Systems Approaches

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OCADU SFI – Understanding Systems
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Image CC-BY Mike Cassano (2009) *Most Interesting Pothole*

Circa 1964,
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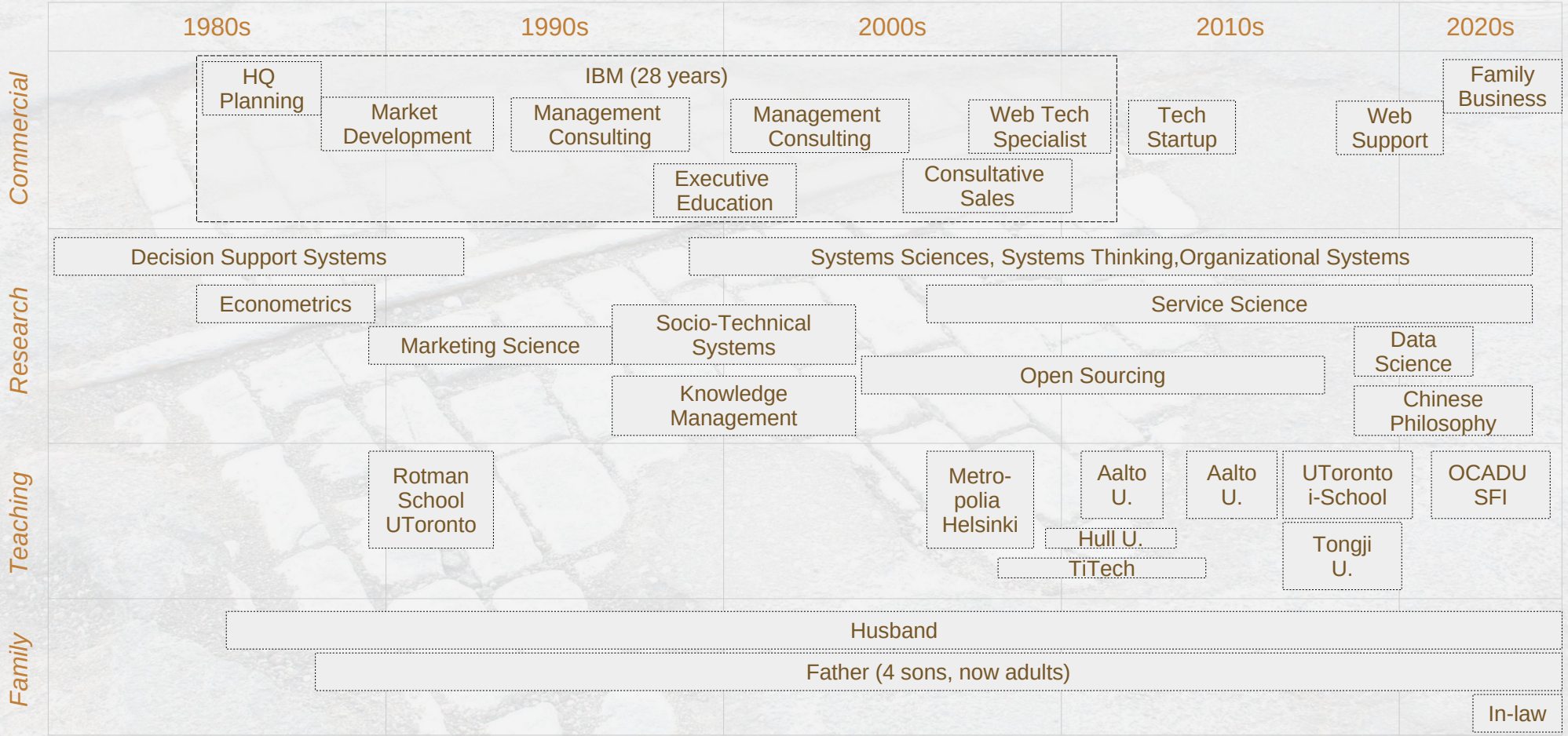
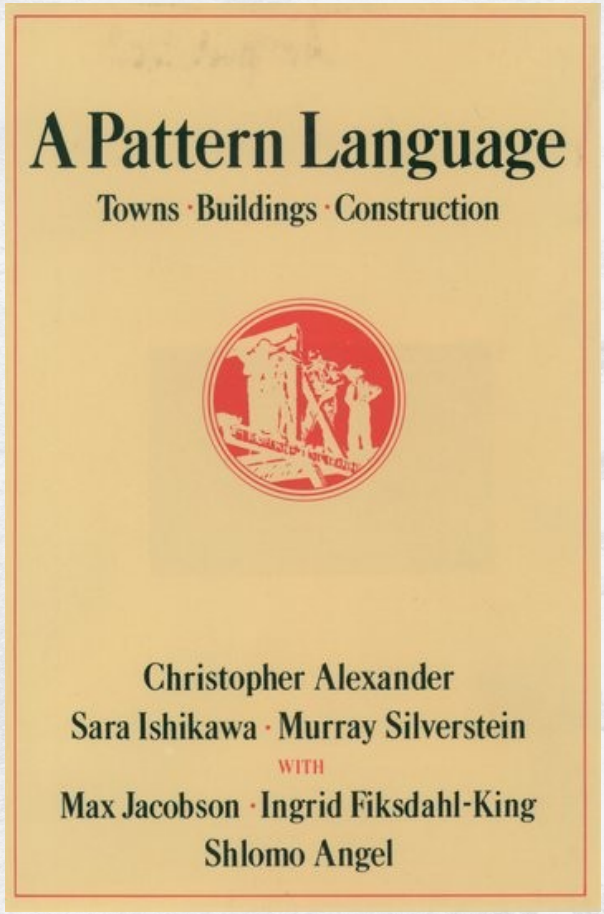
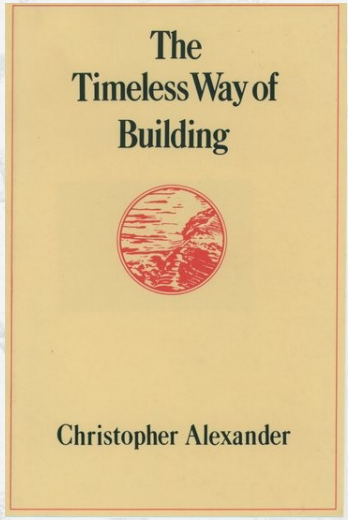


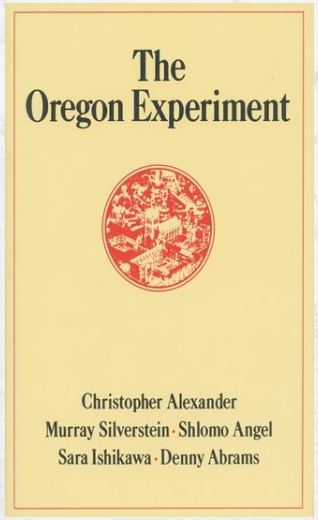
Agenda

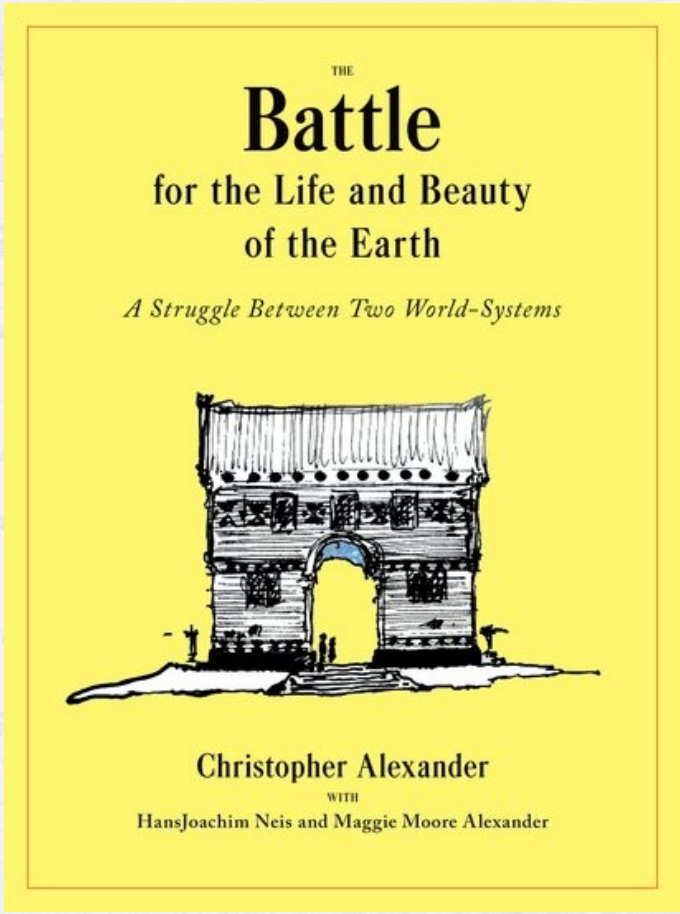
A.	Project Language (Engagement Model)
B.	System of Interest, Contextual Influences
C.	Deliverables (Artifacts, Work Products)
D.	Systems Methods
E.	Systems Theories

From the *Design Methods Movement* (1962), Christopher Alexander was prescriptive 1975-1979, then reflective in practice by 2012









127 Intimacy Gradient** (#1 of 2)

. . . if you know roughly where you intend to place the building wings -- WINGS OF LIGHT (107), and how many stories they will have -- NUMBER OF STORIES (96), and where the MAIN ENTRANCE (110) is, it is time to work out the rough disposition of the major areas on every floor. In every building the relationship between the public areas and private areas is most important.

* * *

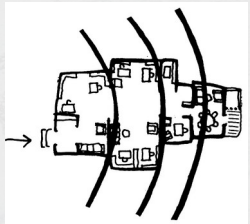
Unless the spaces in a building are arranged in a sequence which corresponds to their degrees of privateness, the visits made by strangers, friends, guests, clients, family, will always be a little awkward.

In any building -- house, office, public building, summer cottage - people need a gradient of settings, which have different degrees of intimacy. A bedroom or boudoir is most intimate; a back sitting room. or study less so; a common area or kitchen more public still; a front porch or entrance room most public of all. When there is a gradient of this kind, people can give each encounter different shades of meaning, by choosing its position on the gradient very carefully. In a building which has its rooms so interlaced that there is no clearly defined gradient of intimacy, it is not possible to choose the spot for any particular encounter so carefully; and it is therefore impossible to give the encounter this dimension of added meaning by the choice of space. This homogeneity of space, where every room has a similar degree of intimacy, rubs out all possible subtlety of social interaction in the building.

We illustrate this general fact by giving an example from Peru - a case which we have studied in detail. [….]

The intimacy gradient is unusually crucial in a Peruvian house. But in some form the pattern seems to exist in almost all cultures. We see it in widely different cultures -- compare the plan of an African compound, a traditional Japanese house, and early American colonial homes -- and it also applies to almost every building type -- compare a house, a small shop, a large office building, and even a church. It is almost an archetypal ordering principle for all man's buildings. All buildings, and all parts of buildings which house well defined human groups, need a definite gradient from "front" to "back," from the most formal spaces at the front to the most intimate spaces at the back.

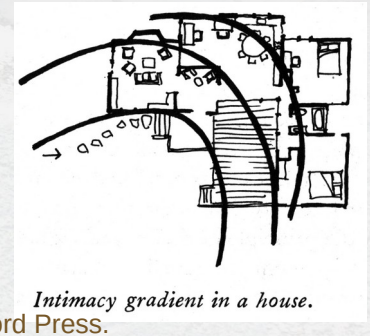
In an office the sequence might be: entry lobby, coffee and reception areas, offices and workspaces, private lounge.



Office intimacy gradient.

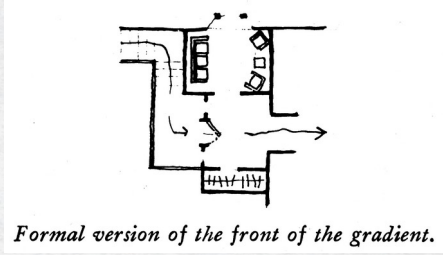
In a small shop the sequence might be: shop entrance, customer milling space, browsing area, sales counter, behind the counter, private place for workers.

In a house: gate, outdoor porch, entrance, sitting wall, common space and kitchen, private garden, bed alcoves.



Intimacy gradient in a house.

And in a more formal house, the sequence might begin with something like the Peruvian sala -- a parlor or sitting room for guests.



Formal version of the front of the gradient.

Source: Christopher Alexander et. al. 1997, *A Pattern Language: Towns, Building, Construction*, Oxford Press.

127 Intimacy Gradient** (#2 of 2)

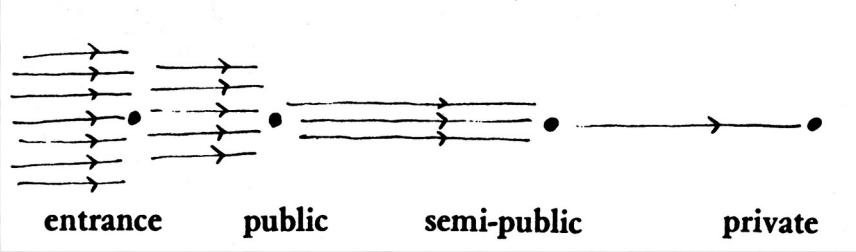
. . . if you know roughly where you intend to place the building wings -- WINGS OF LIGHT (107), and how many stories they will have -- NUMBER OF STORIES (96), and where the MAIN ENTRANCE (110) is, it is time to work out the rough disposition of the major areas on every floor. In every building the relationship between the public areas and private areas is most important.

* * *

Unless the spaces in a building are arranged in a sequence which corresponds to their degrees of privateness, the visits made by strangers, friends, guests, clients, family, will always be a little awkward.

Therefore:

Lay out the spaces of a building so that they create a sequence which begins with the entrance and the most public parts of the building, then leads into the slightly more private areas, and finally to the most private domains.



