

The Design of Ethical Interfaces

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The Design of Ethical Interfaces

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The Design of Ethical Interfaces

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Organizing Principle

“I shall act always...

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Organizing Principle

“I shall act always so as to increase...

The Design of Ethical Interfaces

Organizing Principle

***“I shall act always so as to increase
the total number of choices.”***

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– Heinz von Foerster

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Organizing Principle

***“I shall act always so as to increase
the total number of choices.”***

— **Ethical Imperative**, Heinz von Foerster

Click for PDF of “Ethics and Second-Order Cybernetics”, 1991

The Design of Ethical Interfaces

Ethical Interfaces – Axiom #1

“As a designer, I shall act always so as to increase the total number of choices for a user.”

– Ethical Imperative, Interaction Designers

What the hell does this mean? How do we do this?

Interface Quandry #1

a. Recommendation Engines

***Recommendations are based on who the user was
— recommendations are based on the past.***

At worst, the interface presumes a non-evolving, non-living user.

Interface Quandry #1

b. Search Engines

***Search results are based on who the user was
– search results are grounded in the past.***

Search results are “of the past” – they are “dead on arrival.”

Interface Quandry #1

Recommendations & Search Results = Looking Backward

These engines deliver outcomes based on the past – treating us as we used to be, as if we are dead.

Questions are alive — questions are “of the now”.

How would a user manifest as *alive* in these interactions?

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I. Treat Users as Alive & Evolving

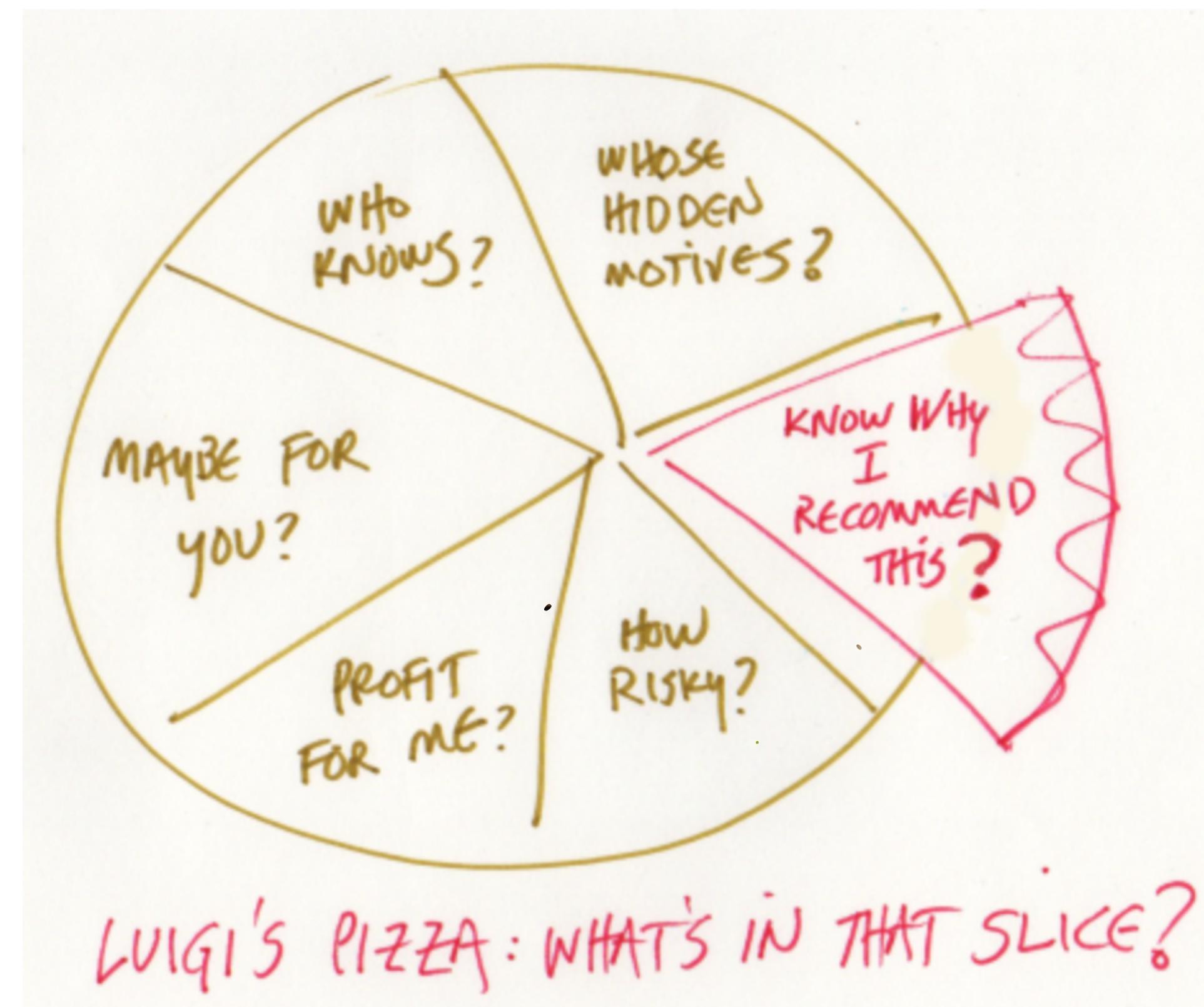
Design Prototype #1: Build Question Engines

Compute relevant questions that invite a generative conversation such that novel, forward-seeing choices may be explored.

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Interface Quandry #2

Luigi's Pizza – A Parable



Click for more about Luigi's Pizza

II. Give Users Equal Agency

Design Prototype #2 – Universal Dialog UI

Always incorporate a dialogical interface so that a user can question the computed offering of any recommendation or result.

“Why did you recommend that? Where did that result come from?”

“Did you consider this (objective) factor or this (subjective) concern?”

III. Guide Users to Valuable Conversations

Design Prototype #3 – “Intelligent Conversation” Metric

Implement a heuristic to evaluate a conversation in terms of its intelligence and value, in order to draw human attention to generative interactions.

In contrast to the “Turing Test, let’s build a “**Turning Test**.”

Click for more

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Design & Prototyping – Research Questions

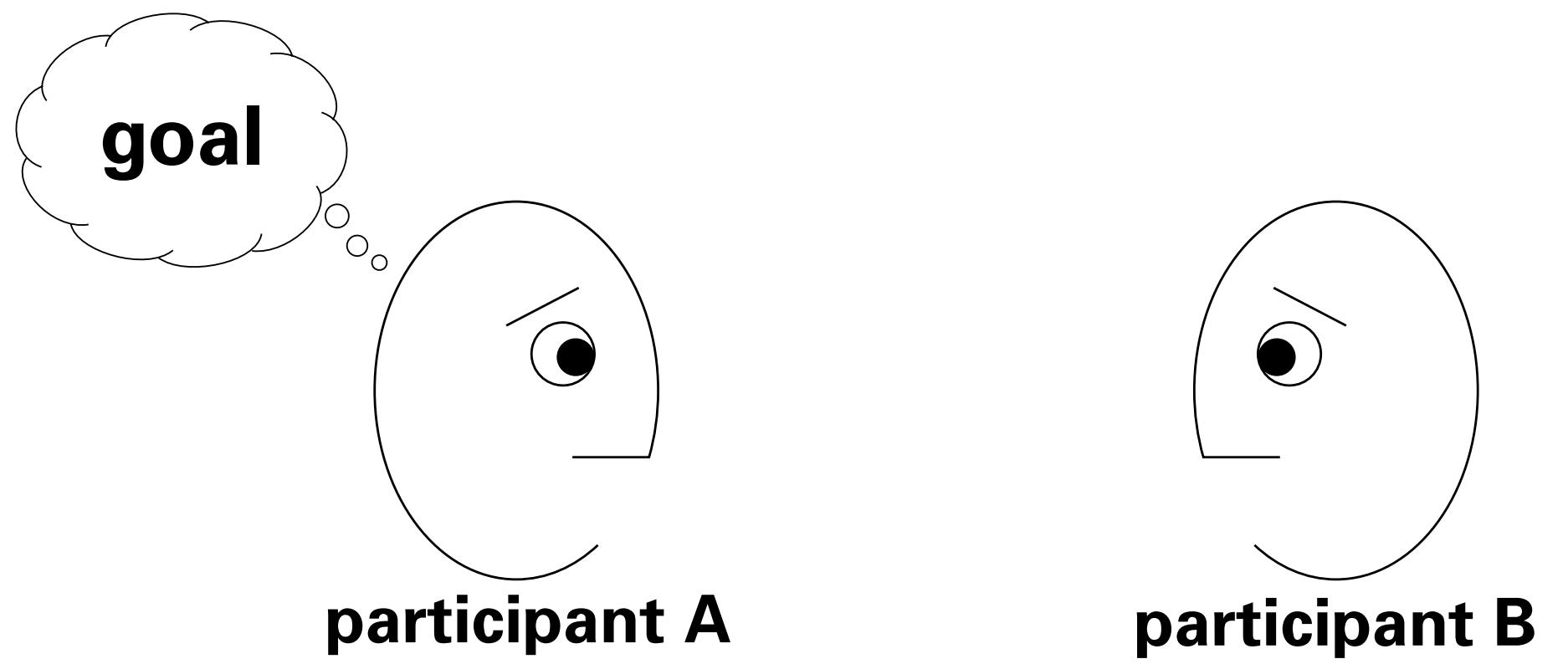
- #1. *Question Engine – Do users evolve better understanding?*
- #2. *Universal Dialog UI – Do users increase their agency?*
- #3. *Turning Test – Do users improve their focus of attention?*

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Design & Prototyping – Research Questions

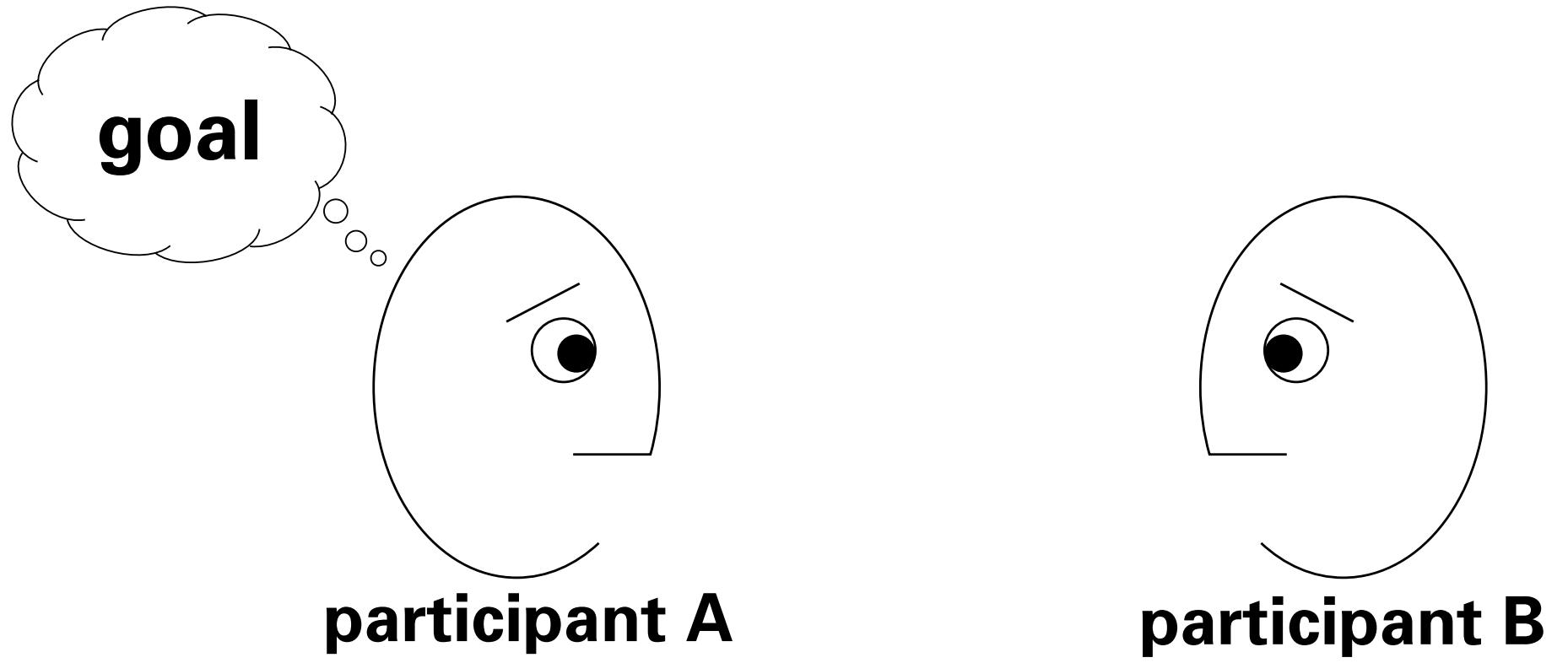
- #1. *Question Engine – Do users evolve better understanding?*
- #2. *Universal Dialog UI – Do users increase their agency?*
- #3. *Turning Test – Do users learn from the conversation?*

Conversational Frame



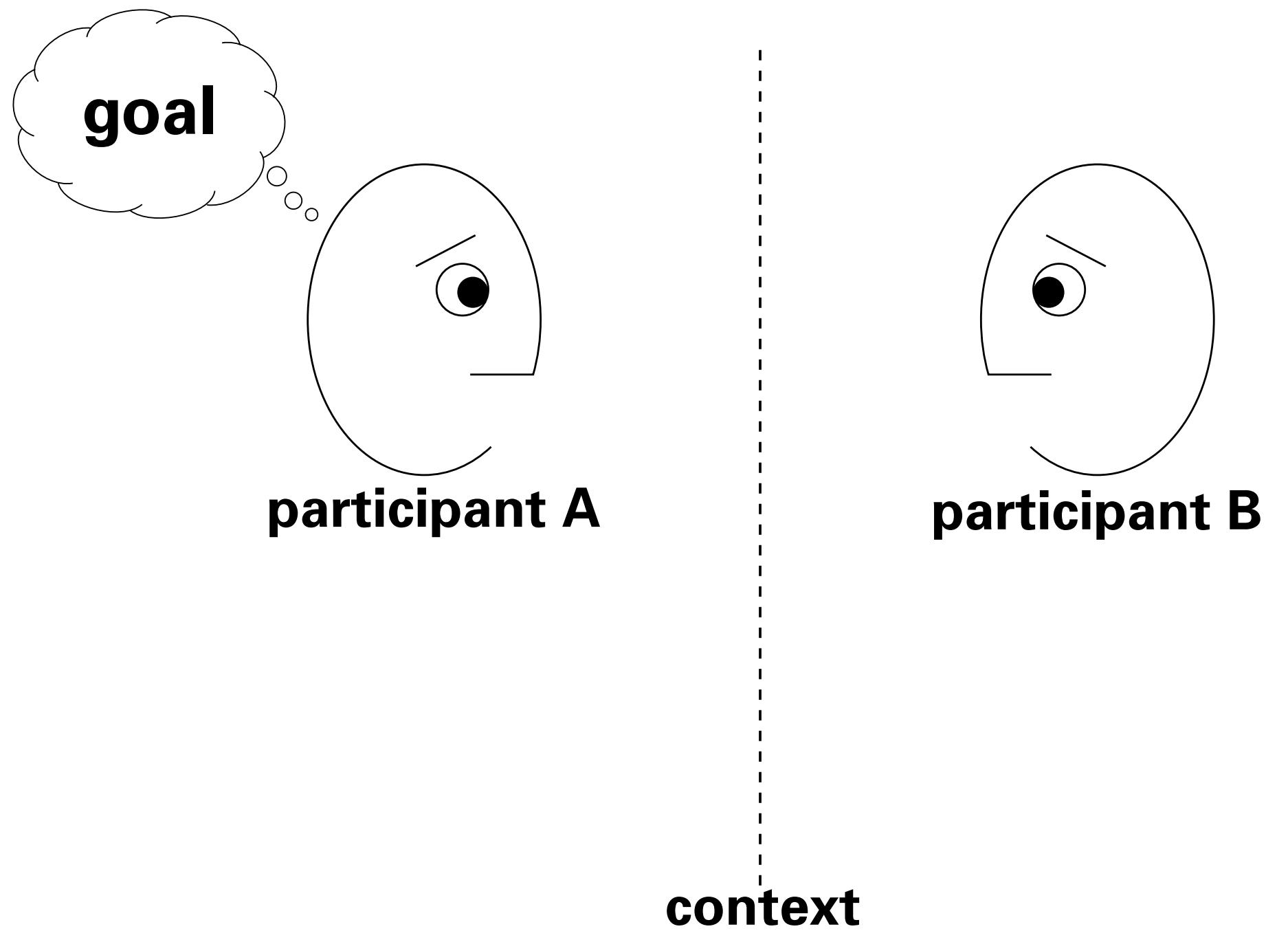
After Dubberly Design & Paul Pangaro

A participant has a goal.



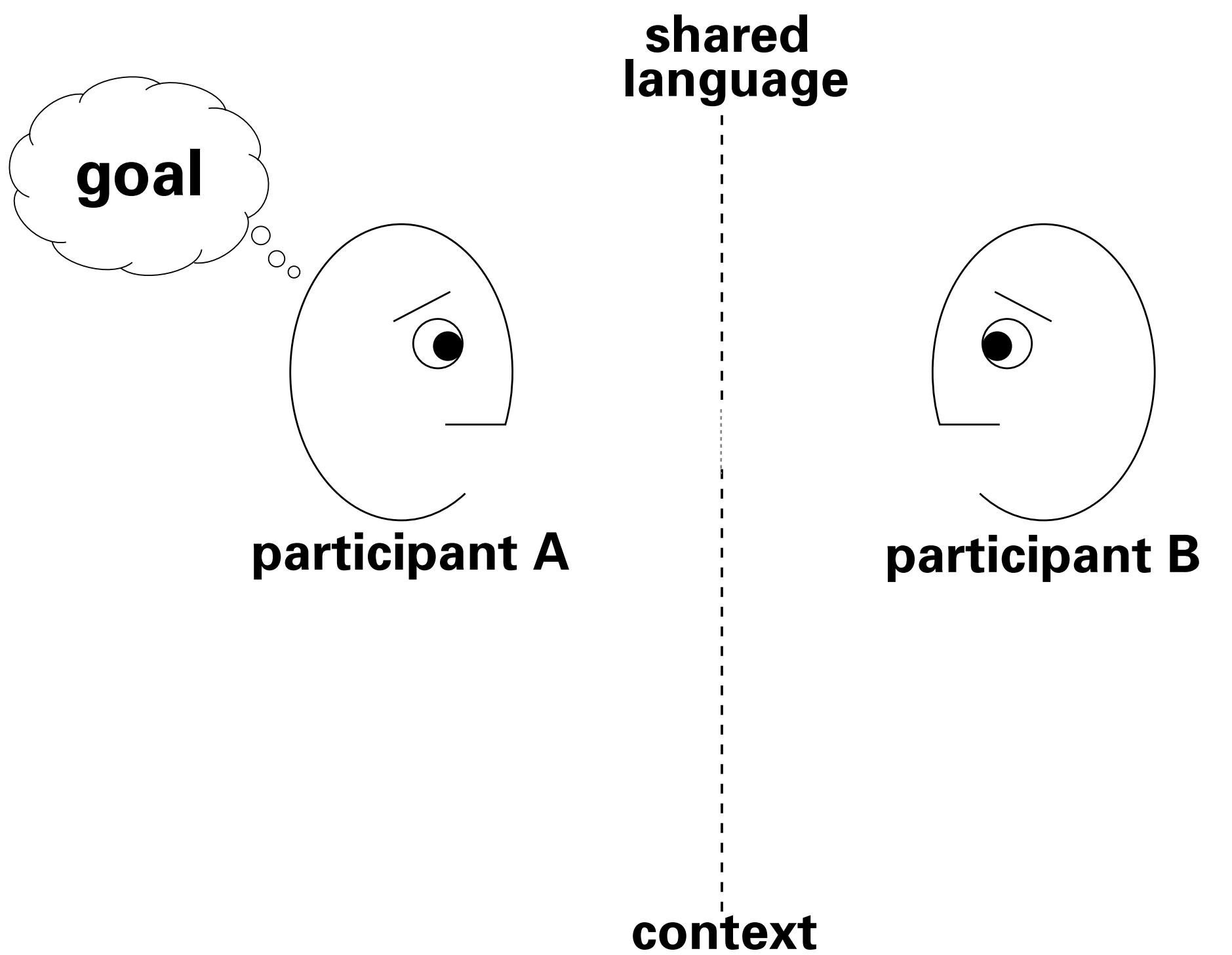
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Chooses a context.



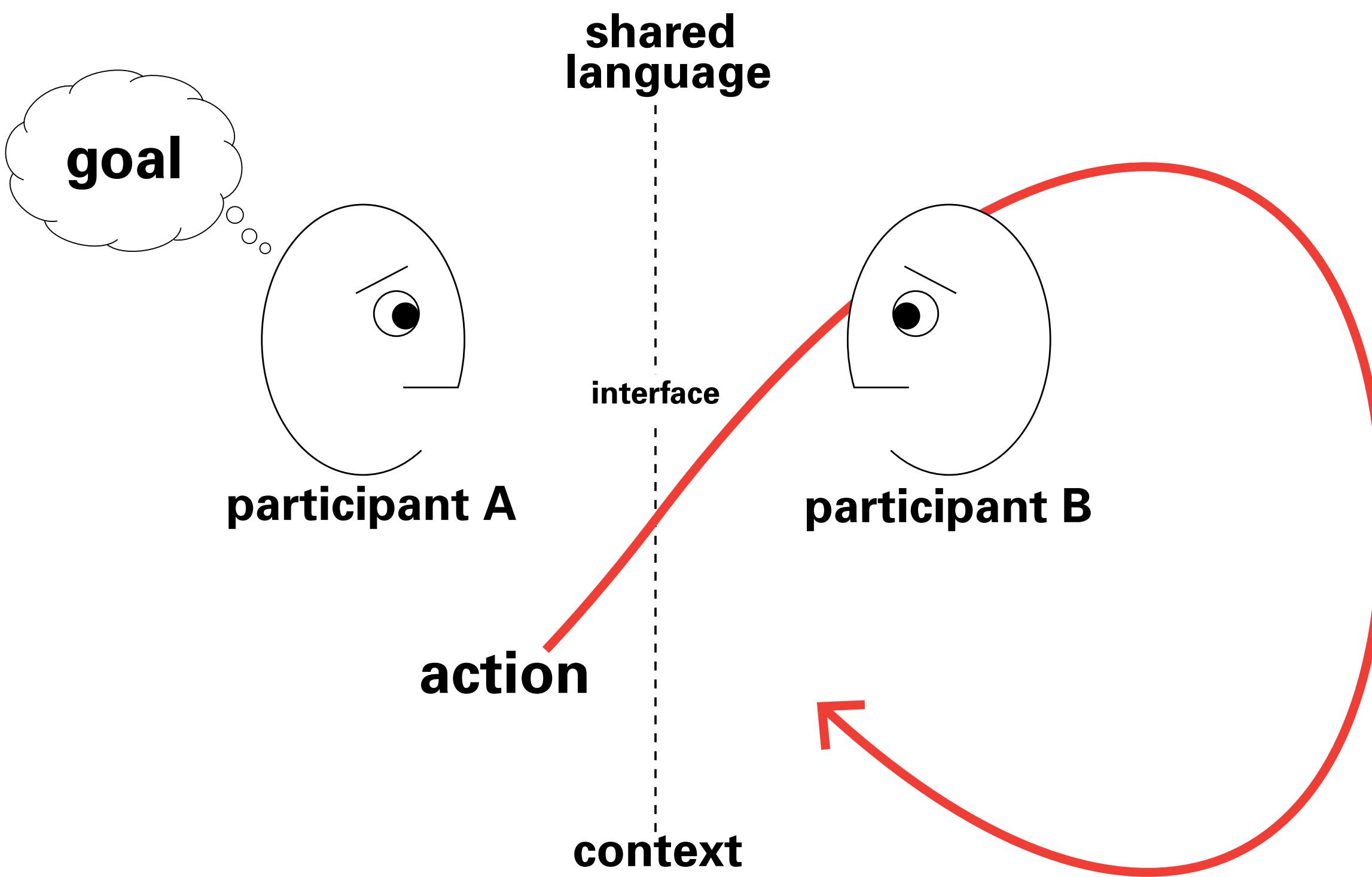
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Chooses a language.



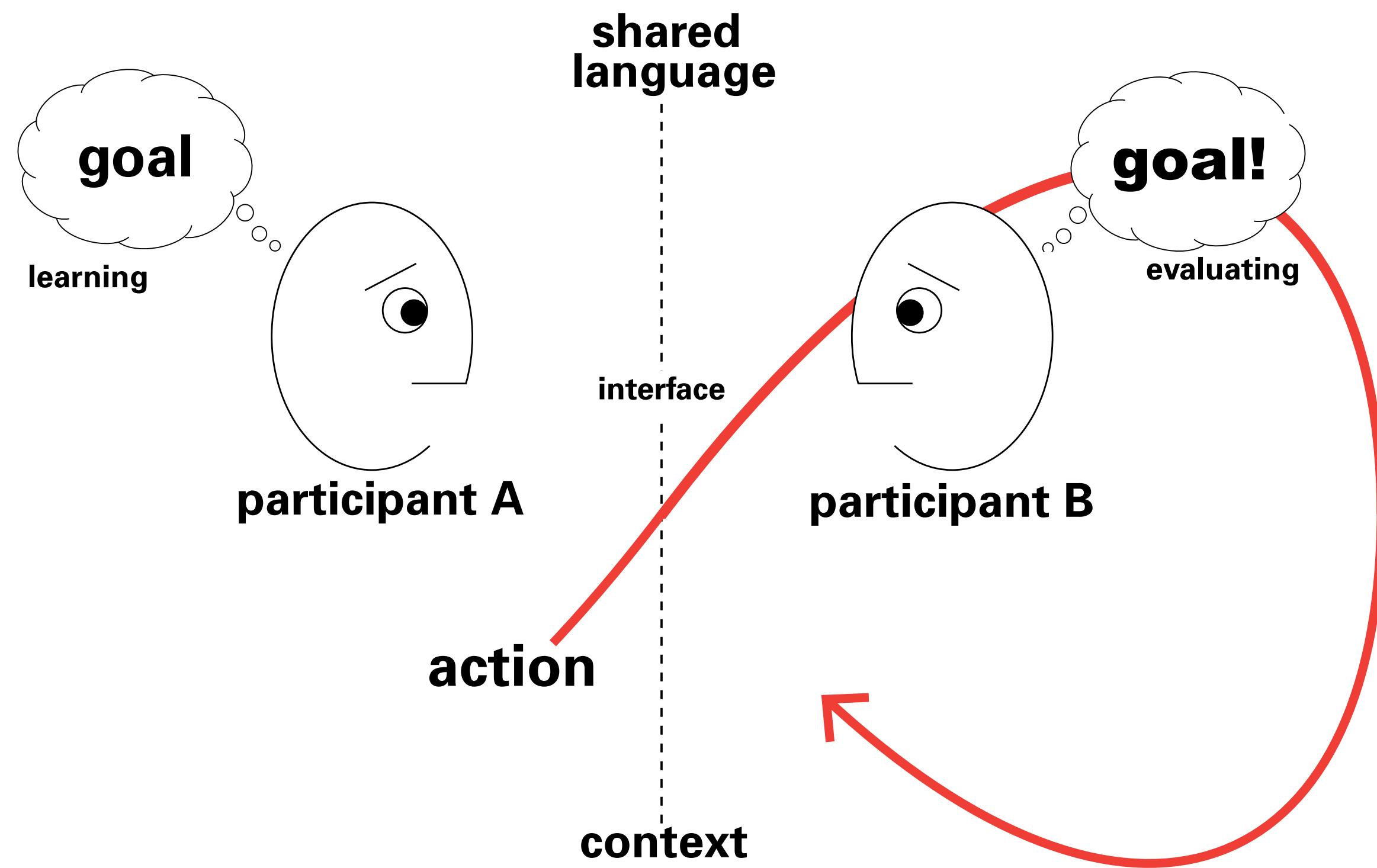
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Begins an exchange.



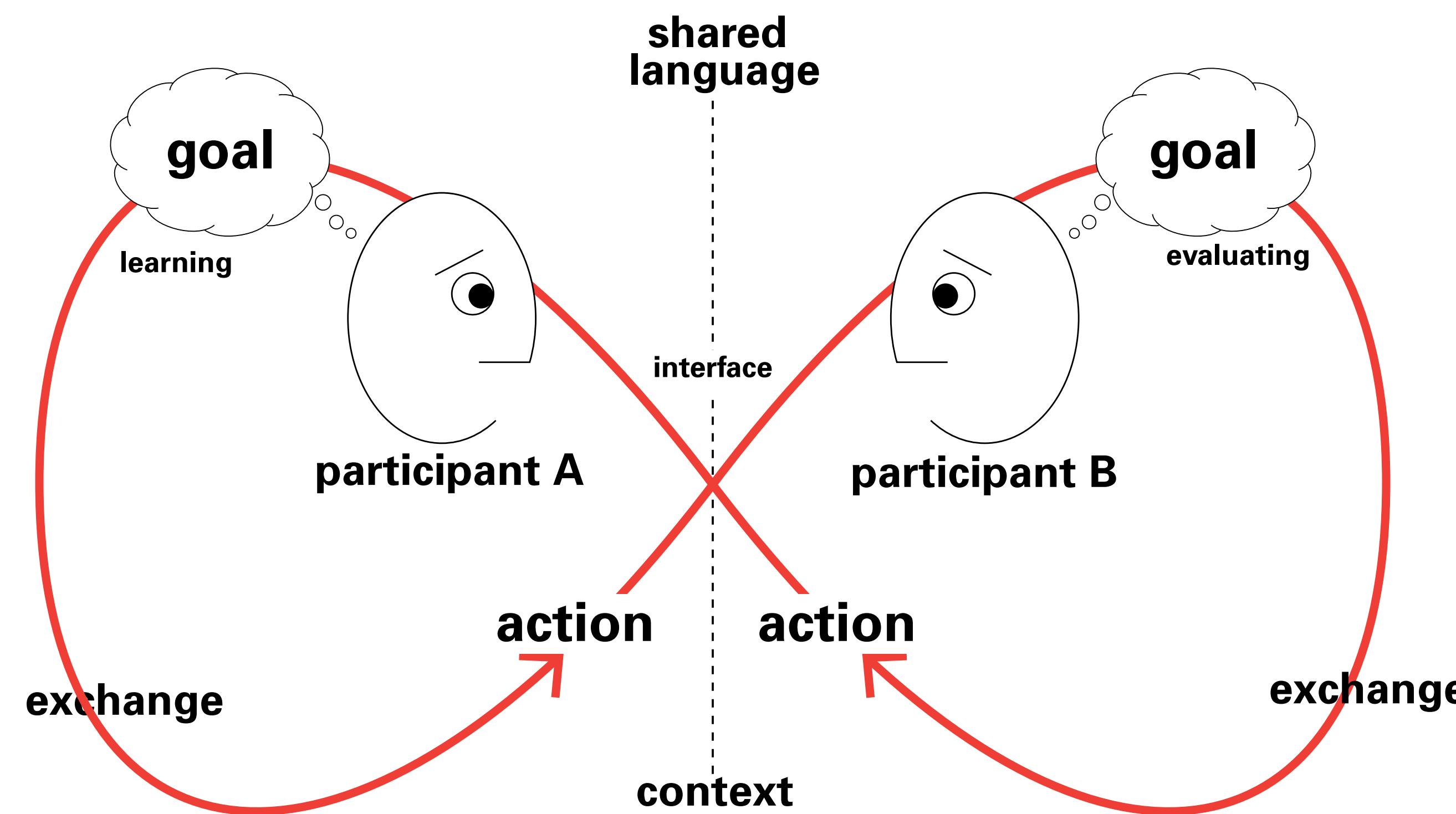
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May evoke a response...



