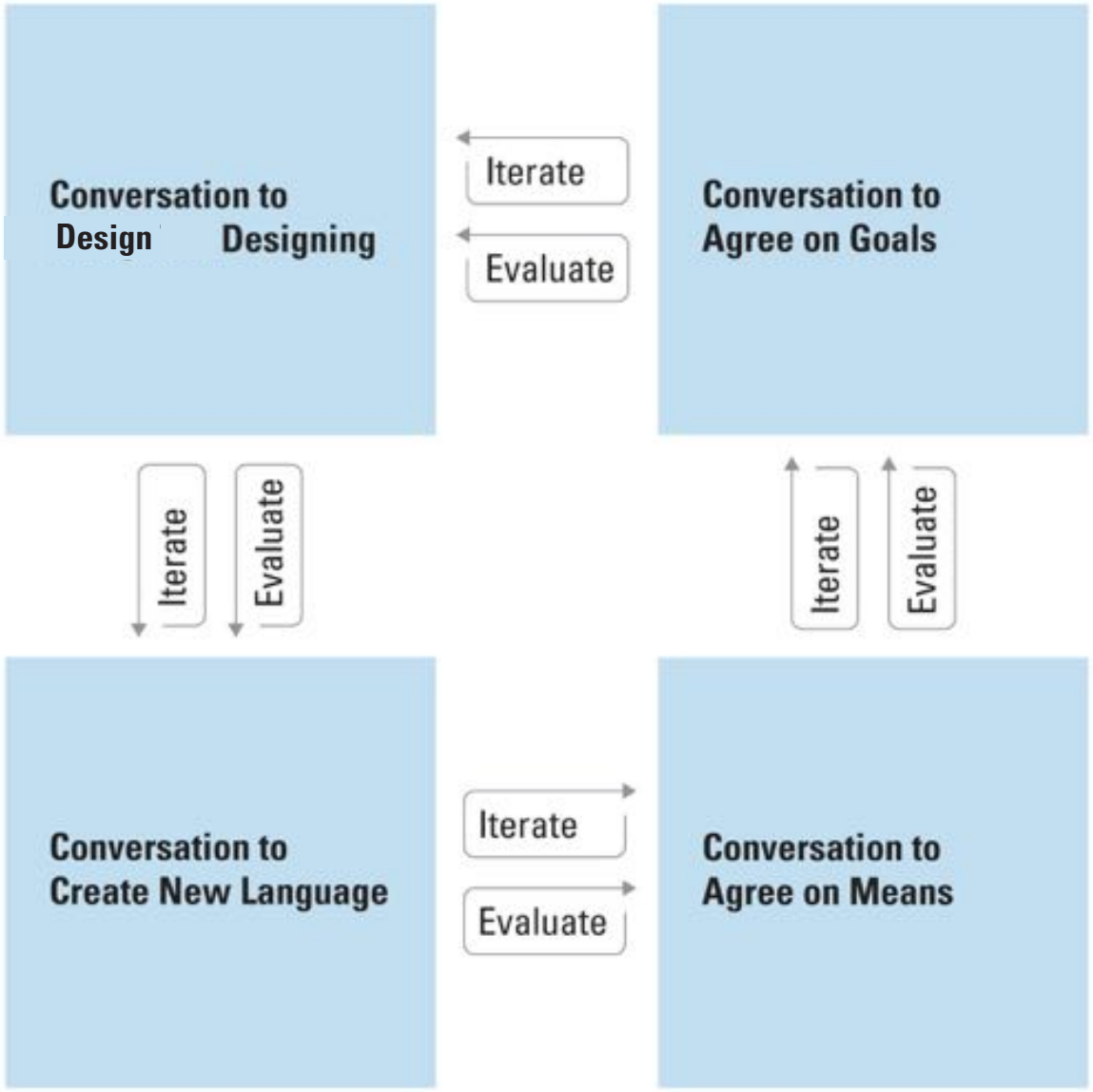
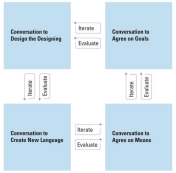
CYBERNETICS CONVERSATION DESIGN



Design



how has design changed?

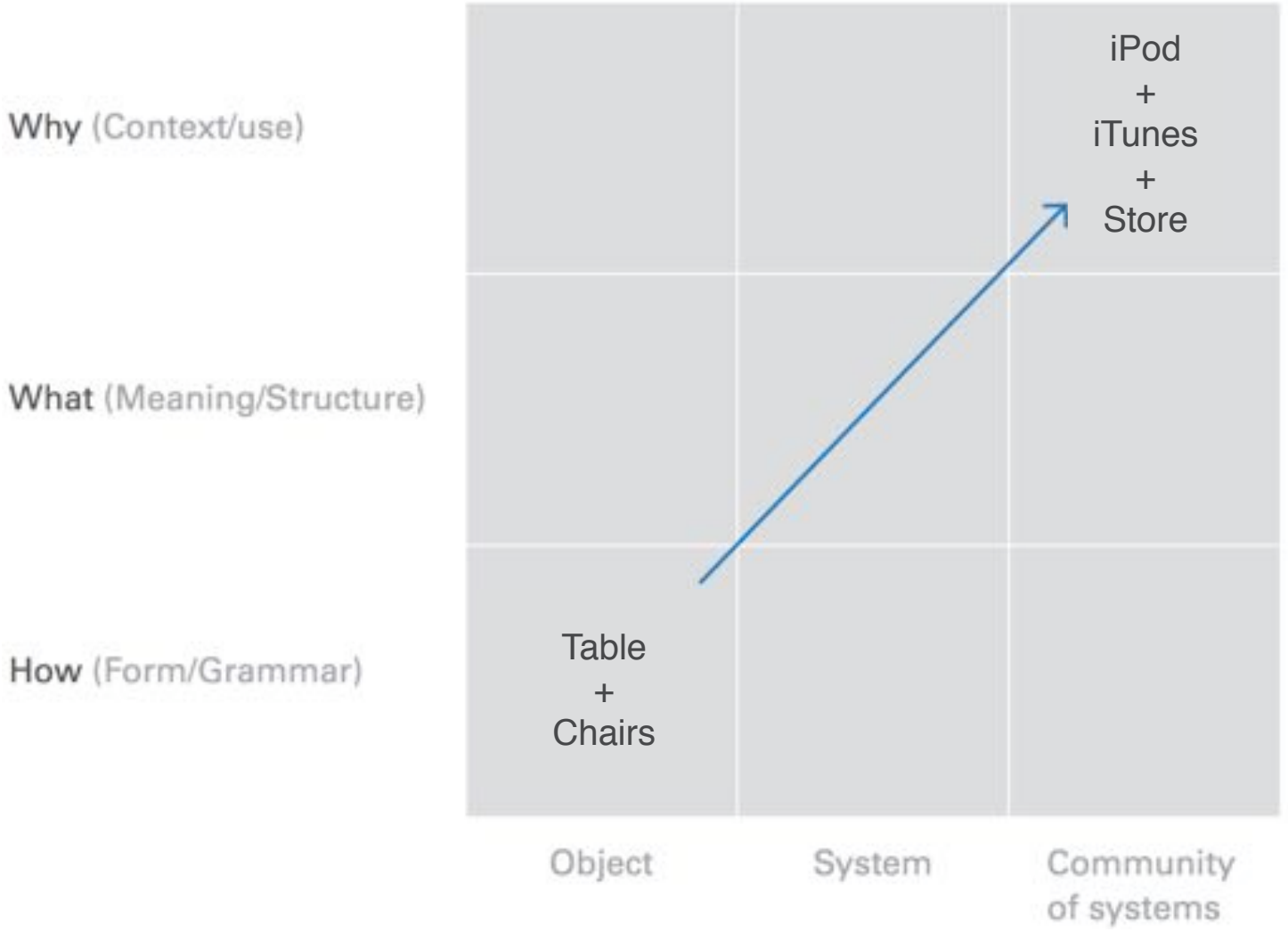
cybernetics & design

conversation & design

design as conversation

rationale for systems literacy

how has design changed?



design processes must change

We are in a new era of technology,
where the sensor + mobility + video webs
are being added to the ‘text web’.

Designers will have new tools and media,
which will change the way they work,
which suggests changes in design education.

Designers will focus on systems not objects,
embrace complexity, and move from
form-giving to conversation-managing.

Hugh Dubberly

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Design = systems
+ complexity
+ conversation

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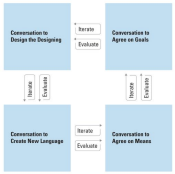
+ complexity
+ conversation

Design



how has design changed?

cybernetics & design

conversation & design

design as conversation

rationale for systems literacy

CYBERNETICS

system has goal

system aims toward goal

environment affects aim

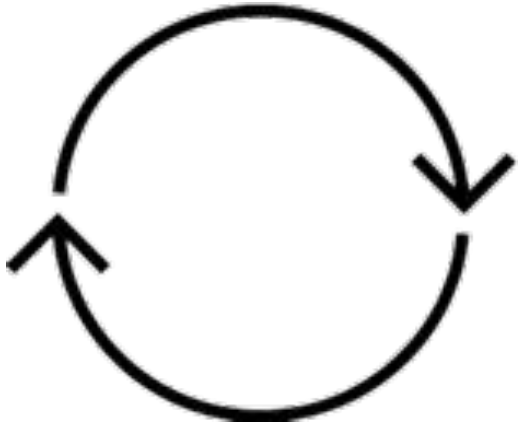
information returns to system—'feedback'

system measures difference between state and goal
—detects 'error'

system acts to correct the error, to achieve its goal

the art of regulation

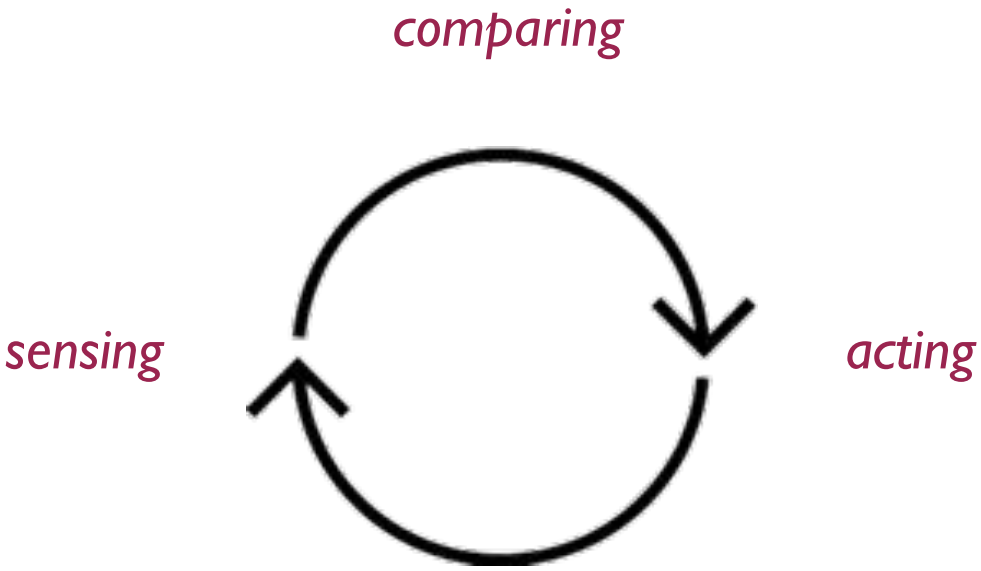
compares heading with
goal of reaching port