* * *

At the same time that common areas are to the front, make sure that they are also at the heart and soul of the activity, and that all paths between more private rooms pass tangent to the common ones -- COMMON AREAS AT THE HEART (129). In private houses make the ENTRANCE ROOM (130) the most formal and public place and arrange the most private areas so that each person has a room of his own, where he can retire to be alone A ROOM OF ONE'S OWN (141). Place bathing rooms and toilets half-way between the common areas and the private ones, so that people can reach them comfortably from both BATHING ROOM (144); and place sitting areas at all the different degrees of intimacy, and shape them according to their position in the gradient - SEQUENCE OF SITTING SPACES (142). In offices put RECEPTION WELCOMES YOU (149) at the front of the gradient and HALF-PRIVATE OFFICE (152) at the back. . . .

Source: Christopher Alexander et. al. 1997, *A Pattern Language: Towns, Building, Construction*, Oxford Press.

The essential idea of a pattern language is: a *solution* to a *problem* in *context*

Every time a designer creates a pattern (or, for that matter, entertains any idea about the physical environment), he essentially goes through a three-step process.

He considers a PROBLEM, invents a PATTERN to solve the problem, and makes mental note of the range of CONTEXTS where the pattern will solve the problem. [….]

The format says that whenever a certain **CONTEXT** exists, a certain **PROBLEM** will arise; the stated **PATTERN** will solve the **PROBLEM** and there should be provided in the **CONTEXT**.

While it is not claimed that the PATTERN specified is the only solution to the PROBLEM, it is implied that unless the PATTERN or an equivalent is provided, the PROBLEM will go unsolved (Alexander, Ishikawa, & Silverstein, 1967, pp. 1–4).

Alexander, Christopher, Sara Ishikawa, and Murray Silverstein. 1967. *Pattern Manual.* Berkeley, California: Center for Environmental Structure

Here is a short and necessarily incomplete definition of a pattern:

A recurring structural configuration that solves a problem in a context, contributing to the wholeness of some whole, or system, that reflects some aesthetic or cultural value.[1]

Pattern Name: A name by which this problem/solution pairing can be referenced

Problem: The specific problem that needs to be solved.

Context

The circumstances in which the problem is being solved imposes constraints on the solution. The context is often described via a "situation" rather than stated explicitly.

Forces

The often contradictory considerations that must be taken into account when choosing a solution to a problem.

Solution: The most appropriate solution to a problem is the one that best resolves the highest priority forces as determined by the particular context.

Resulting Context

The context that we find ourselves in after the pattern has been applied. It can include one or more new problems to solve

Rationale

An explanation of why this solution is most appropriate for the stated problem within this context.

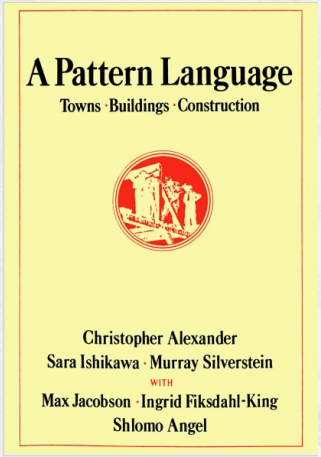
Related Patterns

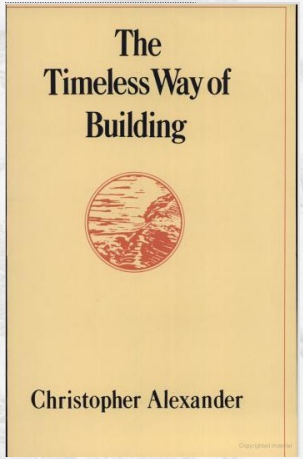
The kinds of patterns include:

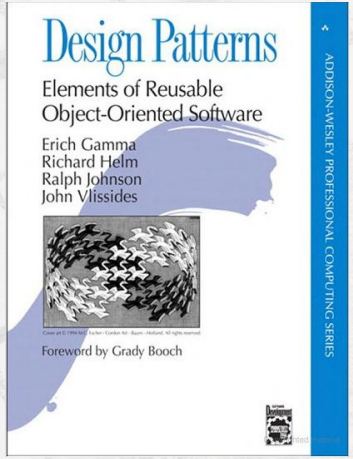
- Other solutions to the same problem,
- More general or (possibly domain) specific variations of the pattern,
- Patterns that solve some of the problems in the resulting context (set by this pattern)

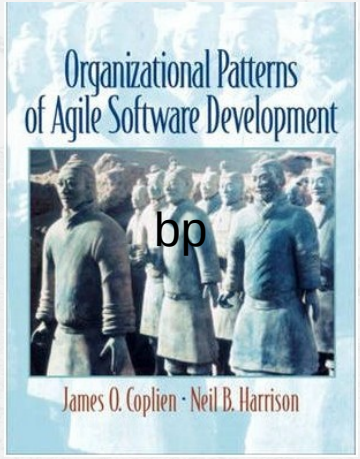
Source: [1] Coplien, James O., and Neil B. Harrison. 2004. *Organizational Patterns of Agile Software Development*. Prentice-Hall, Inc. http://books.google.ca/books?id=6K5QAAAAMAAJ . [2] Gerard Meszaros and Jim Doble, “A Pattern Language for Pattern Writing”, *Pattern Languages of Program Design* (1997), http://hillside.net/index.php/a-pattern-language-for-pattern-writing

Pattern Language was applied on built environments (1979)→ object software (1994) → agile teams (2005) → Project Language (2013)









From Pattern Languages to "A Project Language"

A shift proposal from existing pattern community

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EIITI HANYUDA, Mamezou, Co.
HIROSHI NAKANO, Center for Environment Structure Tokyo

Patterns and pattern languages are accepted worldwide and used in various areas of IT such as DESIGN PATTERNS, ANALYSIS PATTERNS, DOMAIN DRIVEN DEVELOPMENTS, and AGILE SOFTWARE DEVELOPMENT. Although patterns are successful in such areas, they are less accepted in the areas of large development and planning projects. We suggest that large projects and communities should be responsible for identifying and documenting their own patterns instead of adopting those found in pattern libraries. This is consistent with Alexander's hope to use patterns and pattern languages as part of his emphasis on planning and community involvement. Our paper focuses on the beginnings of a pattern language that we believe will facilitate the writing of appropriate patterns for different situations by those involved in solving and building in those same situations. Additionally we propose "a Project Language" as a different form of Pattern Language, consisting of episodes and stories. In this paper, we have thus focus upon the essence of C. Alexander's Community Planning and a centering process via pattern language. In this paper we argue for a turn from the existing dominant ideas a out how to use patterns by professionals to a positive, community-centric way participants to think about and act on their own pattern languages. This new approach is, we believe, both urgent and indispensable at this time.

Categories and Subject Descriptors: D.3.3 [Programming Languages]: Language Constructs and Features—*Patterns*; K.6.1 [Management of computing and information systems]: Project and People Management—*Strategic information systems planning*

General Terms: Patterns, Pattern Language, Project Language, Center, Centering Process, and Generative Process

Additional Key Words and Phrases: Patterns turn

ACM Reference Format:

Motohashi, M., Hanyuda E. and Nakano H. C. 2013. From Pattern Languages to "A Project Language". In *Post-proceedings of 20th Conference on Pattern Languages of Programs (PLoP)*. Article 1 (October 2013), 17 pages.

1. LIST OF PATTERNS

- PROJECT LANGUAGE
  Use a project language, which is a pattern language with the special purpose of realizing a concrete project. This pattern is a root of following patterns.
- OWN WORDS
  As many people as possible will participate, and tell your context, problem, and dream in your own words.
- PATTERNS FOR THE FUTURE
  Build patterns from the context, problems, expected consequences towards the future using your words.
- A LANGUAGE OF VISIONS
  Picture visions and imaginations as pattern stories.
- CENTER AND CENTERING PROCESS
  Use "center" and "centering process" for adjusting two systems of the language and the environment. Centering is effective way to match two other systems.
- WORKING MASTER PLAN
  Make a working master plan to realize the visions to the environment as projects.

Motohashi, Masanari, Eiiti Hanyuda, and Hiroshi Nakano. 2013. "From Pattern Languages to a Project Language: A Shift Proposal from Existing Pattern Community." In *Proceedings of the 20th Conference on Pattern Languages of Programs*, 33. The Hillside Group. http://dl.acm.org/citation.cfm?id=2725669.2725708.

Configurable Development Processes

Keeping the focus on what is being produced.

John Cameron

The diversity of IT projects frustrates any direct attempt to systematize the processes used for their development. One size just won't fit all. Even three or four sizes aren't enough because the set of projects doesn't neatly divide into three or four simple categories. A more flexible and configurable approach to process guidance is needed, a way of tailoring the process to the needs of each particular project.

To make processes configurable there must be some concept of modularity. It must be possible to select different subsets of the available modules and put them together in a coherent way. The scheme proposed here is very simple. The main focus is on the tangible things produced. They are identified (at a certain level of granularity) as "work products" and a descriptive module created for each distinct type. The modules, called Work Product Descriptions (WPDs), describe what the work product is, why and when it is needed, and how it is produced. The WPDs comprise an important subset of the configurable process framework. The process is configured to a particular situation by deciding which work products need to be produced and then making choices about sequencing and phasing.

Work products cover the full range of project work including project management, business process design, organizational change, requirements, usability, architecture, design, construction, and testing. Figure 1, for example, shows work products associated with the application development part of the framework.

The dynamic stability model [4] provides a management consultant's perspective on this approach to configuration. This model classifies industrial production processes into invention (meaning each product is uniquely designed and built), mass production, continuous improvement, and mass customization. To achieve the generally desirable goal of mass customization, in which product and process are both customized to the customer's needs, it is necessary to have modular processes and a means of configuring them. Similarly, the sense-and-respond model of business organization [1], whose goal is responsive, adaptive enterprises, also relies on modular descriptions of capabilities.

Experience at IBM

The work product approach was first developed and used at IBM by the Object-Oriented Technology Center, a group since disbanded, but whose mission from 1994–96 was to support internal OO projects. One of the main reasons for their emphasis on WPDs was the difficulty they found in reaching consensus on the process aspects of development. They found it easier to agree on the artifacts that have to be produced; their work is described in [3].

Since 1996 a number of other IBM working groups have adopted the approach. The scope has been substantially extended, for example to cover project management, various consulting methodologies, and a wide range of specialist technical disciplines. Over 300 WPDs are in use, most of them shared by many groups. The approach has been standard in most of IBM Global Services since September 2000.

Figure 1. List of 96 WPDs used in IBM custom application development (v1.1).

Acceptance Test Plan	Configuration Management Procedures	IT Readiness Assessment and Issues	System Context Diagram
Analysis Class Descriptions	Cost-Benefit Impact Analysis	Logical Data Model	System Management Plan
Analysis Class Diagram	Current IT infrastructure	Nonfunctional Requirements	System Test Plan
Analysis Guidelines	Current Solution Evaluation	Object/Action Table	Technical Prototype
Analysis Interaction Diagram	Customer View and Requirements	Operational Model	Test Cases
Analysis State Chart Diagram	Decision Framework	Organization Change Readiness Refinement and Issues	Test Results
Application Program Interface	Deployment Plan	Package Technical Criteria	Training and User Support Approach
Architectural Decisions	Deployment Unit	Physical Database Design	Transaction Descriptions
Architectural Template	Deployment Unit Matrices	Physical Packaging	Usability Design and Evaluation Plan
Architectural Overview Diagram	Design Class Descriptions	Process Model (data flow diagrams)	Usability Requirements
As-Is Organization Assessment	Design Class Diagram	Process/Data Usage Matrix	Usability Test Plan
As-Is Organization Description	Design Guidelines	Program Module Invocation Model	Usability Test Report
As-Is Process Definition and Assessment	Design Interaction Diagram	Program Module Specification	Use Case Model
Build procedures	Design State Chart Diagram	Project Estimates	Use Case Validation Report
Business Context Diagram	Early Usability Evaluation	Project Goals	User Interface Architecture
Business Event List	Education and Training Plan	Project Tracking Reestimates	User Interface Conceptual Model
Business Object Model	End User Training Materials	Project Workbook Outline	User Interface Design Guidelines
Business Process Model	End User Training Specifications	Reference Architecture Fit/Gap Analysis	User Interface Design Specification
Business Rule Catalog	Envisioned To-Be Business Goals	Release Plan	User Interface Prototype
Candidate Asset List	Executables	Request for Information	User Profiles
Change Cases	Glossary	Request for Vendor Proposal and Response	User Support Materials
Classified Business Terms	Increment Goals	Service Level Characteristics Analysis	Vendor Qualifications
Coding Guidelines	Information Technology Standards	Software Distribution Plan	Viability Assessment
Component Model	IT Organization Skills Gap Analysis	Source Code	Visual Resources

The work product approach to configurable processes is an attempt to structure and manage the knowledge in a very complex domain, knowledge about how to do IT projects.

valuable part of any method. So, more is needed than just WPDs.

The Rest of the Process Framework

The process framework scheme used by IBM has four main components:

- Work Product Descriptions, classified by subject matter, with associated dependency diagrams, as described here.
- Work Breakdown Structures (WBS) describe the temporal structure of a project. A WBS is a skeleton plan, which divides the project into a hierarchical structure of major and minor checkpoints each with exit criteria and a description of the work needed to reach the checkpoint.
- Roles describe sets of skills. They are associated with WPDs and with elements in the WBS.
- Techniques are used for detailed guidance on building a work product or group of work products, when the terse summary in the Development Approach section of the WPD is not sufficient. They can differentiate the use of the same WPD in different contexts.

Within IBM the term "engagement model" is used for all the material needed to describe a certain class of project. An engagement model consists of a set of WPDs, a WBS, a set of role descriptions, and a set of techniques. The management of the process framework is quite complicated. Engagement models and a few of the specialist elements they contain are managed by the groups that do the projects they describe. Other groups manage the WPDs, roles, and other reusable components.

Configuring the Process Framework

Configuration plays a central role in methods based on WPDs. This represents a psychological shift in the role of method. All too often, deviation from a standard methodology is seen as an imperfection, as an unwelcome compromise (despite the fact it always happens!). This attitude is sometimes encouraged by methodologists who, as a group, are not noted for their flexibility. Instead, adapting to particular circumstances should be the norm, and should be an integral part of any method and of the way it is taught.

