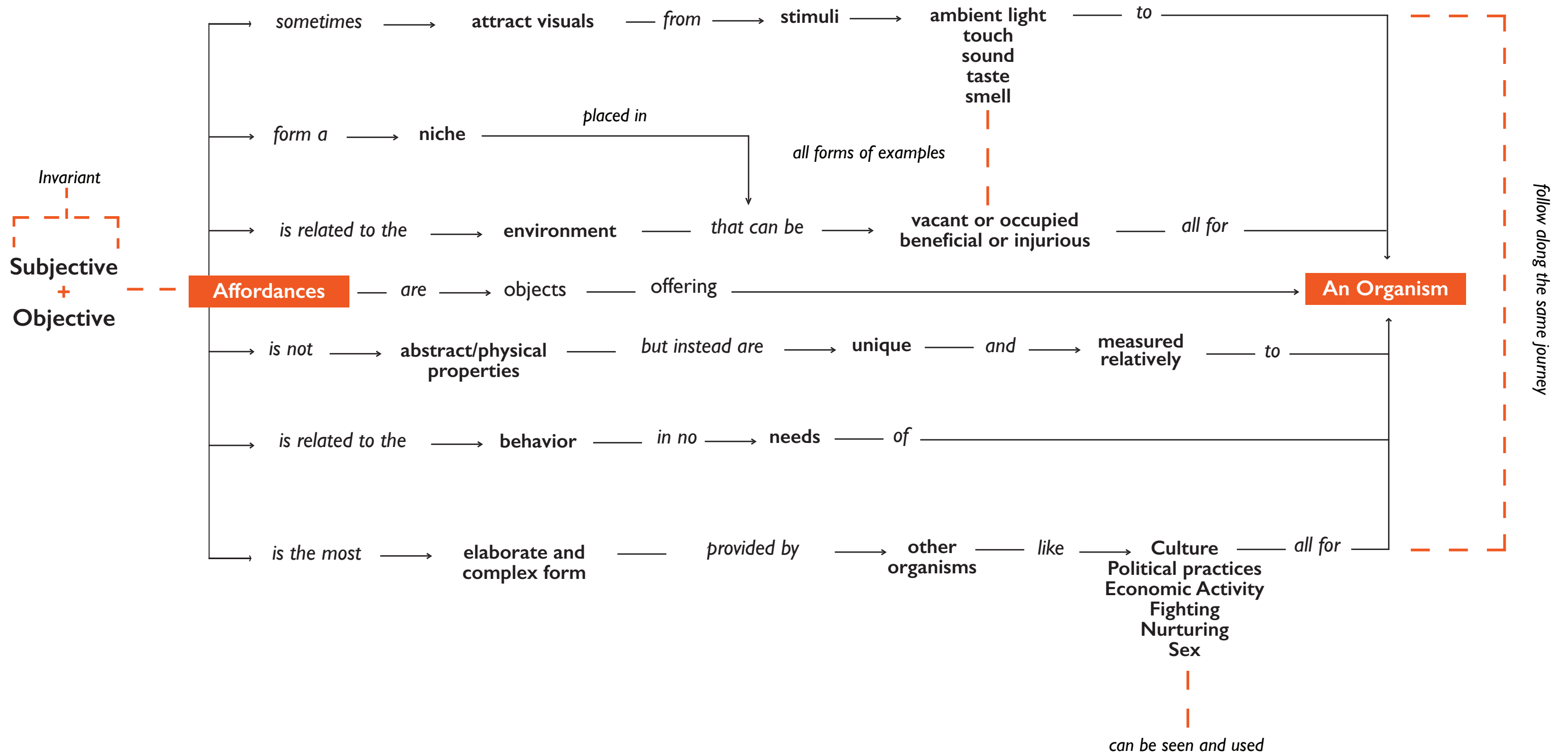


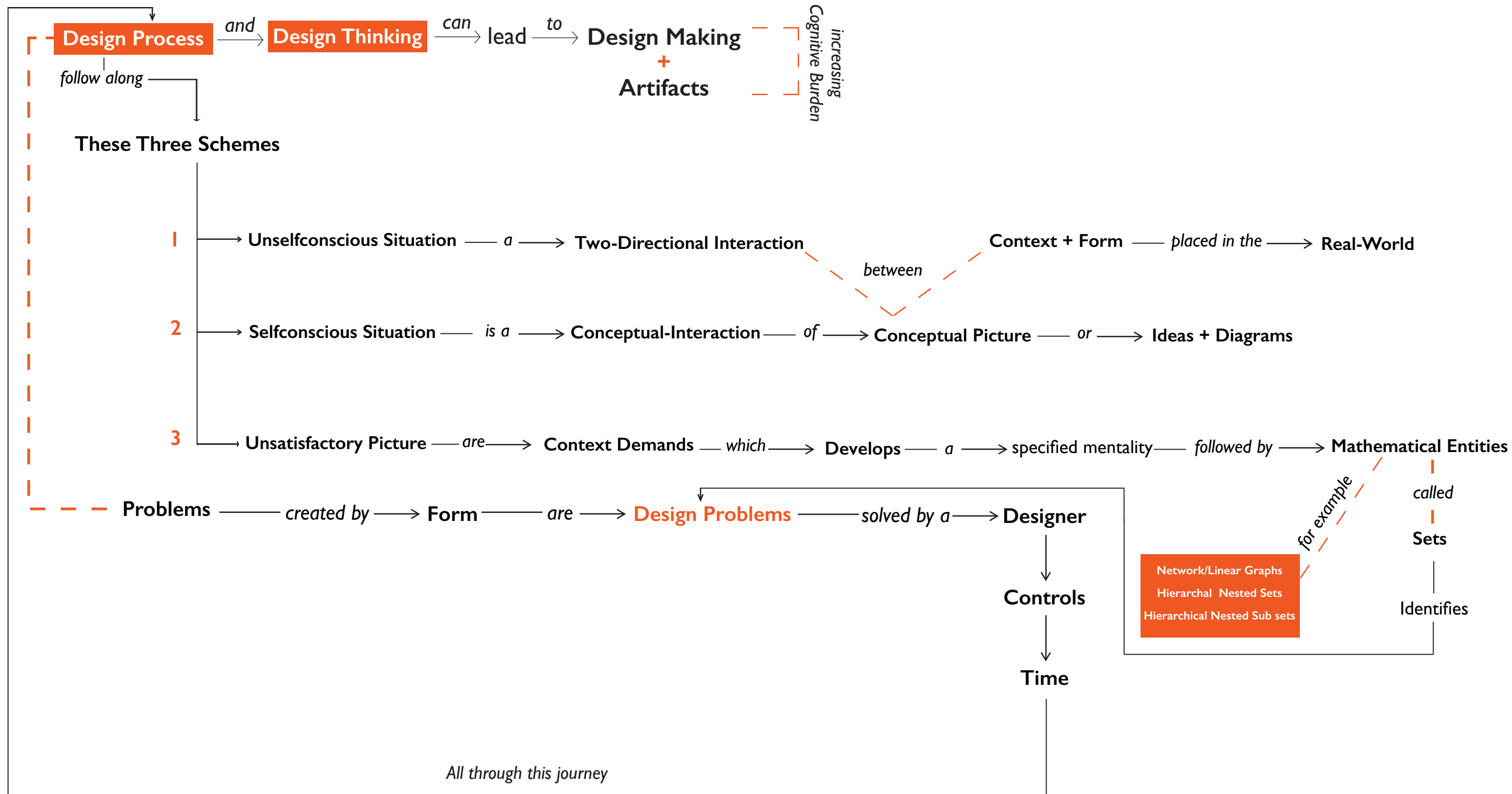
**Methods of Standarization** *are* compatible information *that* allows *a* longer reach *for* **Divergent Words**