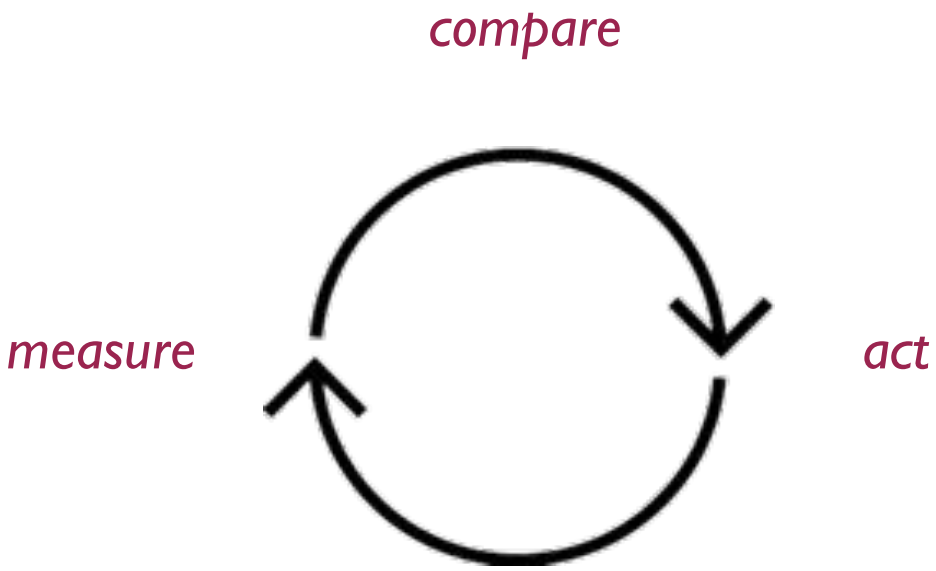
adjusts rudder
to correct heading

ship's heading

the art of regulation

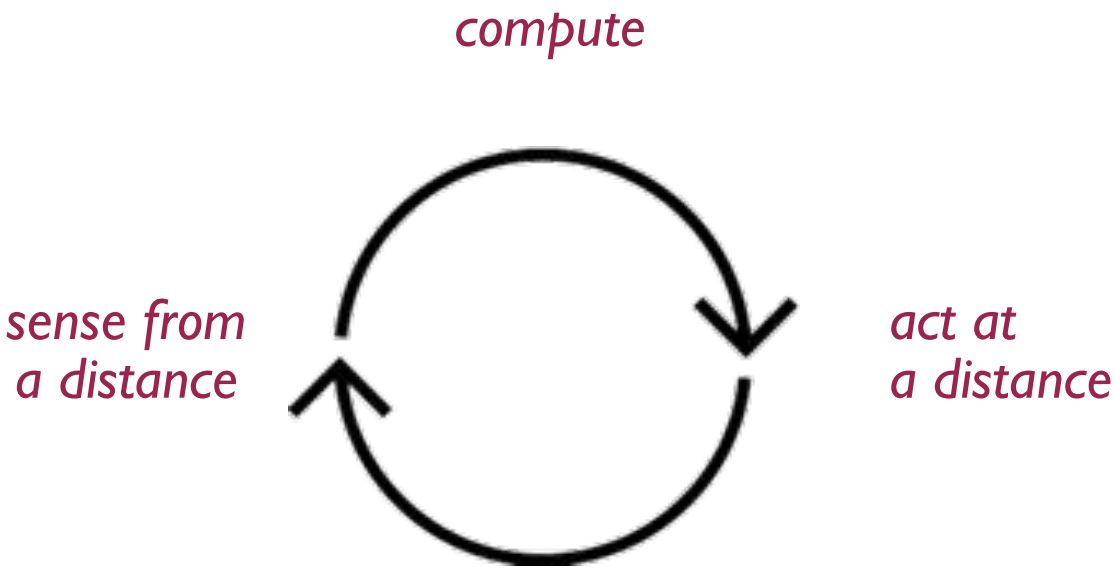


design process



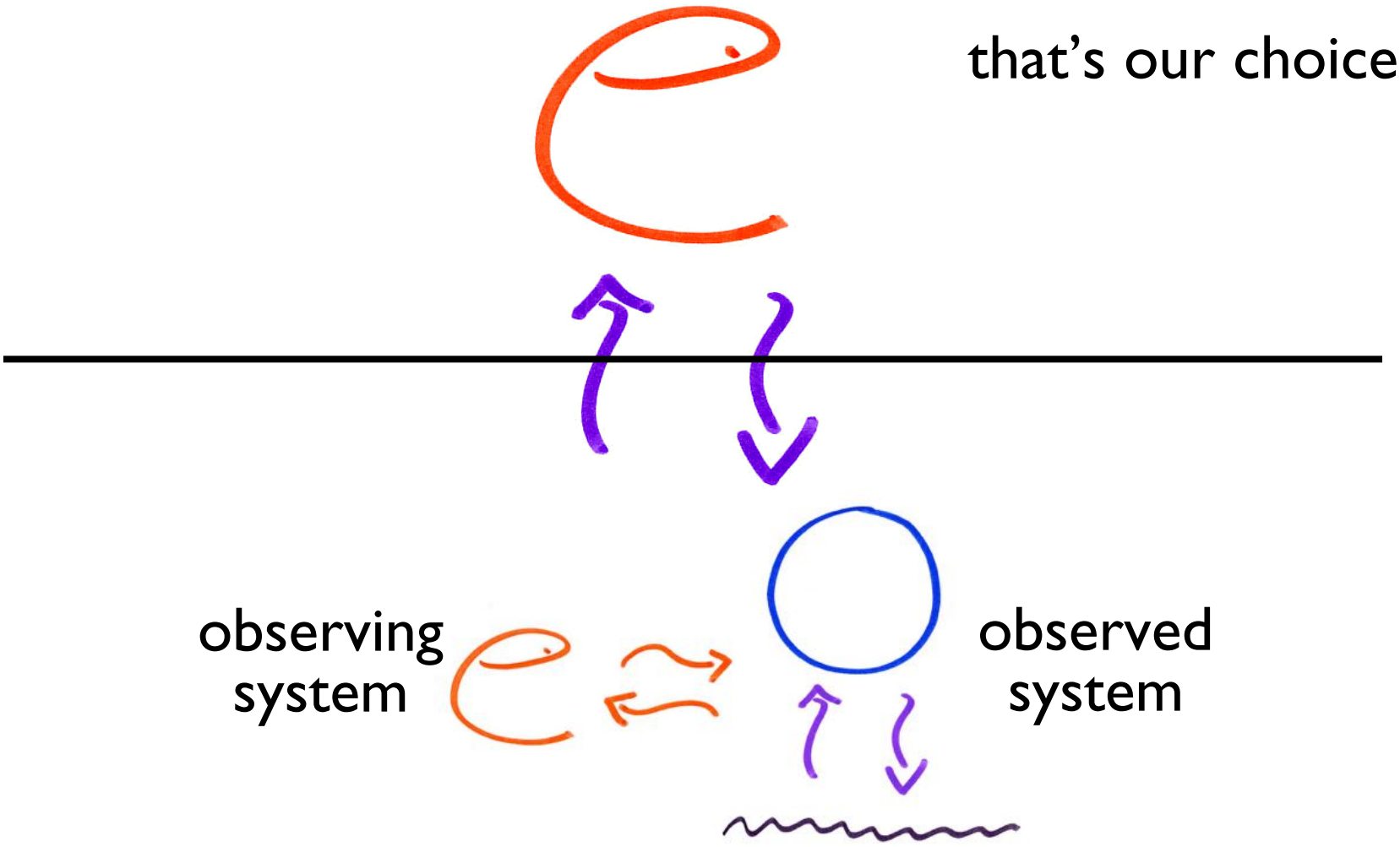
After Dubberly Design Office “Creative Process” concept map

mobile devices



what do we pay attention to?

that's our choice



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JUN 22 1949

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CYBERNETICS

OR CONTROL AND COMMUNICATION IN THE ANIMAL AND THE MACHINE

Norbert Wiener

PROFESSOR OF MATHEMATICS
THE MASSACHUSETTS INSTITUTE
OF TECHNOLOGY

THE TECHNOLOGY PRESS

JOHN WILEY & SONS, INC., NEW YORK

HERMANN et CIE, PARIS

CYBERNETICS

CIRCULAR CAUSAL AND FEEDBACK MECHANISMS IN BIOLOGICAL AND SOCIAL SYSTEMS

Transactions of the Tenth Conference
April 22, 23, and 24, 1953, Princeton, N. J.

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HEINZ VON FOERSTER

DEPARTMENT OF ELECTRICAL ENGINEERING
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CHAMPAIGN, ILL.

Assistant Editors

MARGARET MEAD

AMERICAN MUSEUM OF NATURAL HISTORY
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DEPARTMENT OF PSYCHIATRY AND NEUROLOGY
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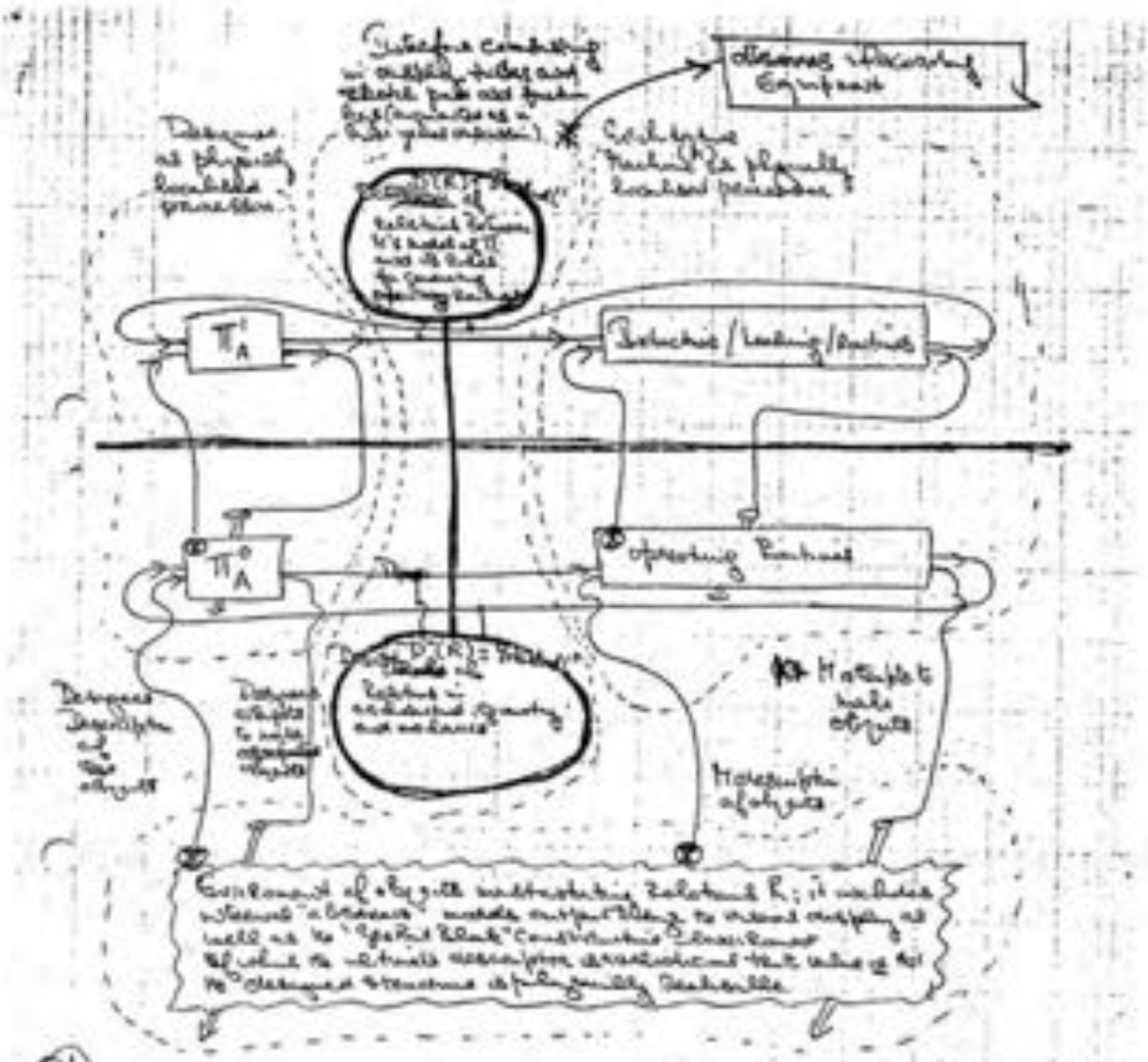
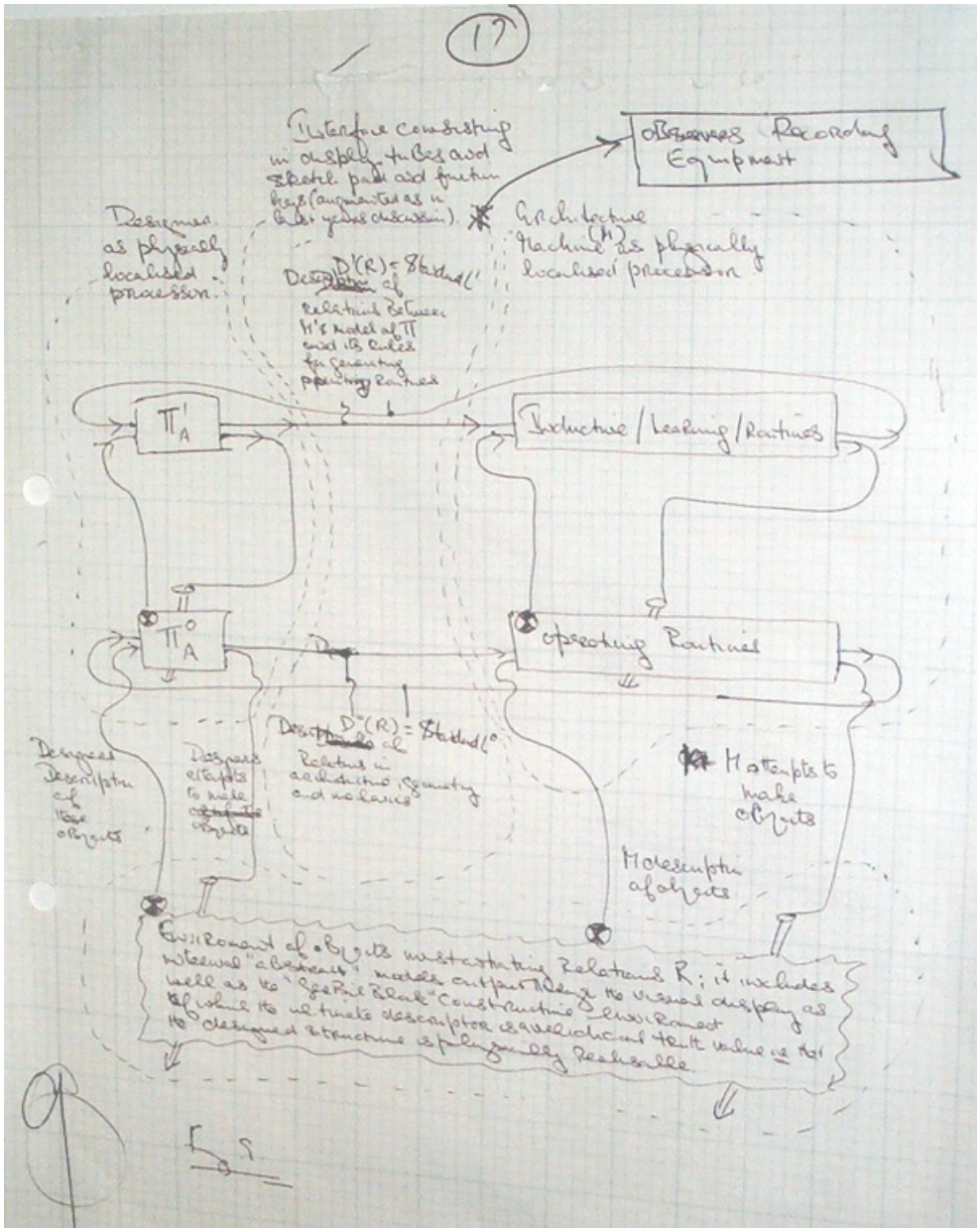
Negroponte