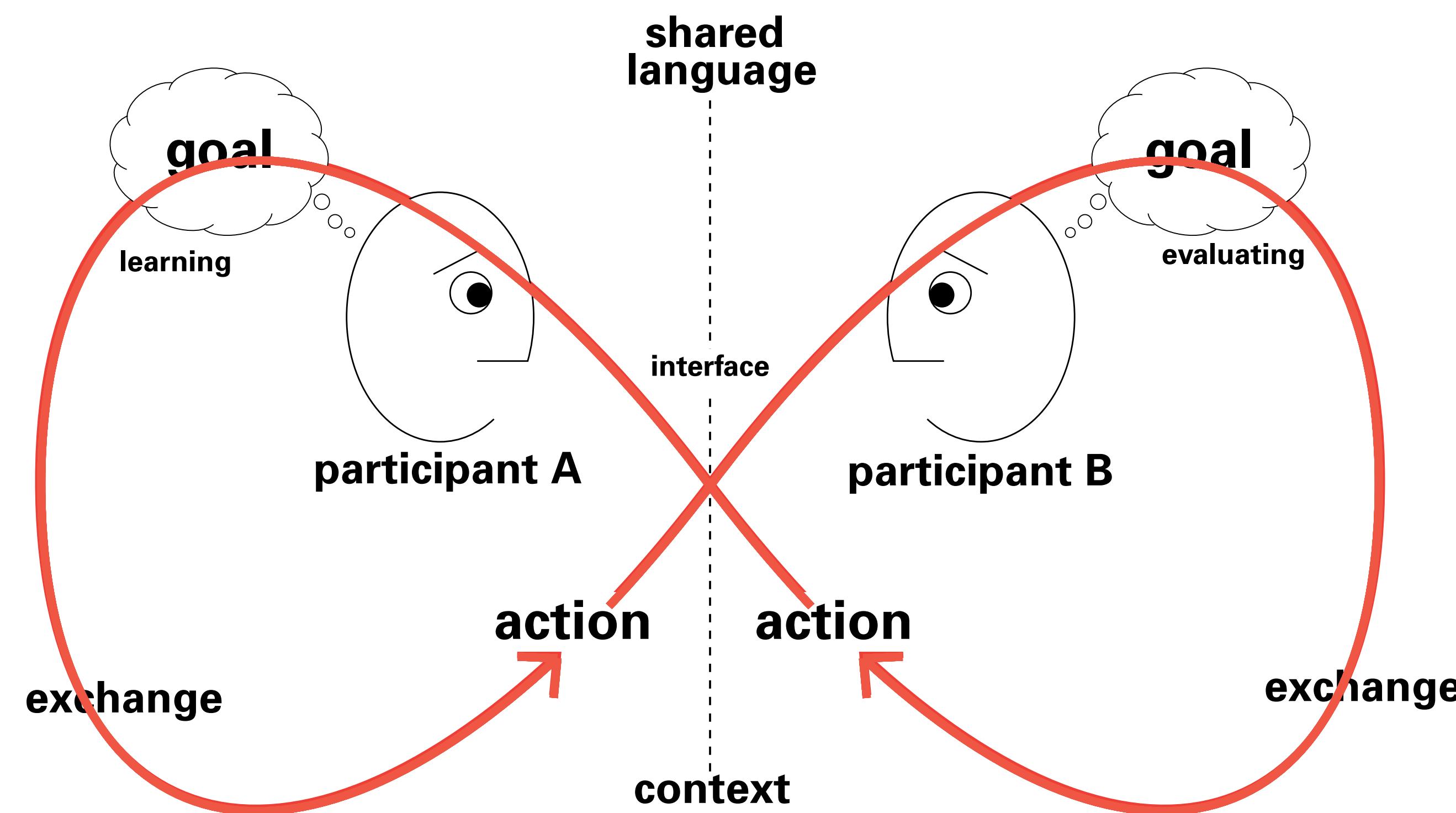
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... and a reaction that evokes a reaction...



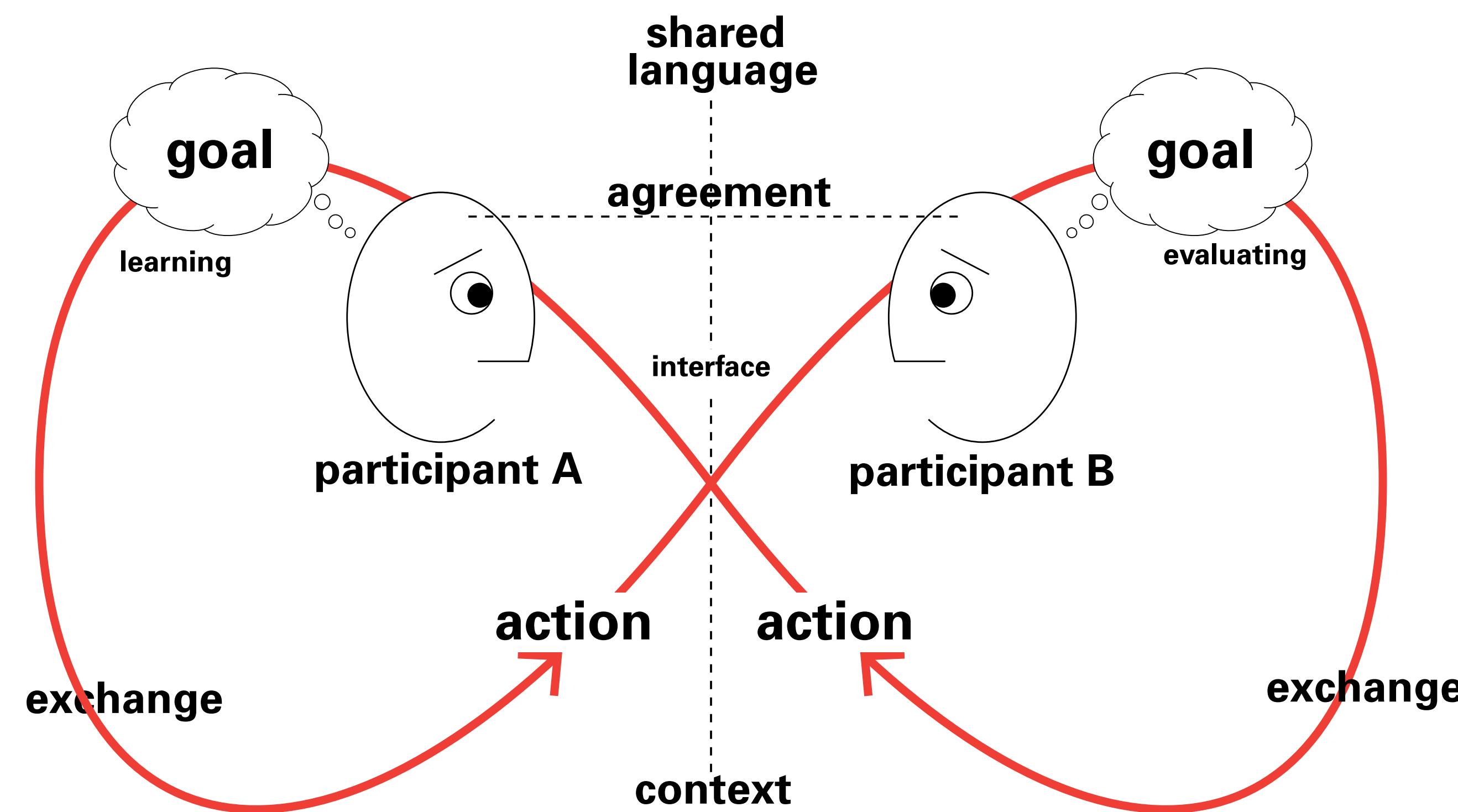
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The engagement may continue.



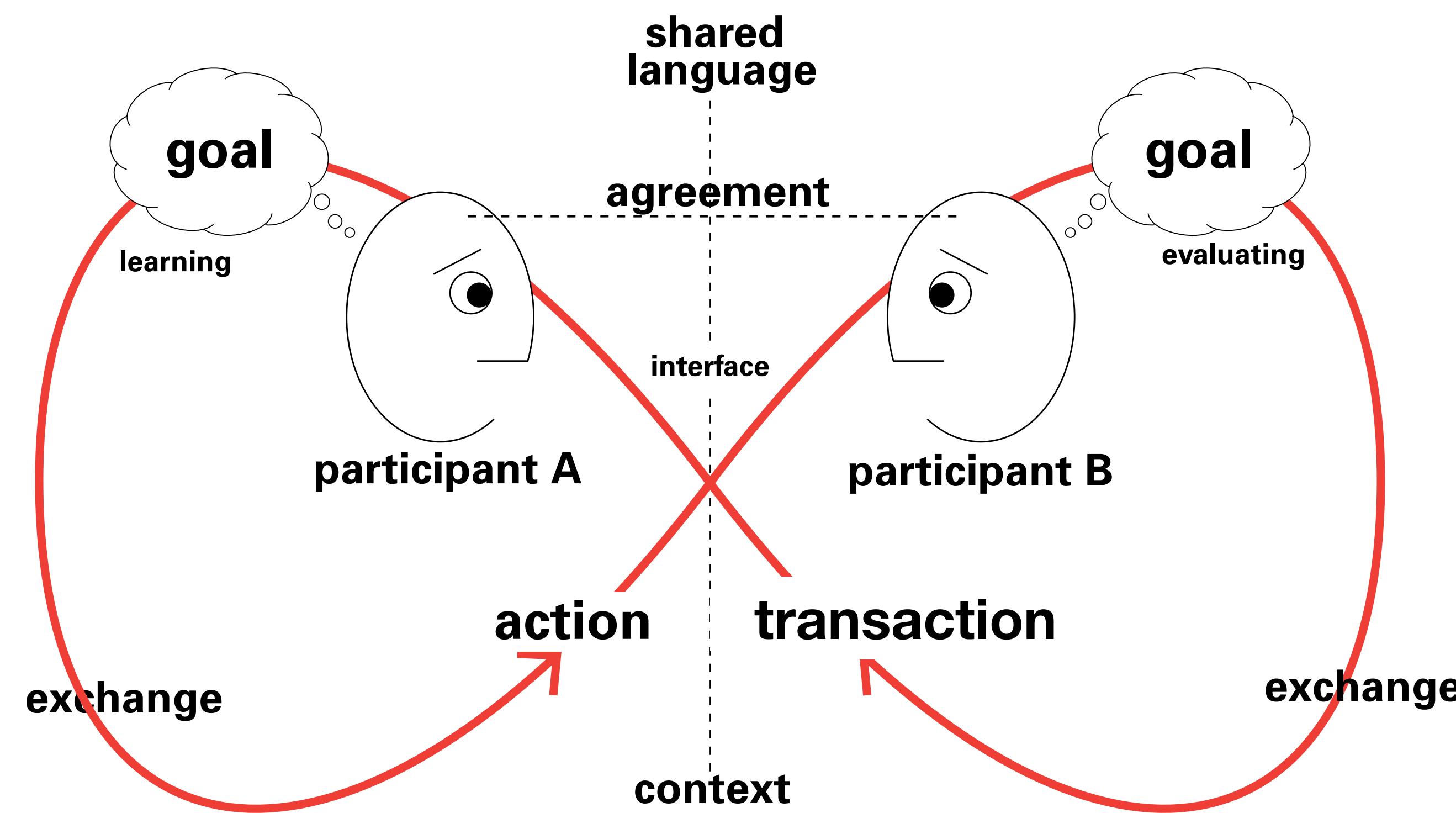
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An agreement may be reached.



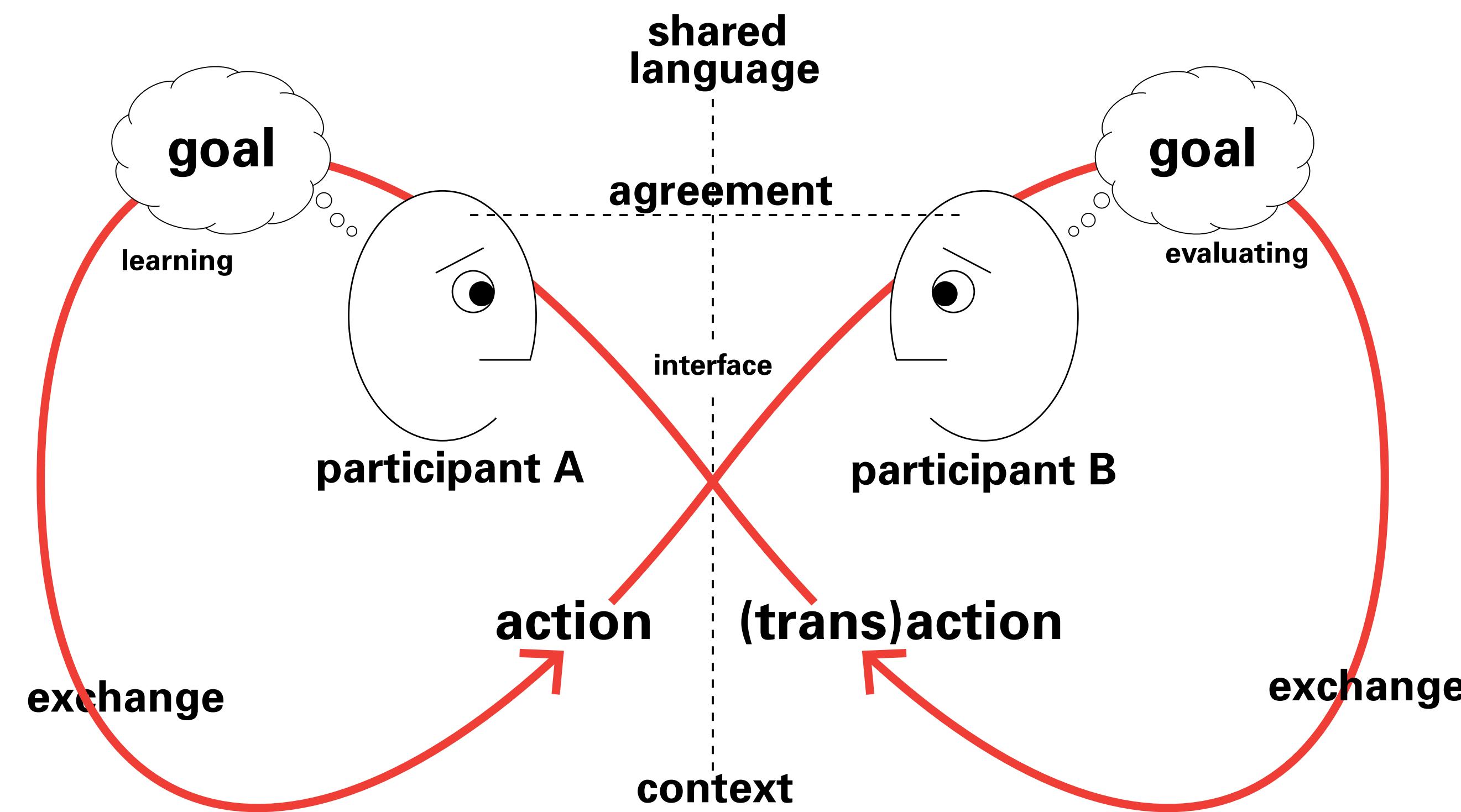
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A transaction may occur.



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Conversation Model



See also Pangaro: *Economy of Insight*

Conversation Model – C-L-E-A-T

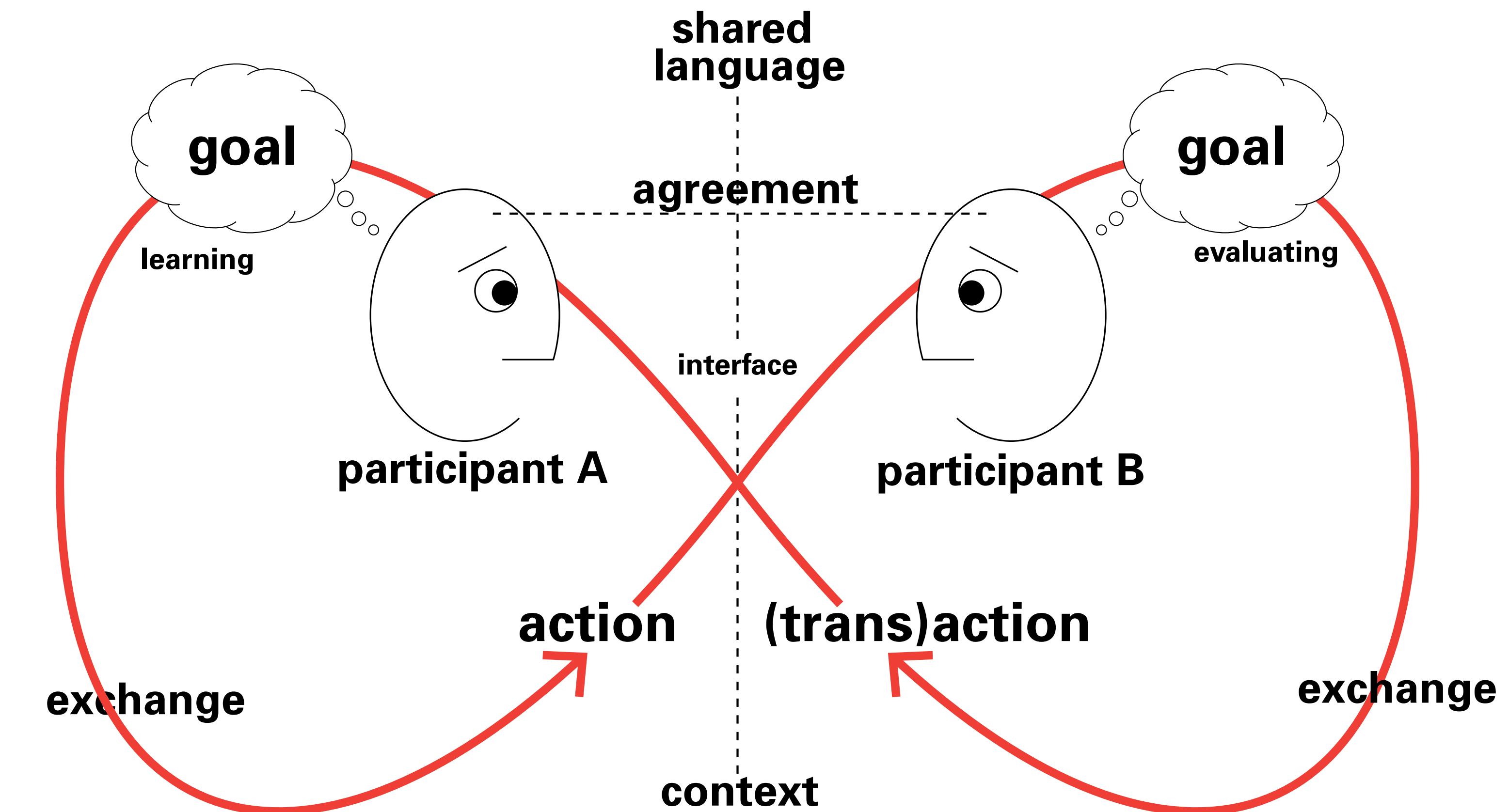
C – Context

L – Language

E – Engagement

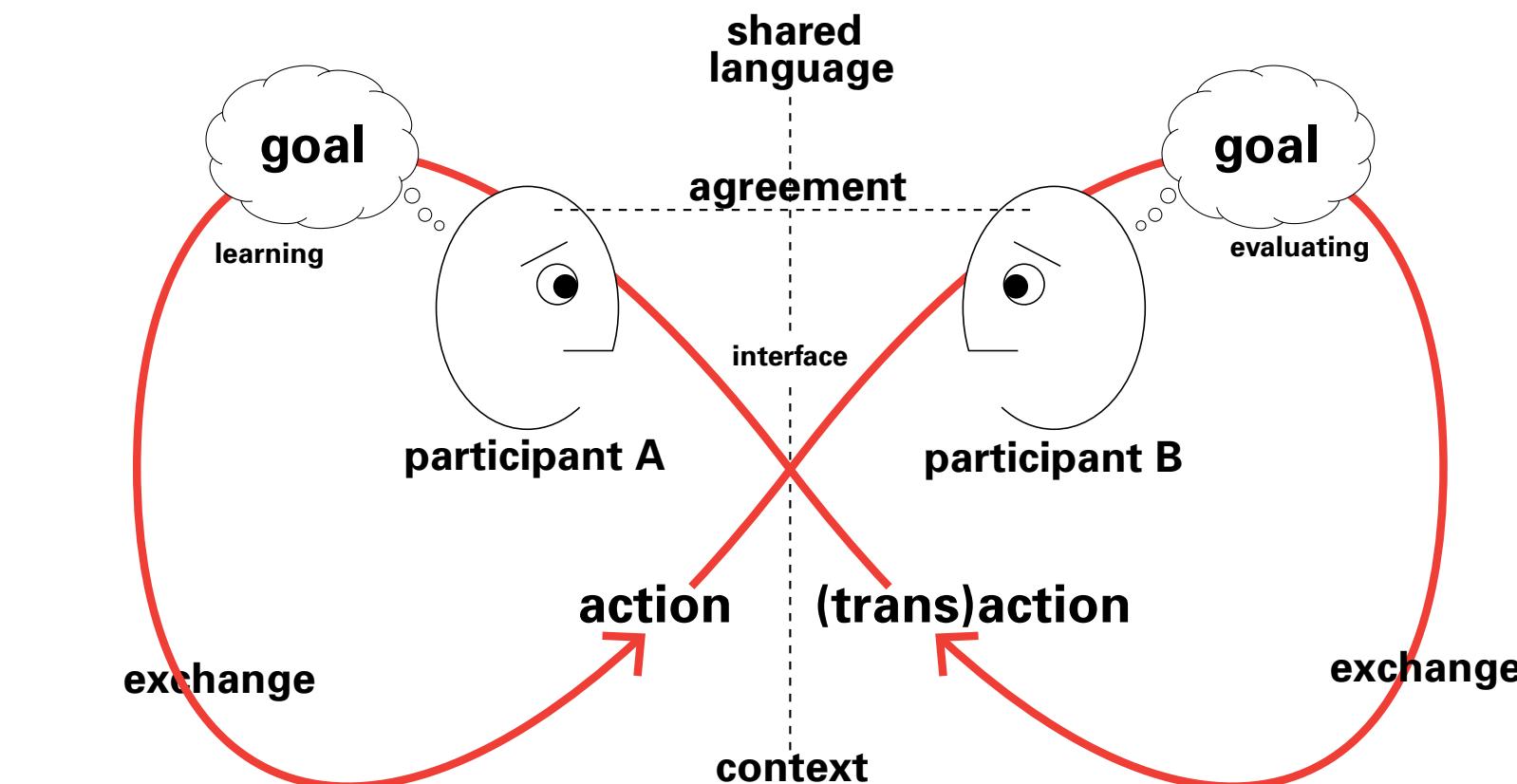
A – Agreement

T – Transaction



Conversation Model

Why does conversation matter?



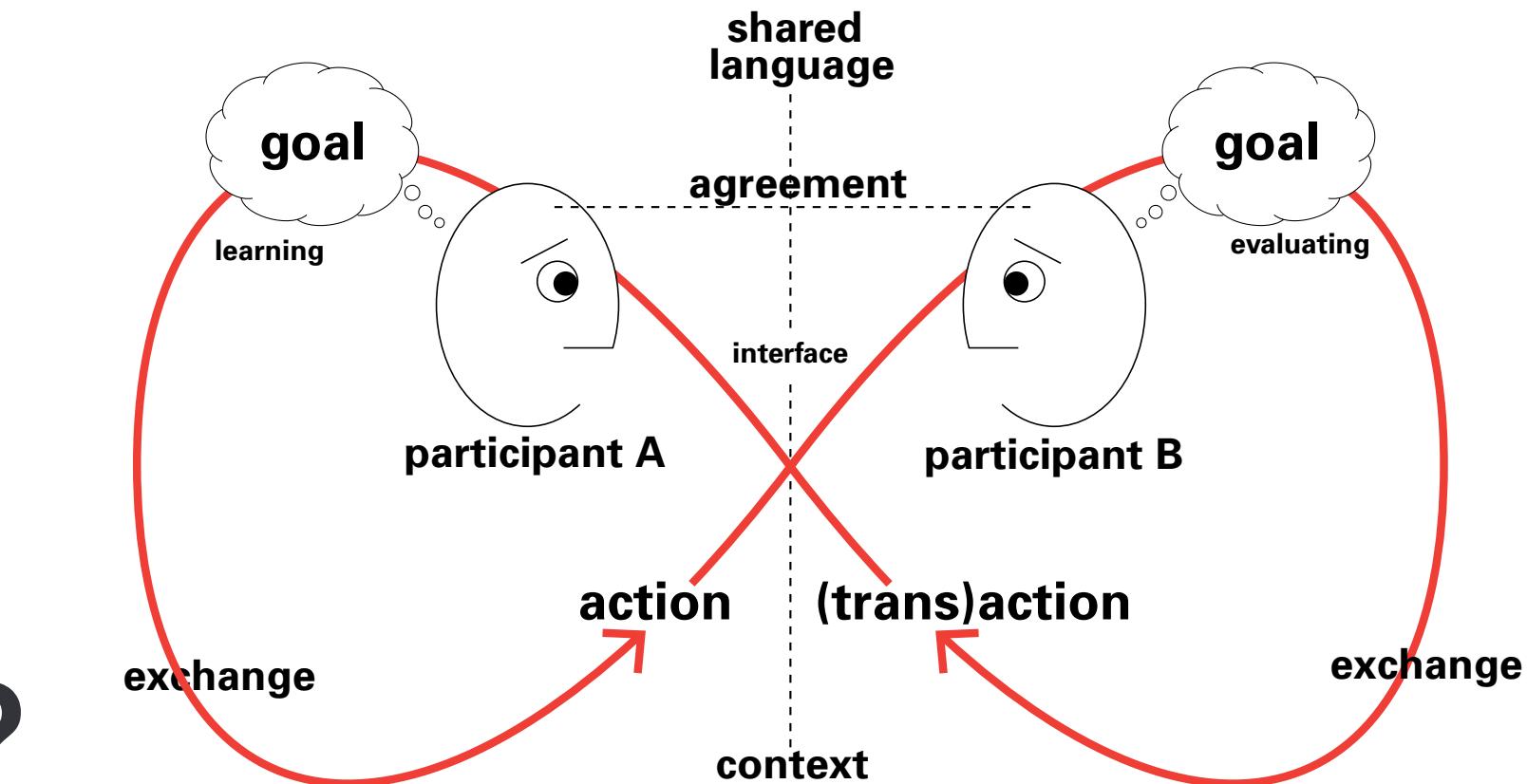
- *to act together, we must reach agreement*
- *to reach agreement, we must have an exchange*
- *to hold an exchange, we must have shared language.*

To cooperate and collaborate requires conversation.

Conversation Model

What may follow from conversation?

- *shared history*
- *relationship*
- *trust*
- *respect*
- *unity.*

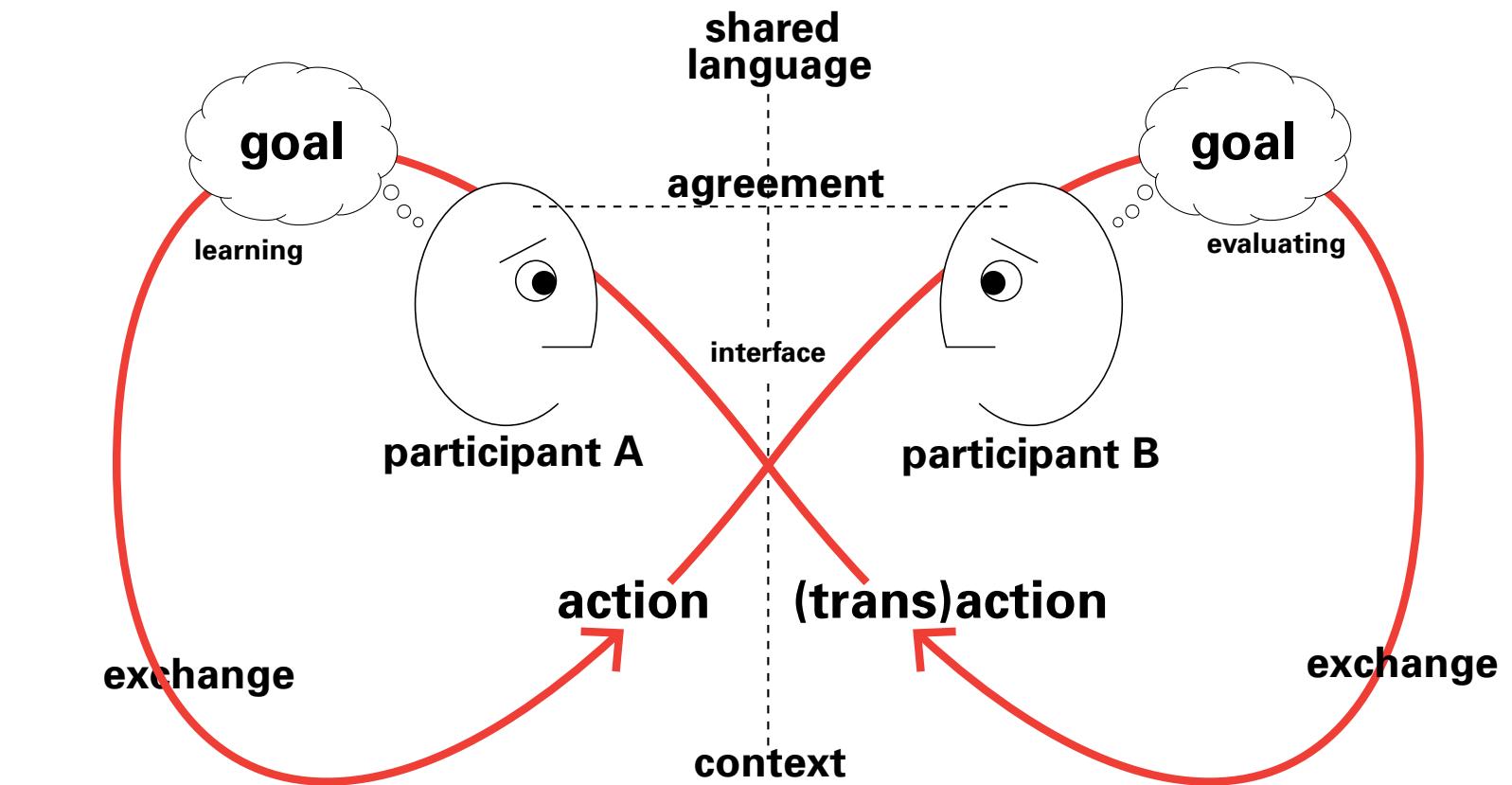


All these require conversation.

Conversation Model

What does conversation enable?