The usual context for configuration is a project. As the project starts key members of the project team configure the method to their needs and circumstances. The early and central question is, "What work products are needed on this project?," not just, of course, what is to be delivered, but also what is to be produced along the way. Tailoring or configuration work is done early during the proposal phase and revised when the project starts. If there is a well-established matching engagement model, the simplest approach is to amend the associated list of WPDs. Work products are usually selected or deselected in groups. Dependency diagrams help people visualize the impact of their decisions.

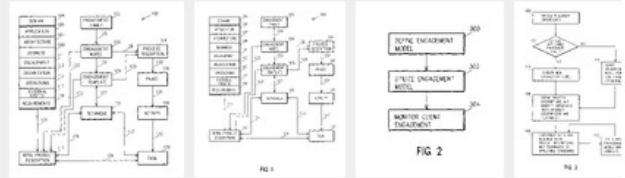
Figure 3 shows the form of a spreadsheet that can be used to record the results of the configuration. The spreadsheet starts from a standard list of WPDs, either the full list or the WPDs associated with an engagement model. Some groups also use a standard

System and method for systems integration

Abstract

A system for providing integrated system solutions includes a set of process descriptions; a set of work product descriptions; and engagement models collecting the process descriptions and work product descriptions into a models for implementing typical projects addressing marketplace requirements. A systems integration method includes the steps of defining an engagement model which will be used to address a market place requirement; utilizing the engagement model to create an engagement template which specifically addresses client requirements within the market place; and measuring, monitoring and controlling client engagements based upon the engagement model.

Images (10)



Classifications

G06Q10/00 Administration; Management

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Application US09/625,108 events

2000-07-25 • Application filed by International Business Machines Corp

2000-07-25 • Priority to US09/625,108

2000-12-14 • Assigned to INTERNATIONAL BUSINESS MACHINES CORPORATION

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2005-09-27 • Application granted

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IBM Pledges Free Access to Patents Involved in Implementing 150+ Software Standards

Promise to Not Assert Patent Rights Is Single Largest Commitment of Its Kind; Latest in a Series of Patent Pledges and Support for Open Standards

ARMONK, NY - 11 Jul 2007: IBM (NYSE: IBM) today announced that it is granting universal and perpetual access to certain intellectual property that might be necessary to implement more than 150 standards designed to make software interoperable.

One likely result of the pledge to commercial and open source communities is that it will be easier for more computing devices and software to be compatible with one another. The move, which IBM believes is the largest of its kind, is also designed to spur industry innovation, while discouraging litigation.

The software specifications and protocols involved in the pledge underpin industry standards, such as those reflected in Web Services: programming, transactions and data exchanged on the Internet and Web. These are typically under, or moving toward, stewardship by standards groups such as the World Wide Web Consortium and OASIS.

"IBM is sending a message that innovation and industry growth happens in an open, collaborative atmosphere," said Bob Sutor, IBM's Vice President of Open Source and Standards. "Users will adopt new technologies if they know that they can find those technologies in a variety of interchangeable, compatible products from competing vendors. We think customers will like this added assurance for the open standards upon which they have come to depend."

IBM's commitment not only applies to the distributors, developers or manufacturers that are implementing the specifications involved, but also extends to their users or customers. It is valid as long as adopters are not suing any party -- not just IBM -- over necessary patented technology needed to implement the standards.

Previously, all adopters of these specifications and protocols needed to secure royalty-free licensing terms from IBM. This move clarifies and makes more consistent the intellectual property usage rules, encouraging even wider implementations of open standards. IBM hopes that others companies and intellectual property holders make similar commitments.

The pledge involving more than 150 specifications and protocols is consistent with commitments that IBM previously has made, and which have since inspired pledges by other vendors. Previous pledges from IBM include commitments not to assert intellectual property rights for hundreds of patents involving the open source, healthcare and education communities.

Please visit http://www-03.ibm.com/linux/opensource/ispinfo.shtml to see the list of specifications and to obtain more details about IBM's commitment.

Contact(s) information

Ari Fishkind
IBM Media Relations
914-766-3210


Secure | https://web.archive.org/web/20121203213741/http://epf.eclipse.org/wikis/openup/
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Practice
Resources for contributing to the Eclipse Process Framework
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Tasks
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Getting Started > Understanding OpenUP
Understanding OpenUP
OpenUP is a lean Unified Process that applies iterative and incremental approaches within a structured lifecycle. OpenUP embraces a pragmatic, agile philosophy that focuses on the collaborative nature of software development. It is a tools-agnostic, low-ceremony process that can be extended to address a broad variety of project types.
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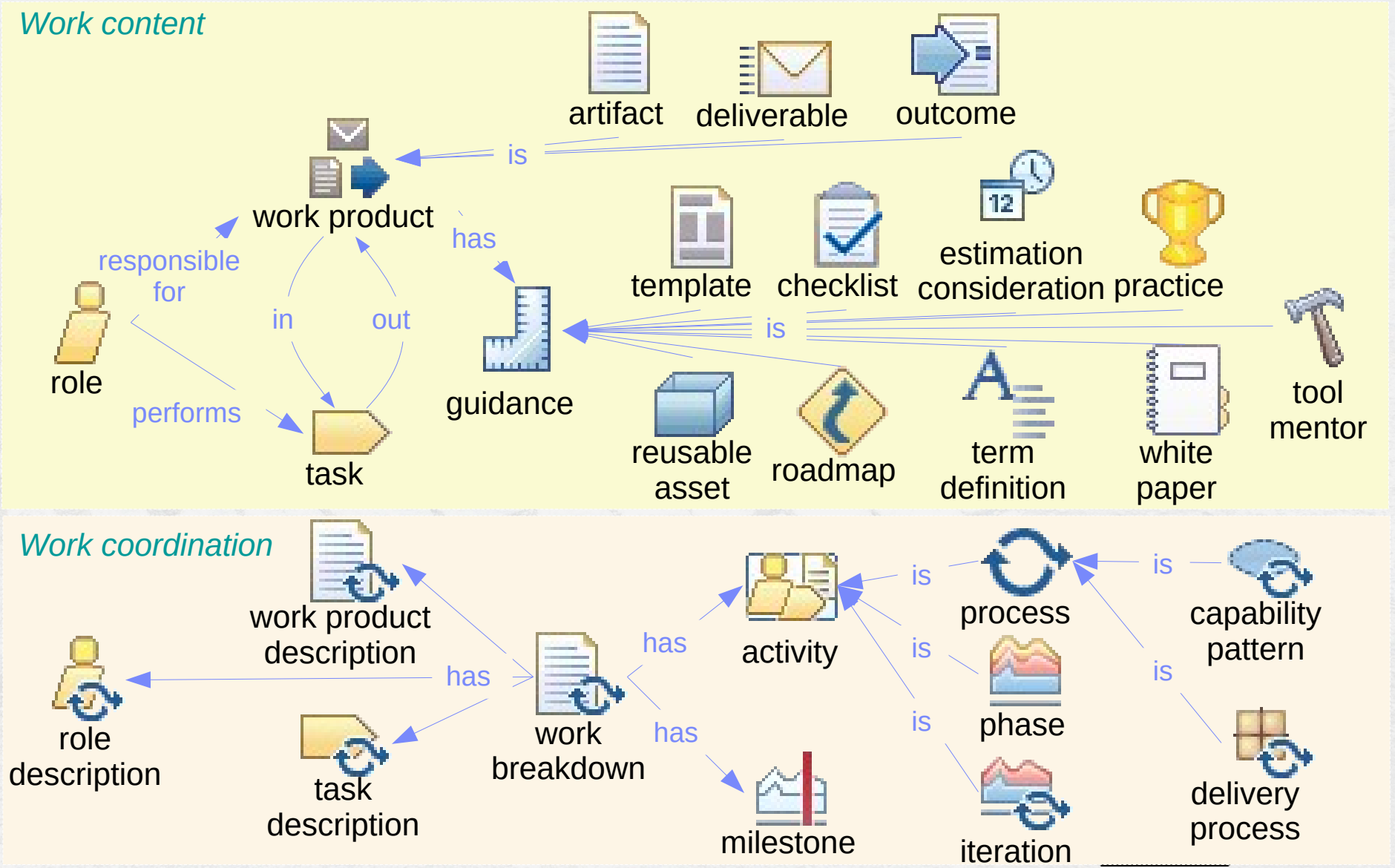
Eclipse Process Framework Composer (Architecture originally pledged by IBM)



Reference: EPF Composer Architecture, http://www.eclipse.org/epf/composer_architecture/

Work Product Descriptions

A WPD is very simply a 3–10-page description of a project artifact that uses the following headings:

- Description
- Purpose
- Impact of Not Having the Work Product
- Reasons for Not Choosing the Work Product
- Notation
- Example
- Development Approach
- Validation and Verification
- Estimating Considerations
- Advice and Guidance
- References

A WPD may take a variety of forms, from a simple document to a set of linked HTML pages (p. 73).

An **engagement model** consists of a set of WPDs, a WBS, a set of role descriptions, and a set of techniques.

- Work Product Descriptions, classified by subject matter, with associated dependency diagrams, as described here.
- Work Breakdown Structures (WBS) describe the temporal structure of a project. A WBS is a skeleton plan, which divides the project into a hierarchical structure of major and minor checkpoints each with exit criteria and a description of the work needed to reach the checkpoint.
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Cameron, John. 2002. “Configurable Development Processes.” *Communications of the ACM* 45 (3): 72–77. https://doi.org/10.1145/504729.504731 .

Pattern language is *not* for wicked problems!

coevolving.com/blogs/index.php/archive/exploring-the-context-of-pattern-languages/

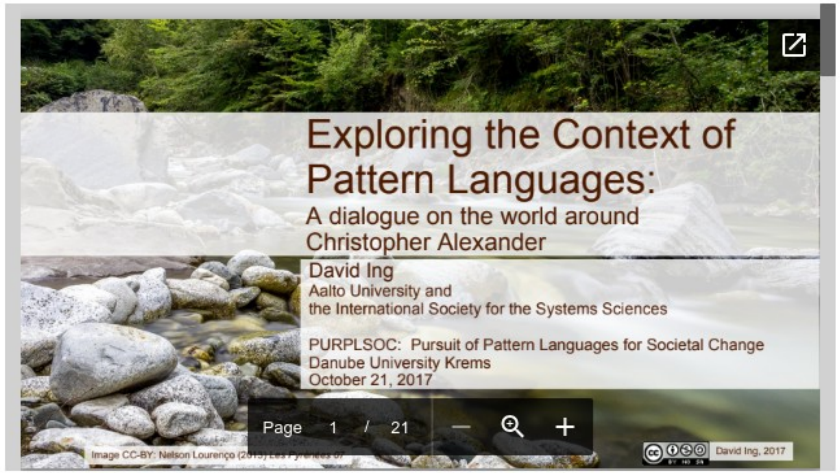
Exploring the Context of Pattern Languages

Pattern language is not for wicked problems, said Max Jacobson, coauthor with Christopher Alexander of the 1977 *A Pattern Language: Towns, Building, Construction*. In addition, the conventional definition of an Alexandrian pattern as "a solution to a problem in context" when applied to social change might better use the term "intervention", rather than "solution".

These are two of the major ideas that emerged at PurpIsoc 2017 conference last October. A 90-minute workshop was run in parallel with other breakouts.

For about the first hour, vocal participants included Max Jacobson (who had given a plenary talk on "A Building is not a Turkish Carpet"), Christian Kohls (who gave a plenary talk on "Patterns for Creative Space") and Peter Baumgarnter (one of the Purlpsoc chairs).

As an impetus to discussion, we stepped through slides that had been posted on the Coevolving Commons.

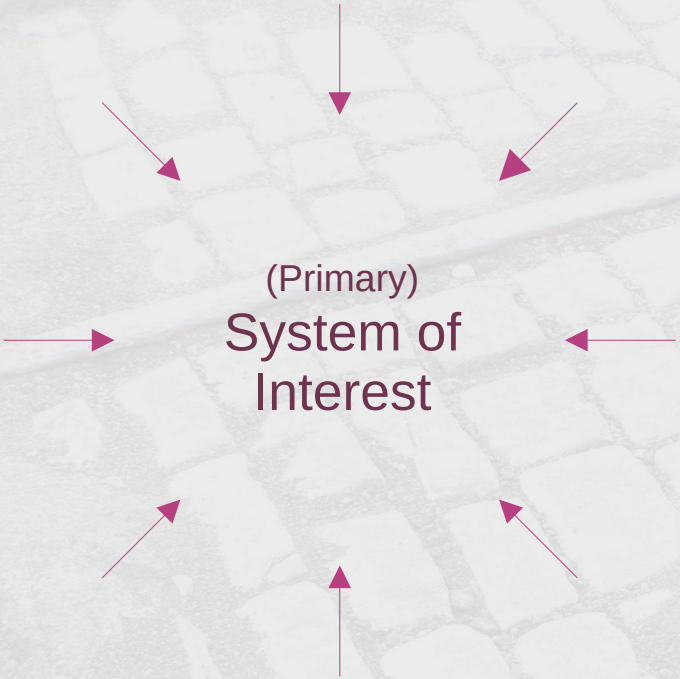


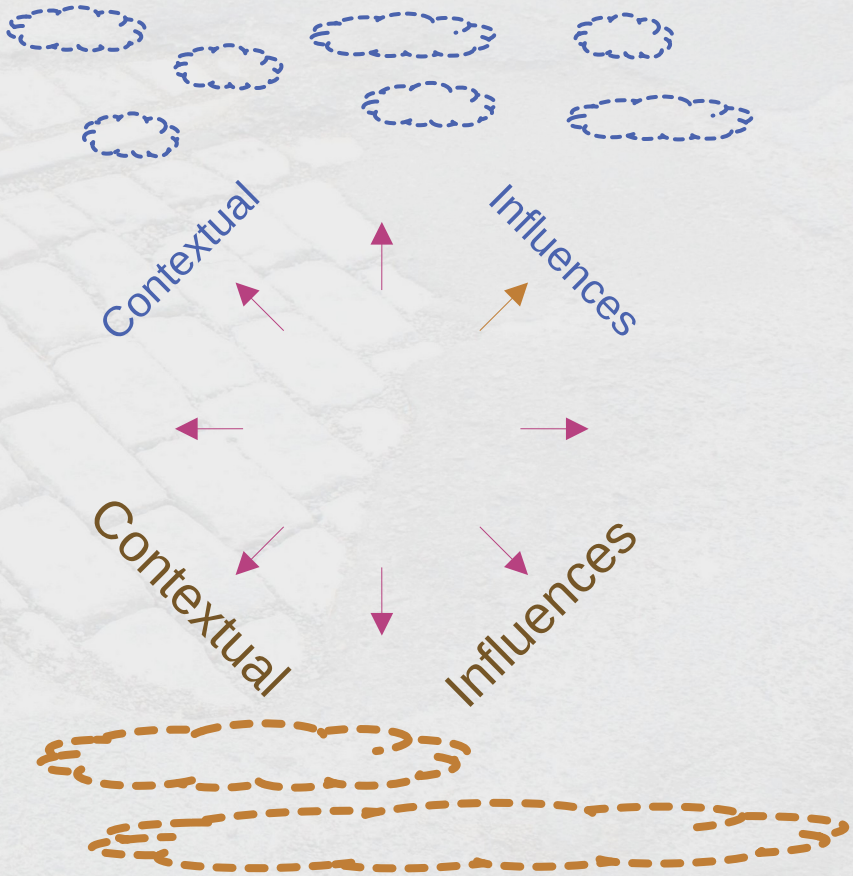
For people who would like the next-best experience to being there, the slides have now been matched up with the digital audio recording, for viewing as a web video.

