Knowing Better via Systems Thinking:
Traditions and Contemporary Approaches

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Creative Systemic Research Platform Institute
        (Ticino, Switzerland; Mora d-Ebre, Span)
Systems Changes Learning Circle
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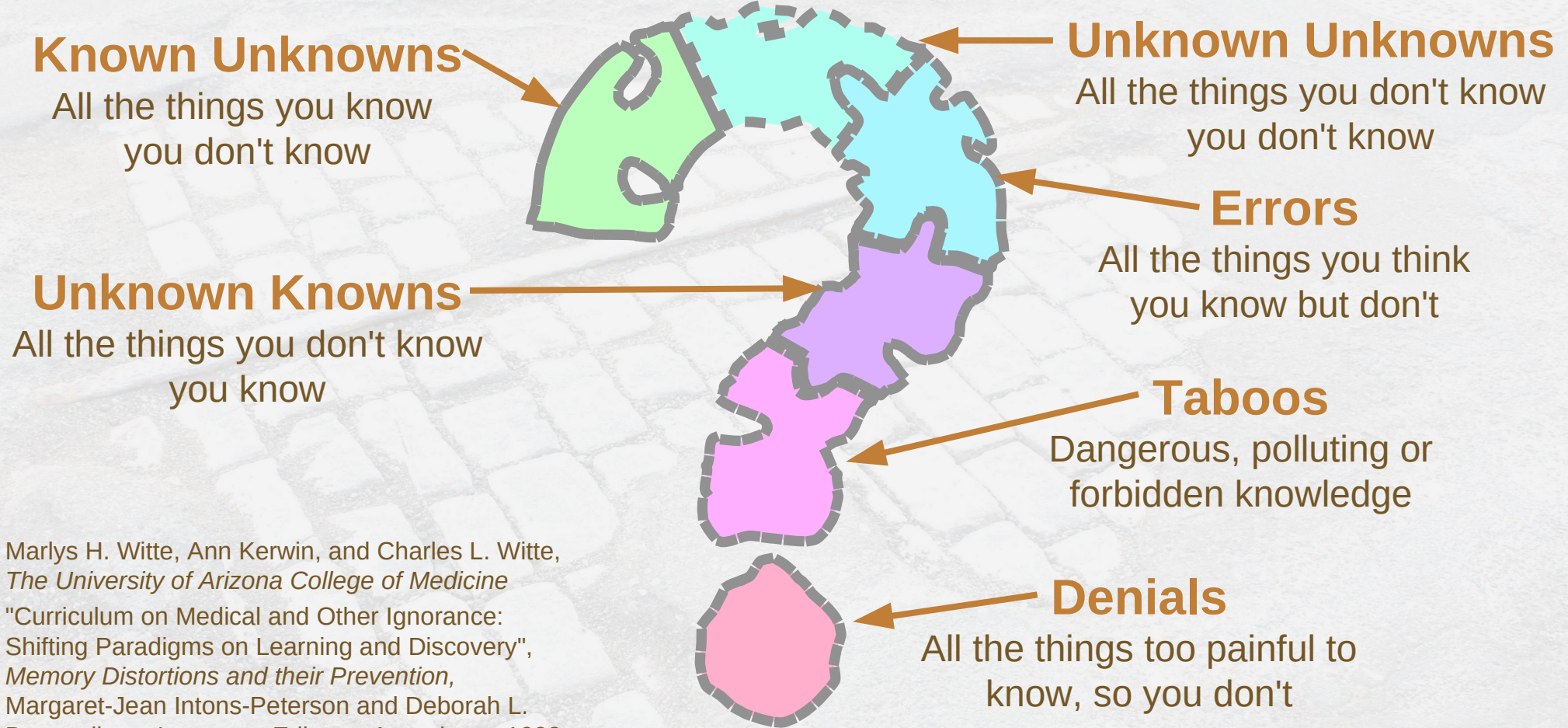**Universitat de Barcelona**
October 10, 2022

David Ing, Toronto, Canada

- Creative Systemic Research Platform, Research Fellow

- International Society for the Systems Sciences, President (2011-2012)

- IBM, 28 years (management consulting, market development, headquarters planning)

- University teaching:
  Finland (AaltoU, Metropolia);
  Canada (OCADU, UToronto);
  PR China (TongjiU);
  UK (UHull); Japan (TiTech)

systemschanges.com, 2022

Agenda

A. Knowing better

B. Systems thinking (one description)

C. Traditions (some favoured)

D. Contemporary approaches (in progress)

E. Ongoing learning opportunities

The *Ignorance Map* cautions physicians against overconfidence

Known Unknowns
All the things you know
you don't know

Unknown Unknowns
All the things you don't know
you don't know

Errors
All the things you think
you know but don't

Unknown Knowns
All the things you don't know
you know

Taboos
Dangerous, polluting or
forbidden knowledge

Denials
All the things too painful to
know, so you don't

Marlys H. Witte, Ann Kerwin, and Charles L. Witte,
The University of Arizona College of Medicine

"Curriculum on Medical and Other Ignorance:
Shifting Paradigms on Learning and Discovery",
Memory Distortions and their Prevention,
Margaret-Jean Intons-Peterson and Deborah L.
Best, editors, Lawrence Erlbaum Associates, 1998

If they can get you asking the wrong questions, they don't have to worry about answers (Thomas Pynchon)

Type **1** error	**False positive**: finding a (statistical) relation that isn't real
Type **2** error	**False negative**: missing a (statistical) relation that is real
Type **3** error	**Tricking ourselves**: Unintentional error of solving wrong problems precisely (through ignorance, faulty education or unreflective practice)
Type **4** error	**Tricking others**: Intentional error of solving wrong problems (through malice, ideology, overzealousness, self-righteousness, wrongdoing)

Ian I. Mitroff and Abraham Silvers. 2010. *Dirty Rotten Strategies: How We Trick Ourselves and Others into Solving the Wrong Problems Precisely.* Stanford University Press.

With known knowns in science eroding by systemic world changes, collective learning on why, how + when-where-whom gains value

Unknown Unknowns
All the things you don't know you don't know

Errors
All the things you think you know but don't

Known Unknowns
All the things you know you don't know

Unknown Knowns
All the things you don't know you know

Taboos
Dangerous, polluting or forbidden knowledge

Denials
All the things too painful to know, so you don't

[1] Ing, David, Minna Takala, and Ian Simmonds. 2003. "Anticipating Organizational Competences for Development through the Disclosing of Ignorance." In Proceedings of the 47th Annual Meeting of the International Society for the System Sciences. Hersonissos, Crete. http://systemicbusiness.org/pubs/2003_ISSS_47th_Ing_Takala_Simmonds.html

Colloquial description:	Learning why	Learning how	Learning when, learning where, learning whom
Pursuits:	Uncovering universal truths	Instrumental rationality towards a conscious goal	Values in practice based on judgement and experience
Primary intellectual virtue:	Episteme	Techne	Phronesis
Translation / interpretation:	Science (viz. epistemology)	Craft (viz. technique)	Prudence, common sense
Type of virtue:	Analytic scientific knowledge	Technical knowledge	Practical ethics
Orientation:	Research	Production	Action
Nature:	Universal	Pragmatic	Pragmatic
	Invariable (in time and space)	Variable (in time and space)	Variable (in time and space)
	Context-independent	Context-dependent	Context-dependent

[2] Ing, David. 2013. "Rethinking Systems Thinking: Learning and Coevolving with the World." *Systems Research and Behavioral Science* 30 (5): 527–47. doi:10.1002/sres.2229.