- *community*
- *commerce*
- *culture*
- *government*
- *society.*

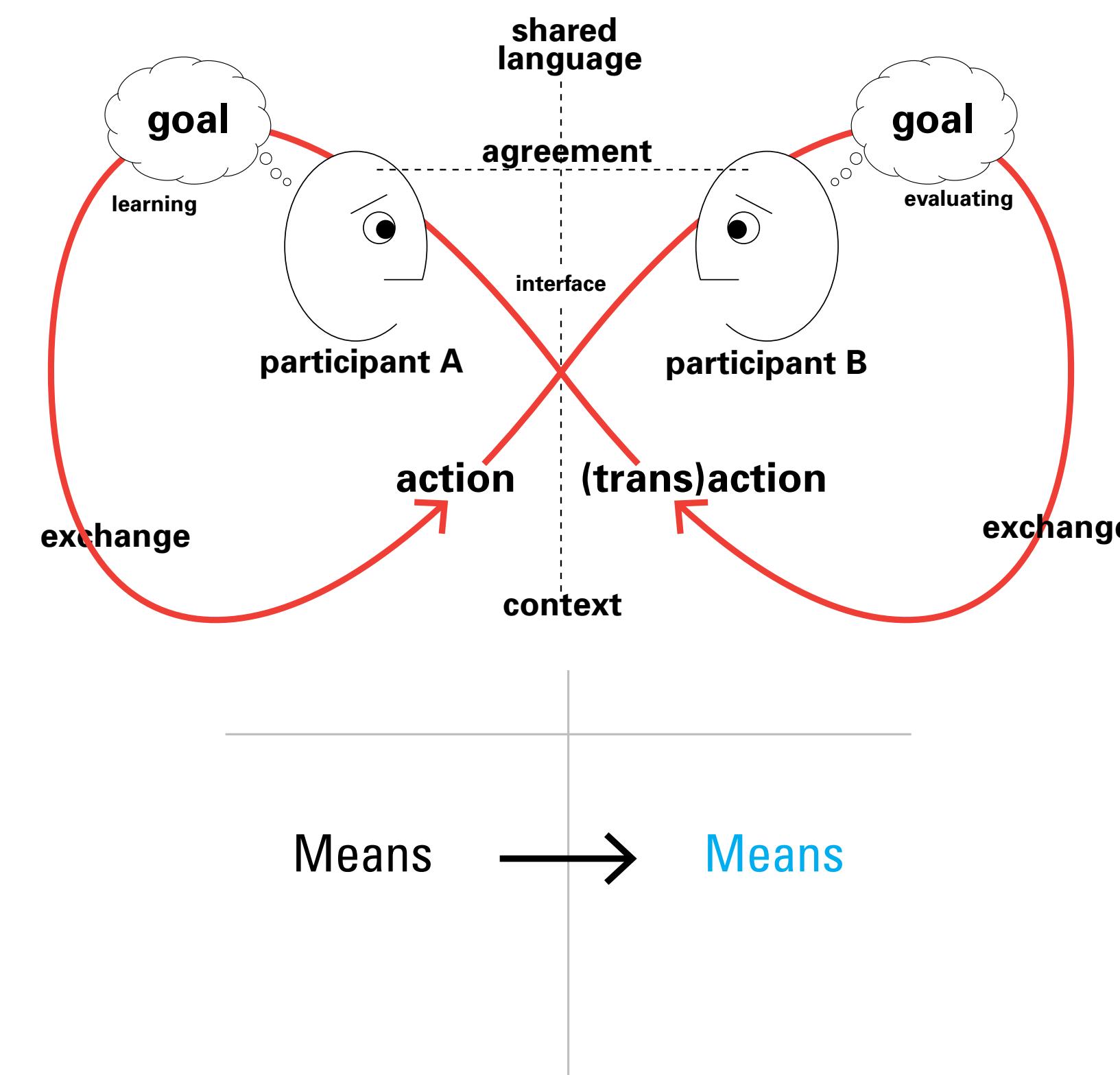


All these **demand** conversation.

Architecture of Conversation

A and B may talk about goals, means, or both

“What is the goal? And how

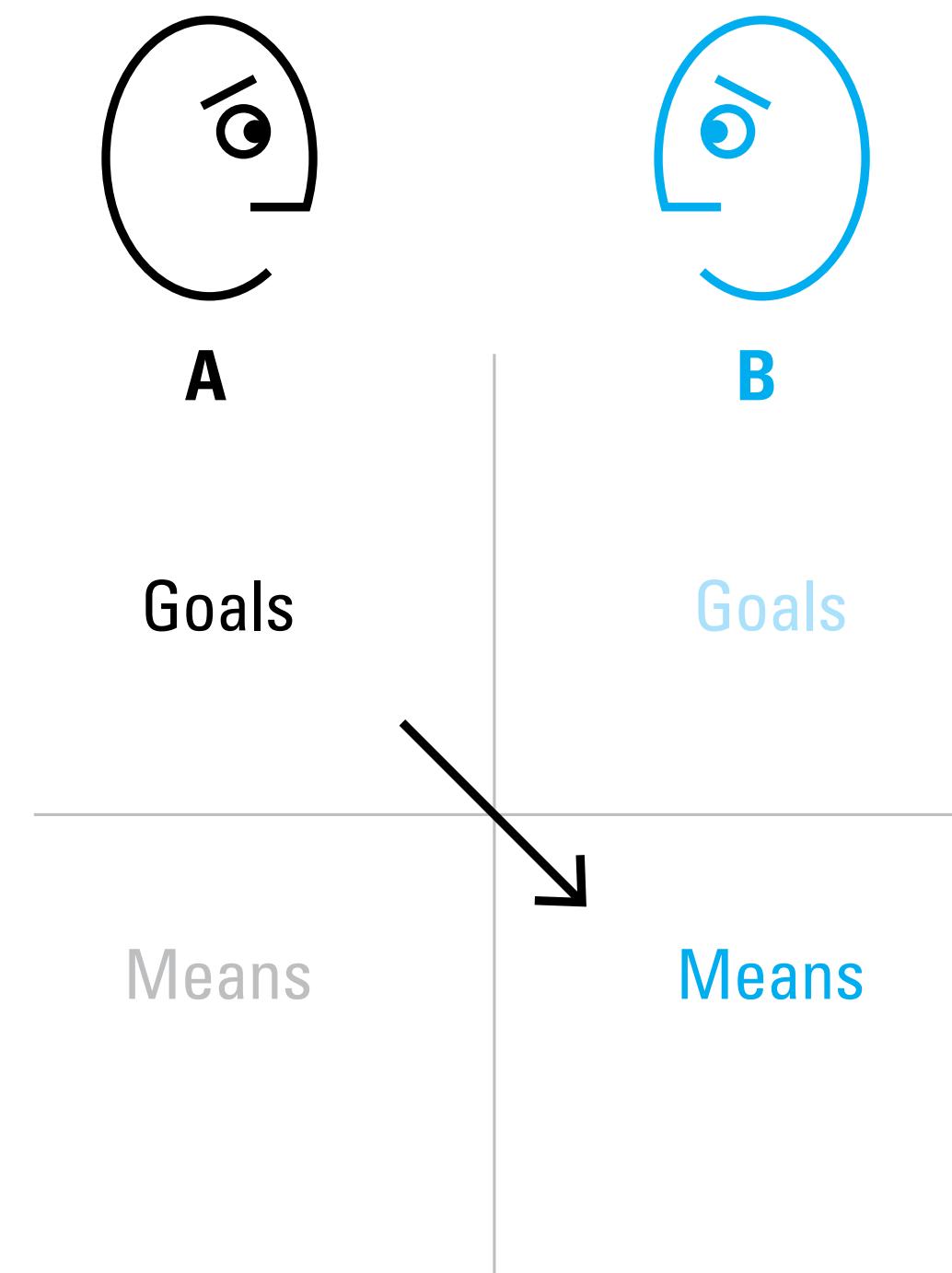


— adopted from Hugh Dubberly
after Paul Pangaro and Gordon Pask

Controlling

A tells B what to do and how to do it

"Alexa, give me some news from NPR."—does this one

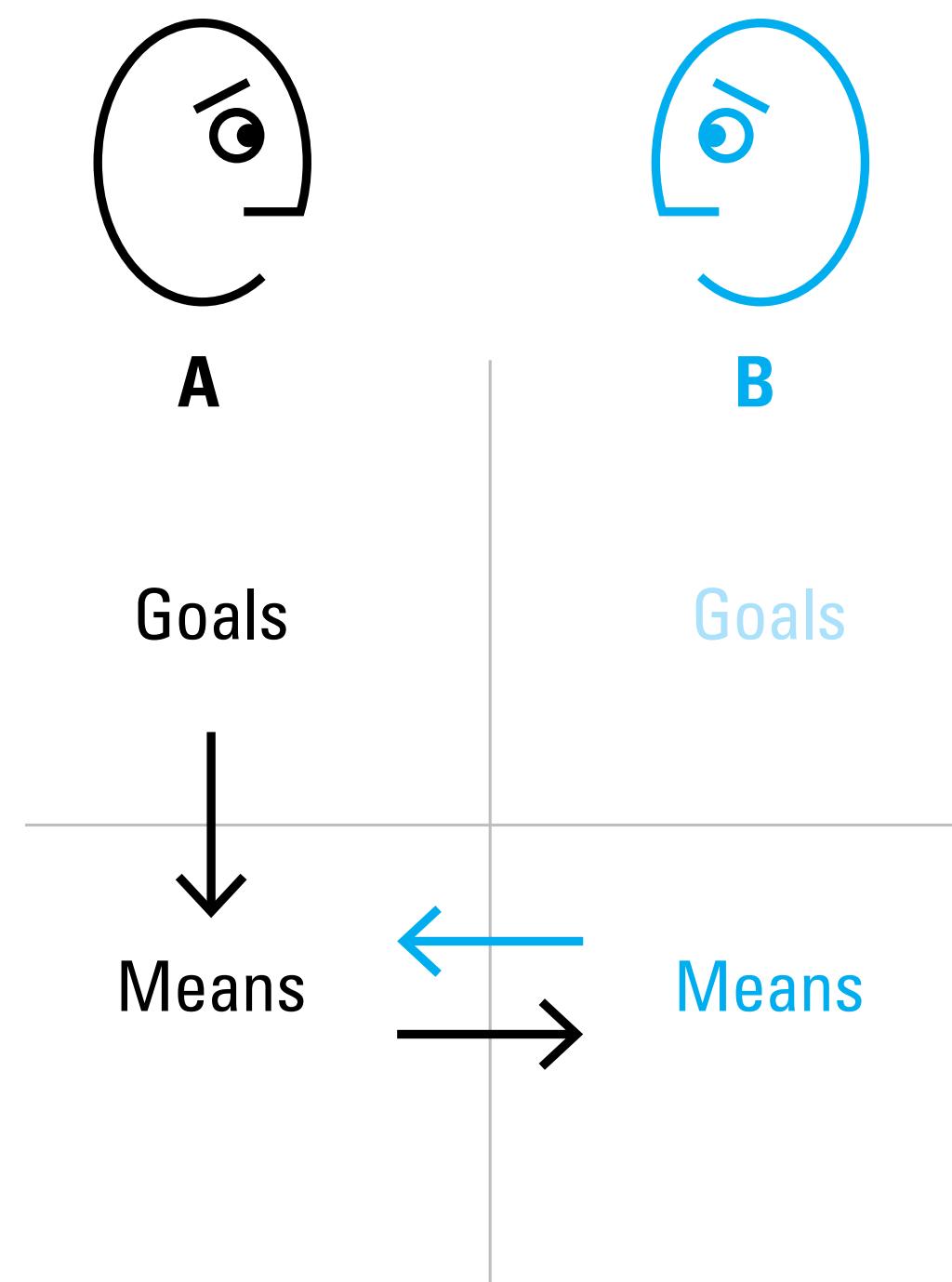


— adopted from Hugh Dubberly
after Paul Pangaro and Gordon Pask

Guiding

A sets goal but discusses means with B

“Alexa, I want to listen to news, what are my options?”

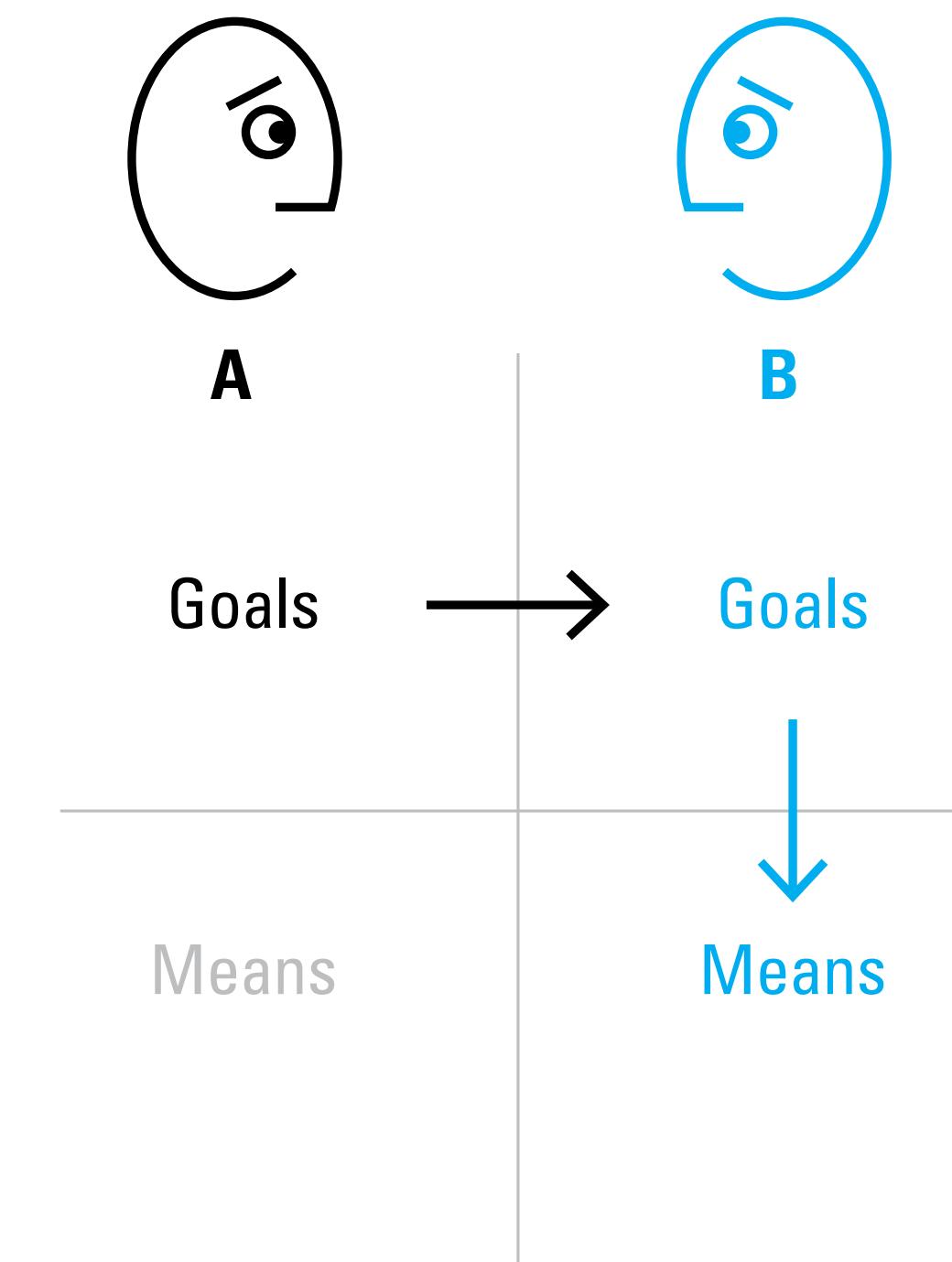


— adopted from Hugh Dubberly
after Paul Pangaro and Gordon Pask

Delegating

A sets the goal but lets B decide the means to reach it

“Alexa, some news please.”—does this one

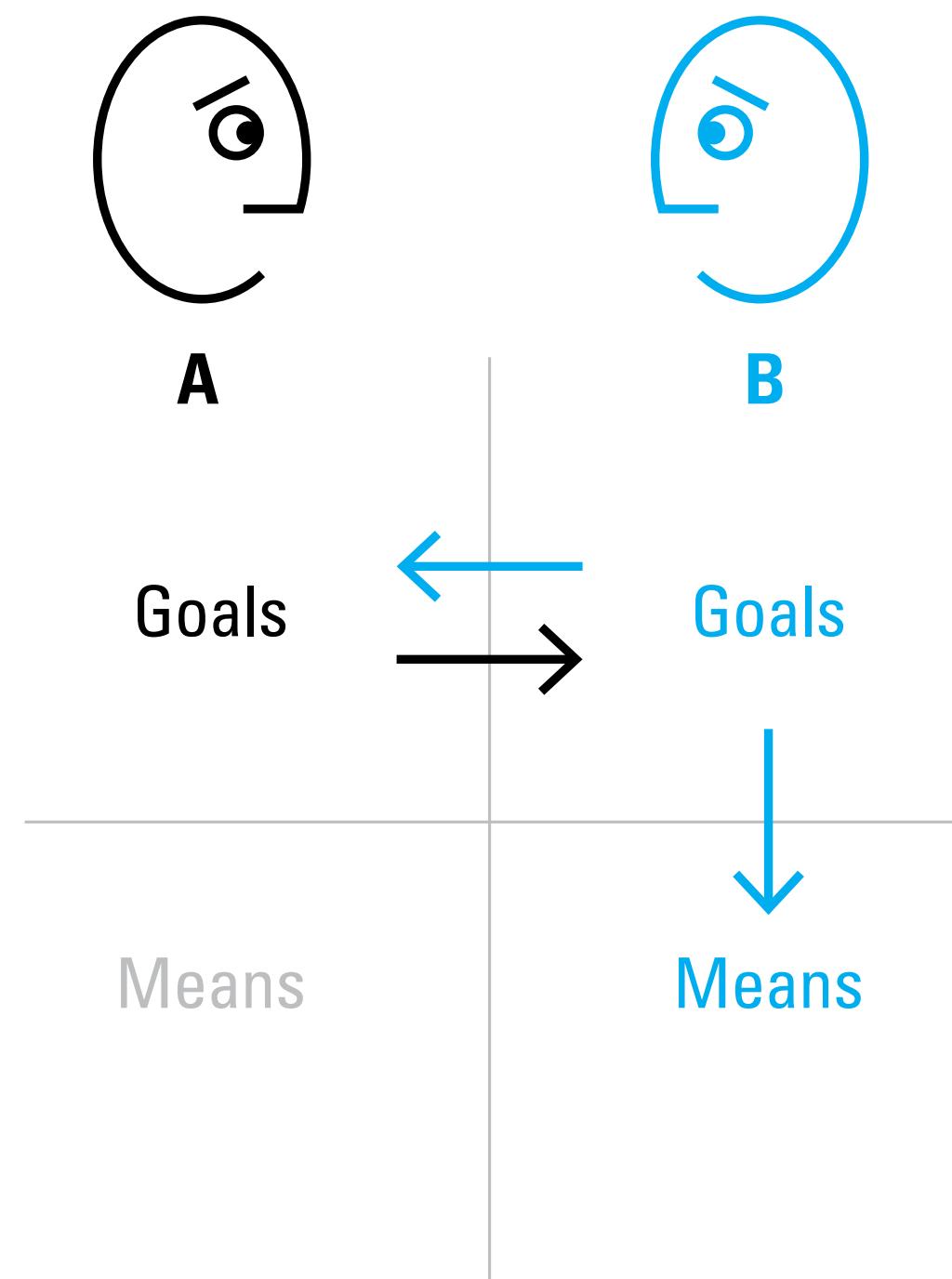


— adopted from Hugh Dubberly
after Paul Pangaro and Gordon Pask

Collaborating

A and B decide together on goals

“Alexa, how about I listen to something?”



— adopted from Hugh Dubberly
after Paul Pangaro and Gordon Pask

Conversational Interfaces

Alexa, define a “*good conversation*”?

- *stays sensitive to your context & language*
- *engages you – keeps continuity in the exchange*
- *leads to agreements – even agreements-to-disagree*
- *enables coordination – acting together with others.*

Alexa, why can't AI + today's “Conversation Interfaces” do these things?

Conversational Interfaces

Cortana, define a “*great conversation*”?

- *tells you things you enjoy learning – delights you*
- *is surprising – energizes you*
- *goes places you didn’t expect to go – is generative*
- *evolves in ways you couldn’t evolve on your own.*

Cortana, why can’t AI + today’s “Conversation Interfaces” do these things?

Conversational Interfaces

Siri, what makes a “*great conversational partner*”?

- *asks great questions*
- *offers different ways to achieve your goal*
- *collaborates with you to define new goals*
- *helps you to be what you want to be... or to become.*

Siri, will Conversational Interfaces become great conversational partners?

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Design & Prototyping – Research Questions

- #1. *Question Engine – Do users evolve better understanding?*
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- #3. *Turning Test – Do users learn from the conversation?*

Ethical Intentions – Conversational Interfaces

Intention #1 – Build cooperative interfaces

Conversation is a **cooperative interface** when sequences of coherent interactions enable participants to evolve their points-of-view such that understanding and agreement are ongoing.

Intentions of Interactions for Conversation v3 – April 2019

Ethical Intentions – Conversational Interfaces

Intention #2 – Build ethical interfaces

Conversation is an ethical interface when there is reliable transparency of action + intent (what + why), such that trust may build and be maintained over time.

Intentions of Interactions for Conversation v3 – April 2019

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- **Internet protocol address.**

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- [Google Accounts Managed with Family Link](#)

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 - how we [recognize patterns like faces](#).
- A [page](#) that explains what data is shared with Google when you visit websites that use our advertising, analytics and social products.
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Ethical Intentions – Conversational Interfaces

Intention #3 – Build humane interfaces

***Conversation is a **humane interface** when
any participant may influence its focus and flow
such that collaboration is ongoing.***

Intentions of Interactions for Conversation v3 – April 2019

The Design of Ethical Interfaces

Ethical Intentions – Conversational Interfaces

- **Cooperative** → *evolving points-of-view* → *agreement*
- **Ethical** → *reliable transparency of what + why* → *trust*
- **Humane** → *shared focus and flow* → *collaboration*

The Design of Ethical Interfaces

Designers, can we enable conversation for others?

Can we *design for conversation?* Enable interactions that...

- *are cooperative, humane, and ethical*
- *create conditions for great conversations*
- *increase the number of choices open to all*
- *help us to be what we want to be... or become.*

The Design of Ethical Interfaces

Ethical Interfaces – Axiom #1

“As a designer, I shall act always so as to increase the total number of choices for a user.”

– Ethical Imperative, Interaction Designers

The Design of Ethical Interfaces

Ethical Interfaces – Axiom #2

***Interaction designers have the responsibility
to create conditions such that a user
may converse with the interface.***

Design for Conversation

Design for Conversation

Ethical Interfaces – Axiom #2

***Interaction designers have the responsibility
to create conditions such that a user
may converse with the interface.***

Design as Conversation

Ethical Interfaces – Axiom #3 – “Second-order Design”

The goal of second-order design is to facilitate the emergence of conditions in which others can design

- to create conditions in which conversations can emerge*
- and thus to increase the number of choices open to all.*

— Dubberly & Pangaro, “Cybernetics and Design: Conversations for Action”, 2019

The Design of Ethical Interfaces

Organizing Principle

***“I shall act always so as to increase
the total number of choices.”***

– Ethical Imperative, Heinz von Foerster

Click for PDF of “Ethics and Second-Order Cybernetics”, 1991

On “Metadesign” – Humberto Maturana

***We are responsible for the language we bring forth,
for the emotions we embody in our language and our actions,
and for the technology they both bring to the world.***

***That is, we are responsible for what we conserve in our
living day-to-day.***

That is an ethical choice at every minute of our lives.

– Hugh Dubberly after H. Maturana

[Click for PDF of "Metadesign" by Humberto Maturana](#)

Thank you.

Special Thanks to:

Brad Myers

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John Cain

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Hugh Dubberly

Pooja Upadhyay

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Appendices

Design and Cybernetics

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The Design of Ethical Interfaces

“If you desire to see, learn how to act.”

— **Aesthetic Imperative**, Heinz von Foerster

[Click for PDF of “Ethics and Second-Order Cybernetics”, 1991](#)

**We believe cybernetics offers a foundation for
21st-century design practice, with this rationale:**

— Dubberly & Pangaro, “Cybernetics and Design: Conversations for Action”, 2019

If design, then systems:

- The prominence of digital technology in daily life cannot be denied (or reversed).
Digital technology comprises systems of systems (Internet of Things).
- Design has expanded from giving-form to creating systems that support interactions.
Human interactions span thinking and acting, whether mundane or metaphysical.

We must model and tame this complex mesh of mechanisms.

Therefore: systems literacy is a necessary foundation for design.

If design, then systems.

If systems, then cybernetics:

- Digital interactions comprise reliable connections, communication, and feedback.
Human interactions comprise purpose, feedback, and learning.
- The science of communication and feedback, interaction and purpose, is cybernetics.

We must model communication and intention in a common frame.

Therefore: cybernetics is a necessary foundation for design.

If design, then systems.

If systems, then cybernetics.

If cybernetics, then second-order cybernetics:

- Framing “wicked challenges” requires articulating human values and viewpoints.
Values and viewpoints are subjective.
- Designers must offer a persuasive rationale for our subjective viewpoints.
- Modeling subjectivity is the province of second-order cybernetics.

We must embrace values and subjectivity at the heart of designing.

Therefore: second-order cybernetics is a necessary foundation for design.

If design, then systems.

If systems, then cybernetics.

If cybernetics, then second-order cybernetics.

If second-order cybernetics, then conversation:

- Taming “wicked challenges” must be grounded in argumentation.
- Argumentation requires conversation so that participants may understand and agree.
- Agreement is necessary for collaboration and effective action.

We must embrace argumentation and collaboration to the heart of 21st-century design.

Therefore: conversation is a necessary foundation for design.

If design, then systems.

If systems, then cybernetics.

If cybernetics, then second-order cybernetics.

If second-order cybernetics, then conversation.

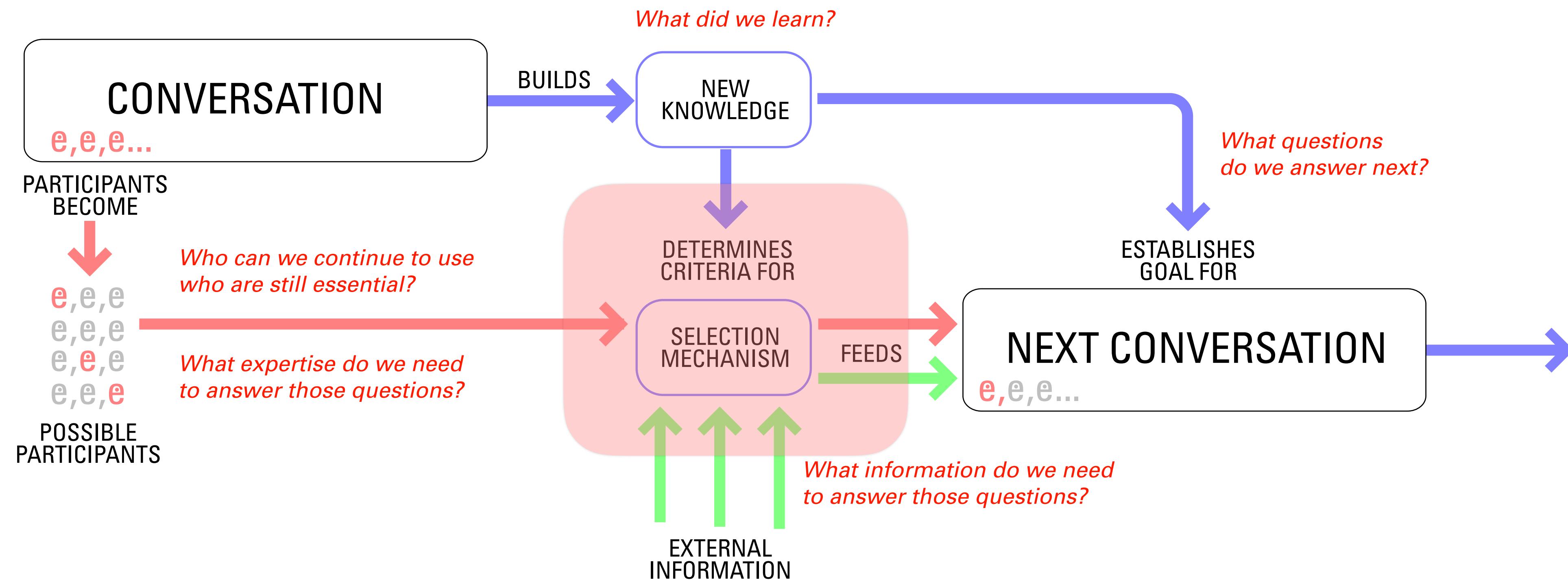
— Dubberly & Pangaro, “Cybernetics and Design: Conversations for Action”, 2019

Appendices

Design as Conversation

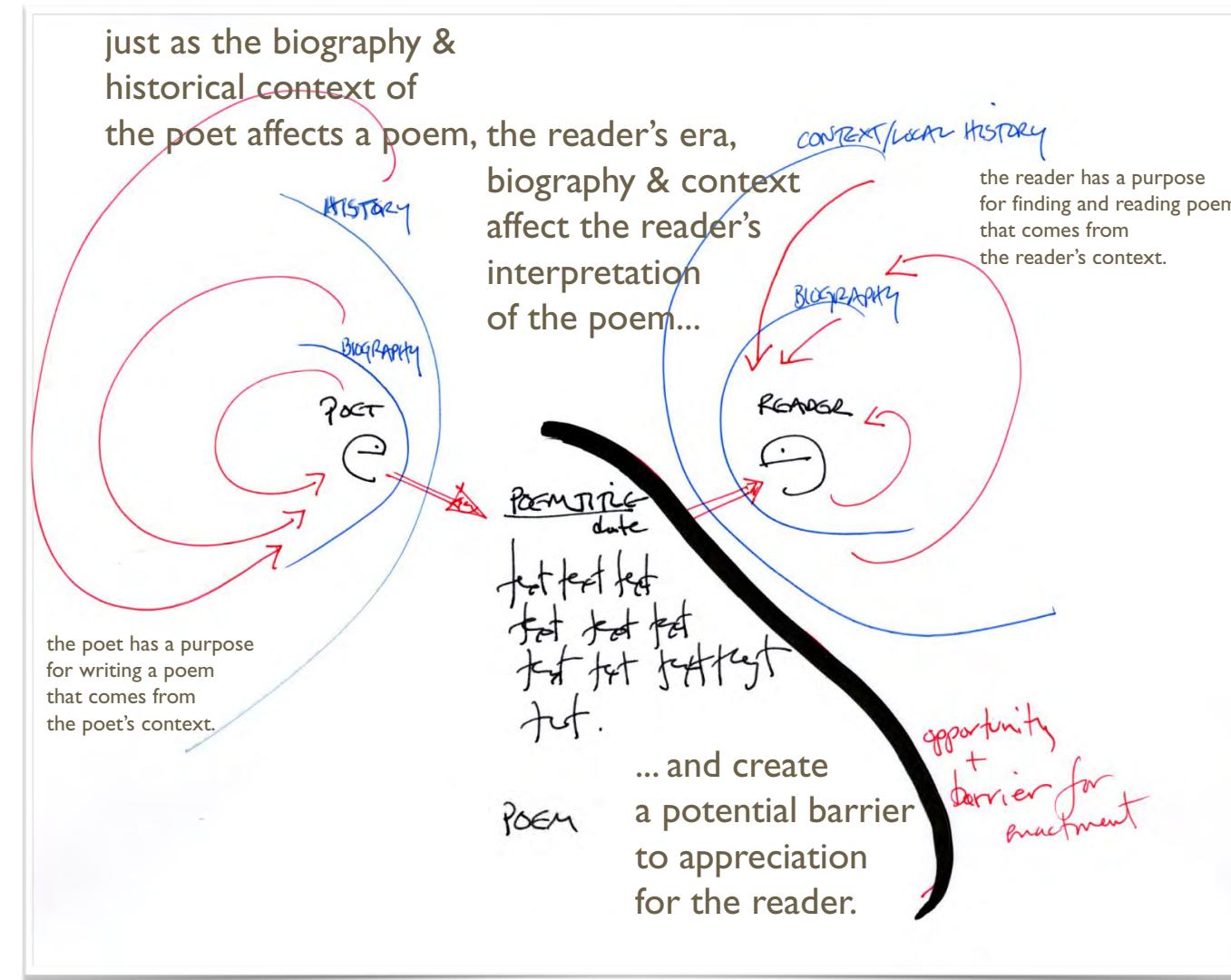
Paul Pangaro
pangaro.com/hciiseminar2019/
ppangaro@cmu.edu

