Service Systems Thinking: An introduction

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Industrial Ecology in 2015

Posted on August 16, 2015 by daviding

Up to a month before the biannual conference of the *International Society for Industria Ecology*, I hadn't heard of this field.

> **Industrial ecology** is the study of the flows of materials and energy in industri consumer activities, of the effects of these flows on the environment, and of th influences of economic, political, regulatory, and social factors on the flow, use transformation of resources. (U.S. National Academy of Engineering, 1994)

The first international conference of the ISIE was held in 2001, in the Netherlands. Th organization has recently described the progress in the field:

> In the early days of industrial ecology, investigation of the soundness and utilit biological analogy and efforts at eco-design were prominent. In the past decad output analysis (especially multi-regional IOA), studies of resource criticality, integration of social science and operations research, agent-based/complexity modeling, urban metabolism and long-term socio-ecological research have bec central to the field.
>
> The influence of industrial ecology is significant and growing, and the analytica that are central to the field, such as life cycle assessment (LCA) and material fl analysis (MFA), are increasingly used in other disciplines. Both LCA and MFA used in the Intergovernmental Panel on Climate Change (IPCC) 5th Assessme Report to examine the embodied greenhouse gas (GHG) emissions from build transportation, and other sectors. Additionally, industrial ecology specialists co the core of the United Nations Environment Programme's (UNEP) Internationa Resource Panel. They have authored five of the Panel's seven reports since 2 (ISIE 2015)

The way I came to Industrial Ecology was by another route. While doing research in June, I encountered a 2001 book, *Construction Ecology: Nature as a Basis for Green Buildings*, edited G. Bradley Guy , Charles J. Kibert and Jan Sendzimir. Here's an extract from the table of contents.

- 1. Defining an ecology of construction: Charles J. Kibert, Jan Sendzimir and G. Bradley Guy

Part 1: The ecologists

- 2. Material circulation, energy hierarchy, and building construction: **Howard T. Odum**
- 3. On complexity theory, exergy, and industrial ecology: **James J. Kay**
- 4. Applying the principles of ecological emergence to building design and construction: **Timothy F.H. Allen**
- 5. Using ecological dynamics to move toward an adaptive architecture: **G. Peterson**

Part 2: The industrial ecologists

- ...
- 8. Construction ecology and metabolism: Stefan Bringezu

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Publications

Submitted by daviding on Sun, 09/27/2015 - 06:27

Publication Date	Publication Title	Author(s)	Form
October 2015	"Systems Thinking: A journey, and the prospects" [**view abstract and presentation slides**]	David Ing	presentation at the **Master's Program in Creative Sustainability, Aalto University of Applied Sciences**, Helsinki, Finland
October 2015	"Service Systems Thinking: An introduction" [**view abstract and presentation slides**]	David Ing	lecture in **Industrial Management, Master's Program, Helsinki Metropolia University of Applied Sciences**, Finland
July 2015	"Service Systems Thinking: From Environmental Structure to a New Generative Pattern Language" [**view abstract and presentation slides**]	David Ing	presentation at **PURPLSOC (Pursuit of Pattern Languages for Societal Change) Conference**, Danube University Krems, Austria
February 2015	"Unfolding values in places, spaces and paces: Service systems thinking and architectural theory" [**view abstract and presentation slides**]	David Ing	presentation at Open Symposium on Service Systems Science 2015: Network Digital Revolution, Tokyo Institute of Technology
January 2015	"From Environmental Structure to Service Systems Thinking: Wholeness with Centers Described with a Generative Pattern Language" [**view abstract and article**]	David Ing	article in review for **Proceedings of the 2014 Conference on Pattern Languages of Programs**

From Environmental Structure to Service Systems Thinking: Wholeness with Centers Described with a Generative Pattern Language

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ABSTRACT

Pattern languages were originally developed in the domain of built environments (i.e. environmental structure). In the early 1990s, the proposal to apply pattern languages in software development led to a reframing of object-oriented design and methods and the rise of agile development practices. This cross-appropriation from built environments to software development coincided with a deeper reading of Christopher Alexander's writing, principally focused on books published in the late 1970s.

Service systems, as a domain originating as recently as 2005, can benefit from a literature review of key ideas evolved by Alexander from 1964 through 2012. Service systems thinking has been proposed as a label that combines (i) systems thinking; (ii) the SSMED (Service Science, Management, Engineering and Design) vision; (iii) the generative pattern language theory underpinning Alexander's life work; and (iv) multiple perspectives open collaboration enabled through contemporary collaborative Internet technologies such as federated wiki. This article focuses primarily on two of four parts, (ii) SSMED and (iii) generative pattern language. References on (i) systems thinking and (iv) federated wiki are separately available as complementary published papers and web video on the Internet.

With service systems thinking as a new area of research, a full of appreciation of Alexander's thinking is an aspiration. Since service systems are interactive in a way that built environments may not be, generativity in a pattern language is desirable. In addition, a service system may aspire to produce wholeness, through the architecting of key centers. This article aims to serve as a boundary-spanning reference on which conversations for orientation can be founded.

Categories and Subject Descriptors

H.1.1 [**Models and Principles**]: Systems and Information Theory—General Systems Theory; J.4 [**Social and Behavioral Sciences**]: Economics, Psychology, Sociology; K.4.3 [**Computers and Society**]: Computer-supported cooperative work

General Terms

Management, Design, Economics, Human Factors, Theory

Keywords

Service systems, systems thinking, pattern language, architecture

1. INTRODUCTION: SERVICE SYSTEMS THINKING AIMS TO BUILD ON CHRISTOPHER ALEXANDER'S APPROACH AS A FOUNDATION

Service systems thinking is proffered as a label for an emerging body of work that: (i) builds on systems thinking extending social systems science (i.e. socio-psychological, socio-technical and socio-ecological systems perspectives) into service systems science; (ii) advances a transdisciplinary appreciation of service science, management, engineering and design (SSMED); (iii) explores the practices of architectural design in Christopher Alexander's work on generative pattern languages; and (iv) collaborates through a multiple perspectives inquiring system with the new federated wiki platform. This endeavour is seen as a community activity that could take ten years to mature.

This article aspires to engage the pattern language community not only to repurpose the broad range of pattern catalogs already developed across the broad range of domains, but also to more deeply appreciate Christopher Alexander's clearer articulation of generative pattern languages in his later writings. In summer 2014, presentations to the service science and systems sciences communities outlined some foundational ideas, and can be viewed as videos on the Internet (Ing 2014).

In brief, service systems thinking can be described both as an intentional representation and as an object-process representation.

In an intentional representation, service systems thinking is a resource that can be applied by service scientists, managers, engineers and designers.

Figure 1 depicts a service system with two roles: a beneficiary and a provider, using an i* (pronounced eye-Star) notation (Horkoff and Yu 2006). Each role has its own softgoals of purposes and interests. The expected portion of joint benefits from the relationship depends on the combination of resources (as hardgoals) that are applied by the other parties and itself. Among the resources at hand for each role is the capacity for system integration.

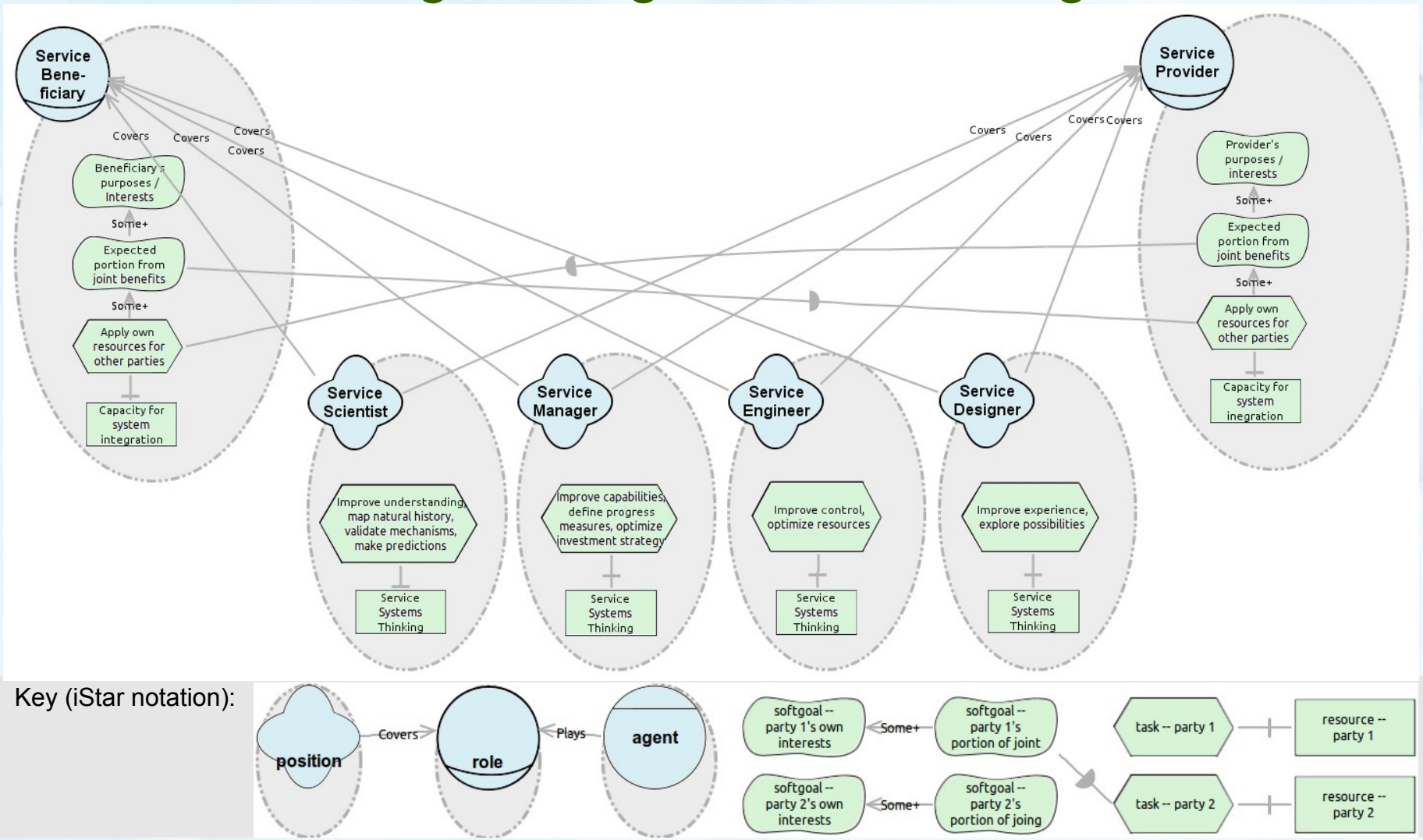
Agenda

1. What could Service Systems Thinking be?
2. Systems Thinking
3. SSMED
   (Service Systems, Management, Enginering and Design)
4. Generative Pattern Language
5. Multiple Perspectives Open Collaboration
6. Contexts that are coevolving?

Agenda

1. What could Service Systems Thinking be?
   - 1.1 An intentional representation
   - 1.2 An object-process representation
2. Systems Thinking
3. SSMED
   (Service Systems, Management, Enginering and Design)
4. Generative Pattern Language
5. Multiple Perspectives Open Collaboration
6. Contexts that are coevolving?

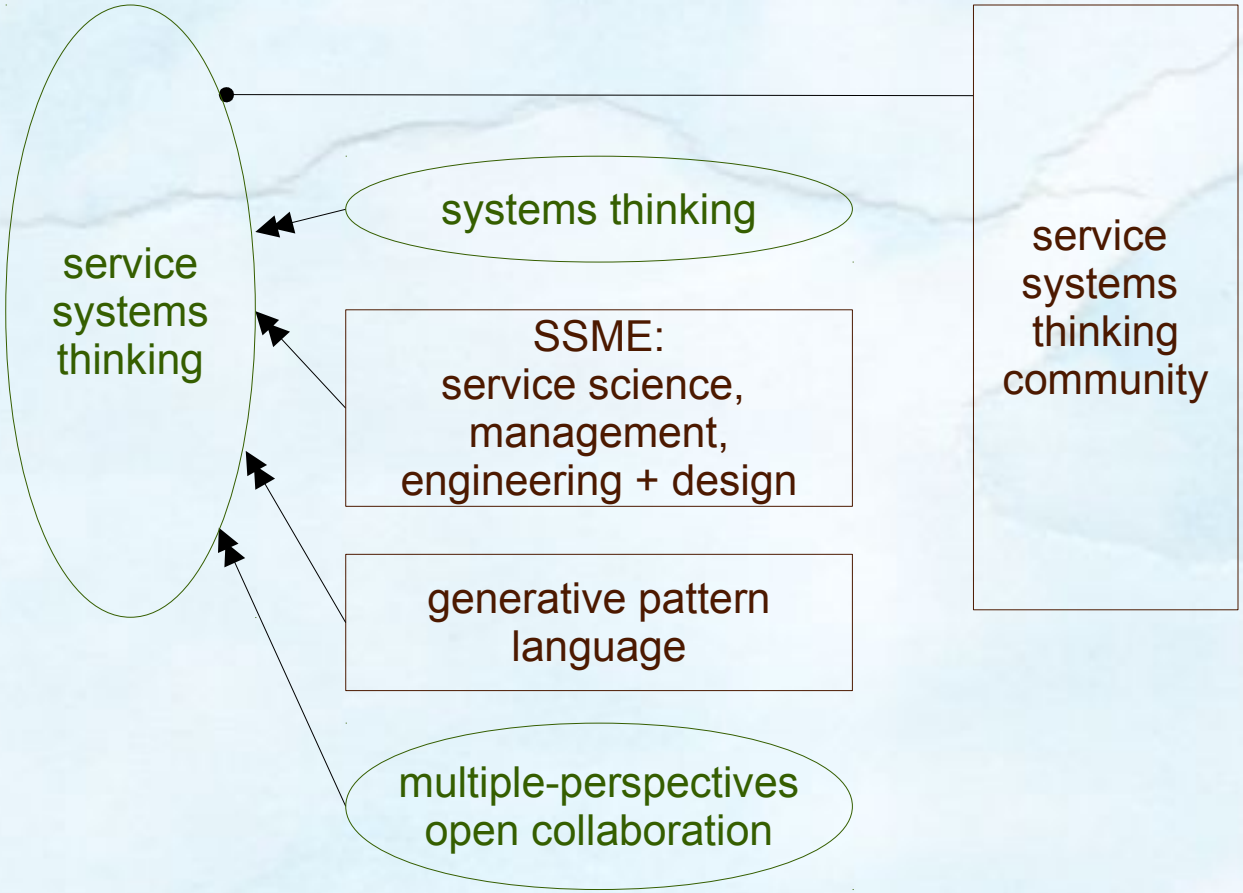
In an intentional representation, service systems thinking is a resource that can be applied by service scientists, managers, engineers and designers



In an object-process representation, service systems thinking is handled by a community

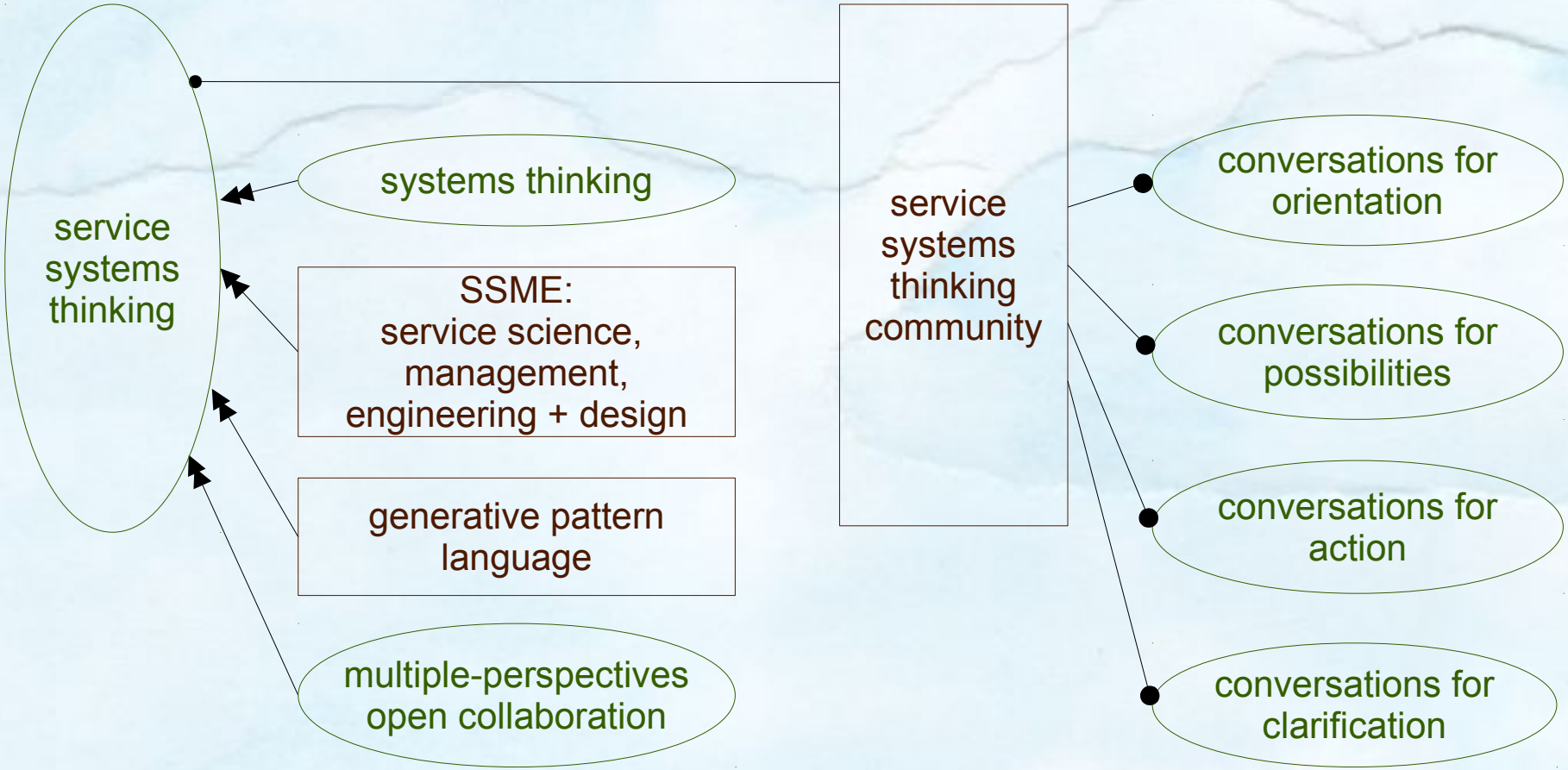
Key (OPM notation): object process agent handles process object is exhibited by (o or p) process is exhibited by (o or p)

Service systems thinking exhibits systems thinking, SSME, generative pattern language and multiple perspectives open collaboration



Key (OPM notation): object process agent handles process object is exhibited by (o or p) process is exhibited by (o or p)

Development within the community can be recognized as conversations: for orientation, for possibilities, for action, and for clarification



Key (OPM notation): object | process | agent handles process | object is exhibited by (o or p) | process is exhibited by (o or p)

