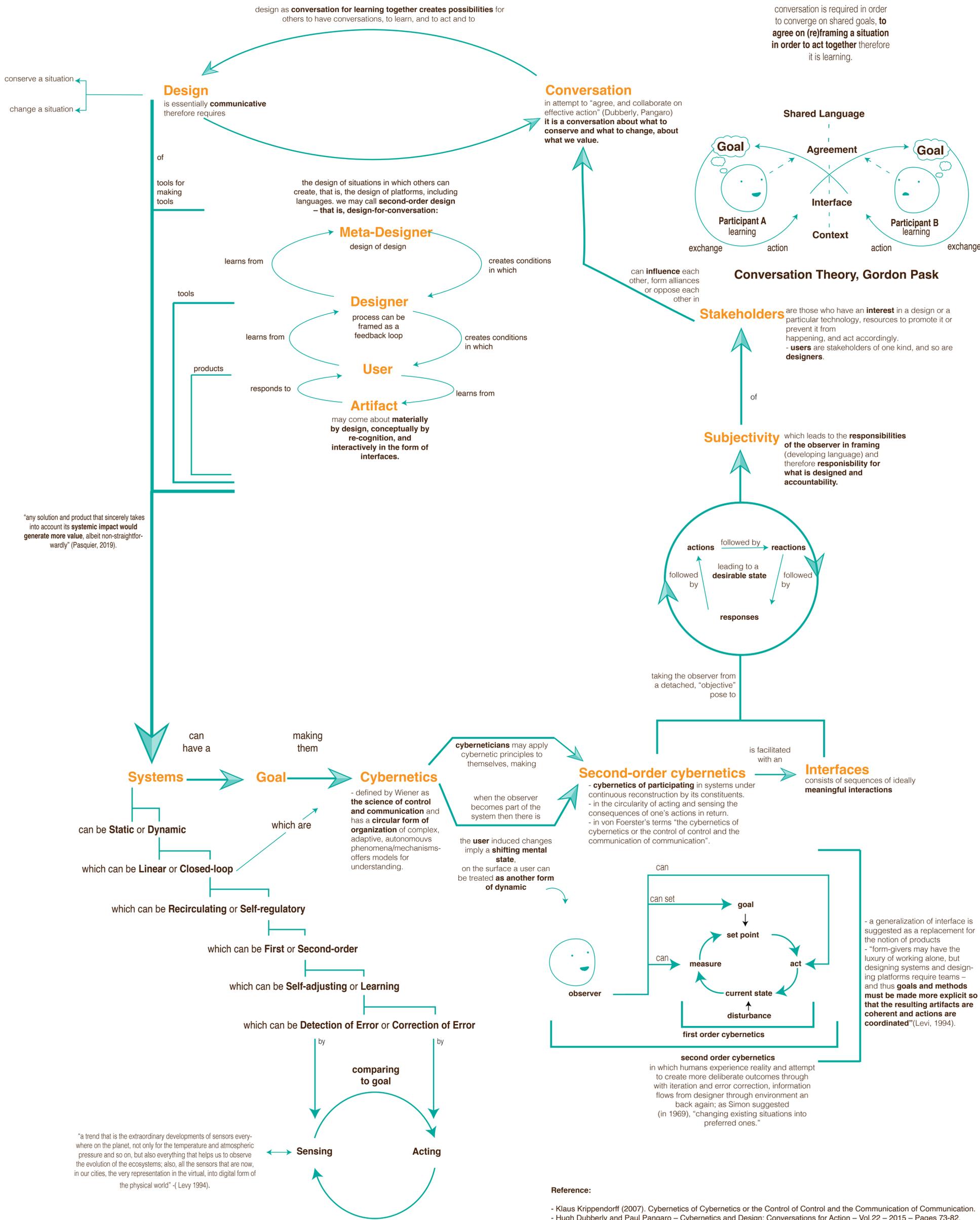# Cybernetics Facilitates Learning through Conversation

conversation is essential to design with feedback as it facilitates examination, critique and improvement of goals