Designing Engagement / Cadence of Conversations



Paul Pangaro
Modeling Engagement Project
Ogilvy & Mather, New York
2007
Click for PDF

Designing Engagement / Poetry Machine

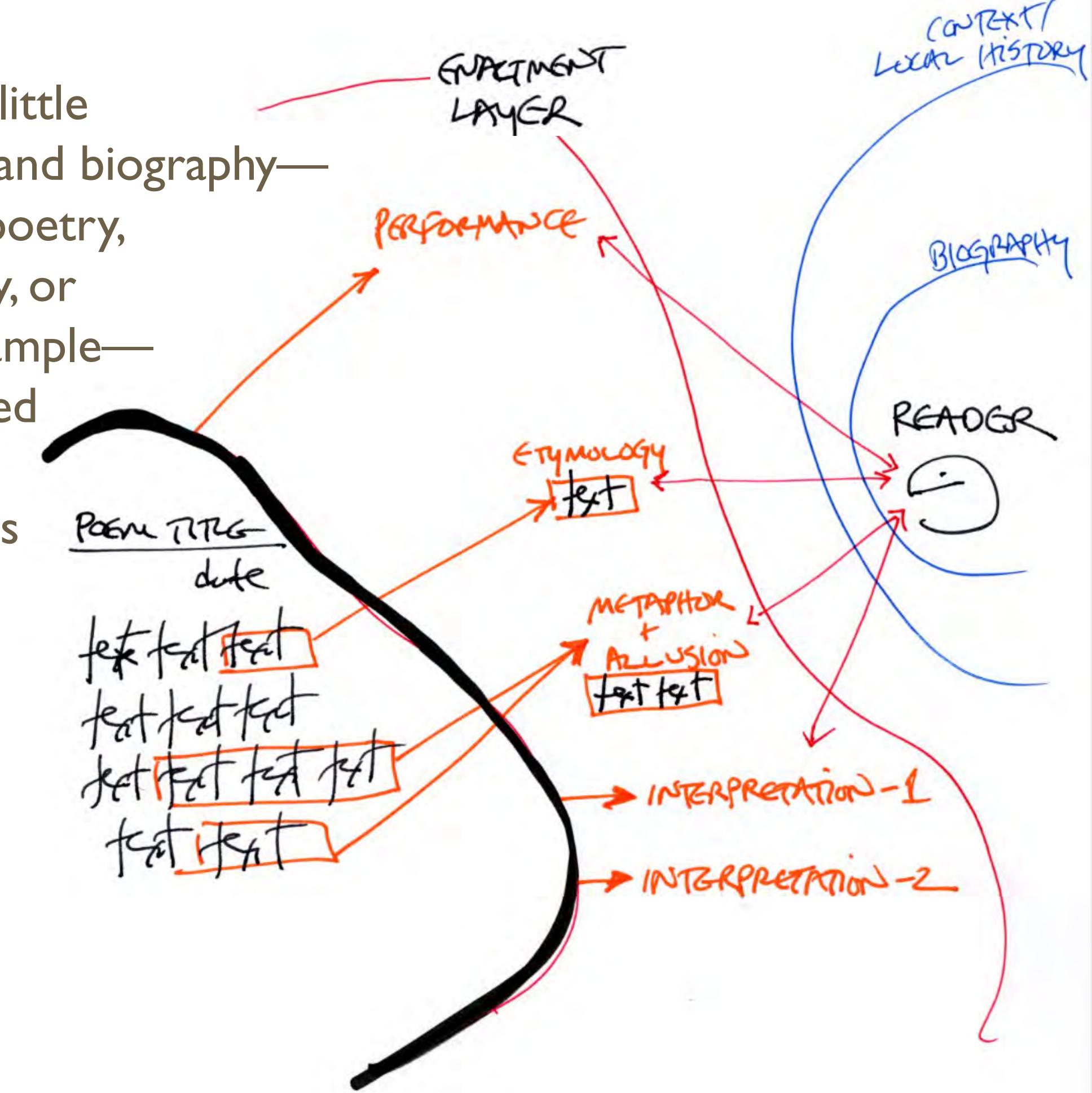


Paul Pangaro
Poetry Machine Project
PoetryMagazine.org, Chicago
2008

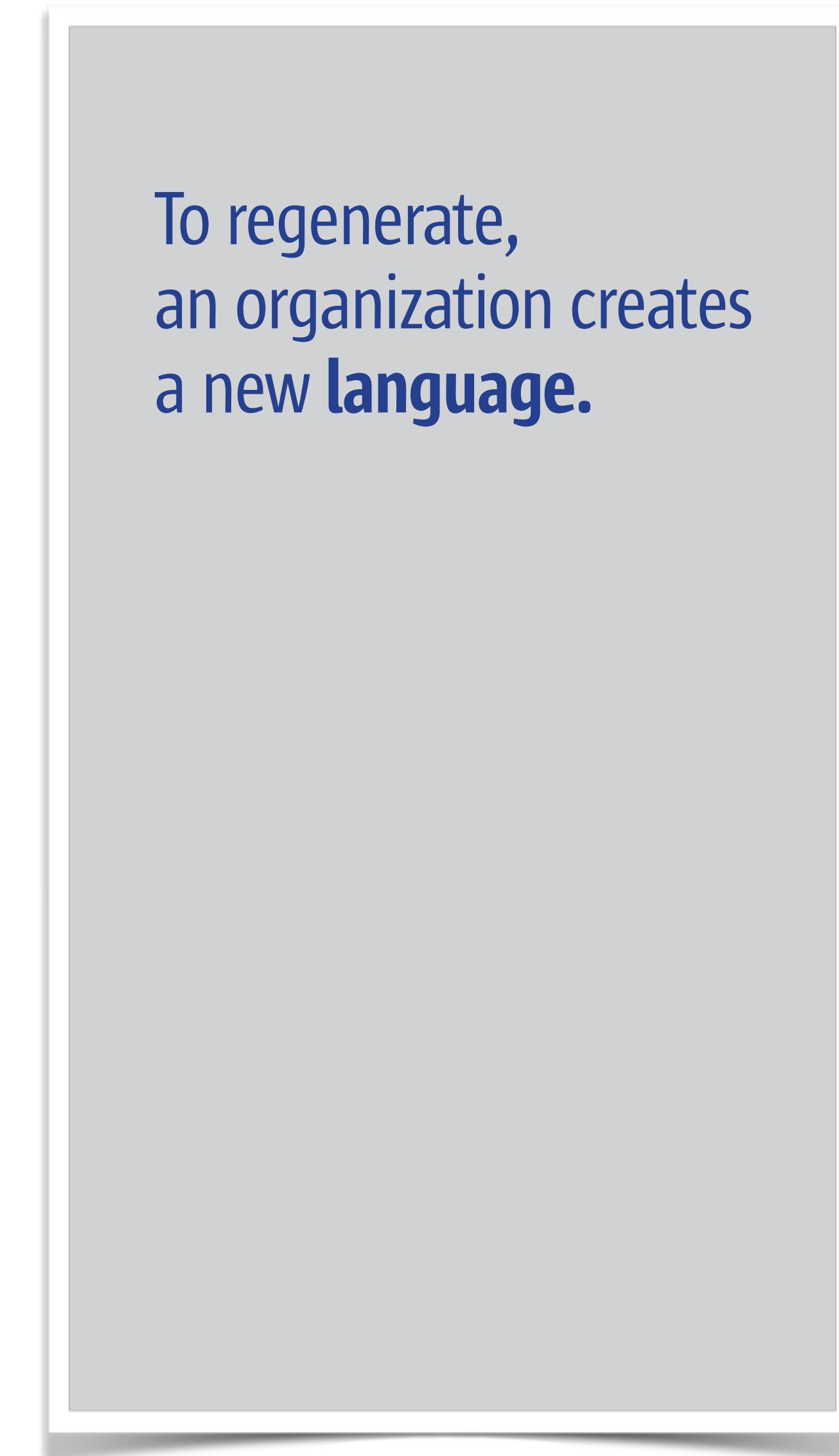
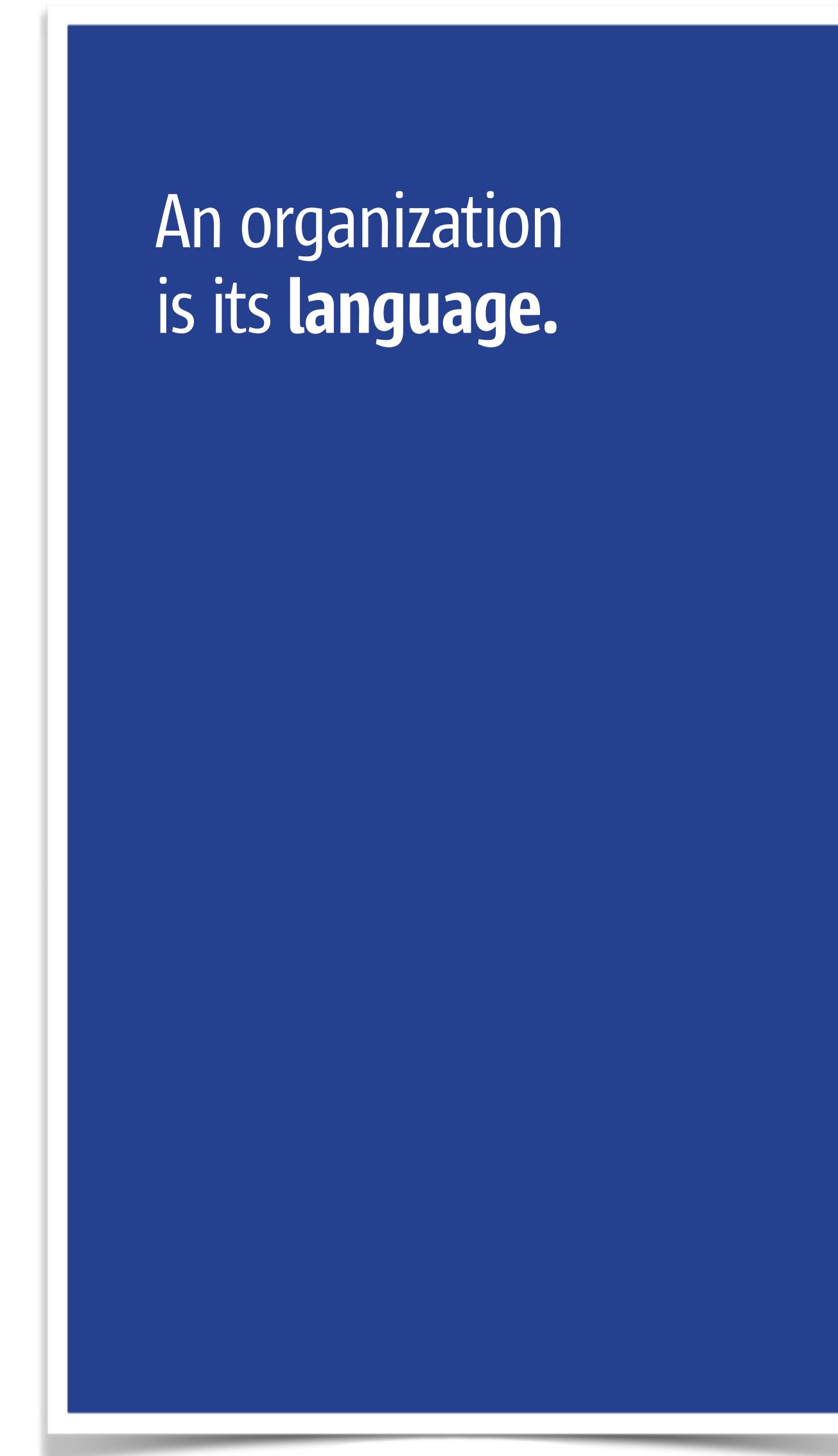
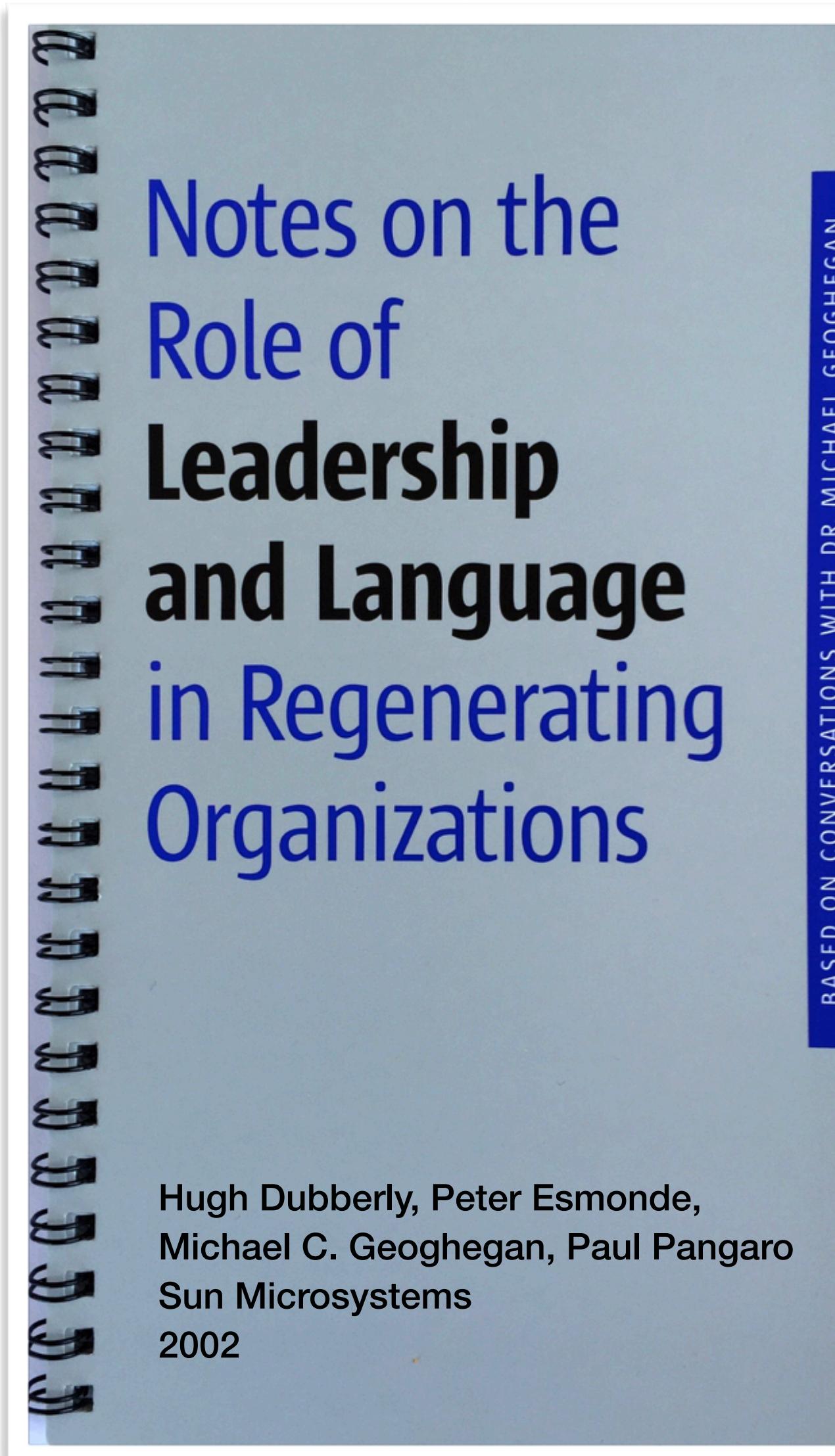
poetymachine's storehouse of enactments creates a dynamic software interface.

if poetymachine knows a little about a reader's context and biography—level of experience with poetry, purpose in seeking poetry, or prior poems read, for example—it can create a personalized enactment layer by choosing specific elements of enactment to present to that specific reader.

the enactment layer enables a dialog that connects poem & reader, poet & reader, reader & self.

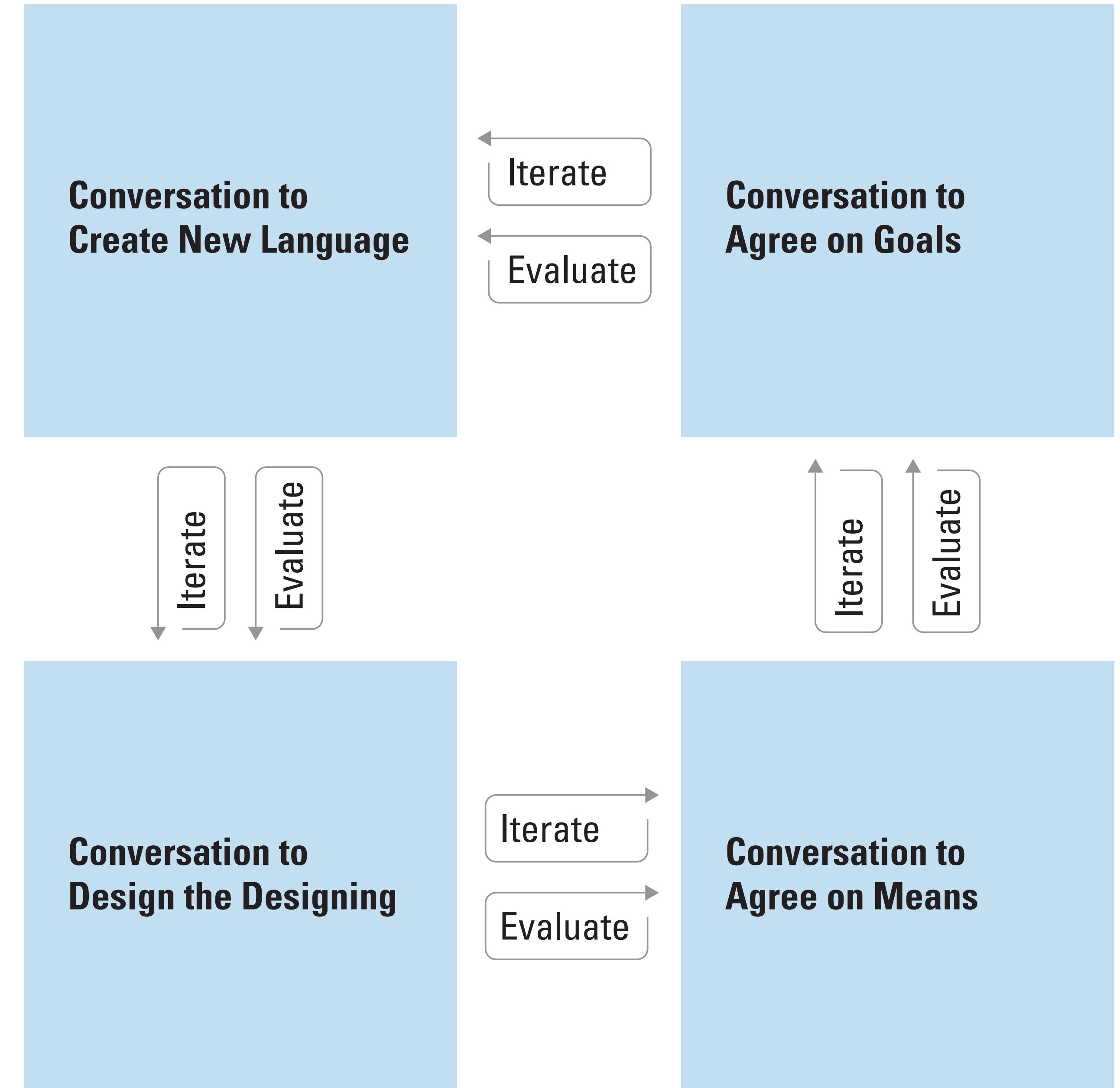


Designing Engagement / Conversations for Organizational Change



Design as Conversation / Conversations for Design

Paul Pangaro
“Designing Our World:
Cybernetics as Conversation for Action”
Heinz von Foerster Lecture,
University of Vienna
2017
[Click for PDF](#)



Appendices

Design for Conversation

Paul Pangaro
pangaro.com/hciiseminar2019/
ppangaro@cmu.edu

thoughtshuffler

thsh.servehttp.com:8084/&SEL@T64&HLS?artificial|intelligence;study;journal;science;theory&PPG??"&RSP@M0?0&UID?8016

thoughtshuffler 20-Dec-2012

KEYWORDS

- cybernetics
- Artificial Intelligence**
- study
- study
- Journal
- control**
- science
- theory

SOURCES

- google.com

Cybernetics - Merriam-Webster O...
... cybernetics. noun plural but singular in construction \s-b-r-ne-tiks\. Definition of CYBERNETICS.: the science of communication and control theory that is ...
from merriam-webster.com

cybernetics -- Britannica Online E...
... Control theory as it is applied to complex systems. Cybernetics is associated with models in which a monitor compares what is happening to a system at various ...
from britannica.com

Cybernetics - A Definition
... **Artificial Intelligence** and cybernetics: Aren't they the same thing? Or, isn't one about computers and the other about robots? The answer to these questions is ...
from pangaro.com

Cybernetics and Systems Theory
... The following links provide general background information on the field of Cybernetics and Systems Theory, an interdisciplinary academic domain. ...
from pcp.lanl.gov

cybernetics - definition of cyber...
... cybernetics (s b-r-n-t-k-s). n. (used with a sing. verb). The theoretical study of communication and control processes in biological, mechanical, and electronic ...
from thefreedictionary.com

What are Cybernetics and System...
... Cybernetics and Systems Science (also: "General Systems Theory" "Systems Research") constitute a somewhat fuzzily defined academic domain, that ...
from pcp.lanl.gov

+source | get | split | +key | suggest +source | get | split | +key | suggest +source | get | split | +key | suggest +source | get | split | +key | suggest +source | get | split | +key | suggest +source | get | split | +key | suggest +source | get | split | +key | suggest

ThoughtShuffler
 UI design and coding by Jeremy Scott Diamond
 UX & heuristics by Paul Pangaro
 2012

national geographic, fracking,
Hydraulic fracturing, water, oil, sand



March 2013 National Geographic Cover Story: "America Strikes Oil..."

nysfrackingunplugged.wordpress.com



In his article entitled "**America Strikes Oil**: The Promise and Risk of **Fracking**," Edwin Dobb, a Berkeley Graduate School of Journalism lecturer and **National Geographic** contributing writer, focuses **fracking** activities in North Dakota.

thoughtshuffler v3 iOS
UX by Miriam Simun
UI by See-ming Lee
concept & heuristics by Paul Pangaro
2013



qz.com

Starbucks is finally going to show US coffee drinkers what a “flat white” is. Prepare for controversy – Quartz

1/1/2015, 7:00:26 AM

Starbucks is introducing the “flat white” to its coffee menus across the US on Jan. 6, reports Eater. It’s a little surprising it took this long; the drink has been available for years in the UK and Australia, which both consume far less coffee per capita than the US. (It’s also a popular drink with New Zealanders, whose coffee consumption is on par with that of Americans.)

But good coffee is more about quality than quantity, is it not? Though the US is the birthplace of Starbucks, the most

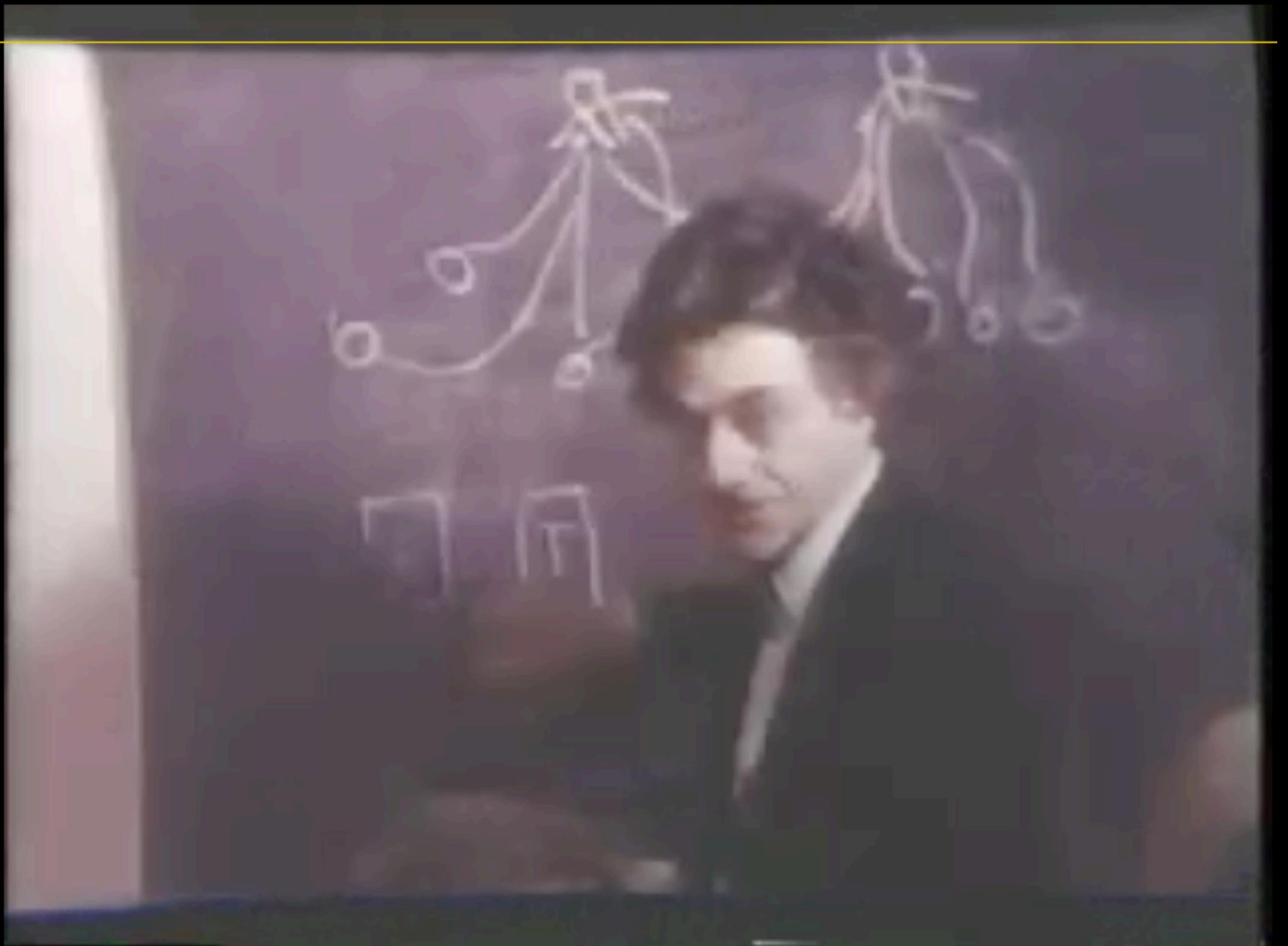
Streamfully mobile
UI design & coding by John Katagawa
UX & heuristics by Paul Pangaro
2014

Appendices

Gordon Pask and Conversation

Paul Pangaro
pangaro.com/hciiseminar2019/
ppangaro@cmu.edu

In 1975 Pask was the subject of
an entire episode of the series
The Design Prototypeers by the BBC.
Click for video



GORDON PASK

1975

CONVERSATION, COGNITION AND LEARNING



A CYBERNETIC THEORY
AND METHODOLOGY

ELSEVIER

GORDON PASK

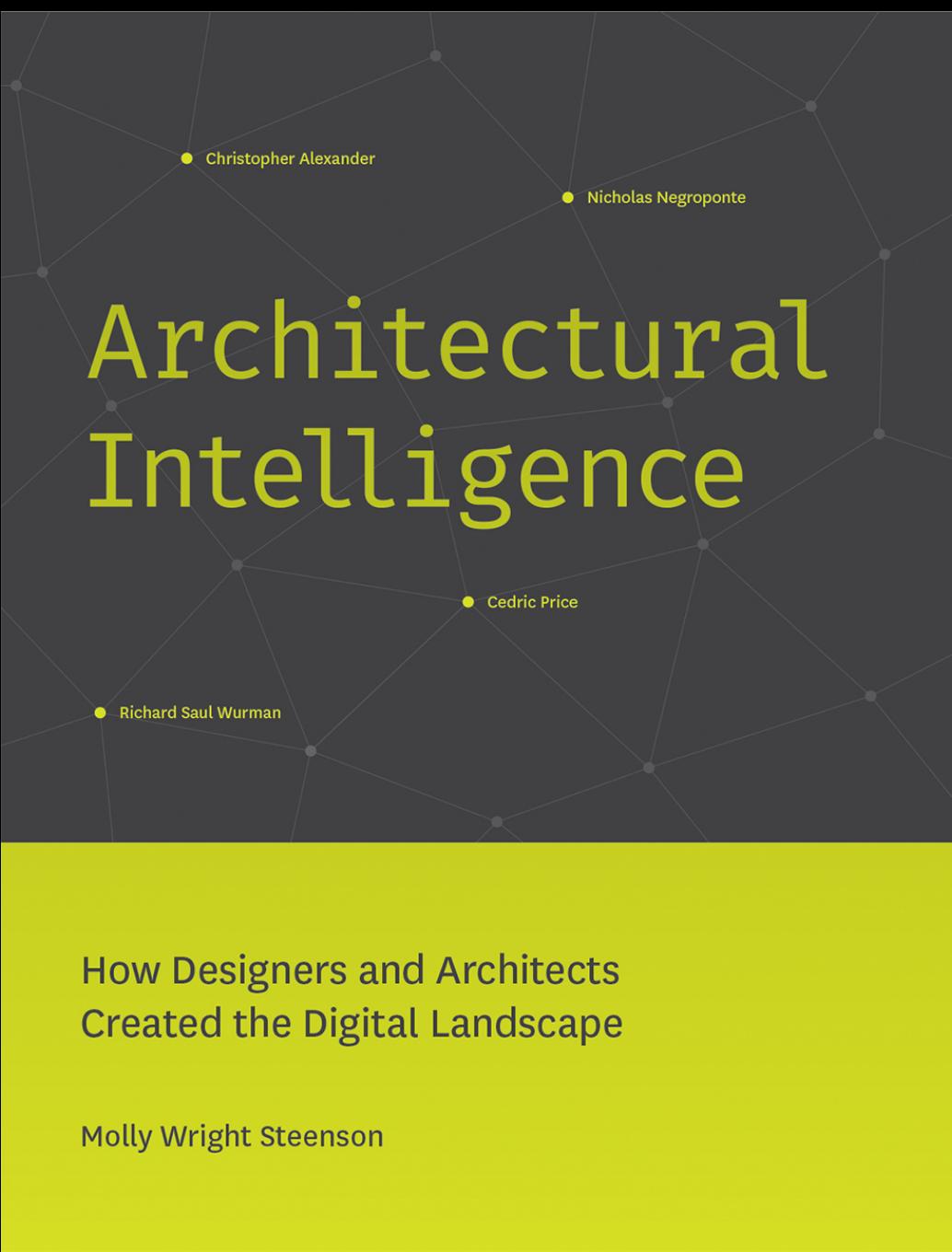
1976

CONVERSATION THEORY



APPLICATIONS IN EDUCATION
AND EPISTEMOLOGY

ELSEVIER



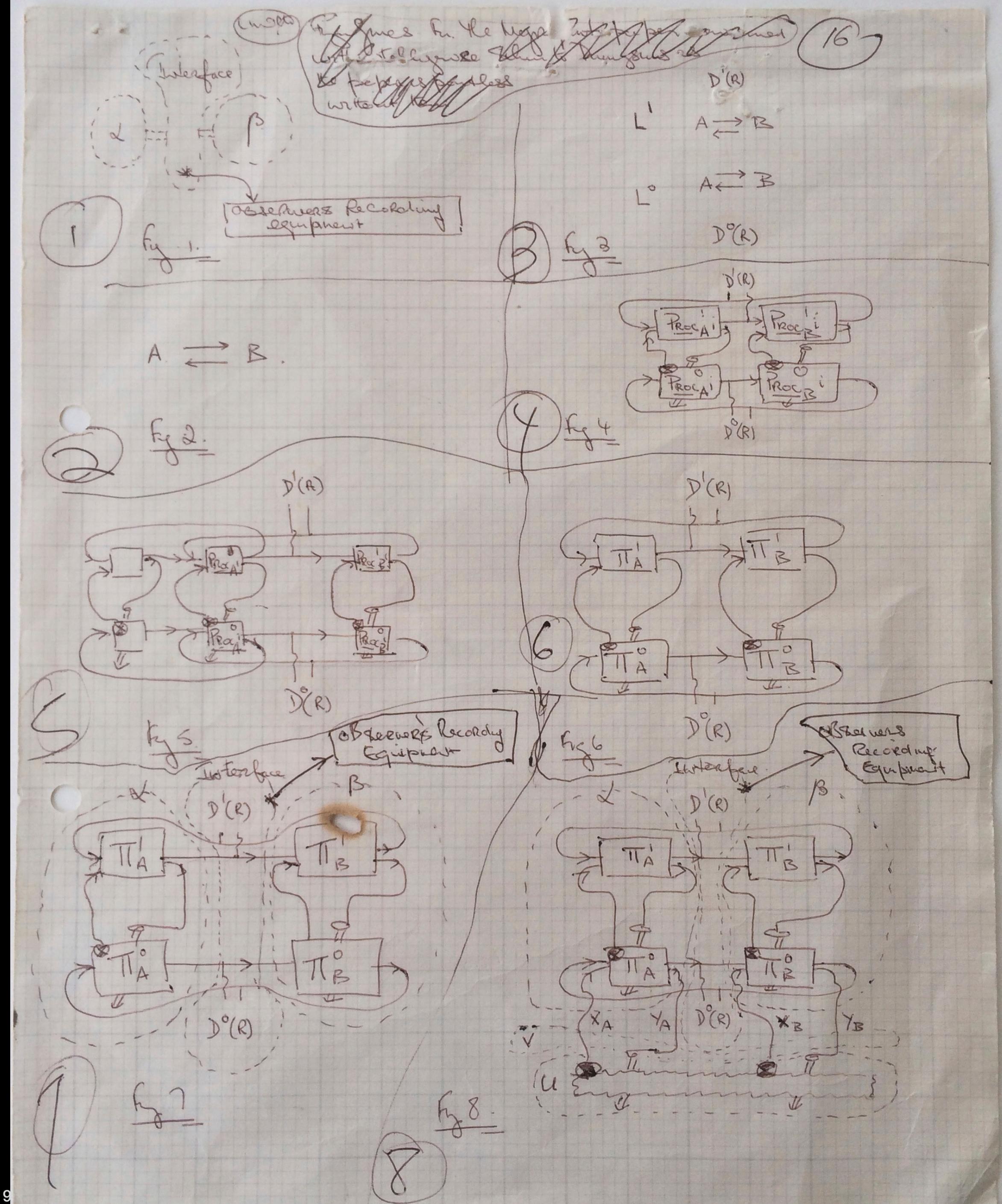
Architecture Intelligence
Molly Wright Steenson,
MIT Press, 2017