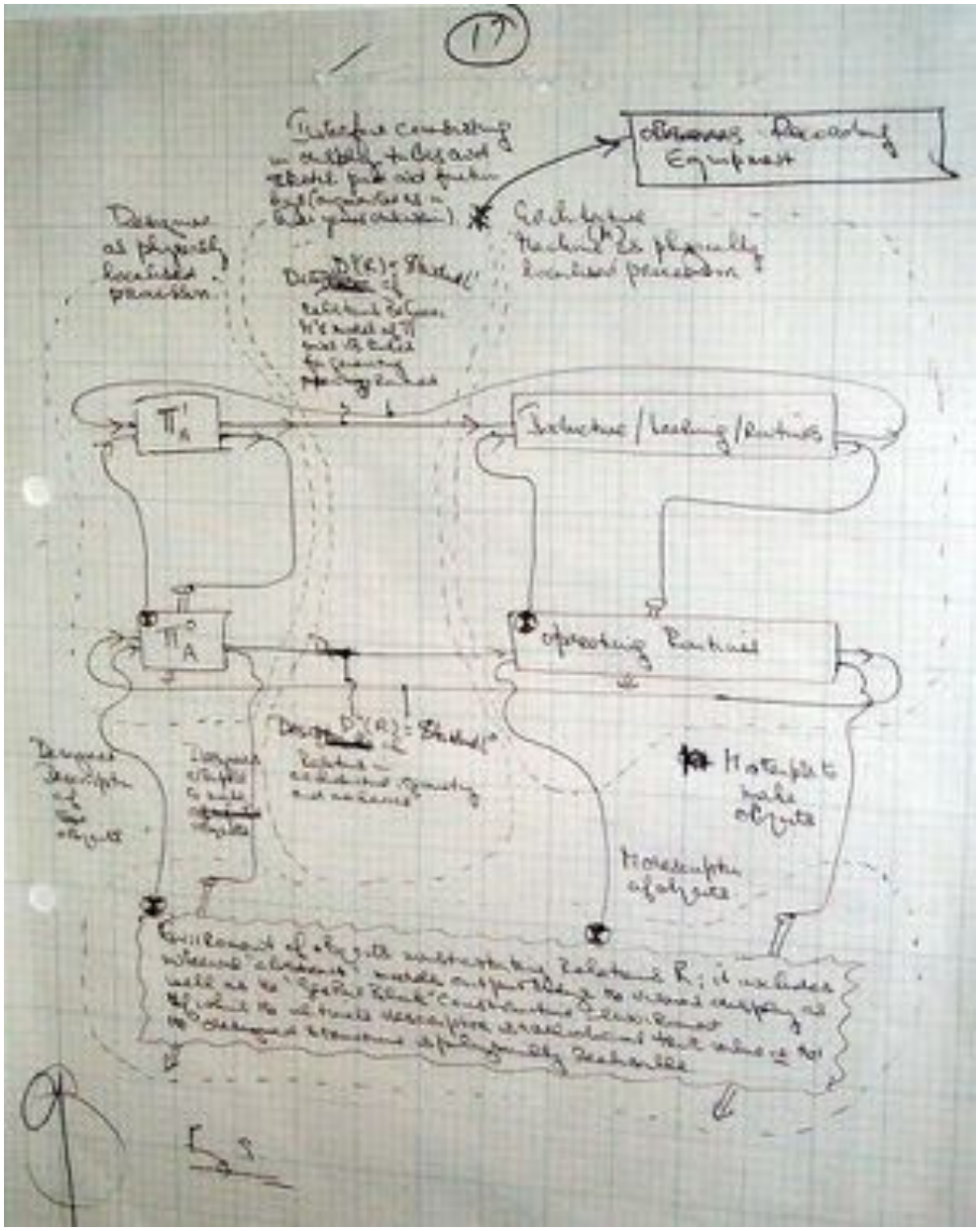
1

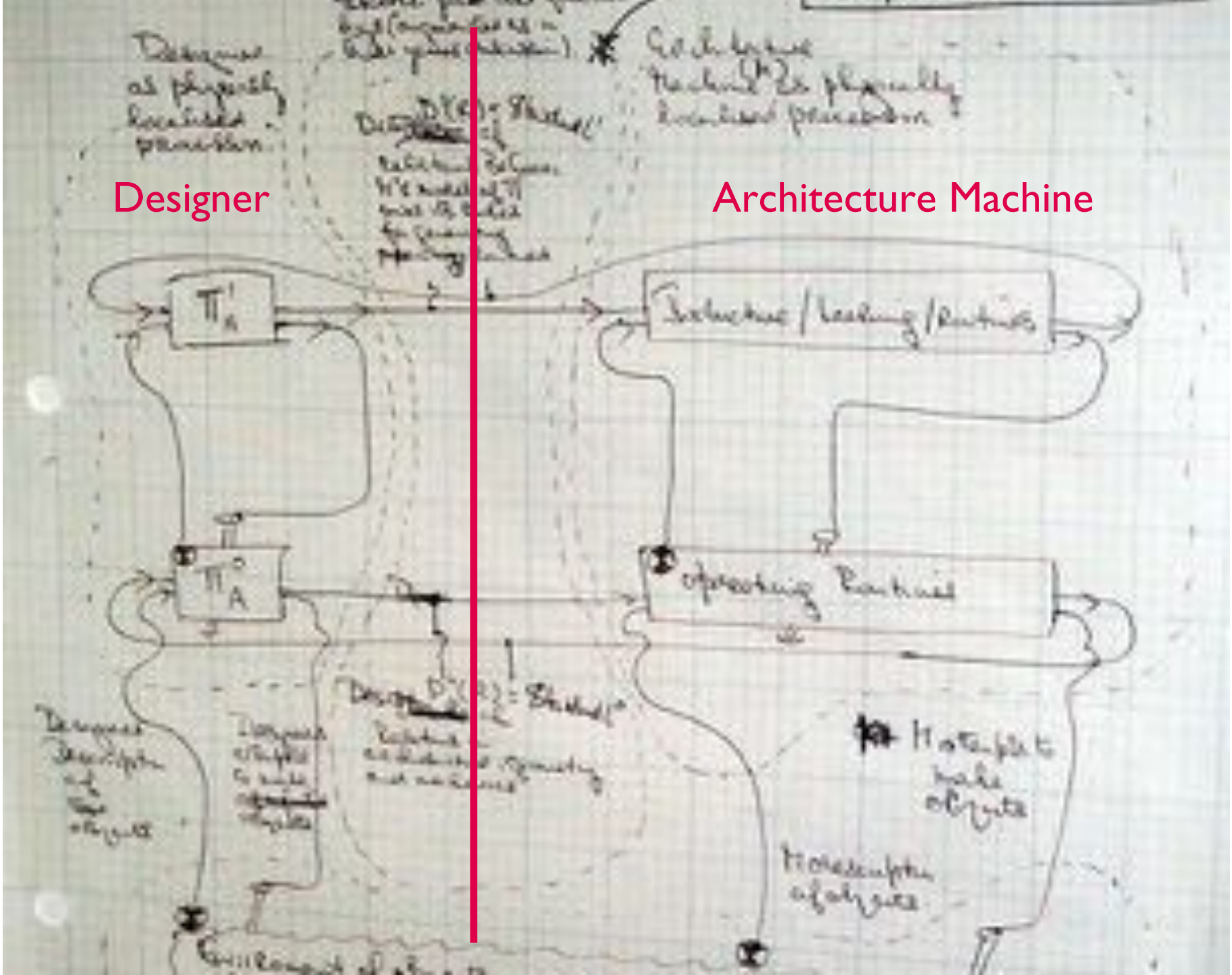
Aspects of Machine Intelligence

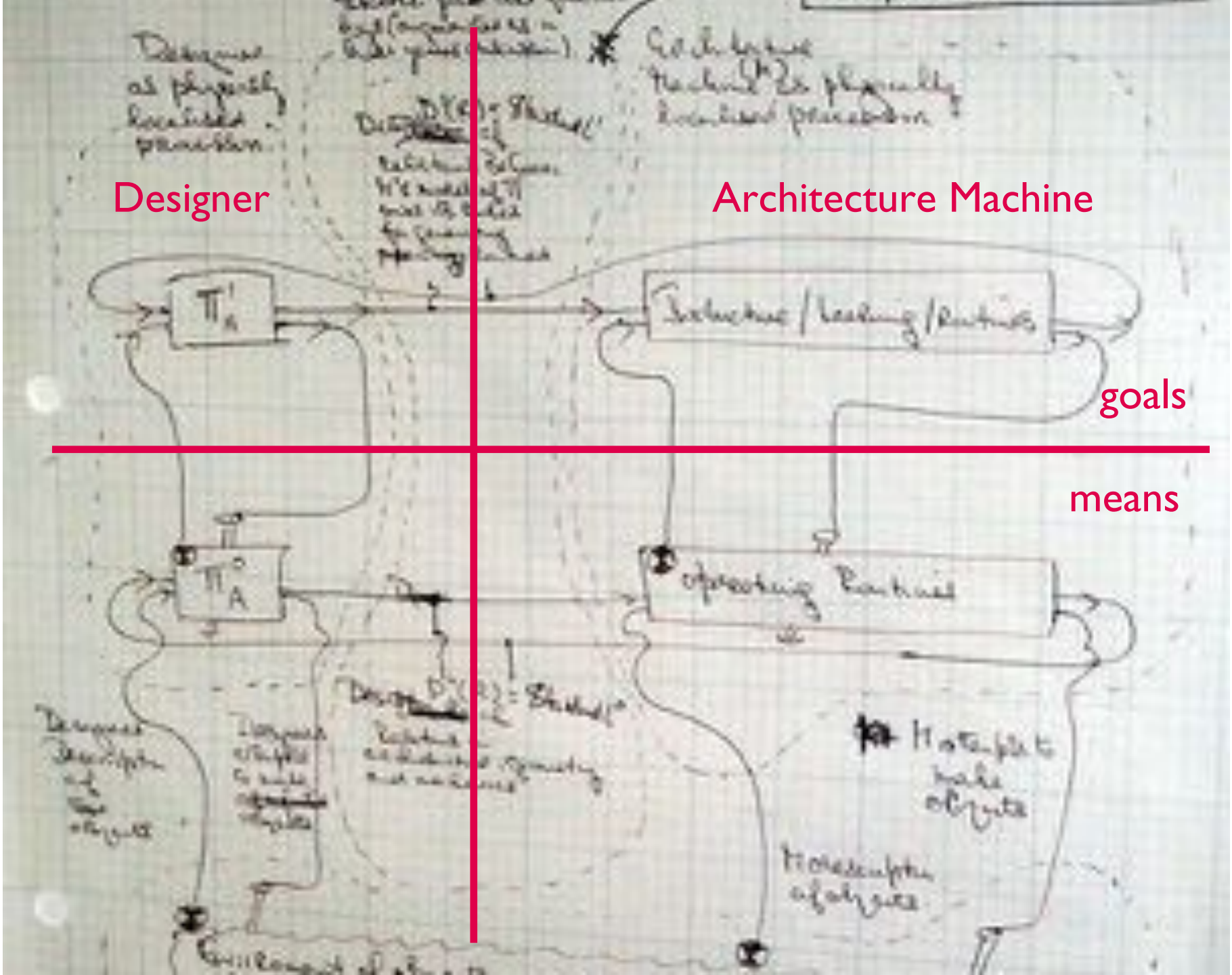
Introduction by Gordon Pask

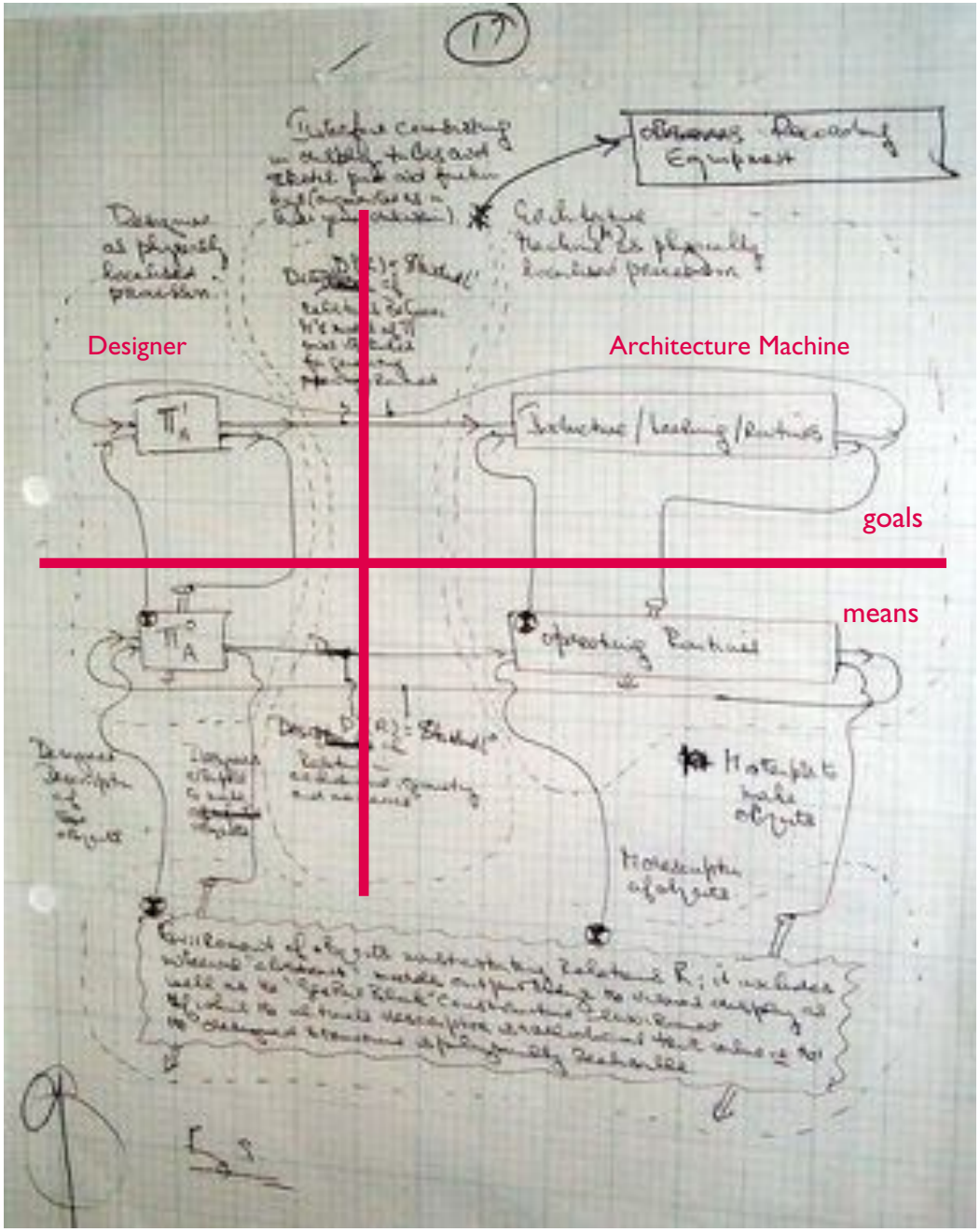



17
Interface consisting in displays to Bes and sketch pad and function keys (augmented as in Bob's yesterday discussion)
Observers Recording Equipment
Designers as physically localised processor.
Architecture Machine (H) as physically localised processor
D'(R) = Standard
Description of relations between H's model of Π and its rules for executing operating Routines
Π'A
Inductive / Learning / Routines
Π°A
Operating Routines
D°(R) = Standard
Description of Relations in architecture, symmetry and no laws
Designers Description of these objects
Designers attempts to make objects