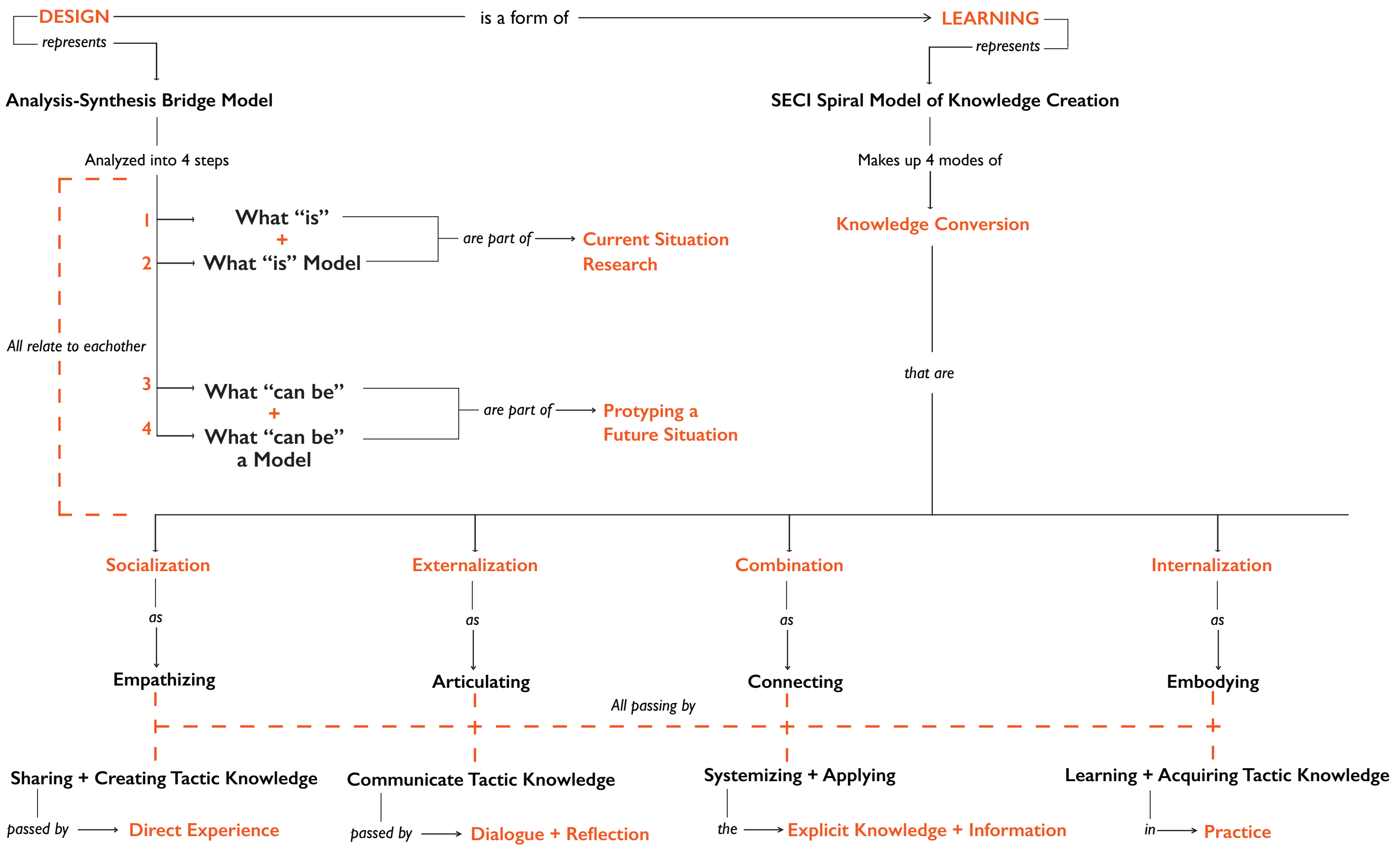
second main factor

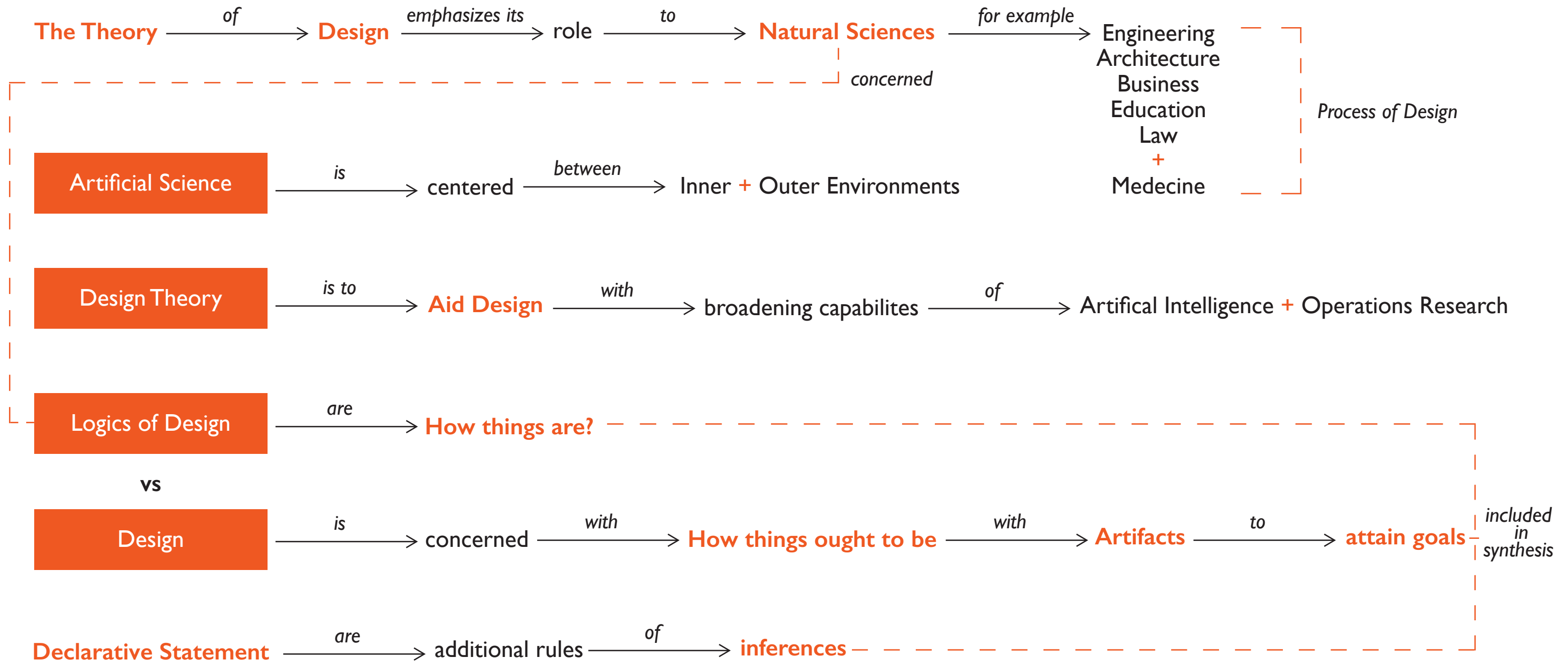
one main factor



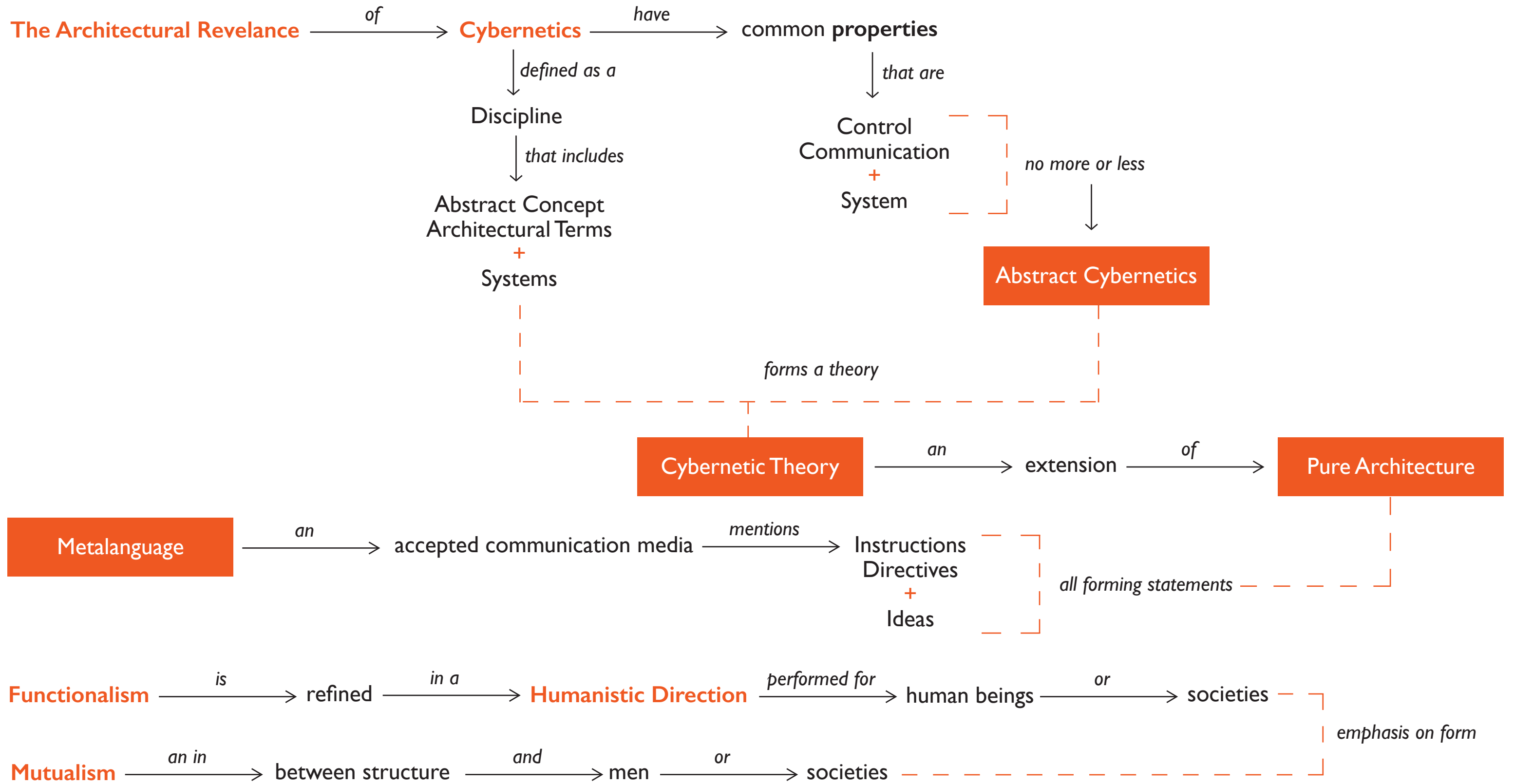


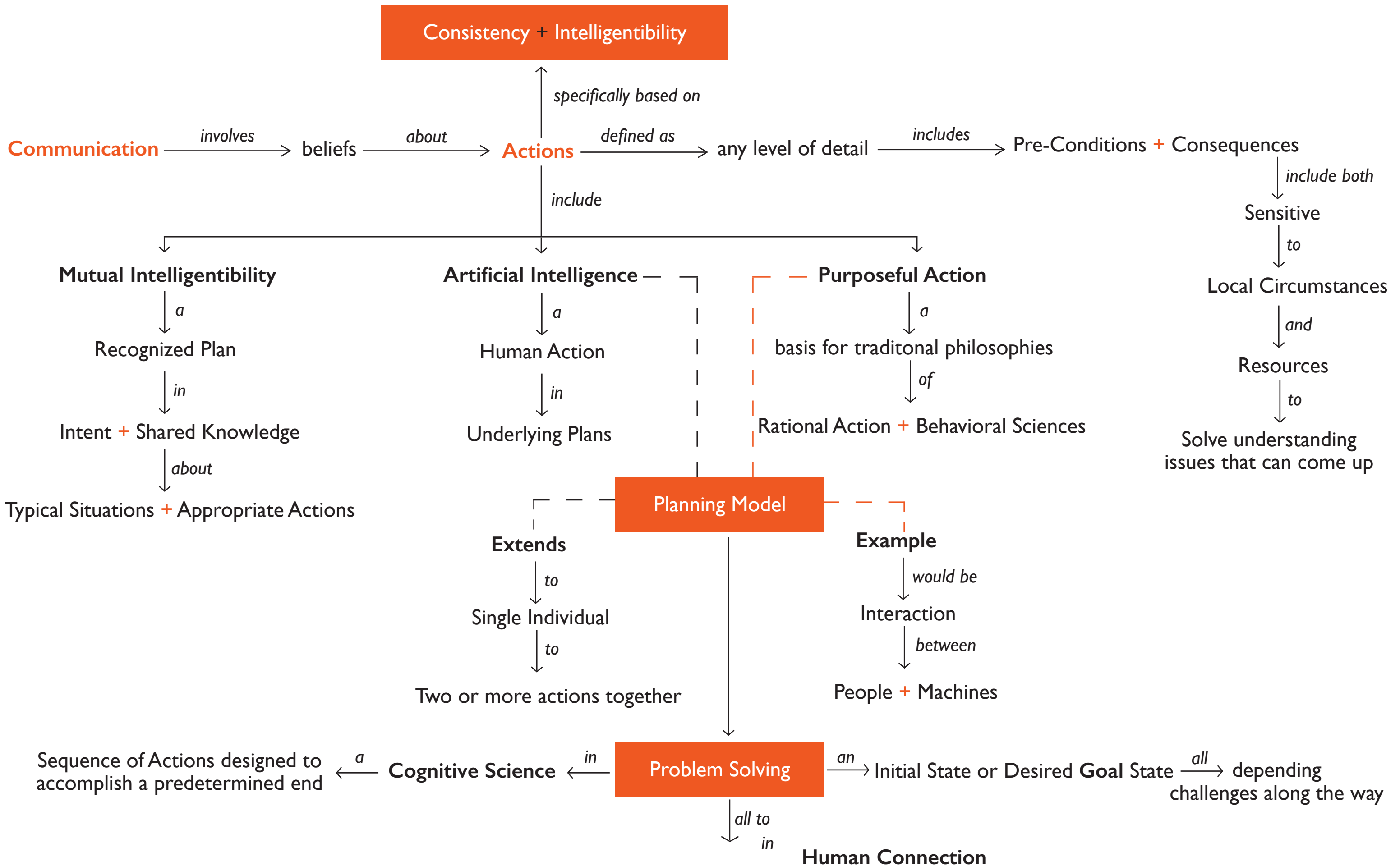


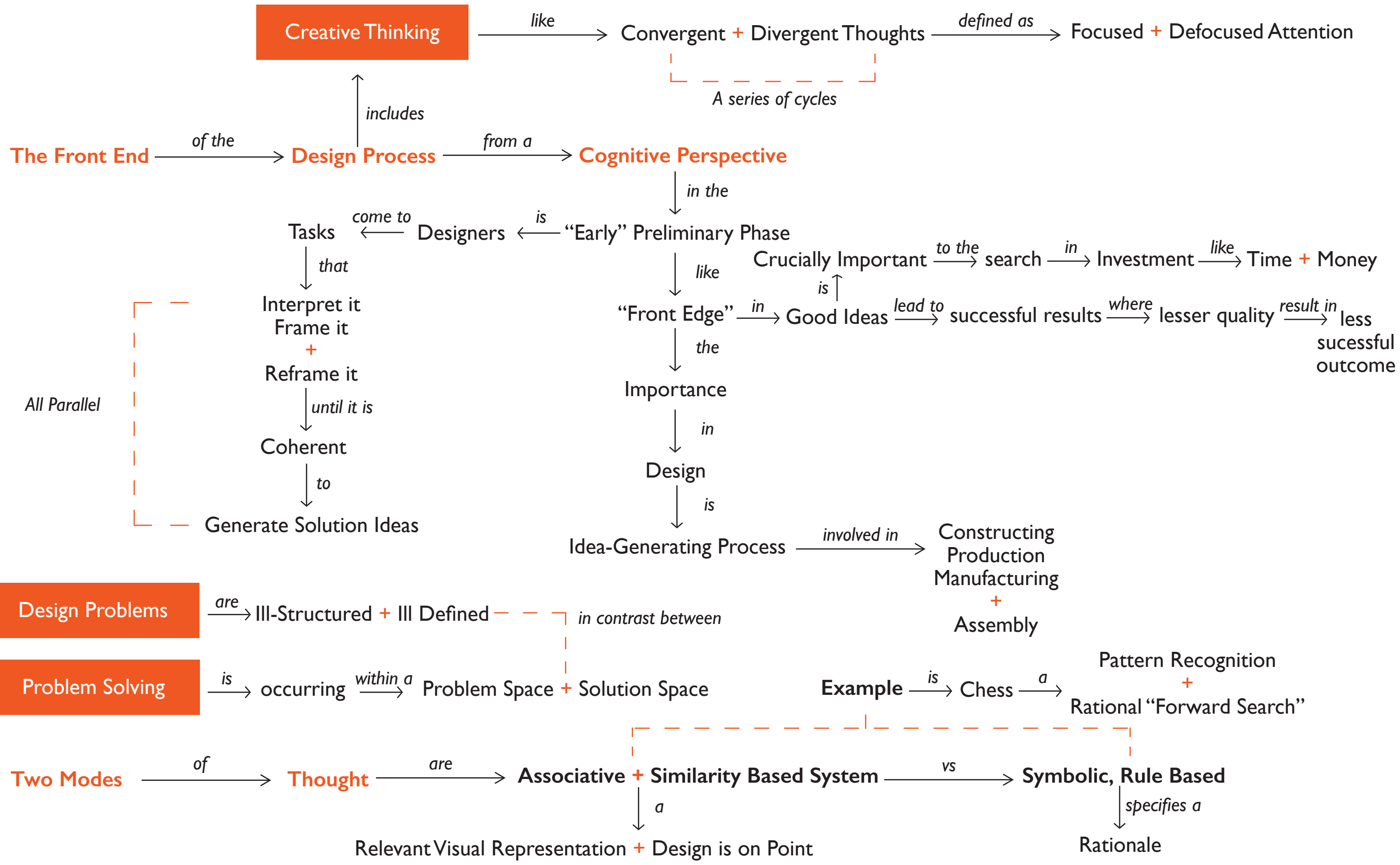




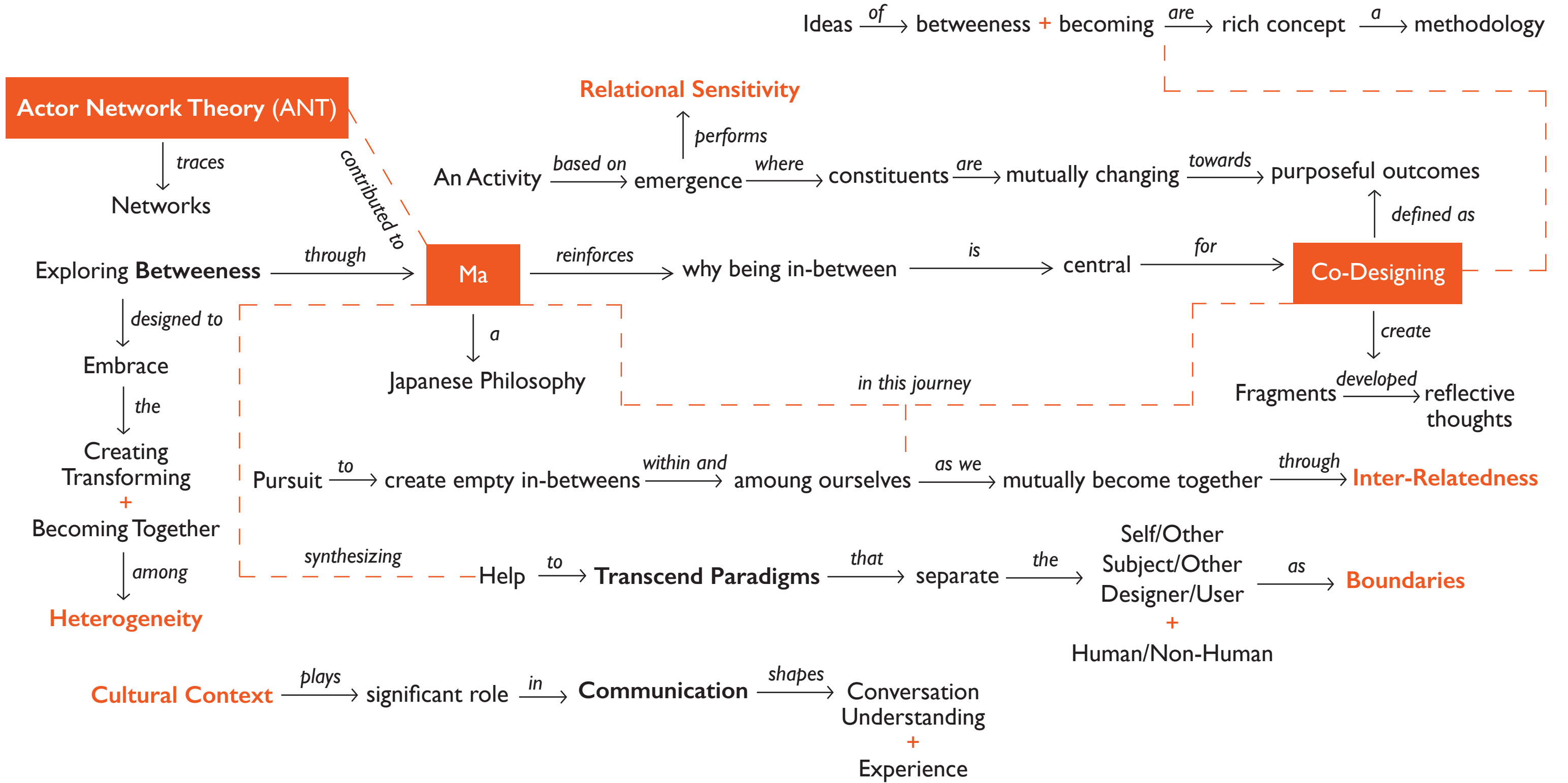
The Science *of* Design *not only is* possible *but also has been* emerging since *the* mid-1970's











in this journey

**Decolonial Turn** *has* shifted *in* **Critical Design Discourse + Practice** *over the* years *which* **Introduces New Conversations**

*around*  
**Representation + Epistemic Diversity**

*grounds*  
**Design Research  
Practice  
+  
Theory**

**Pluriverse** *in* **Global Boom** *of* **Design** *are* categorized *in* **four signals**

*which are*

**1.) Ubiquity of Design** *from* largest structures *to* humble aspects

*of*  
**everyday lives**

**2.) Social Context** *is* important *for* **successful design**

**3.) Ecological Oriented Fields** *have* realized design's vital role *in* creating *a* more livable world

*a*  
**type of design makes a difference**

**4.) Serious Design Notion** *the* most radical change

follow along all together

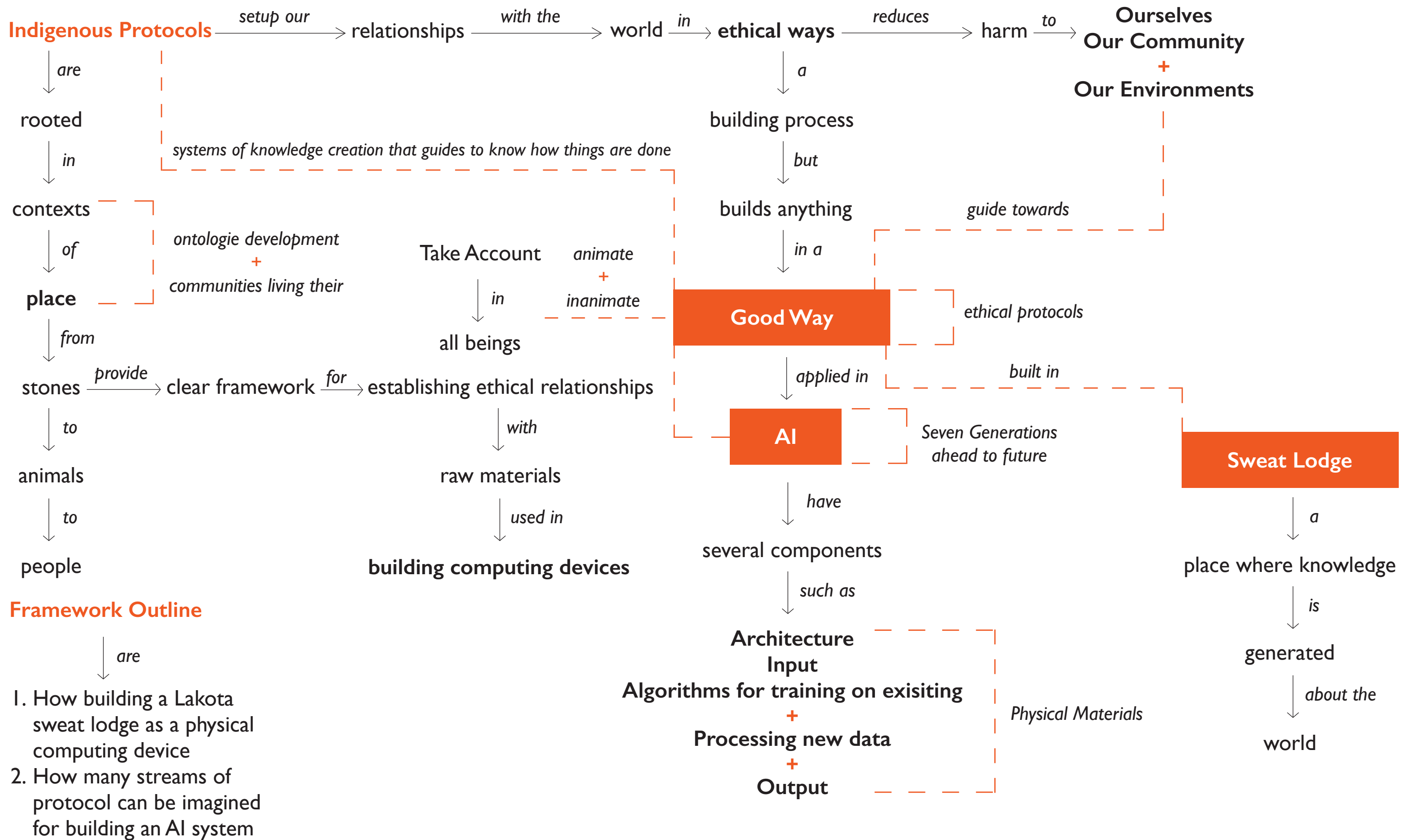
**Griot** *are* **before colonialism** *which* represents African history

This *ongoing* **redefinition** *of* **design** *such as* **Politico-Ontological + Ontological**

*are*  
**simple observations**

*like*

*create ways of being*  
**Objects  
Structures  
Policies  
Expert Systems  
Discourses  
+  
Narratives**





# Thinking of Design

## Concept Map Book

Qinzhe Chen

Spring 2022

ARTG 6110

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12	<b>A Mathematical Theory of Communication</b>	Shannon
14	<b>Boundary Objects</b>	Star and Griesemer
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# INTRODUCTION

This process book is for ARTG 6110 Information Design Theory and Critical Thinking. During this semester, we read lots of books and articles of different scholars and explore what is design, some important theories about design ethics, design process and other related topics, such as the relationship with science and AI, the concept of a Japanese word "Ma".

This process book is a collection of all concepts map I made based on these readings each week, with important takeaways in the readings and feedback I got from class critique. It is a book about what I learnt from these concepts in the realm of designing and each concept map is a structure of the reading with the branches and details of different theories.

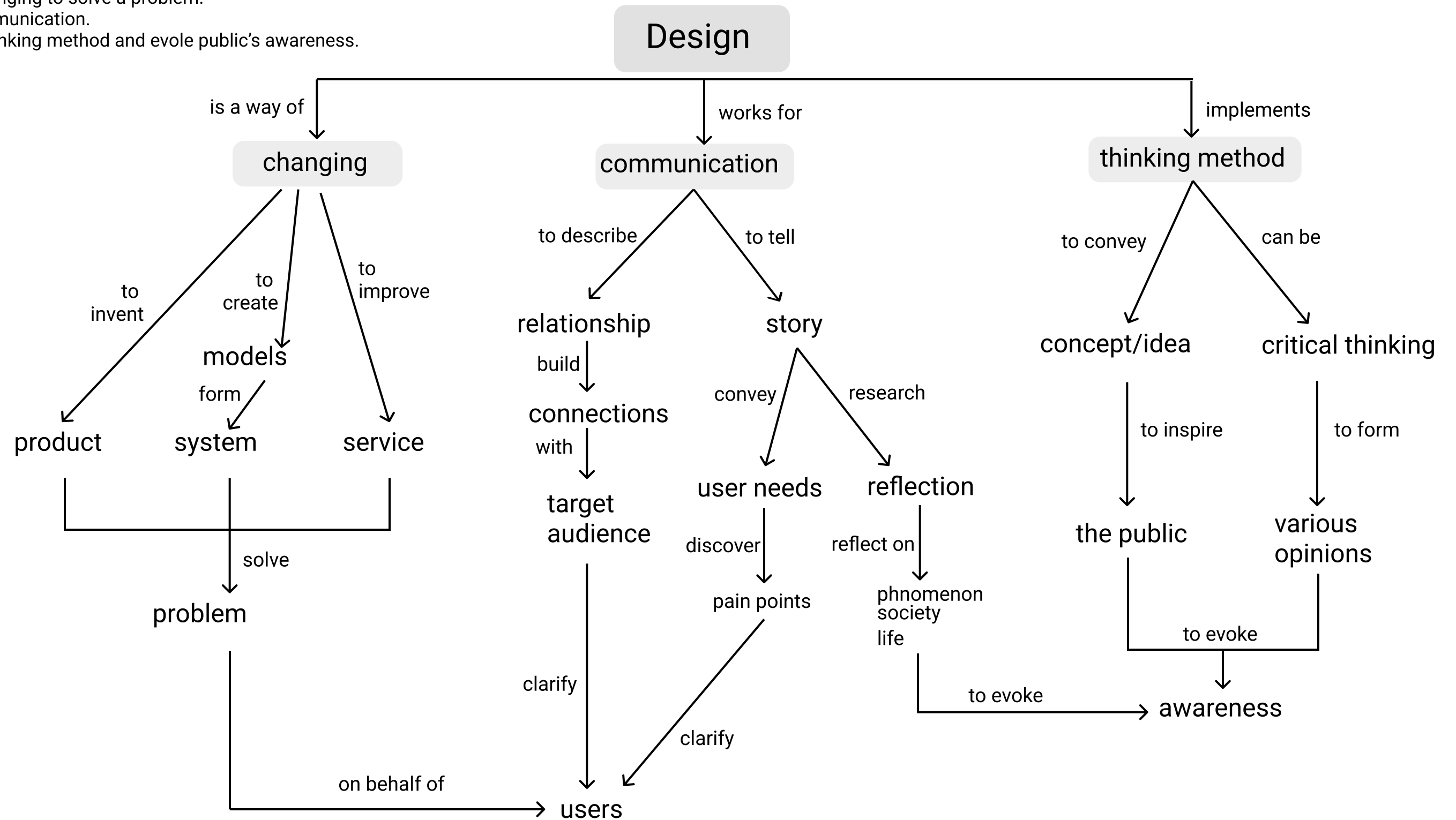
# Concept map of DESIGN

## What is design?

Design is a way of changing to solve a problem.

Design works for communication.

Design implements thinking method and evolve public's awareness.



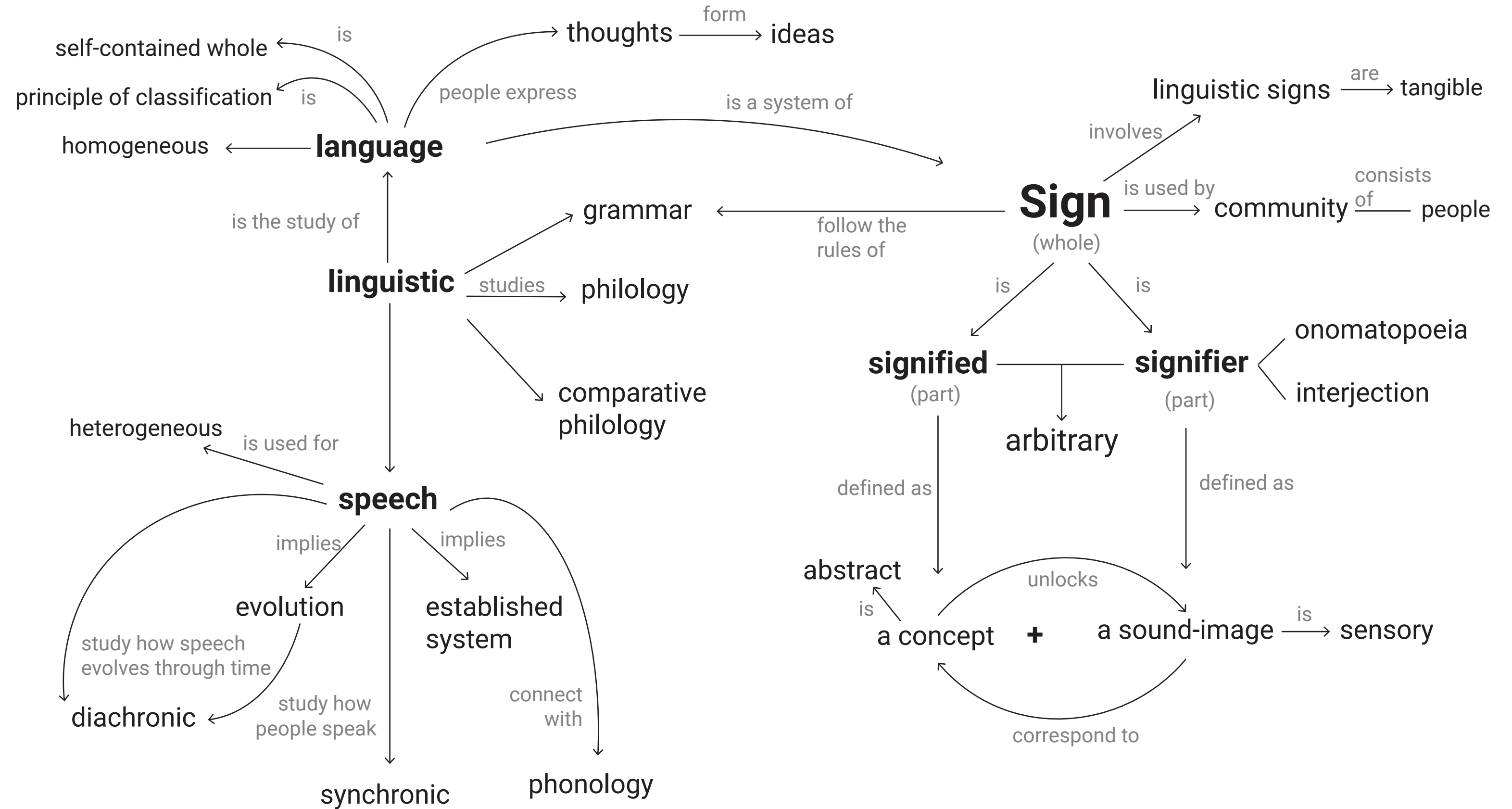


# Feedback

1. **Word → word structures as a sentence fragment.** Try to have the **word → word** configuration read as a sentence for as long as possible. For instance, "Design is a presentation of thinking method" and "thinking method develop critical thinking" your meaning is not quite clear. Better would be "Design implements thinking methods", and "thinking methods can be critical thinking".
2. **Make stronger visual groupings of content.** Use white space to separate these into meaningful **chunks of content**.