Agenda

1. What could Service Systems Thinking be?
2. Systems Thinking
   - 2.1 Wholes and parts
   - 2.2 Evolving, learning
   - 2.3 The anthropocene
3. SSMED
   (Service Systems, Management, Enginering and Design)
4. Generative Pattern Language
5. Multiple Perspectives Open Collaboration
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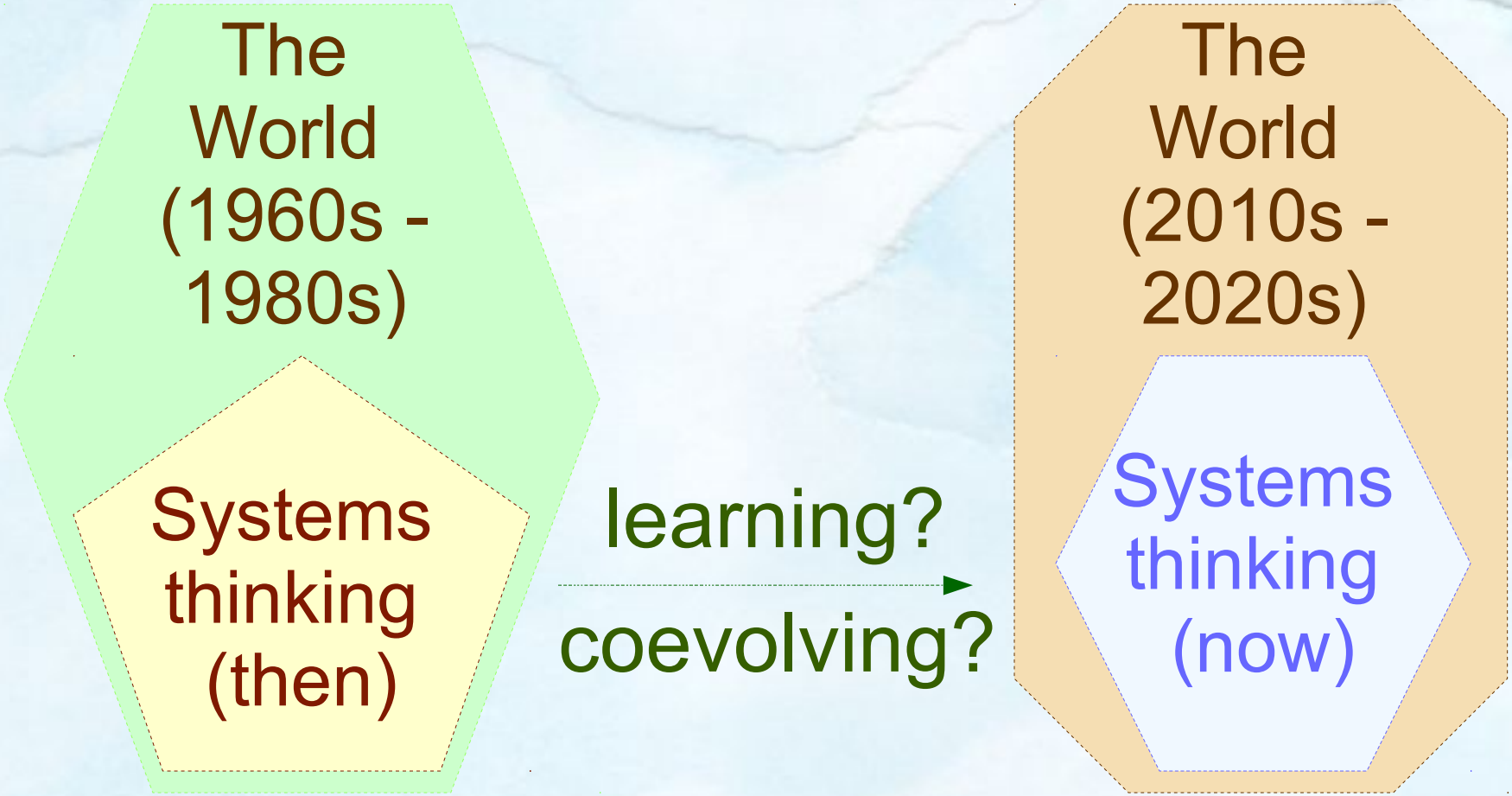
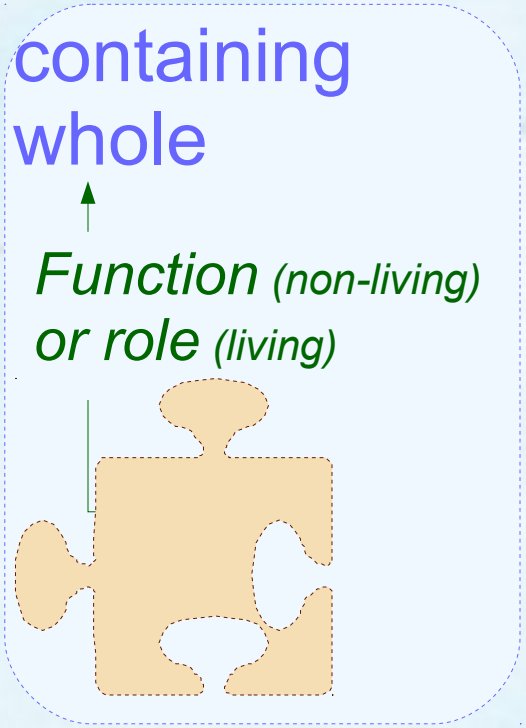
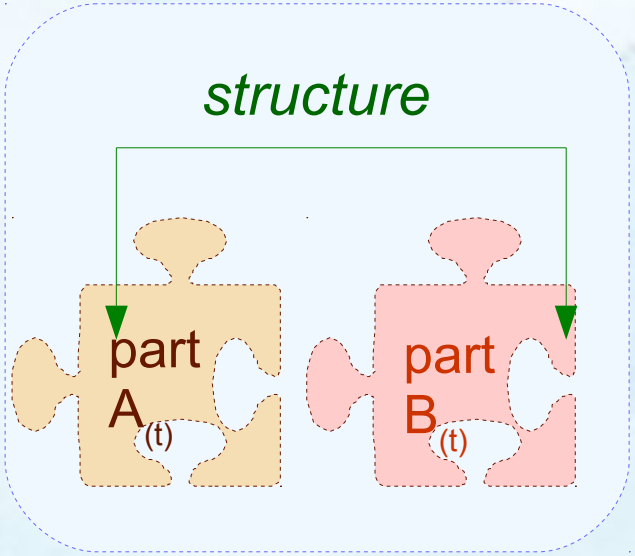
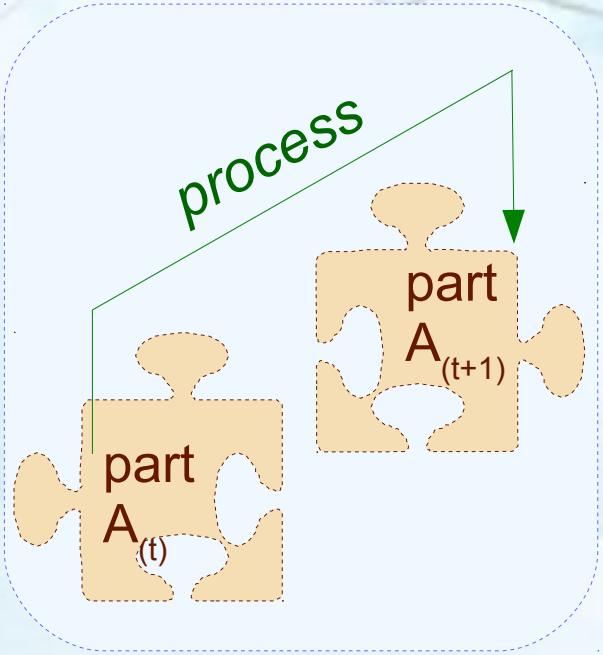
Is systems thinking *learning* and *coevolving* with the *world*?



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







Function
"contribution of the part to the whole"

Structure
"arrangement in space"

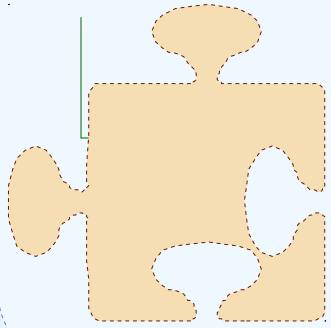
Process
"arrangement in time"

Source: 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. Gharajedaghi, Jamshid. 1999. *Systems Thinking: Managing Chaos and Complexity : A Platform for Designing Business Architecture. Elsevier*. http://books.google.ca/books?id=7N-sFxFntakC .

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

containing whole

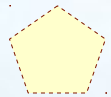
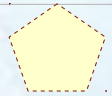
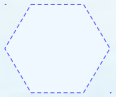
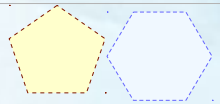
Function (non-living) or role (living)



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.

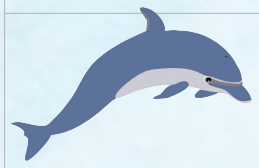
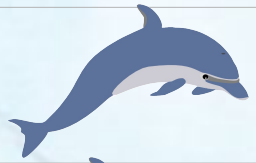
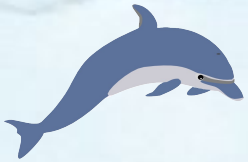
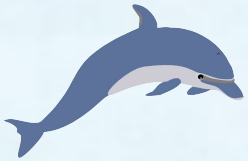
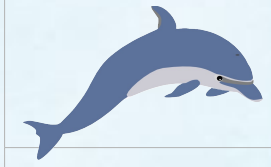
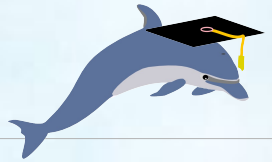
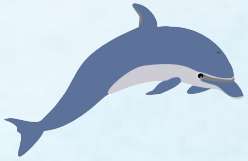
Source: Ackoff, Russell L. 1981. *Creating the Corporate Future: Plan or Be Planned For. New York:* John Wiley and Sons. http://books.google.com/books?id=8EEO2L4cApsC.

Types of systems and models
(Ackoff and Gharajedaghi 1996)

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.

Learning types (Bateson, 1972)

System	External event	Behavioral pattern	Type	Learning process
			**Learning 0** Specific response not subject to correction	No learning
			**Learning I** Change in specific response by correcting errors within a set of alternatives	Proto-learning
			**Learning II** Corrective change in set of alternatives, or in how sequence of experiences is punctuated	Deutero-learning
			**Learning III** Corrective change in *sets* of alternatives	Trito-learning
			**Learning IV** Phylogenesis (of tribe or species) with ontogenesis (of individual living being)	Genetic change

Lacking history to study organizational learning circa 1995, videos and book explored *How Buildings Learn*

1. How Buildings Learn - Stewart Brand - 1 of 6 -...
28,610 views • 2 years ago

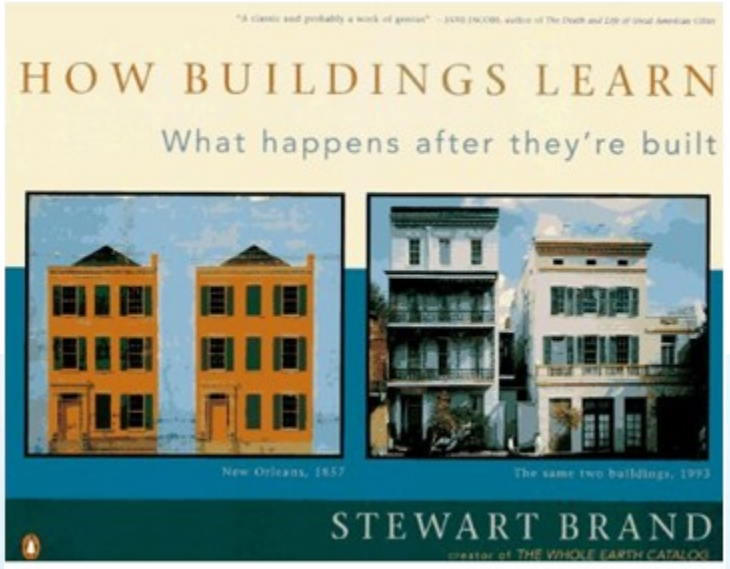
6. How Buildings Learn - Stewart Brand - 6 of 6 -...
10,888 views • 2 years ago

2. How Buildings Learn - Stewart Brand - 2 of 6 - "T...
8,386 views • 2 years ago

3. How Buildings Learn - Stewart Brand - 3 of 6 -...
7,432 views • 2 years ago

5. How Buildings Learn - Stewart Brand - 5 of 6 - "T...
4,345 views • 2 years ago

The Oak Beams of New College, Oxford
1,967 views • 2 years ago



Pacing layers emphasize coevolution and learning

SITE

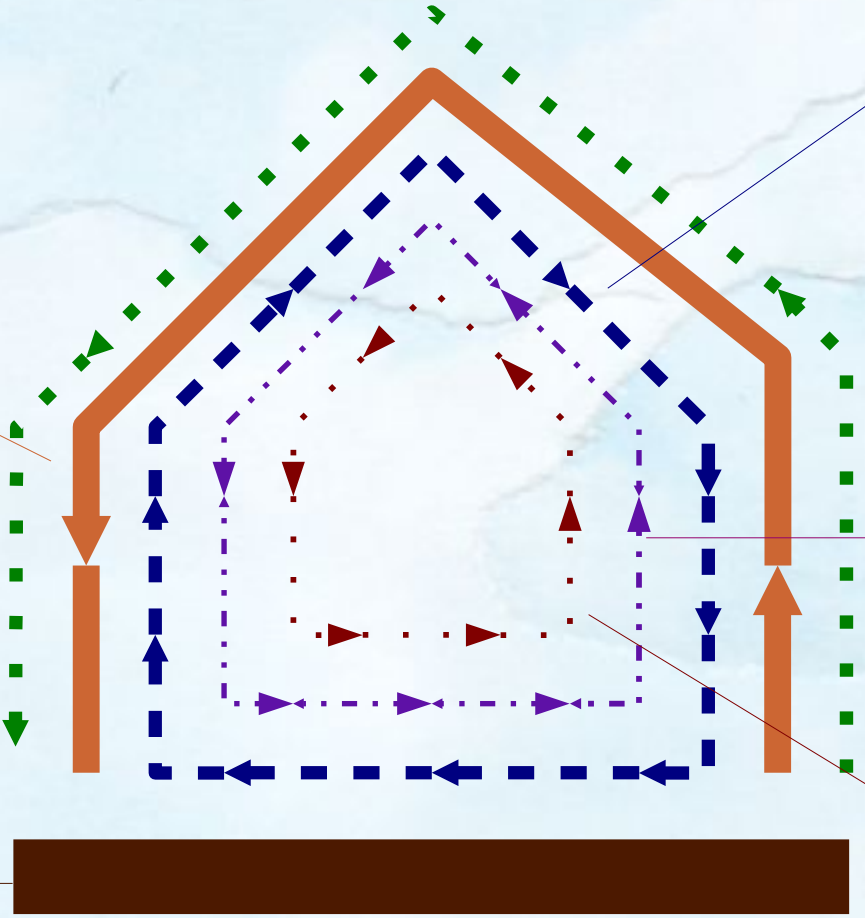
This is the geographical setting, the urban location, and the legally defined lot, whose boundaries outlast generations of ephemeral buildings. "Site is eternal", Duffy agrees.

STRUCTURE

The foundation and load-bearing elements are perilous and expensive to change, so people don't. These are the building. Structural life ranges from 30 to 300 years (but few buildings make it past 60, for other reasons).

SKIN

Exterior surfaces now change every 20 years or so, to keep up with fashion or technology, or for wholesale repair. Recent focus on energy costs has led to re-engineered Skins that are air-tight and better-insulated.



SERVICES

These are the working guts of a building: communications wiring, electrical wiring, plumbing, sprinkler system, HVAC (heating, ventilation, and air conditioning), and moving parts like elevators and escalators. They wear out or obsolesce every 7 to 15 years. Many buildings are demolished early if their outdated systems are too deeply embedded to replace easily.

SPACE PLAN

The interior layout, where walls, ceilings, floors, and doors go. Turbulent commercial space can change every 3 years; exceptionally quiet homes might wait 30 years.

STUFF

Chairs, desks, phones, pictures; kitchen appliances, lamps, hair brushes; all the things that twitch around daily to monthly. Furniture is called mobilia in Italian for good reason.

Source: Stewart Brand. 1994. *How Buildings Learn: What Happens after They're Built*. New York: Viking.

Innovation (Drucker, 1992)

Innovation depends rather of what we might call "organized abandonment."

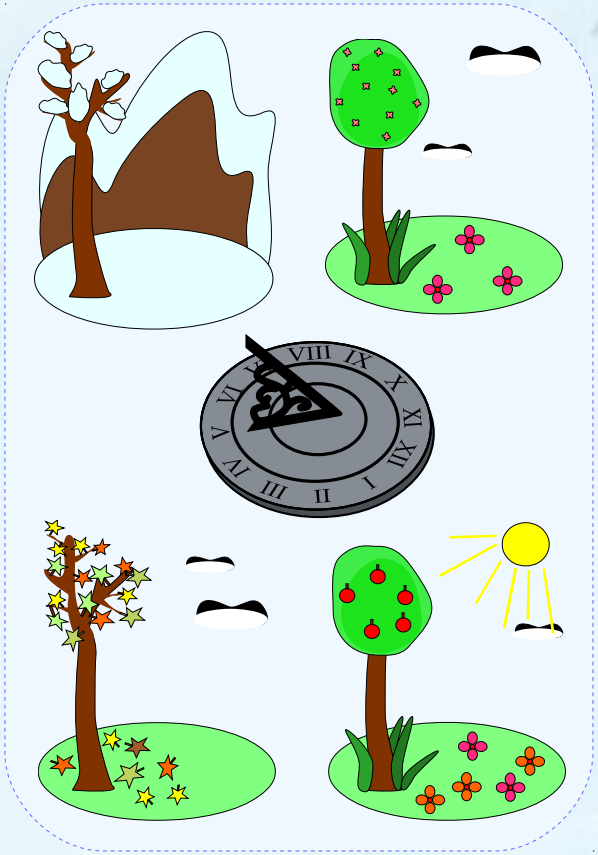
To get at the new and better, you have to throw out the old, outworn, obsolete, no longer productive, as well as the mistakes, failure, and misdirections of efforts of the past.

Think of the old medical saying: "As long as the patient eliminates there is a chance. But once the bowels and the bladder stop, death does not take long."

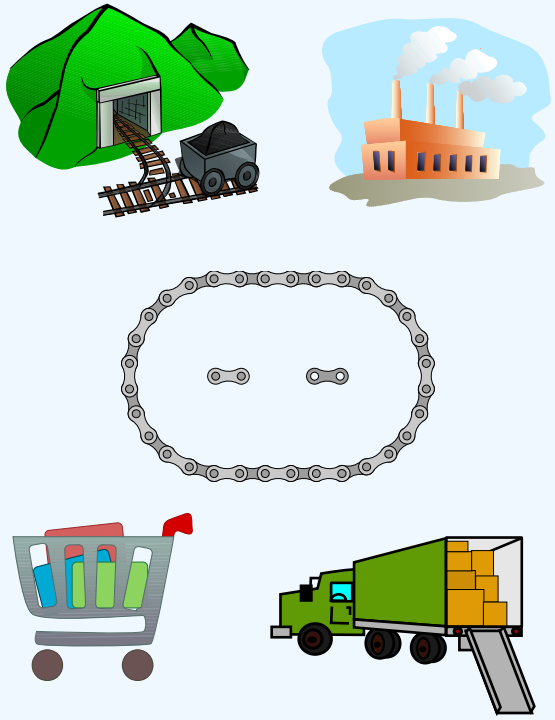
Agenda

1. What could Service Systems Thinking be?
2. Systems Thinking
3. SSMED
   (Service Systems, Management, Enginering and Design)
   - 3.1 Service systems (science)
   - 3.2 Systems of systems
   - 3.3 Dynamic value
4. Generative Pattern Language
5. Multiple Perspectives Open Collaboration
6. Contexts that are coevolving?

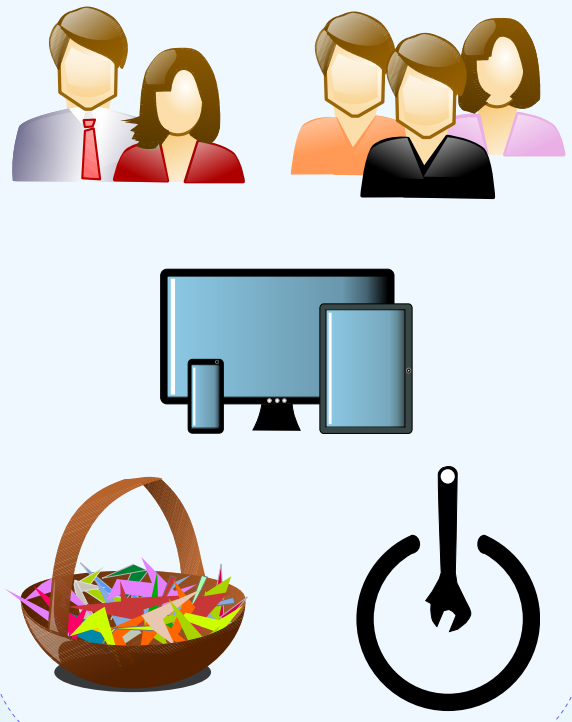
Is thinking different across agricultural systems, industrial systems, and service systems?