Soft Architecture Machines
Nicholas Negroponte, ed.,
MIT Press, 1976

[Click for PDF](#)

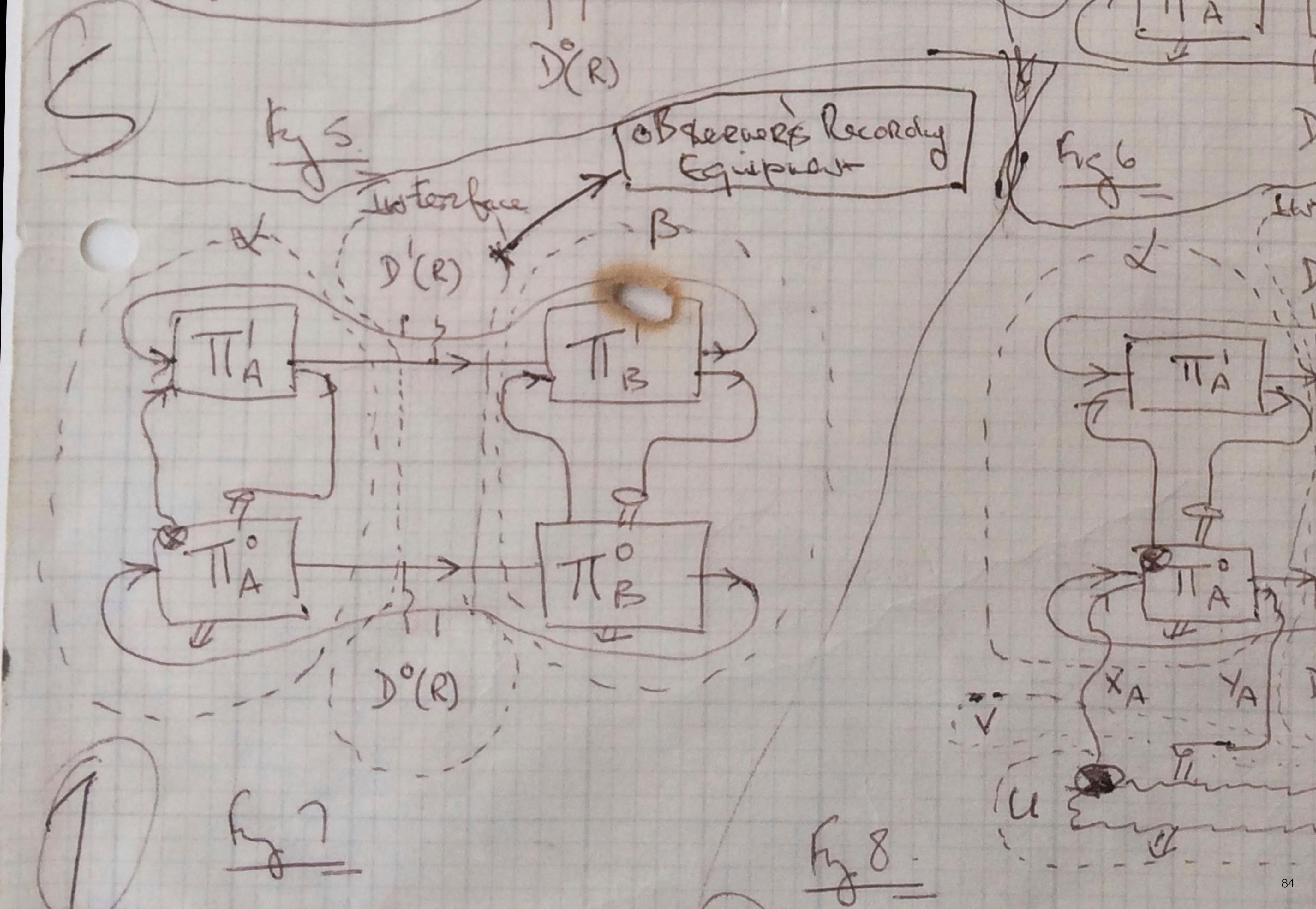
Book Design: Muriel Cooper





Pask's hand-drawn models of interaction are playful in spirit and rigorously complete.

They capture all types of interactions between participants in a conversation.



Aspects of Machine Intelligence

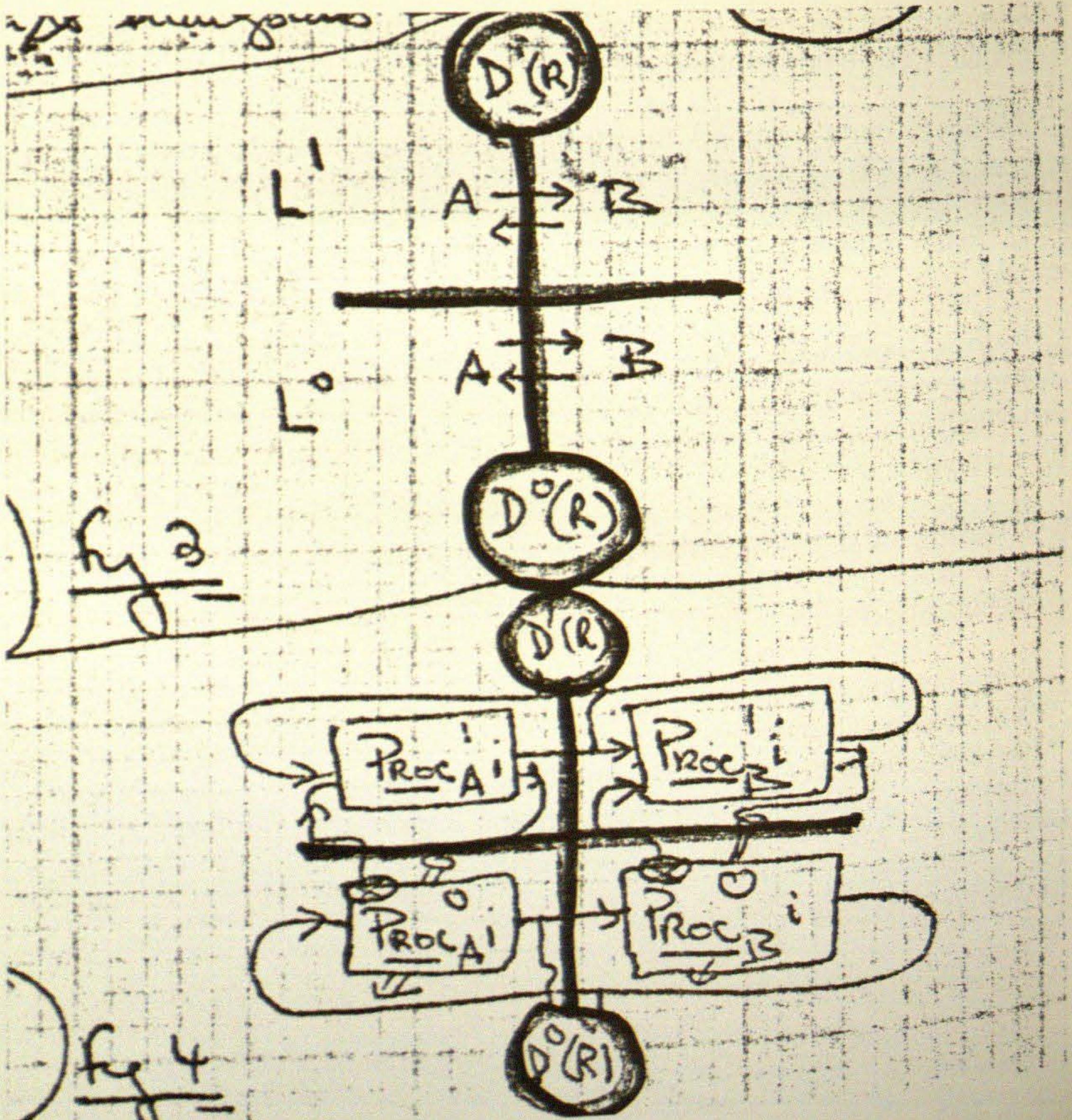
Introduction by Gordon Pask

The current status of mindlike computer programs is summarized, at a philosophical rather than technical level, in the following short but authoritative papers: Minsky (1968), Simon (1966), Turing (1969). Whoever wishes to delve into this subject in greater depth may read the books where these papers are published in their entirety, augmenting them, to obtain comprehensive background, by Ernst and Newell (1969); Ashby (1960); Cohen (1966); Fogel, Owens, and Walsh (1966); Von Foerster and Zopf (1962); Uttley (1959); Von Foerster et al. (1968); McCulloch (1965); Oestreicher and Moore (1968); Amarel (1969); Rose (1970); Minsky and Papert (1969); Feigenbaum and Feldman (1963); Banerji (1969); and Garvin (1970). It is also worth perusing all volumes of the journal *Artificial Intelligence*.

Henceforward, it is assumed either that the reader knows the *kind* of symbolic operations performed by computer programs and other artifacts, that he will study the matter at leisure, or that he will take these operations for granted. With this supposition in mind I shall give a personal and possibly idiosyncratic view of the conditions under which *artificially intelligent* is a properly used term and offer an interpretation of these conditions with respect to *use* of the *architecture machine*. Apart from the pictograms or ikons developed in the text, the only special symbols used are the special brackets < and > which enclose *ordered* collections of objects; the equality sign =; and ≡, which is read as "defined as equal to."

Overview

The contention is as follows: Intelligence is a property that is ascribed by an *external observer* to a *conversation* between *participants* if, and



7.2. \Downarrow means "operates upon according to a hypothesis," and \otimes means "gives a description (in the language appropriate to the level where the line terminates), which may or may not confirm the hypothesis."

7.3. Thus a complete circuit on one side of L , starting at \otimes , passing through — to a *Proc*, and returning by way of — and \Downarrow on the original *Proc* is a causal coupling, or, equivalently, it permits *reproduction* of the original *Proc*.

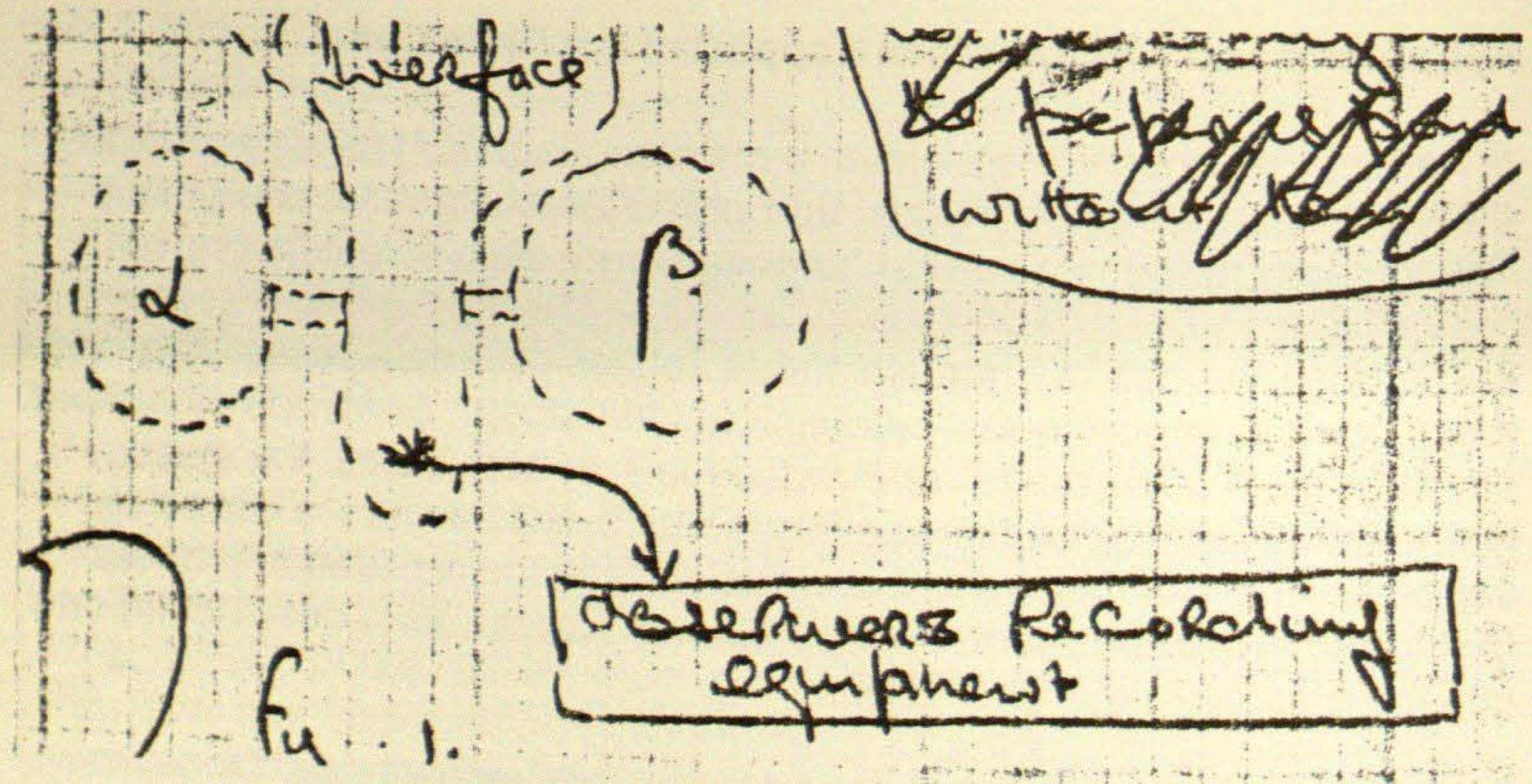
7.4. The unadorned, horizontal connections have a different meaning: they are *inferential* couplings, which, limiting cases apart, entail the notion of choice.

7.5. Hence, any complete circle (such as the line emanating from *Proc_A*, i to *Proc_B*, i and terminating on *Proc_A*, i) may be called a deductive chain.⁵

7.6. Finally, the lines to and from D' (R) and $D°(R)$ indicate whatever is referenced by the inference, that is, whatever R , in R is ostended by the participants *A* and *B* on occasion n .

7.7. Call this ikon (Figure 4) the conversational paradigm.

7.8. If one ikon is created by filling the spaces in Figure 3, then (obeying the proper rules) the process can be iterated laterally to yield a further paradigm, for example, the ikon in Figure 5. The motivation for doing so is noted in Section 2.1.1 \triangleq to represent as much of mind as desired.



2.1.3. It is crucial to the argument that *all* observations occur at such a spatio-temporally localized interface; the observer's measuring and recording equipment is, in the last resort, bound to it. But the interface is neutral regarding the type of interaction, if any, that takes place across it.

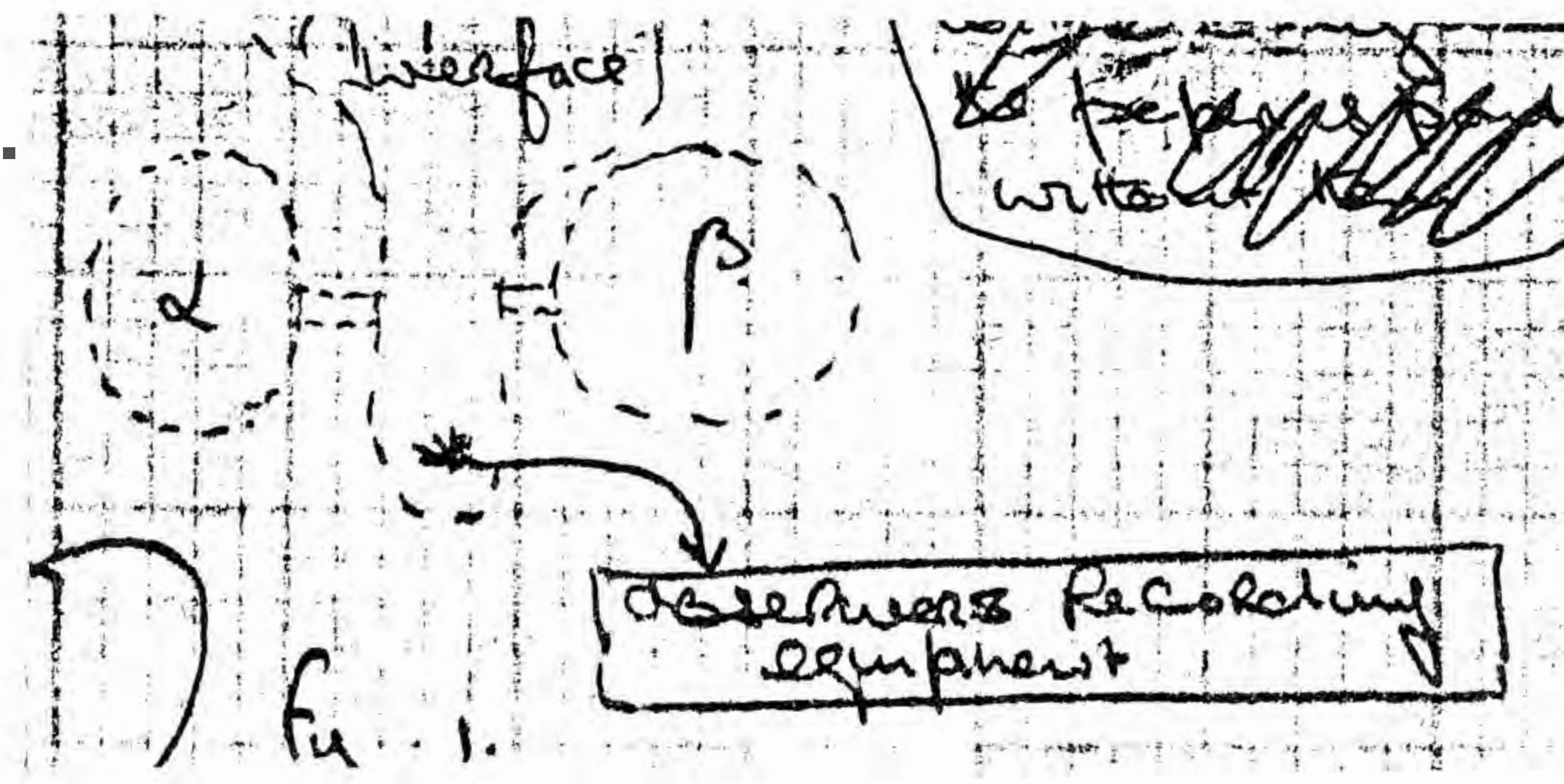
In Figure 1, which introduces the notation for distinguishing *M Individuals*, α may be a user of the architecture machine regarded as a biological unit and β the architecture machine regarded as a chunk of metal and semiconductor material. But α may also be a rat and β its experimental environment.

2.2. A *P Individual* is distinguished as a self-replicating and (usually) evolving *organization*. It is respectably and precisely defined in terms of an object language *L* and a relational domain *R* described in *L* by a description *D(R)* with respect to which it *is* self-replicating. Here, self-replication is intended in the abstract sense of the theory of reproductive automata, as originally conceived by von Neumann (1968) and as recently developed by Loegren (1972).

2.2.1. Though, in general, the domain may be allowed to grow systematically under the control of the given *P Individual*, we confine our attention to cases in which *R* is fixed. Under these circumstances, it is possible to specify domains with the property that if a given *P Individual* is viable (that is, is able to reproduce) on occasion *n*, then it is also viable at any later occasion *n + r* (*r* finite) for *R*, in *R*.²

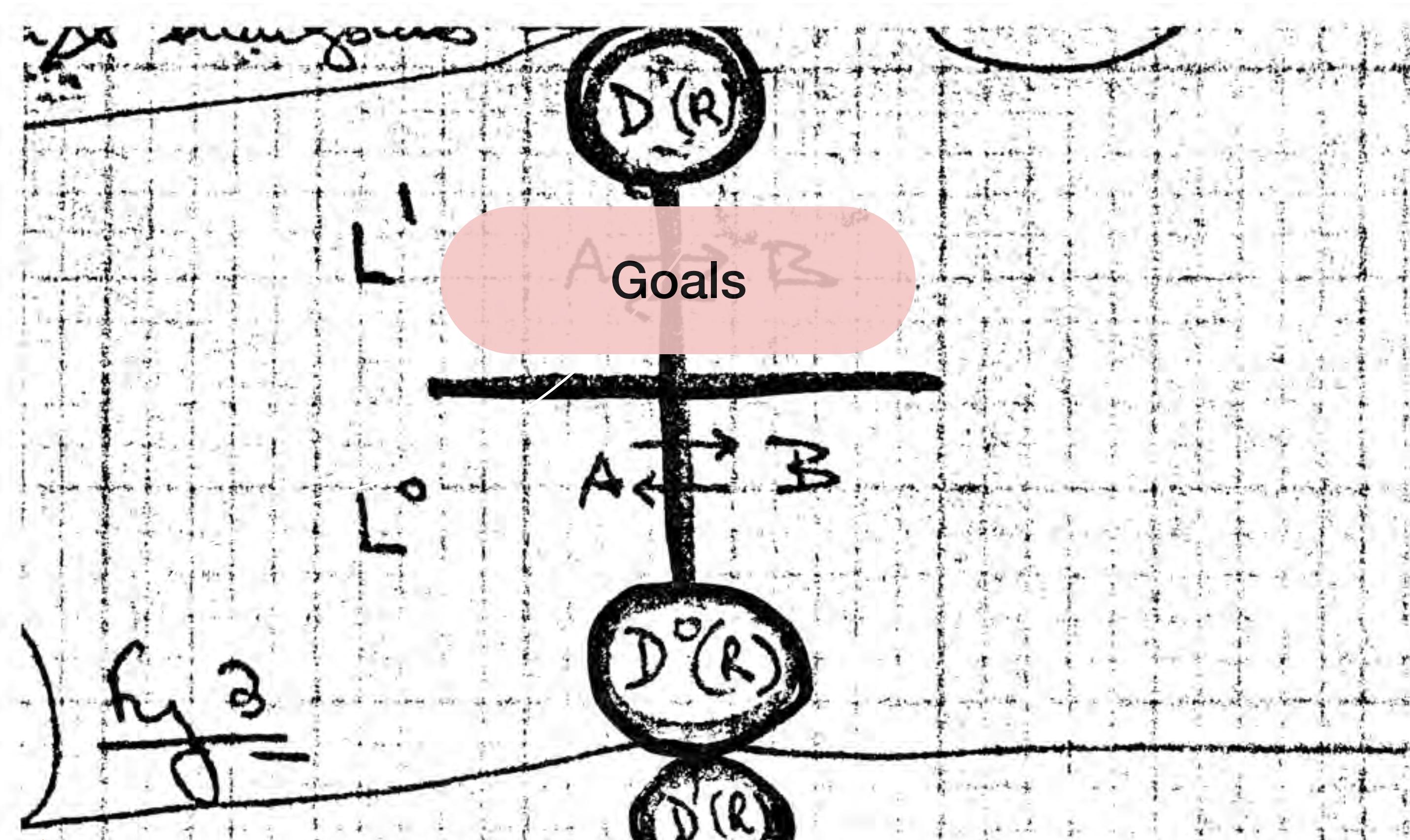
2.2.2. It is assumed that a *P Individual* is active or that any conversation in which it is a participant does in fact proceed, that is, for each occasion, some topic relation *R* (a part of *R* or all of it) is actually ostended for

Interactions occur through an interface.



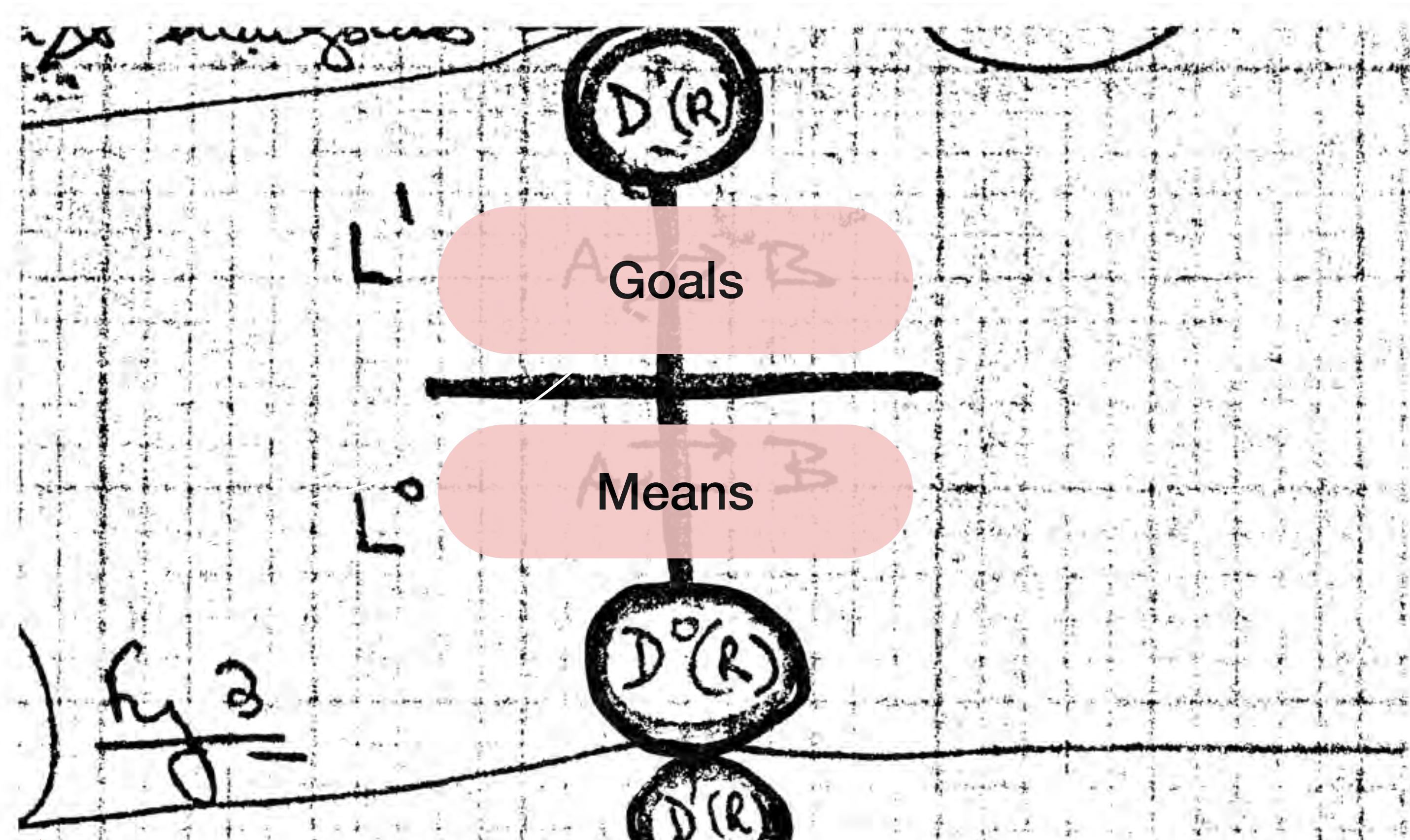
Gordon Pask.
“Aspects of Machine Intelligence”
In *Soft Architecture Machines*,
Nicholas Negroponte, ed., MIT Press
1976.