# Course in General Linguistics

## Ferdinand de Saussure



# Feedback

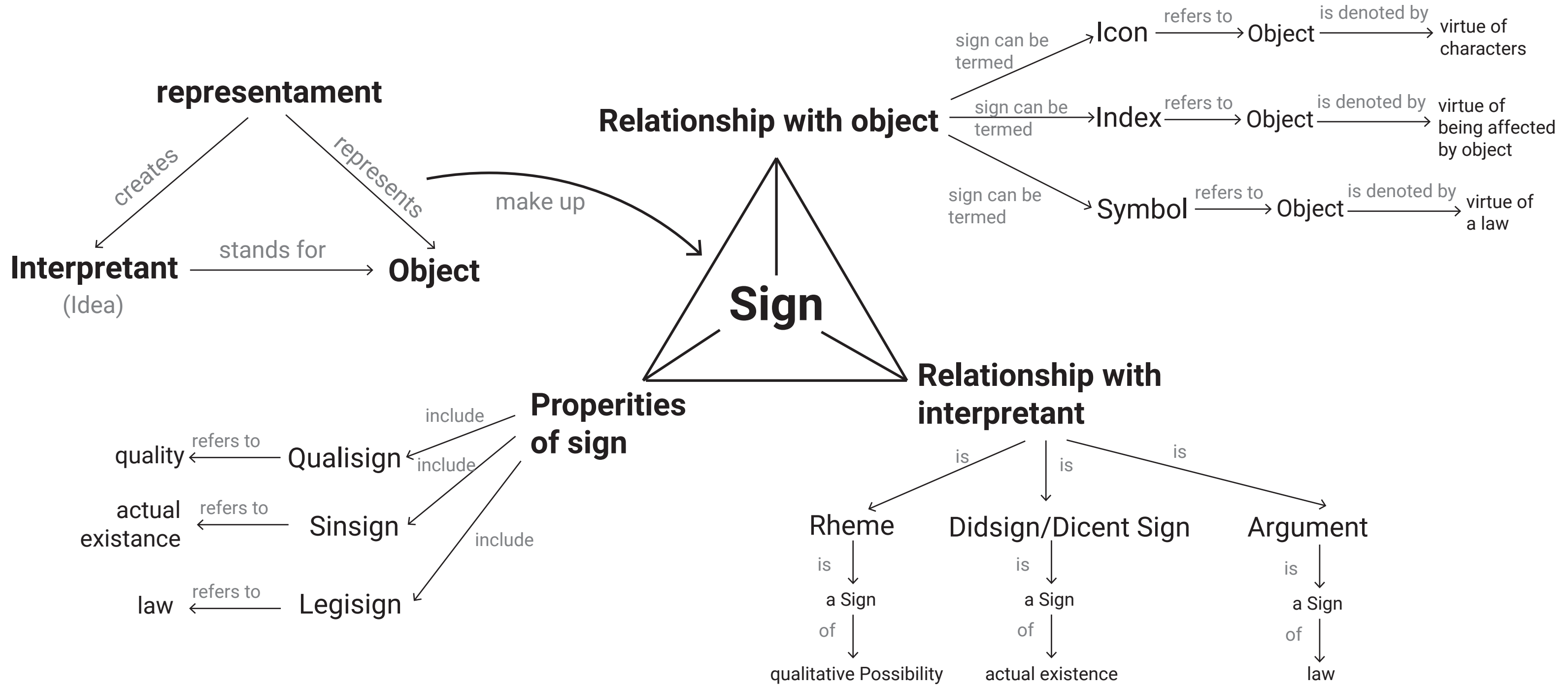
Suggestions for design layout:

1. use one "studies" if this is all the same relationship.
2. Care more about the whole structure. It can be more neat as a whole.
3. Try to make use of the white space on the paper.

# Philosophical Writings

## Peirce

### THREE TRICHOTOMIES OF SIGNS



# Important takeaways

## 1. THREE TRICHOTOMIES OF SIGNS

This article discusses about signs from three aspects:

**properties of sign,**

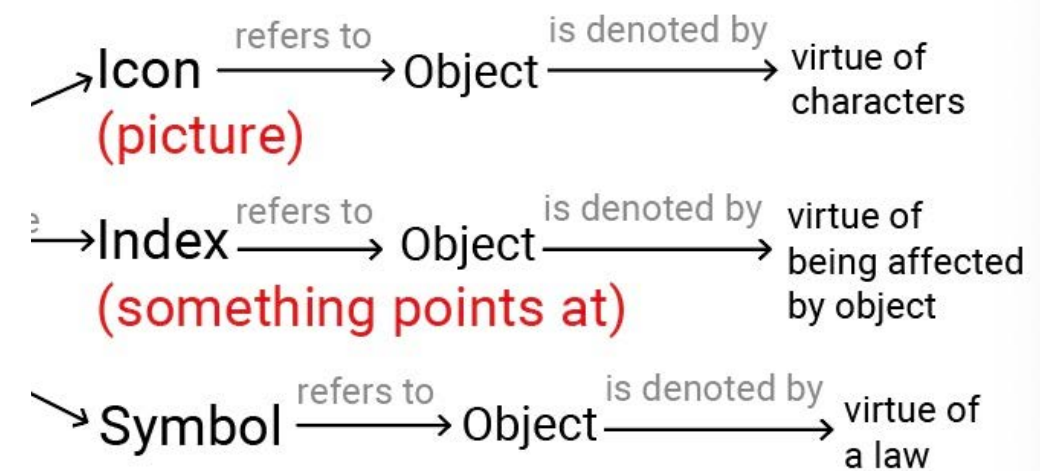
**relationship with object,**

**relationship with interpretant.**

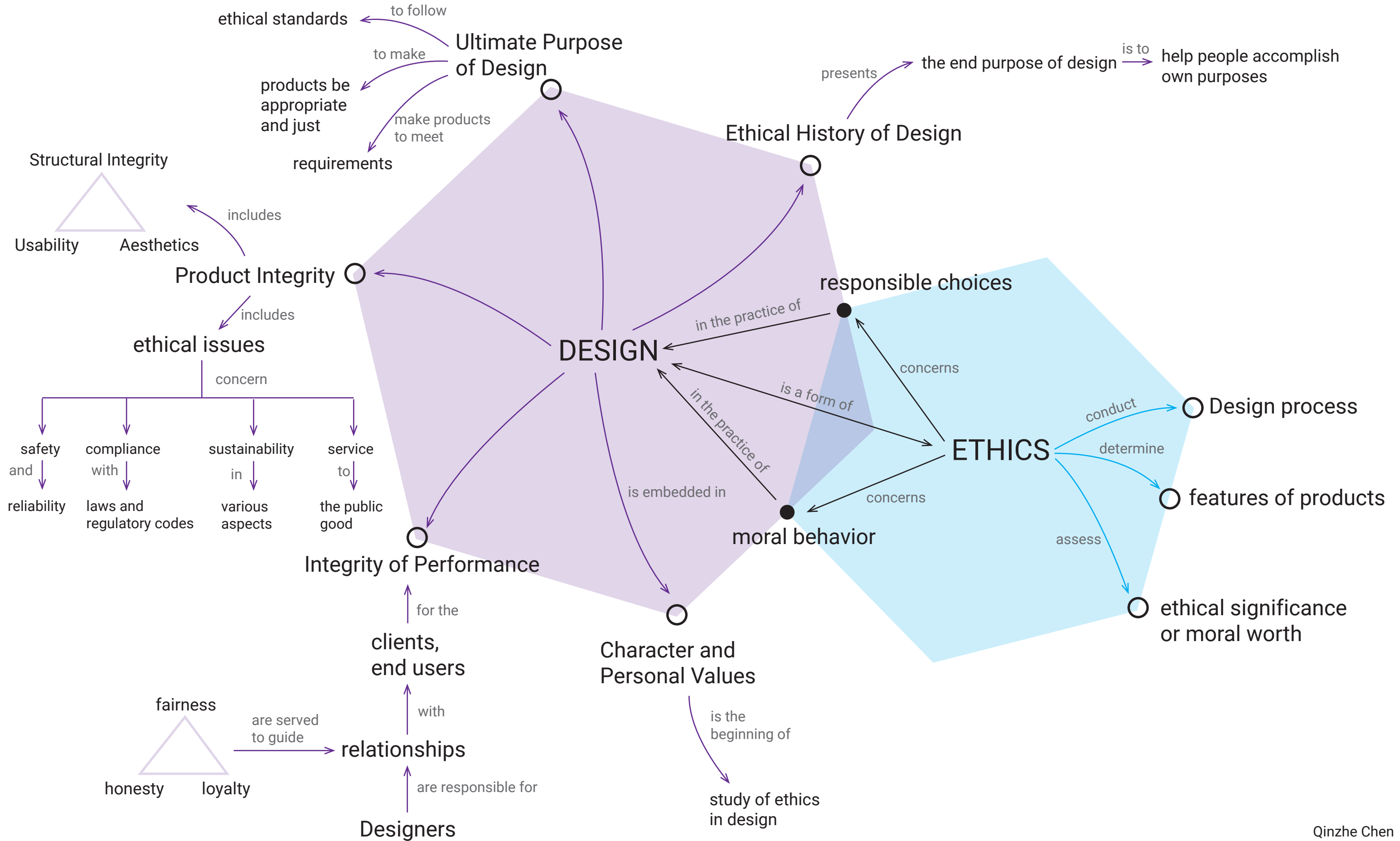
## 2. THREE TRICHOTOMIES OF SIGNS

In the **relationship with object**, we talk about an icon as a picture, and an index means something points at.

There's different between symbol and icon.  
For example, "the sheep" represents one single sheep in the picture, so it is an icon of sheep.  
However, "sheep" represents the symbol of this category of animal.



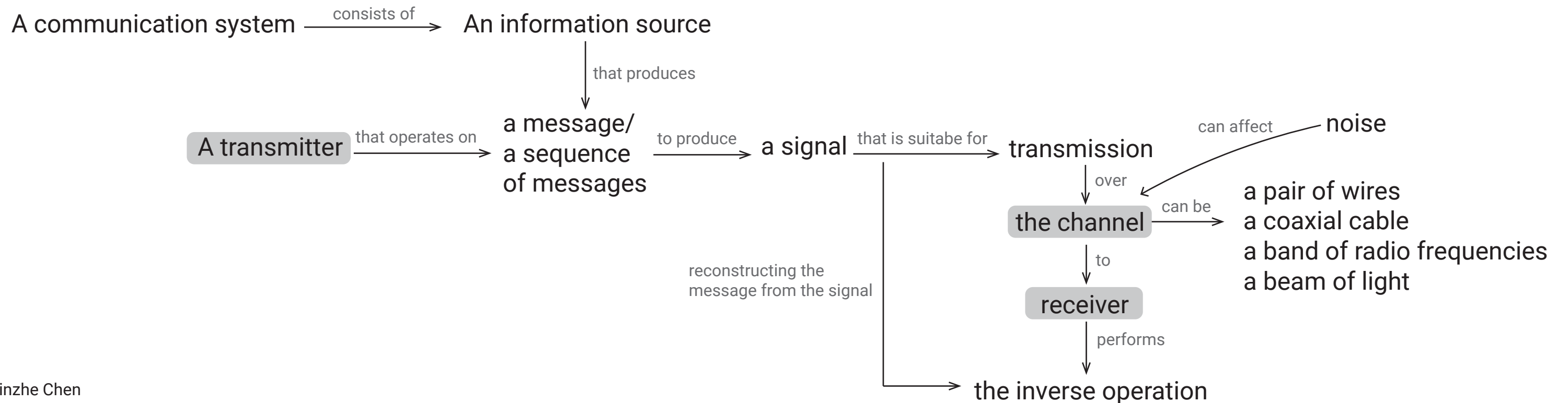
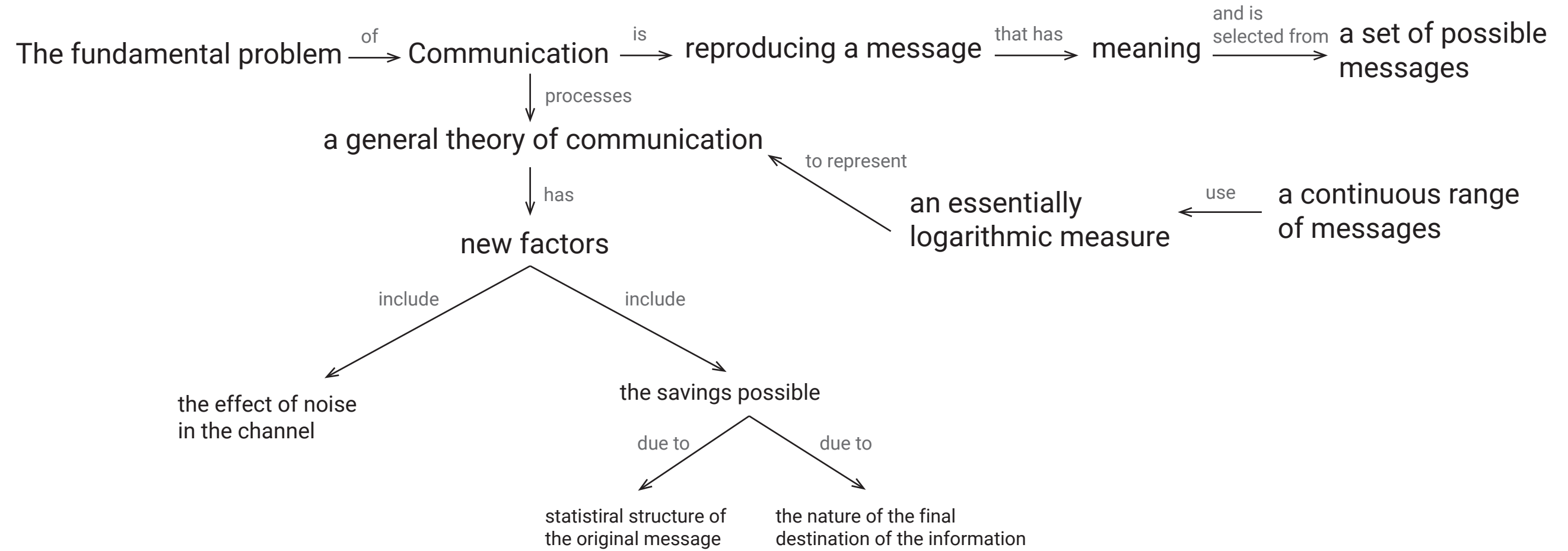
# DESIGN ETHICS



# Feedback

1. It's easy to read with the colorful diagrams. The two hexagons are clear for audience to see the categories and details in "design" and "ethics".
2. The connection between these two parts are nice to mention people about the logics between design and ethics. It's clear to understand what happens about design ethics in the process of designing.

# A Mathematical Theory of Communication

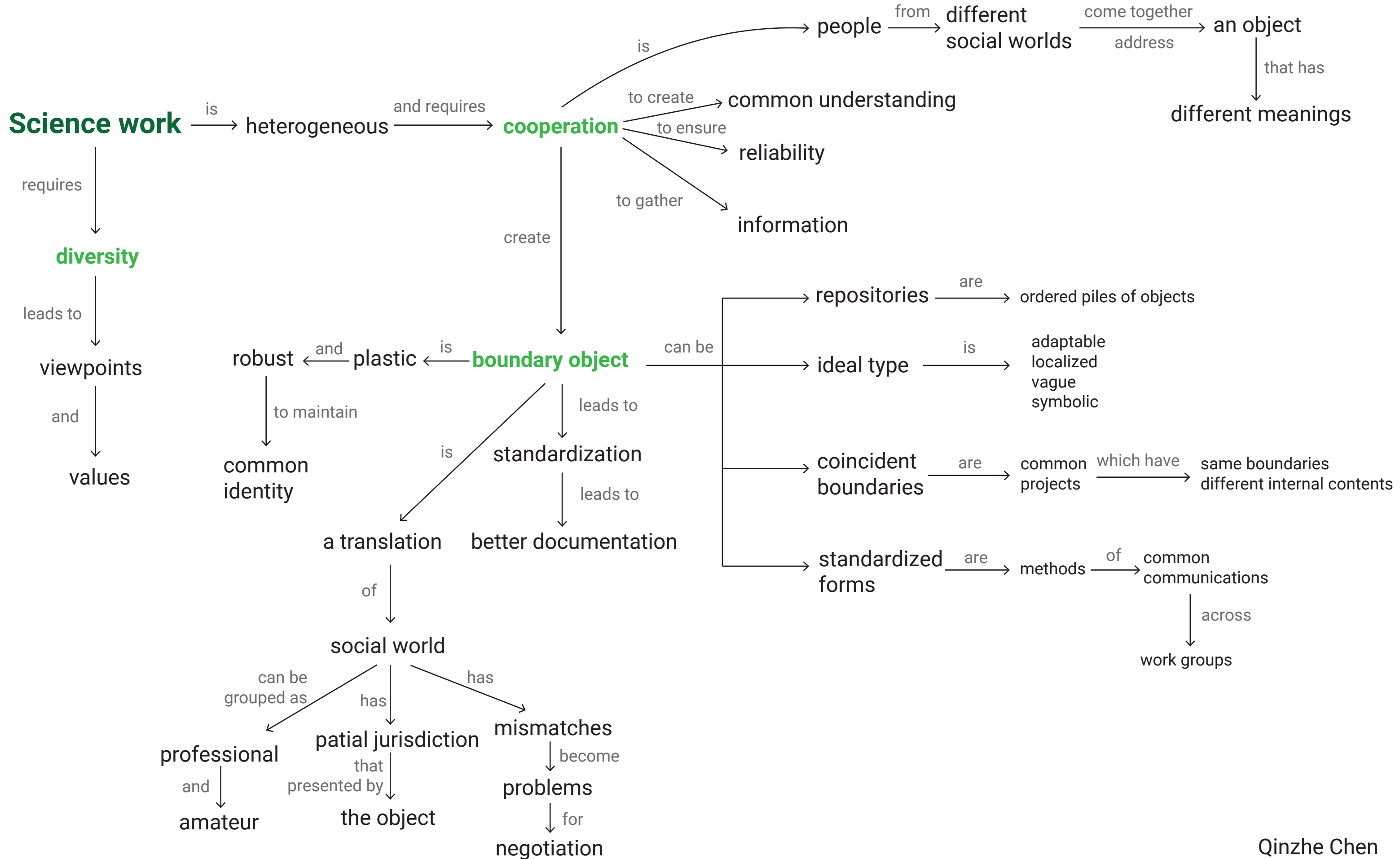




# Important takeaways

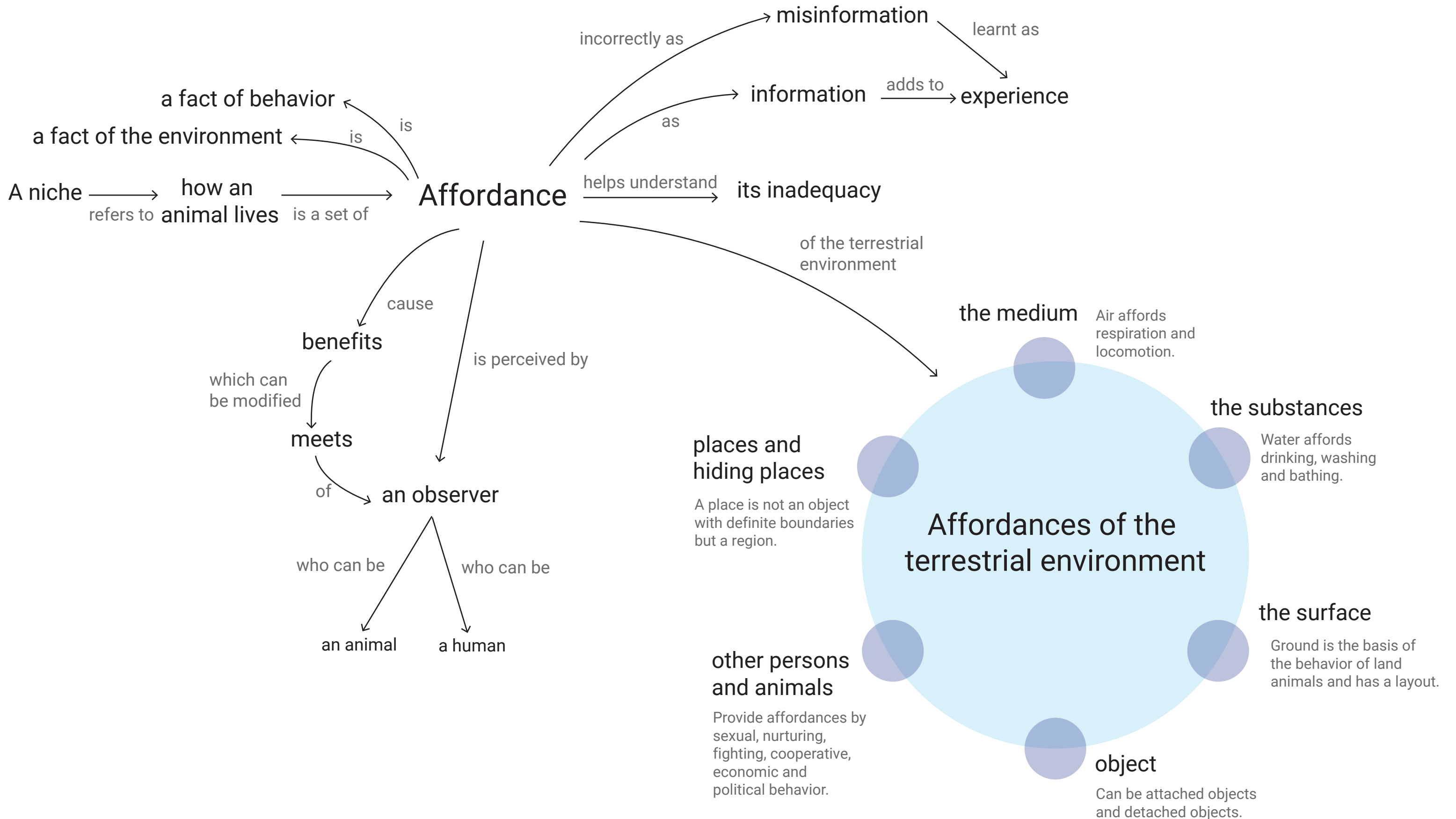
1. In the communication system, noise is also an important element to consider about. Noise can affect the channel in the process of transmitting the information and signal to the receiver.
2. The two separated diagrams can be connected better. The structure of communication can be linked to the communication system flow. The flow is a kind of explanation of the communication theory.