H attempts to make objects
H description of objects
Environment of objects with structuring Relations R; it includes viewed "as Bes" models output Design to viewed display as well as to "Spatial Book" Construction Environment of which its ultimate description as which and result value is the designed structure is physically realisable.


17
Interface combining
Observing Recording
Equipment
Collective
Physically
Localized perception
Instructive / Learning / Routing
Operating Routine
Hotsculpte
Make
objects
Hotsculpte
of objects


Designer
Architecture Machine


Designer
Architecture Machine
goals
means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Architecture Machine
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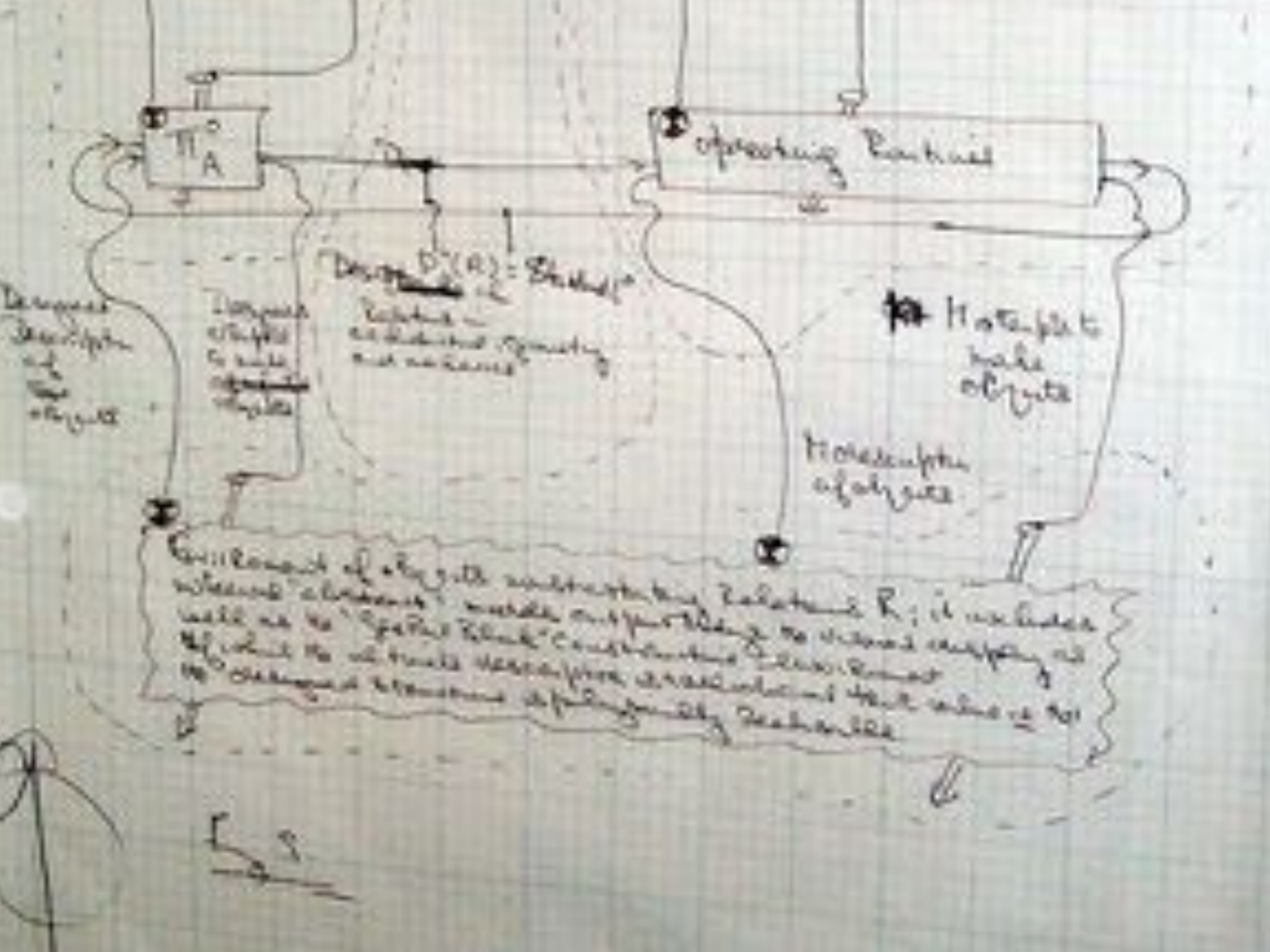
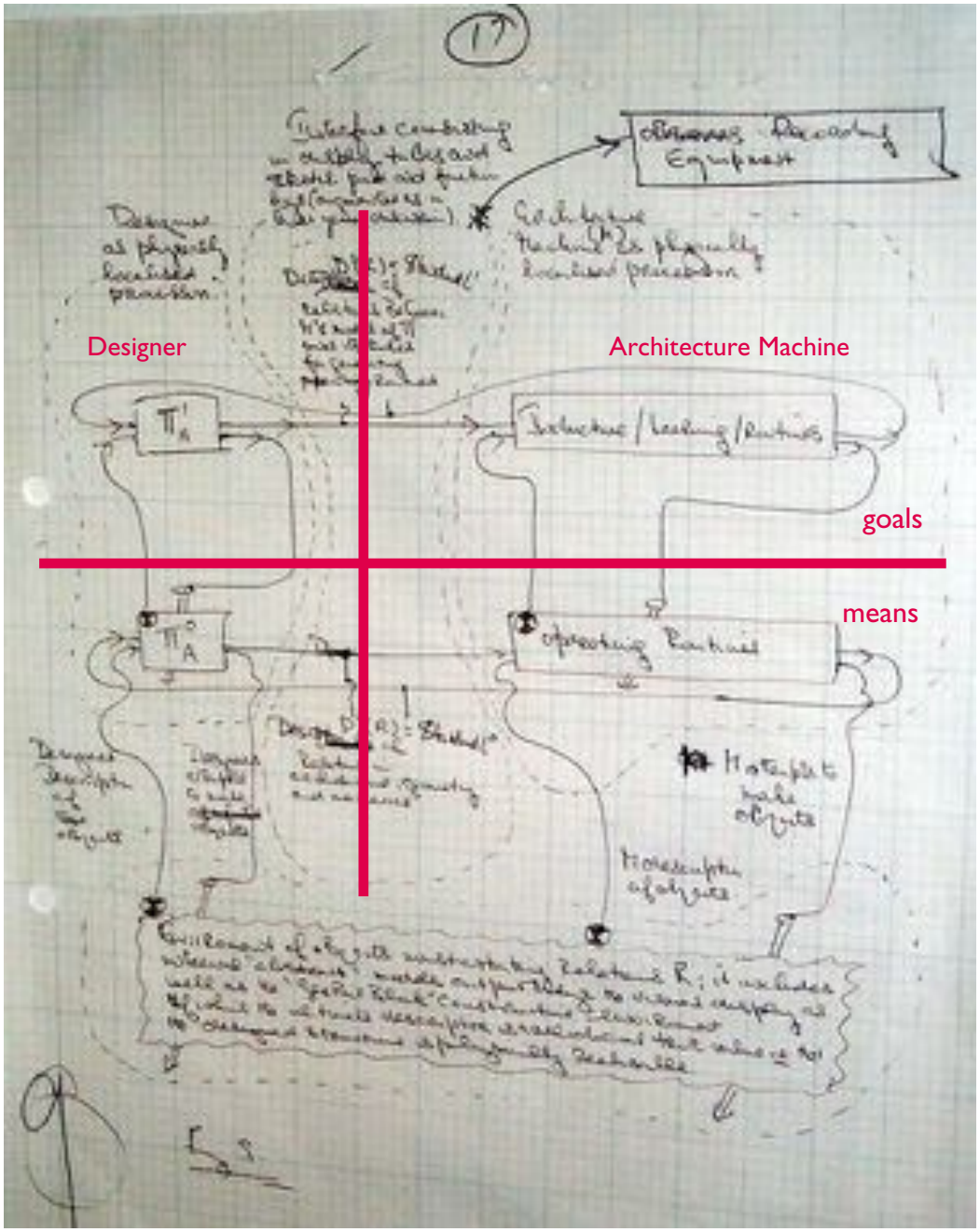