Agenda
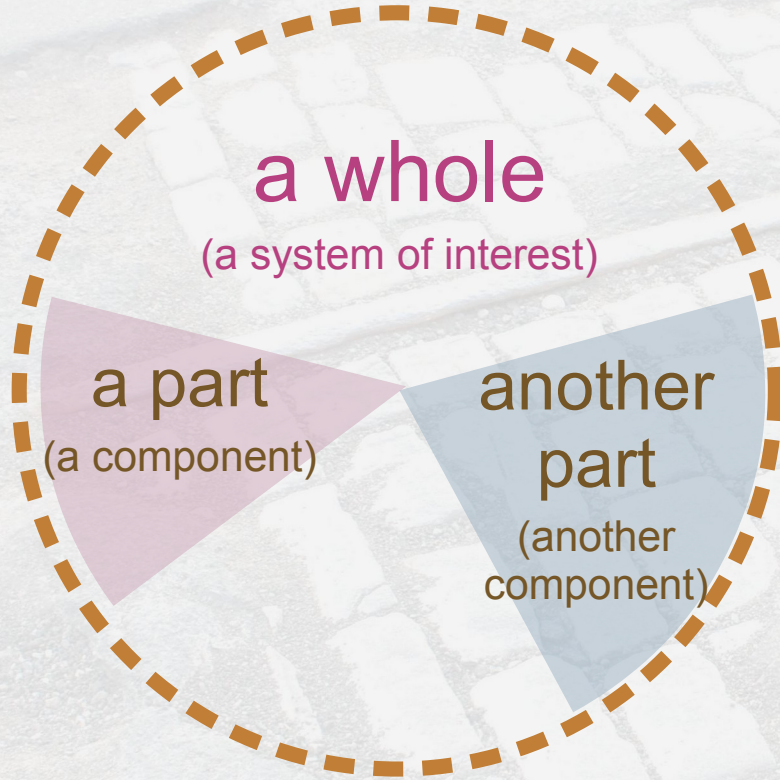
A. Knowing better

B. Systems thinking (one description)

C. Traditions (some favoured)

D. Contemporary approaches (in progress)

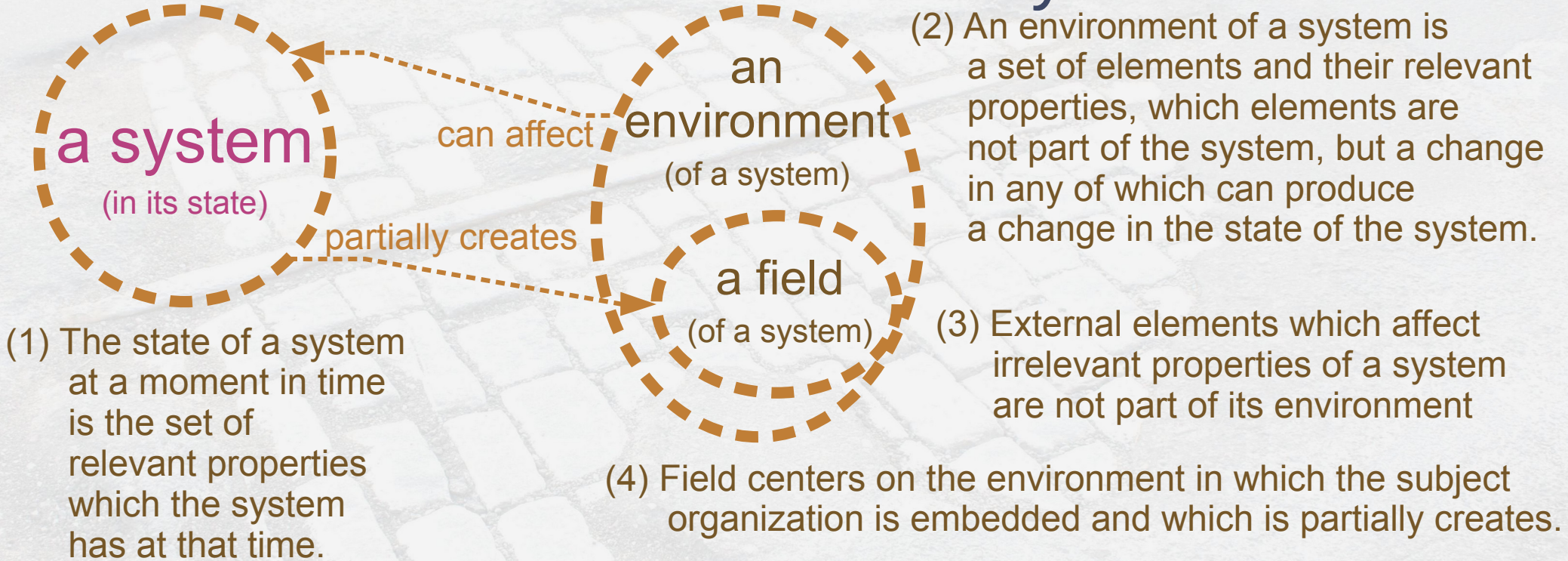E. Ongoing learning opportunities

A system is a whole
that cannot be divided into independent parts

a whole
(a system of interest)

a part
(a component)

another part
(another component)

(1) Every part of a system
    has properties
    that it loses when
    separated from the system.

(2) Every system has
    some properties –
    its essential ones –
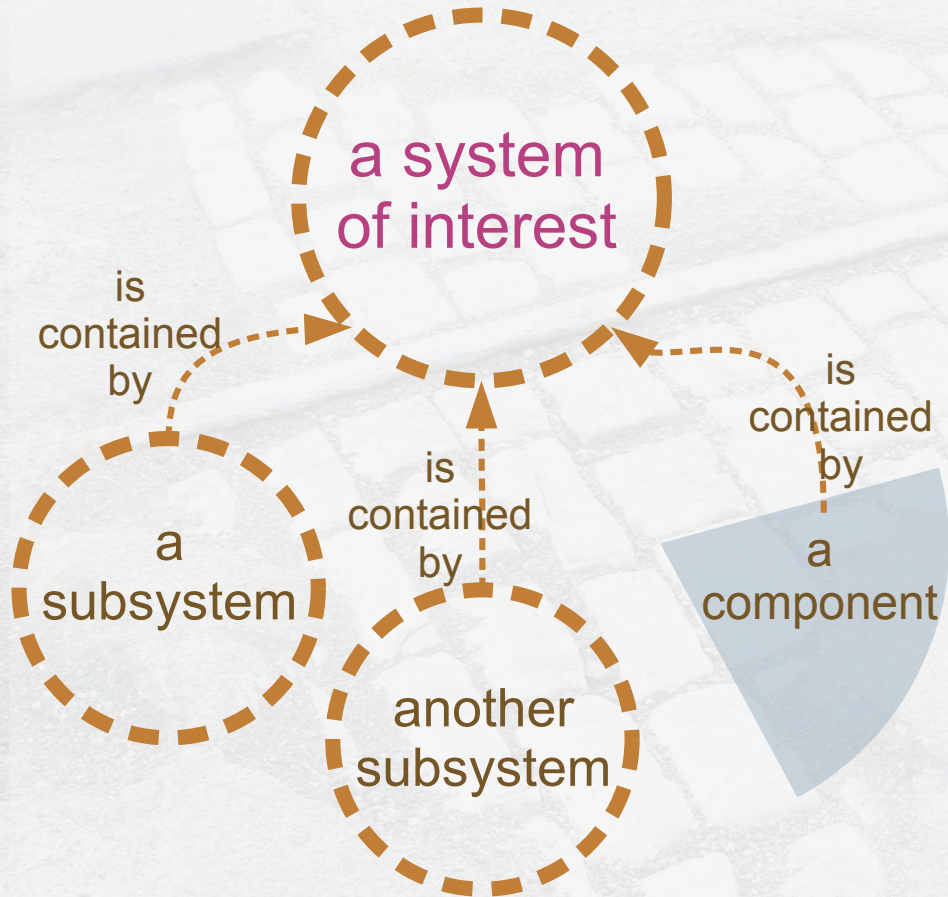   that none of its parts do.