Agricultural Systems



Industrial Systems



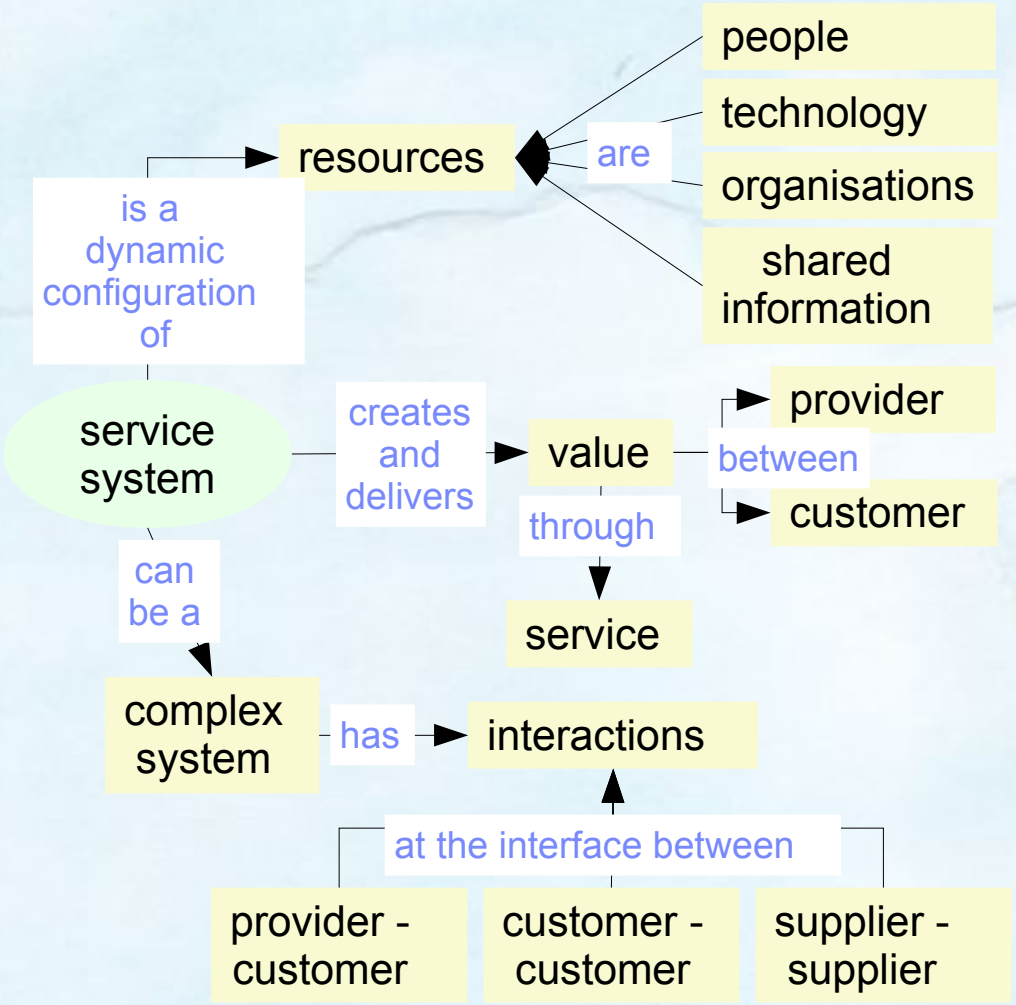
Service Systems(?)

Service systems in our society can be ranked from concrete to abstract, as subjects for schoolchildren

Systems that move, store, harvest, process	• Transportation	K
	• Water and waste management	1
	• Food and global supply chain	2
	• Energy and energy grid	3
	• Information and communications (ICT) infrastructure	4
Systems that enable healthy, wealthy and wise people	• Building and construction	5
	• Banking and finance	6
	• Retail and hospitality	7
	• Healthcare	8
	• Education (including universities)	9
Systems that govern	• Government (cities)	10
	• Government (regions / states)	11
	• Government (nations)	12

Source: Spohrer, James C., and Paul P. Maglio. 2010. “Toward a Science of Service Systems: Value and Symbols.” In Service Science: Research and Innovations in the Service Economy, edited by Paul P. Maglio, Cheryl A. Kieliszewski, and James C. Spohrer, 157–94. 10.1007/978-1-4419-1628-0_9

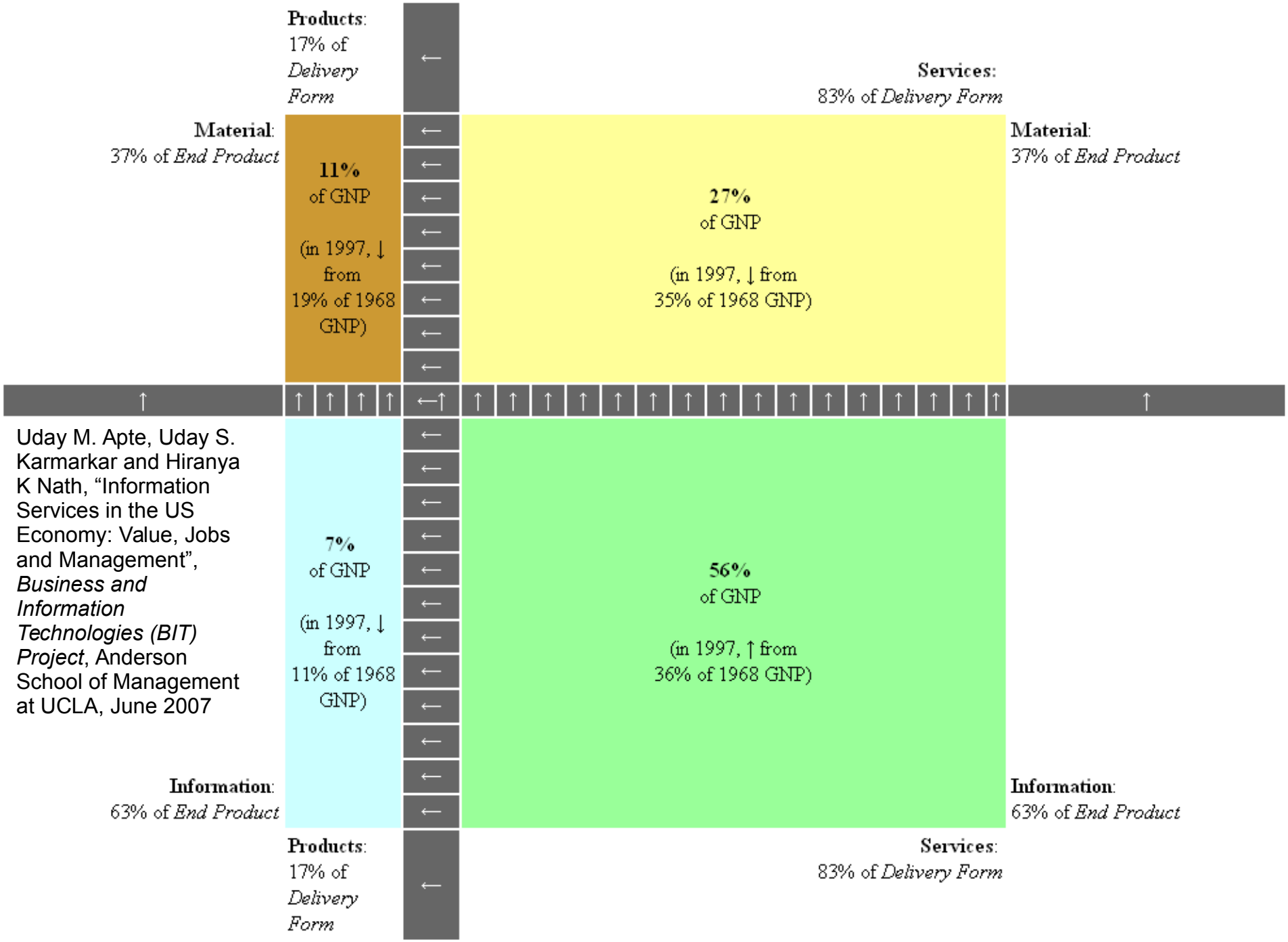
Service systems (Cambridge IfM and IBM, 2008)



A service system can be defined as a dynamic configuration of resources (people, technology, organisations and shared information) that creates and delivers value between the provider and the customer through service.

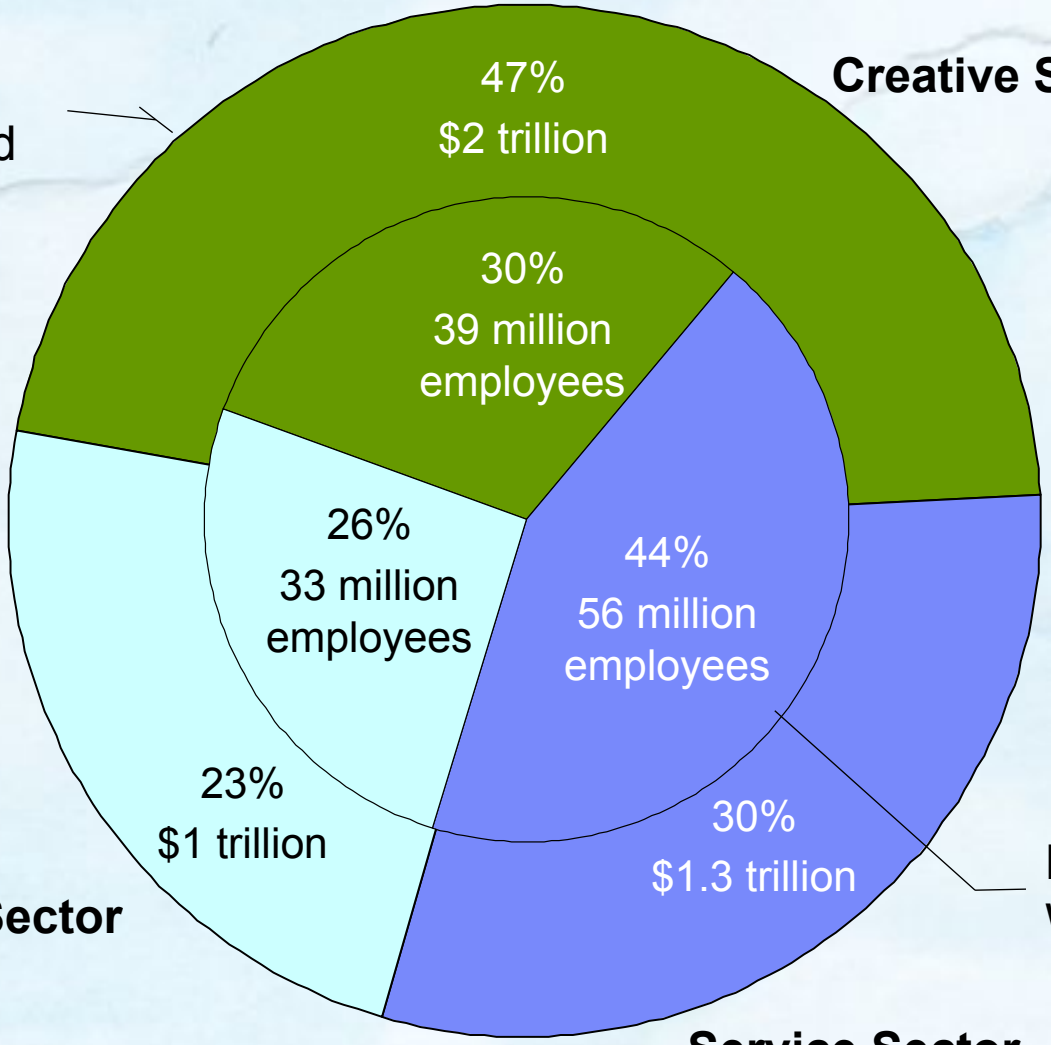
In many cases, a service system is a complex system in that configurations of resources interact in a non-linear way. Primary interactions take place at the interface between the provider and the customer. However, with the advent of ICT, customer-to-customer and supplier-to-supplier interactions have also become prevalent. These complex interactions create a system whose behaviour is difficult to explain and predict.
(IfM and IBM, 2008, p. 6)

Source: IfM, and IBM. 2008. *Succeeding through Service Innovation: A Service Perspective for Education, Research, Business and Government.* Cambridge, UK: University of Cambridge Institute for Manufacturing. http://www.ifm.eng.cam.ac.uk/ssme/ .



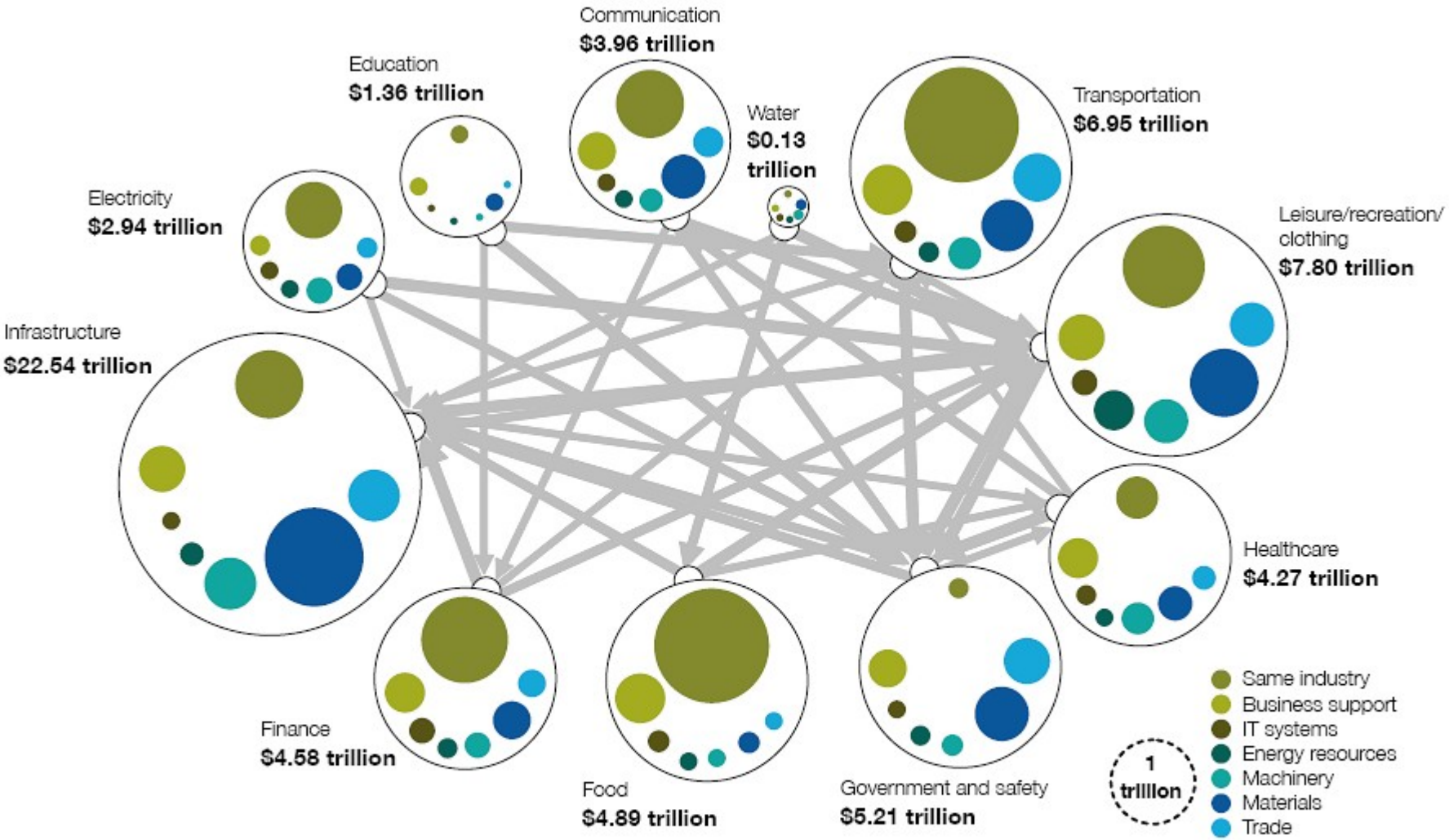
Uday M. Apte, Uday S. Karmarkar and Hiranya K Nath, "Information Services in the US Economy: Value, Jobs and Management", *Business and Information Technologies (BIT) Project*, Anderson School of Management at UCLA, June 2007

Creative class generates greater wealth per employee



Source:
Richard L. Florida (2004) *The flight of the creative class : The new global competition for talent.*

US$54 trillion system of systems -- IBM

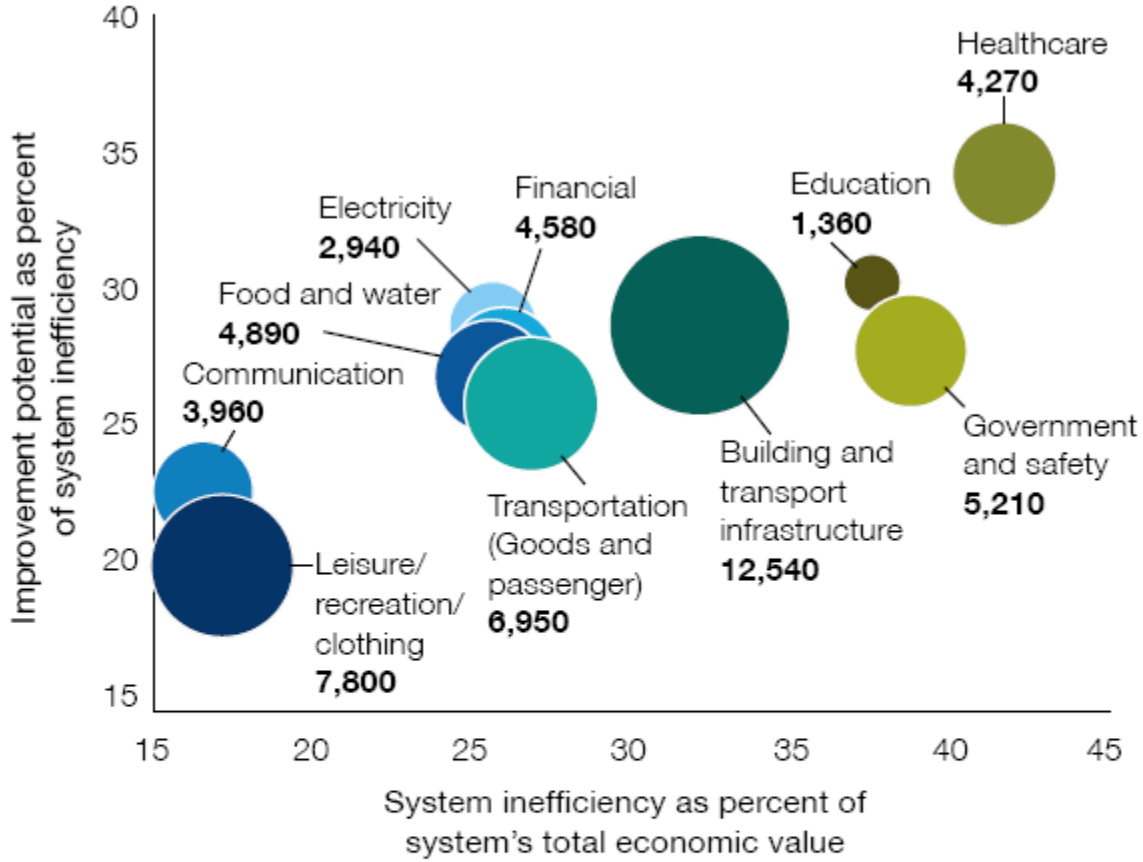


http://www-935.ibm.com/services/us/gbs/bus/html/ibv-smarter-planet-system-of-systems.html.

Note: Size of bubbles represents systems' economic values. Arrows represent the strength of systems' interaction.
Source: IBM Institute for Business Value analysis of Organisation for Economic Co-operation and Development (OECD) data.

Figure 1: We live and work within a complex, dynamic and interconnected US$54 trillion system of systems.

The world's $4 billion challenge -- IBM



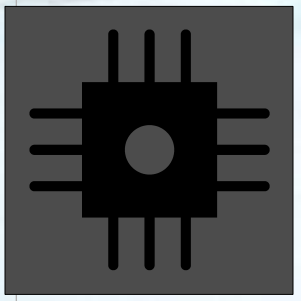
Note: Size of the bubble indicates absolute value of the system in US$ billions
Source: IBM Institute for Business Value analysis based on inefficiency and improvement potential estimates reported during 2009 survey of 518 economists.

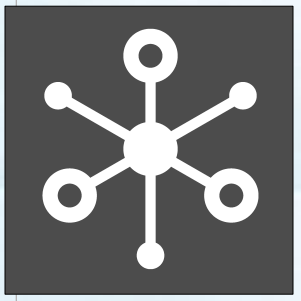
http://www-935.ibm.com/services/us/gbs/bus/html/ibv-smarter-planet-system-of-systems.html.