Π°_{A}
operating Routine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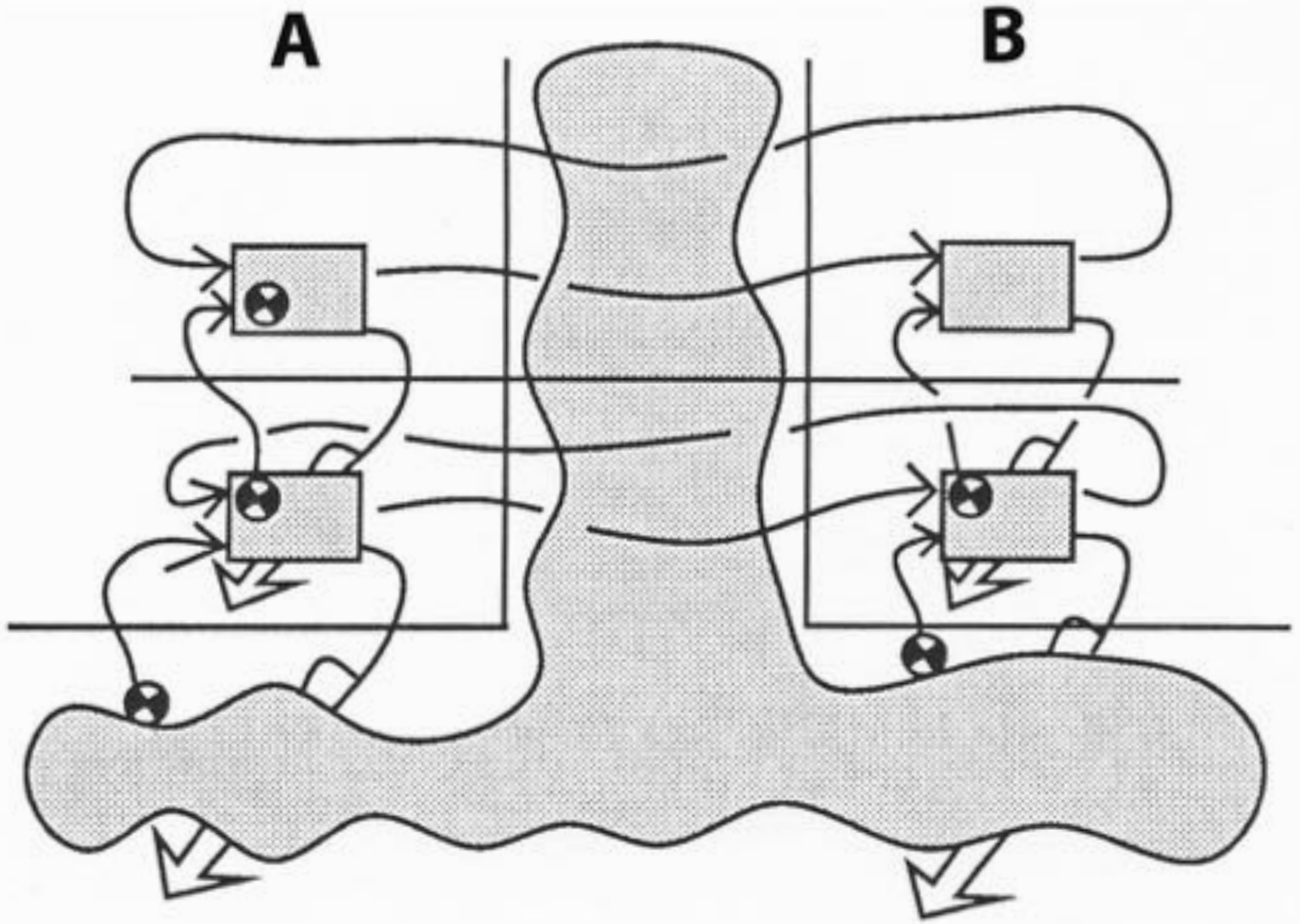
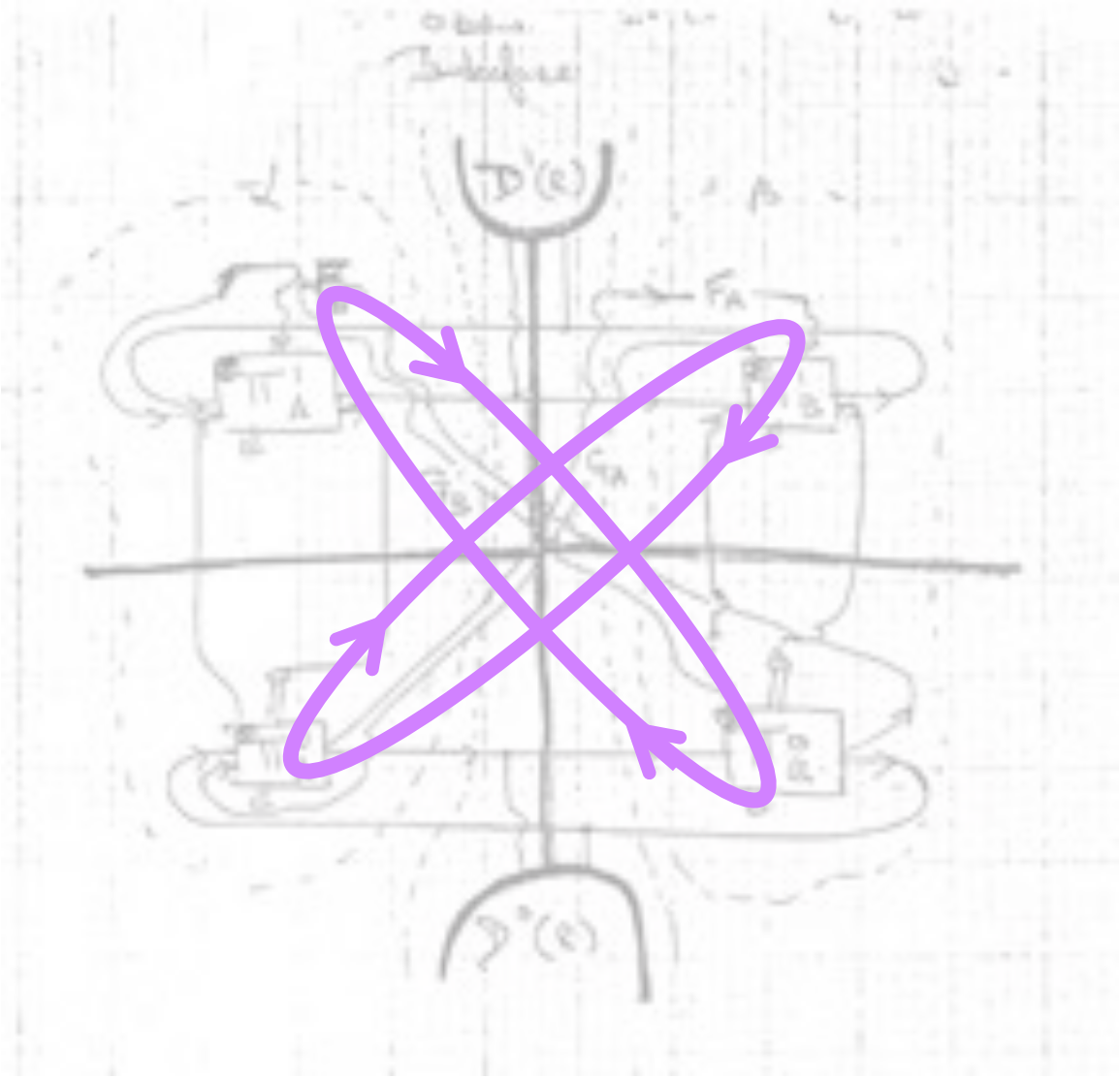

A
B

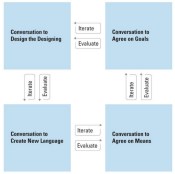
GRAPHICAL
CONVERSATION
THEORY

GRAPHICAL
CONVERSATION
THEORY

dance—contention—shared outcomes



Design



how has design changed?

cybernetics & design

conversation & design

design as conversation

rationale for systems literacy

iconic examples of design conversations

Andriano Olivetti & Marcello Nizzoli at Olivetti

Tom Watson & Eliot Noyes at IBM

Max Dupree & George Nelson at Herman-Miller

Hiroshi Yamauchi & Shigeru Miyamoto at Nintendo

Steve Jobs & Jonathan Ive at Apple

* via Hugh Dubberly

Hochschule für Gestaltung
Ulm, Germany

Founded under the Marshall Plan (1948 / 1953 to 1968)

Goals included social change—design as bulwark against fascism

Classes offered in operations research, cybernetics, and semiotics

Acquired status of the Bauhaus (Gropius blessed it)

via Hugh Dubberly

Hochschule für Gestaltung
Ulm, Germany

Norbert Wiener and Martin Heidegger visit and lecture

Bucky Fuller and Charles Eames visit

Bruce Archer and Horst Rittel on faculty

American design school leaders visit in 1962

British design school leaders visit in 1966

via Hugh Dubberly

then...

In 1963, Horst Rittel and Christopher Alexander are hired to teach at University of California Berkeley

In 1968, Ulm closes

1000+ papers are published in “design rationale”, including the process of design as based in feedback

Many more papers on “design patterns” after Alexander

In 1972, Rittel critiques the state of design methods, calls for a shift to design as rhetoric, echoing 2nd-order cybernetics

via Hugh Dubberly

Rittel and Webber, 1972

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. Policy problems cannot be definitively described. Moreover, in a pluralistic society there is nothing like the undisputable public good; there is no objective definition of equity; policies that respond to social problems cannot be meaningfully correct or false; and it makes no sense to talk about "optimal solutions" to social problems unless severe qualifications are imposed first. Even worse, there are no "solutions" in the sense of definitive and objective answers.

Rittel's Problems

simple problems

question is clear—we only need to provide an answer

2 + 2 = ?

why doesn't the lightbulb work?

most problems given in school are like this

Rittel's Problems

wicked problems

participants hold conflicting views of the problem

coming to agreement on the problem is impossible—without reframing

reframing is a process of construction and agreement

Rittel's Problems

reframing is a process of construction and agreement—
even then, we cannot:

– create a definitive formulation ("poverty can be fixed by education")

– know when we are done (we don't know if we can do better)

– apply a definitive test of a solution (any solution has consequences)

– avoid consequences of failed solution (cannot unbuild a freeway)

– reuse knowledge on another problem (each is unique)

the most important problems of the 21st century are like this

Rittel's Problems

2nd-order

reframing is a process of construction and agreement—
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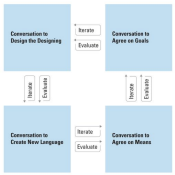
Design

how has design changed?

cybernetics & design

conversation & design

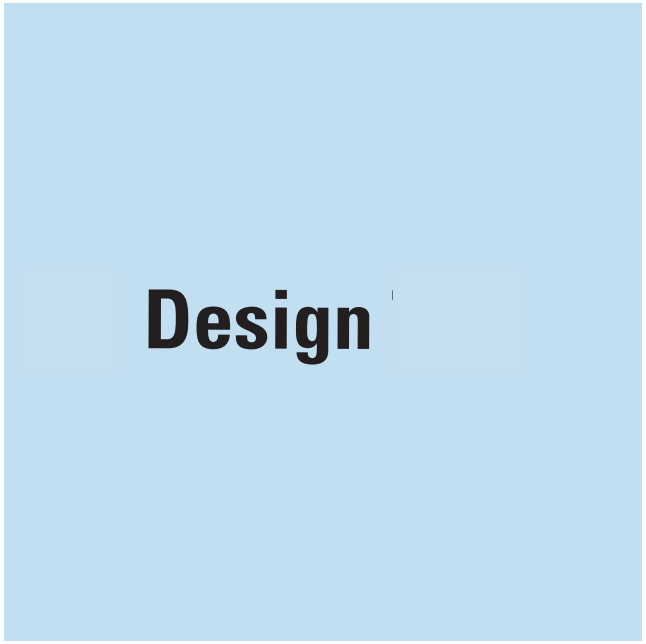


design as conversation

rationale for systems literacy

	HCD = Guidelines, Desired Elements	Cybernetic Design = Models, Explanations & Prescriptions
1	**The design is based upon an explicit understanding of users, tasks and environments.**	**Rigorous models of interaction, purposive systems, feedback, effective behaviors to achieve goals**
2	**Users are involved throughout design and development.**	**Incorporating required variety in the design process**
3	**The design is driven and refined by user-centered evaluation.**	**Criteria for steering the design process based in metrics of human values, human qualities, human needs; how and where to apply the criteria based on prescriptive models**
4	**The process is iterative.**	**Cybernetic processes are always iterative**
5	**The design addresses the whole user experience.**	**Cybernetic models are systemic and holistic, capable of modeling as large a context as appropriate**
6	**The design team includes multidisciplinary skills and perspectives.**	**Incorporating required variety in the design process**
	Wikipedia article, Human-Centered Design, section on UCD Models and Approaches	**Dubberly and Pangaro, Cybernetics and Service-Craft: Language for Behavior-Focused Design, 2008.**
	http://en.wikipedia.org/wiki/User-centered_design#UCD_models_and_approaches	http://www.dubberly.com/articles/cybernetics-and-service-craft.html

Design... from Thinking to Conversation



What is the process of Design Thinking?