Ackoff, Russell L. 1981. *Creating the Corporate Future: Plan or Be Planned For*. New York: John Wiley and Sons, p. 15

An environment of a system consists of all variables which can affect the system's state

a system
(in its state)

can affect

partially creates

an environment
(of a system)

a field
(of a system)

(2) An environment of a system is a set of elements and their relevant properties, which elements are not part of the system, but a change in any of which can produce a change in the state of the system.

(1) The state of a system at a moment in time is the set of relevant properties which the system has at that time.

(3) External elements which affect irrelevant properties of a system are not part of its environment

(4) Field centers on the environment in which the subject organization is embedded and which is partially creates.
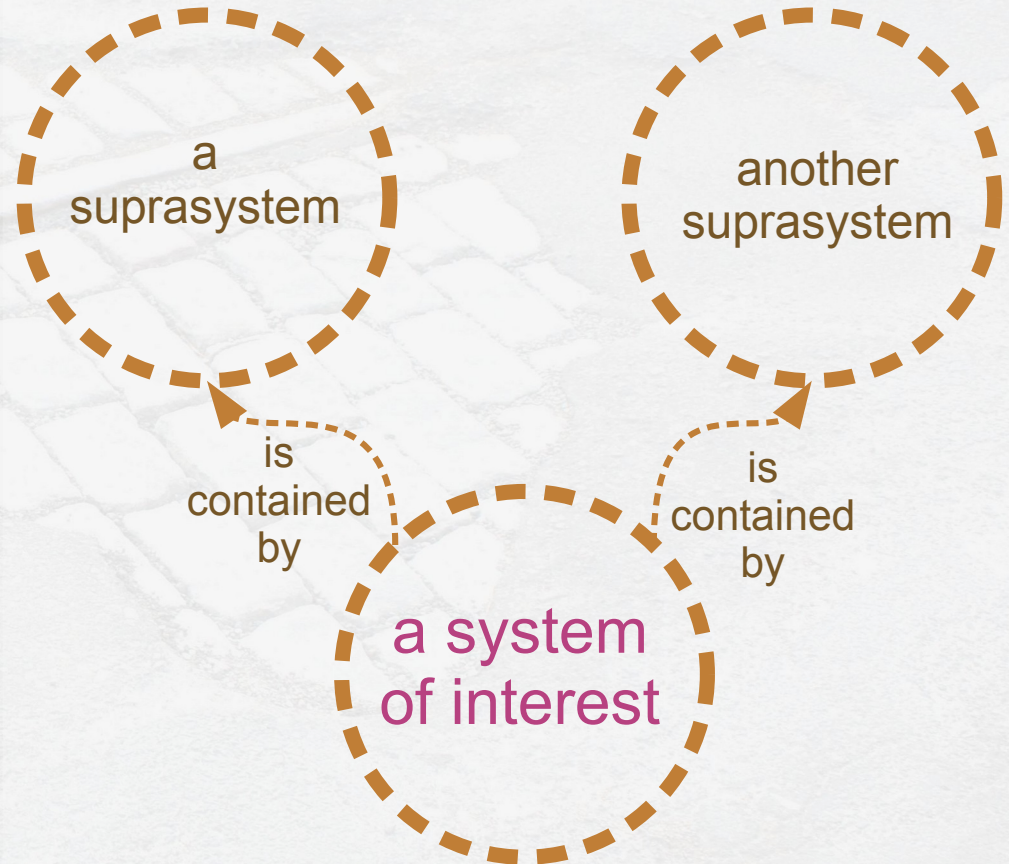
Ackoff, Russell L. 1971. "Towards a System of Systems Concepts." *Management Science* 17 (11): 661–671, (pp. 662-663)

Trist, Eric L. 1992. "Andras Angyal and Systems Thinking." In *Planning for Human Systems: Essays in Honor of Russell L. Ackoff*, edited by Jean-Marc Choukroun and Roberta M. Snow, 111–32. University of Pennsylvania Press. (p. 127)
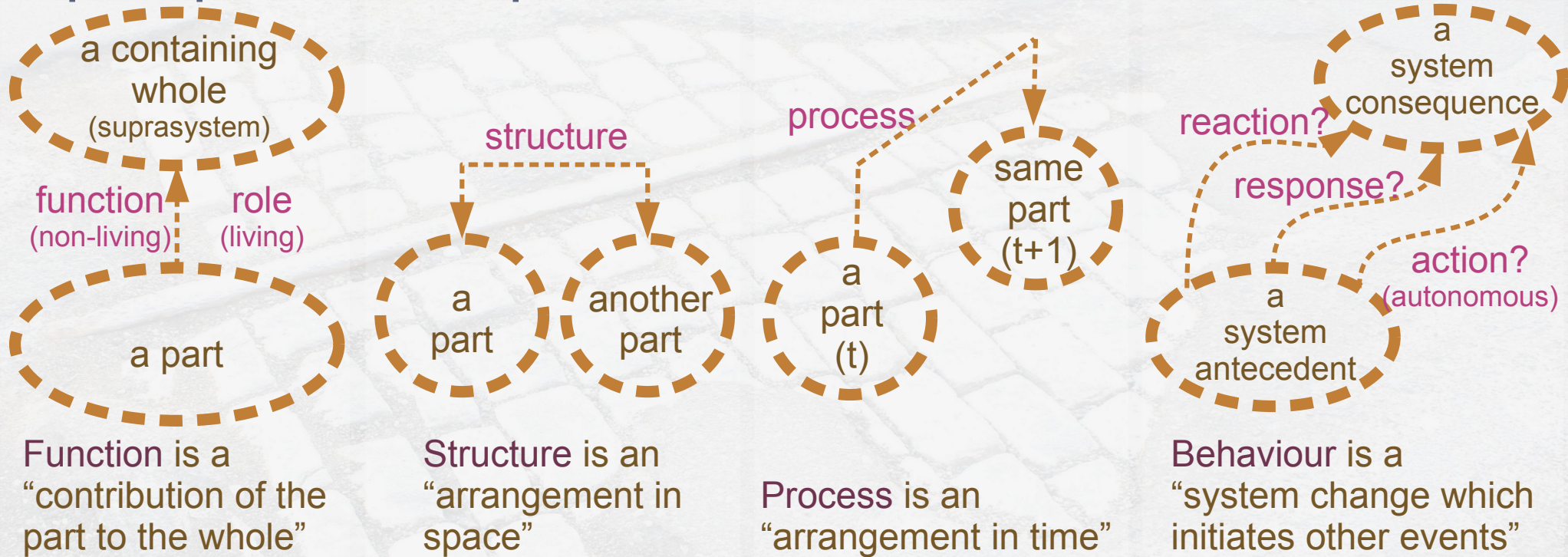
A system can contain subsystems or components

A system can be contained by multiple suprasystems

a system of interest

is contained by

a subsystem

is contained by

another subsystem

is contained by

a component

a suprasystem

another suprasystem

is contained by

is contained by

a system of interest

Systems thinking is a perspective on parts, wholes, and their relations

a containing whole (suprasystem)

function (non-living) role (living)

a part

structure

a part another part

process

a part (t)

same part (t+1)

reaction? response? action? (autonomous)

a system consequence

a system antecedent

Function is a "contribution of the part to the whole"

Structure is an "arrangement in space"

Process is an "arrangement in time"

Behaviour is a "system change which initiates other events"

Ing, David. 2013. "Rethinking Systems Thinking: Learning and Coevolving with the World." *Systems Research and Behavioral Science* 30 (5): 527–47.
Gharajedaghi, Jamshid. 1999. *Systems Thinking: Managing Chaos and Complexity : A Platform for Designing Business Architecture*. Elsevier
Ackoff, Russell L. 1971. "Towards a System of Systems Concepts." *Management Science* 17 (11): 661–671.