Interactions in a conversation can be observed to have levels of *goals* –



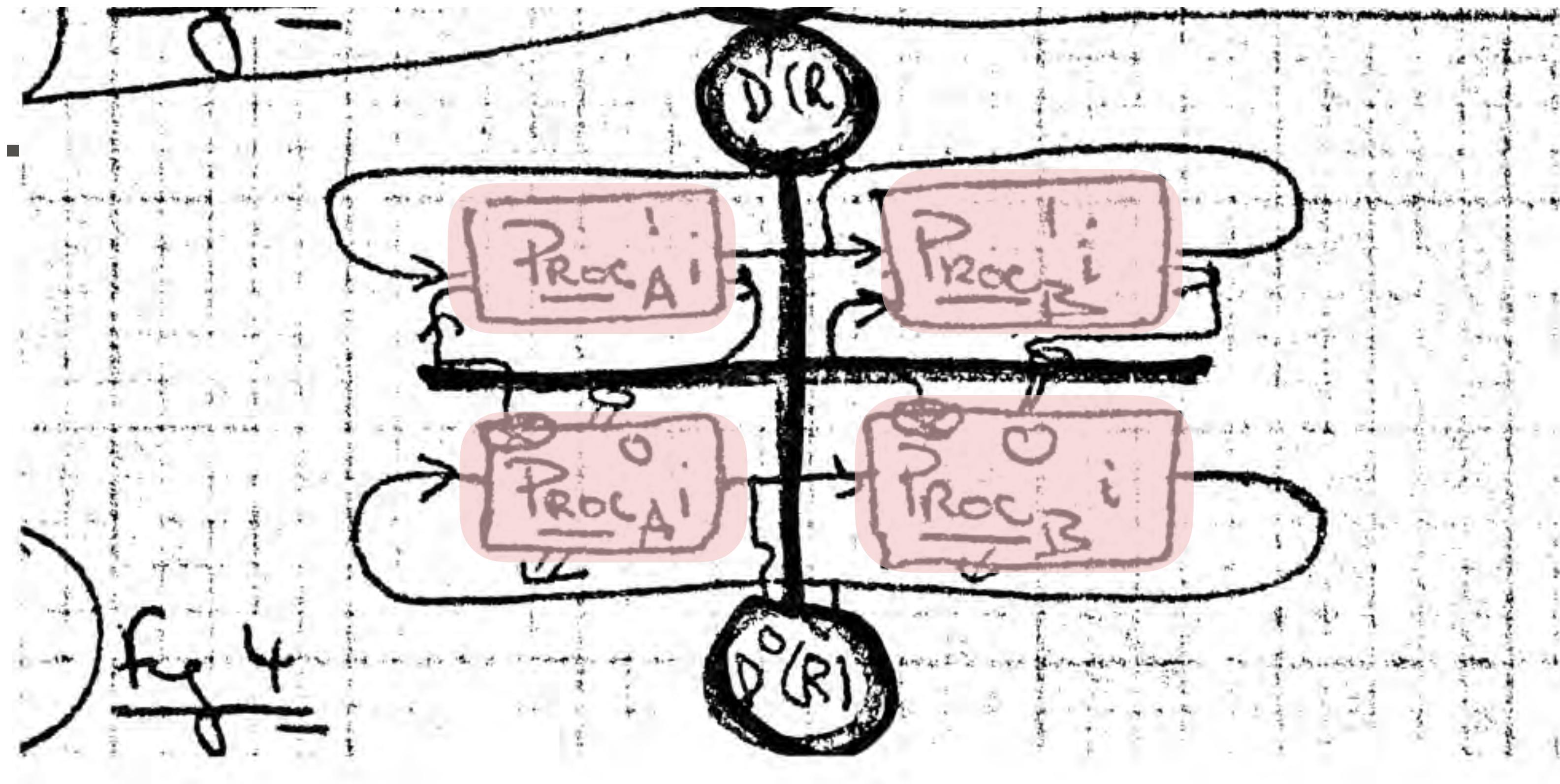
Gordon Pask.
“Aspects of Machine Intelligence”
In *Soft Architecture Machines*,
Nicholas Negroponte, ed., MIT Press
1976.

Interactions in a conversation can be observed to have levels of *goals* – and corresponding levels of *means* to achieve them.



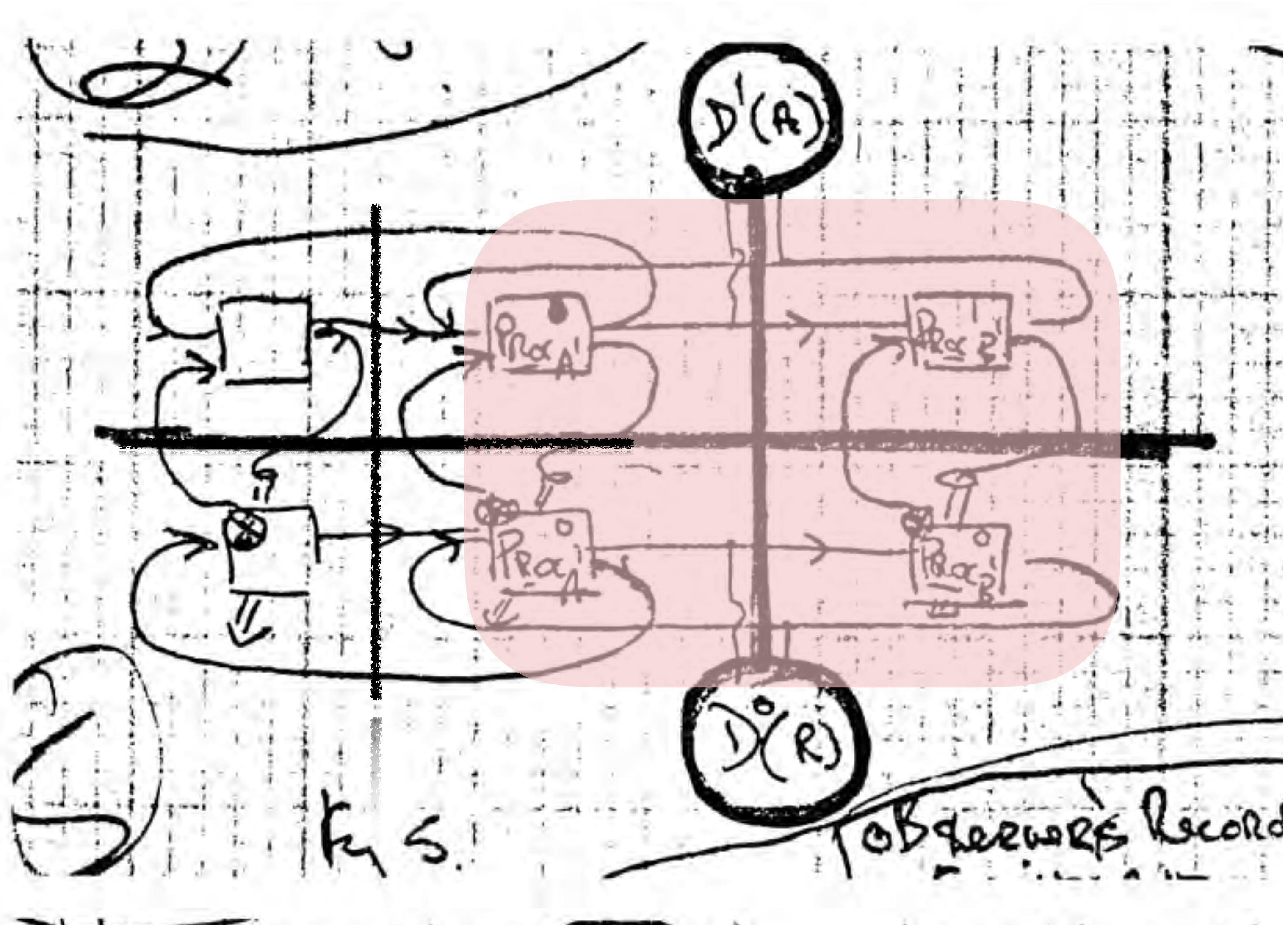
Gordon Pask.
“Aspects of Machine Intelligence”
In *Soft Architecture Machines*,
Nicholas Negroponte, ed., MIT Press
1976.

Conversations are driven by processes.



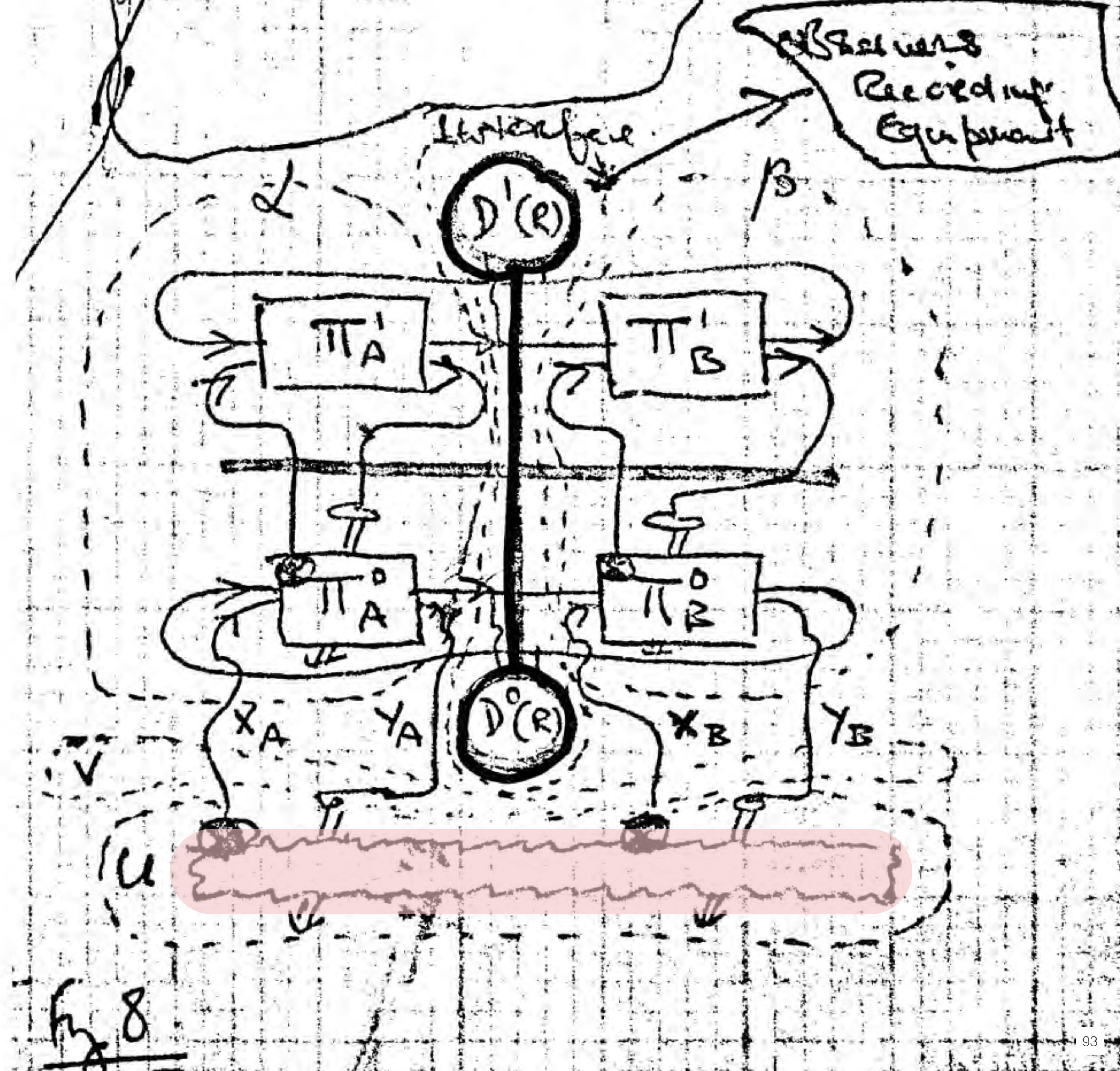
Gordon Pask
“Aspects of Machine Intelligence”
In *Soft Architecture Machines*,
Nicholas Negroponte, ed., MIT Press
1976.

Conversations have similar structures and processes, whether between persons or internal to one person.



Gordon Pask
“Aspects of Machine Intelligence”
In *Soft Architecture Machines*,
Nicholas Negroponte, ed., MIT Press
1976.

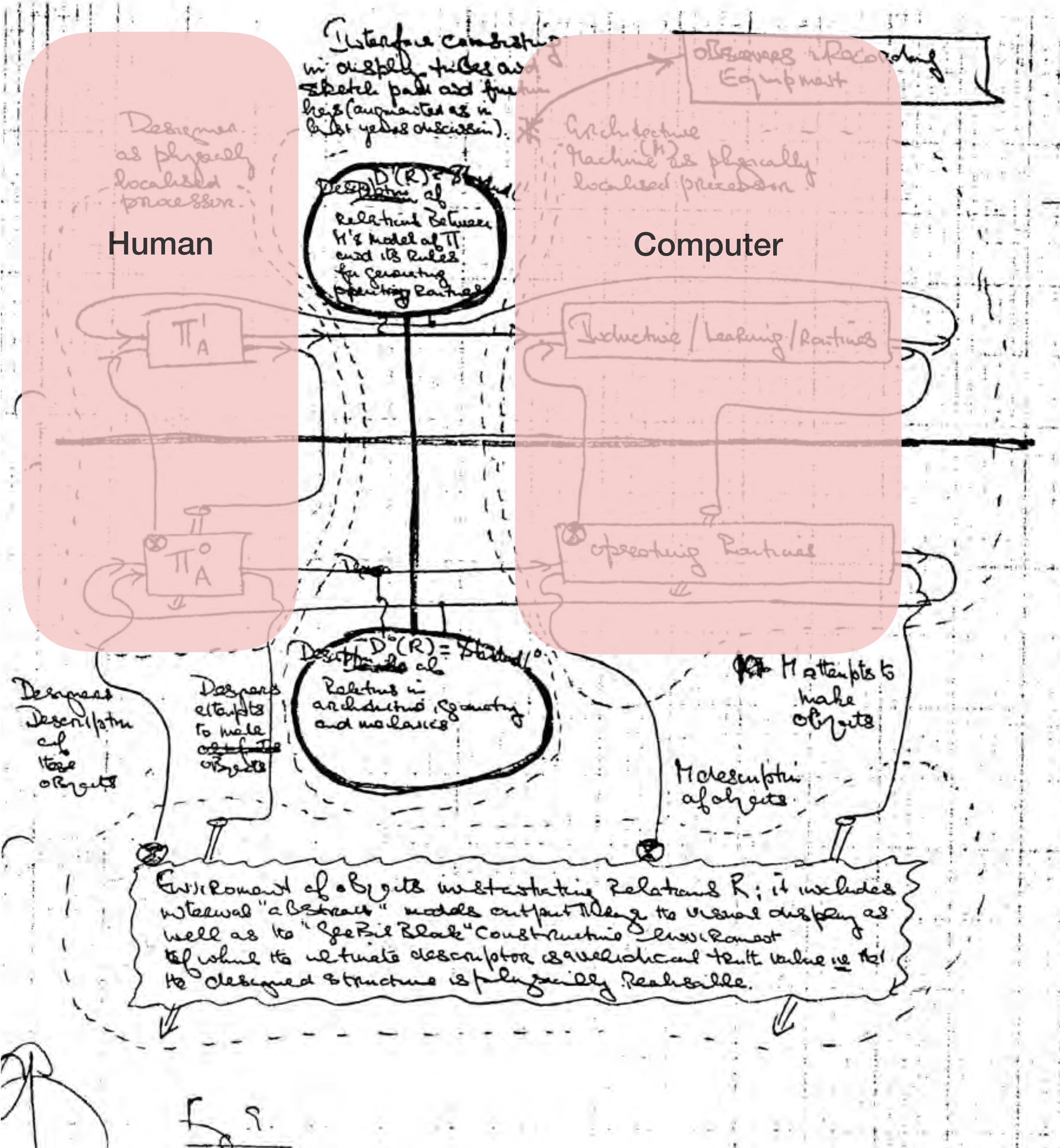
Conversations may result in actions taken in an environment.



Gordon Pask
“Aspects of Machine Intelligence”
In *Soft Architecture Machines*,
Nicholas Negroponte, ed., MIT Press
1976.

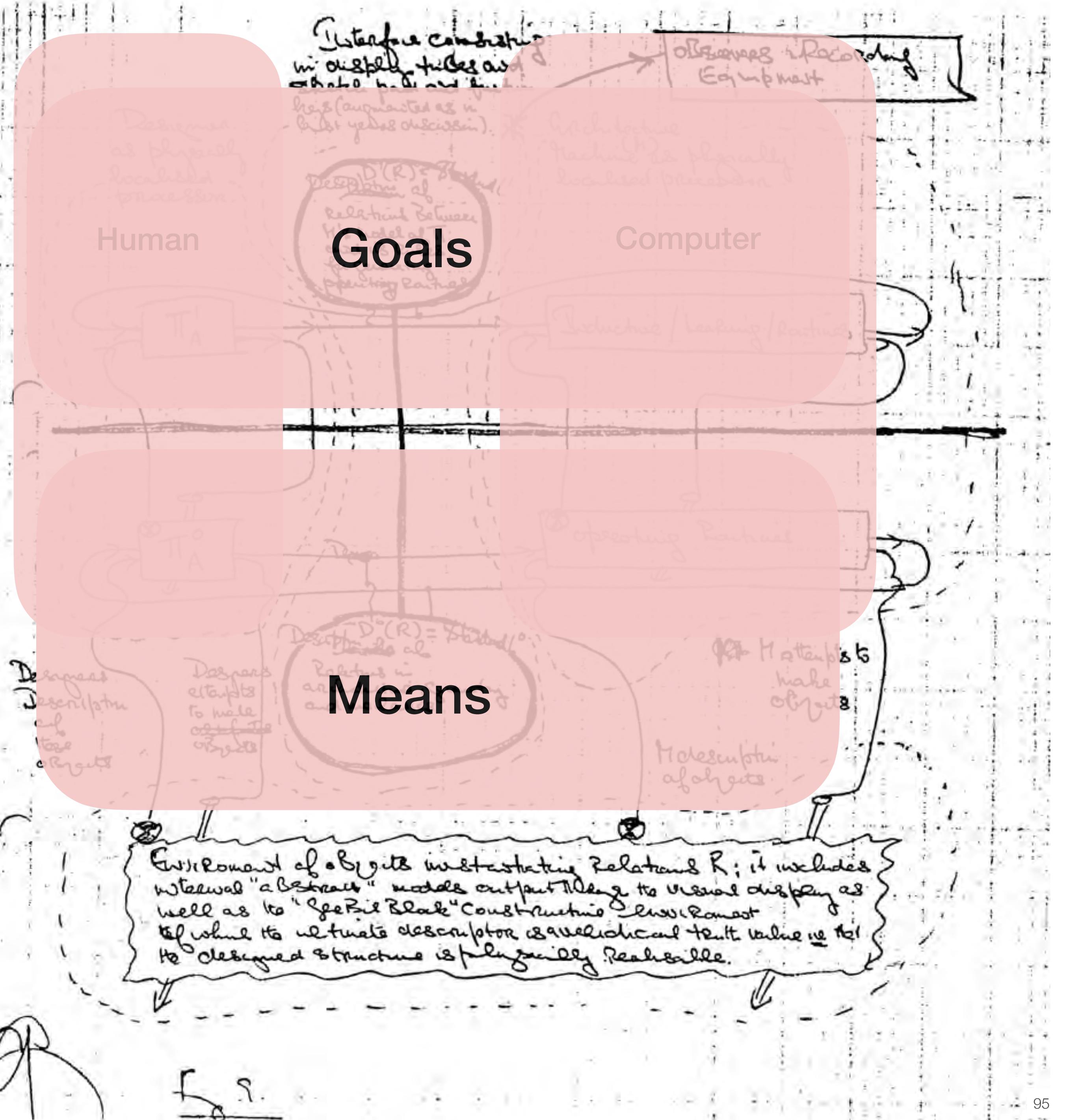
A computer can partner with a human in a conversation for design.

Gordon Pask.
“Aspects of Machine Intelligence”
In *Soft Architecture Machines*,
Nicholas Negroponte, ed., MIT Press
1976.

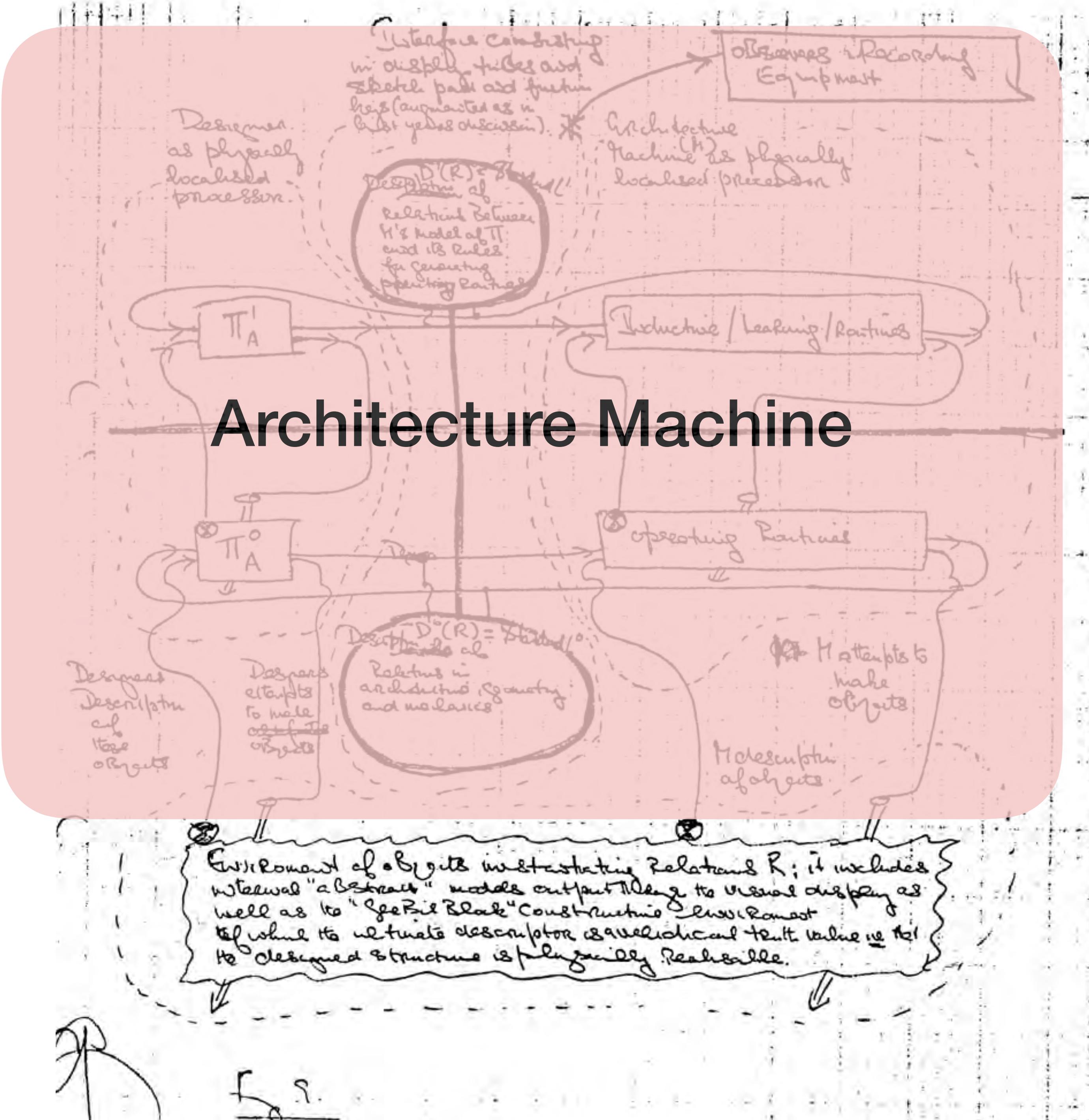


A computer can partner with a human in a conversation for design.

Gordon Pask.
“Aspects of Machine Intelligence”
In *Soft Architecture Machines*,
Nicholas Negroponte, ed., MIT Press
1976.



A computer can partner with a human in a conversation for design.



Gordon Pask.
"Aspects of Machine Intelligence"
In *Soft Architecture Machines*,
Nicholas Negroponte, ed., MIT Press
1976.

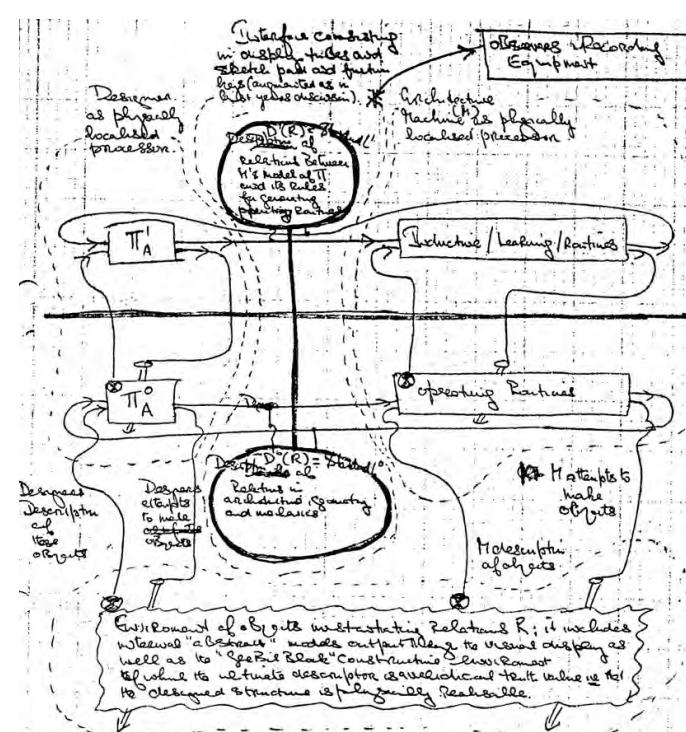
#1 – Novelty Regulation

#2 – Uncertainty Regulation

#3 – Autonomy

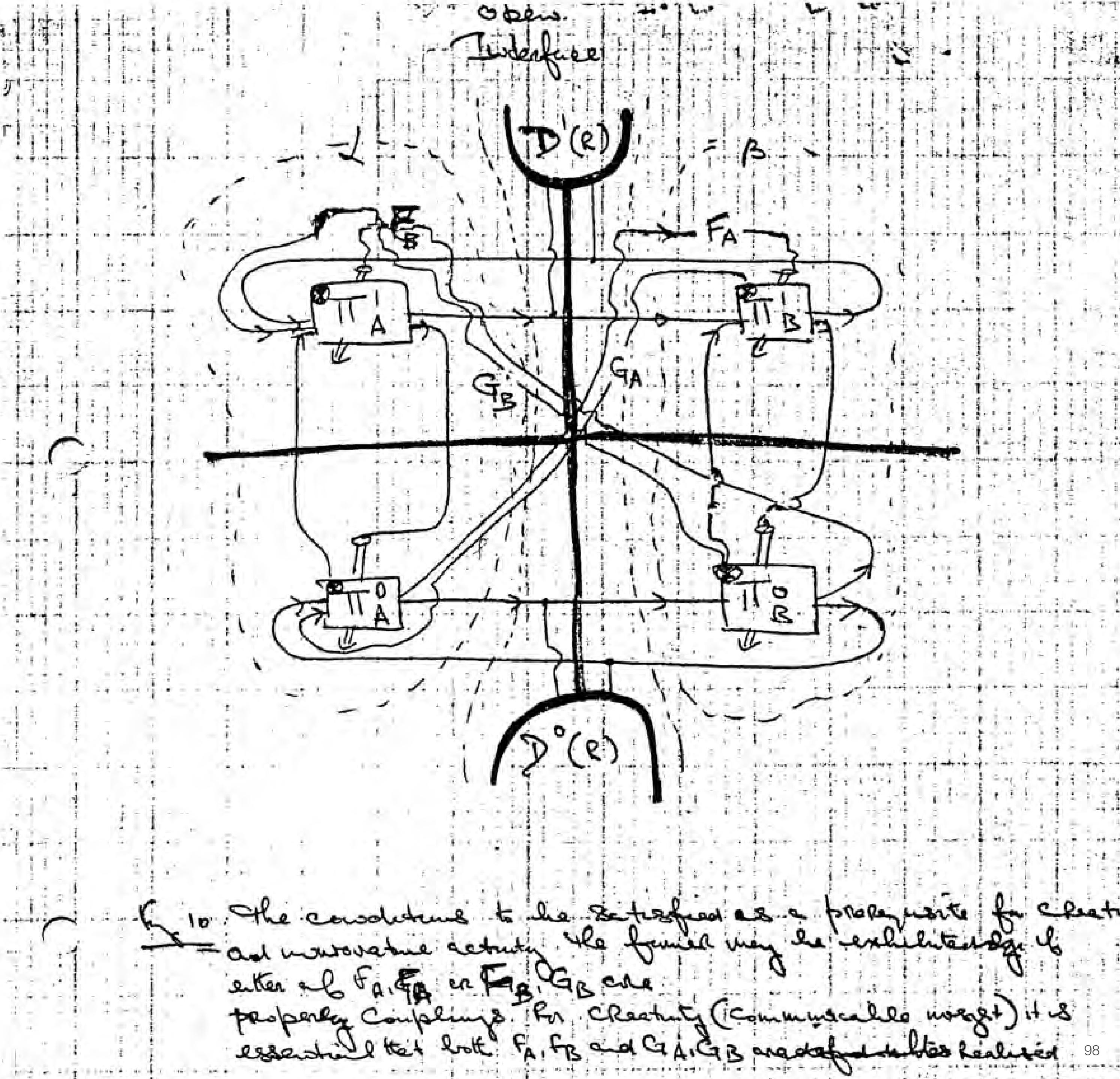
Paskian Interaction Principle #4 – Conversation for Design

The Architecture Machine proposes a human-computer conversation for design where the machine co-participates in evolving goals as well as means (methods).



Click for presentation on Paskian Principles

Conversation may be a **dance** where each participant construes the other to be part of a unified whole.



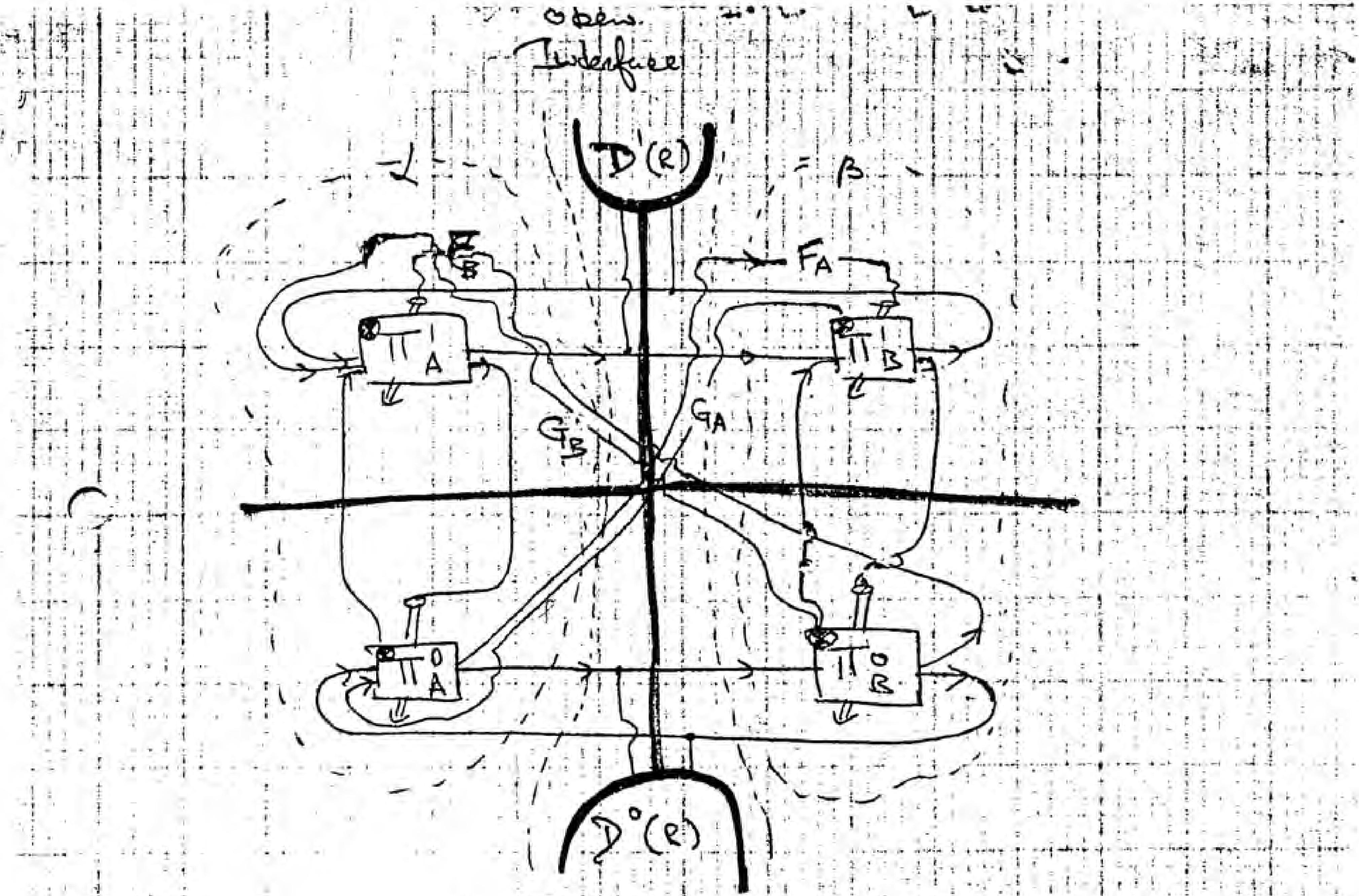
Gordon Pask.