Figure 2: Of the US$15 trillion in inefficiencies within our global system, approximately US$4 trillion could be eliminated.

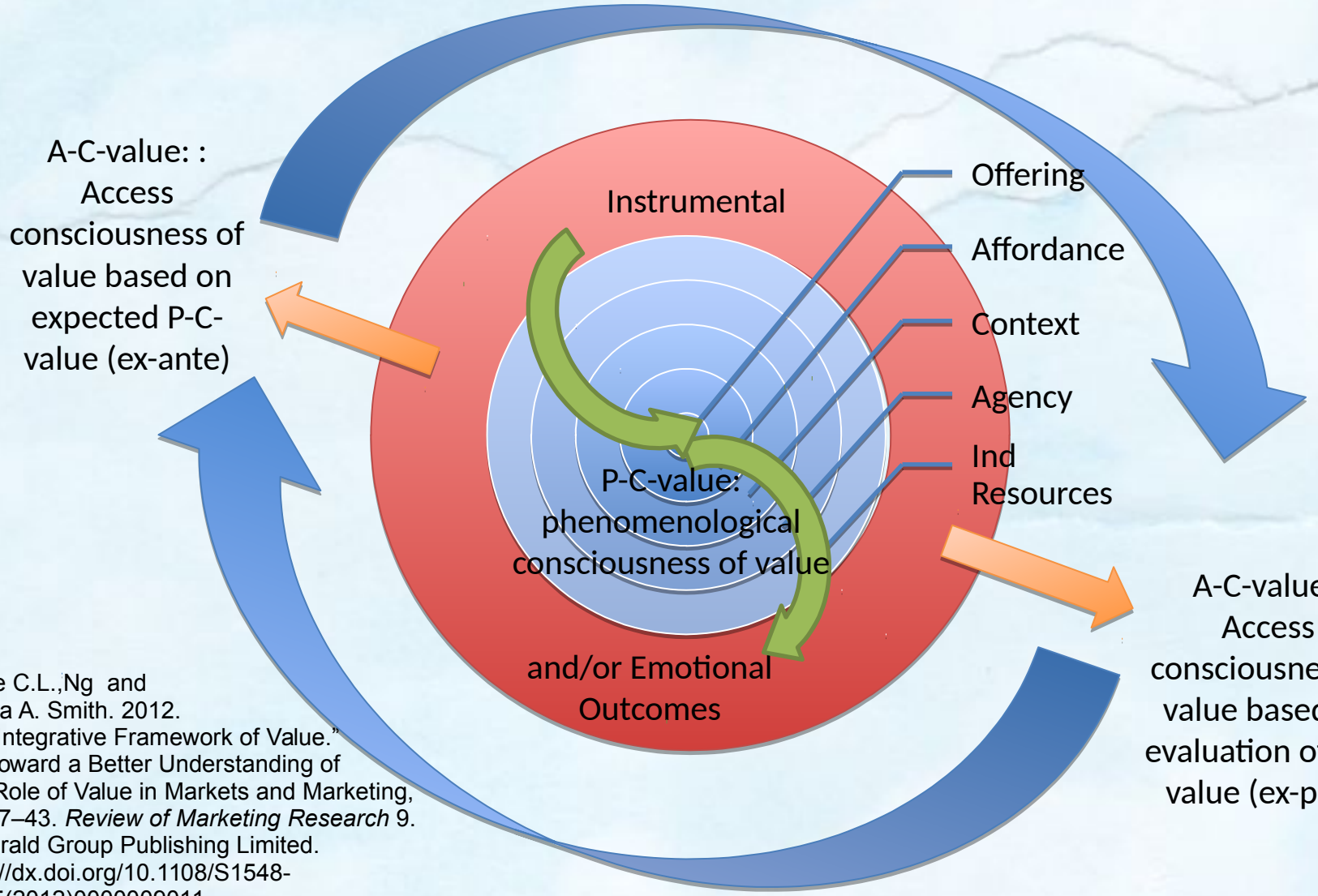
The unobservable becoming observable

Pre-digital physical infrastructure	*Converging physical and digital infrastructure*
World as invisible or unobserved	Our world is becoming INSTRUMENTED
Analog / synchronous connections, person-to-person and machine-to-machine	Our world is becoming INTERCONNECTED
Things as dumb or unresponsive to interaction	Virtually all things, processes and ways of working are becoming INTELLIGENT



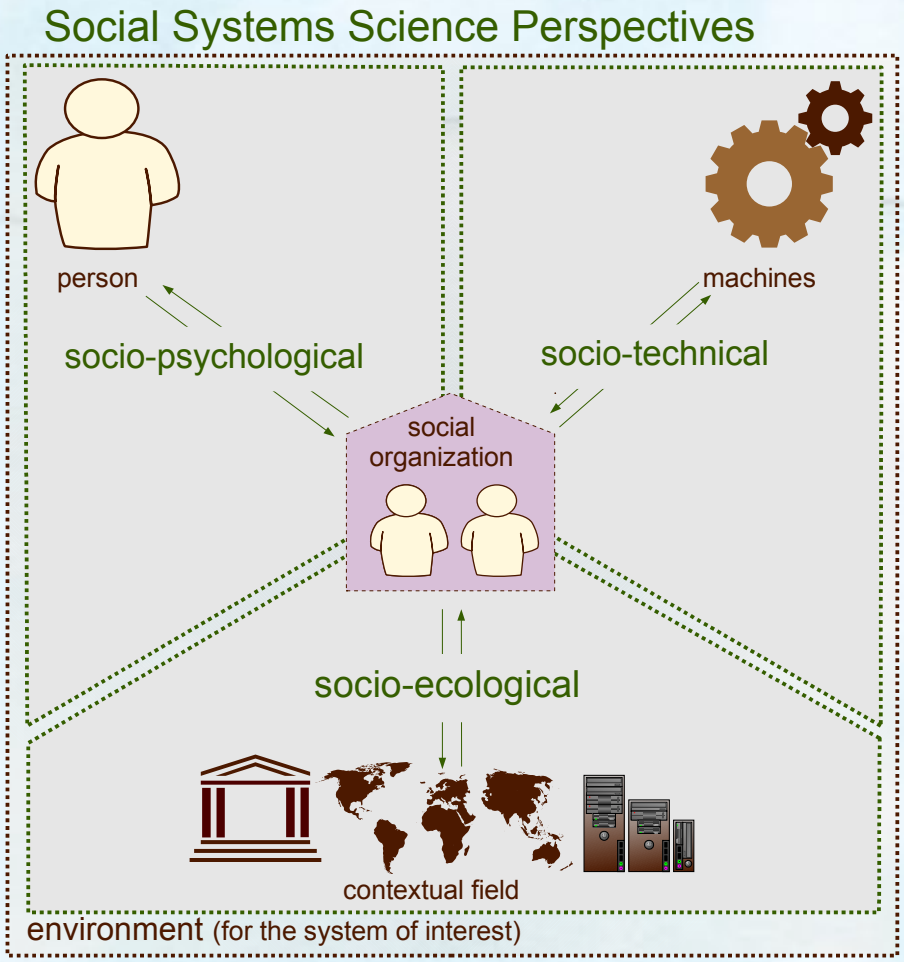


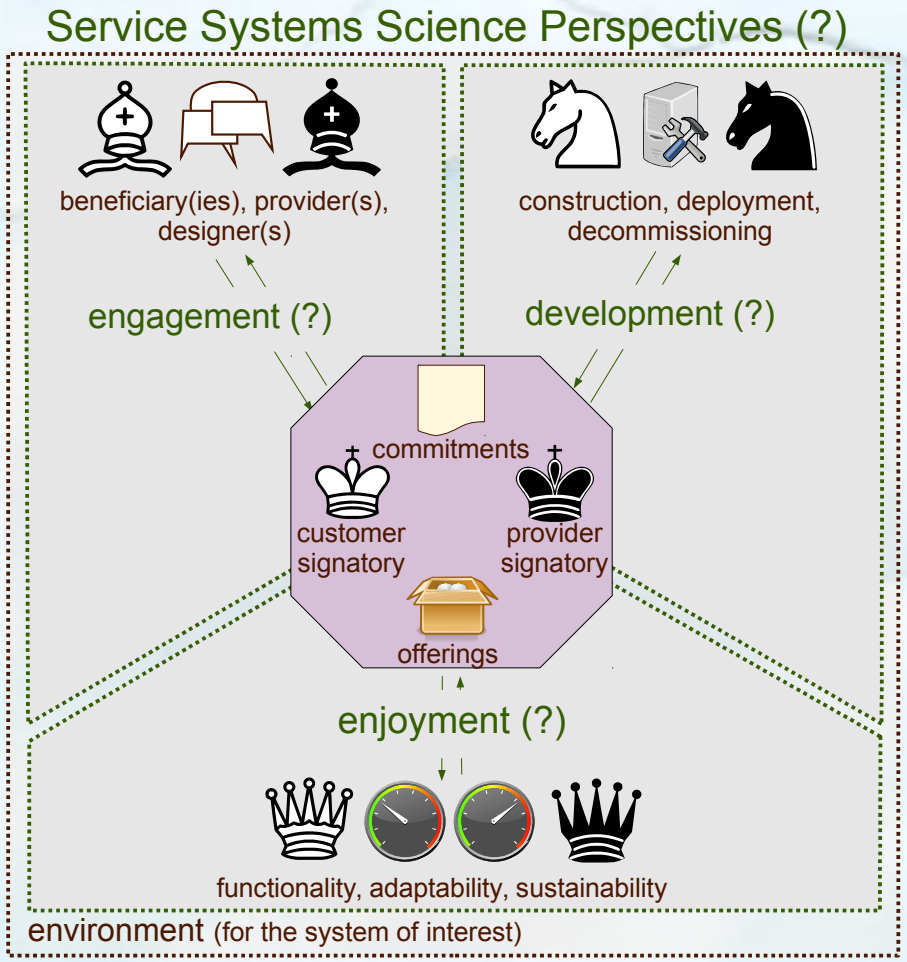
Value is dynamic, with access consciousness ex-ante and ex-post, and phenomenological consciousness in lived experience



Irene C.L.,Ng and Laura A. Smith. 2012. "An Integrative Framework of Value." In Toward a Better Understanding of the Role of Value in Markets and Marketing, 9:207–43. *Review of Marketing Research* 9. Emerald Group Publishing Limited. http://dx.doi.org/10.1108/S1548-6435(2012)0000009011.

Can we build on Social Systems Science towards a new Service Systems Science?





Agenda

1. What could Service Systems Thinking be?
2. Systems Thinking
3. SSMED
   (Service Systems, Management, Enginering and Design)
4. Generative Pattern Language
   - 4.1 Wholeness (Quality without a name)
   - 4.2 Unfolding
   - 4.3 The Eishin campus project
5. Multiple Perspectives Open Collaboration
6. Contexts that are coevolving?

“Would you choose the service system on the left or the service system on the right?” echoes Alexander's carpets

The Berlin prayer rug

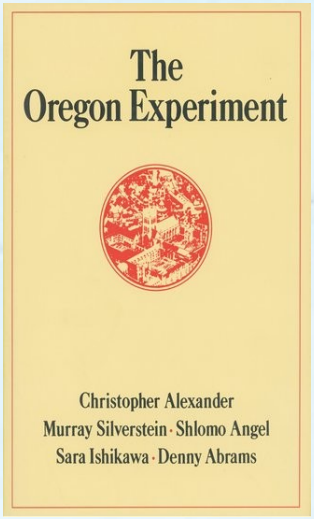
Well known Kazak from Tschebull collection

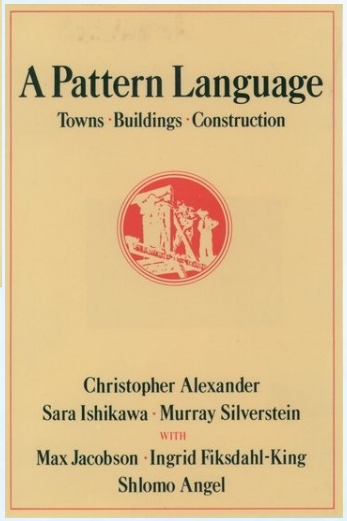
If you had to choose one of these two carpets, as a picture of your own self, then which one of the two carpets would you choose? [p.28]

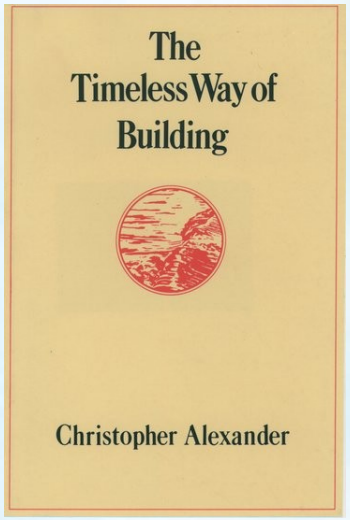
In case you find it hard to ask the question, let me clarify by asking you to choose the one *which seems better able to represent your whole being, the essence of yourself, good and bad, all that is human in you*. [p..29]

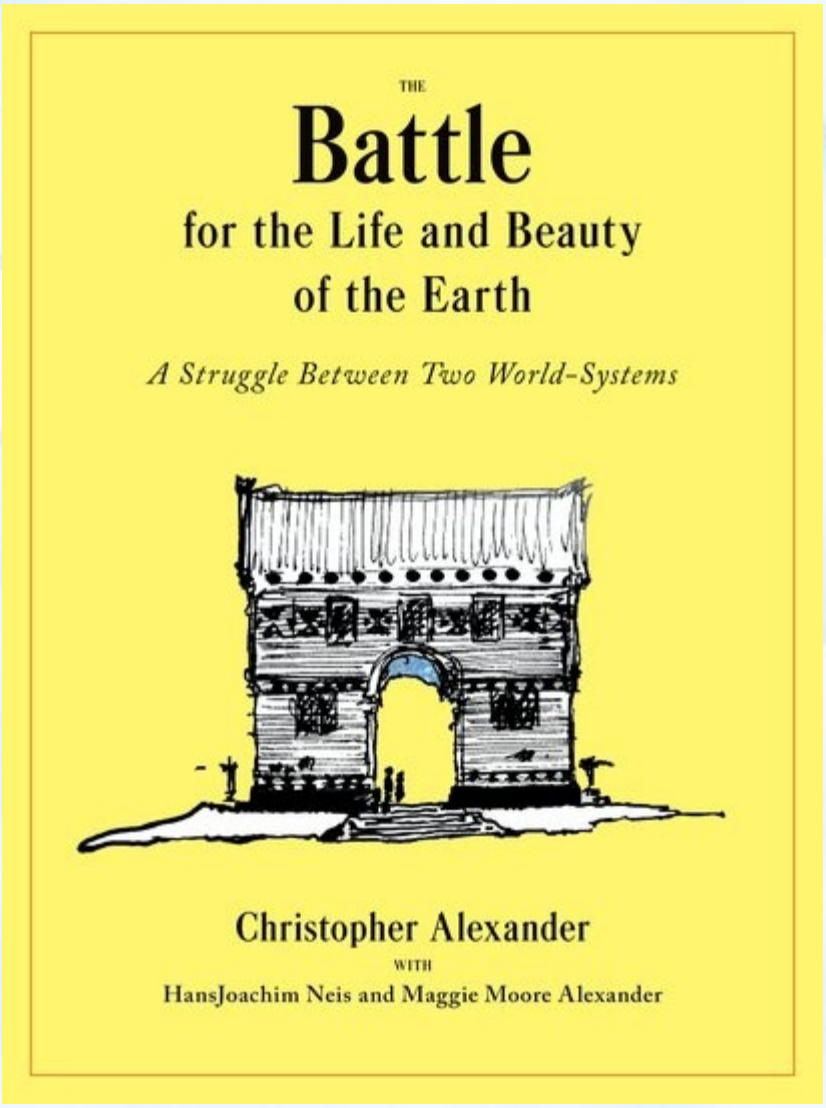
Christopher Alexander, *A foreshadowing of 21st century art – The color and geometry of very early Turkish carpets* (1993)

The writing of 1975-1979 by Alexander was prescriptive; the 2012 is reflections on practice









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 up 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

127 INTIMACY GRADIENT**

. . . 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.

* * *

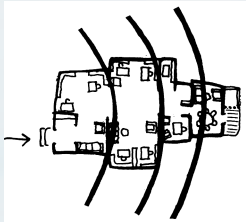
Unless the spaces in a building are arranged in a sequence which corresponds to their degrees of privateness, the visits made by strangers, friends, guests, clients, family, will always be a little awkward.

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.

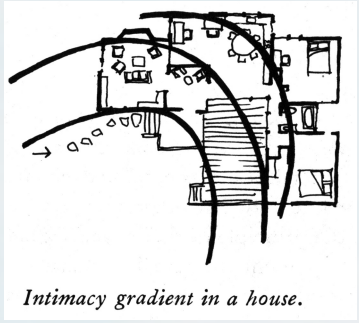
In an office the sequence might be: entry lobby, coffee and reception areas, offices and workspaces, private lounge.



Office intimacy gradient.

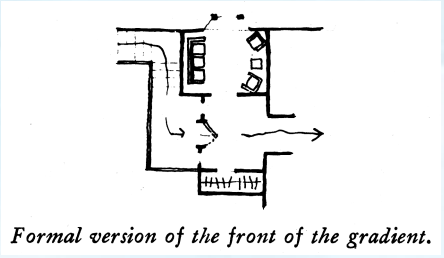
In a small shop the sequence might be: shop entrance, customer milling space, browsing area, sales counter, behind the counter, private place for workers.

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**

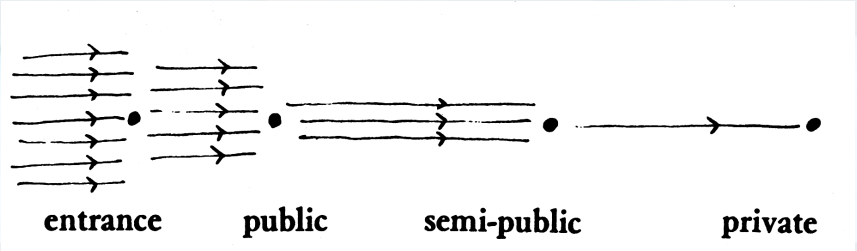
. . . if you know roughly where you intend to place the building wings -- WINGS OF LIGHT (107), and how many stories they will have -- NUMBER OF STORIES (96), and where the MAIN ENTRANCE (110) is, it is time to work out the rough disposition of the major areas on every floor. In every building the relationship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

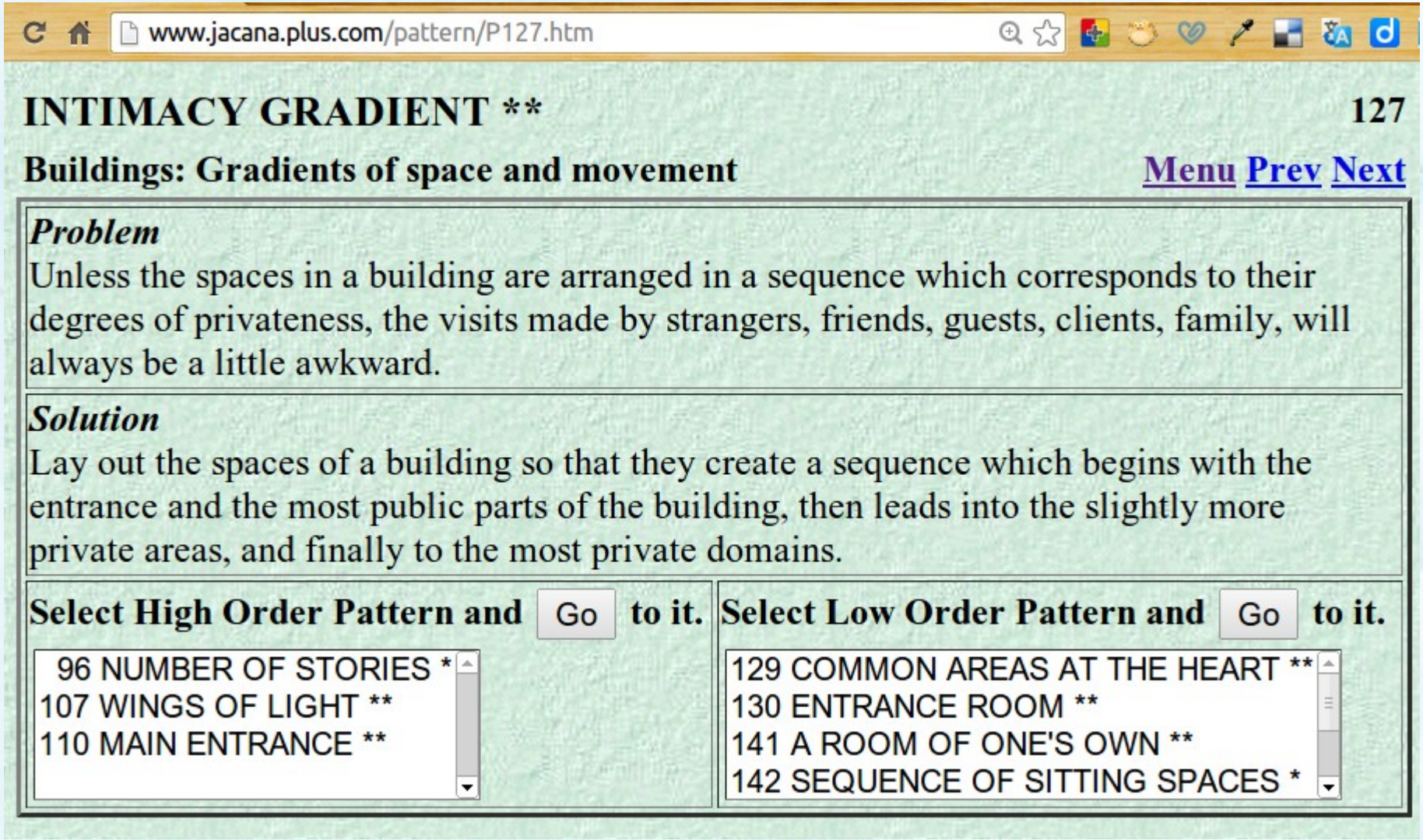


* * *

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.-

127 INTIMACY GRADIENT**



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

August 26, 2004

Intimacy Gradient and Other Lessons from Architecture

A number of my posts have been about integrating different domai
understand how human behavior should be incorporated in the des
Dunbar Number in sociology, and both Four Kinds of Privacy and F
work in the cryptography field. The topic of this post comes from th

In order to provide for Progressive Trust, you need to establish wh
Gradient".