In authentic systems thinking, synthesis precedes analysis and the containing whole is appreciated

a containing whole (system)

(2)

behavior or property of containing whole

(1)

the thing to be explained

(3)

behavior or property of the thing as role or function within whole

Synthesis precedes analysis

1. Identify a **containing whole** (system) of which the **thing to be explained** is a part.

2. Explain the **behavior or properties** of the **containing whole**

3. Then explain the **behavior or properties** of the **thing to the explained** in terms of its **role(s) or function(s)** within its containing whole.
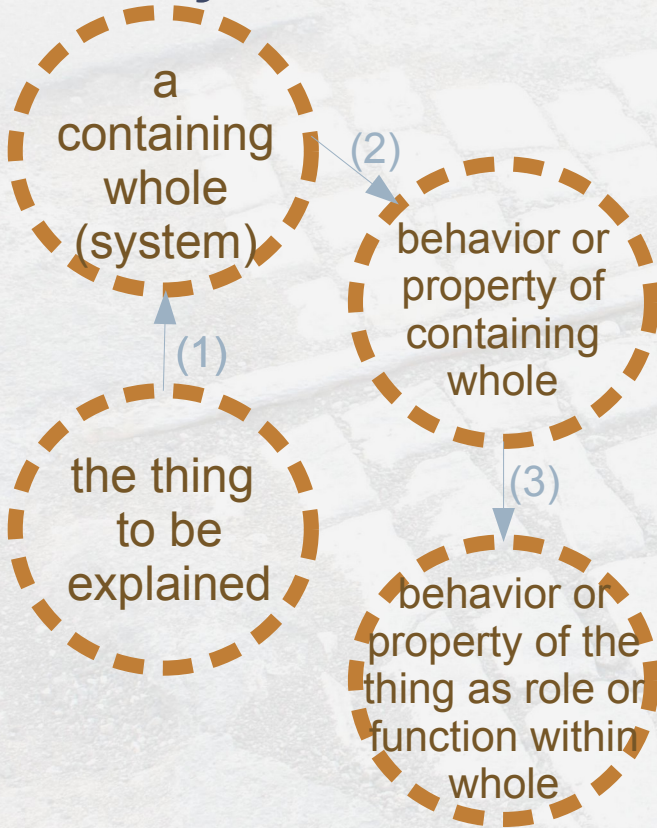
Ackoff, Russell L. 1981. *Creating the Corporate Future: Plan or Be Planned For*. New York: John Wiley and Sons, p. 16

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There are the historical traditions of systems thinkers, from which we favour 3 categories, and add new sources

Early cybernetics
Gregory Bateson (1904-1980)
Norbert Wiener (1894-1964)
Warren McCulloch (1898-1969)
Margaret Mead (1901-1978)
W. Ross Ashby (1903-1972)

Soft & critical systems
C. West Churchman (1913-2004)
Russell Ackoff (1919-2009)
Peter Checkland (1930-)
Werner Ulrich (1948-)
Michael C. Jackson (1951-

Complexity theory
Ilya Prigogine (1917-2003)
Stuart Kauffman (1939-)
James Lovelock (1919-)

General systems theory
Ludwig von Bertalanffty (1901-72)
Kenneth Boulding (1910-1993)
Geoffrey Vickers (1894-1983)
Howard Odum (1924-2002)

Learning systems
Kurt Lewin (1890-1947)
Eric Trist (1911-1993)
Chris Argyris (1923-2013)
Donald Schön (1930-1997)
Mary Catherine Bateson (1939-)

Later cybernetics
Heinz von Foerster (1911-2002)
Stafford Beer (1926-2002)
Humberto Maturana (1928-)
Niklas Luhmann (1927-1998)
Paul Watzlawick (1921-2007)

System dynamics
Jay Forrester (1918-2016)
Donella Meadow (1941-2001)
Peter Senge (1947-)

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Werner Ulrich (1948-)
Michael C. Jackson (1951-

Complexity theory
Ilya Prigogine (1917-2003)
Stuart Kauffman (1939-)
James Lovelock (1919-)

Ecological anthropology
J.J. Gibson (1904-1979)
Tim Ingold (1948-)

General systems theory
Ludwig von Bertalanffty (1901-72)
Kenneth Boulding (1910-1993)
Geoffrey Vickers (1894-1983)
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Learning systems
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Eric Trist (1911-1993)
Chris Argyris (1923-2013)
Donald Schön (1930-1997)
Mary Catherine Bateson (1939-)

Postcolonial & Chinese philosophy of science
Keekok Lee (1938-)
François Jullien (1951-)
John Law (1946-)

Later cybernetics
Heinz von Foerster (1911-2002)
Stafford Beer (1926-2002)
Humberto Maturana (1928-)
Niklas Luhmann (1927-1998)
Paul Watzlawick (1921-2007)

Service science
Richard Normann (1953-2003)
James C. Spohrer (1956-)
Gary S. Metcalf (1957-)

System dynamics
Jay Forrester (1918-2016)
Donella Meadow (1941-2001)
Peter Senge (1947-)

Practice theory
Hubert Dreyfus (1929-2017)
C. Fernando Flores (1943-)
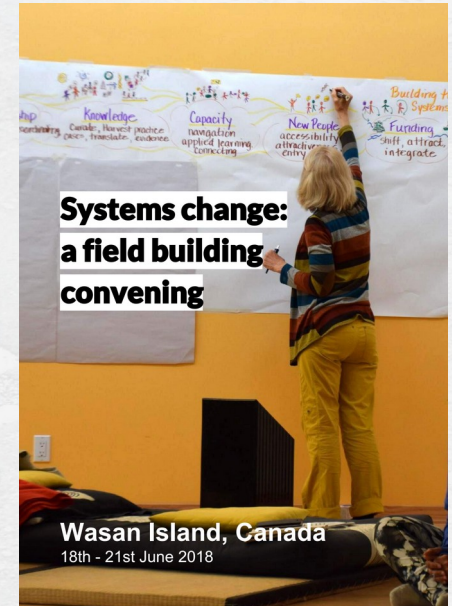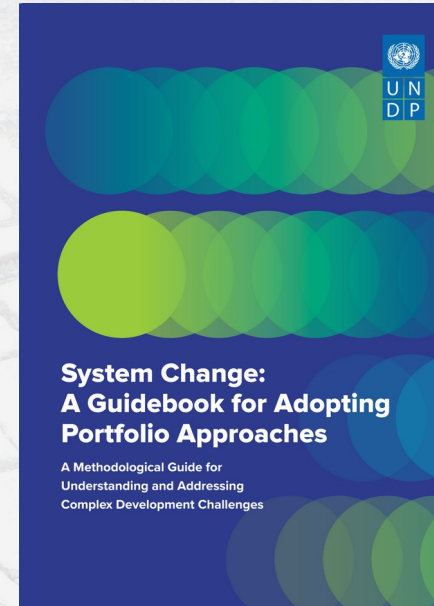Étienne Wenger (1952-)

Systemic design
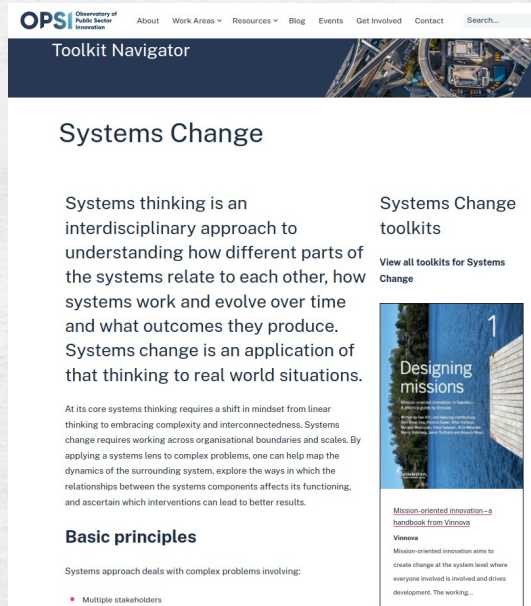Harold G. Nelson (1943-)
Birger Sevaldson (1953-)
Peter H. Jones (1957-)

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Which is/are *system(s) change(s)* c.f. ***not*** *system(s) change(s)?*

OECD Observatory of Public Sector Innovation
"… (rare) use" by governments of systems approaches towards making public services more effective and resilient"
(Cook & Tõnurist, 2017, p. 4).