# Star, Griesemer



# THE THEORY OF AFFORDANCES

James J. Gibson

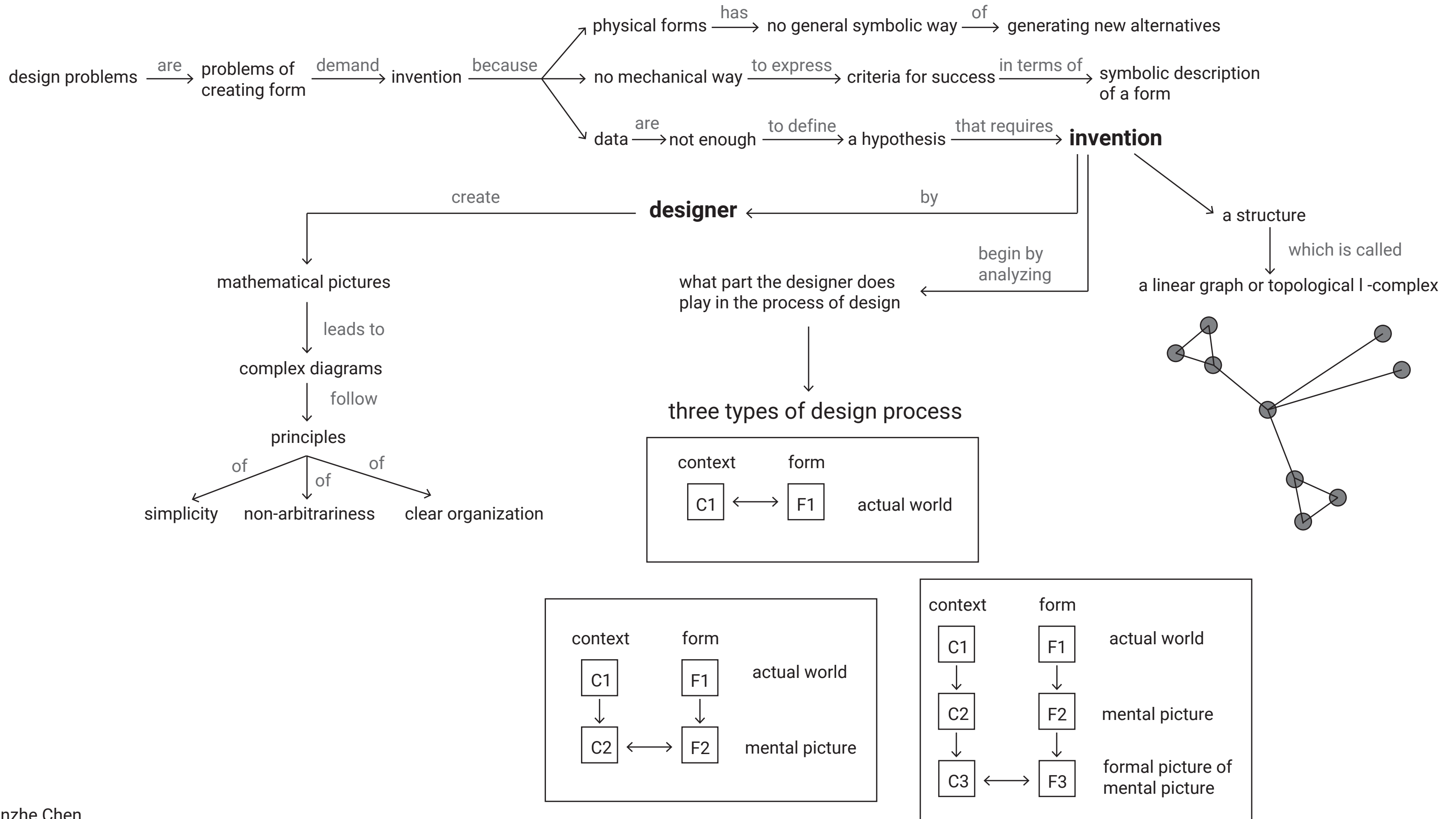


# Feedback

1. The structure for “Affordances of the terrestrial environment” looks nice with the circles to spread the six important affordances.
2. Affordances of the terrestrial environment include six elements: the medium, substances, the surface, object, other persons and animals, places and hiding places.

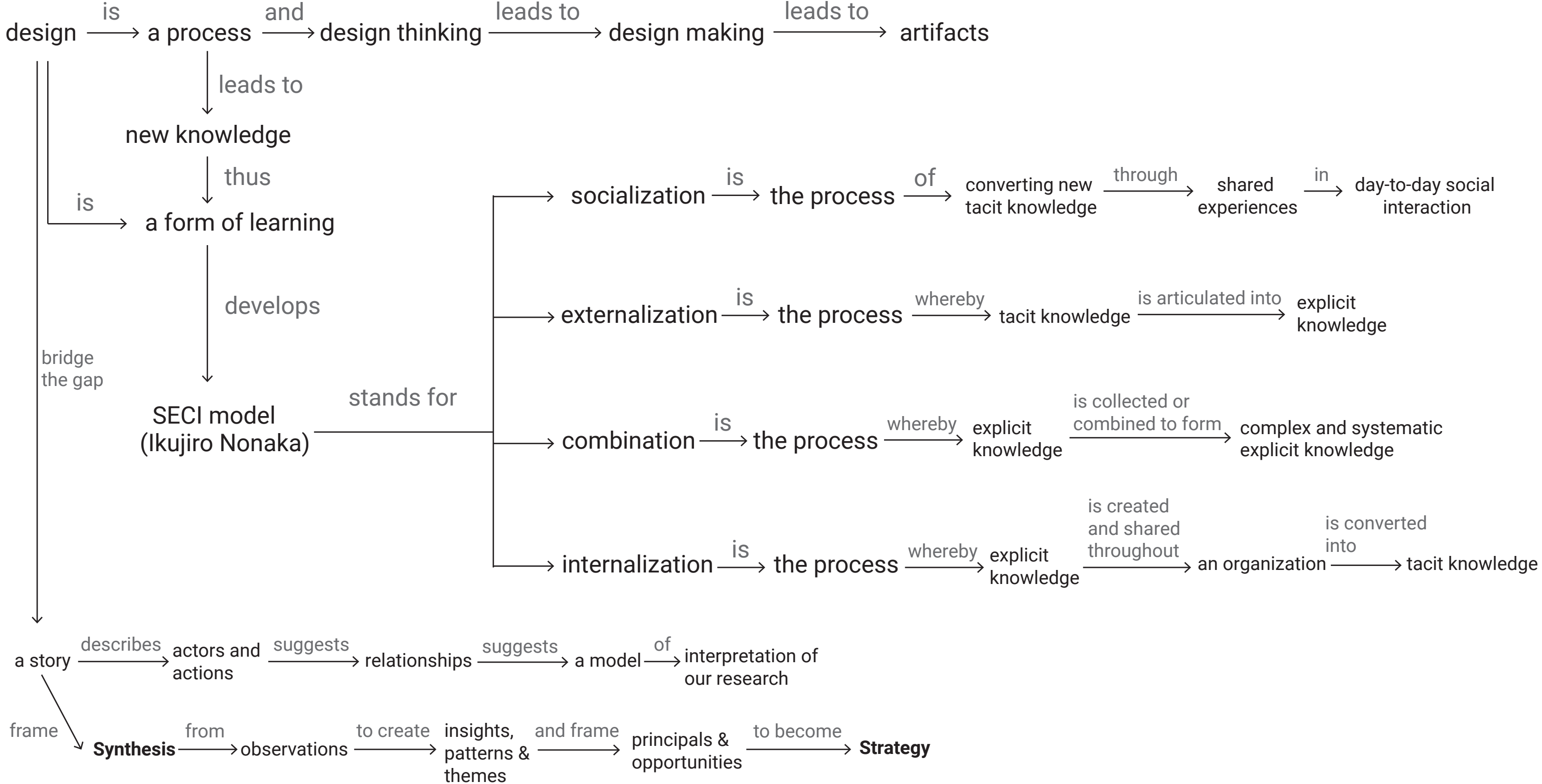
# Synthesis of Form

## Alexander



# Design as Learning

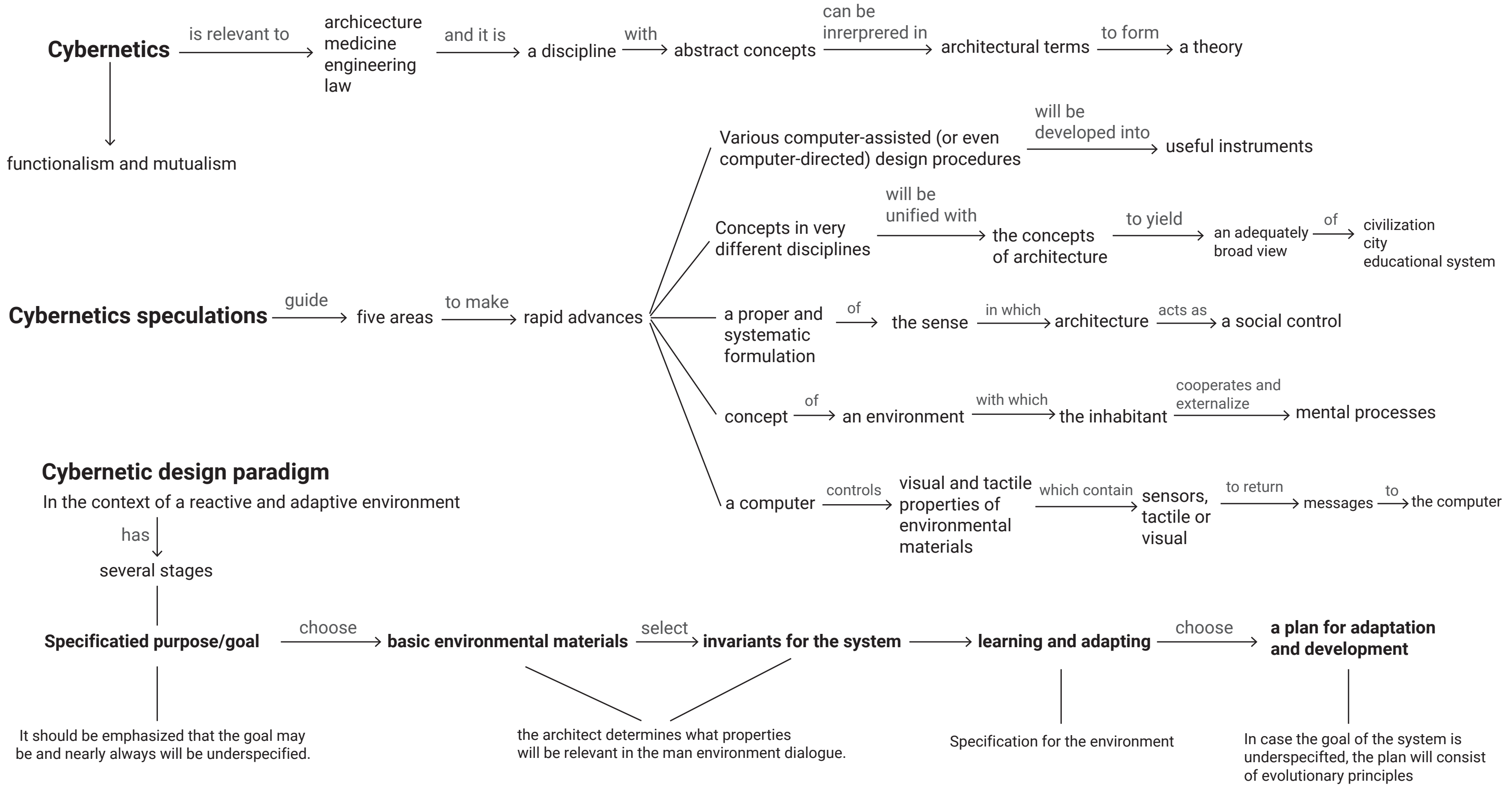
## The Analysis-Synthesis Bridge Model



# Feedback

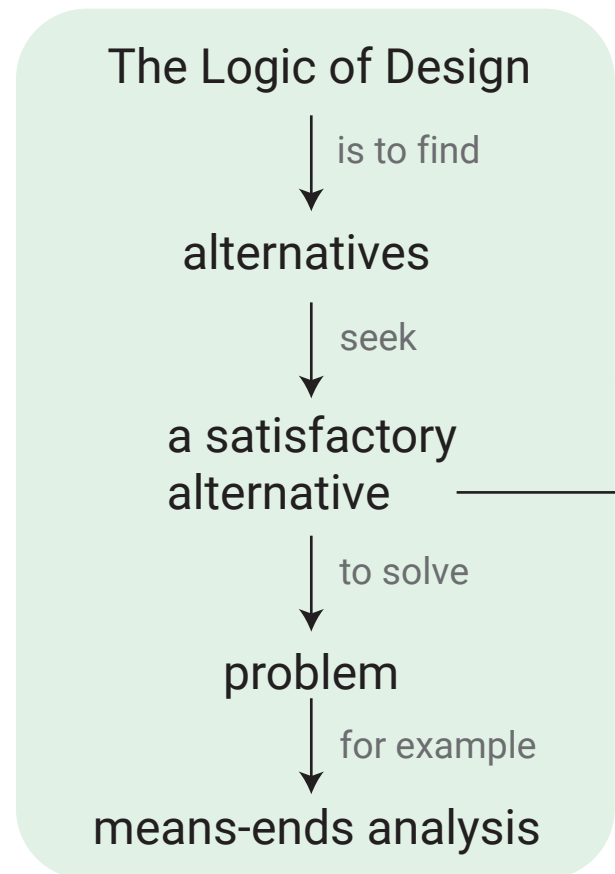
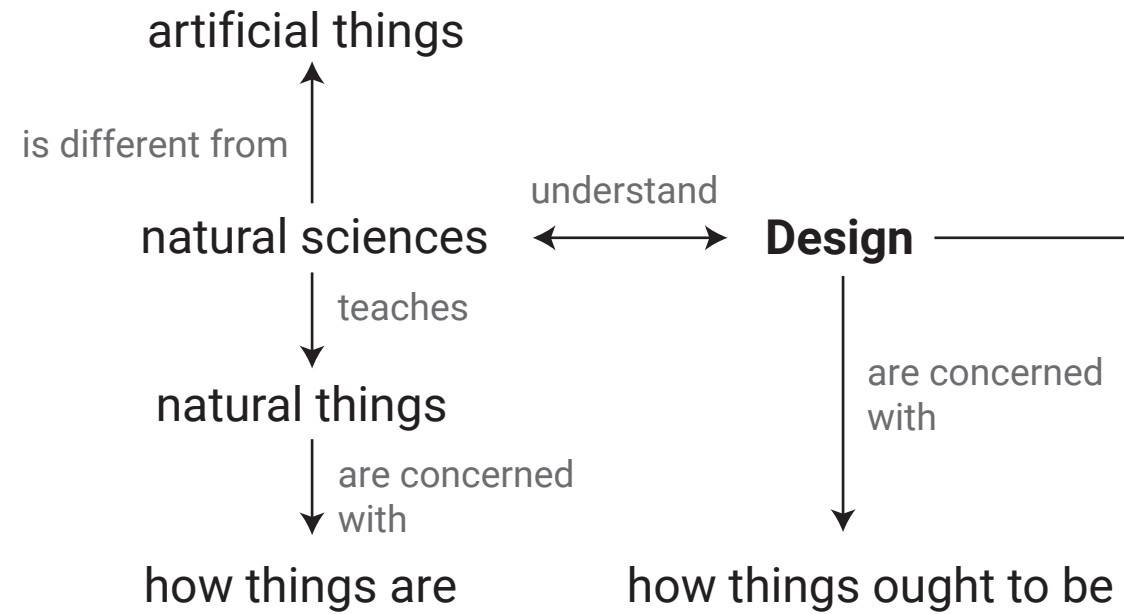
In the concept map of “Synthesis of Form “ written by Alexander, I used many arrows to present the completed statements and describe the structure with a very clear directivity. It’s really clear to see the direction and know the concept, but sometimes, a graph is a better way to present some concepts for readers to understand.

# THE ARCHITECTURE RELEVANCE OF CYBERNETIC

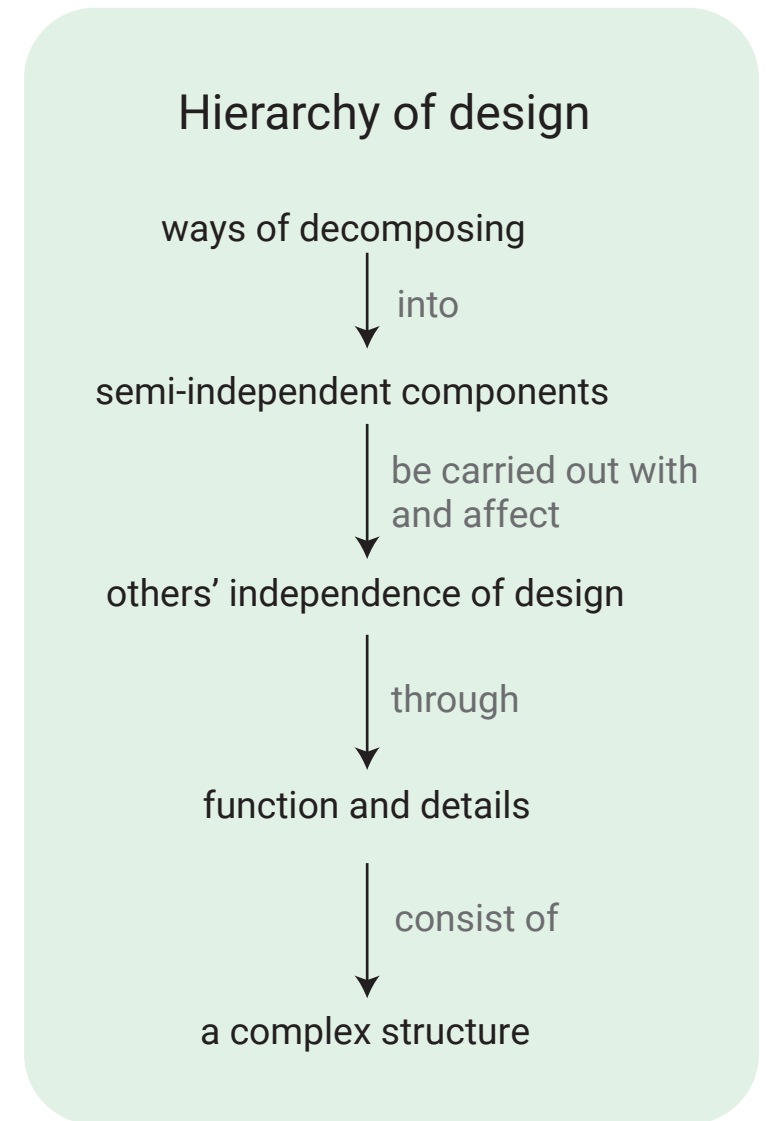
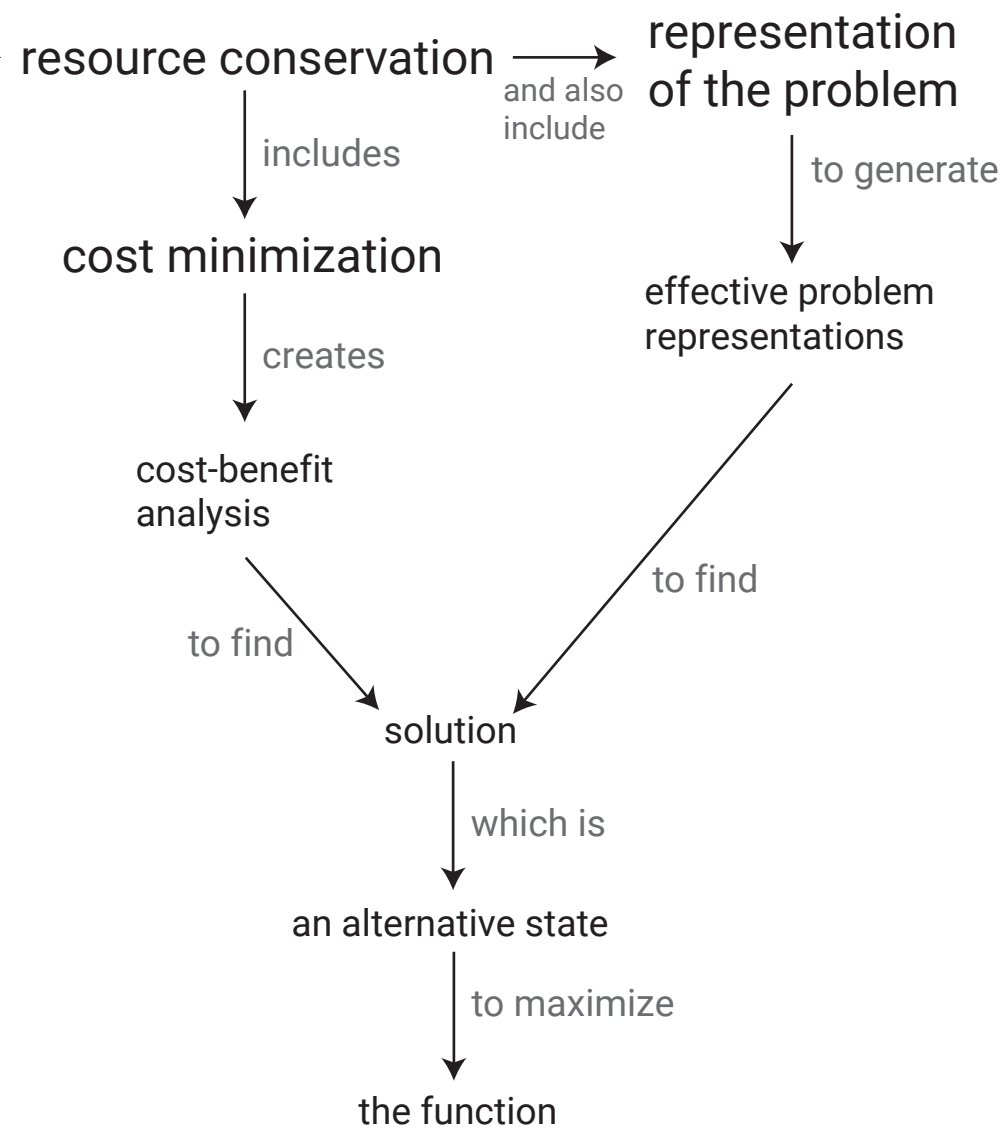
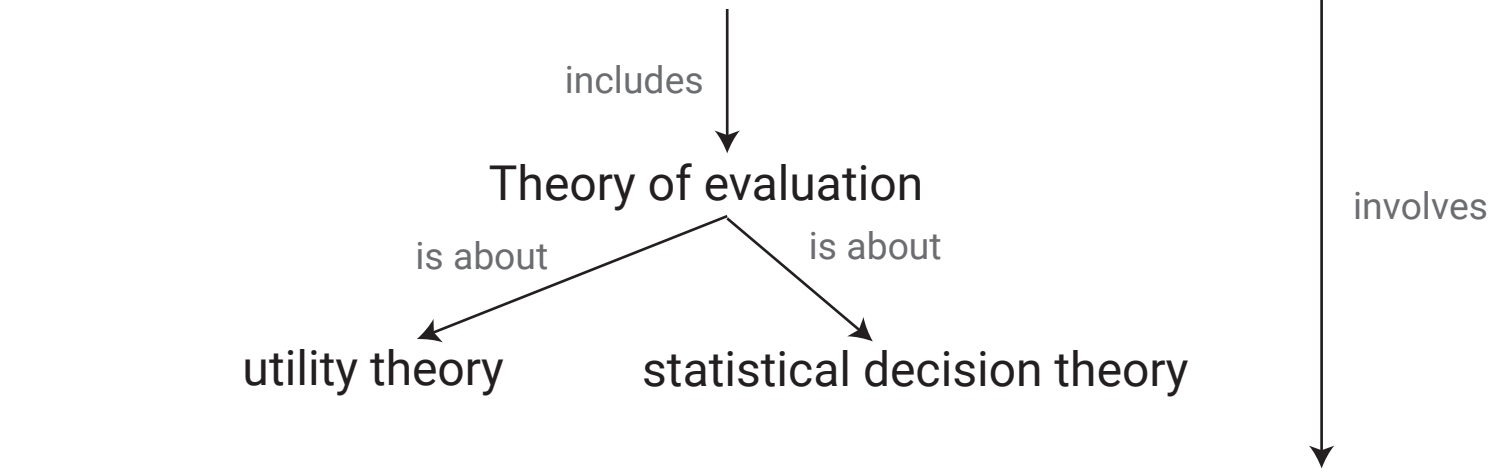




