GAIA

- NEUE BIOTECHNOLOGIEN UND LANDWIRTSCHAFT
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FRAMEWORKS FOR TRANSDISCIPLINARY RESEARCH   FRAMEWORK #4

Four Building Blocks of Systems Thinking

Transdisciplinary research generally treats problems as systems, but has few ways of making that systems approach explicit. *Derek and Laura Cabrera* at Cornell University in Ithaca, NY, describe four building blocks of systems thinking, along with ways in which these building blocks can be effectively combined.

The Building Blocks

Distinctions (Identity-Other)

An essential element of systems thinking is making *distinctions* (identity-other) between and among things and ideas. How we draw

or define the boundaries of an idea or a system of ideas is an essential aspect of understanding. Whenever we draw a boundary to define a thing, that same boundary defines what is not the thing (the "other"). Systems thinkers consciously use distinctions to challenge existing norms, labels, and definitions and to identify biases in the way information is structured.

Systems (Part-Whole)

Systems thinkers organize things and ideas into part-whole *systems* to make meaning. They know that changing the way ideas are organized changes meaning itself. The act of thinking is defined by splitting things up or lumping them together. Systems thinkers constantly consider context by asking "What is this a part of?" in order to see how things fit into larger wholes than is the norm.

Relationships (Action-Reaction)

Systems thinkers identify *relationships* (action-reaction) between and among things and ideas. We cannot understand much about anything,

including a system, without understanding how parts and wholes are related. Relationships come in all types: causal, correlation, direct/indirect, etc. Systems thinkers use relationships to show dynamical interactions between things and ideas, including feedback loops to show reciprocal relations.

Perspectives (Point-View)

Systems thinkers look at ideas from different *perspectives* (point-view) and understand that every time we make a distinction (including

identifying relationships and systems), we are always doing so from a particular perspective. Systems thinkers use perspectives to rethink distinctions, relationships, and/or systems. They move beyond human or animal perspectives (i.e., "perspectives with eyes") by taking conceptual perspectives (i.e., seeing a phenomenon from the perspective of an idea or thing).

Mixing and Matching the Building Blocks

Even though the four patterns *distinctions (D), systems (S), relationships (R),* and *perspectives (P)* are very simple, the brain is very complex so it can do these four things simultaneously and in combinations that create amazing patterns of thought. Systems thinkers mix and match as follows:
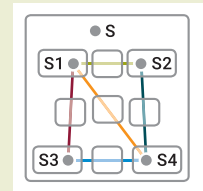
- **Mix R and D:** make a relationship a distinction, which means to define relationships as ideas or things rather than just noting connections between objects;
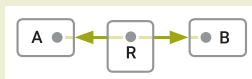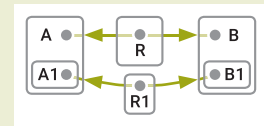

- **Mix R, D, and S:** after identifying relationships, "zoom into them" by deconstructing them into part-whole systems;
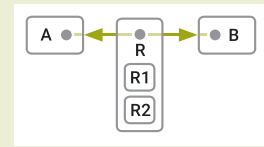

- **Mix S and R:** see the organization of parts and the relationships between them in novel ways;

- **Mix S and R:** compare the relationship between two wholes by comparing the relationships between their parts (i.e., a "Relationship Channel" or "R-channel");


- **Mix P and S:** Break down perspectives into sub-perspectives in order to avoid the homogenous perspective thinking error (i.e., assuming any group is characterized by a single perspective);
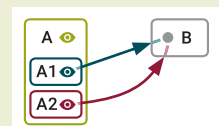
- **Mix P, S, R, and D:** see that distinct objects and ideas can be grouped/related in various ways according to a perspective, thereby avoiding thinking errors brought about by categorizing;
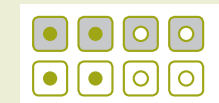
- **Mix P, S, R, and D:** realize every complex topic or phenomenon is a massively relational, perspectival network where
  1. every relationship can be made a distinction, and
  2. where every element must be made a distinction, could be a system in and of itself, could be a perspective (point or view), and could be related to or the relationship between other elements.
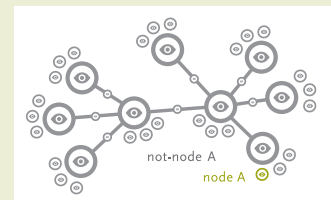
Reference

Cabrera, D., L. Cabrera. 2015. *Systems thinking made simple: New hope for solving wicked problems.* Ithaca, NY: Odyssean.

Derek and Laura Cabrera developed a visual modeling language and software called *Plectica.*

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This series aims to alert GAIA readers to useful frameworks for conducting transdisciplinary research. If you would like to contribute a framework description, please contact mickler@oekom.de.