"Aspects of Machine Intelligence"

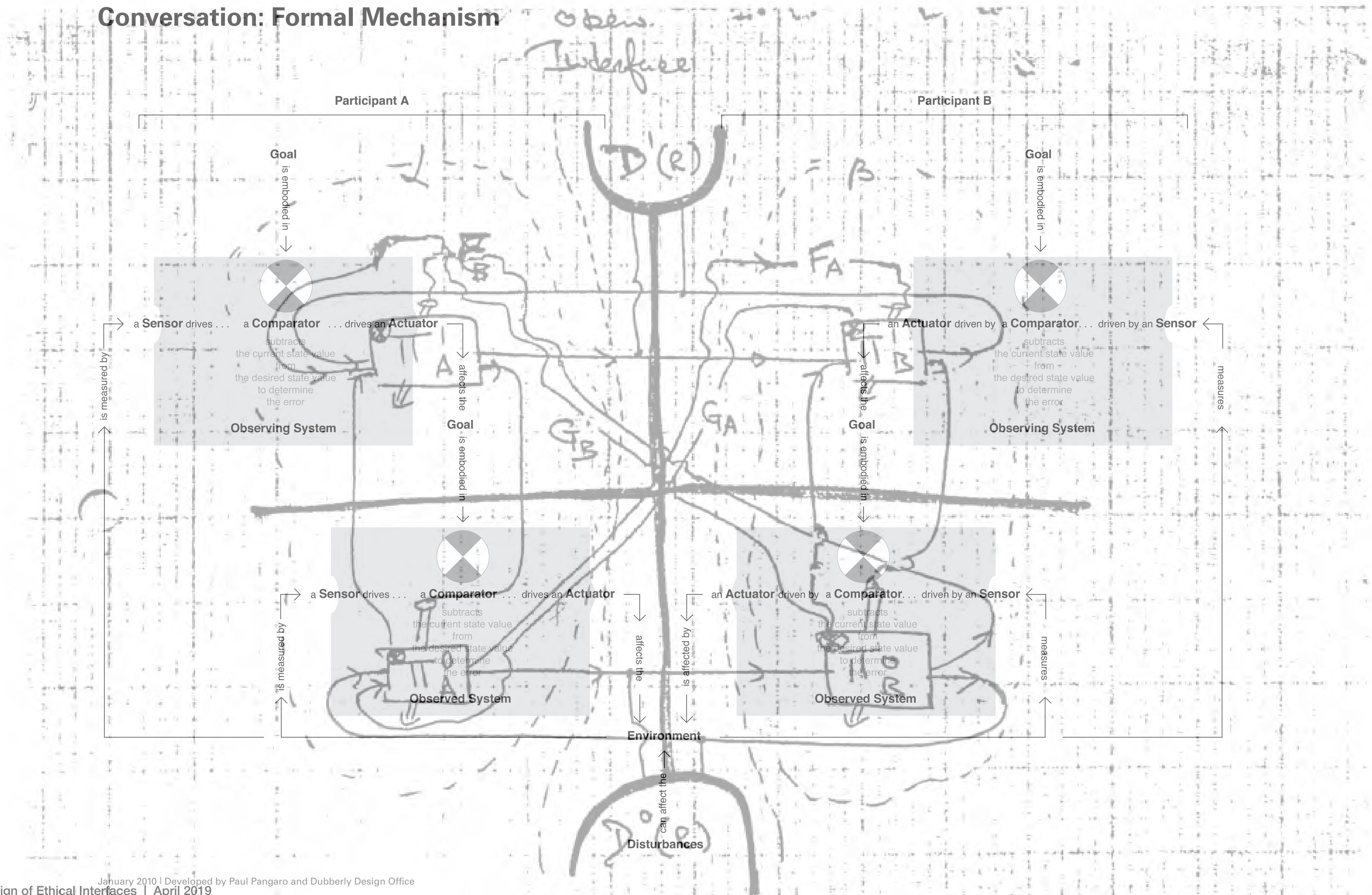
In *Soft Architecture Machines*,

Nicholas Negroponte, ed., MIT Press

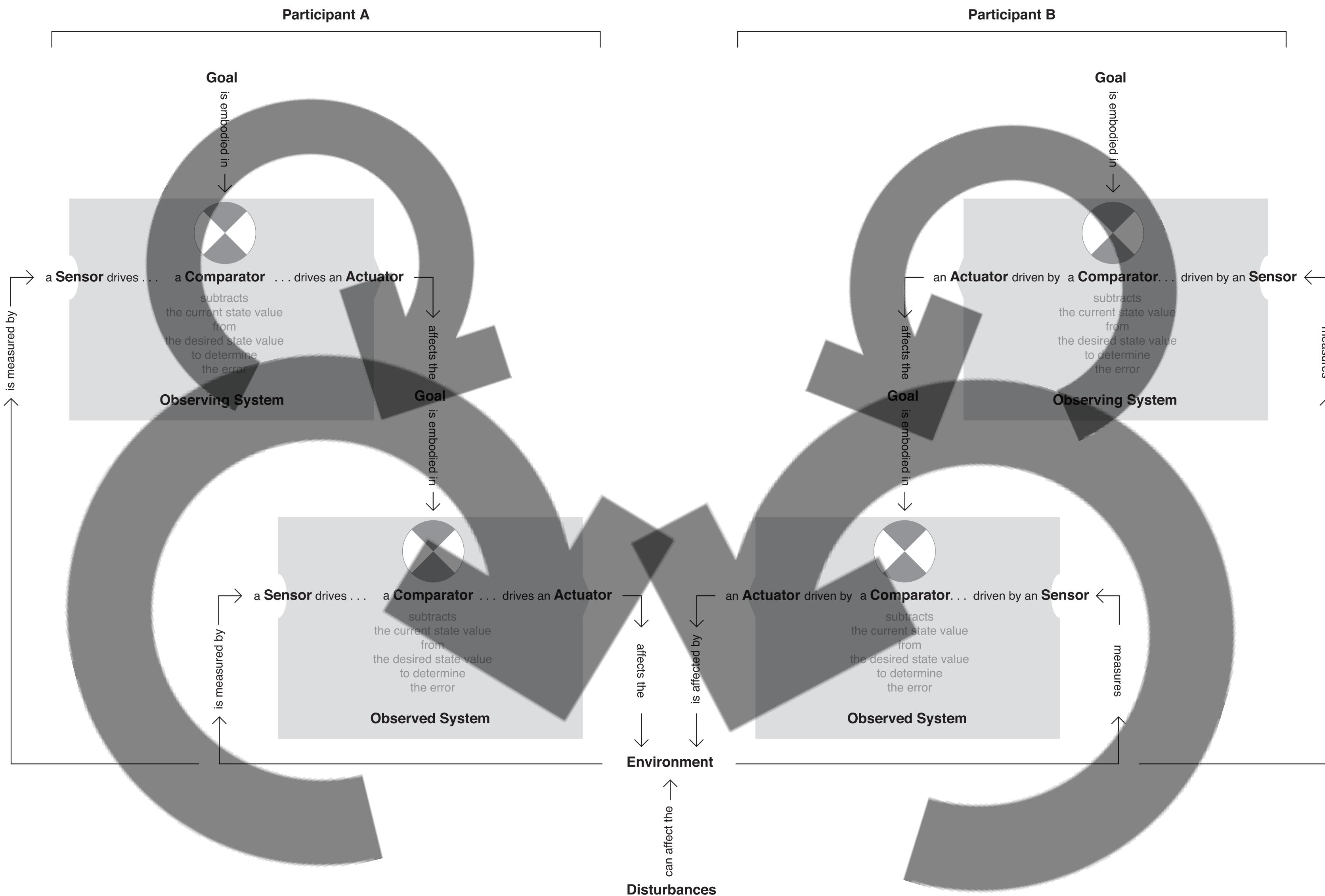
1976.



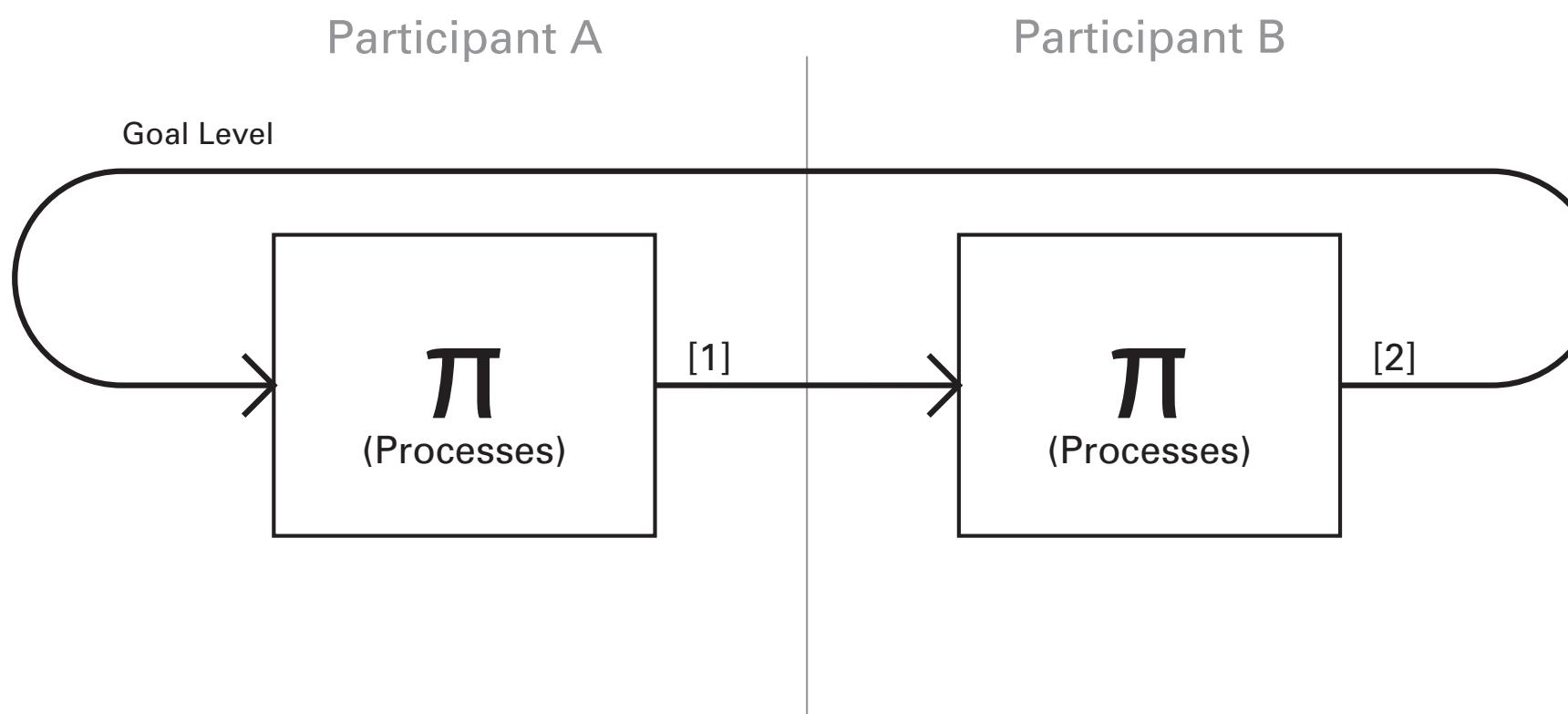
Conversation: Formal Mechanism



Conversation: Formal Mechanism



Conversation Theory after Pask



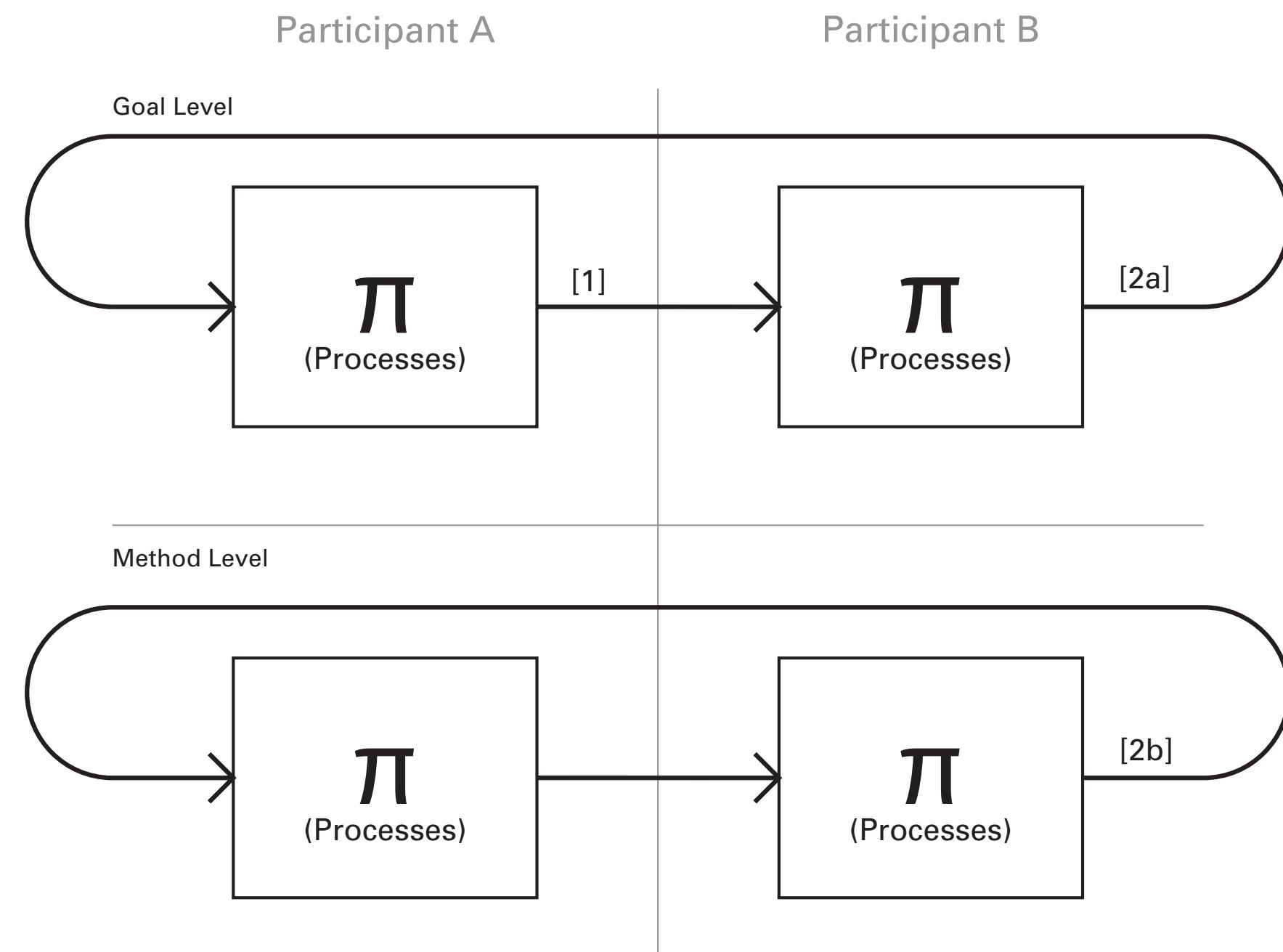
Example:

[1] A: Can I have a hamburger?

[2] B: Sure, you want fries with that?

Architecture of Conversation

Distinguishing Goals and Methods

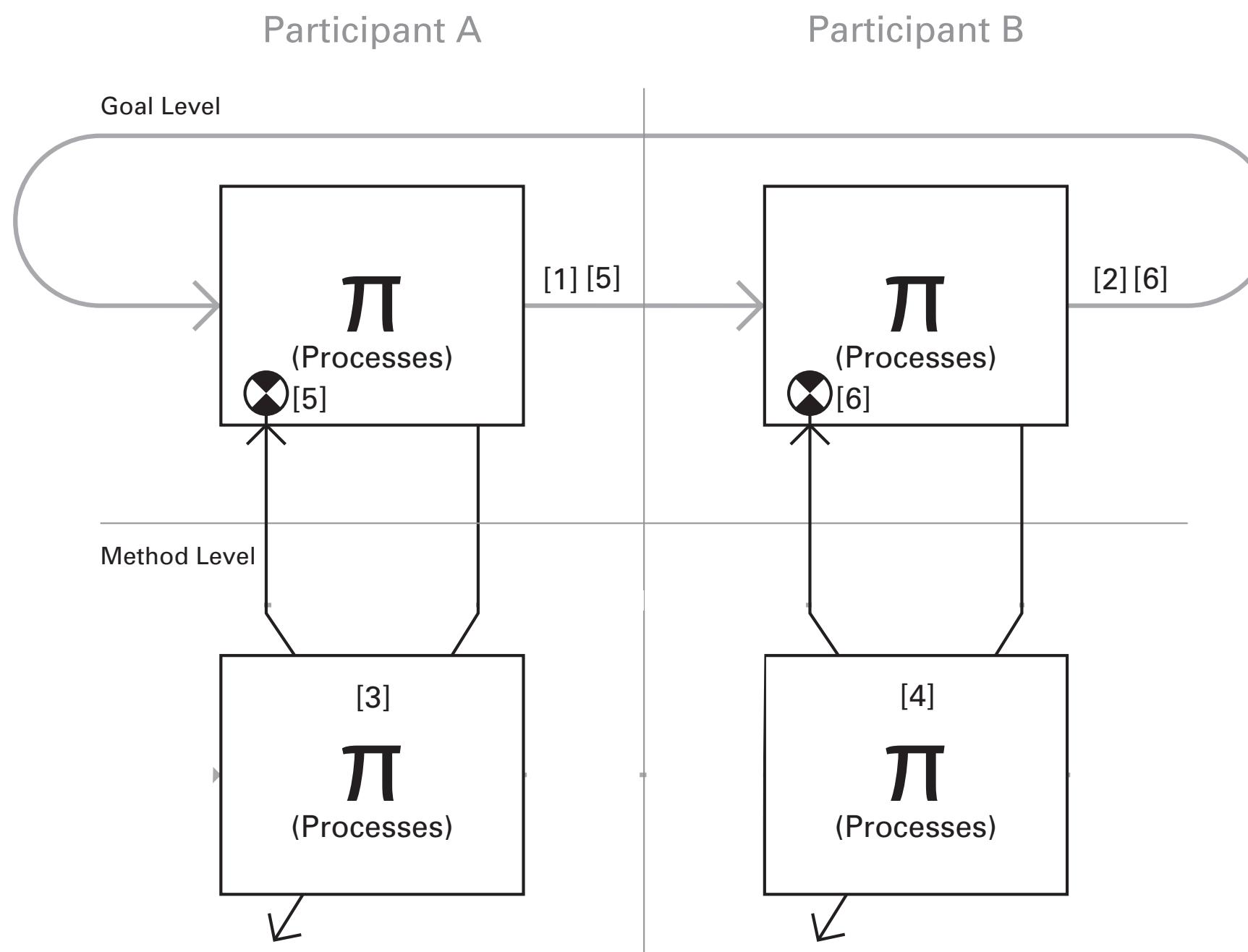


Example:

[1] Can I have a hamburger?

[2] [a]Sure, [b]you want me to make
you one here or get takeout?

Conversation (Objective) Interactions with 'it'



Example:

[1] I'd like to have a hamburger for dinner.

[3] [Performs the actions of taking the meat out of the fridge, putting it on the grill, turning the grill on, watching until it's done, etc.]

[5] I've cooked the hamburger and achieved my goal.

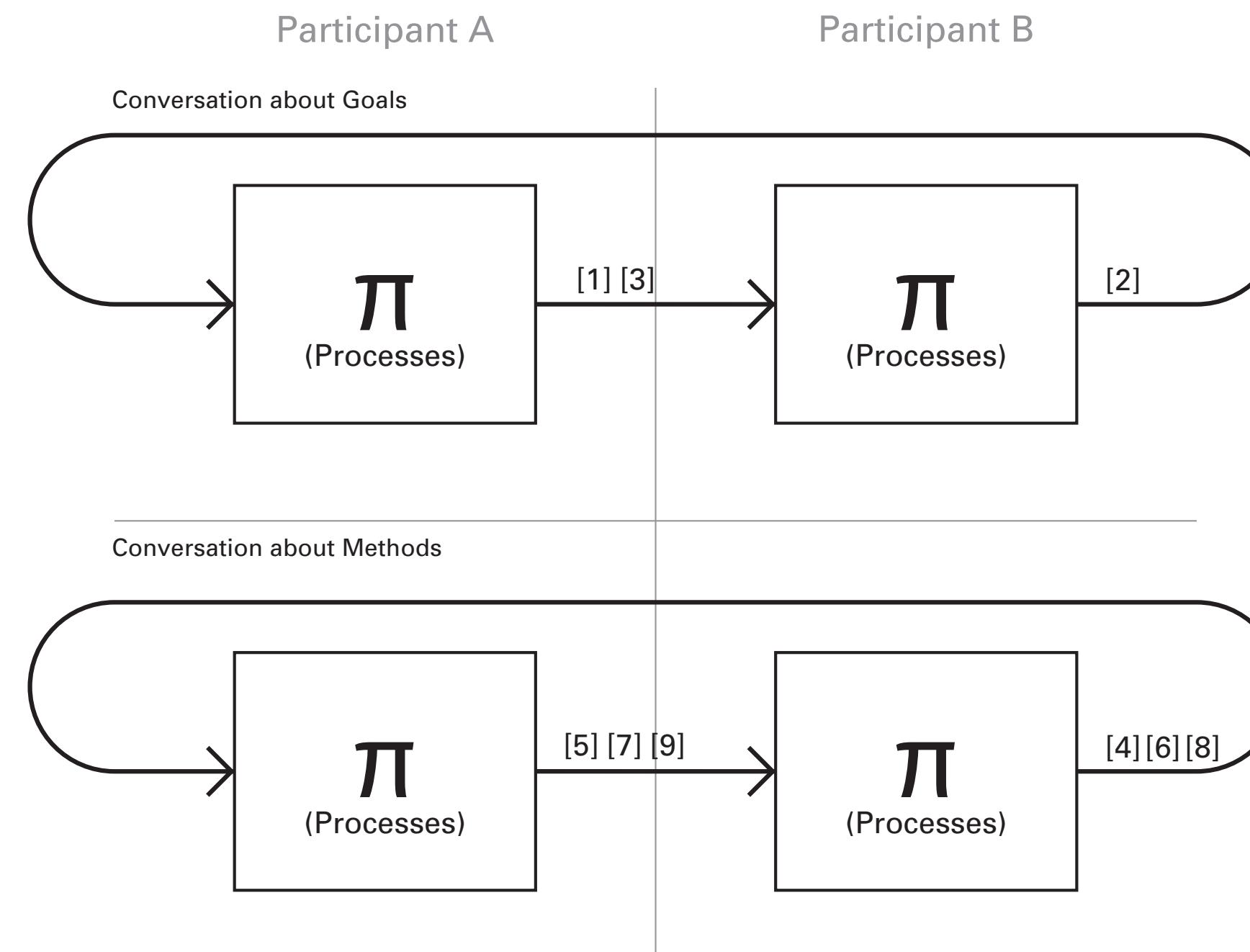
[2] I'd like to eat chicken. I'll go get takeout.

[4] [Gets coat, leaves the apartment, walks to the takeout place, orders the food, waits until it's done, pays for it, brings it home and then eats it.]

[6] I've eaten the chicken and achieved my goal.

Conversation (Subjective)

Interactions that refer to 'I' and 'you'



Example:

[1] I'm thinking we might want to have hamburgers for dinner.

[3] Chicken is fine too.

[5] You could go to that takeout place and bring it back.

[7] I've been much more often!

[9] Ok.

[2] Well... You've had them a lot lately. What about chicken instead?

[4] We don't have any chicken defrosted.

[6] I went last time, so it's your turn.

[8] Yes, ok, I'll go after I finish reading my email.

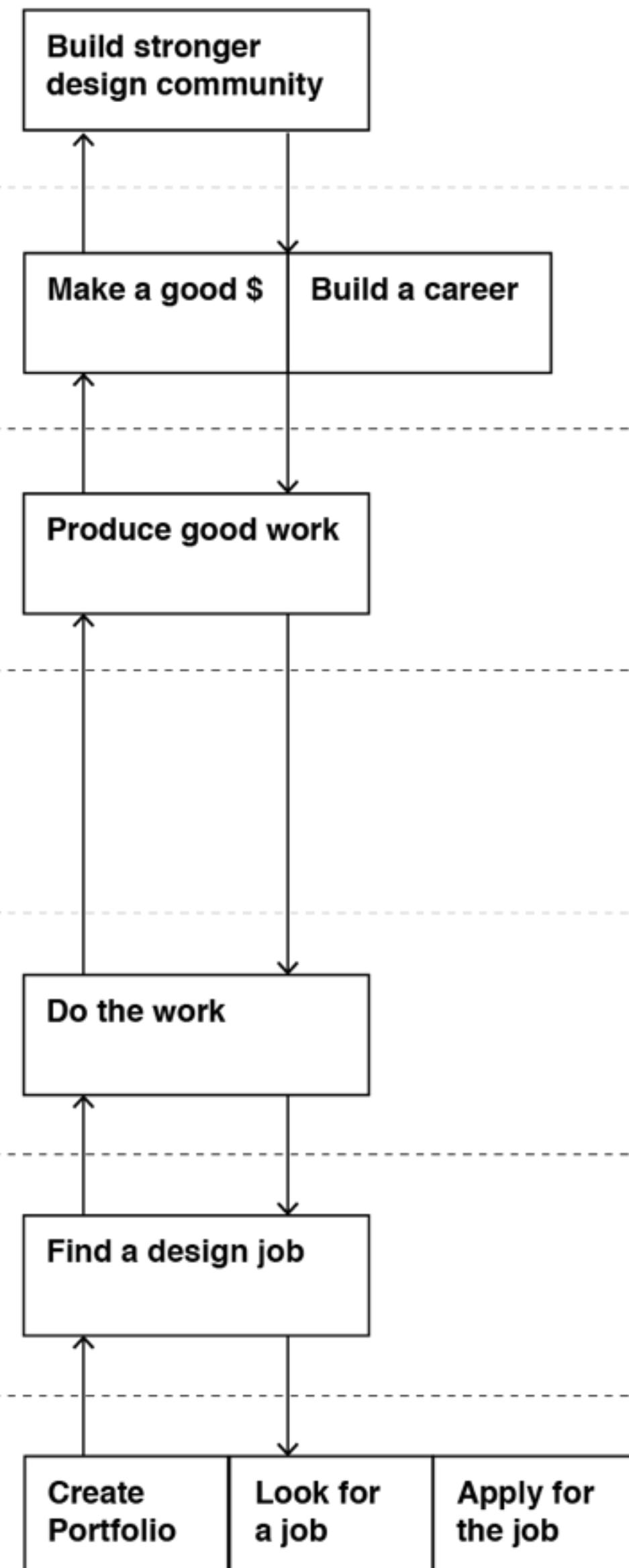
A photograph showing a group of people in a workshop or classroom setting. In the center, a man with glasses and a mustache is seated at a table, gesturing with his hands while speaking. Around him, several people are standing and listening attentively. One woman to his left is holding a small yellow object. To his right, a woman in a teal dress has her hands on her hips. In the foreground, a person's hands are visible writing on a large sheet of paper spread out on the table. The background shows a whiteboard and some colorful artwork on the walls.

PROBLEM STATEMENT

In India, there are many talented designers, but it is challenging to finding connections to other designers and design jobs.