Agenda

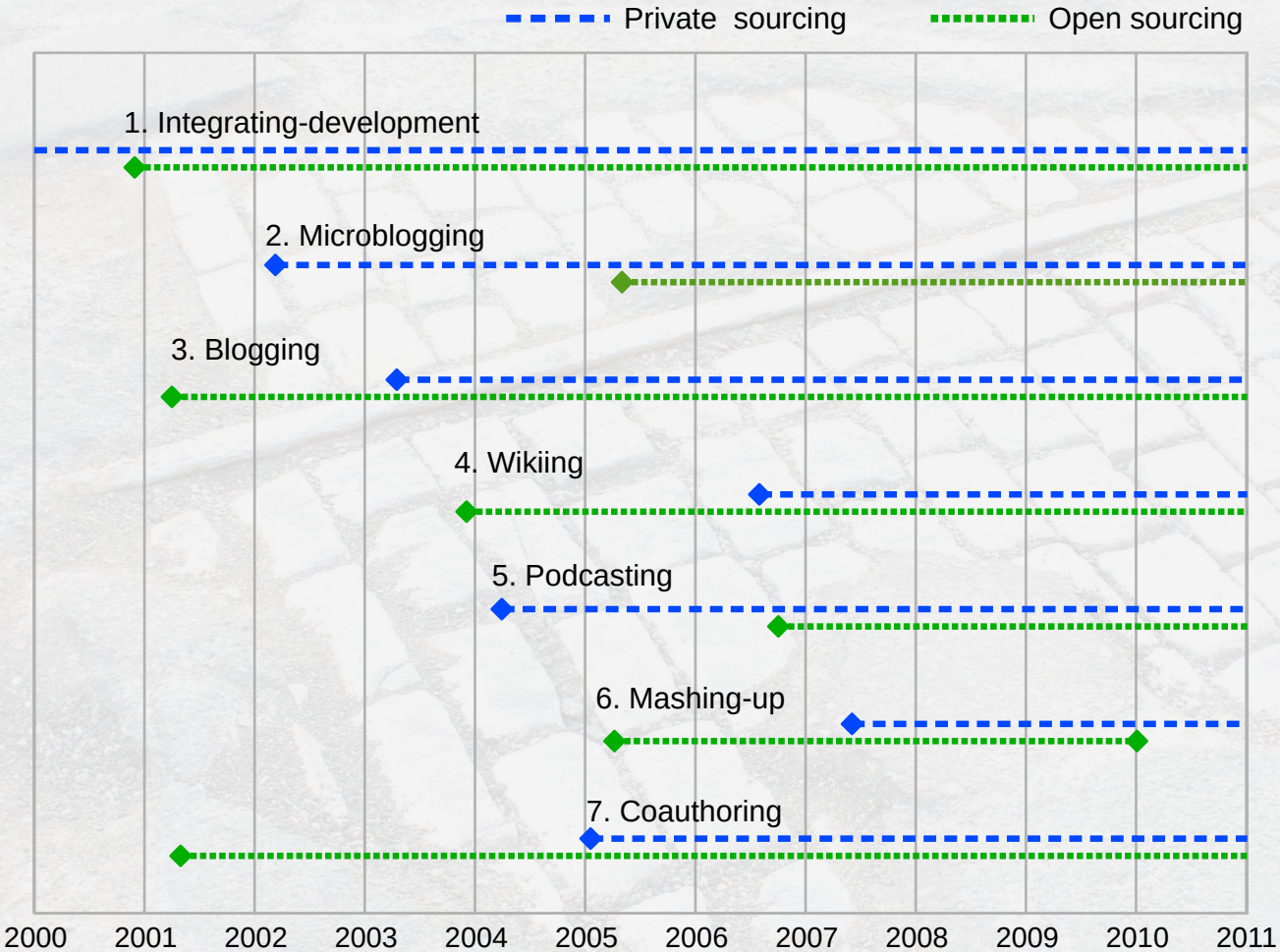
A.	Project Language (Engagement Model)
B.	System of Interest, Contextual Influences
C.	Deliverables (Artifacts, Work Products)
D.	Systems Methods
E.	Systems Theories

Perspective on a system of interest can be reductive (looking inwards) and expansive (looking outwards)





Seven cases at IBM 2001-2011 → phenomenon for theory-building



Tracking citations is the traditional approach for literature reviews

Google Scholar

David Ing

FOLLOW

Aalto University
Verified email at aalto.fi - Homepage

Systems Thinking Service Science Open Source
Open Innovation Pattern Language

TITLE	CITED BY	YEAR
Rethinking systems thinking: Learning and coevolving with the world D Ing Systems Research and Behavioral Science 30 (5), 527-547	48	2013
Service Science: Reframing Progress with Universities J Spohrer, A Giuiusa, H Demirkan, D Ing Systems Research and Behavioral Science 30 (5), 561-569	42	2013
Negotiated Order and Network Form Organizations A Parhankangas, D Ing, DL Hawk, G Dane, M Kosits Systems Research and Behavioral Science 22 (5), 431-452	29	2005
Point of Sale Data in Consumer Goods Marketing: Transforming the Art of Marketing into the Science of Marketing D Ing, AA Mitchell The Marketing Information Revolution, Blattberg, Glazer, and Little (eds …	22	1994
A shearing layers approach to information systems development I Simmonds, D Ing IBM Research Report	19	2000

Google Scholar

Peter Hayward Jones

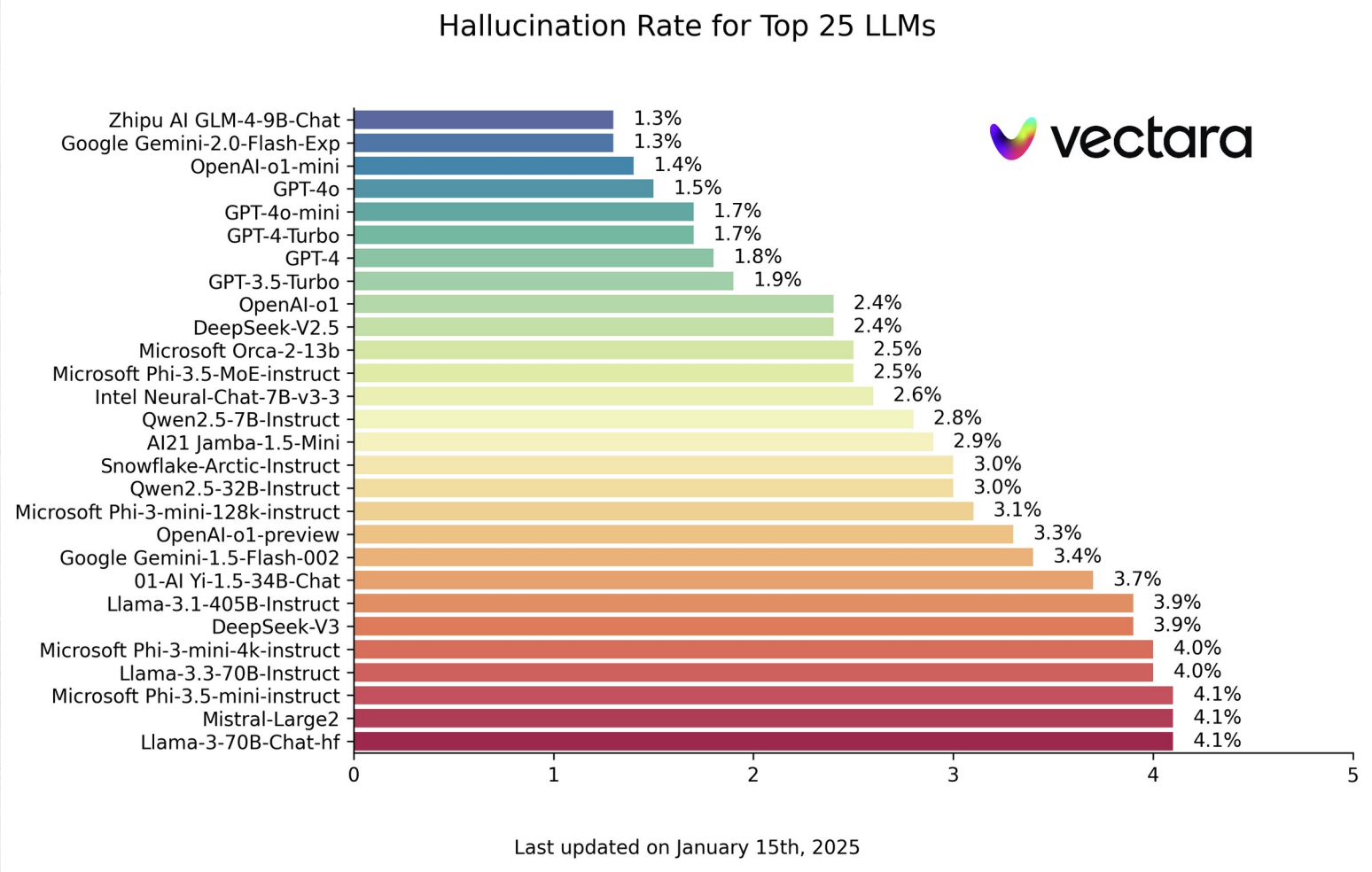
FOLLOW

Tecnologico de Monterrey
Verified email at tec.mx - Homepage

Systemic design Social complexity Healthcare services
Dialogic design Organizational behaviour

TITLE	CITED BY	YEAR
An ontology for strongly sustainable business models: Defining an enterprise framework compatible with natural and social science A Upward, P Jones Organization & Environment 29 (1), 97-123	827	2016
Systemic design principles for complex social systems PH Jones Social systems and design, 91-128	568	2014
Design for care: Innovating healthcare experience P Jones Rosenfeld Media	316	2013
Bodystorming as embodied designing D Schleicher, P Jones, O Kachur interactions 17 (6), 47-51	231	2010
Contexts of co-creation: Designing with system stakeholders P Jones Systemic design: Theory, methods, and practice, 3-52	150	2018
Collaborative foresight: Complementing long-horizon strategic	130	2014

Gen AI may guide summarization, with hallucination risks (5% ?)



Source: Vectara, "Hallucination Leaderboard", https://github.com/vectara/hallucination-leaderboard

LLMs mix (i) *Transformers* with (ii) *Retrieval Augmented Generation*

Let's try ...

COPILOT

perplexity

NotebookLM

A GenAI Chat Challenge:

Our interest is in the use of Generative AI for academic literature reviews, where original sources are traceable and can be cited in master's level research. How does (i) Microsoft Copilot compare against (ii) Perplexity AI, and against (iii) Google NotebookLM, on those criteria?

LLM prompts can be sensitive to (i) system of interest; (ii) contextual influences; and (iii) changes over time

System of interest:

What systems changes did IBM go through **inside the organization, as a commercial business**, described in the 2017-2018 book, "Open Innovation Learning" by David Ing. Outline the relevant content of that book in preparation for presentation to an audience at the master's level of education.

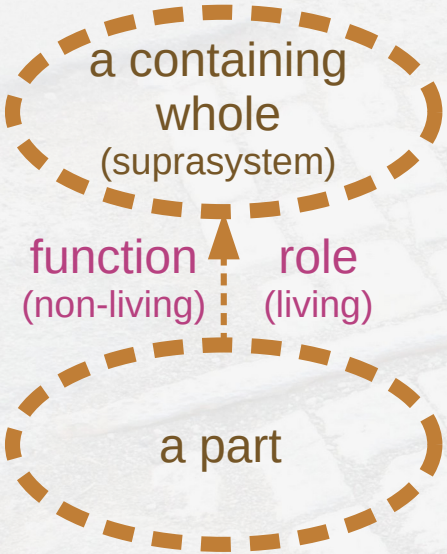
Contextual influences:

What systems changes did IBM go through **outside the organization, with open source communities**, described in the 2017-2018 book, "Open Innovation Learning" by David Ing. Outline the relevant content of that book in preparation for presentation to an audience at the master's level of education.

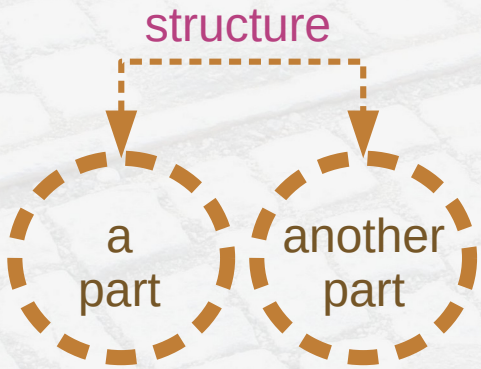
Changes over time:

In August 2024, David Ing published a **new article** "Reifying Socio-Technical and Socio-Ecological Perspectives for Systems Changes: From rearranging objects to repacing rhythms". How does this **update** findings from "Open Innovation Learning" published in 2017?