"design conversations discuss goals, means, context (itself a conversation, not a state), **how to frame the situation** (and who advocated for what position), **what to conserve** (what we value), **what to try, how to evaluate it, what happened when we tried, and what to try next.**"
(Dubberly, Pangaro, 2015).

design as **conversation for learning together creates possibilities** for others to have conversations, to learn, and to act and to

conversation is required in order to converge on shared goals, **to agree on (re)framing a situation in order to act together** therefore it is learning.

conserve a situation

change a situation

Design
is essentially **communicative** therefore requires

of

tools for making tools

the design of situations in which others can create, that is, the design of platforms, including languages. we may call **second-order design – that is, design-for-conversation:**

Meta-Designer
design of design

learns from

creates conditions in which

Designer
process can be framed as a feedback loop

learns from

creates conditions in which

tools

User
responds to

products

Artifact
may come about **materially by design, conceptually by re-cognition, and interactively in the form of interfaces.**

learns from

Conversation
in attempt to "agree, and collaborate on effective action" (Dubberly, Pangaro) **it is a conversation about what to conserve and what to change, about what we value.**

Shared Language

Goal

Agreement

Goal

Interface

Participant A learning

Context

Participant B learning

exchange   action   action   exchange

Conversation Theory, Gordon Pask

can **influence** each other, form alliances or oppose each other in

Stakeholders are those who have an **interest** in a design or a particular technology, resources to promote it or prevent it from happening, and act accordingly.
- **users** are stakeholders of one kind, and so are **designers**.

of

Subjectivity which leads to the **responsibilities of the observer in framing** (developing language) and therefore **responsibility for what is designed and accountability.**

actions --- followed by --- **reactions**

followed by   leading to a **desirable state**   followed by

responses

taking the observer from a detached, "objective" pose to

"any solution and product that sincerely takes into account its **systemic impact would generate more value**, albeit non-straightfor-wardly" (Pasquier, 2019).

can have a

making them

cyberneticians may apply cybernetic principles to themselves, making

Systems

Goal

Cybernetics
- defined by Wiener as **the science of control and communication** and has a **circular form of organization** of complex, adaptive, autonomouvs phenomena/mechanisms- offers models for understanding.

when the observer becomes part of the system then there is

Second-order cybernetics
- **cybernetics of participating** in systems under continuous reconstruction by its constituents.
- in the circularity of acting and sensing the consequences of one's actions in return.
- in von Foerster's terms "the cybernetics of cybernetics or the control of control and the communication of communication".

is facilitated with an

Interfaces
consists of sequences of ideally **meaningful interactions**

can be **Static** or **Dynamic**

which are

which can be **Linear** or **Closed-loop**

the **user** induced changes imply a **shifting mental state**, on the surface a user can be treated **as another form of dynamic**

which can be **Recirculating** or **Self-regulatory**

which can be **First** or **Second-order**

which can be **Self-adjusting** or **Learning**

which can be **Detection of Error** or **Correction of Error**

by   by

comparing to goal

can

can set

goal

set point

can

measure

act

current state

observer

disturbance

first order cybernetics

- a generalization of interface is suggested as a replacement for the notion of products
- "form-givers may have the luxury of working alone, but designing systems and design-ing platforms require teams – and thus **goals and methods must be made more explicit so that the resulting artifacts are coherent and actions are coordinated"**(Levi, 1994).

second order cybernetics
in which humans experience reality and attempt to create more deliberate outcomes through with iteration and error correction, information flows from designer through environment an back again; as Simon suggested (in 1969), "changing existing situations into preferred ones."

"a trend that is the extraordinary developments of sensors every-where on the planet, not only for the temperature and atmospheric pressure and so on, but also everything that helps us to observe the evolution of the ecosystems; also, all the sensors that are now, in our cities, the very representation in the virtual, into digital form of the physical world" -(Levy 1994).

Sensing   **Acting**

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