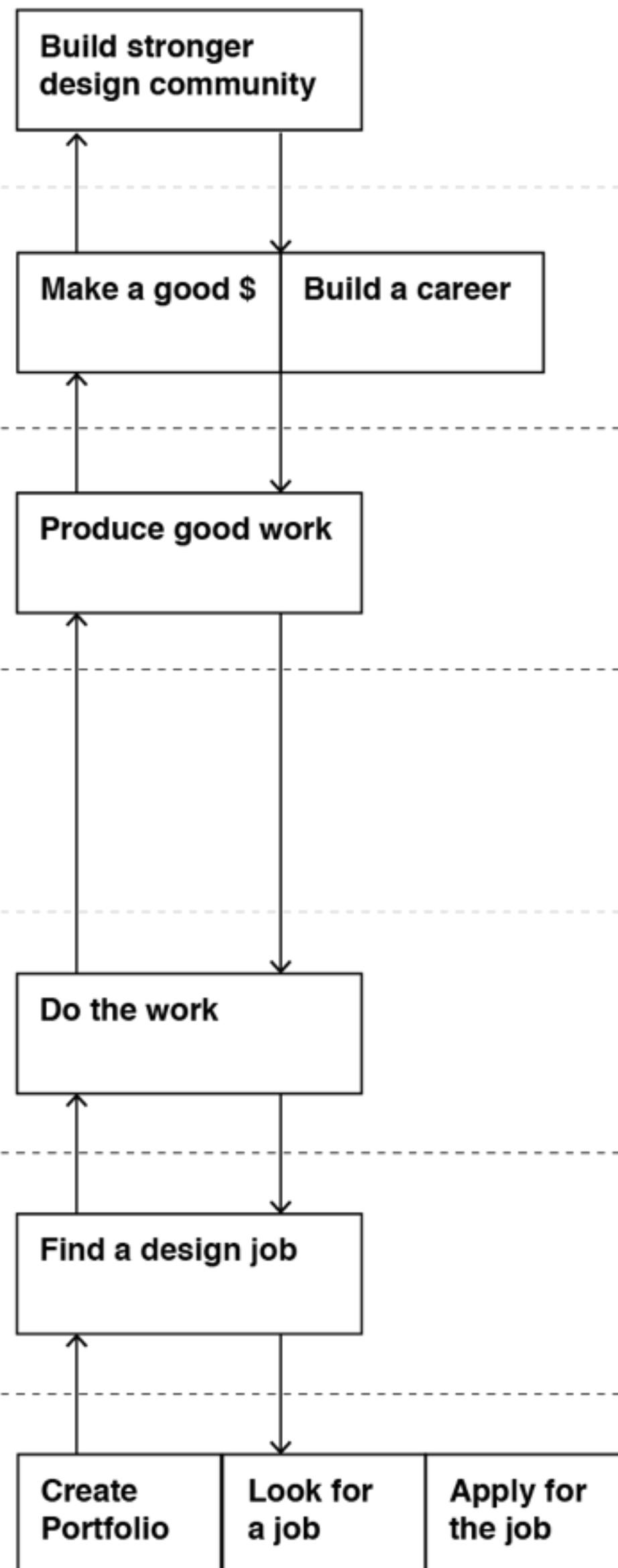
DESIGNERS

DESIGNERS IN INDIA

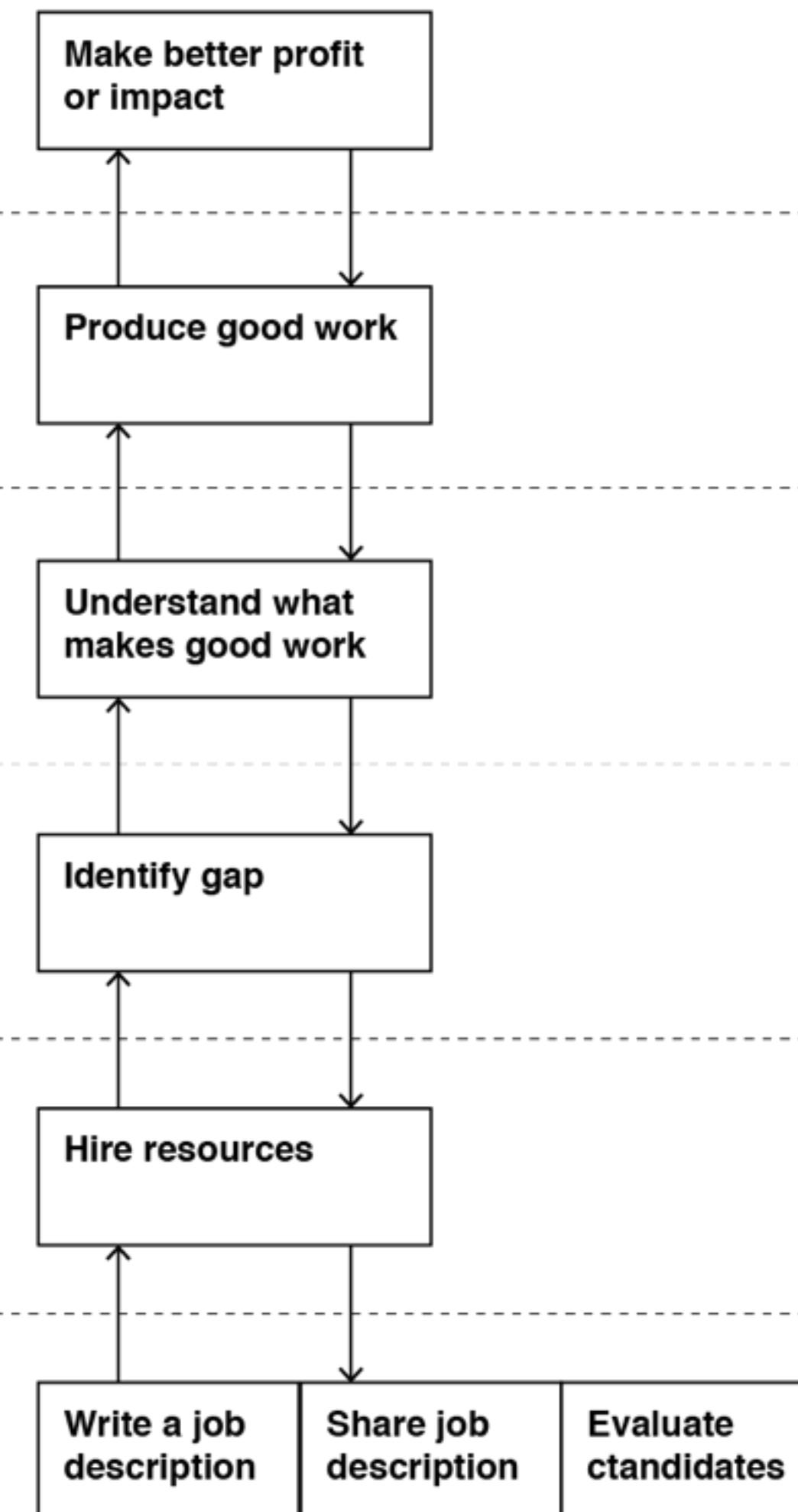


DESIGNERS AND COMPANIES

DESIGNERS IN INDIA

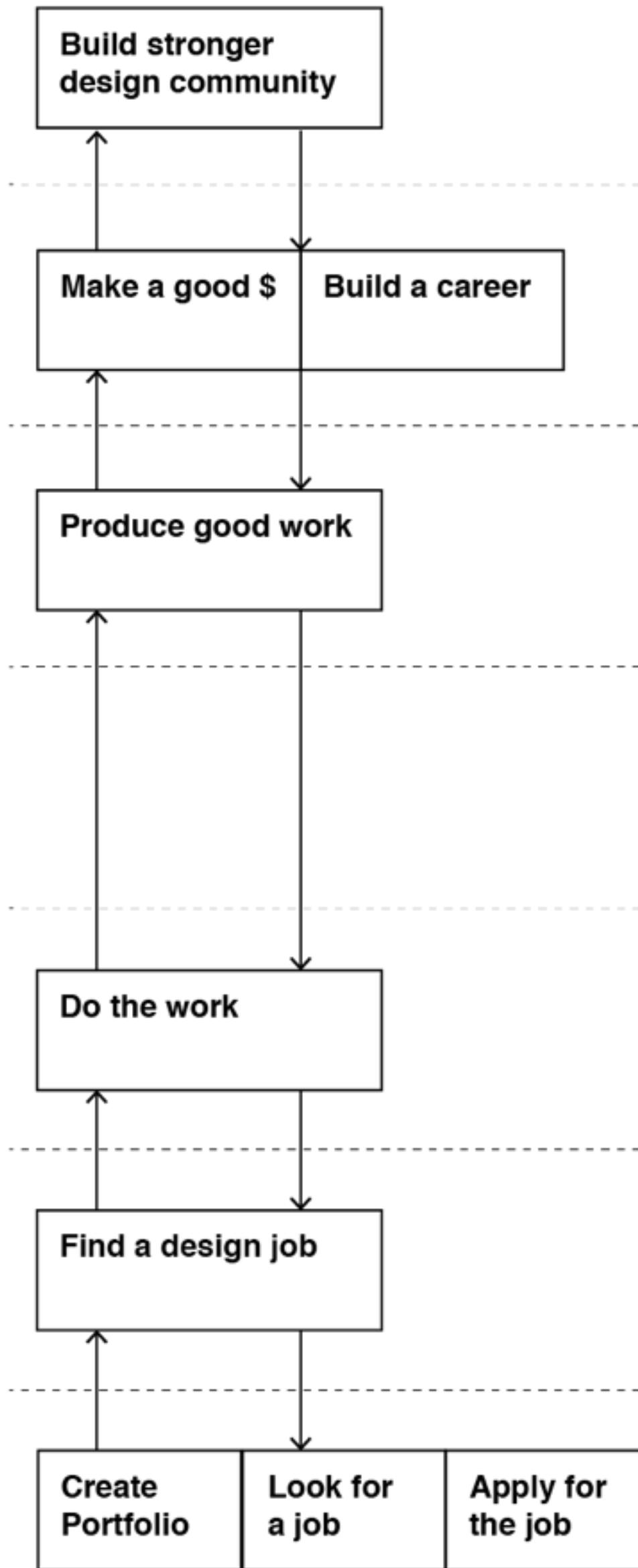


COMPANIES

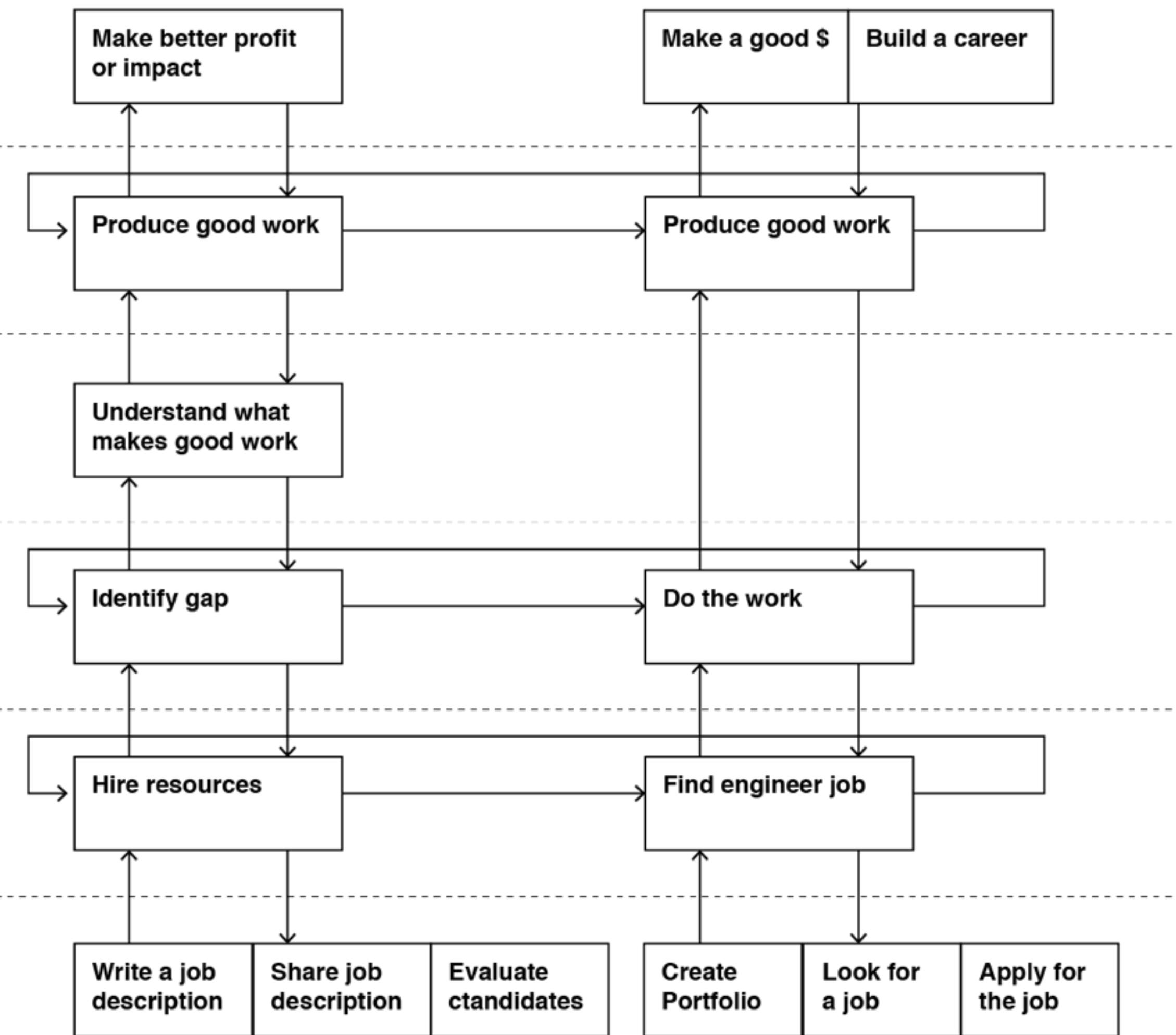


CURRENT CONVERSATION

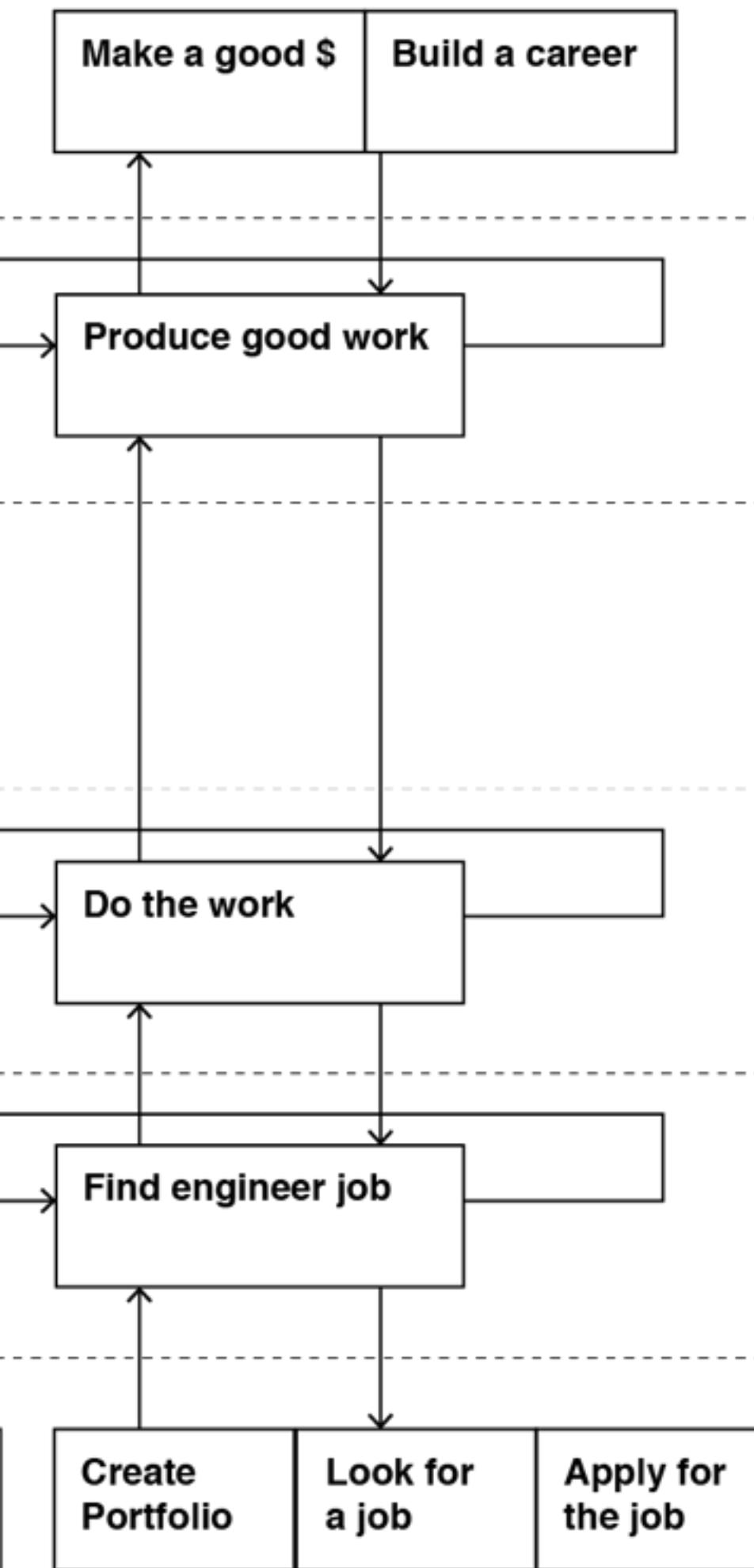
DESIGNERS IN INDIA



COMPANIES

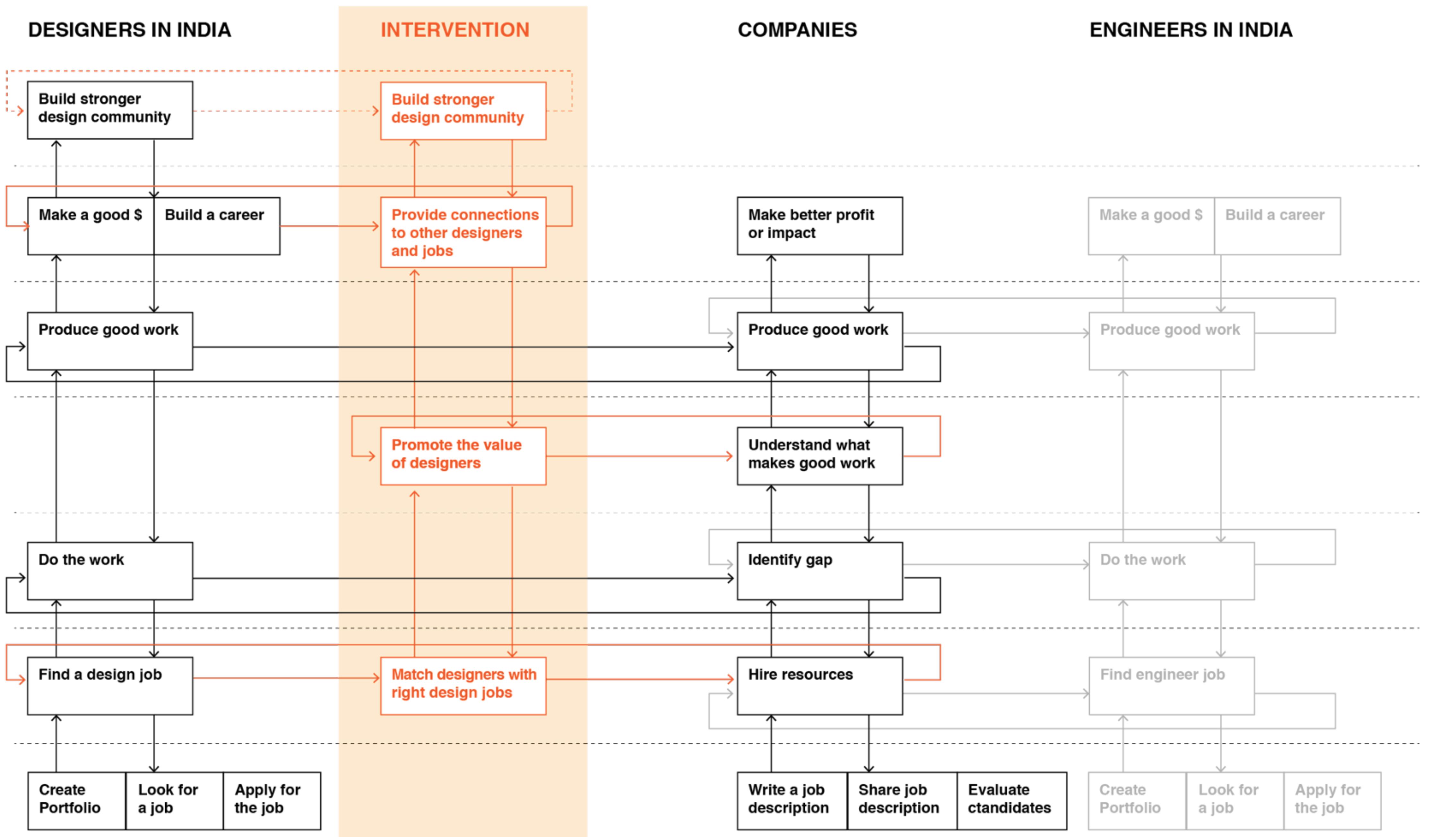


ENGINEERS IN INDIA

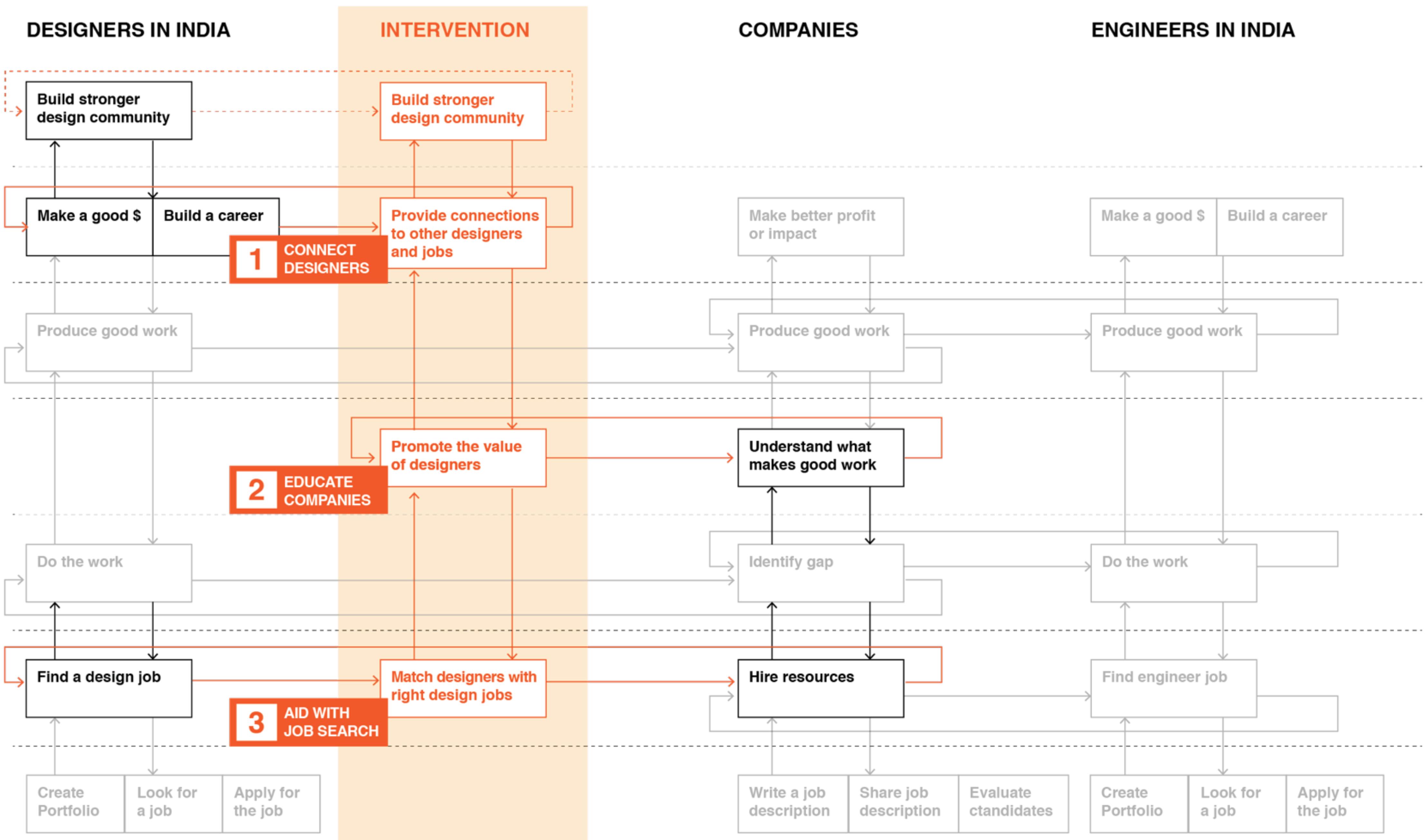


NO CONVERSATION OR VERY LITTLE CONVERSATION

INTERVENTION TO INCLUDE DESIGNERS



INTERVENTION TO INCLUDE DESIGNERS



Conversation (Subjective Interactions)

Summary of Elements

A: "Controlling Process (alias goal)" is, for example, management policy defined at this level ("increase revenue by 4%") but carried out at another (see below). The distinction of levels is made in the course of the modeling process. The precise levels are chosen to display the flows of control and feedback that are of interest.

B: "Controlled Process (alias method)" is, for example, the increase of revenue via hiring more salespersons, as dictated by the level above.

C: "Injunction to execute" is the actual line of control that causes the lower level to respond, for example, the memorandum indicating start of a project or a budget authorization.

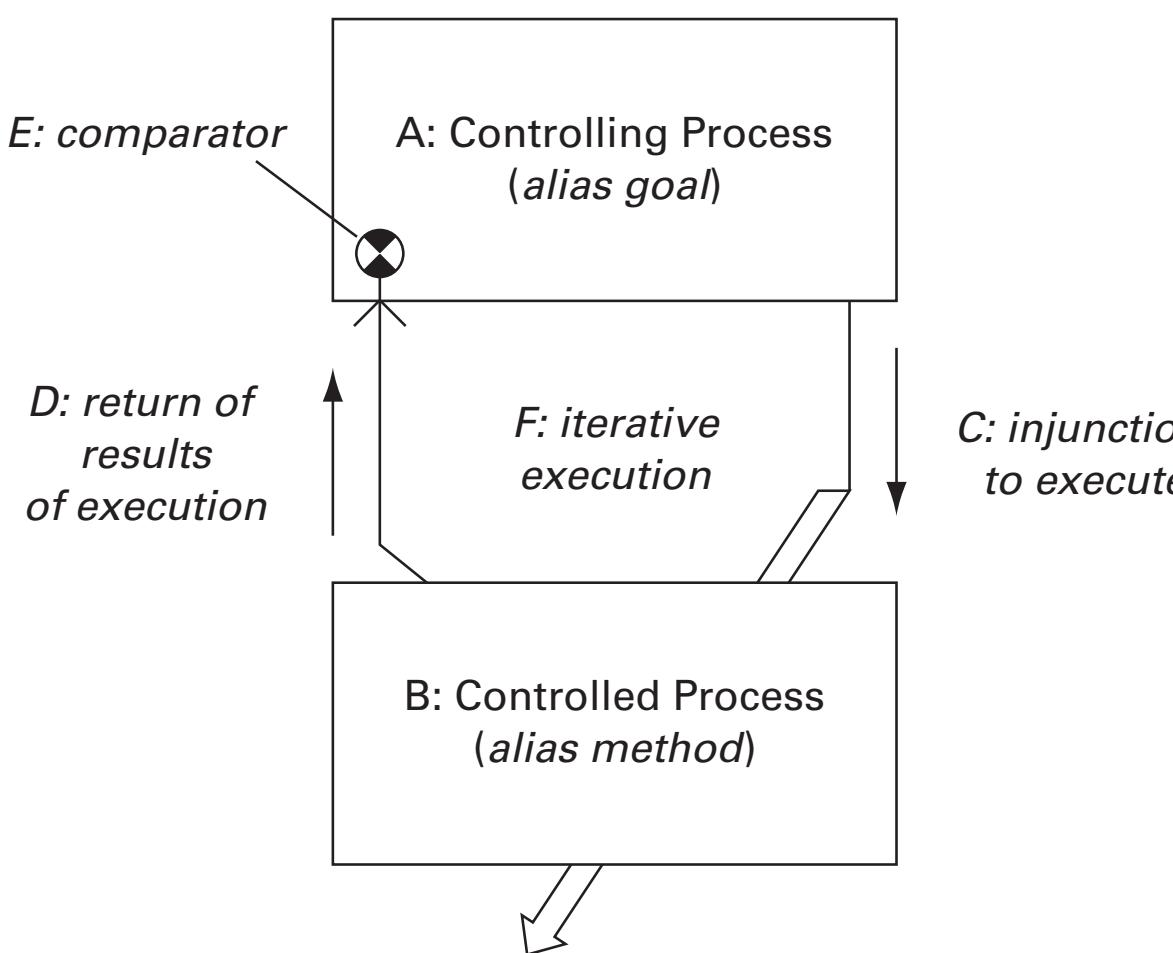
D: "Return of results of execution" is the actual feedback of information to the higher level, as for example a report indicating results of specific manufacturing procedures, or an internal survey.

E: "Comparator" is the specific mechanism whereby the feedback information is used by comparing the actual result to the desired result, or original goal.

F: "Iterative execution" of the entire loop takes into account the result from the comparator above, that causes changes in various processes, flows of control and feedback, etc., to make the entire loop more effective.

If all of the above aspects are present, the system of interactions is deemed "intelligent."

It must be emphasized that the two levels shown are only two of (possibly) many vertical levels; modeling by the observer leads to distinguishing multiple vertical layers in the conversation. Hence a box that appears at a "lower level" in one interaction may itself be at the "higher level" relative to a further box that appears below it.



Closure occurs when comparator confirms execution of controlled processes is coherent with controlling processes
(as when a goal is achieved by executing a successful method)

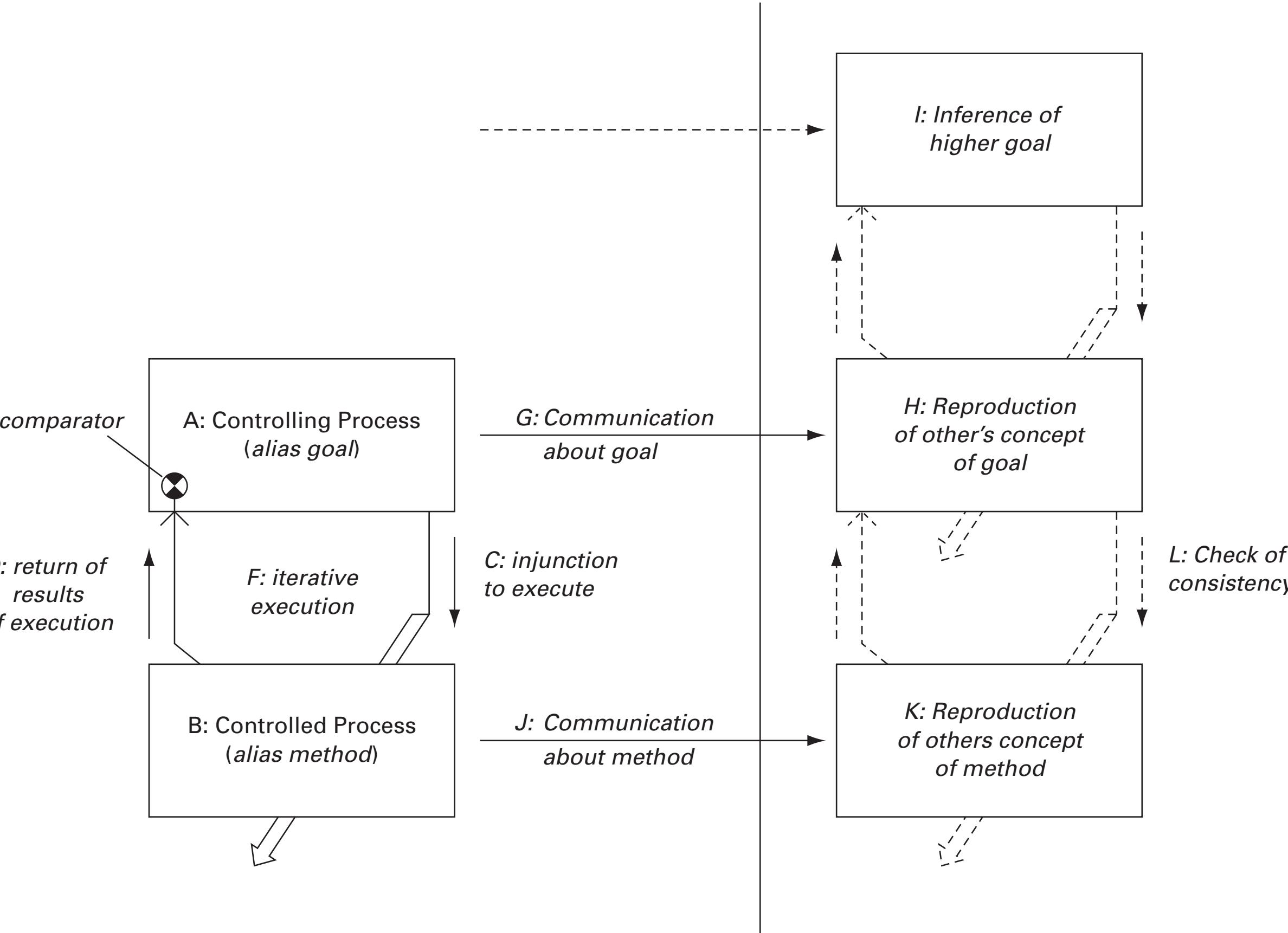
Conversation (Subjective Interactions)

Summary of Elements

G: "Communication about goal"
is, for example, the communication to a customer that the company's value proposition expressed via its advertising is to provide products with the best cost/benefit ratio, or durability, for a given application; or, to an employee, that the company considers the employee to be an essential asset for its future.

H: The actual result of the communication is different than what came from the "sender." ("Sender" and "receiver" are held in quotations to retain a different meaning from that of information theory.) The "receiver" attempts "Reproduction of other's concept of goal" but this may not be accurately achieved.

I: "Inference of higher goal"
is the production of a higher goal for which the previous interaction is consistent and affirming. This is as if the "sender" had actually exchanged something (shown as the upper, dashed arrow) but in fact nothing has actually been "transferred" at this level, up to this point. Quite often, the context or the common experience of the two conversants provides enough for a higher-level goal to be correctly inferred. However, sometimes the "sender" creates a false context to encourage an incorrect inference, as for example when advertisers imply a food product is healthy simply because it uses the word "natural", or when a participant simply states "I have your interests at heart" while not having demonstrated this to be the case.



J: "Communication about method"
is, for example, the communication to a customer about the details of a product's capabilities (which should affirm its stated goals, G); or, an exchange with an employee about the details of working conditions and health benefits from the corporation, which should show the method by which that employee is to be considered an asset to the corporation, relative to the goal as communicated in G.

K: "Reproduction of other's concept of method", as in H above, is subject to interpretation and later modification.

L: "Check of consistency"
is a reproduction in the "receiver" of the entire vertical loop of the "sender". This may show the consistency across the upper and lower levels, and thereby affirm understanding of the "sender's message." Of course, this can only be (at best) very close and (at worst) only a small fraction of the intended message. Alternatively, the consistency check can expose the inconsistency between communicated goal and method. For example, the loss of retirement pensions or erosion of healthcare coverage would contradict the assertion that the employee is a valued asset to the corporation. The "receiver" can either make queries back to the "sender" about intended meanings in order to clarify understanding (not shown in the diagram); or maintain a model of the perceived inconsistency in the "sender."

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