**Engineering + Science = Design**



**THE EVALUATION OF DESIGNS**



# Important takeaways

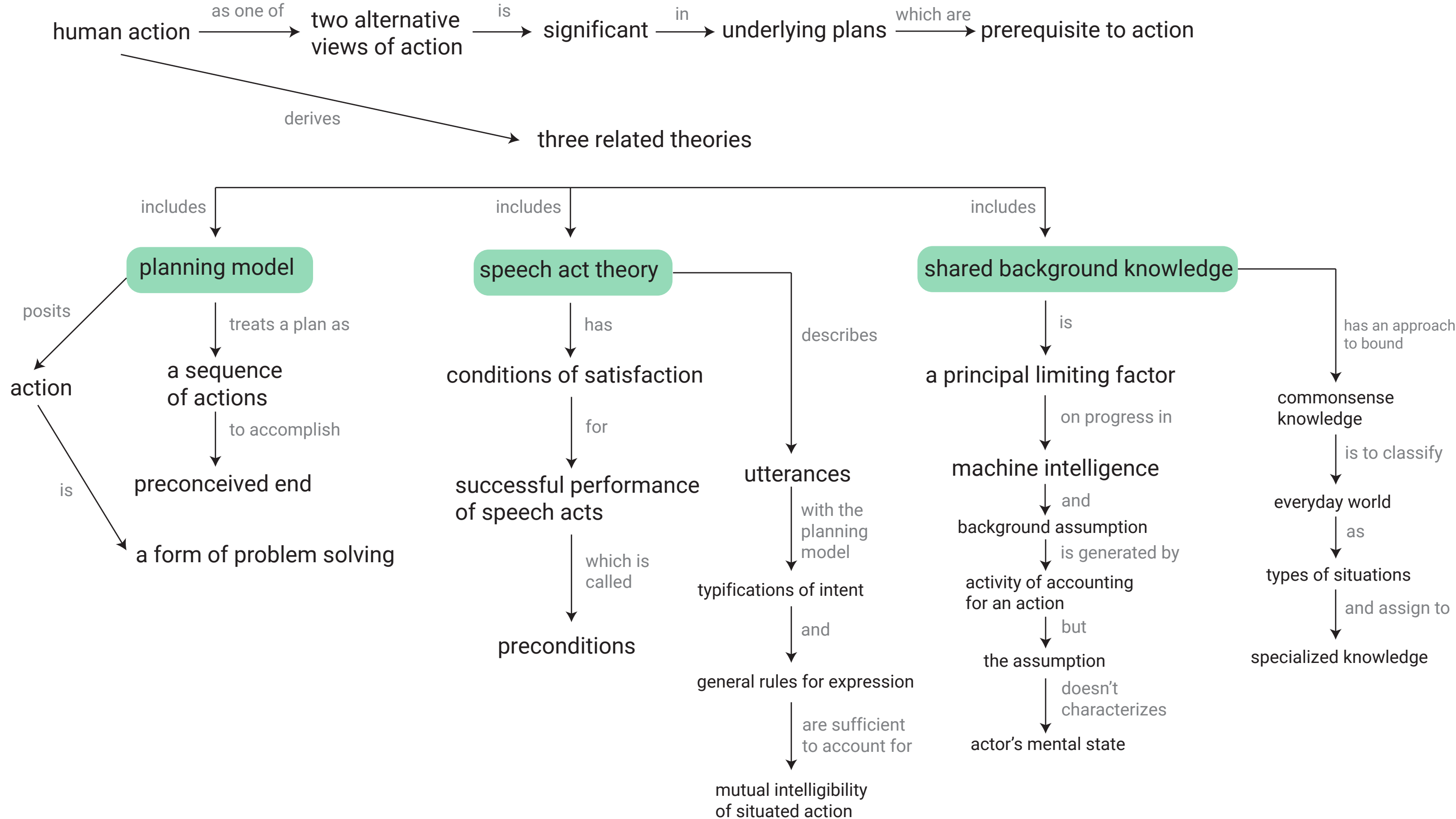
## **“Engineering + Science = Design”**

From learning about “The Sciences of the Artificial”, Herbert A. Simon gives a special explanation of design. From the perspective of AI and engineering, the author says that design is a combination of engineering and science.

The Logic of Design also explains that in the process of problem-solving, we seek for a satisfactory alternative to solve a problem.

The evaluation of design emphasizes the importance of utility theory and statistical decision theory.

# Human–Machine Reconfigurations



# Design Synthesis

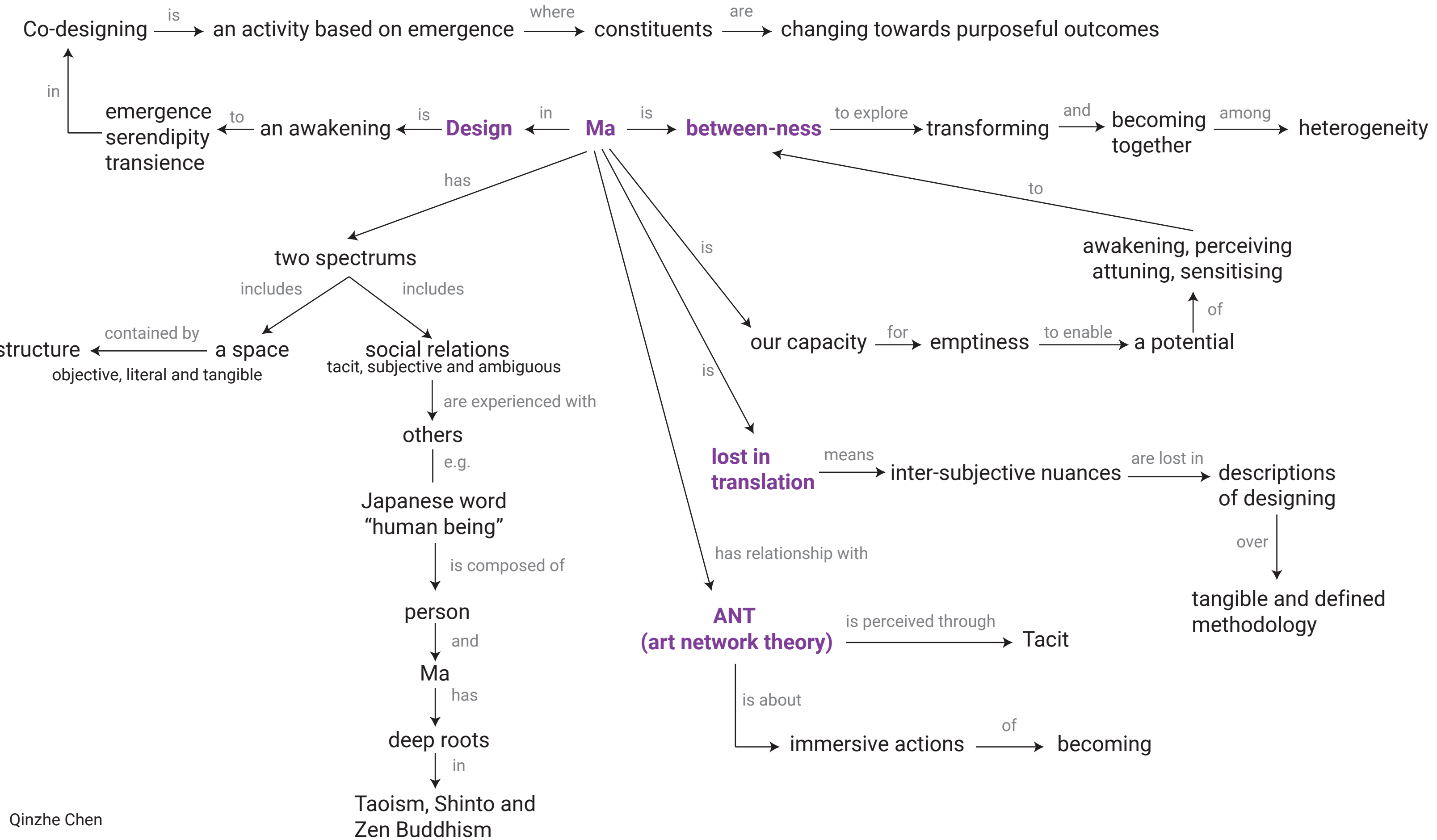


# Important takeaways

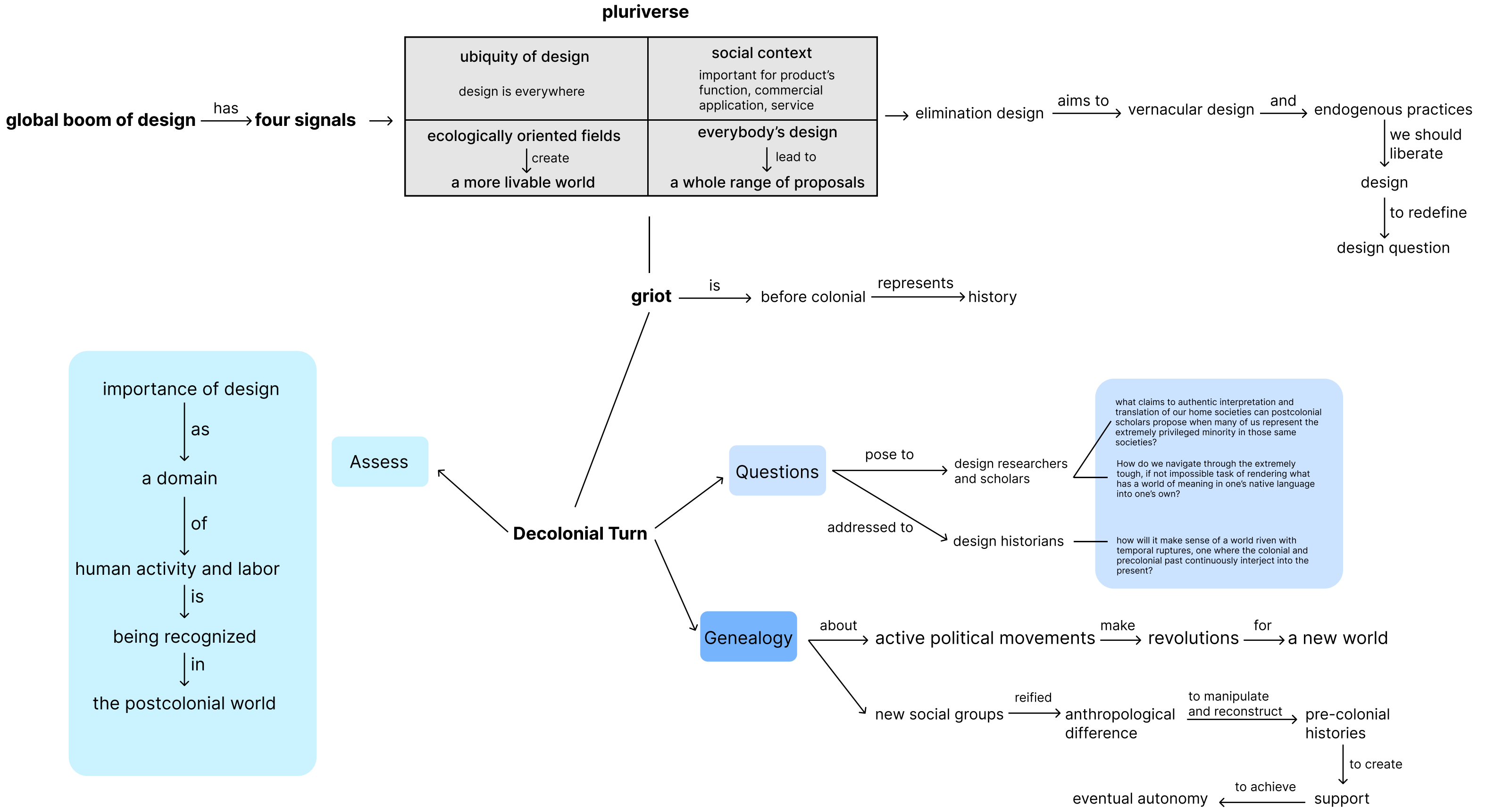
Design Synthesis is an important step in the process of designing. In my final project discussion about what is design process, I refer to this material and compare the theory mentioned in this book with other resources.

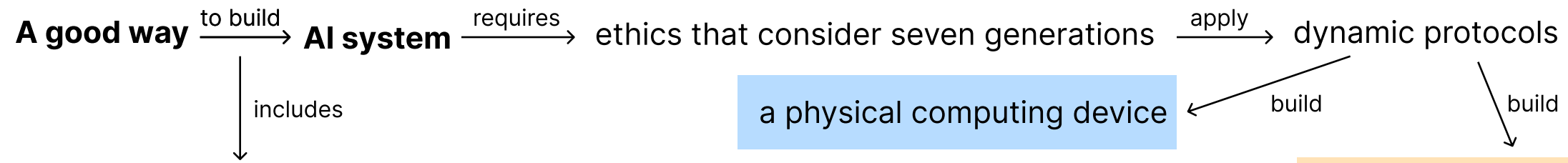
With the two modes of thoughts, design thinking can be divergent and convergent. Divergent thinking is like a brainstorming to develop various ideas of designing. Convergent thinking is more focused to one direction or one aspect to explore more details.

**Being awake to Ma:  
designing in between-ness as a way of becoming with**



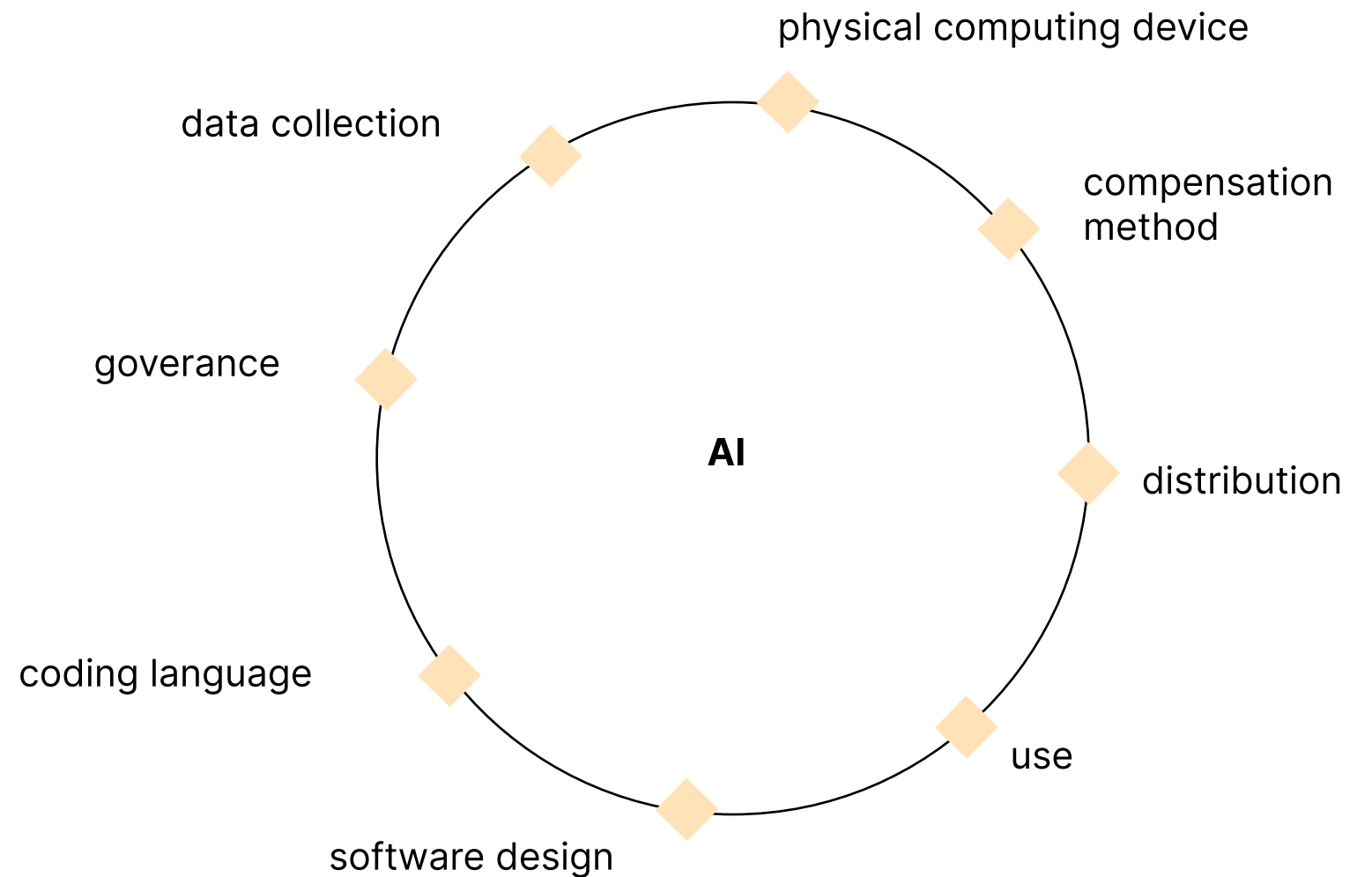
**Escobar\_Designs for the Pluriverse**  
**The song of the Griot**  
**Design History Society**





an AI system

## 8 protocol streams to form an AI





# Mapping Design Theories

A collection of “*mental models*” that summarize design processes, theories, and perspectives by design researchers since 1955, some of which are contrasting, but at the same time gives young designers a holistic take on design.

Why concept maps? To categorize the most important concepts from the readings and allow readers to grasp & digest content fast & easily with interesting connections.