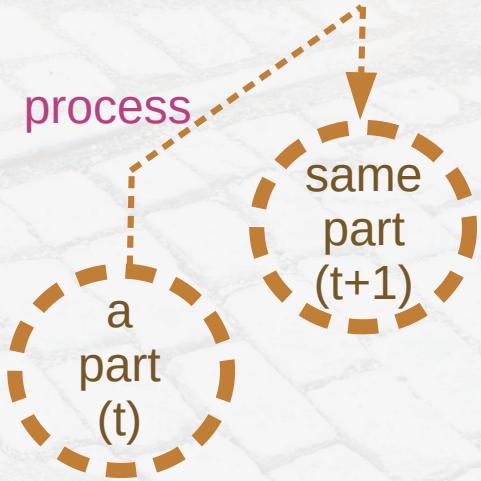
Systems thinking is a perspective on parts, wholes, and their relations



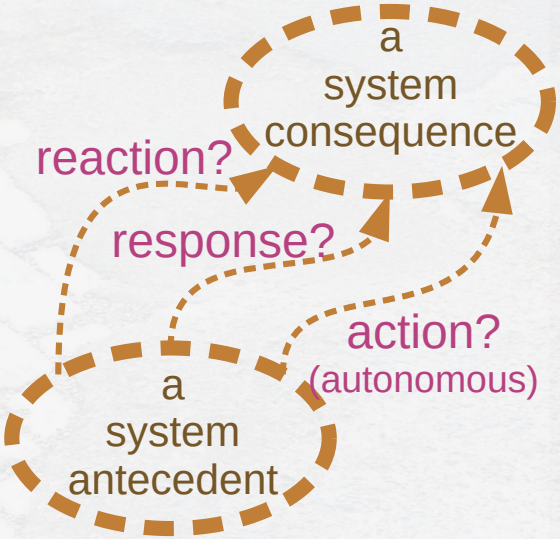
Function is a "contribution of the part to the whole"



Structure is an "arrangement in space"



Process is an "arrangement in time"



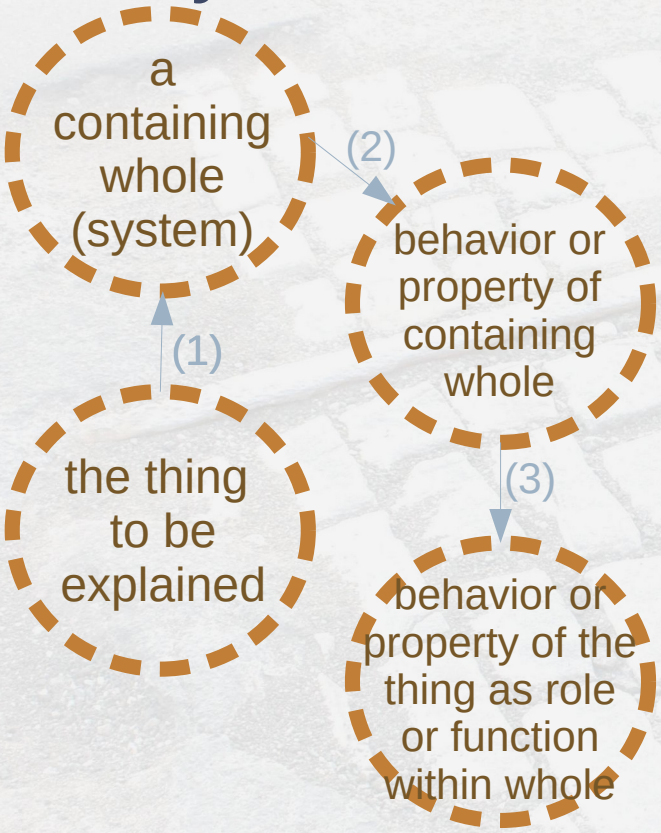
Behaviour is a "system change which initiates other events"

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

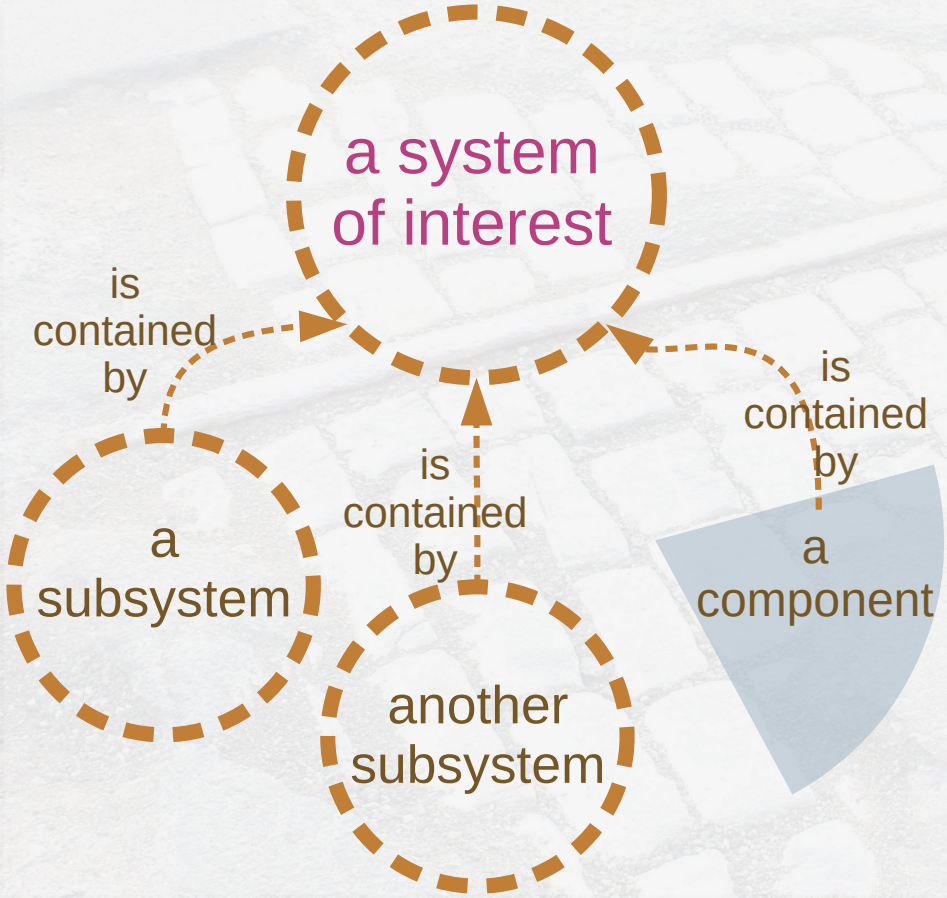


Synthesis precedes analysis

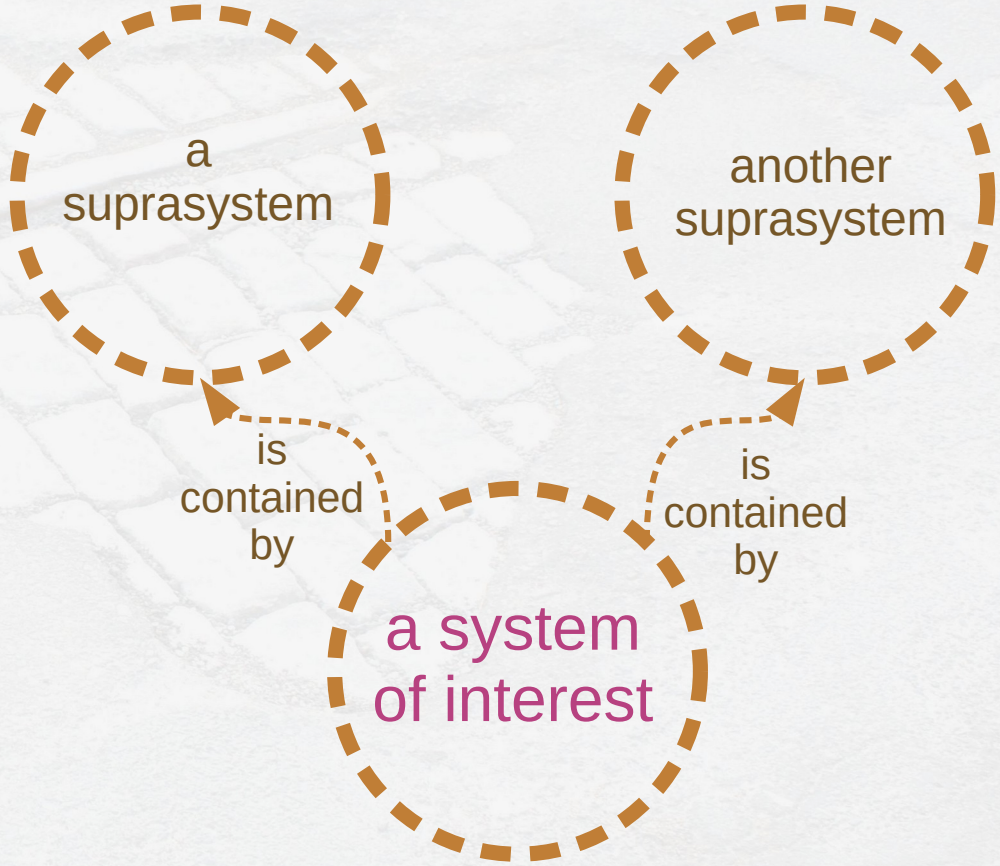
1. Identify a **containing whole** (system) of which the **thing to be explained** is a part.
2. Explain the **behavior or properties** of the **containing whole**
3. Then explain the **behavior or properties** of the **thing to the explained** in terms of its **role(s) or function(s)** within its containing whole.

Ackoff, Russell L. 1981. *Creating the Corporate Future: Plan or Be Planned For*. New York: John Wiley and Sons, p. 16

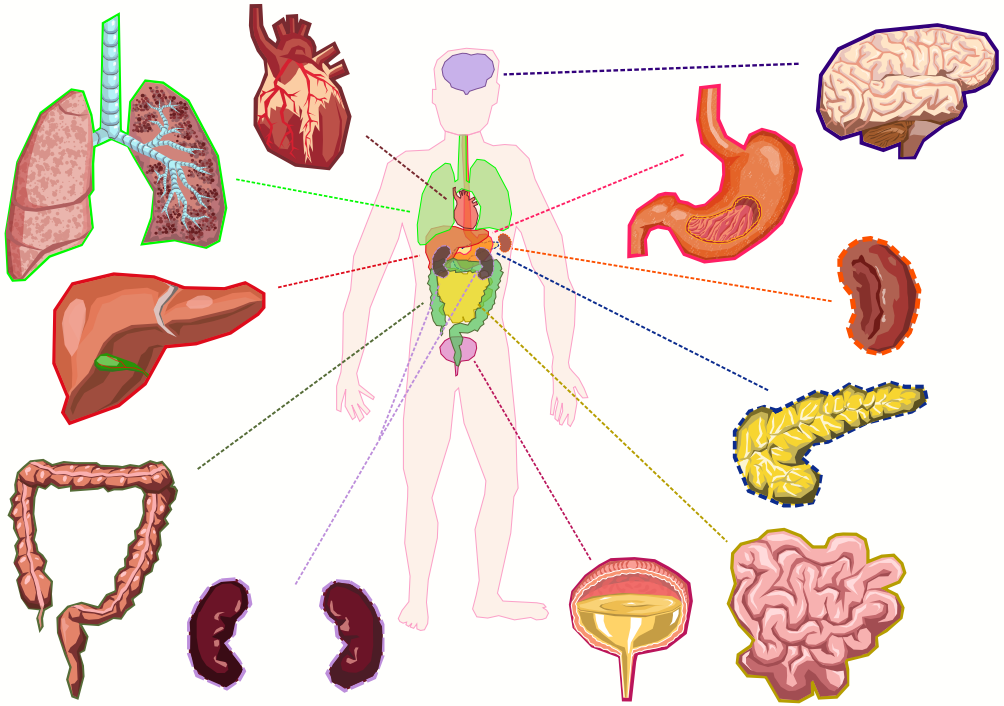
A system can contain subsystems or components

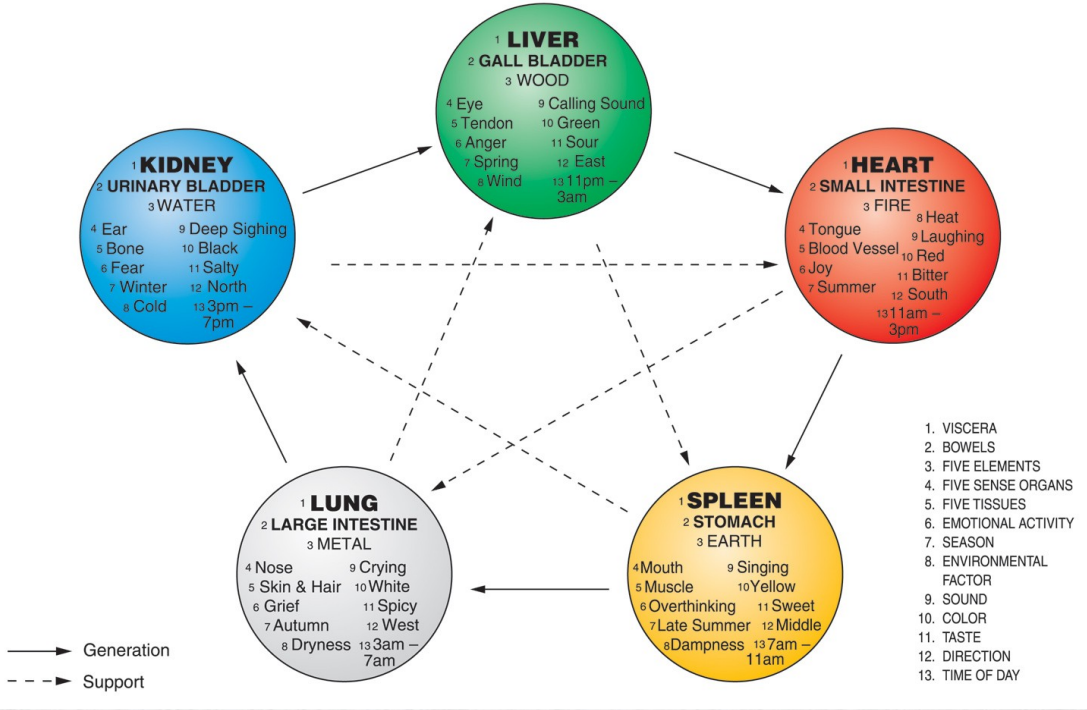


A system can be contained by multiple suprasystems



Human organs as *parts* by western physicians contrast to the *subsystems* of Traditional Chinese Medicine