Stanford Social Innovation Review
… a way for "policymakers, foundations, NGOs, and social enterprises tackling issues like poverty, preventable disease and poor education" to "solve the root causes" of these intractable problems
(Seelos & Mair, 2018, p. 35).

United Nations Development Programme
… a three phase methodology: (i) sense and frame; (ii) engage and position; and (iii) transform (Wellsch, 2022, p. 1)

Forum for the Future + McConnell Foundation
"What is systems change?"
"… asked people attending and unable to attend to offer their definitions of systems change"
(Birney & Riddell, 2018, p. 5)

"Change as Three Steps" as attributed to Kurt Lewin is a "largely post-hoc reconstruction"; he never wrote "refreeze"

Stephen Cummings
Victoria University of Wellington, New Zealand

Todd Bridgman
Victoria University of Wellington, New Zealand

Kenneth G Brown
University of Iowa, USA

Abstract
Kurt Lewin's 'changing as three steps' (unfreezing → changing → refreezing) is regarded by many as the classic or fundamental approach to managing change. Lewin has been criticized by scholars for over-simplifying the change process and has been defended by others against such charges. However, what has remained unquestioned is the model's foundational significance. It is sometimes traced (if it is traced at all) to the first article ever published in *Human Relations*. Based on a comparison of what Lewin wrote about changing as three steps with how this is presented in later works, we argue that he never developed such a model and it took form after his death. We investigate how and why 'changing as three steps' came to be understood as the foundation of the fledgling subfield of change management and to influence change theory and practice to this day, and how questioning this supposed foundation can encourage innovation.

[Change as Three Steps] has come to be **regarded** both as an **objective self-evident truth** and an idea with a **noble provenance** [p. 3]

unfreeze → change → refreeze

Unfreezing change as three steps | Sage Publishing | Youtube

Lewin never wrote 'refreezing' anywhere.

As far as we can ascertain, the **re-phrasing of Lewin's freezing to 'refreezing'** happened first in a 1950 conference paper by **Lewin's former student Leon Festinger** (Festinger and Coyle, 1950; reprinted in Festinger, 1980: 14).

Festinger said that: 'To Lewin, life was not static; it was changing, dynamic, fluid. Lewin's unfreezing-stabilizing-refreezing concept of change continues to be highly relevant today'.

It is worth noting that Festinger's first sentence seems to **contradict** the second, or at least to contradict later interpretations of Lewin as the developer of a model that deals in static, or at least clearly delineated, steps.

Furthermore, Festinger **misrepresents** other elements; **Lewin's 'moving' is transposed into 'stabilizing'**, which shows how open to interpretation Lewin's nascent thinking was in this 'preparadigmatic' period (Becher and Trowler, 2001: 33). [p. 5]

Cummings, Stephen, Todd Bridgman, and Kenneth G Brown. 2016. "Unfreezing Change as Three Steps: Rethinking Kurt Lewin's Legacy for Change Management." *Human Relations* 69 (1): 33–60. https://doi.org/10.1177/0018726715577707 .

In contrast to strategy as *plan*, strategy as *pattern* in a stream of actions is defined by consistency in behavior, whether or not intended
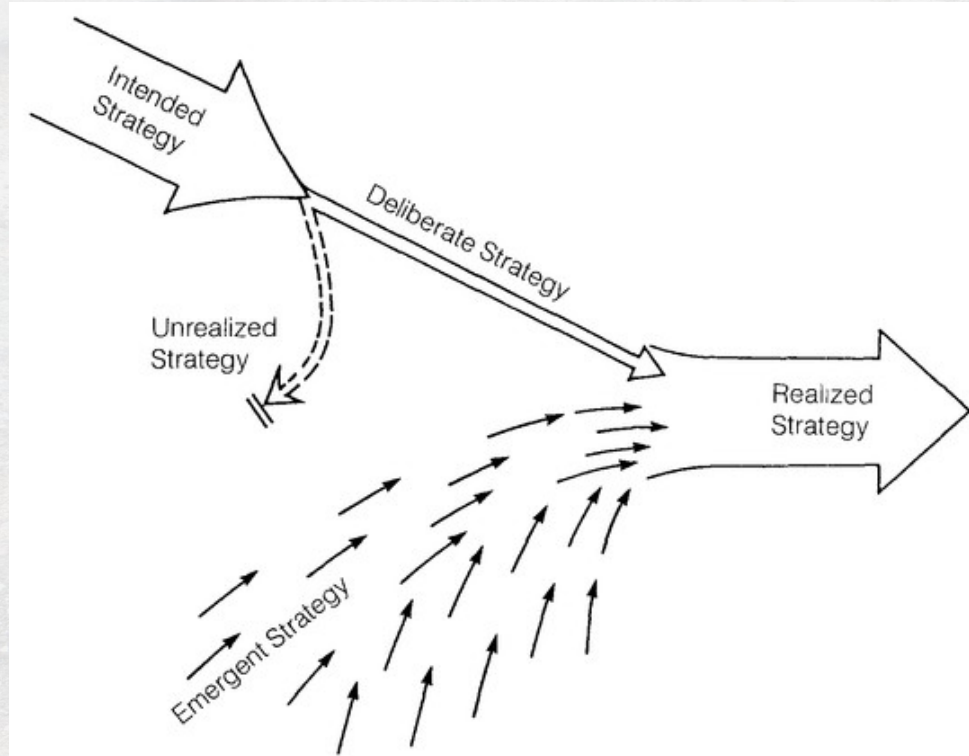
To paraphrase Hume, strategies may result **from human actions**, but **not human designs**.

If we label the first definition *intended* **strategy** and the second *realized* **strategy**, as shown in Figure 1, then we can distinguish between *deliberate* **strategies**, where intentions that exists previously were realized, from *emergent* **strategies**, where patterns developed in the absence of intentions, or despite them (which went *unrealized*).

Mintzberg, Henry. 1987. "The Strategy Concept I: Five Ps For Strategy." *California Management Review* 30 (1): 11–24. https://doi.org/10.2307/41165263 .

Three works in 2022 reflect the current (i) doing, (ii) thinking, + (iii) making, in year 4 of 10 for the Systems Changes Learning Circle

http://systemschanges.com/online/presentations   http://coevolving.com/commons/publications

Systems Thinking through Changes:
An action learning guide for the Canadian Digital Service

Code for Canada
https://codefor.ca
Systems Changes Learning Circle
http://systemschanges.com

March 2022

Image CC-BY Mike Cassano (2009) Most Interesting Pothole

systemschanges.com 2022

http://systemschanges.com/online/
presentations/20220304_cfc

http://coevolving.com/commons/20220304
-systems-thinking-through-changes

Article

Systems Changes Learning: Recasting and reifying rhythmic shifts for doing, alongside thinking and making

David Ing[1]

Abstract: In 2022, the *Systems Changes Learning Circle* is in its fourth year of 10-year journey on "Rethinking Systems Thinking". In a contextual action learning approach, the Circle has elevated rhythmic shifts as the feature that both resonates with practitioners in the field, and fits with a post-colonial philosophy of science bridging classical Chinese thought with Western professional practices. This multiparadigm inquiry recasts and reifies the activities of doing (*praxis*), thinking (*theoria*) and making (*poiesis*). The facility with this approach is deepened 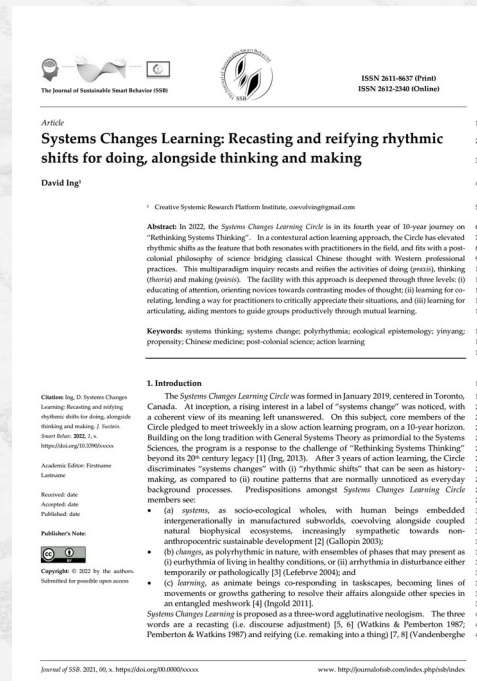through three levels: (i) educating of attention, orienting novices towards contrasting modes of thought; (ii) learning for co-relating, lending a way for practitioners to critically appreciate their situations, and (iii) learning for articulating, aiding mentors to guide groups productively through mutual learning.