Observe

Brainstorm

Prototype

What does that mean?

Ethnography	**Observe**
Open-ended idea generation	**Brainstorm**
Making and testing	**Prototype**

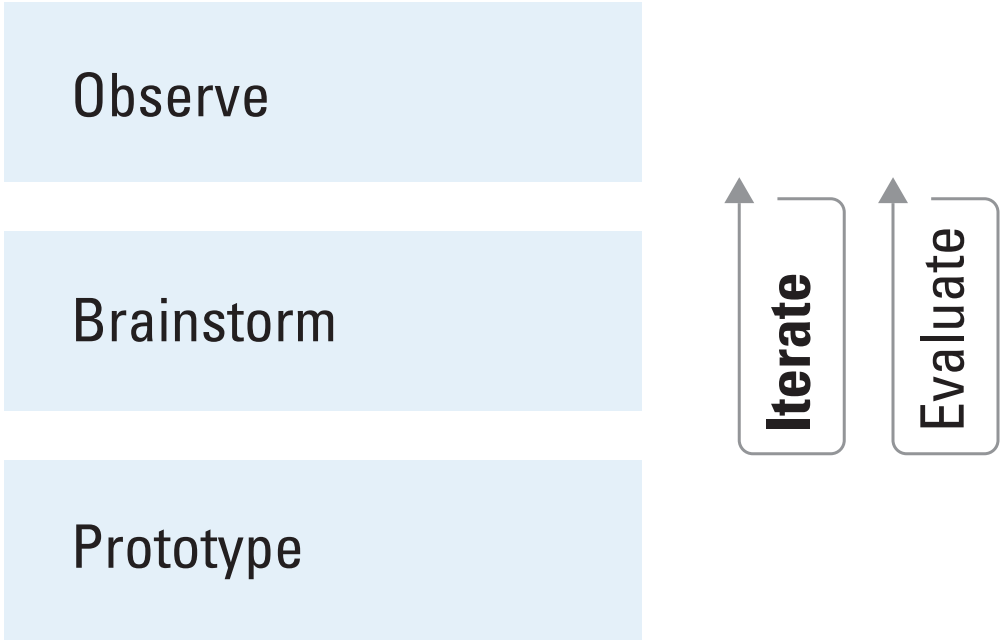
What does that mean?

Observe

Brainstorm

Prototype

What does that mean?

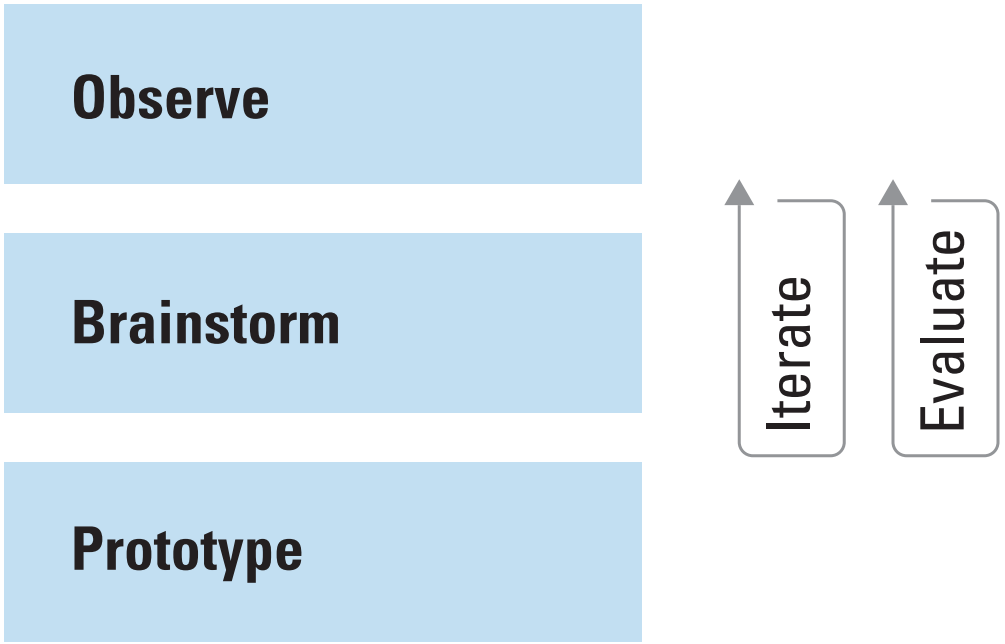


Limitations

Specific?

Rigorous?

Repeatable?



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Observe

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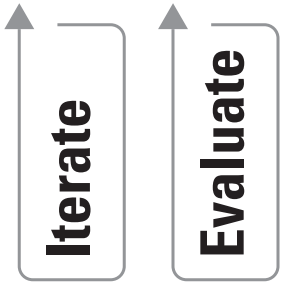


Clear?

Quantifiable?

Directed?

Rethinking...

Specific?

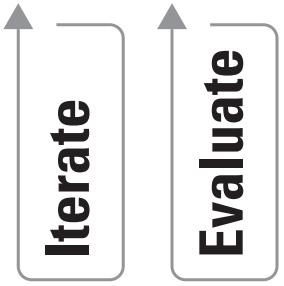
Rigorous?

Repeatable?

Observe

Brainstorm

Prototype

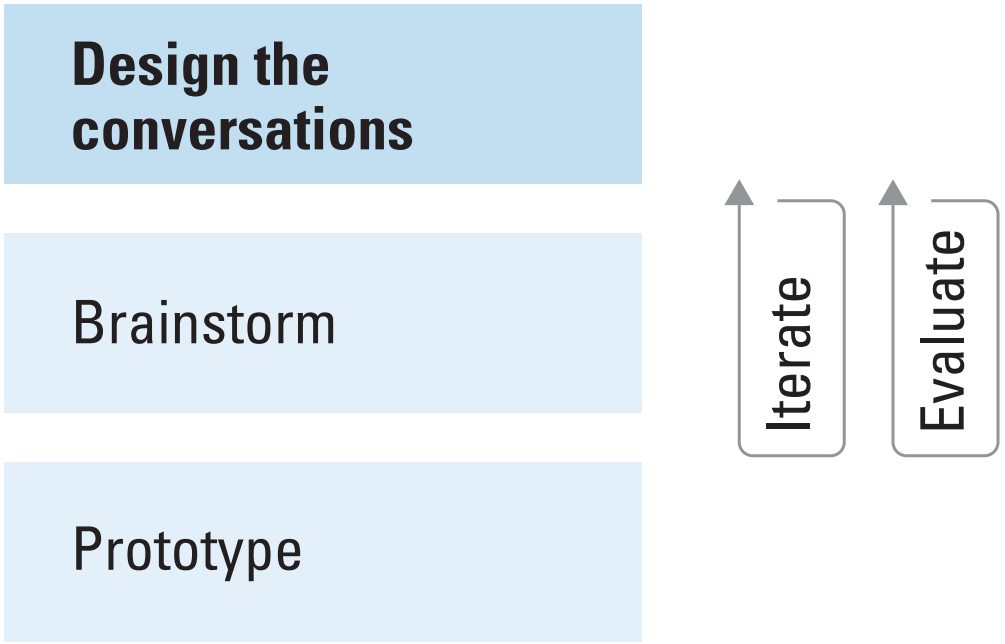


Clear?

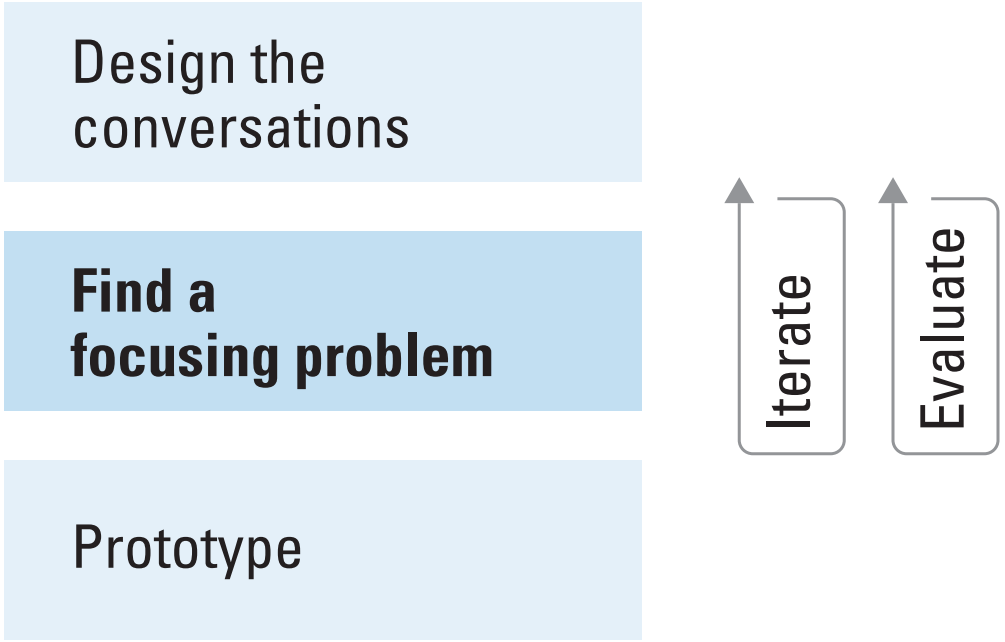
Quantifiable?

Directed?

Design the Conversations



Find a Focusing Problem



Find a Focusing Problem

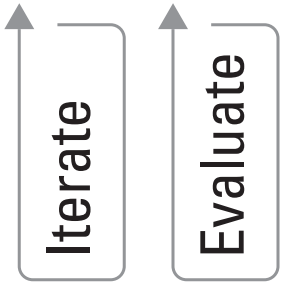
Economic
From atoms to bits

Social
Consistent with who we are

Design the conversations

Find a focusing problem

Prototype



Requirements for Focusing Problems

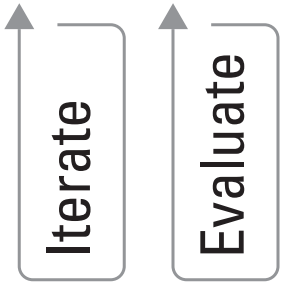
- Problem class replaces transformation of mass & energy with actionable information flows—so that it participates in the new economy—"bits to atoms"
- Economic potential—removing uncertainty in the market is worth something
- Consistent with the social system—to connect with who we are (our history) & what we can see ourselves engaging in
- Requisite variety of domains of expertise needed to solve problem can be defined and made available
- Initial set of individuals who want to do it
- An exemplar or teacher for the business as a whole—so that what is learned can be reproduced.