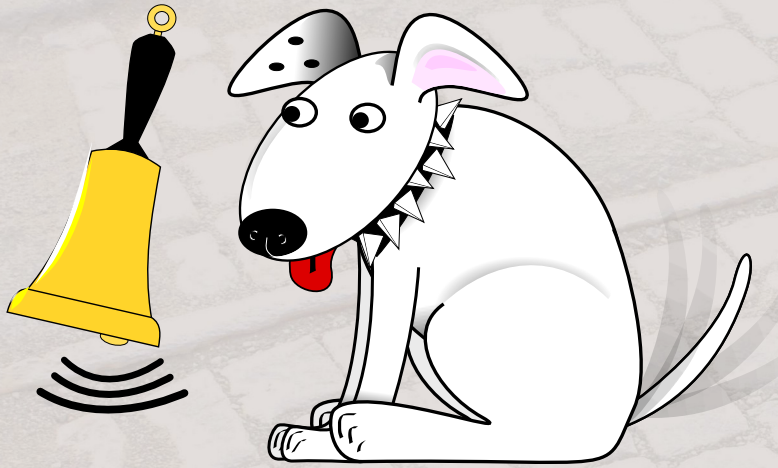


Mothsart, “Organs of the human body”, at https://openclipart.org/detail/280284/human-body

Traditional Chinese Medicine World Foundation, “Classification of things according to the theory of the five elements”, at https://www.tcmworld.org/what-is-tcm/the-five-major-organ-systems/

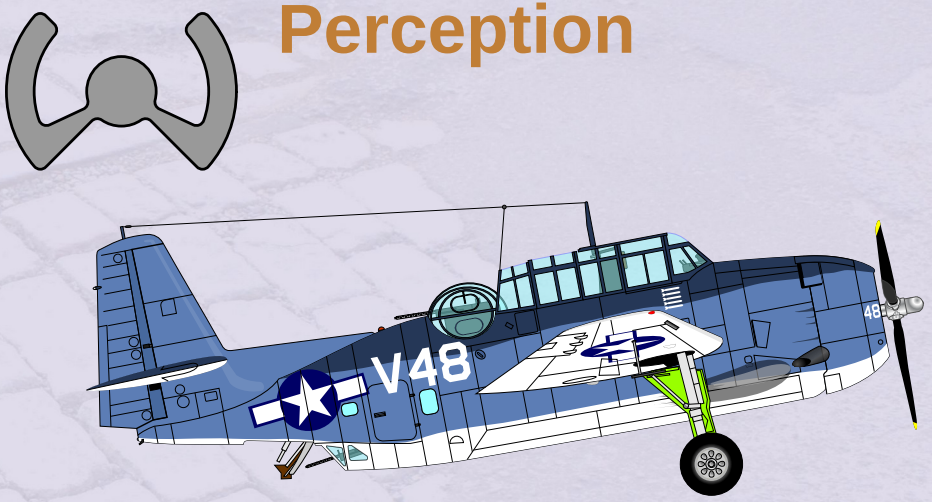
Ask Not What's Inside Your Head, but What Your Head's Inside of

Stimulus – Response
(Behavioral Psychology)



[In the 1950] psychophysics of perception … "givens" in the light to the eye could not support perceptual phenomena, but only elementary experiences such as sensations. [….] Succinctly put, the psycho-physical program was … traditional in considering perception to be a set of responses to presented stimuli (albeit "higher order" stimuli).

Ecological Approach to Perception



Over the last 10-15 years [James J. Gibson] has tried to develop enough theory … to demonstrate that direct perception is indeed plausible even if hordes of difficult details remain to be worked out. The … analysis of the optic array, stimulus organization, and the functional organization of perceptual systems are what Gibson oftens points to as radical features ….

William M. Mace 1977. "James J. Gibson's Strategy for Perceiving: Ask Not What's inside Your Head, but What Your Head's inside of." In *Perceiving, Acting, and Knowing: Toward an Ecological Psychology*, edited by Robert Shaw and John Bransford, 43–65.

Agenda

A.	Project Language (Engagement Model)
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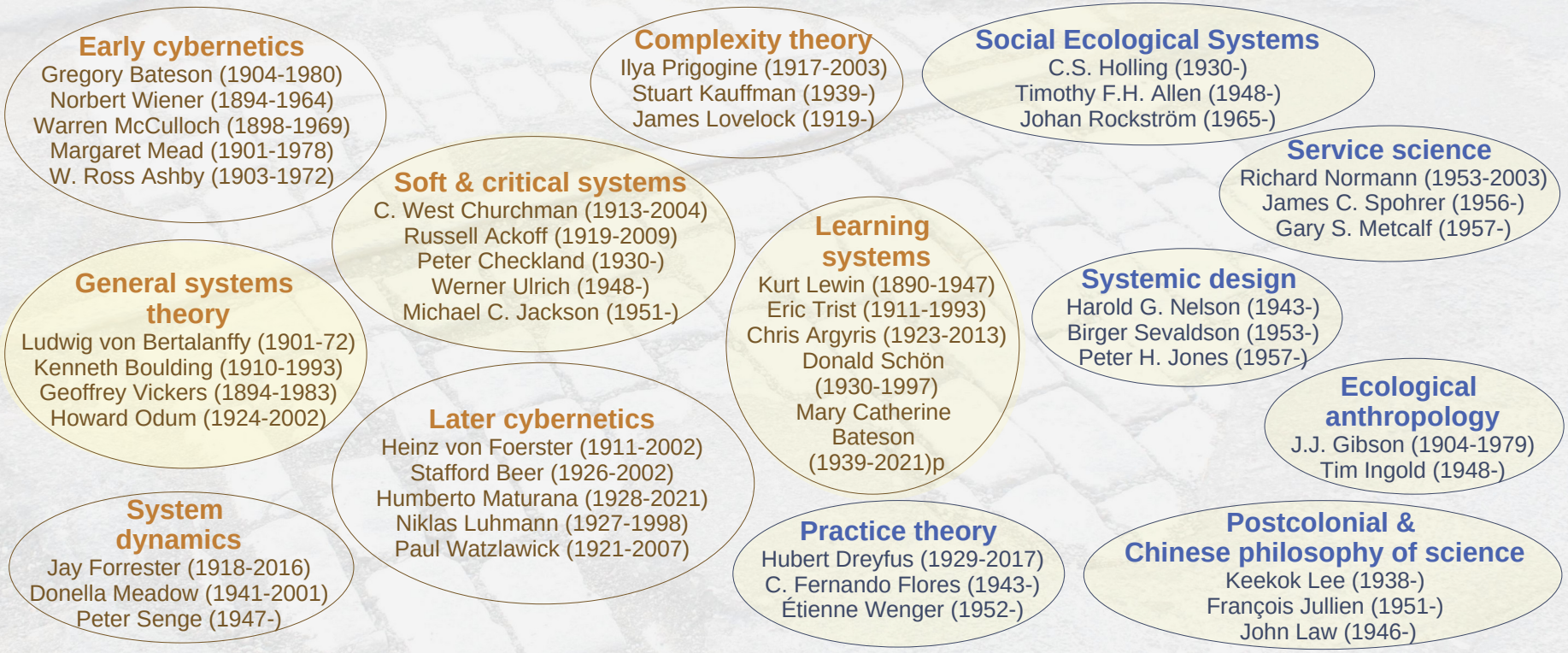
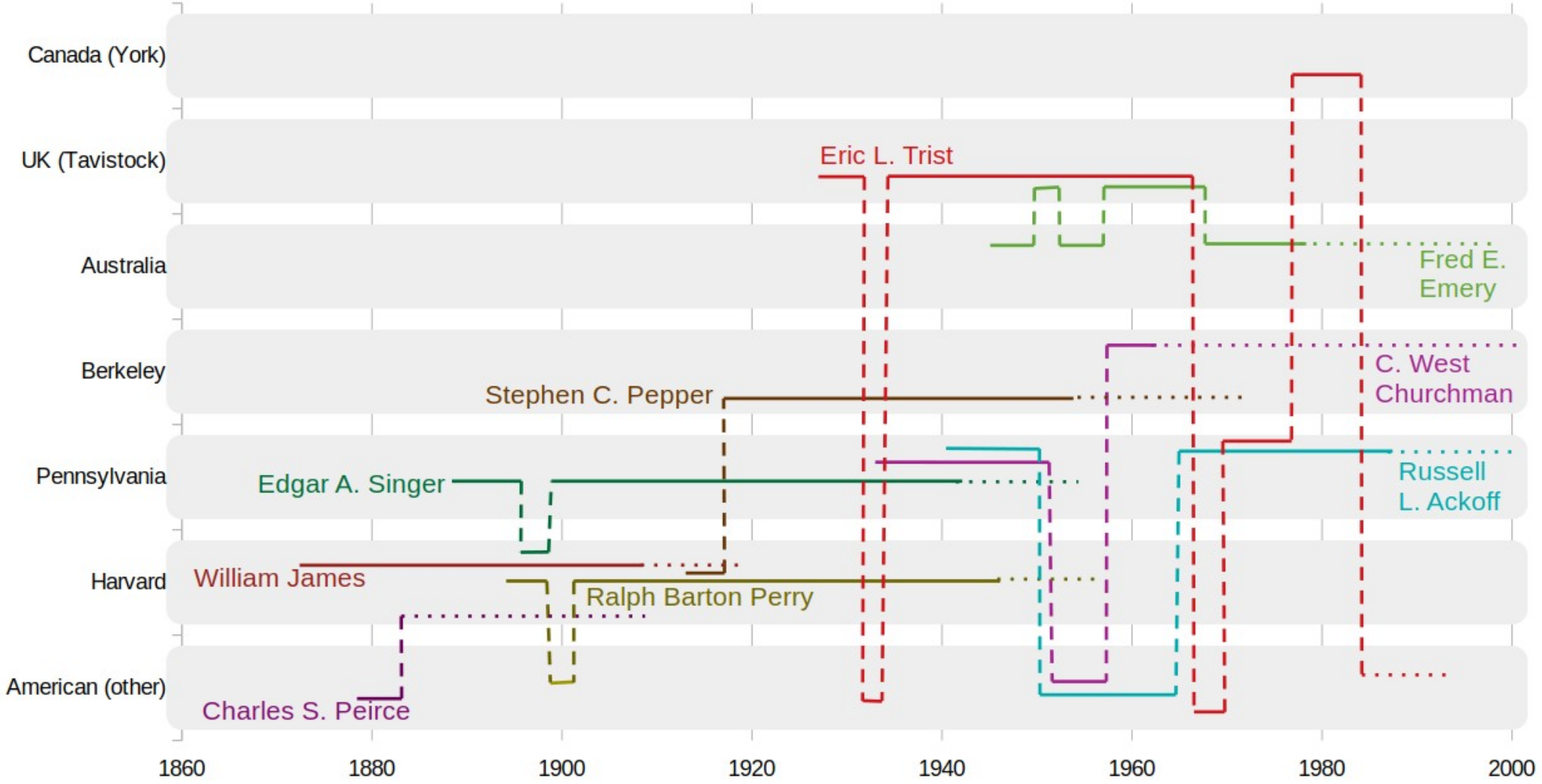
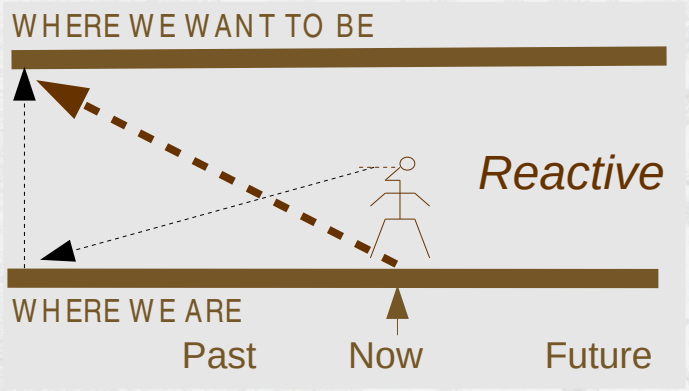
A rich legacy of 20th century systems thinkers enables selection for the domain at hand, and extensions with contemporary researchers