Keywords: systems thinking; systems change; polyrhythmia; ecological epistemology; yinyang; propensity; Chinese medicine; post-colonial science; action learning

1. Introduction

The *Systems Changes Learning Circle* was formed in January 2019, centered in Toronto, Canada. At inception, a rising interest in a label of "systems change" was noticed, with a coherent view of its meaning left unanswered. On this subject, core members of the Circle pledged to meet triweekly in a slow action learning program, on a 10-year horizon. Building on the long tradition with General Systems Theory as primordial to the Systems Sciences, the program is a response to the challenge of "Rethinking Systems Thinking" beyond its 20th century legacy [1] (Ing, 2013). After 3 years of action learning, the Circle discriminates "systems changes" with (i) "rhythmic shifts" that can be seen as history-making, as compared to (ii) routine patterns that are normally unnoticed as everyday background processes. Predispositions amongst *Systems Changes Learning Circle* members see:
- (a) *systems*, as socio-ecological wholes, with human beings embedded intergenerationally in manufactured subworlds, coevolving alongside coupled natural biophysical ecosystems, increasingly sympathetic towards non-anthropocentric sustainable development [2] (Gallopin 2003);
- (b) *changes*, as polyrhythmic in nature, with ensembles of phases that may present as (i) eurhythmia of living in healthy conditions, or (ii) arrhythmia in disturbance either temporarily or pathologically [3] (Lefebvre 2004); and
- (c) *learning*, as animate beings co-responding in taskscapes, becoming lines of movements or growths gathering to resolve their affairs alongside other species in an entangled meshwork [4] (Ingold 2011).
Systems Changes Learning is proposed as a three-word agglutinative neologism. The three words are a recasting (i.e. discourse adjustment) [5, 6] (Watkins & Pemberton 1987; Pemberton & Watkins 1987) and reifying (i.e. remaking into a thing) [7, 8] (Vandenberghe

http://coevolving.com/commons/
2022-07-recasting-and-reifying-r
hythmic-shifts

Appreciating Systems Changes via Multiparadigm Inquiry:
Architectural Design, Ecological Anthropology, Classical Chinese Medicine, Systems Rhythms

David Ing
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Systems Changes Learning Circle
(Toronto, Canada)

International Society for the Systems Sciences
66th Annual Meeting, July 2022

Image CC-BY Mike Cassano (2009) Most Interesting Pothole

systemschanges.com 2021

http://coevolving.com/commons/2022-07-08-
appreciating-systems-changes
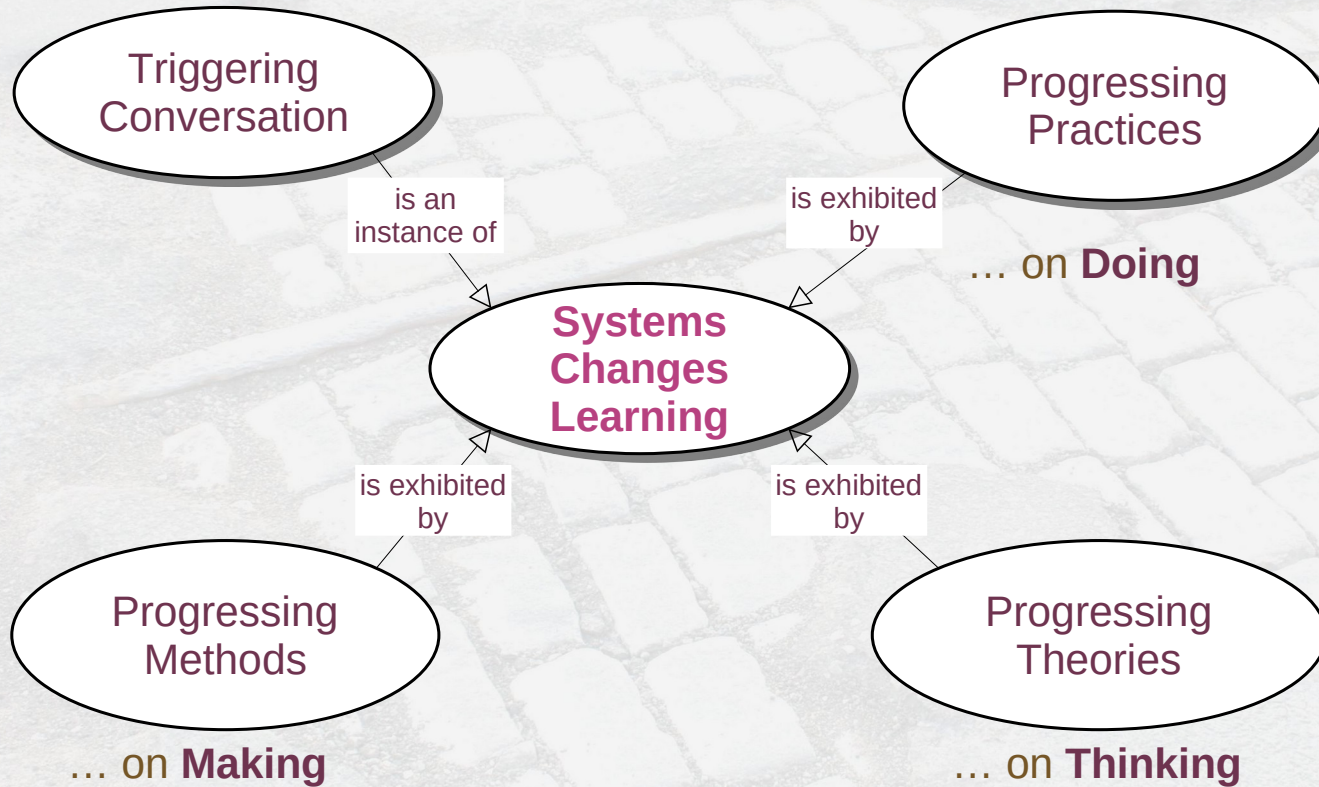

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Systems Changes Learning initiated with Triggering Conversation exhibits (i) Doing (practices), (ii) Thinking (theories), + (iii) Making (methods)


Triggering Conversation

Progressing Practices

is an instance of

is exhibited by

… on **Doing**

Systems Changes Learning

is exhibited by

is exhibited by

Progressing Methods

Progressing Theories

… on **Making**

… on **Thinking**

Object Process Language

- *Systems Changes Learning* is physical and systemic.
- *Triggering Conversation* is physical and systemic.
- *Triggering Conversation* is instance of *Systems Changes Learning*,
- *Systems Changes Learning* exhibits *Progressing Practices, Progressing Theories*, and *Progressing Methods*.
- *Progressing Practices* is physical and systemic.
- *Progressing Theories* is informational and systemic.
- *Progressing Methods* is informational and systemic.