Designed by Tanvi Modi

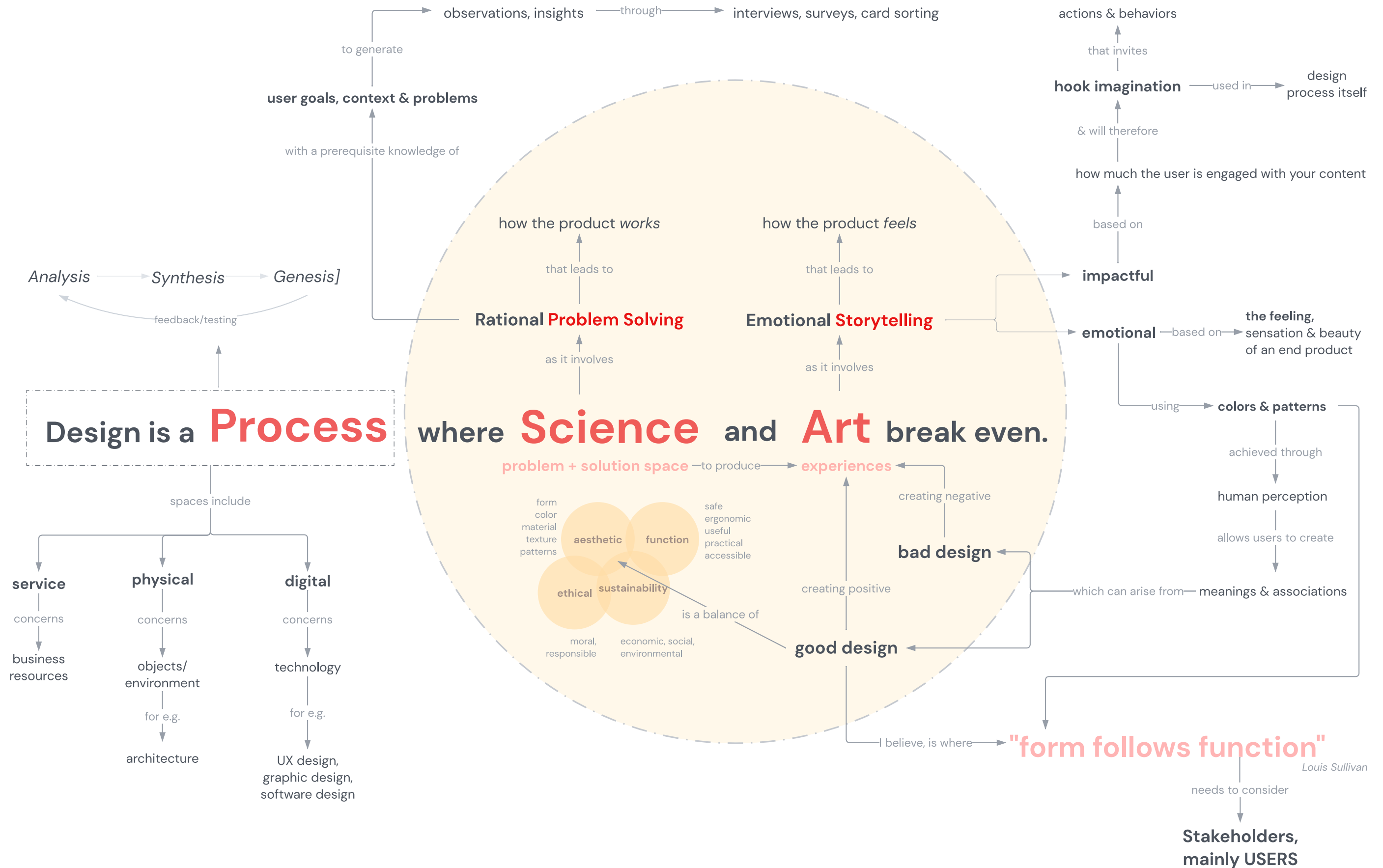
NORTHEASTERN UNIVERSITY

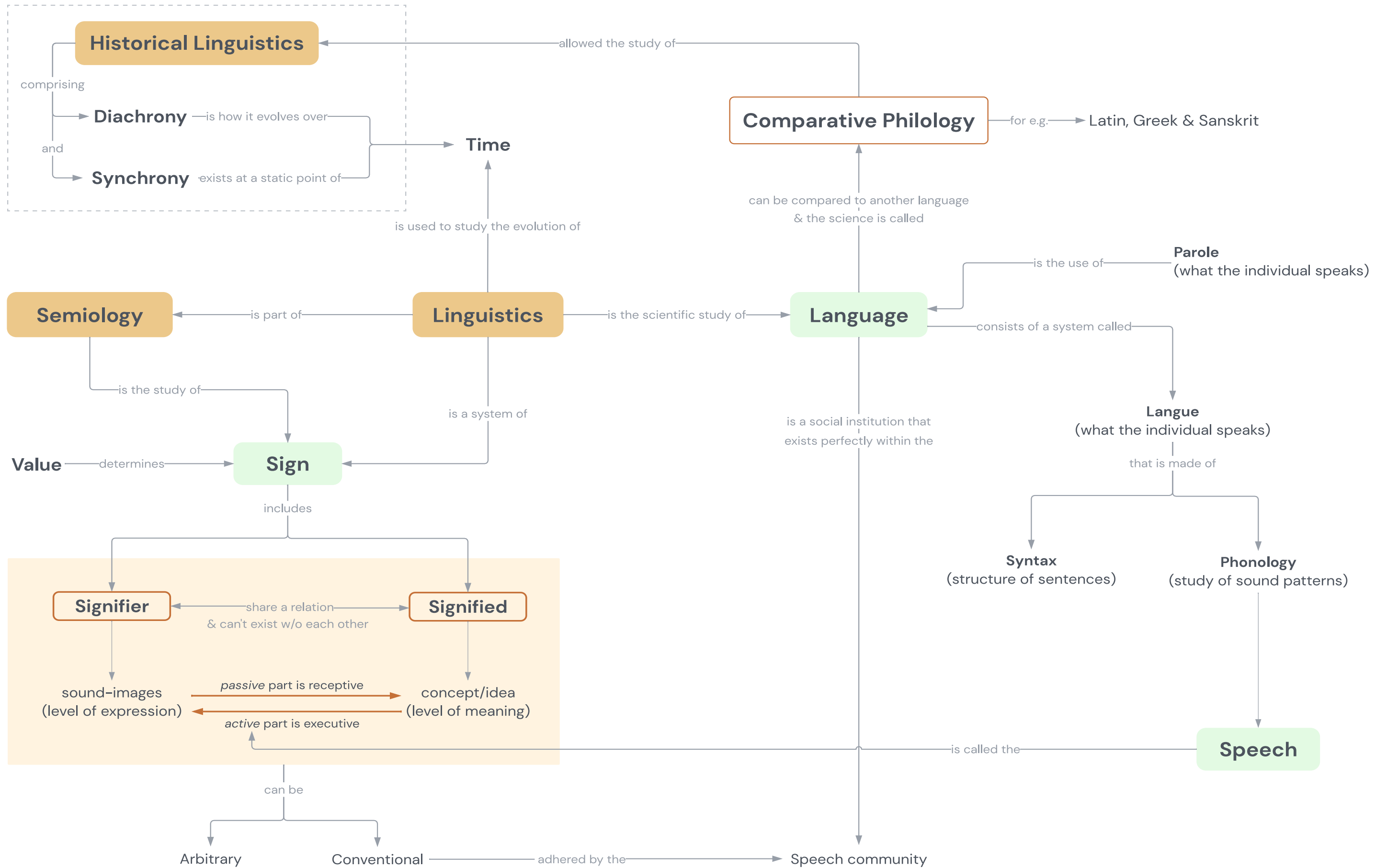
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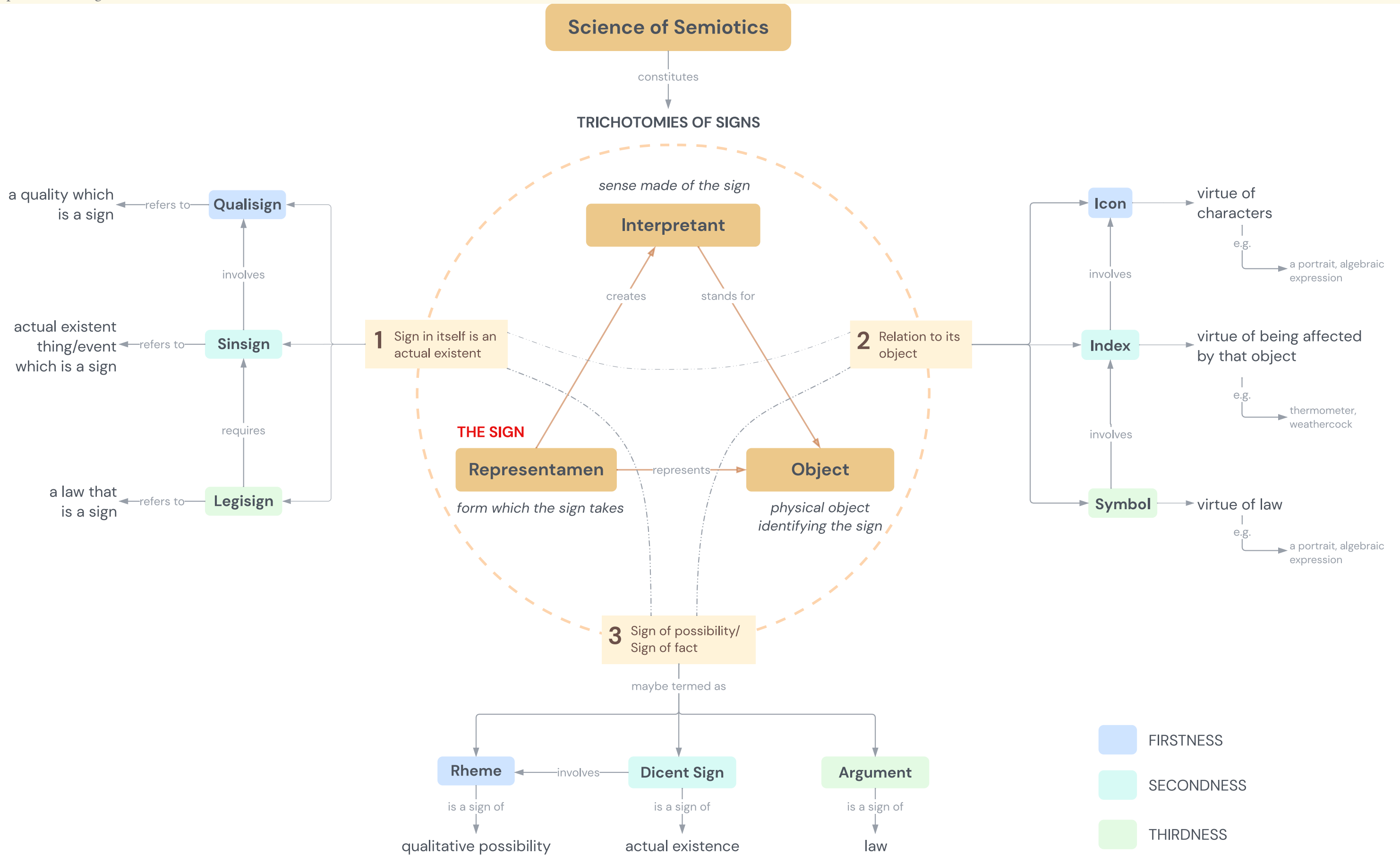
Spring '22 | Prof. Michael Arnold Mages

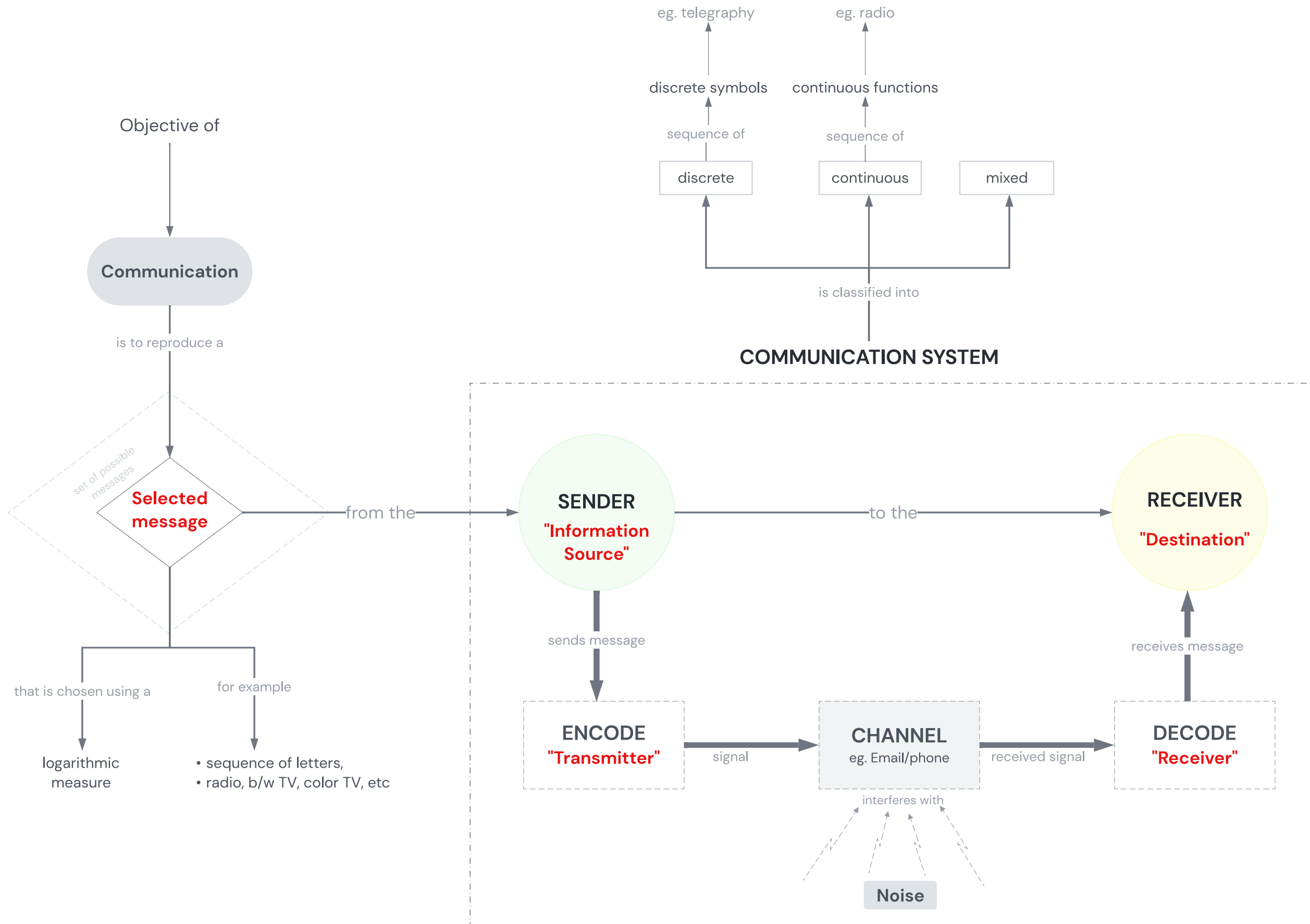
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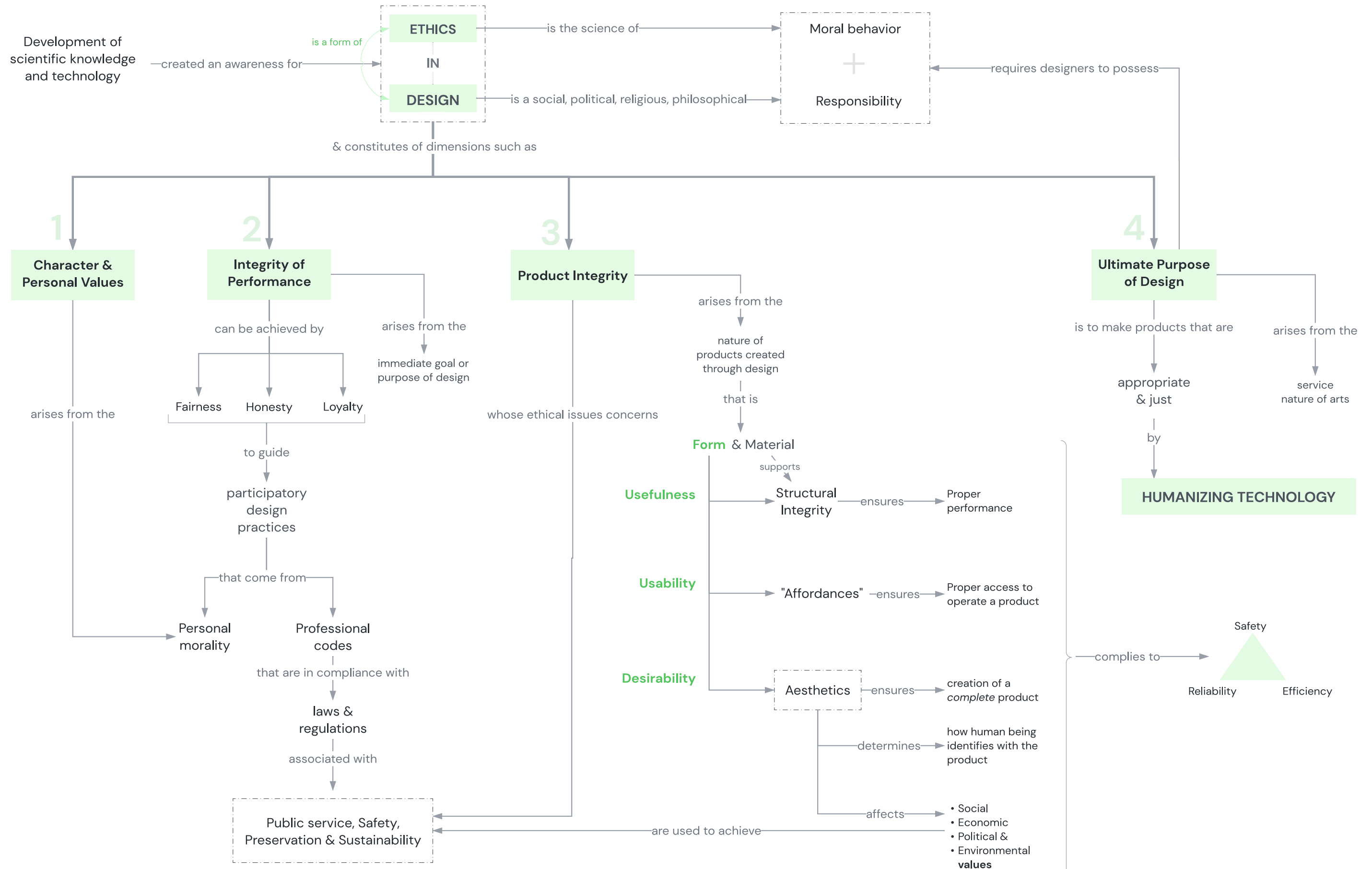
- 01** **Tanvi Modi**  
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- 02** **de Saussure**  
Course in General Linguistics
- 03** **Peirce**  
Philosophical Writings of Peirce
- 04** **Shannon, C. and Weaver, W.**  
The Mathematical Theory of Communication
- 05** **Buchanan, R**  
Design Ethics, Encyclopedia of Science, Technology, and Ethics
- 06** **Star, S. and Griesemer, J**  
“Institutional Ecology and “Translation” of Boundary Objects, Social Studies of Science
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- 11** **Pask, G.**  
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- 12** **Suchman, L.**  
Human–Machine Reconfigurations – Plans & Situated Actions
- 13** **Goldschmidt, G.**  
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- 14** **Akama, Y.**  
Being Awake to Ma
- 15** **Ansari, A.** – The History of Design and the Design of History  
**Diawara, M.** – The Song of the Griot  
**Escobar, A.** – Introduction — Designs for the Pluriverse
- 16** **Kite, S., Stover, C., Janis, M. S., & Benesiinaabandan, S.**  
How to Build Anything Ethically