Prototype a Solution

Design the conversations

Find a focusing problem

Prototype a solution

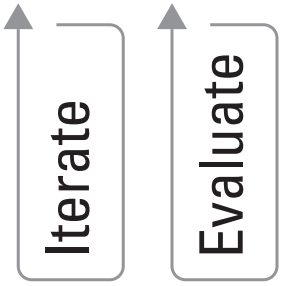


Iterate & Evaluate

Design the conversations

Find a focusing problem

Prototype a solution



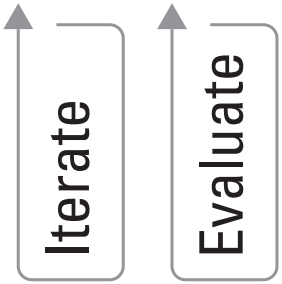
Iterate & Evaluate

Measure
improvements

Design the
conversations

Find a
focusing problem

Prototype a solution



Iterate & Evaluate

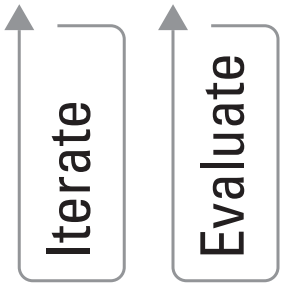
Measure improvements

Measure convergence on design goals

Design the conversations

Find a focusing problem

Prototype a solution



Conversation is the core

Measure improvements

Measure convergence on design goals

Conversation to Agree on Means

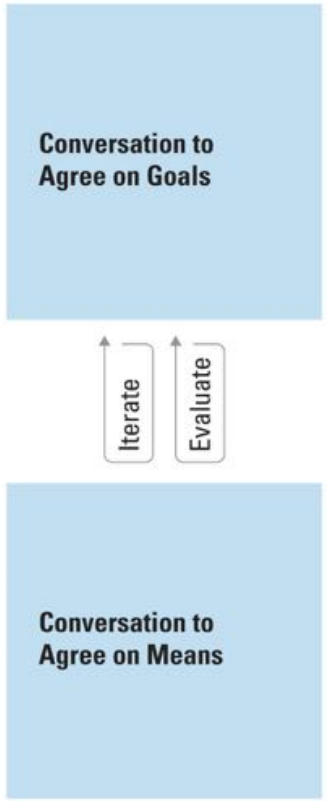
Design... from Thinking to Conversation

Rethinking Design Thinking

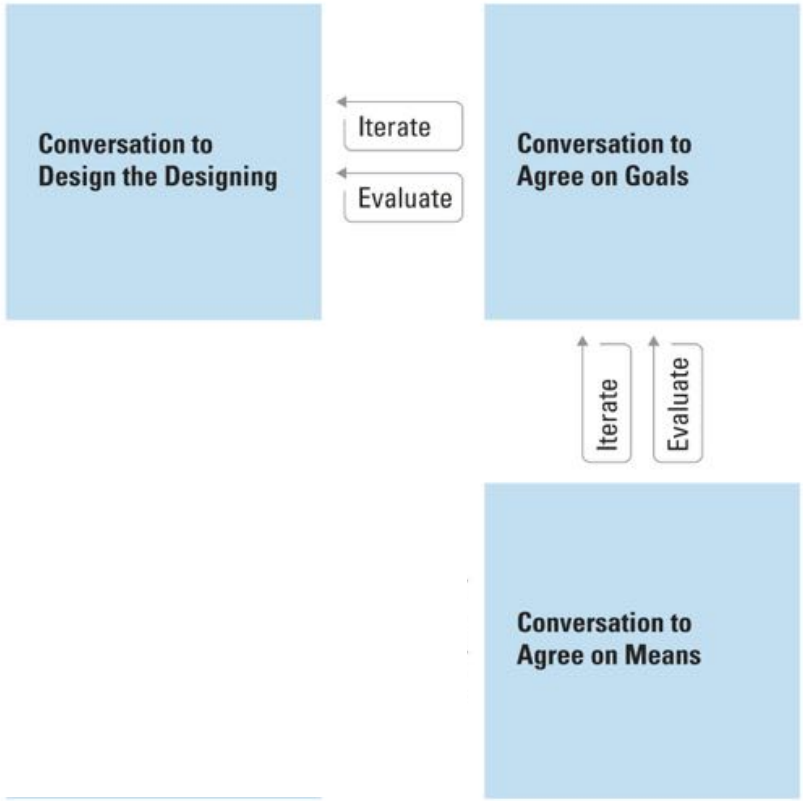
Conversation to Agree on Means

Design as Conversation

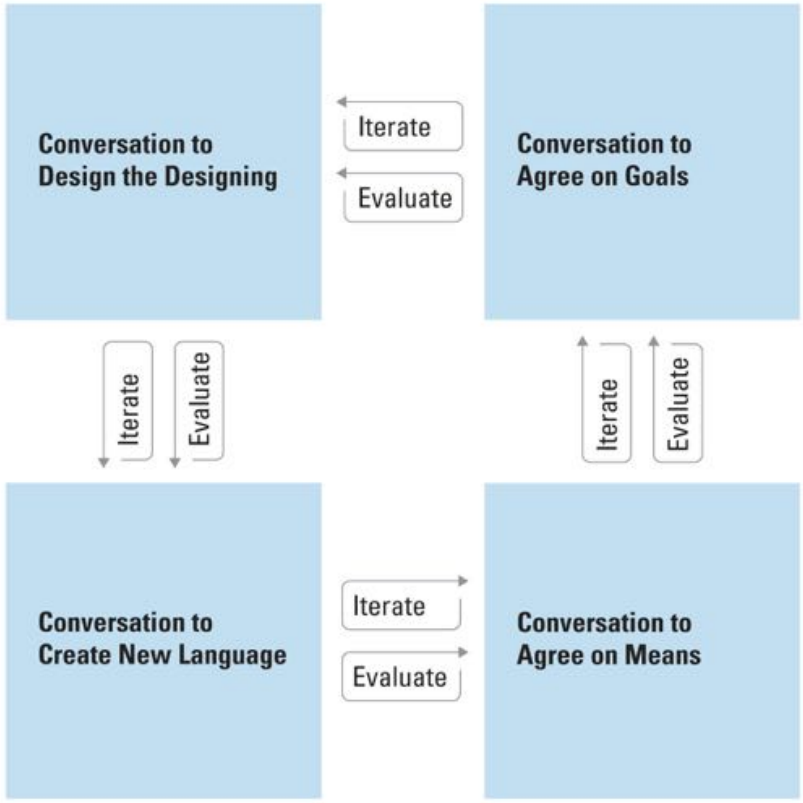
Design as Conversation



Design as Conversation



Design as Conversation



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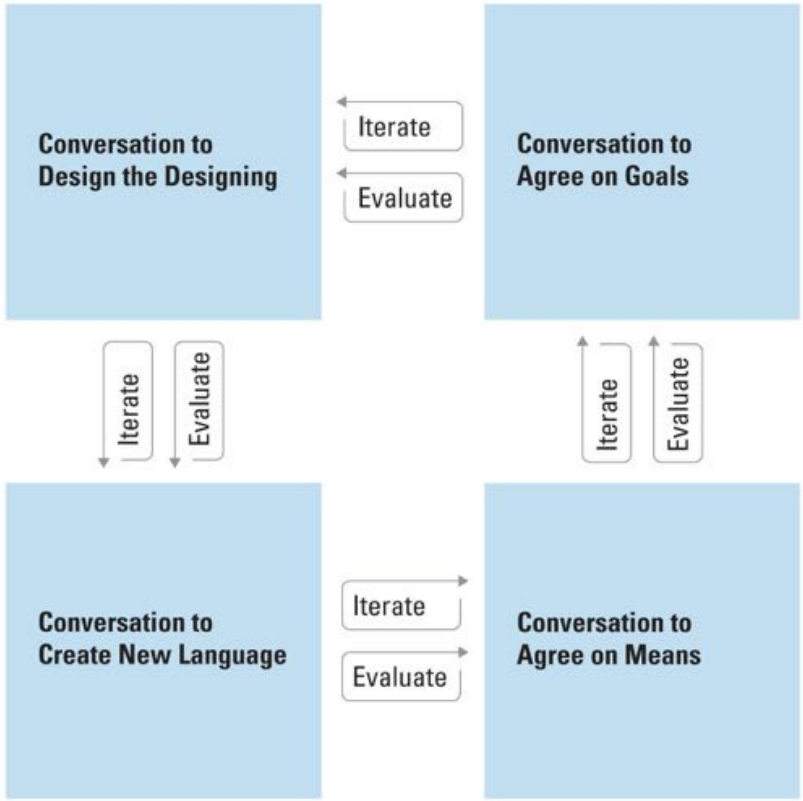

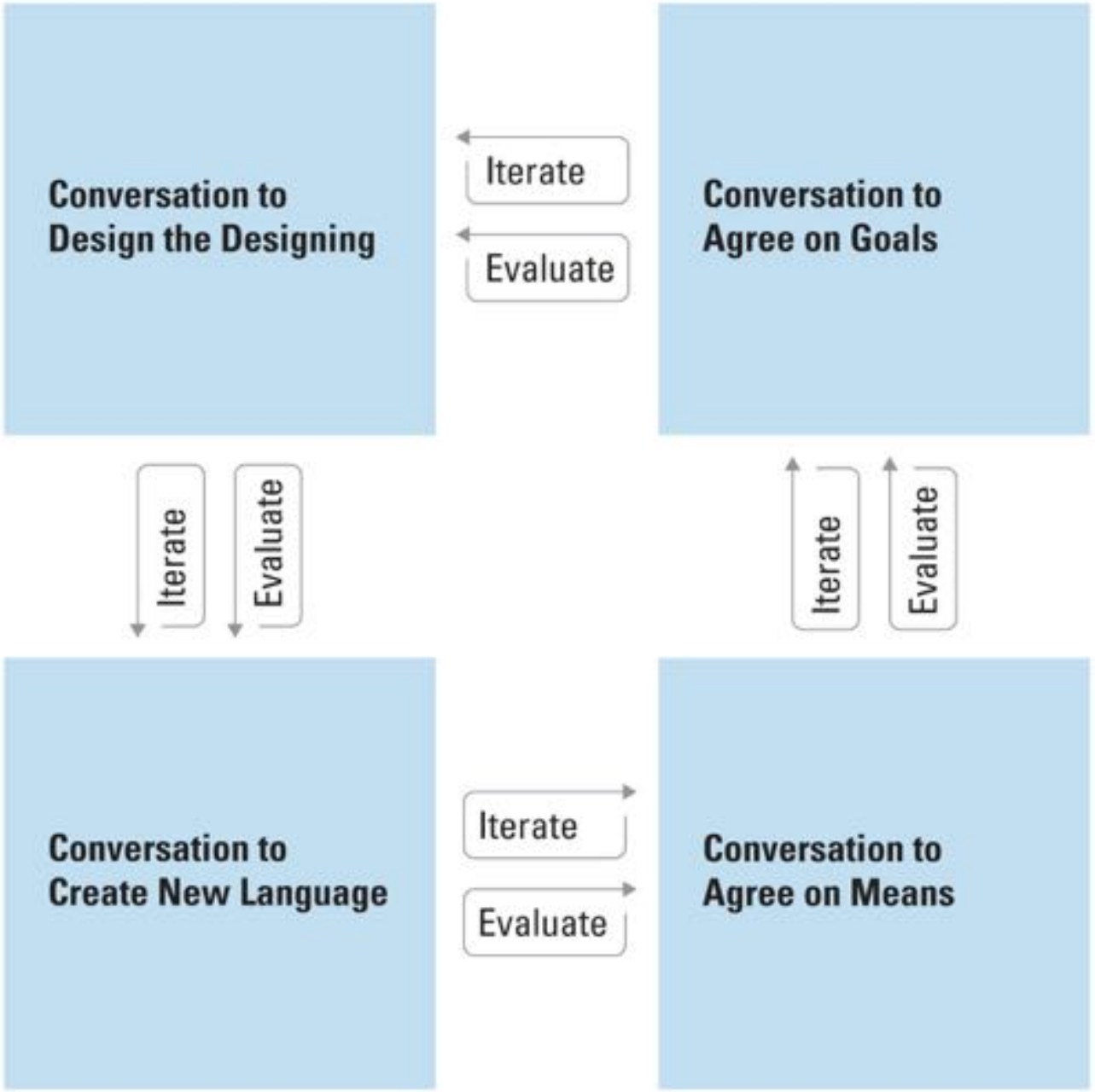
Conversation to Design the Designing
Iterate
Evaluate
Conversation to Agree on Goals
Iterate
Evaluate
Iterate
Evaluate
Conversation to Create New Language
Iterate
Evaluate
Conversation to Agree on Means

A. Conversation to Agree on Goals
Decide why we are doing what we are doing
- to create value for shareholders
- to pursue our vision for a market
- to commit to sustainable innovation.

B. Conversation to Design the Designing
Identify irreplaceable expertise for success in designing a new space of possibilities.

C. Conversation to Create New Language
As a new space of possibilities evolves, a new language frames and defines it.

D. Conversation to Agree on Means
Decide how to achieve our goals, that is, create a plan for the actions of the enterprise.