The concept of Intimacy Gradient comes from architect Christophe
Language: Towns, Buildings, Construction. (Oxford University Pres

> *Pattern #127 - Intimacy Gradient:*
>
> ***Conflict:*** *Unless the spaces in a building are arranged in
> corresponds to their degrees of privateness, the visits ma
> guests, clients, family, will always be a little awkward.*
>
> ***Resolution:*** *Lay out the spaces of a building so that they
> begins with the entrance and the most public parts of the
> slightly more private areas, and finally to the most private*

In architecture there are always some areas of the house or buildir
entry, the living room, the atrium, etc., and areas that are more pri
bedrooms, and offices. In a good design there is some marker of c
areas -- it might be a difference in ceiling height, a stairway leading
entrance. As an example, in the classical Japanese tea house, you

Failure to respect the Intimacy Gradient results in uncomfortable b
about a Frank Gehry building at Case Western Reserve University:

> *I asked many of the graduate students how they felt abou
> "Horrible," said one. "Like living in a refrigerator" said ano
> comfortable offices and gathering places, and had the mo
> Now everything is so sterile, and the acoustics so bad, tha
> together. I have to go outside if I want any privacy."*

The Intimacy Gradient is also used in other media. As I noted in my
Hand Circus:

> *When we arrived, we were led down the side of the theatr
> noticed that it looked like we were all being led backstage
> a sudden see an entrance -- maybe 5 foot tall requiring m
> through and to our surprise, we are have walked through*

The Intimacy Gradient is also used in other media. As I noted in my review of Seven Fingers of the Hand Circus:

> *When we arrived, we were led down the side of the theatre and all of a sudden I noticed that it looked like we were all being led backstage. We curve around and all of a sudden see an entrance -- maybe 5 foot tall requiring most of us to duck. We duck through and to our surprise, we are have walked through a fridgerator, and we are on the stage!*
>
> *One of the 7 players welcomes us, and another offers random people a glass of tea as we walk across the stage to our seats. The stage is set like a city loft, with a tv, some couches, a bed, a bathtub and shower, a kitchen, and of course the fridgerator we entered through. On the stage, and chatting to members of the audience are the 7 cast members, all wearing comfortable looking white shorts or athletic and white t-shirts.*
>
> *The audience arrives over 30 minutes and the 7 players act as if we are guests of their loft, serving some of us tea, chatting, sweeping the floor, etc.*

Entering through the refrigerator door raised the intimacy of the experience for the audience of that circus. Thus in spite of it being produced in a large auditorium it felt as up-close and personal as did the much smaller Circus Contraption.

The Intimacy Gradient exists in movies as well -- anywhere you see a scene taking place in a public space that transitions down through smaller and tighter shots ultimately to a closeup of a face it is much more intimate then just cutting to the closeup.

In social software design, there also needs to be an Intimacy Gradient. One of the problems with Wikis is that there is often very little transition between public and intimate, and doing so can be quite jarring. SocialText, a Wiki service vendor, is aware of this problem and is "seeking to add more layers to the 'intimacy gradient', without recreating the highly structured collaboration tools that exist today". Ross Mayfield outlines this possible future Intimacy Gradient for SocialText:

- *The broadest tier is a guest space, available to all*
- *The second tier is a knowledgebase, accessible to all employees and contractors*
- *The third tier is product development, for employees and contractors bound by a confidentiality agreement*
- *The fourth tier is for the core management team to share confidential financial and HR information.*

Can we make better service systems, learning inductively from architecting built environments?

Deduction == (1) rule, (2) case, (3) result;
Induction == (1) case, (2) result, (3) rule;
Abduction == (1) result, (2) rule, (3) case.
From Charles S. Peirce via Barbara Minto. 1976.
The Pyramid Principle: Logic in Writing and Thinking.

(3) Rule:
A service system can be enjoyed by a variety of parties with value(s) unfolding over time

(2) Result:
Engaging with service systems can be reframed as experiences in places, spaces and paces

(1) Case:
Approaching the Eishin campus as a service system appreciates the practices of Christopher Alexander in creating a pattern language and combining systems of centers.

An *unfolding* is a process which gets you from one stage or moment of development to the next moment of development, in the evolution of a neighborhood or in the evolution of a building

1. An unfolding is a dynamic configuration that acts to generate form.
2. An unfolding arises from the particular whole in which it is forming. It is shaped by the whole, and acts upon the whole, and causes the rebirth of the whole.
3. An unfolding is by its nature personal, and requires human input and human feeling from the people doing the work, as an essential part of its contribution to the formation of the environment.

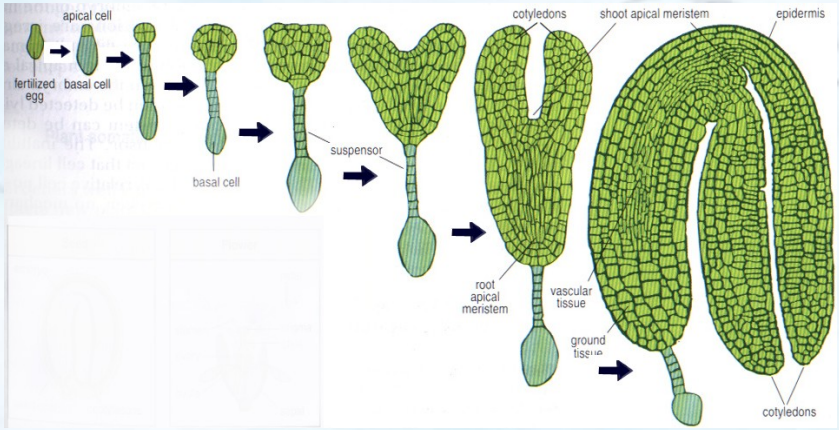
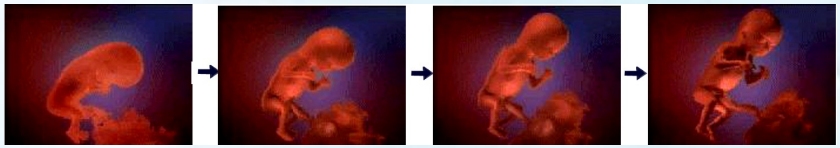
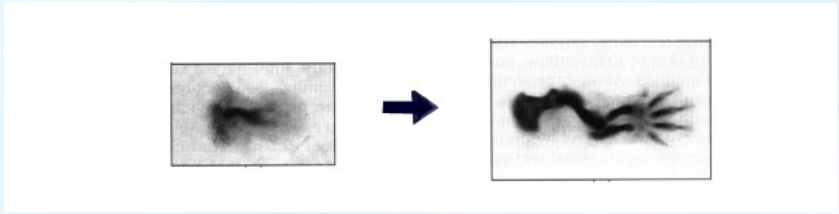


Diagram of a typical angiosperm (flowering plant) unfolding



Photographs of a human embryo unfolding



Two photographs, three days apart, of a mouse foot unfolding

It is helpful to compare such unfoldings with similar phenomena in plant morphogenesis and embryology. Both in the angiosperm shown below, and in the embryo shown beneath it, you can picture each unfolding as a limited and brief process which in the first one gradually shapes the seed, and in the second, takes the blur that is the beginning of a hand in the embryo, to the next stage of development where the hand gets its first outline fingers.

Adapted from Christopher Alexander, “What is an unfolding?” at http://www.livingneighborhoods.org/ht-0/whatisanunfolding.htm

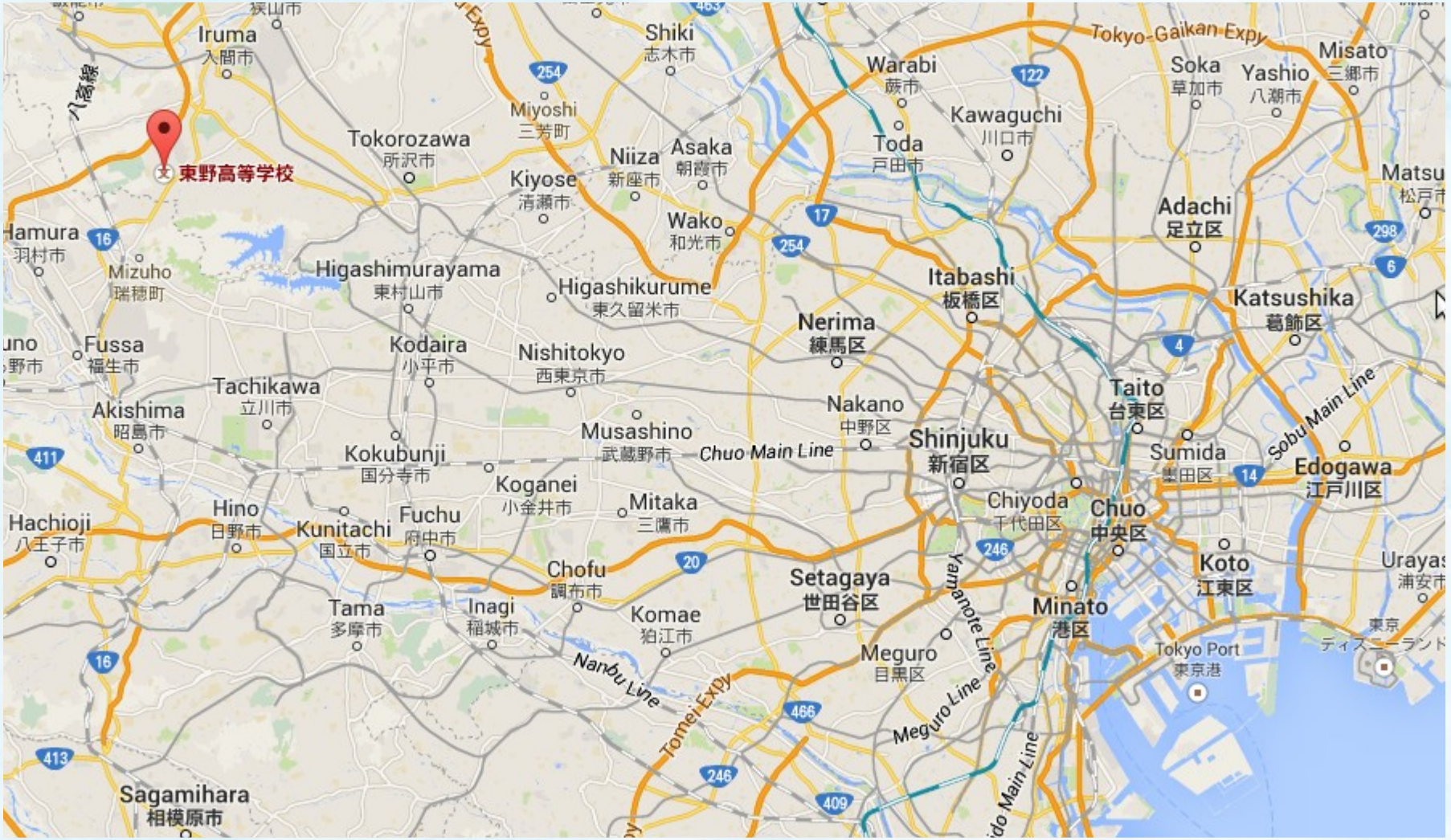
学校法人 盈進学園 東野高等学校

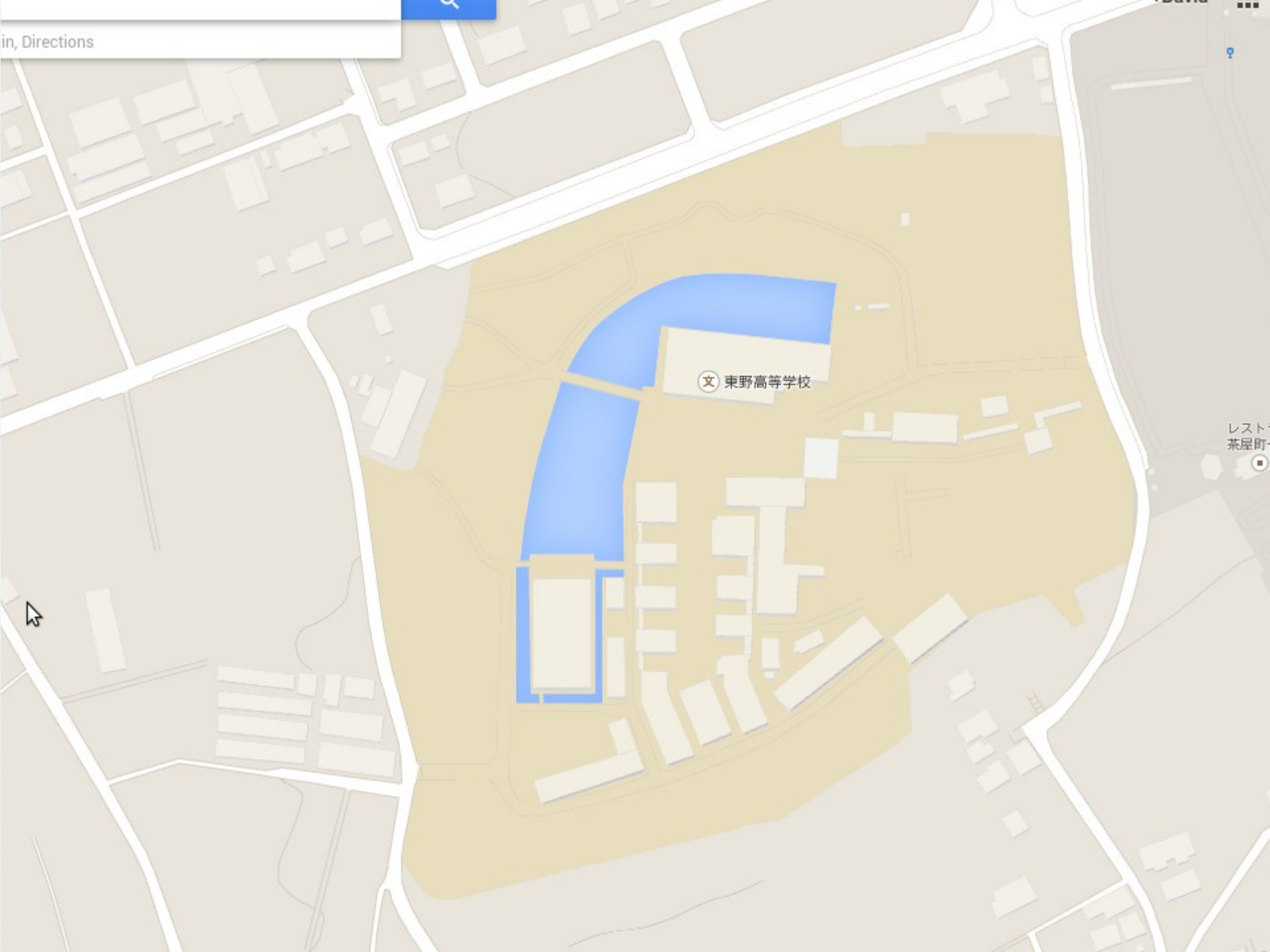
入試関連情報 | 保護者の方々へ

HOME | CURRENT NEWS | ABOUT HIGASHINO | ACADEMICS | GUIDANCE | ACTIVITIES & ANNUAL EVENTS | ADMISSIONS

twitter 犬猿の仲印パからノーベル平和賞受賞者。17歳のマララさんについて「テロリストが最も恐れるのは『教科書を持った少女』だ」と潘基文氏。＜ペンは剣より強し＞

The site originally was tea fields in Iruma, Saitama prefecture, northwest of Tokyo

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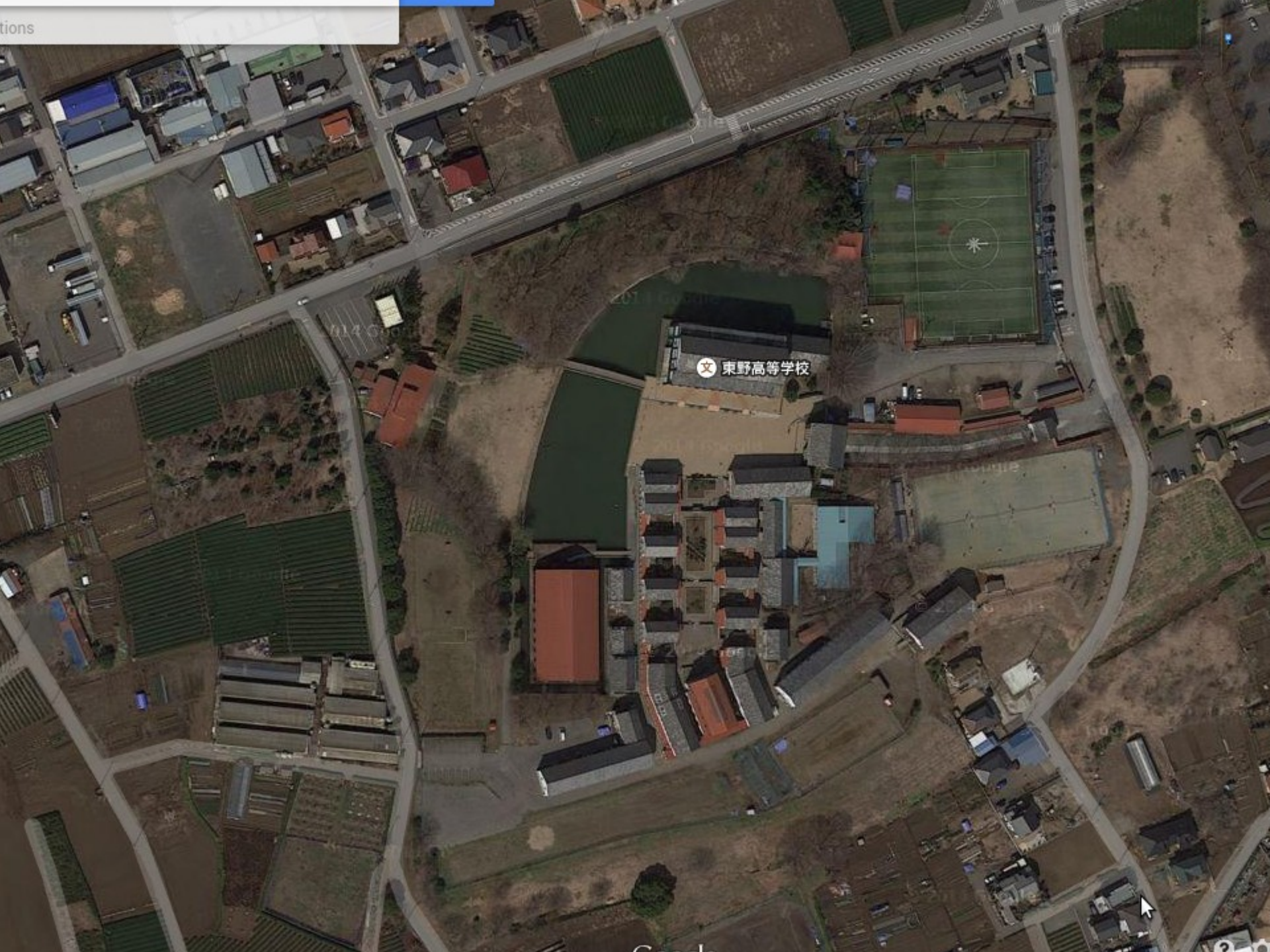

東野高等学校

The practices employed on the 1985 Eishin project can be traced with 8 activities

1. Interview on hopes and dreams
2. Make a “poetic vision” as first sketch of a pattern language
3. Make the rudimentary pattern language physically coherent
4. Refine the language through discussions
5. Obtain approval of the pattern language
6. Renegotiate pattern language with space and money within budget
7. Find systems of centers in (i) the notions in people's minds, and (ii) the places in the land. Combine them.
8. Adjust the site plan on the site itself (not on models)

(1) Interview on hopes and dreams

Our work on the Eishin project began, as promised in the contract, with the construction of a pattern language. We spent four to five months engaging students, teachers and administrators in creating this new pattern language, which would spring from their hopes and dreams as well as from the land itself.