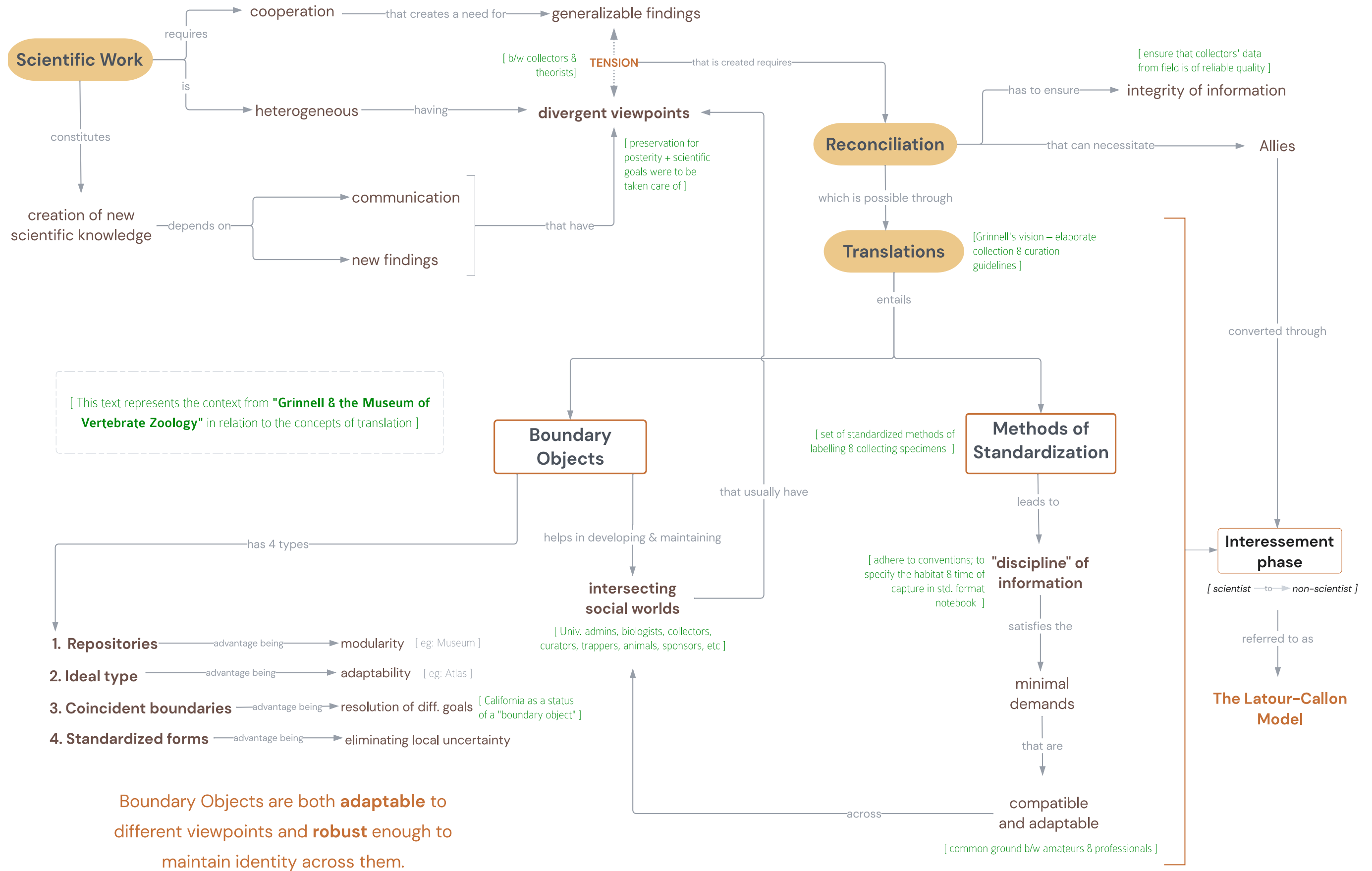




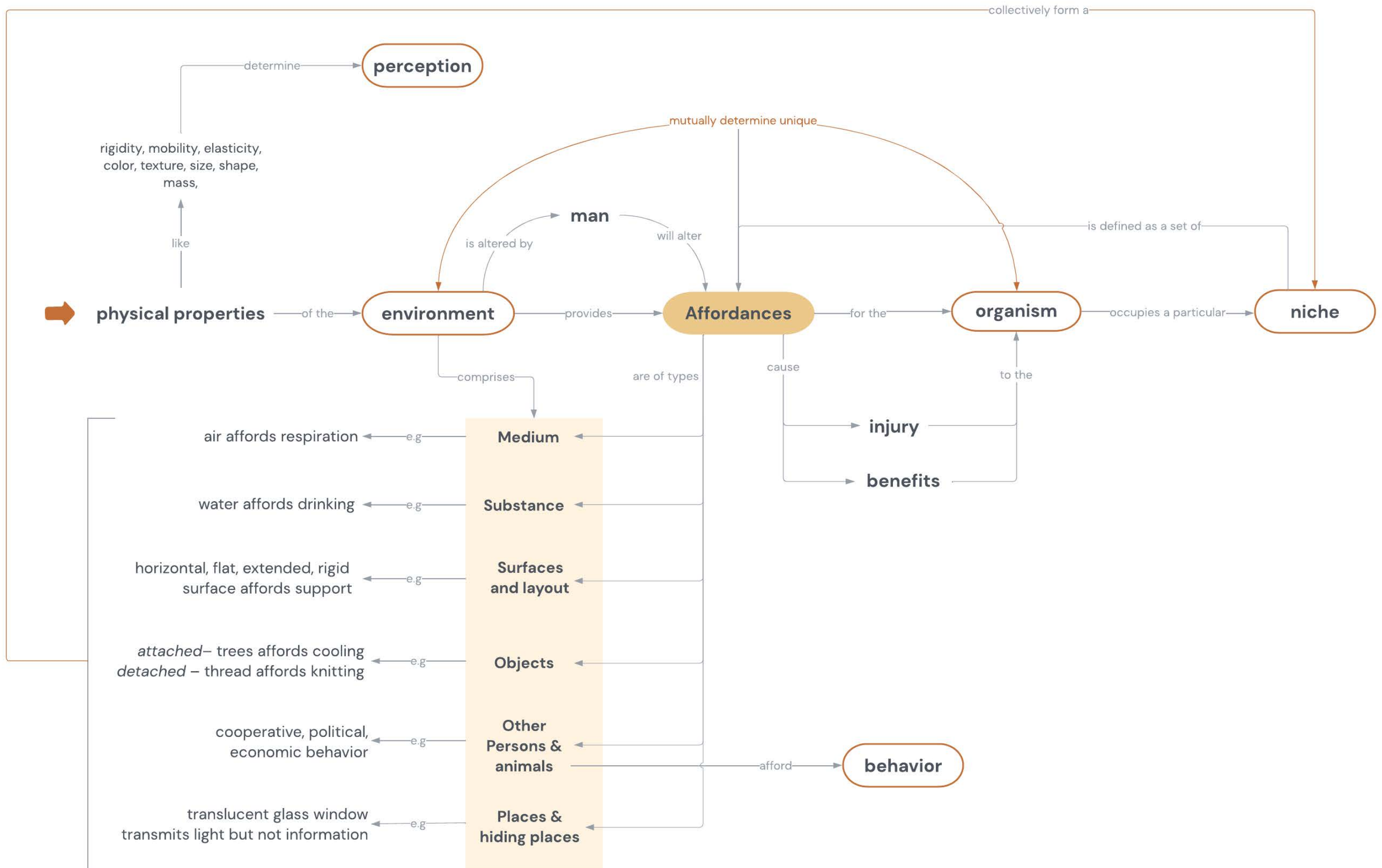


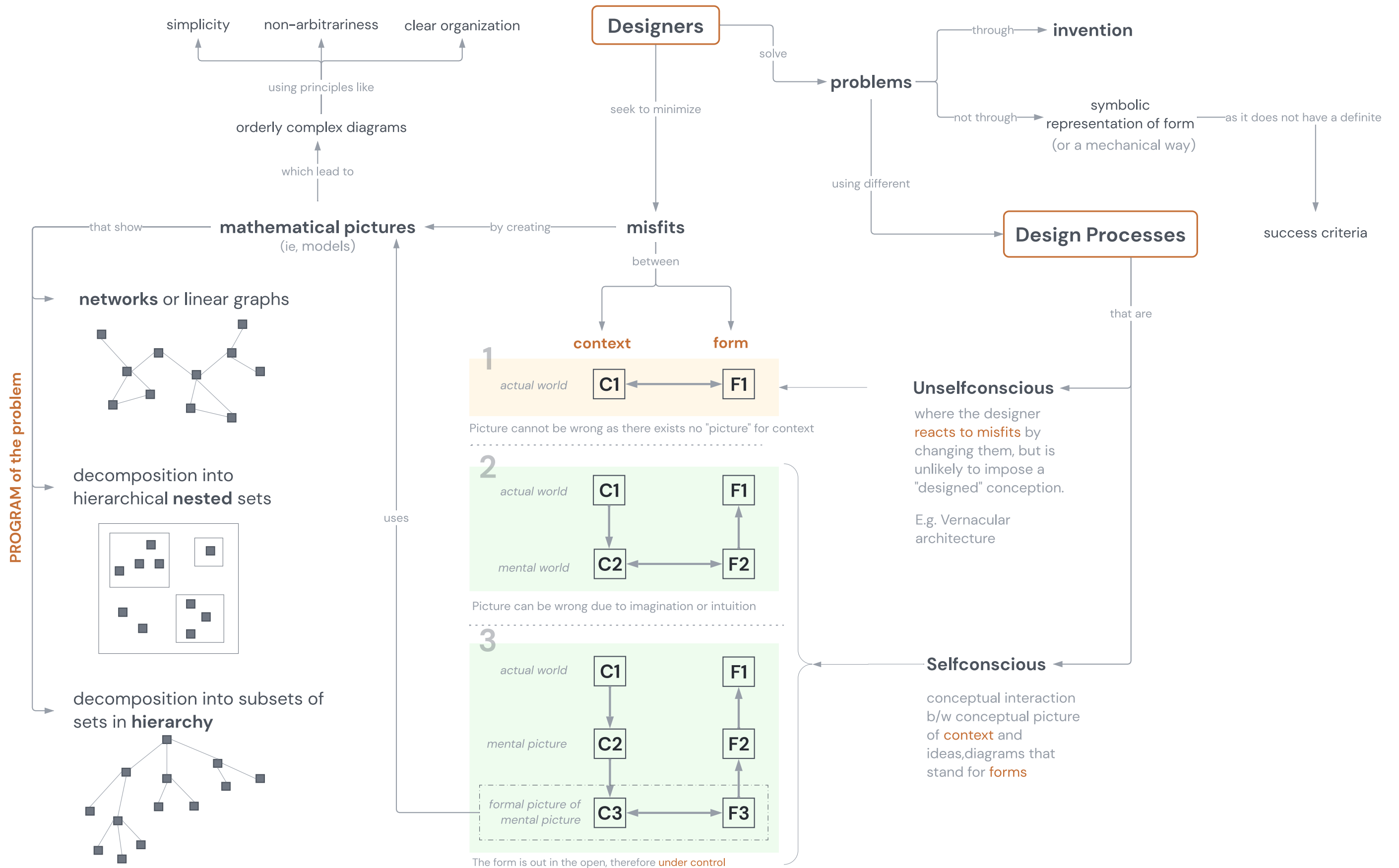




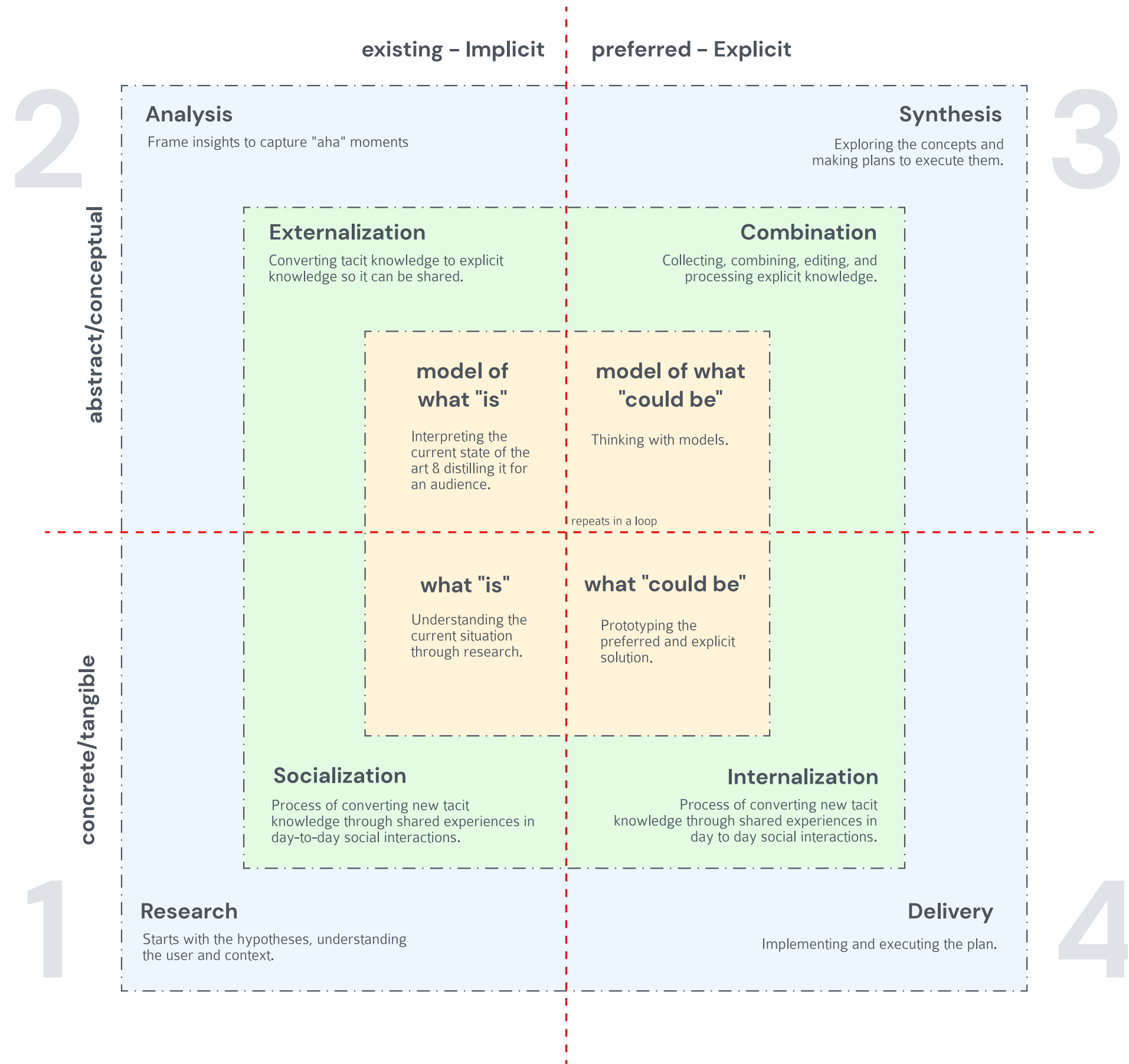
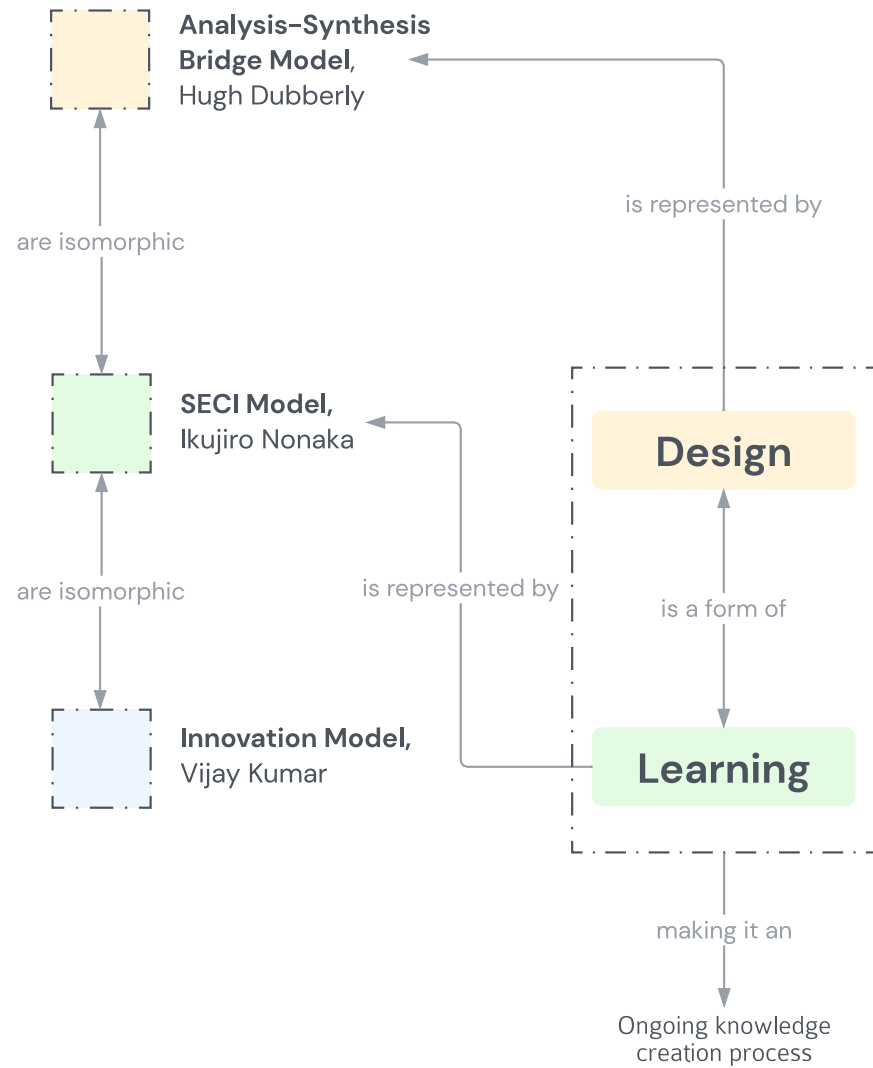


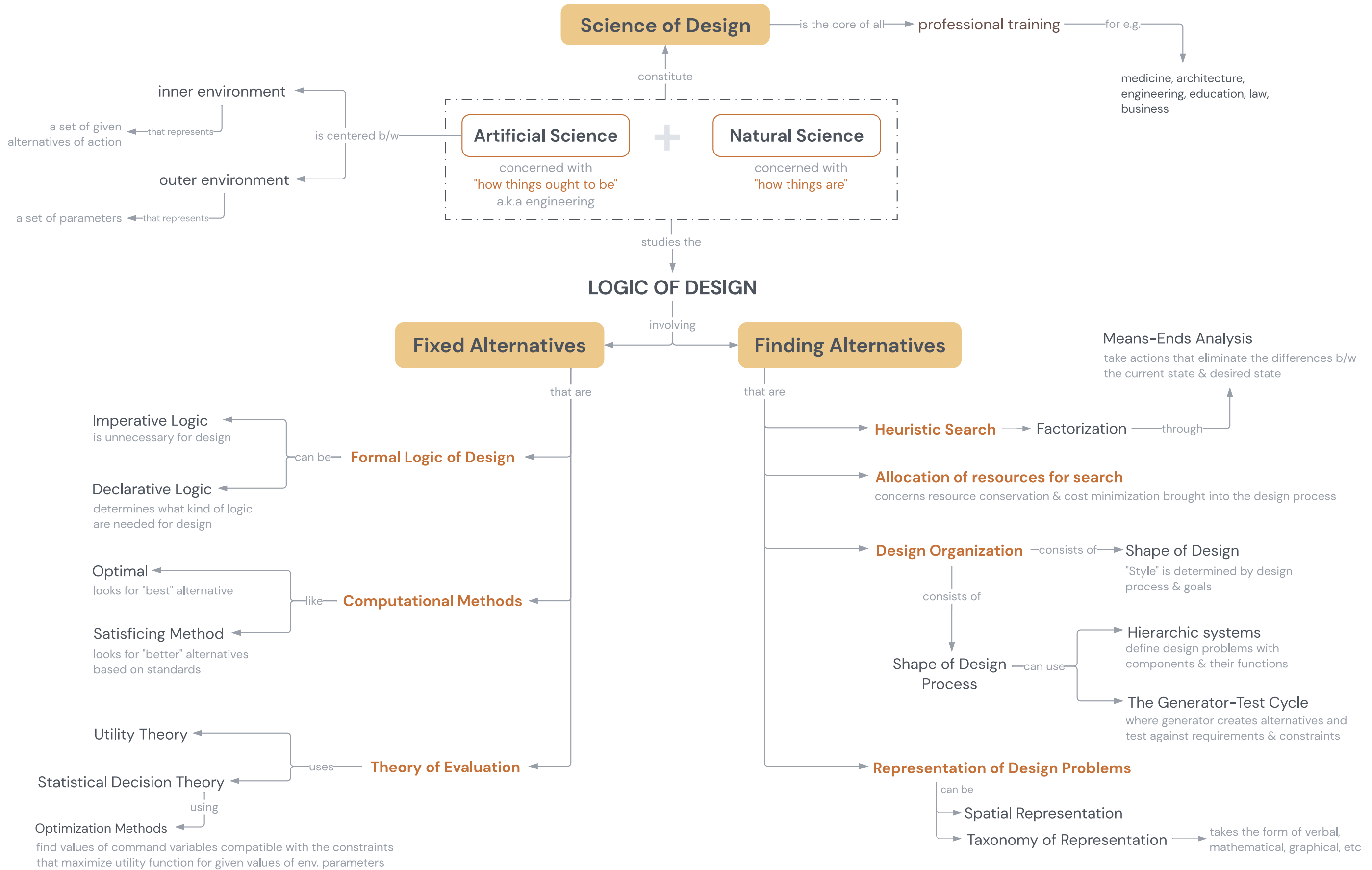


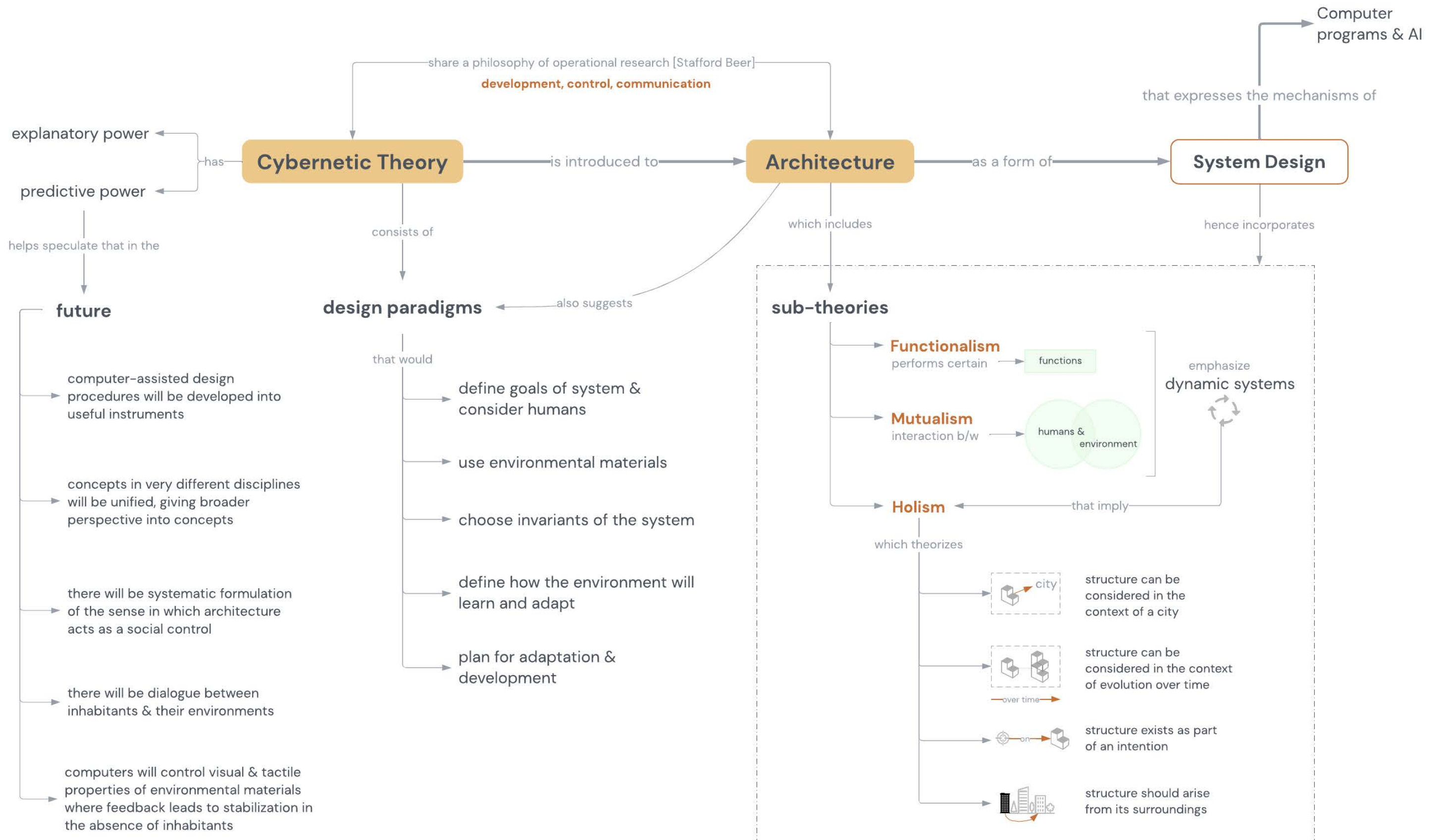




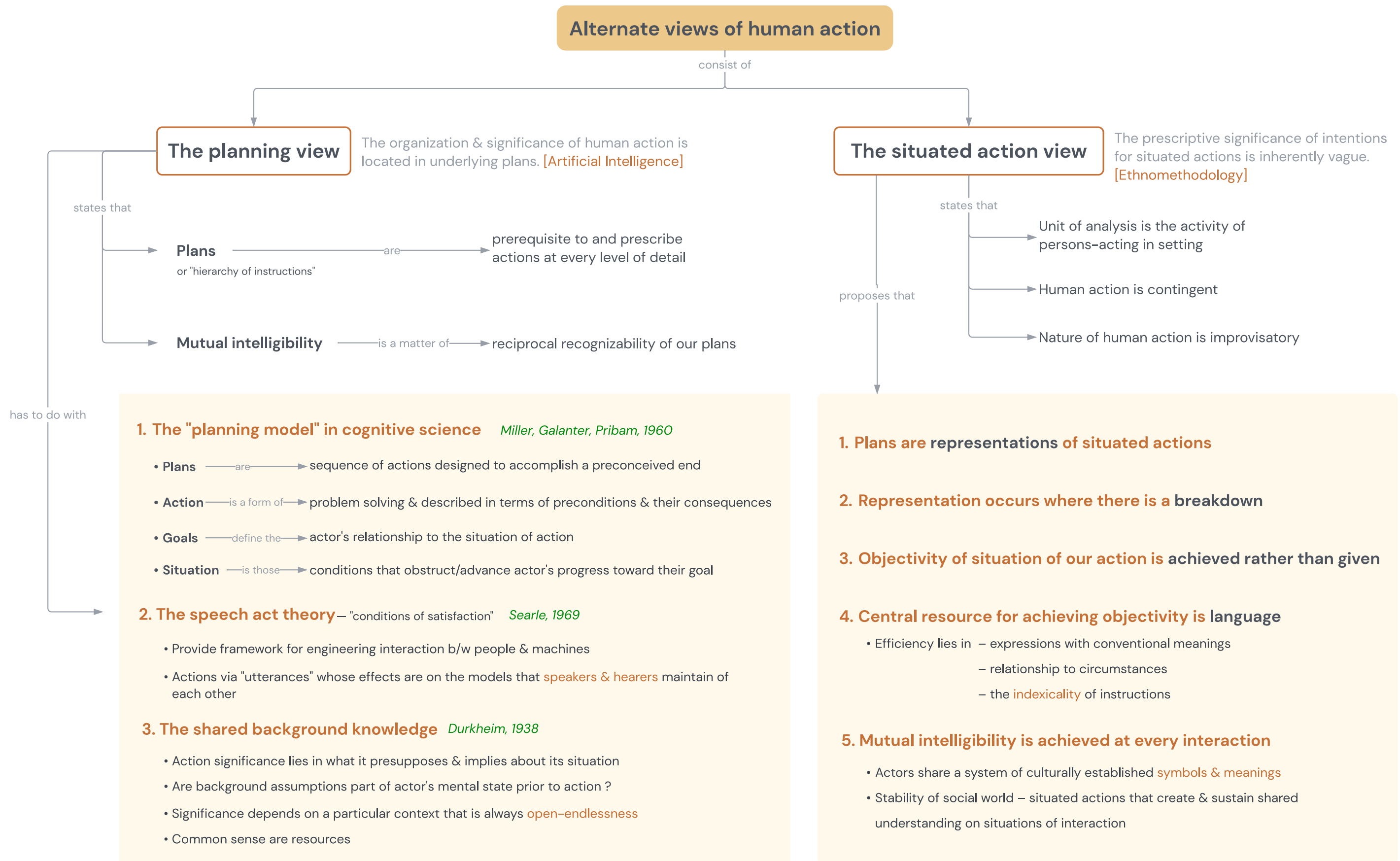
How to read it:

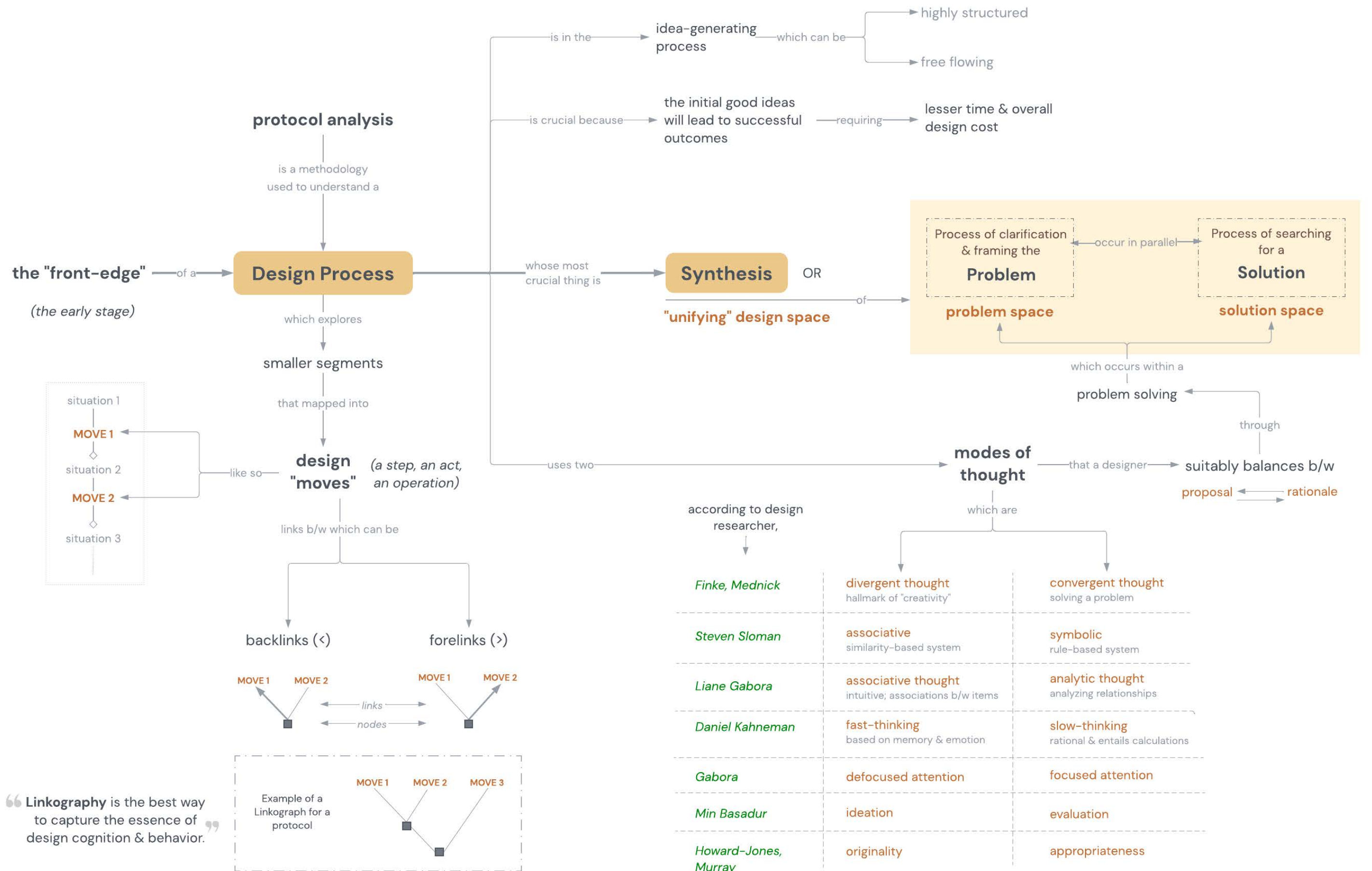




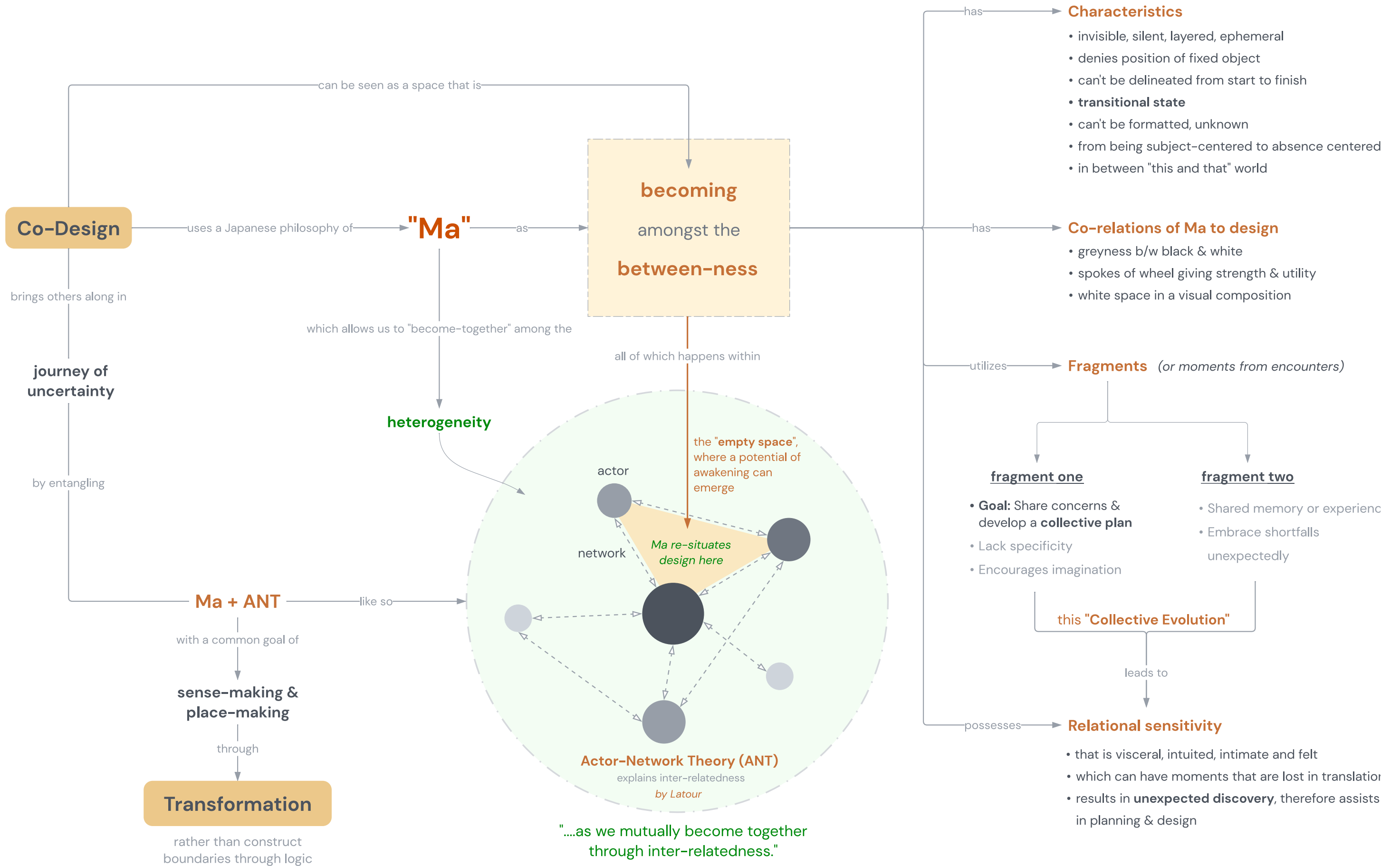




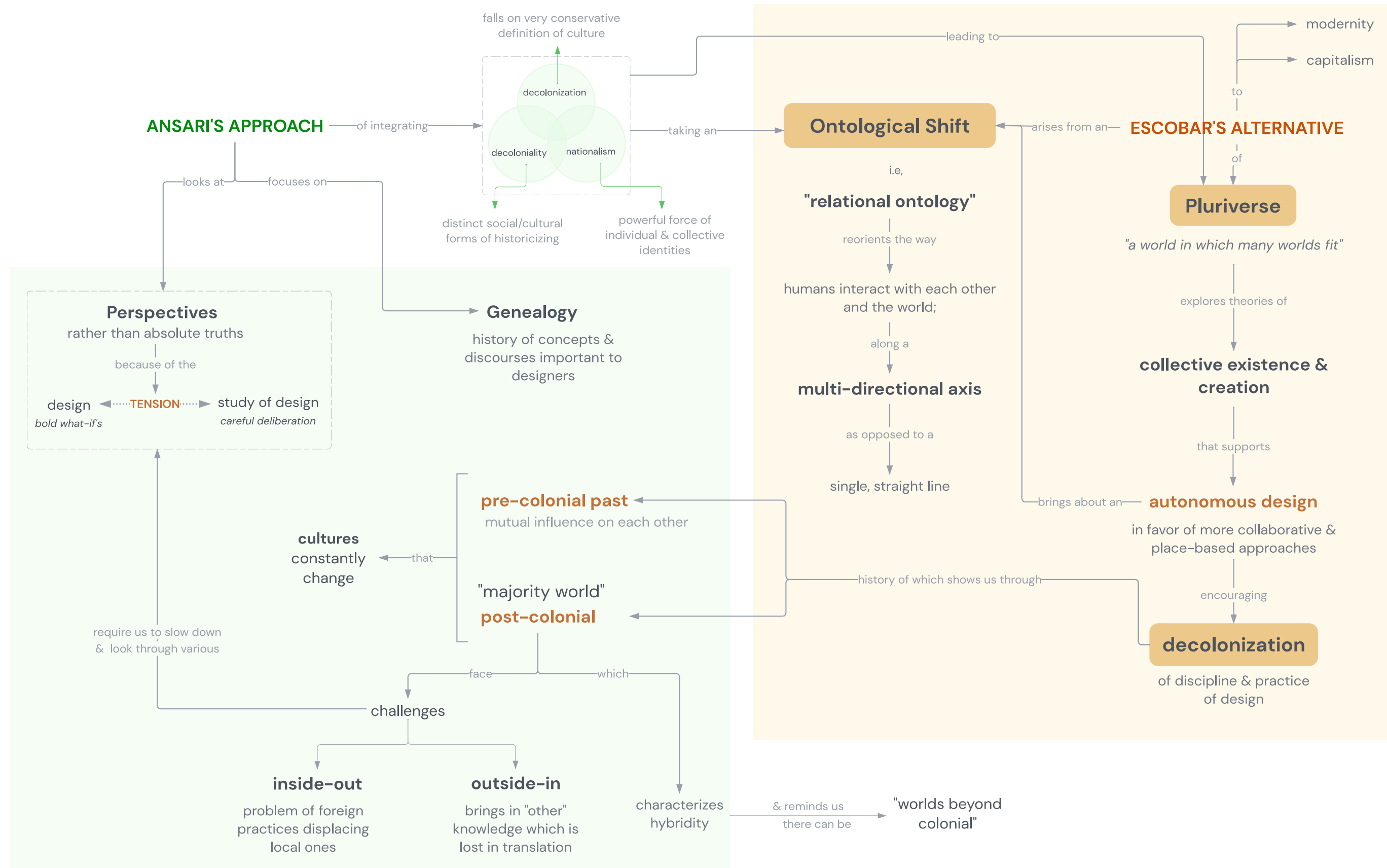


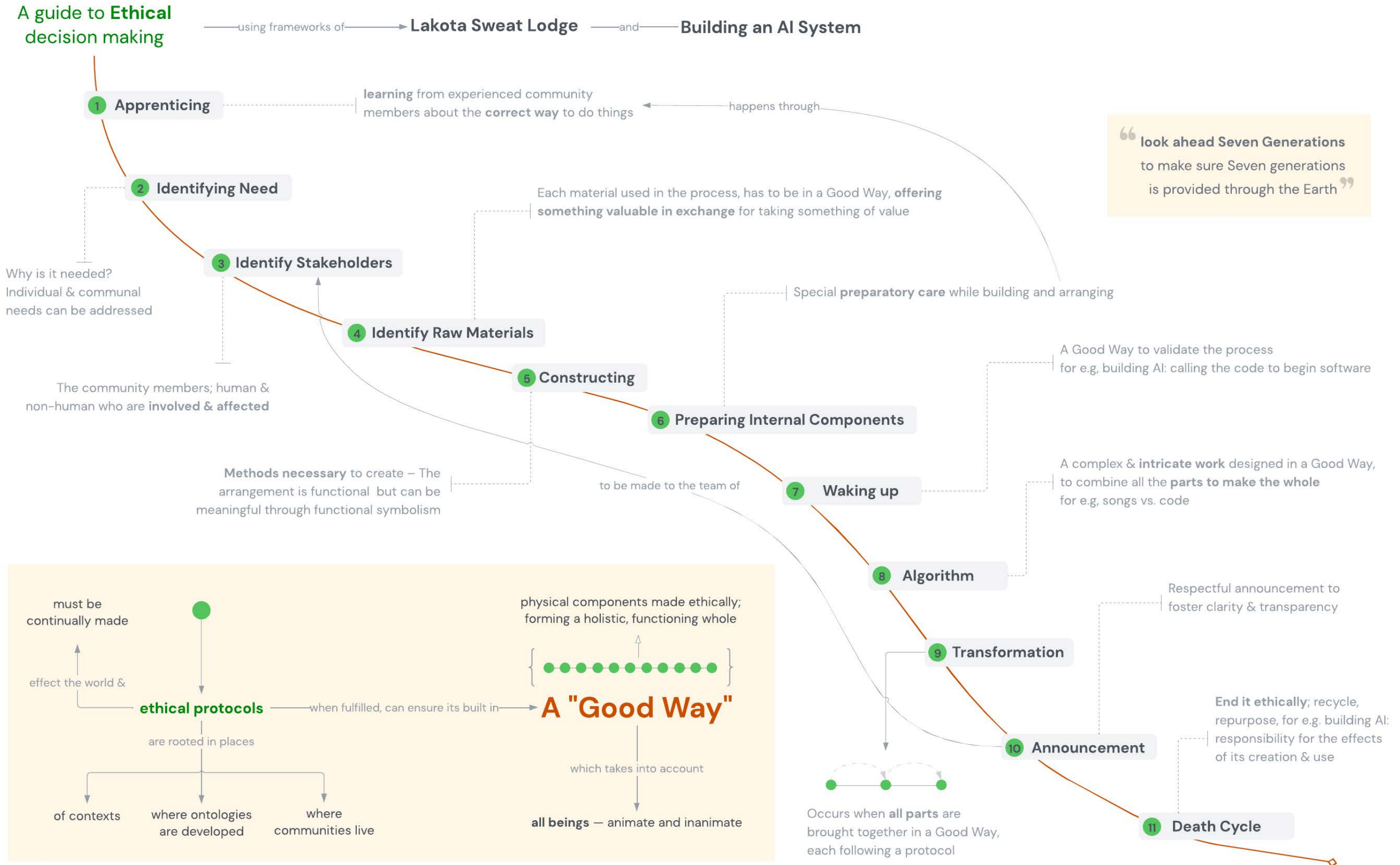


“Linkography is the best way to capture the essence of design cognition & behavior.”



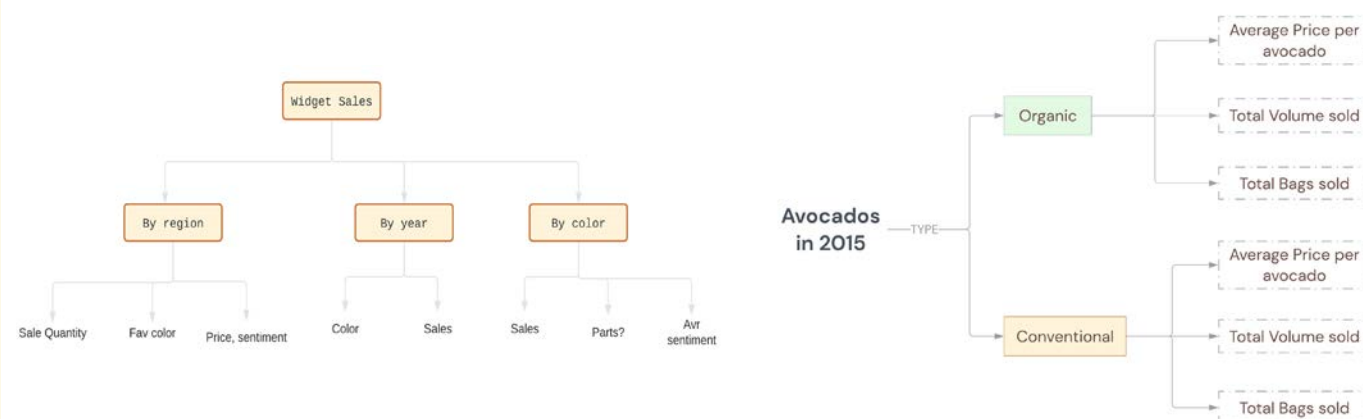
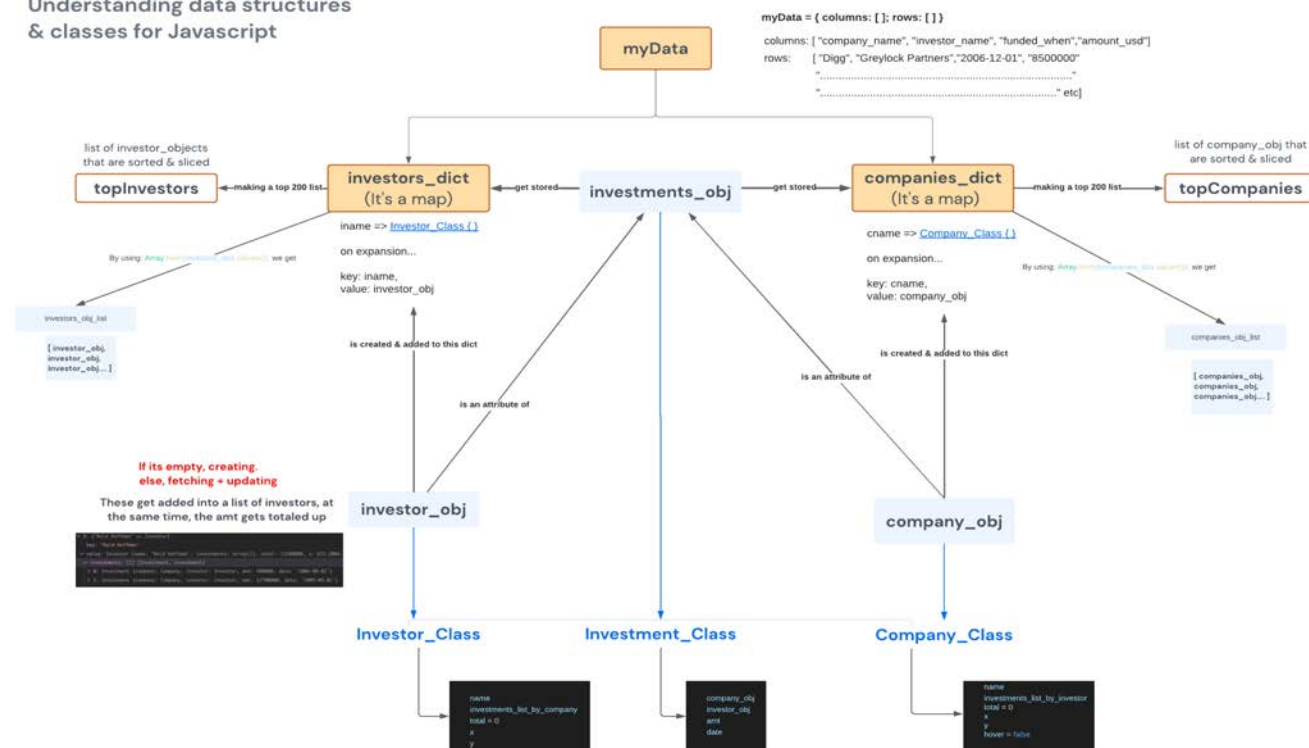






Other areas where I utilized the concept-map strategy

Understanding data structures & classes for Javascript



# Takeways & Learnings

Prior to this class, I had a very shallow understanding of design. When someone asked me – “What exactly is design?” or “Do you just make things pretty?”, I was simply not able to explain. I had a lot of aha-moments from some of these readings from class and now I’m able to think/talk about design in profound ways (including the jargon!). I learned the why’s and how’s of good design being ethical, functional, aesthetic and sustainable. The **design process** in itself is a designed system, sometimes within a boundary and most times within a “Ma” [pg. 14]. Now while I design, I consciously think of my design decisions based on reflections from this class.

Concept maps! This strategy has truly helped me think of complex information in visual, categorical and connective ways. When my brain is able to connect concepts, I tend to digest and remember information more easily. Reading some of this material was out of my comfort zone, but by the end of this semester, I was able to confidently put my understanding on paper through these mental models.

I would like to thank Prof. Michael Arnold Mages for conducting insightful discussions on theories of design and making us think of design in a mindful way that I had never unmasked before. Thank you to my peers who have inspired me in many ways through each of their journeys of making this book.

Now I have a book to show anyone who asks me, “What is Design?” !