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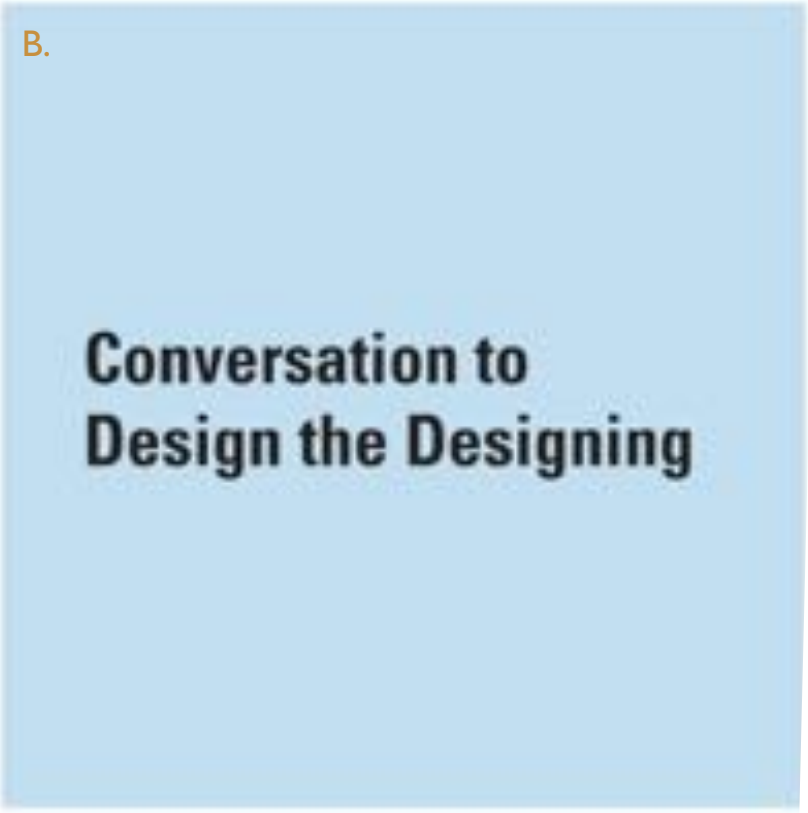

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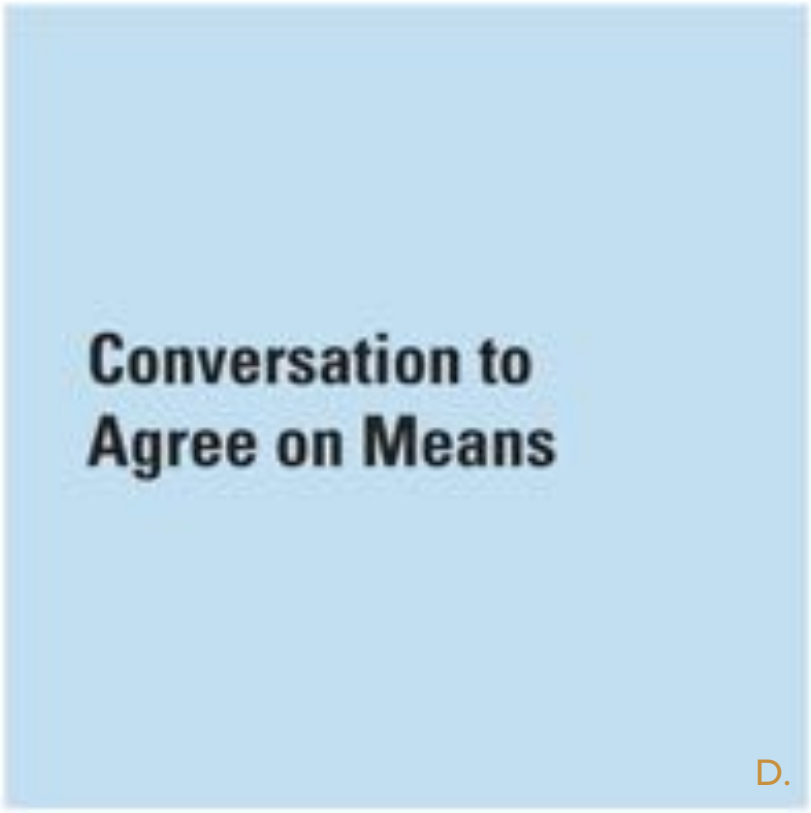

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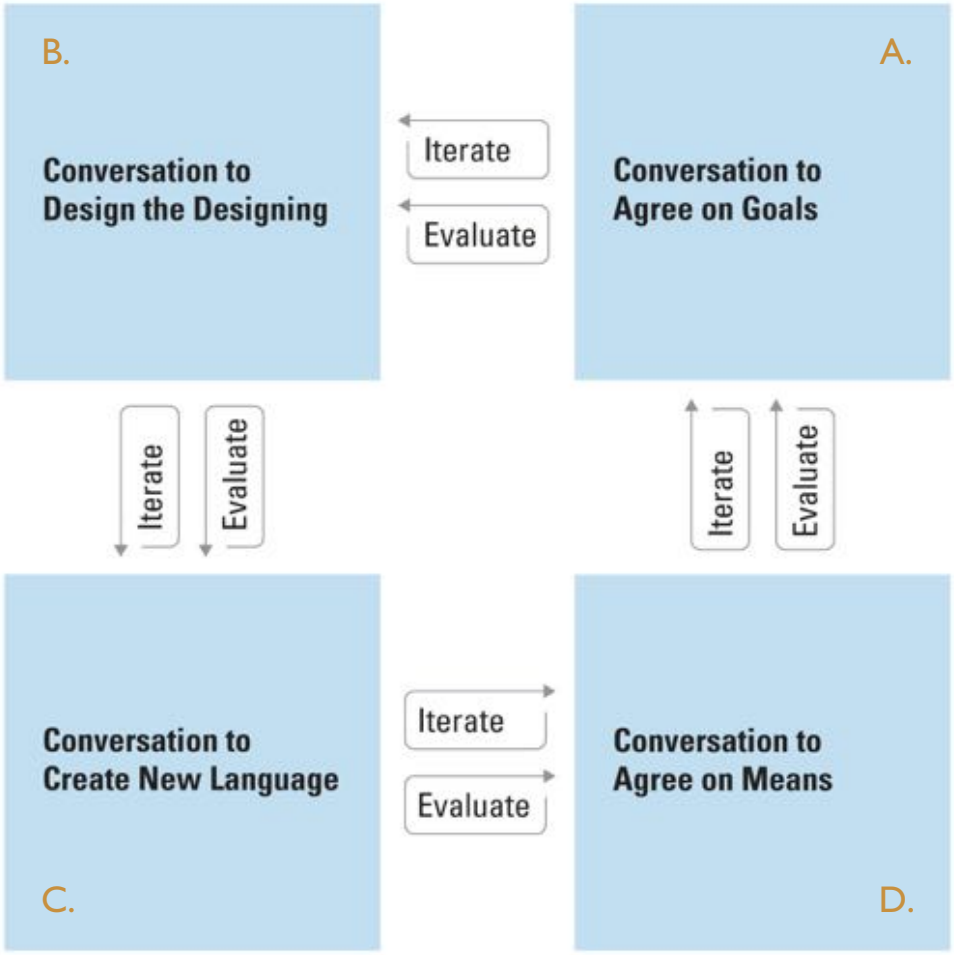


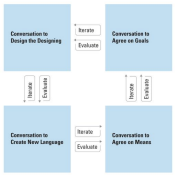
Design

how has design changed?

cybernetics & design

conversation & design

design as conversation



rationale for systems literacy

If design, why systems?

Some of today's design challenges are 'complex problems'.

Complex problems are usually problems across systems, where systems are platforms of interaction among objects and rules.

Design for complex problems requires first-order systems literacy.

If design, why systems?

If systems, why cybernetics?

Many of today's important design challenges are 'wicked problems'.

Wicked problems are always situations across systems, where some systems are platforms of language and conversation.

Design for wicked problems requires cybernetic systems literacy, because cybernetics subsumes human agency and purpose.

If design, why systems?

If systems, why cybernetics?

If cybernetics, why second-order cybernetics?

Taming today's wicked problems requires the acknowledgment of framing—the subjectivity of looking at situations from a perspective that is only one of many, yet must support objective facts as well as create an argument for some design approaches above others.

Design for wicked problems and reframing requires second-order cybernetics, because second-order makes the role of the observer explicit, and therefore makes explicit the responsibility of the designers for the process of design itself.

If design, why systems?

If systems, why cybernetics?

If cybernetics, why second-order cybernetics?

If second-order cybernetics, why design?

If designers must be responsible for the process of design, it is the responsibility of designers to seek the most effective tools and methodologies—and to document, evolve, and disseminate them into the community of design and into the world of wicked problems.

Therefore, designers must themselves be responsible for systems literacy as the foundation for design.

If design, then systems.

If systems, then cybernetics.

If cybernetics, then second-order cybernetics.

If second-order cybernetics, then design.

Design

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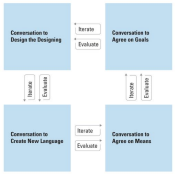
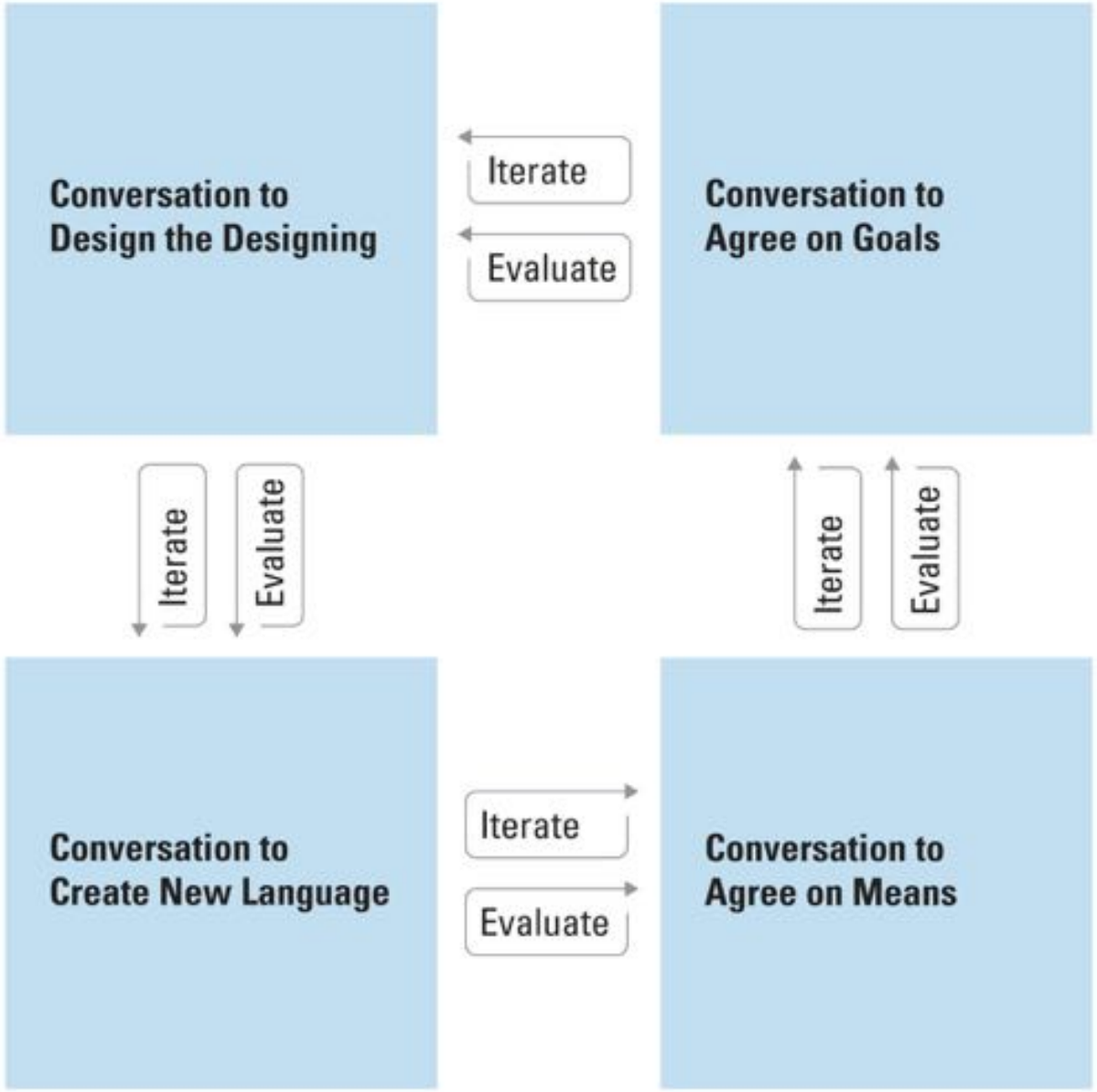


rationale for systems literacy

CYBERNETICS CONVERSATION DESIGN



pangaro@generalcybernetics.net