The very first thing we did was spend two weeks just talking to different teachers and students, to get a feeling for their hopes and dreams. These talks were one-on-one and often lasted about an hour, for any one interview, during which we asked questions, talked, probed, explored dreams of an ideal campus, and tried to understand each person's deepest visions as a teacher, or as a student. We asked people about their longings, and their practical needs. We asked them to close their eyes and imagine walking about in the most wonderful campus they could imagine. [Alexander (2012) p. 117]

Examples of People's Dreams

Here are a few examples of the dreams of teachers that, with many others, formed the base for our first rough Pattern Language draft.

"The main entrance is critical to the character of the whole campus, its placement on the edge of the site must be done with great care. I see the main entrance as a gate, where I can greet students and teachers in the morning."

"I see the new campus surrounded by some fence or wall."

"There is one essential center, where the sun shines on the buildings, and which catches the spirit of the whole school. It is an open place, where very important buildings lie .... Something is there, do not know exactly what, that makes the place catch the spirit of the whole school, and stays in the memory".

[p. 121, 10 more paragraphs not transcribed]

(2) Make a “poetic vision” as first sketch of a pattern language

1. The new campus will consist of an outer precinct with all of the sports fields, gardens and outer buildings, and an inner precinct with all of the buildings, high school and college activities.
2. The inner precinct of the school is made up of seven major entities.
3. The entrance street, which connects the outer boundary to the inner boundary.
4. The main yard, which contains the great hall.
5. The ta-noji center, which contains two narrow crossing streets, and the communal functions, and the college departments.
6. The home base street, which contains the individual home base buildings, and the common space for high school students.
7. The college cloister which contains the library, and special college functions such as research center.
8. The lawn which is shared by the high school and college.
9. The gymnasium, which stands at the end of the home base street, and forms its head.[2]

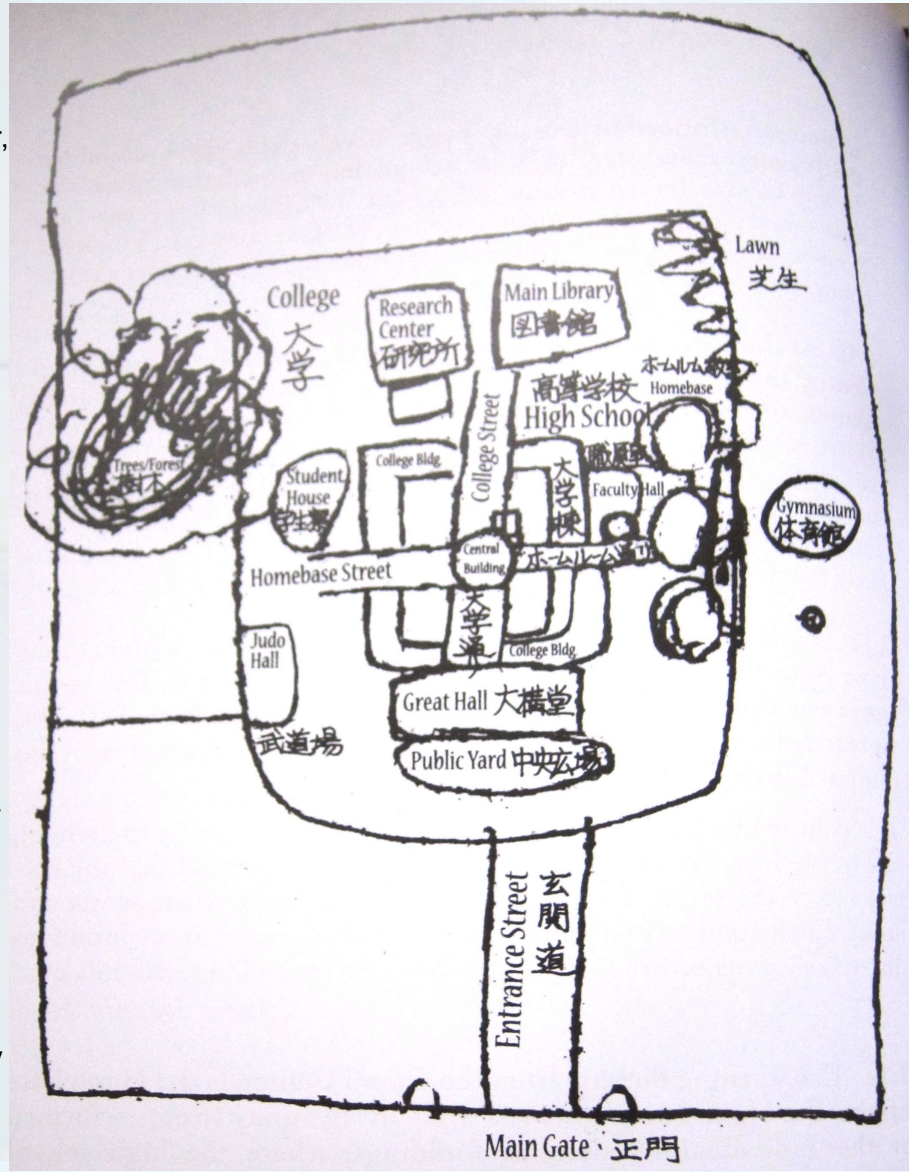
[2] As it turned out in the event, the gymnasium was placed on the lake, not on the home base street. In the evolution of a language, contents do sometimes change.

It should be strongly emphasized that this very brief and rudimentary pattern language was not created by sociological "research," nor was it done by making a list of what people spoke about. Rather, it was a poetic vision, crude but potent, which tried to flesh out in architectural language and in three dimensions, a physical world whose inner meaning corresponded to the meaning conveyed to us by teachers, staff, and students, and by them to one another, as discussion of the nature of the school began. This language was made and polished by us, the architects. But it was made, more essentially, by the teachers and students from the raw material and work and expressions of intent that they first gave to us. [pp. 122-123]

(3) Make the rudimentary pattern language physically coherent

The Completeness of the Language: Seven Principles

- **Relationships**. Each pattern establishes certain relationships which should exist in the finished campus. The sum total of those relationships, expressed by the patterns in the language, acting together, define the possible configurations which this language generates. [p. 124]
- **Spatial**. A given pattern contains, or defines, certain spatial entities. The relationships are defined among these spatial entities.
- **Reliability**. The essence of these relationships is that they must be reliable, and true. They cannot be arbitrary relationships (as they might often be in a single person's design). They need to be sufficiently true, so that we can trust them, and would want to find these relationships present in any version of any campus that might be generated by this language.
- **Consistency**. It is not necessarily easy to define a system of patterns which is consistent. For example, if one pattern asserts a certain relationship between two entities, and another pattern asserts a further relationship between the same entities, but one which is inconsistent with the first, then that system of two patterns is inconsistent, and can only, with great difficulty, work to generate real physical configurations.
- **Inconsistency**. From time to time, two patterns which are physically inconsistent may be refreshing and life-giving. This happens because the contradiction generates vigor and opens new ideas.
- **Completeness**. A system of patterns is complete if it contains sufficient relationships to allow a well-formed configuration to be built.
- **Coherence**. A system of patterns is coherent if the relationship specified amongst the patterns tend, most of the time, to generate easily graspable mathematical configurations.



(4) Refine the language through discussions

Once we had the language working to the extent that it could generate coherent plans, we then began a series of meeting with the school's Building Committee to discuss and refine specifics of the various patterns. [....]

Types of discussion included:

1. The degree of separation or integration of high school and university.
2. The existence of separate buildings.
3. The meaning of the homeroom street.
4. The meaning of the tanoji center.
5. Walking around in the rain, and how much cover to have.
6. The number of buildings which would be shared between the college and the high school.
7. The material of the buildings.
8. The degree of difference and autonomy of different classroom buildings.

What was remarkable was that the teachers understood the specific details of the pattern-language at a practical and concrete level. [p. 126]

Examples of Kinds of Discussions

Clinic Room Teacher

… Her main concern was sun in the health room. ….

Political Economics and Social Studies

Homeroom very important. … See each student's face clearly. Little bigger desk with containers. Much light, clear windows. No plastics. Traditional materials. Calm. Wood.

President of Student Body

He likes the classroom …. He think that the stairs in the existing school are grotesque, too dark, too hard, so he wants to have some more fun stairs in the new school.

Chairman of Budget Committee

… students can walk around barefooted, so that the foot can touch the ground directly, with grass, flowers, and earth. Education should be more related to nature not to the city. […]

Chairman of Personal Learning

He is very keen on a large gymnasium. [….]

[pp. 128-130, 7 more paragraphs not transcribed]

(5) Obtain approval of the pattern language [page 1 of 8]

This pattern language is a list of key centers, each of which contributes some essential quality to the campus. The list was established long before any design started. [p. 130]

The list contains 110 essential patterns, each describing a generic kind of center, and itself made of other centers. As they are defined here, these 110 key patterns completely govern and define the life of the school. Even before we have any idea about the physical configuration of the buildings, their shape, or design, or the way these centers are made real in space, it is already obvious that the school is given its life to an enormous degree, merely by this list of patterns. [p. 151]

1.	Global Character of the Campus
2.	The Inner Precinct
3.	The Buildings of the Inner Precinct
4.	The Streets of the Inner Precinct
5.	The Outer Precinct
6.	Features of the Inner Precinct
7.	Special Outdoor Details
8.	Interior Building Character

1.1	An outer Boundary surrounds the Campus.	A white, 60 cm wall serves as the based for a wooden fence. [....]
1.2	Contained by this Outer Boundary there is an Outer Precinct. ...	A second wall, far inside the first, surrounds the school itself, and forms a second zone between the first and second wall. [....]
1.3	The Inner Precinct is a densely built area where School and College have their major buildings and activities.	It is the place where the daily life of students and faculty occurs. [....]
1.4	...	...
1.5	As a whole, the Campus is given character by stone foundation walls, natural concrete walls, wood columns, ...	In addition ...

(5) Obtain approval of the pattern language [page 2 of 8]

This pattern language is a list of key centers, each of which contributes some essential quality to the campus. The list was established long before any design started. [p. 130]

1.	Global Character of the Campus
2.	The Inner Precinct
3.	The Buildings of the Inner Precinct
4.	The Streets of the Inner Precinct
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2.1	The Entrance Street to the campus is a highly visible pedestrian Way. It begins at the Outer Boundary of the Campus, and ends at the Inner Precinct.	The Entrance Street is vital to the character of the whole campus. [....]
2.2	The Small Gate marks the outer end of the Entrance Street.	It is a small, imposing building, which has height and volume.
2.3	...	...
...	...	...
2.14	The lake is a peaceful place to rest.	At the lowest point along the land, there is a lake, with grass and trees along the edges ...

(5) Obtain approval of the pattern language [page 8 of 8]

This pattern language is a list of key centers, each of which contributes some essential quality to the campus. The list was established long before any design started. [p. 130]

1.	Global Character of the Campus
2.	The Inner Precinct
3.	The Buildings of the Inner Precinct
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8.1	The interior character is warm and subdued: wooden columns, floors and walls in places; pale yellow wall color, ...	Wooden columns, often visible; Wood floors in classrooms; Passages and more public areas, floor of soft red tile; ...
8.2	Floors of many buildings are raised, slightly, off the ground.	... each building an extra two feet of height ... and helping to make the whole thing a little more stately.
8.3	...	...
...	...	...
8.9	Inside, here and there throughout ... there are surprising soft highlights of color, shining out among the subdued colors of the rest	For the most part, the school is composed of materials with beautiful, subdued, natural colors; wood columns; …. But, occasionally, and only where necessary, highlights of lively colors are used. [....]

(6) Renegotiate pattern language with space and money within budget

How can something like the cost or budget be made practical?

... we finish the pattern language phase with a serious analysis of space and money. It is done right away, so that any hidden conflicts are visible, and can immediately come into the open to get resolved.

First of all, we make a record of all of the spaces and areas which were defined by the pattern language -- adding up, pattern by pattern, the total outdoor space and indoor space. In our case, the analysis showed us that the requested numbers were too large. [….]

AREAS REQUESTED BY THE FACULTY			
A. Built Space (indoor space in square meters)	**First guess requested**	**Available 73.4%**	**Renegotiated finalized**
Public Yard Buildings	**945 m²**	**693 m²**	**750 m²**
Buildings of the Tanoji Center	**7583 m²**	**5566 m²**	**5604 m²**
Cloister (research center)	**1350 m²**	**991 m²**	**1150 m²**
Homebase Street buildings	**5680 m²**	**4169 m²**	**4300 m²**
Buildings in the Outer Precinct	**2432 m²**	**1785 m²**	**1400 m²**
Total	**17990 m²**	**13204 m²**	**13204 m²**
B. Coverage of Land (outdoor space in square meters)	**First guess requested**	**Available 79.5%**	**Renegotiated finalized**
Total	**84286 m²**	**67000 m²**	**67000 m²**

Second, as the simplest way to trim all space to our available budget, we made an average percentage reduction for all items, one figure for trimming indoor space; and then another for exterior land area. Each item was trimmed by a similar (but not identical) percentage. [....]

Third, we then asked the faculty to re-allocate the spaces, keeping the same trimmed totals, in order to conform to the available resources. The rule was simple: they could increase some, but must then decrease others, so that the total areas remained as they must remain.

(7) Find systems of centers in (i) the notions in people's minds, and (ii) the places in the land. Combine them. [page 1 of 3]

The first system consists of **patterns** created notions or entities that exist in people's minds). These patterns exist in a loose and undeveloped form in people's minds, even if they have not explicitly built a pattern language. When the pattern language *is* explicitly defined, it is more clear and makes a more powerful system which will get better results, especially because it comes from the feelings of people themselves. [p. 169]

The Most Important Centers Given by the Pattern Language

... the patterns together, geometrically … does not indicate any one arrangement on the land.

1. The **Entrance Street**.
2. The entrance street leads to a big square element which we refer to as the **Tanoji Center**.
3. This was to be the core of the college, and the center of gravity of the **Five College Buildings**.
4. Leading out from the Tanoji Center, in some direction, is **The Homebase Street**, the core of the high school.
5. **Individual Classroom Buildings** open along the **Homebase Street**.
6. The **Great Hall** and **Main Square** next to it.
7. The **Library and Research Center**, to one side. [p. 170]

Diagram 1: Seven most important centers in the pattern language, which together give a broad conceptual picture of a possible layout that the centers can have. Not to scale.

(7) Find systems of centers in (i) the notions in people's minds, and (ii) the places in the land. Combine them. [page 2 of 3]

The second system exists in the form of **places** on the site, discernible places that can be seen and felt on the site, if you have sufficient sympathy with the land. You can make this system explicit, by making a map of the centers, and paying attention to their structure. [p. 169]

The Most Important Centers Suggested by Land Forms

... "natural places" in the land.

1. **Natural Entrance Position**. The most important among these centers was the location of the main approach. This was in the southeast corner, partly because of a bus stop in Nihongi village, and partly because of the feeling of one's natural desire about how best to approach the site.

2. **The Ridge**, running along the south of the project site. A beautiful spot, with breeze, sunshine, view ... and a very delightful feeling. This was the high point in the site, and it was on this very point that we sat and looked and sat and talked, until we began to see what was really there to be seen.

3. **The Swamp**, where vegetables used to be grown, the low point in the terrain -- a kind of swamp -- that later became a lake.

4. **A Natural Place for Large Buildings**, a zone in the middle, running the way contours ran, from north to south.

5. **Minor Entrance Position**, the northwest corner -- a natural high spot, from which to view the site, also a natural point for a secondary entrance.

6&7. **East and West Ends of the Ridge**, the two ends of the ridge, which formed natural high points, and at each end, the feeling of a terminus, along the two ends of the ridge. [p. 171]

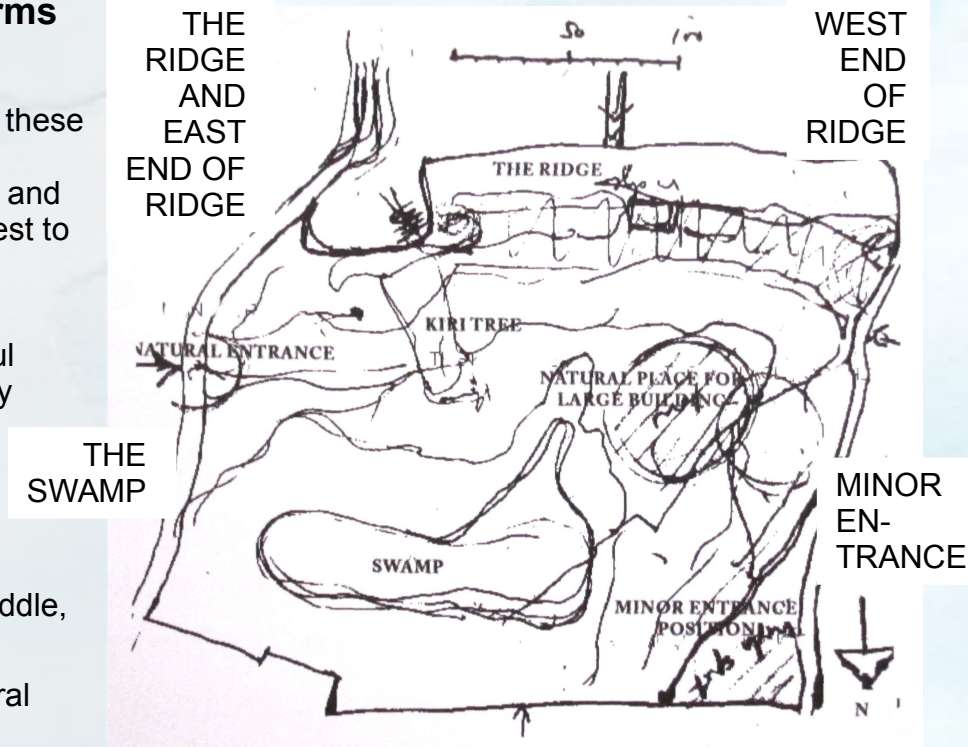


Diagram 2: The seven most NATURAL centers in the land, which, together can lead to a basic possible layout that the centers can have, in their LOCATIONS in the land.