With authentic systems thinking, synthesis precedes analysis

Thinking *synthetically*
- Placing together parts into wholes
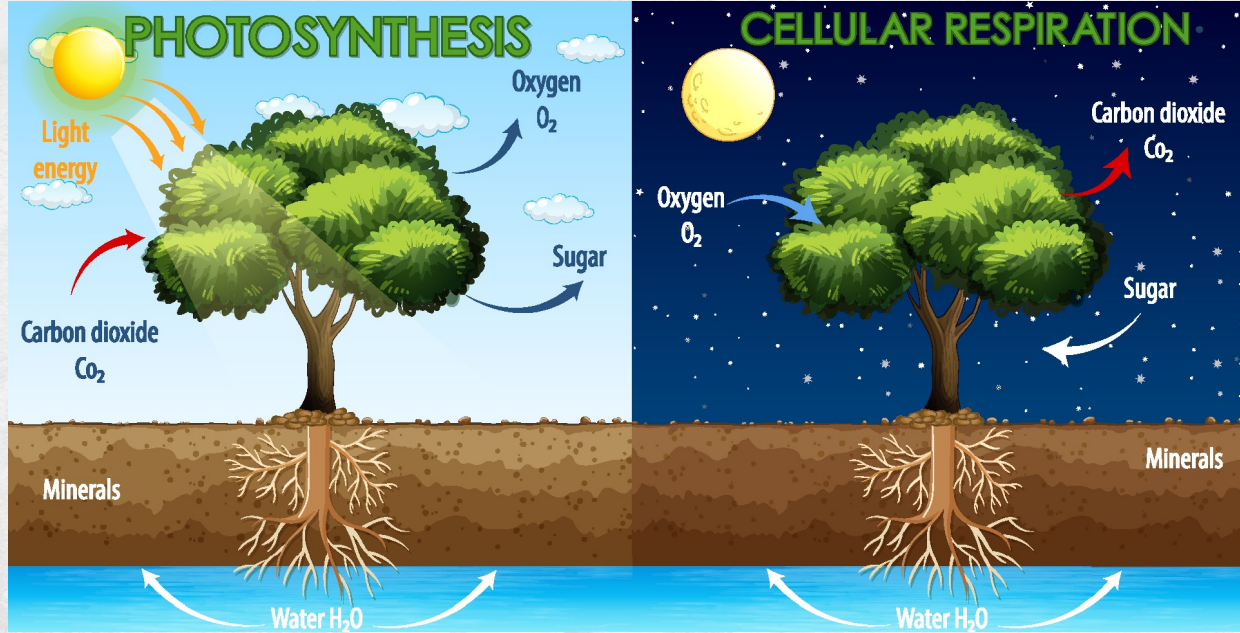
Thinking *analytically*
- Loosening from wholes into parts

"Photosynthesis, Cellular Respiration" BY brgfx (2021)
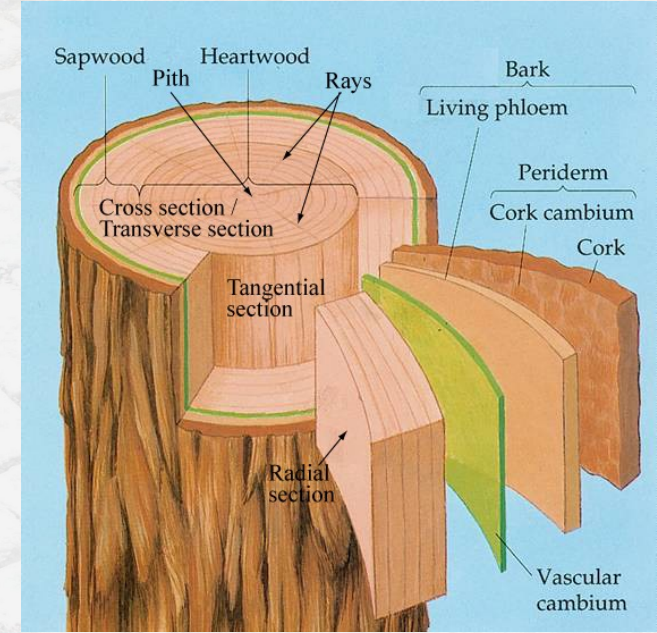
"A cut-through of a tree trunk" CC-BY-NC-SA University of Cambridge 2004

Systems Changes Learning adds ... thinking *dyadically* ... over time
- e.g. the sun *waxing* (increasing in strength) and *waning* (decreasing in strength)
- Dyadic (yinyang waxing and waning) is not dualistic (e.g. sun, no sun)

Our attention is drawn to rhythmic shift(s) in the texture, as the line of the system of interest crosses over co-related systems of influence

Texture

Knowing Better via Systems Thinking

October 2022
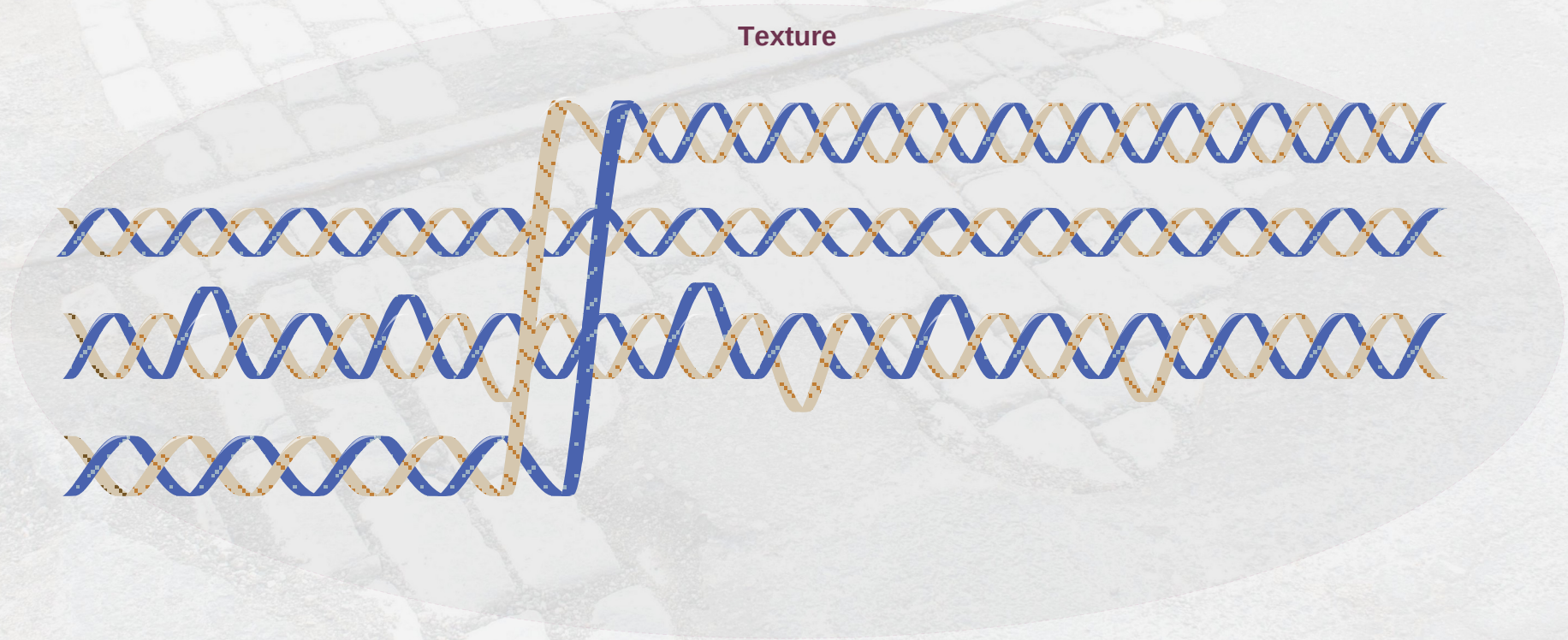
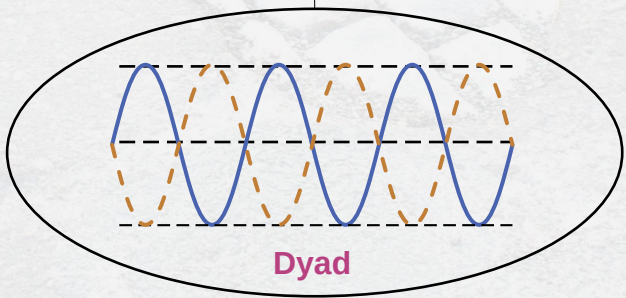# Rhythms of a living system of interest weave into a contexture of co-related systems of influence