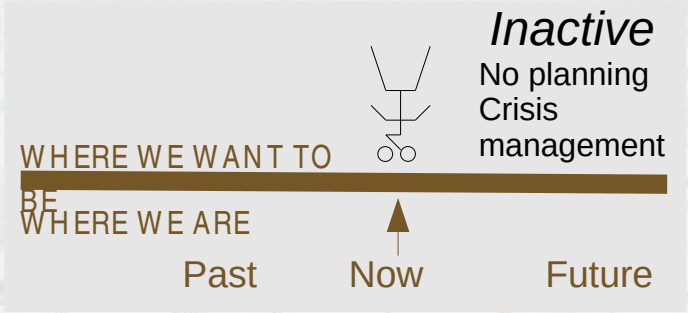


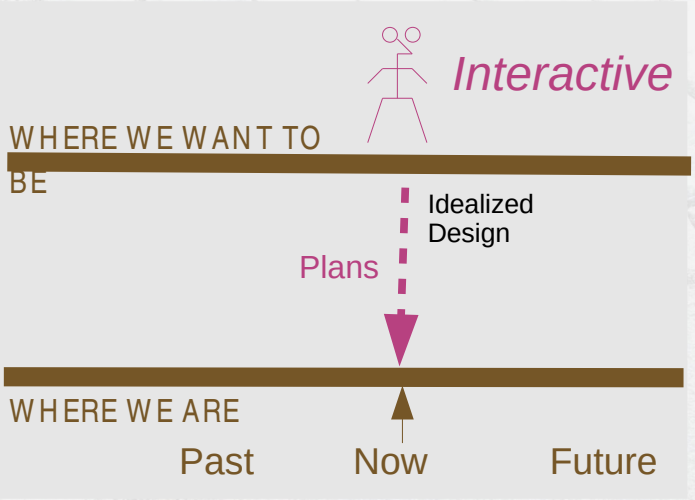
Source: Ramage, Magnus, and Karen Shipp. 2020. "Introduction to the First Edition." In *Systems Thinkers*, edited by Magnus Ramage and Karen Shipp, xiii–xx. Springer London. https://doi.org/10.1007/978-1-4471-7475-2, p. xvii

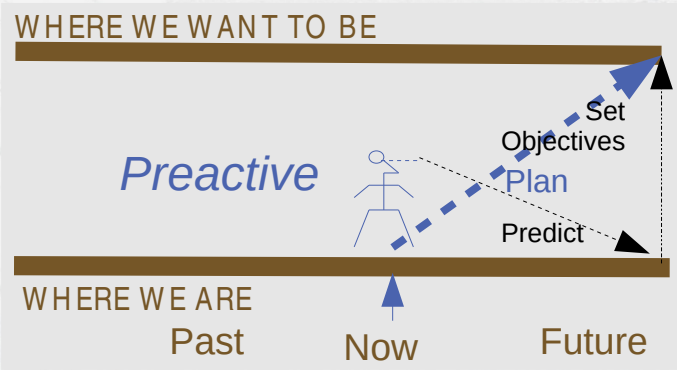

Canada (York)
UK (Tavistock)
Australia
Berkeley
Pennsylvania
Harvard
American (other)
Eric L. Trist
Fred E. Emery
C. West Churchman
Stephen C. Pepper
Russell L. Ackoff
Edgar A. Singer
William James
Ralph Barton Perry
Charles S. Peirce
1860
1880
1900
1920
1940
1960
1980
2000

In contrast to action as inactive, reactive or preactive, interactive idealizes on a desirable future outcome in the present



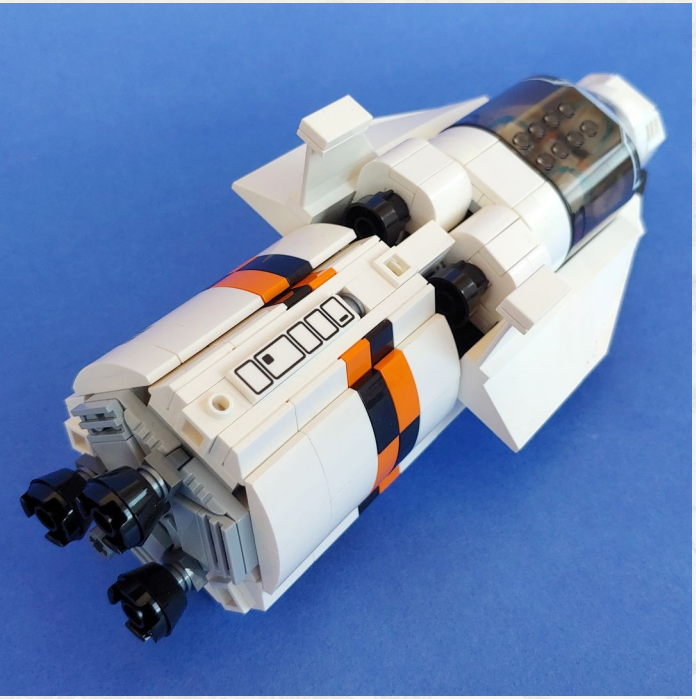






Ackoff, Russell Lincoln, Jason Magidson, and Herbert J. Addison. 2006. *Idealized Design: Creating an Organization's Future*. Upper Saddle River, N.J: Wharton School Pub.

Redesigning a system for right now, as neither ideal nor utopian, heeds three requirements + assumes reality comes with change



Technologically feasible

- Doesn't preclude innovation, nor require economic feasibility

Operationally viable

- Capable of working and surviving if brought into existence

Capable of learning + adapting

- Gains from experience, can improve or be improved by others

Reference: Ackoff, Russell L. 1994. *The Democratic Corporation*. New York: Oxford University Press, pp. 79-80

Images from Flickr: "3rd Stage" CC-BY 2019 B Mauro; ""Greenhouse 2" CC-BY 2010 A.S. Morton; "Lakeview Park Sunflower Garden" CC-BY 2020 David Ing

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

human relations

THE TAVISTOCK INSTITUTE

human relations
1–29
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DOI: 10.1177/0018726715577707
hum.sagepub.com
SAGE

Unfreezing change as three steps: Rethinking Kurt Lewin's legacy for change management

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.

Keywords
CATS, changing as three steps, change management, Kurt Lewin, management history, Michel Foucault

Corresponding author:
Stephen Cummings, Victoria Business School, Victoria University of Wellington, Wellington, New Zealand.
Email: stephen.cummings@vuw.ac.nz

[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).

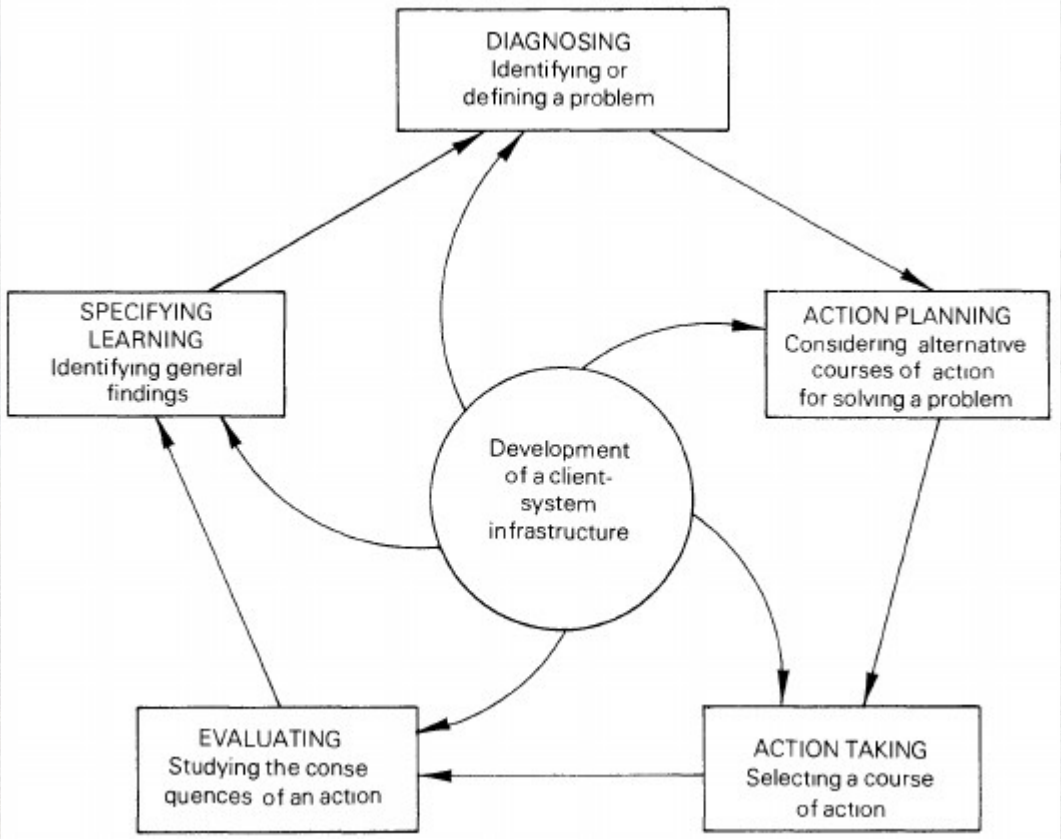
Festinger said that: 'To Lewin, life was not static; it was changing, dynamic, fluid. Lewin's unfreezing-stabilizing-refreezing concept of change continues to be highly relevant today'.

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 .

Action Research counters a premise that scientific knowledge is obtainable only through direct experience, verified independently



Action Research as a Corrective to the Deficiencies of Positivist Science

Six characteristics of action research provide a corrective to the deficiencies of positivist science …

- A.R is future oriented
- A.R. implies system development
- A.R. generates theory grounded in action
- A.R. is agnostic
- A.R. is situational

Susman, Gerald I., and Roger D. Evered. 1978. “An Assessment of the Scientific Merits of Action Research.” *Administrative Science Quarterly* 23 (4): 582–603. https://doi.org/10.2307/2392581 .

Deliverables, via a literature review aided by Generative AI

A GenAI Chat Challenge:

Technology companies today combine open source technologies with commercial interests. In a systems approach involving open sourcing while private sourcing as described in "Open Innovation Learing" by David Ing, what would be the deliverables applying (i) an idealized design approach by Russell Ackoff, in comparison to (ii) an organizational change approach by Eric Trist? Include conditions under which (i) an idealized design approach and/or (ii) organizational change approach would or would not be chosen.

Let's try ...

Agenda

A.	Project Language (Engagement Model)
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Designing for a problematique (mess) involves changing the characteristics of the larger whole, rather than in its parts

Resolving (a clinical approach)	**Solving (a research approach)**	**Dissolving (a design approach)**
To *resolve* a problem is to select a course of action that yields an outcome that is good enough, that *satisfices* (satisfies and suffices).	To *solve* a problem is to select a course of action that is believed to yield the *best possible* outcome, that *optimizes*.	To *dissolve* a problem is to change the nature, and/or the environment, of the entity in which it is imbedded so as to remove the problem. Problem dissolvers *idealize* rather than satisfice or optimize because their objective is to change the system involved or its environment in such a way as to bring it closer to an ultimately desired state, one in which the problem cannot or does not arise.

Ackoff, Russell L. 1981. “The Art and Science of Mess Management.” *Interfaces* 11 (1): 20–26. https://doi.org/10.1287/inte.11.1.20.

A design approach to mess management involves a concept of planning with five phases

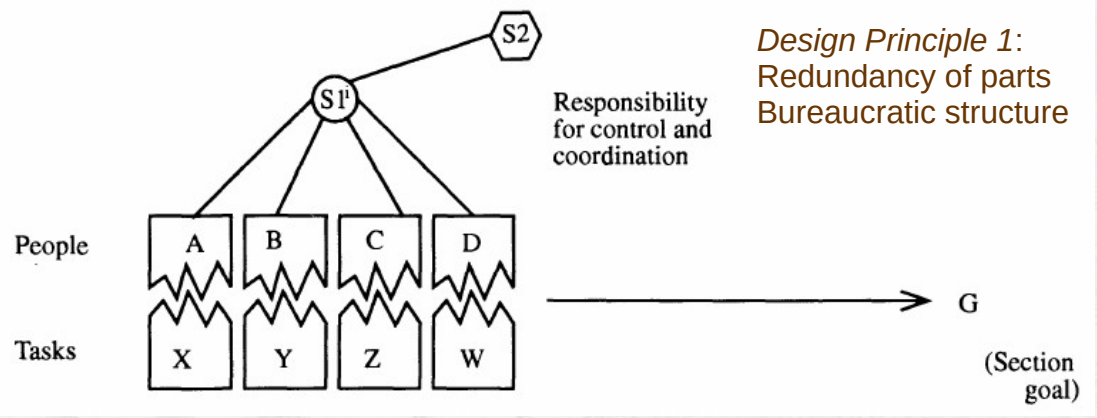
Formulating the mess	**Ends planning**	**Means planning**	**Resource planning**	**Design of implementation and control**
This is done in such a way as to capture and highlight the essential systemic properties of the mess, not by listing independently formulated threats and opportunities, but by projecting the future that the system would have if it, and its environment, were to continue unchanged.	This involves selecting the ideals, objectives, and goals to be pursued by preparing an idealized redesign of the system planned for, a design with which the relevant stakeholders would replace the existing system today if they were free to do so.	Here the ways of filling the gaps are selected. (These are more likely to require invention than discovery.) They can take the form of policies. programs, projects, procedures, practices, or individual courses of action.	Determination is made of how much of each type of resource people, facilities and equipment, materials and energy, money, information, knowledge, and understanding will be required by the means selected, and when these requirements will arise.	Decisions are made as to who is to do what, where, and when, and how their behavior and its effects are to be monitored and modified when necessary.

Ackoff, Russell L. 1981. “The Art and Science of Mess Management.” *Interfaces* 11 (1): 20–26. https://doi.org/10.1287/inte.11.1.20.