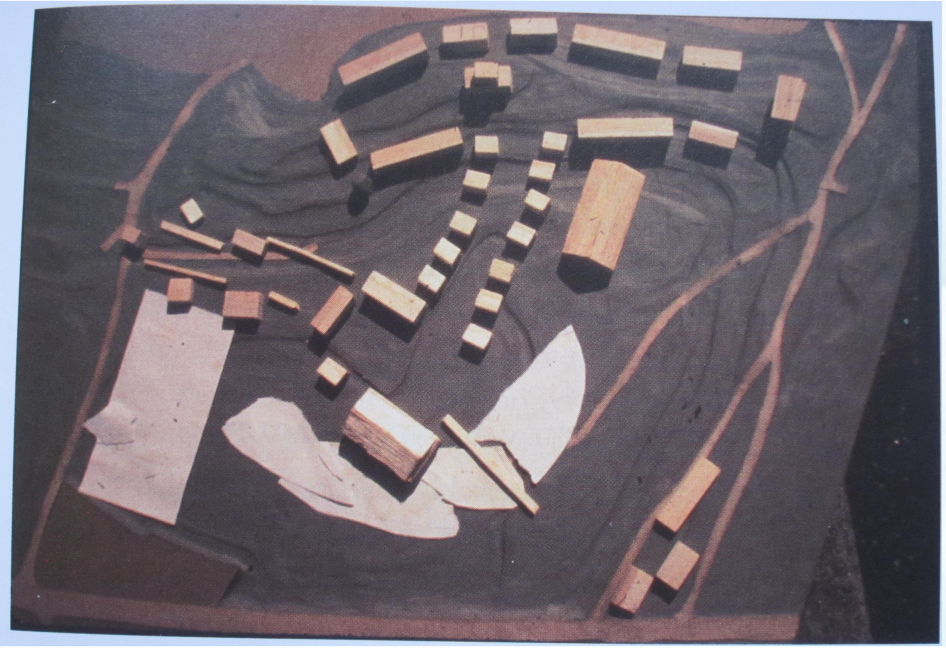
(7) Find systems of centers in (i) the notions in people's minds, and (ii) the places in the land. Combine them. [page 3 of 3]

... to bring these two systems of centers together. We have to hunt for a single configuration which springs from both centers, and integrates the qualities of both. We must find a way in which the system of centers defined by the pattern language can be placed, so that it enhances, preserves, and extends, the system of centers which is already in the land. It is a kind of healing process, which uses the new centers given by the pattern language, to heal the configuration of the old centers -- those that exist in the land.

... this is the single most difficult phase of the work. ... it took ... about nine months of continuous effort, to get the site plan right. [p. 173]

... after ... months of frustration, the problem did get solved. [...] a new point emerged. The fact that the homebase street would be more powerful as an *approach* to the Tanoji Center, than as something *hanging off* it. This was hard to see, at first, because it implied reversing the main sequence of the pattern language. But when we tried it, it was clear that the sequence almost instantaneously "jelled" with the land configuration.

Instead of this:	We now had:
1) Entrance Street	1) Entrance Street
2) Main Square	2) Main Square
3) Tanoji Center (College)	3) Home Base Street (High School)
4) Home Base Street (High School)	4) Tanoji Center (College)



The small balsa-wood model of the site, scale 1:500, on which the solution finally became apparent

(8) Adjust the site plan on the site itself (not on models)

We have already made it clear that nearly all of our work on the site plan was done on the site itself. Whatever we did on models, we used the models as if they were site itself -- and relied on feelings that we could feel in the model, imagining that it was the site itself. This was made necessary by the huge distance between California and Japan.

As one works on a site, and the plan gradually emerges, it is necessary, of course, to leave marks -- sticks, stones, markers of various kinds -- to fix the position of the different things which have been decided. On the Eishin site... the site was covered in tea bushes. [….] A marker therefore had to be about six feet high, even to be seen at all.

So we used six-foot-long bamboos. [….]. We ... tied different colored ribbons and cloths -- white, yellow, red, blue -- to the ends of our long bamboos. These were our markers -- our *flags*. [p. 180]

We had started making these flags quite early in the process. Even in July of 1982, as we began to get an idea established about the entrance position, we marked it with three or four of these flags. They looked beautiful. **And they made it possible to visualize the evolving site plan, truly, because they were real.**

When I came back to Japan after the breakthrough in November, we took about two hundred of these flags to the site, and began planning them in the ground, starting to make a realistic version as opposed to the very rough-and-ready diagram we had made so far. At this stage, now dealing with the real positions and dimensions on the land, we brought true feeling to the land itself. It was visible on the ground. [p. 181]

Colored flags, to identify various special purposes and areas on the land.

Solutions to problems come not from a pattern per se, but through generativity in the pattern language

In many problem-solving strategies, we try to attack problems directly. In doing so, we often attack only symptoms, leaving the underlying problem unresolved. Alexander understood that good solutions to architectural problems go at least one level deeper. **The structures of a pattern are not themselves solutions, but they generate solutions. Patterns that work this way are called generative patterns. A generative pattern is a means of letting the problem resolve itself over time, just as a flower unfolds from its seed:**

Image: Unfolding, by mrpeaches83 at https://www.flickr.com/photos/mrpeaches83/

9. This quality in buildings and in towns cannot be made, but only generated indirectly by the ordinary actions of the people, just as a flower cannot be made, but only generated from the seed (Alexander, 1979. p.xi)

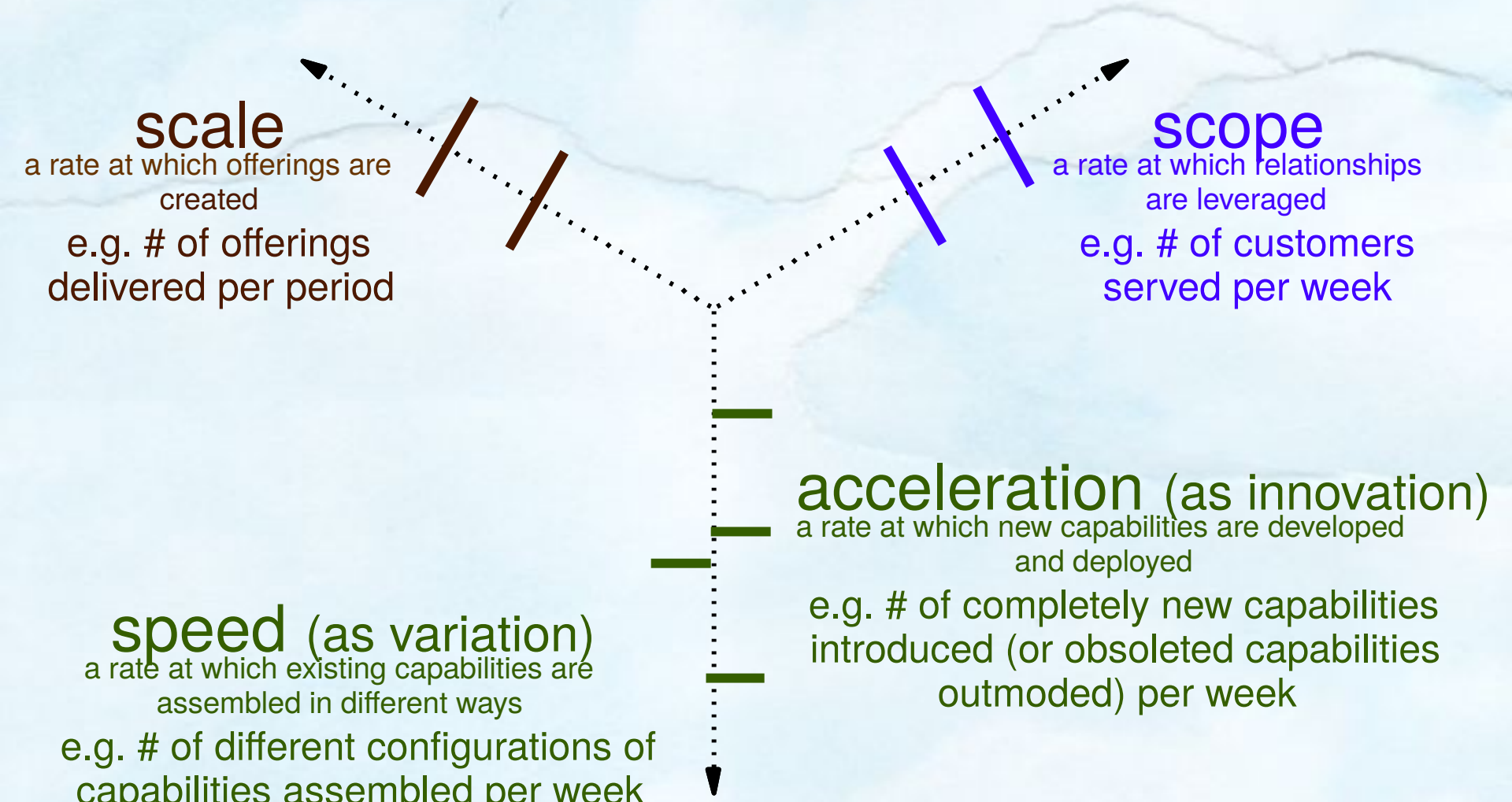
An ordinary language like English is a system which allows us to create an infinite variety of one dimensional combinations of words, called sentences…. A pattern language is a system which allows its users to create an infinite variety of those three dimensional combinations of patterns which we call buildings, gardens, towns. ….

Thus, as in the case of natural languages, the pattern language is generative. It not only tells us the rules of arrangement, but shows us how to construct arrangements as many as we want which satisfy the rules. (Alexander, 1979: pp. 185 186)

Why is generativity important? First, ... most real problems go deeper than their surface symptoms, and we need to address most interesting problems with emergent behavior. Second, a good pattern is the fruit of hard work and intense review and refinement. Simple problems can be addressed through simple rules, since the solutions are more direct or obvious than we find in generative solutions. The pattern form excels an engaging the reader in generative solutions: to understand the principles and values of lasting solutions and long-term emergent behavior. Good patterns go beyond the quick fix.

[James O. Coplien, Software Patterns 1996, pp. 33-34]

Places, spaces and paces trade-off between scale, scope, speed and acceleration



Mainstream architecture and urban design are rationalistic and teleological; Alexander is ateleological

Attributes of the design process	Development philosophies	
	Teleological development	Ateleological development
Ultimate purpose	Goal / purpose	Wholeness / harmony
Intermediate goals	Effectiveness / efficiency	Equilibrium / homeostasis
Design focus	Ends / result	Means / process
Designers	Explicit designer	Member / part
Design scope	Part	Whole
Design process	Creative problem solving	Local adaptation, reflection and learning
Design problems	Complexity and conflict	Time
Design management	Centralized	Decentralized
Design control	Direct intervention with a master plan	Indirect via rules and regulations

Lucas D. Introna 1996. “Notes on Ateleological Information Systems Development.” *Information Technology & People* 9 (4): 20–39. doi:10.1108/09593849610153412.

Agenda

1. What could Service Systems Thinking be?
2. Systems Thinking
3. SSMED
   (Service Systems, Management, Enginering and Design)
4. Generative Pattern Language
5. Multiple Perspectives Open Collaboration
6. Contexts that are coevolving?

5.1 Design of inquiring systems

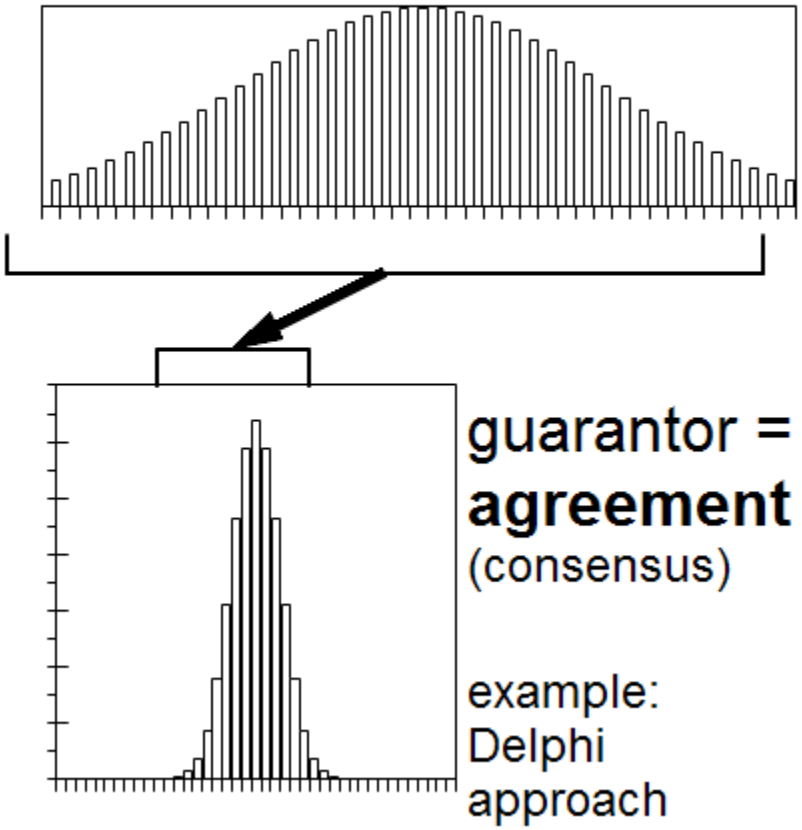
5.2 Wiki origins (with design patterns)

5.3 (Federated) wiki

Ways of knowing (1, 2)

The first way of knowing

Inductive-Consensual IS

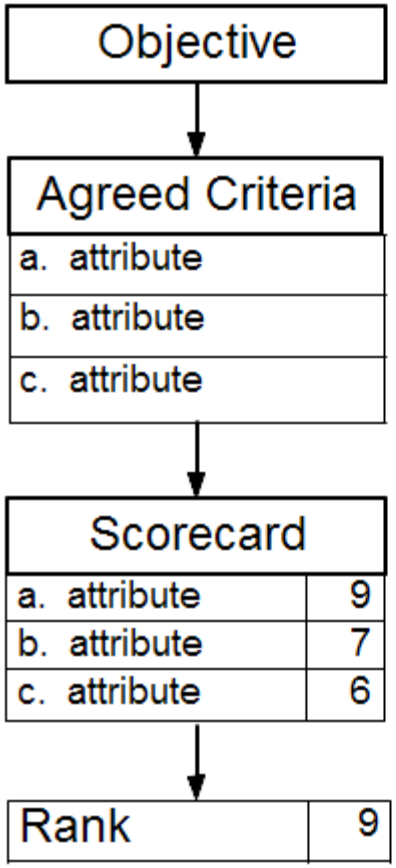


guarantor = **agreement** (consensus)

example: Delphi approach

The second way of knowing

Analytic-Deductive IS



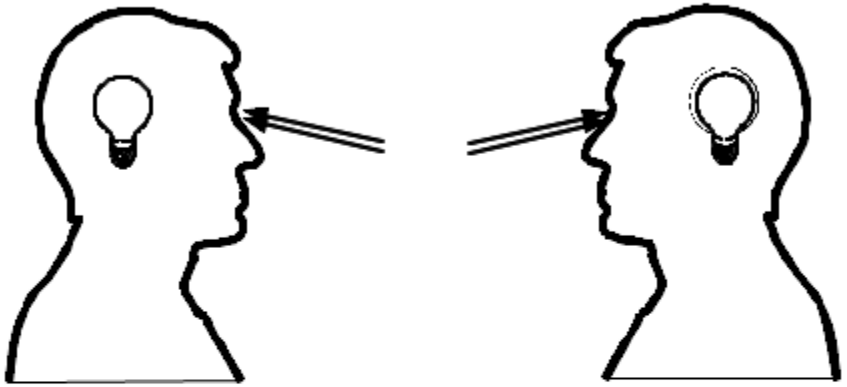
guarantor = **logical consistency** (fact nets)

example: finding the "best man" for the job

Ways of knowing (3, 4)

The third way of knowing

Multiple Realities IS



model + data as inseparable whole

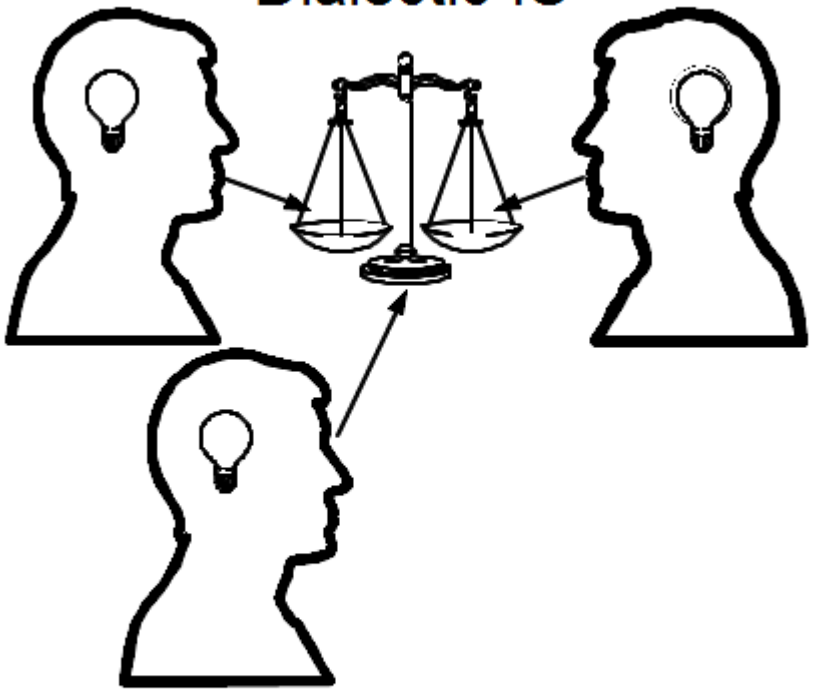
For human beings to have experience or gain knowledge about the external world, something must be built into the internal structure of their minds ...

guarantor = (ability to see) range of views (representations)