"Joseph Shabason at The Redeemer", CC-BY David Ing 2018

"Giom Perret at The Redeemer", CC-BY David Ing 2018

"David Occhipinti + Mike Murley at The Drake", CC-BY David Ing 2008

Contexture

consists of
(has)

Dyad

October 2022   systemschanges.com, 2022

Mechanisms ⇒ causality in conditions. Living systems ⇒ propensity in conditions

Water skiing, motion via causality
- Motorboat towing

Surfing, motion via prospensity
- Waves in the ocean
- Surfer on the board

Systems Changes Learning centers on a hub of *knowing from within*, appreciated through a cycle of learning along four spokes
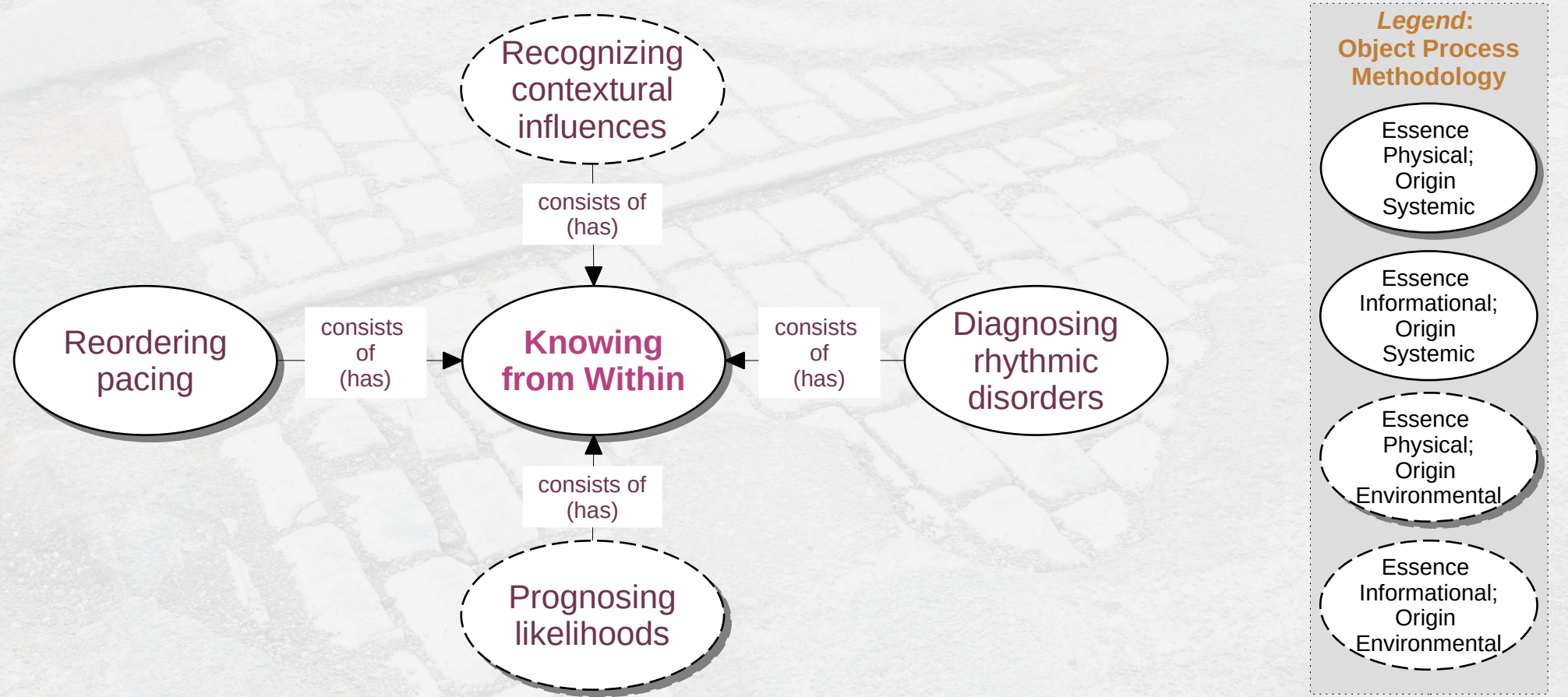
Recognizing contextual influences

consists of (has)

Reordering pacing

consists of (has)

Knowing from Within

consists of (has)

Diagnosing rhythmic disorders

consists of (has)

Prognosing likelihoods

Legend:
Object Process Methodology

Essence Physical; Origin Systemic

Essence Informational; Origin Systemic

Essence Physical; Origin Environmental

Essence Informational; Origin Environmental

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Centered in Toronto, the Systems Changes Learning Circle originates from CSI, OCADU SFI and Systems Thinking Ontario

David Ing

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Creative Systemic Research Platform Institute

is an institution aiming to promote research and development of non-profit projects. We focus on investigating the skills needed for Community Resilience, supported by ecological practices and systemic and creative learning.

Existing since 2017 as a non-profit research group, we evolved in December 2020 into the CSRP Institute.

More about   Contact us

Open Learning Commons

Category	Topics
Peer Learning Groups A top-level category for discussing peer learning groups in general, and for containing sub-categories for specific peer learning groups and their discussions. ■ MetaCAugs	7
Pattern Language	8
Systems Aesthetics The Systems Aesthetics category on discuss.openlearning.cc is one of the online resources for an ongoing open access research project, originating as a subgroup of the Systems Changes Learning Circle.	1
Systems Changes The Systems Changes category on discuss.openlearning.cc is one of the online resources for an ongoing open access research project.	63
Systems Thinking The Systems Thinking category on discuss.openlearning.cc aims to be a venue for conversations that will persist over time.	73
Open Learning Commons (Meta) Discussion of Open Learning Commons itself. For example, architectural choices.	6
wiki All topics created in this category are wikis, and therefore editable by all members.	1

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👥 29 📌 2 📄 Casual chat CC-BY-SA, extending http://systemschange...

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In a review of the Stewart Brand biography, we might recognize an emerging journalist who fell into systems thinking and has been in the right place at the right time. The review may be seen as negative, but maybe it's worth remembering that public figures are human beings, too.

> Brand's next big idea combined his receding interest in photography with his increasing interest in "systems thinking," a shift from his Randianism to the faddish work of architectural theorist Buckminster Fuller. On one 1966 acid trip, Brand was struck by an idea: Why hadn't NASA released

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COOPERATING AT GLOBAL SCALE IS HUMANITY'S PRIMARY CHALLENGE

Cooperating-at-scale is mission critical to pursuing the sustainable development goals. We're a cooperative dedicated to nurturing trustworthy technology and organizing principles for cooperating-at-scale, and such recursion is a property of the natural systems that inspire us.

Coevolving Innovations
… in Business Organizations and Information Technologies

Christopher Alexander, Horst Rittel, C. West Churchman

At U.C. Berkeley in the 1960s, Christopher Alexander, Horst Rittel and C. West Churchman could have had lunch together. While disciplinary thinking might lead novices to focus only on each of pattern language, wicked problems and the systems approach, there are ties (as well as domain-specific distinctions) between the schools.

Circa 1968-1970: Christopher Alexander, Horst Rittel, West Churchman

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Agenda

A. Knowing better

B. Systems thinking (one description)

C. Traditions (some favoured)

D. Contemporary approaches (in progress)

E. Ongoing learning opportunities