Search Conferences are conducted as Participative Design Workshops, towards moving from DP1 towards DP2 autonomous workgroups

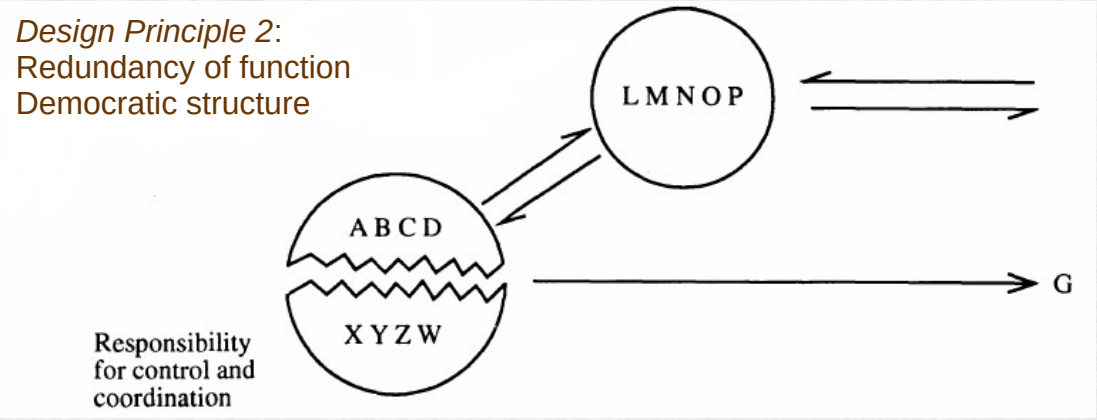
Development of a Human Resources Workshop

Step	*Action*
1.	Plenary. Final briefing, expectations, exploration of extended social field
2.	Small groups. Desirable futures. Probable futures. Connections are made to democratic structures
3.	Plenary. Briefing on conceptual tools
4.	Mirror groups A + B redesign A, C + D redising D
5.	Plenary presentation of designs
6.	Mirror groups A + B redesign B, C + D redesign D
7.	Plenary presentaitons
8.	Team groups and/or plenary. Future strategy and process



Design Principle 1:
Redundancy of parts
Bureaucratic structure

Design Principle 2:
Redundancy of function
Democratic structure



Emery, Fred E., and Merrelyn Emery. 1993. "The Participative Design Workshop." In *The Social Engagement of Social Science*, edited by Eric L. Trist, Hugh Murray, and Beulah Trist, 2 The Socio-Technical Perspective:599–613. A Tavistock Anthology. Philadelphia: University of Pennsylvania Press. https://muse.jhu.edu/pub/56/edited_volume/chapter/1775974.

Methods, via a literature review aided by Generative AI

A GenAI Chat Challenge:

Technology companies today combine open source technologies with commercial interests. In a systems approach involving open sourcing while private sourcing as described in "Open Innovation Learning" by David Ing, what methods would be applied with (i) an interactive planning approach by Russell Ackoff, in comparison to (ii) a search conference approach by Fred E. Emery involving Design Principle 1 and Design Principle 2? Include conditions under which (i) an interactive planning approach and/or (ii) search conference approach would or would not be chosen.

Let's try ...

Agenda

A.	Project Language (Engagement Model)
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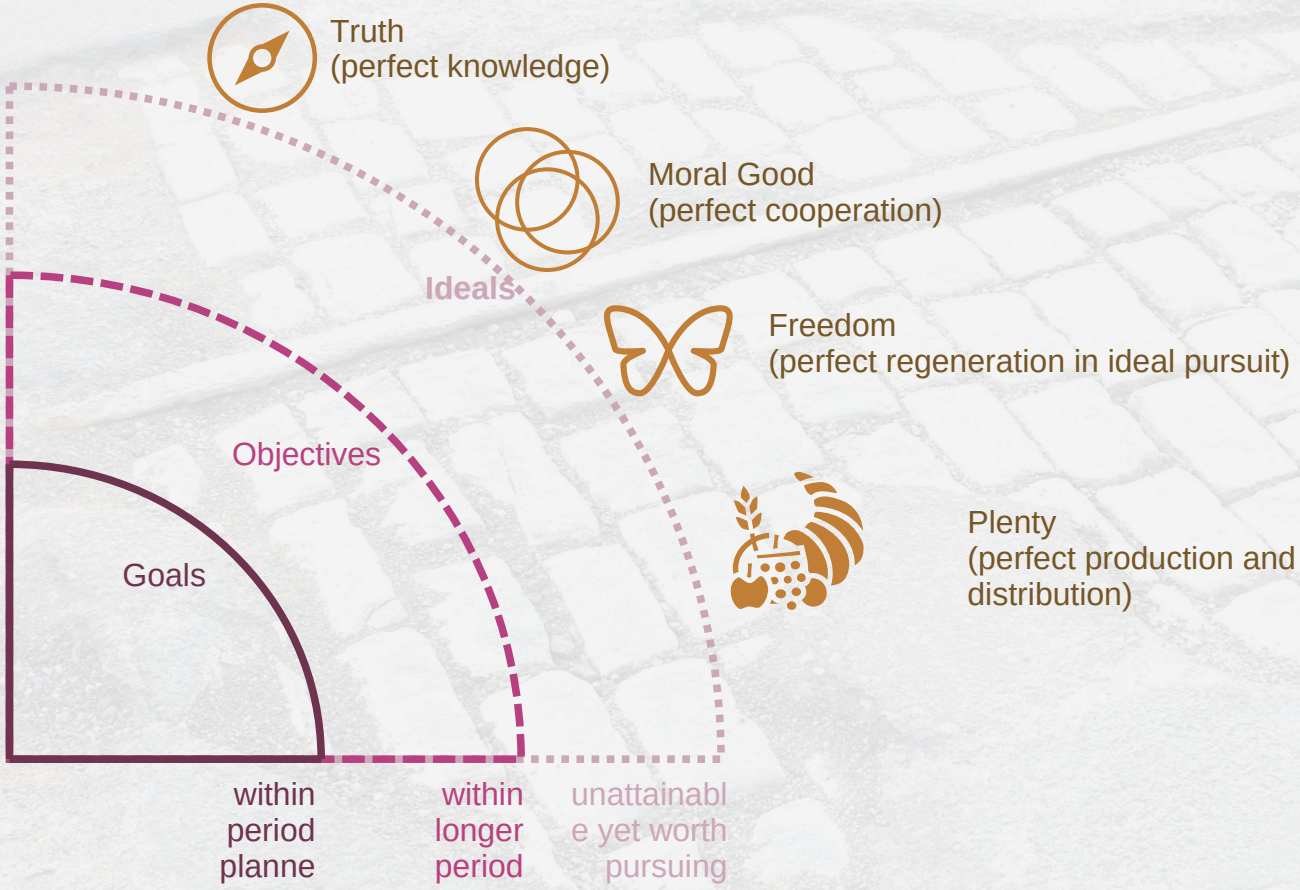
Types of systems can be categorized by purposefulness

Systems and models	*Parts*	*Wholes*
Deterministic	Not purposeful	Not purposeful
Animated	Not purposeful	Purposeful
Social	Purposeful	Purposeful
Ecological	Purposeful	Not purposeful

Purposive == goal-seeking	*Goals*: those ends that we can expect to attain within the period covered by planning.
	Objectives: those ends that we do not expect to attain within the period planned for but which we hope to attain later, and toward which we believe progress is possible within the period planned for.
Purposeful == ideal-seeking	*Ideals*: those ends that are believed to be unattainable but towards which we believe progress is possible during and after the period planned for.

Ackoff, Russell L., and Jamshid Gharajedaghi. 1996. “Reflections on Systems and Their Models.” Systems Research 13 (1): 13–23. https://doi.org/10.1002/(SICI)1099-1735(199603)13:1<13::AID-SRES66>3.0.CO;2-O.

A Non-Relativistic Pragmatic Theory of Value specified 4 pursuits, later refined with a variety of ends over defined time periods



Churchman, C. West, and Russell Lincoln Ackoff. 1950. “Modern Synthesis: The Pragmatic Method.” In *Methods of Inquiry: An Introduction to Philosophy and Scientific Method,* 193–258. St. Louis: Educational Publishers. https://catalog.hathitrust.org/Record/005757861.

Ackoff, Russell L., and Fred E. Emery. 1972. On Purposeful Systems. Aldine-Atherton. https://archive.org/details/onpurposefulsyst0000acko

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The Socio-Psychological, Socio-Technical, and Socio-Ecological Systems perspectives were developed concurrently

Post WWII social psychology following Kurt Lewin led to three systems perspectives at the Tavistock Institute for Human Relations

[... the] socio-psychological, the socio-technical and the socio-ecological perspectives ... emerged from each other in relation to changes taking place in the wider social environment. One could not have been forecast from the others. Though **interdependent**, each has its own focus. Many of the **more complex projects require all three perspectives**. [p. 30]

Socio-Psychological Systems Perspective

... in Institute projects, the **psychological forces** are are directed **towards the social field**, whereas in the the Clinic, it is the other way around [with **social forces** directed **toward the psychological field**]. [p. 31]

Socio-Technical Systems Perspective

... the **best match** between the **social** and **technical systems** of an organization, since called the **principle of joint optimization**

... the **second design principle**, the **redundancy of functions**, as contrasted with the **redundancy of parts**. [p. 32]

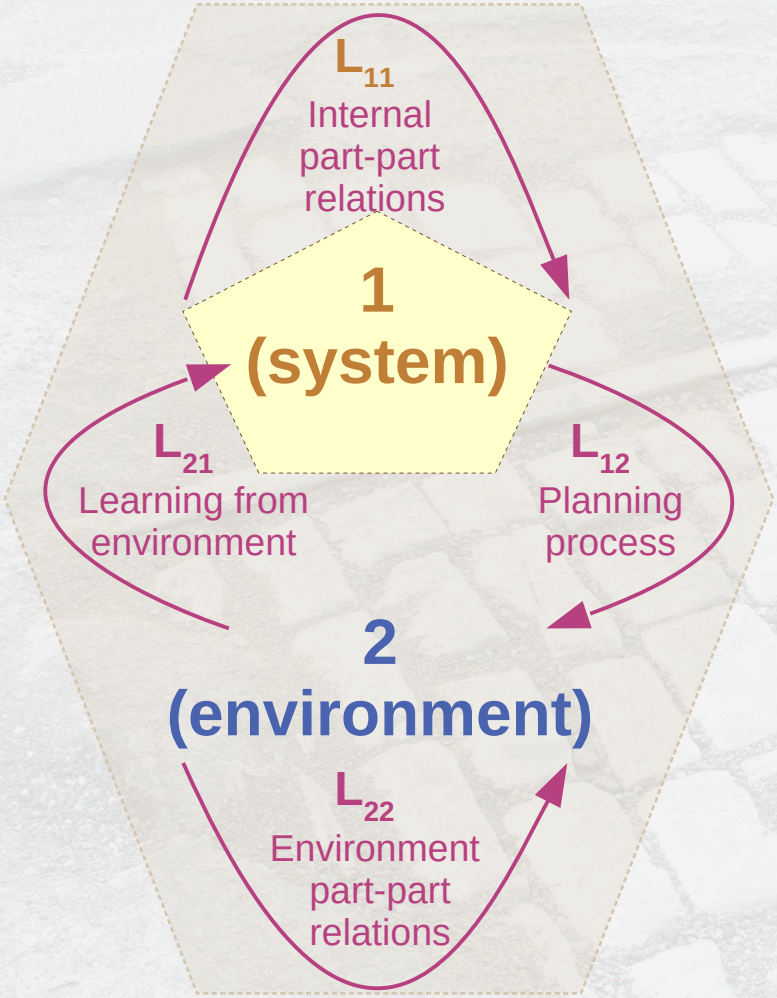
Socio-Ecological Systems Perspective

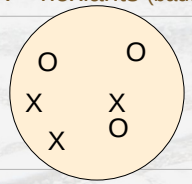
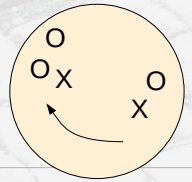
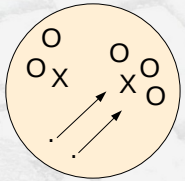
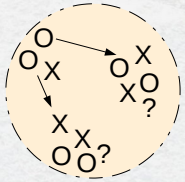
... the **context** of the **increasing levels of interdependence, complexity and uncertainty** that characterize societies a the present time.

... new problems related to **emergent values** such as **cooperation** and **nurturance**. [p. 33]

Trist, Eric L., and Hugh Murray. 1997. “Historical Overview: The Foundation and Development of the Tavistock Institute to 1989.” In *The Social Engagement of Social Science: The Socio-Ecological Perspective*, edited by Eric L. Trist, Frederick Edmund Emery, and Hugh Murray, 3:1–35. Philadelphia: University of Pennsylvania Press.

Causal texture theory sees shifts in the field of system + environment



	Where O = goals (goodies), X = noxiants (baddes)	
Type I. Random Placid		Goals and noxiants randomly distributed. Strategy is tactic. “Grab it if it's there”. Largely theoretical of micro, design, e.g. concentration camps, conditioning experiments. Nature is not random.
Type 2. Clustered Placid		Goals and noxiants are lawfully distributed – meaningful learning. Simple strategy – maximize goals, e.g. use fire to produce new grass. Most of human span spent in this form. Hunting, gathering, small village. What people mean by the “good old days”.
Type 3. Disturbed Reactive		Type 2 with two or more systems of one kind *competing* for the same resources. Operational planning emerges to out-manoeuvre the competition. Requires extra knowledge of both Ss and E. E is stable so start with a set of givens and concentrate on problem solving for win-lose games. Need to create insturments that are variety-reducing (foolproof) – elements must be standardized and interchangeable. Birth of bureacractic structures where people are redundant parts. Concentrate power at the top – strrategy becomes a power game.
Type 4. Turbulent		Dynamic, not placid/stable. Planned change in type 3 triggers off unexpected social processes. Dynamism arises from the field itself, creating unpredictability and increasing *relevant uncertainty* and *its continuities*. Linear planning impossible, e.g. whaling disrupted reproduciton, people react to being treated as parts of machine. Birth of open systems thinking, ecology, and catastrophe theory.

Source: Fred E. Emery, and Eric L. Trist. 1965. “The Causal Texture of Organizational Environments.” Human Relations 18 (1) (February): 21–32. doi:10.1177/001872676501800103

Theories, via a literature review aided by Generative AI

A GenAI Chat Challenge:

Technology companies today combine open source technologies with commercial interests. In a systems approach involving open sourcing while private sourcing as described in "Open Innovation Learning" by David Ing, what theories are relevant with (i) purposeful systems approach by Russell Ackoff, in comparison to (ii) a Socio-Psychological Systems and/or Social-Technical Systems and/or Socio-Ecological Systems approach by Eric Trist and Fred E. Emery from the Tavistock Institutute? Include conditions under which (i) an purposeful systems approach and/or (ii) Tavistock approach would or would not be chosen.

Let's try ...

Are your changes systematic, or systemic?

Systematic	*Systemic*
Somatic (adaptive, cellular) change	Genotypic (generational) change
Non-living, effect-producing (allopoietic)	Living, systems-generating (autopoietic)
Reactive	Co-responsive

Agenda

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