example: disciplinary views of the causes of the drug problem

The fourth way of knowing

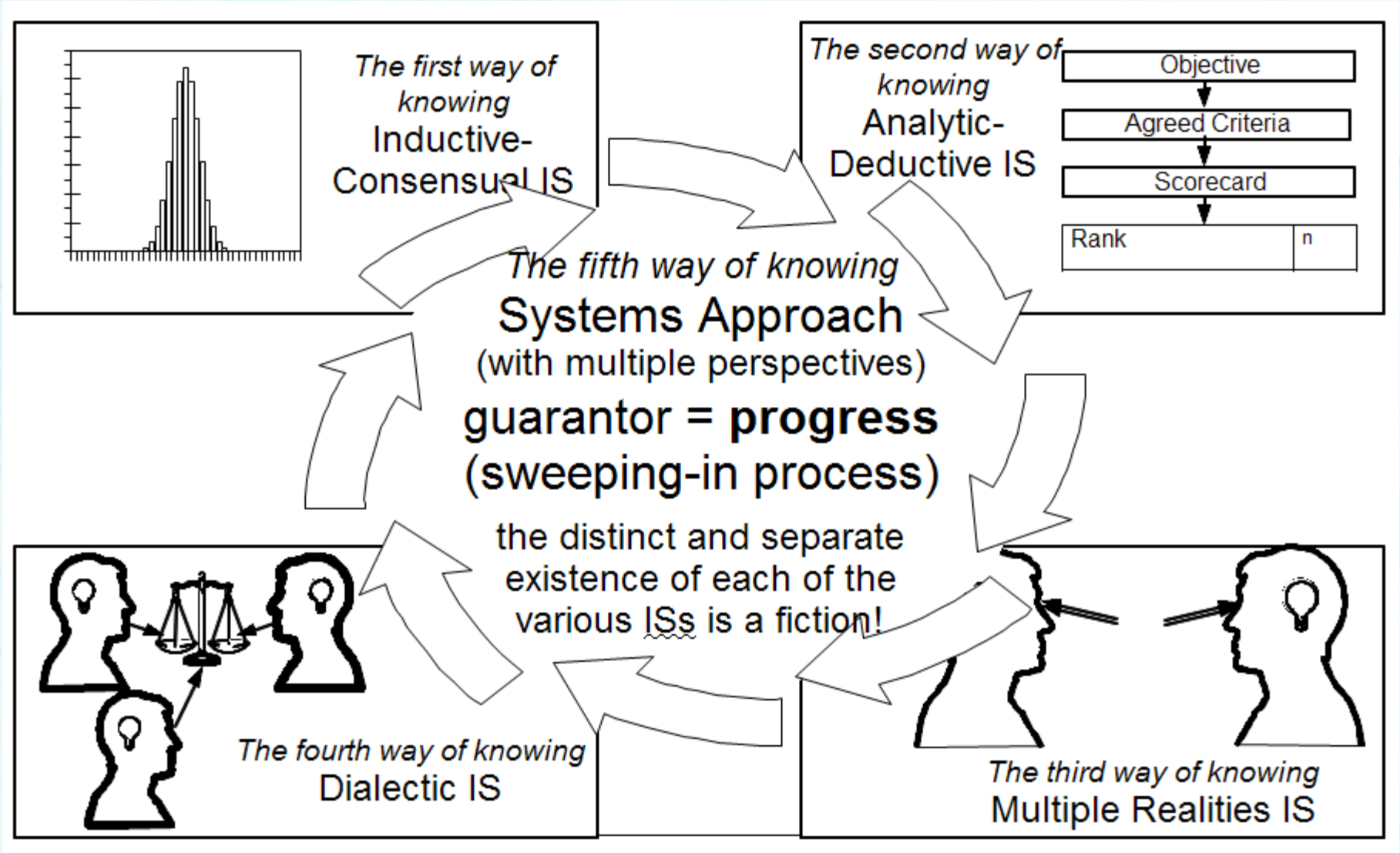
Dialectic IS



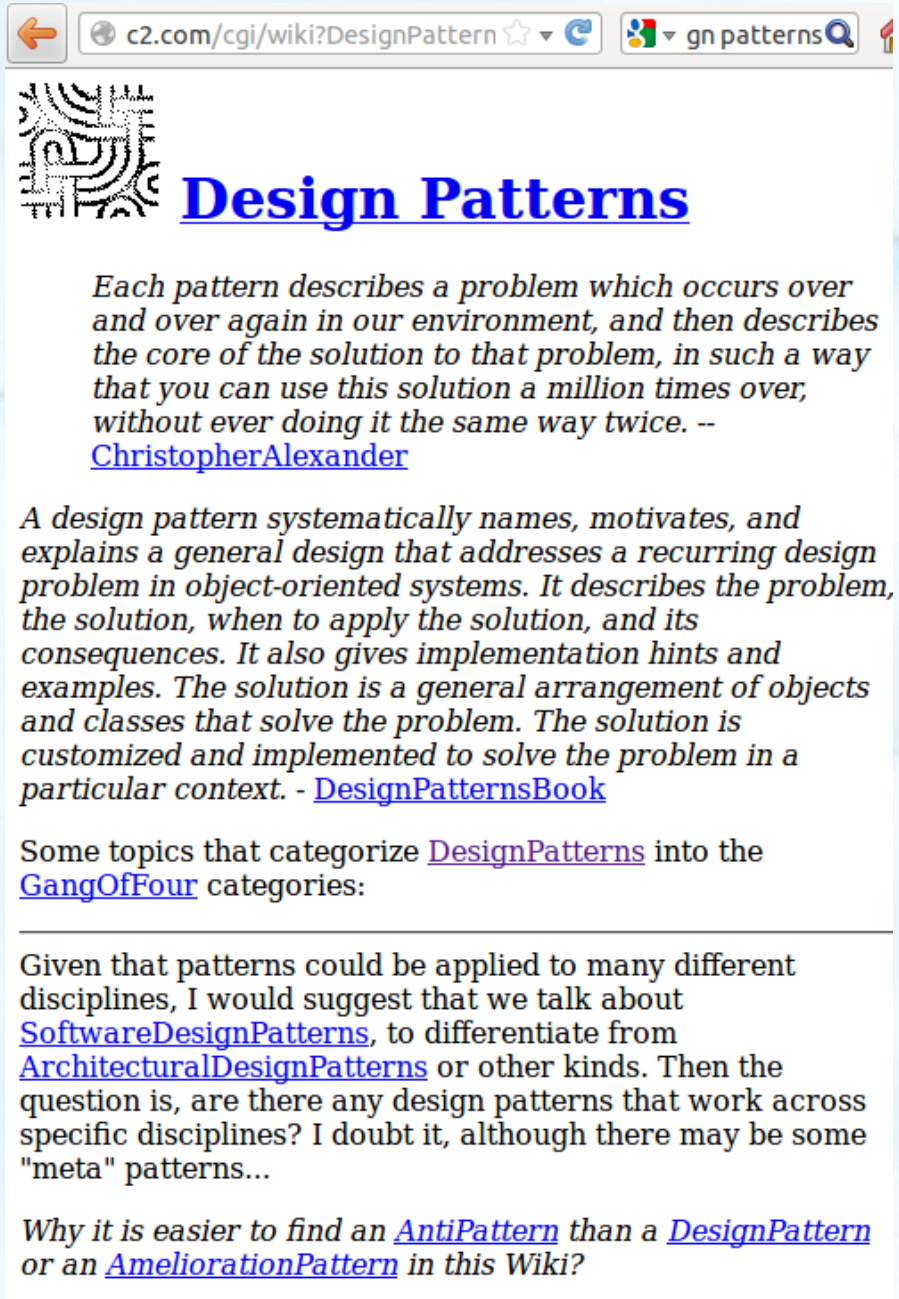
guarantor = conflict

example: challenging assumptions of what skid row housing should be

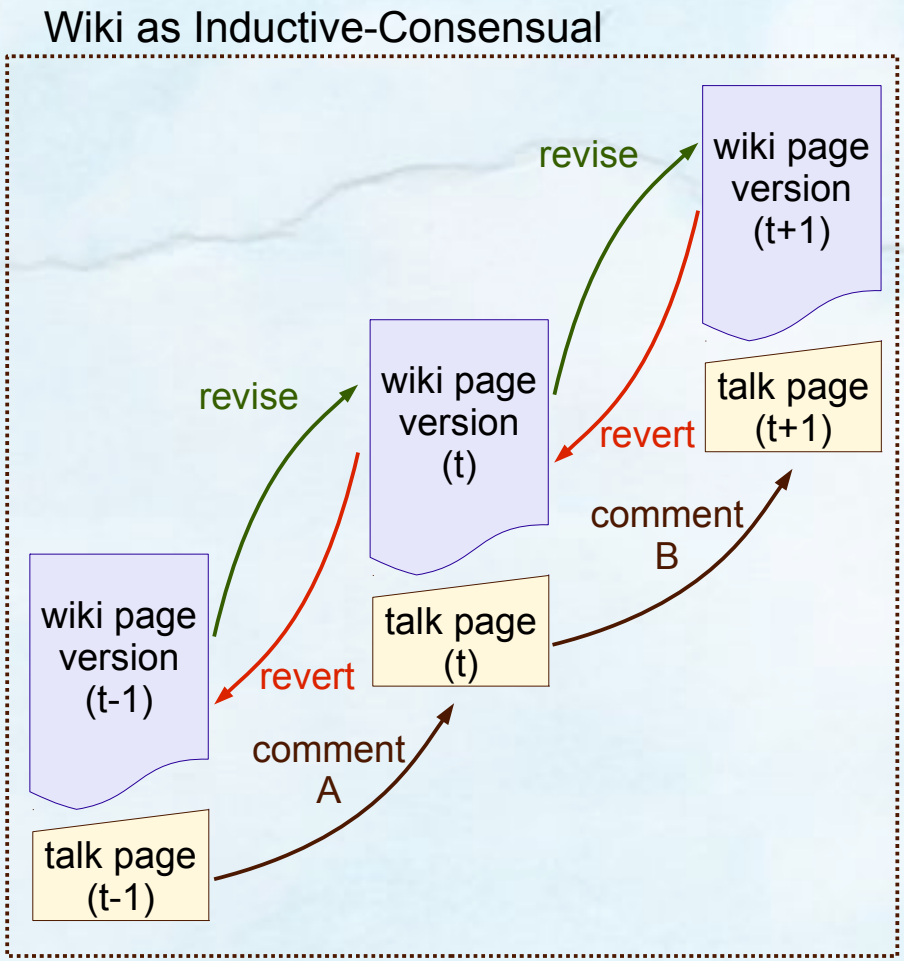
Ways of knowing (5)

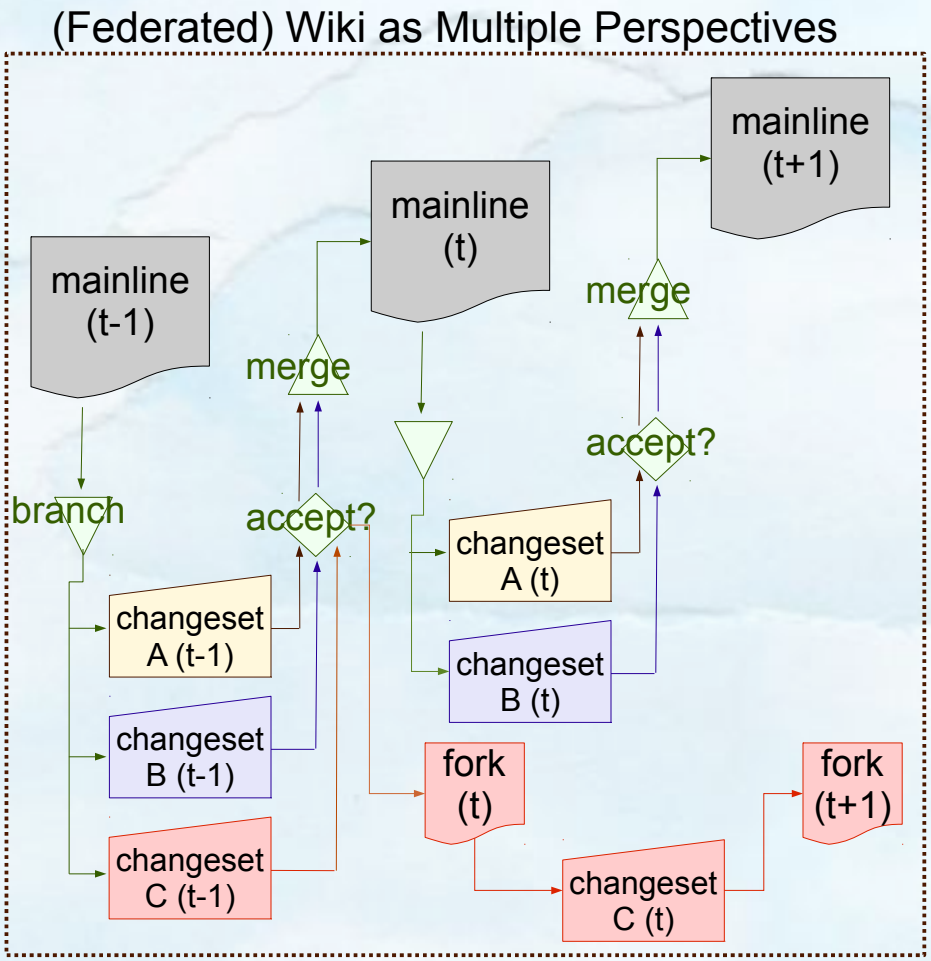


Wiki was invented to support pattern language collaborations



Inductive-consensual Wiki revise-revert cycles become Federated Wiki perspectives, branch-merge or fork





Source: Mitroff, Ian I., and Richard O. Mason. 1982. "Business Policy and Metaphysics: Some Philosophical Considerations." *The Academy of Management Review* 7 (3) (July 1): 361–371. doi:10.2307/257328. http://www.jstor.org/stable/257328.

newer, older

Welcome Visitors

Welcome to the Smallest Federated Wiki. This page was first drafted Sunday, June 26th, 2011. The pages on this particular site have been edited to describe how to get things done on many of the federated sites.

Featured Sites

sites.fed.wiki.org
A catalog of federated wiki sites with domain names for page titles and brief descriptions tuned to look good in search results. Know your federation.

Topic Based Subsets
We pick topics that have been of lasting interest and subset them into their own federated wiki sites. We've built this feature into c2 wiki's Subset Wiki bridge and only use it here. github

Learn More

Read a little bit of How To Wiki. Then move on to our Sandbox and give your new knowledge a workout. Still confused? Look for answers in our Frequently Asked Questions, updates in Recent Changes.

Smallest Federated Wiki

Our new wiki innovates three ways. It shares through federation, composes by refactoring and wraps data with visualization. Follow our open development on GitHub or just watch our work in progress videos here.

We introduce the parts of a Federated Wiki page. The "story" is a collection of paragraphs and paragraph like items. The "journal" collects story edits. Should you take my page and edit it as yours, I can see what you've done and may decide to take your edits as my own.

Generative Pattern Language

While the label "pattern language" has been appropriated for a variety of contexts, the label of "generative pattern language" can be used for the "purer" thinking originating from the Center for Environmental Structure at U.C. Berkeley.

Christopher Alexander and his colleagues have a significant body of artifacts since the formation of the CES in 1967.

Pattern Manual (1967) is a charter for the CES.

A Pattern Language Which Generates Multi-Service Centers (1968) demonstrates how a pattern language could become instantiated differently for a variety of sites and circumstances.

"Systems Generating Systems (1968)" articulates the ties between a pattern language and systems thinking.

The Battle for Life and Beauty of the Earth (2012) is a history of a development project for the Eishin campus in Japan, demonstrating the CES vision from start to finish.

The variety of Current Applications of Pattern Languages often don't reflect the full vision of

A Pattern Language Which Generates Multi-Service Centers (1968)

Christopher Alexander, Sara Ishikawa, and Murray Silverstein. 1968. *A Pattern Language Which Generates Multi-Service Centers*. Center for Environmental Structure. preview on Google Books

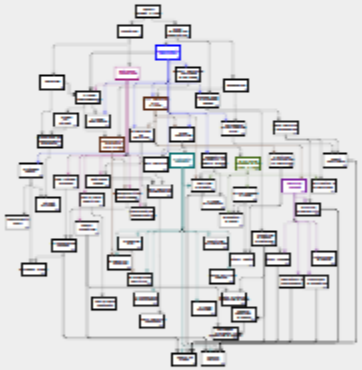
Introduction (Alexander et. al. 1968)

I. Summaries of 64 Patterns (Alexander et al. 1968)

II. The Idea of a Pattern (Alexander et al. 1968)

III. Eight Buildings Generated by the Pattern Language (Alexander et al. 1968)

IV. The Language (Alexander et. al 1968)



http://coevolving.com/maps/fed/Service-Centers-cascade.svg

This page is part of Historic Works on Generative Pattern Languages

A Pattern Language Which Generates Multi-Service Centers (1968)

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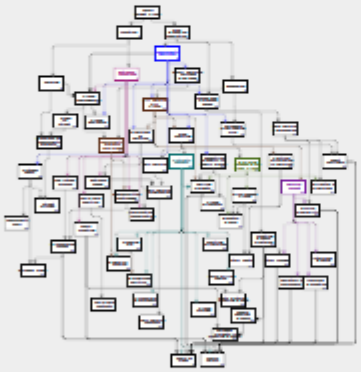


http://coevolving.com/maps/fed/Service-Centers-cascade.svg

This page is part of Historic Works on Generative Pattern Languages

The Idea of a Pattern (Alexander et al. 1968)

If we examine the patterns as they are presented in full, in the Appendix, we shall see that each pattern has two parts: the PATTERN statement itself, and a PROBLEM statement. The PATTERN statement is itself broken down into two further parts, an IF part, and a THEN part. In full the statement of each pattern reads like this:

IF:X THEN:Z / PROBLEM:Y

X defines a set of conditions. Y defines some problem which is always liable to occur under the conditions Z. Z defines some abstract spatial relation which needs to be present under the conditions X, in order to solve the problem Y.

In short, IF the conditions X occur, THEN we should Z, in order to solve the PROBLEM Y. [p. 17]

This page is part of A Pattern Language Which Generates Multi-Service Centers (1968)

Can we make better service systems, learning inductively from architecting built environments?

Deduction == (1) rule, (2) case, (3) result;
Induction == (1) case, (2) result, (3) rule;
Abduction == (1) result, (2) rule, (3) case.
From Charles S. Peirce via Barbara Minto. 1976.
The Pyramid Principle: Logic in Writing and Thinking.

(3) Rule:
A service system can be enjoyed by a variety of parties with value(s) unfolding over time

(2) Result:
Engaging with service systems can be reframed as experiences in places, spaces and paces

(1) Case:
Approaching the Eishin campus as a service system appreciates the practices of Christopher Alexander in creating a pattern language and combining systems of centers.

Agenda

1. What could Service Systems Thinking be?
2. Systems Thinking
3. SSMED
   (Service Systems, Management, Enginering and Design)
4. Generative Pattern Language
5. Multiple Perspectives Open Collaboration
6. Contexts that are coevolving?

6.1 Intellectual virtues

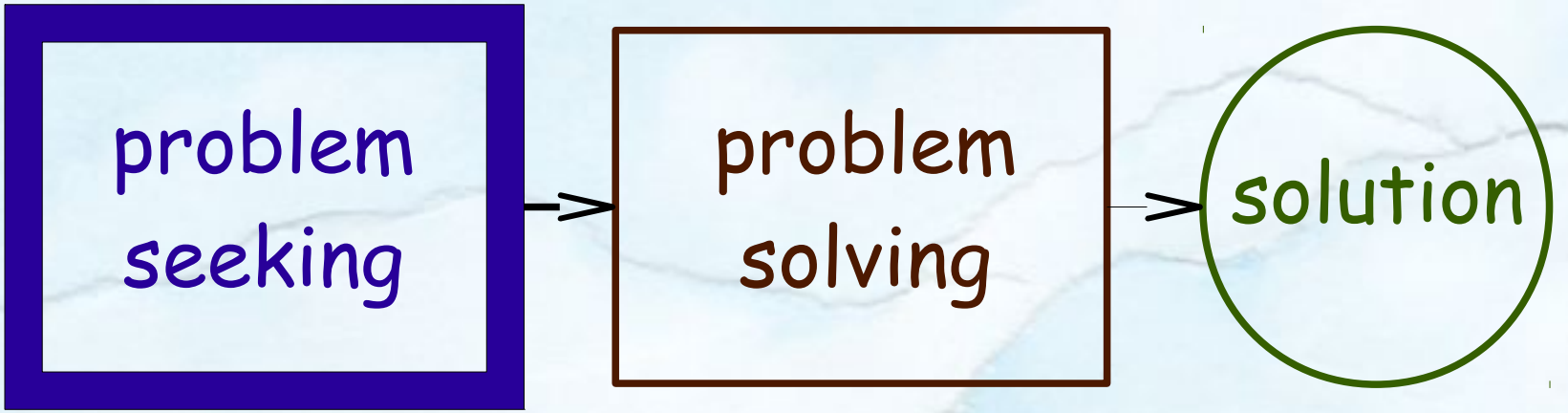
6.2 Architectual programming

6.3 Agile delivery, action research

Defining systems science(s) → science?

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
Pursuits:	Uncovering universal truths	Instrumental rationality towards a conscious goal	Values in practice based on judgement and experience
Colloquial description:	**Know why**	**Know how**	**Know when, know where, know whom**

Pattern language presumes *problem seeking* as *architectural programming*, and *problem solving* as *design*

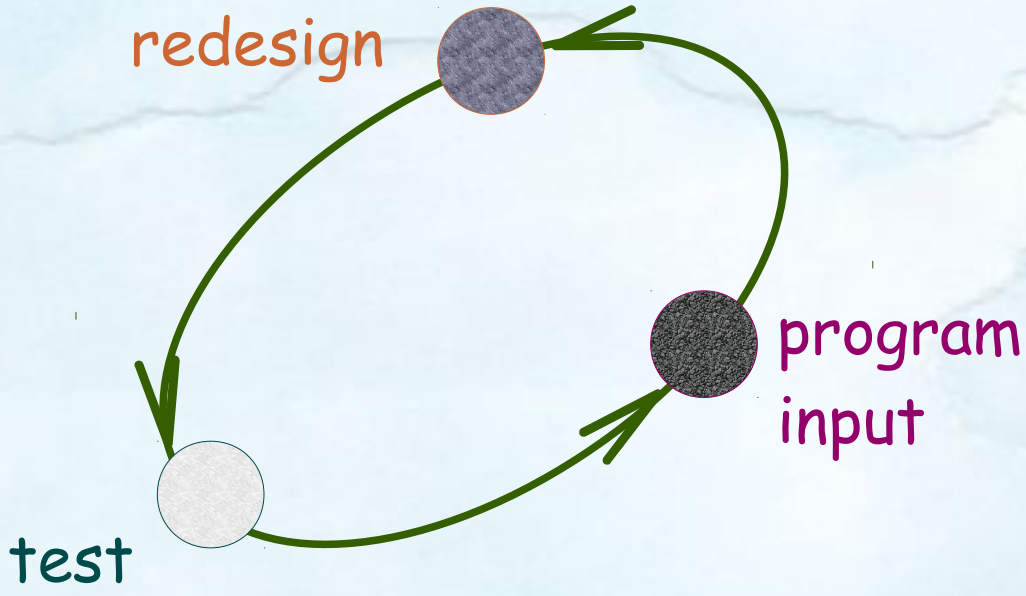


Programming is a specialized and often misunderstood term. It is "*a statement of an architectural problem* and the requirements to be met in offering a solution. While the term is used with other descriptive adjectives such as *computer* programming, *educational* programming, *functional* programming, etc., in this report, programming is used to refer only to architectural programming.

Why programming? The client has a project with many unidentified sub-problems. The architect must define the client's total problem.

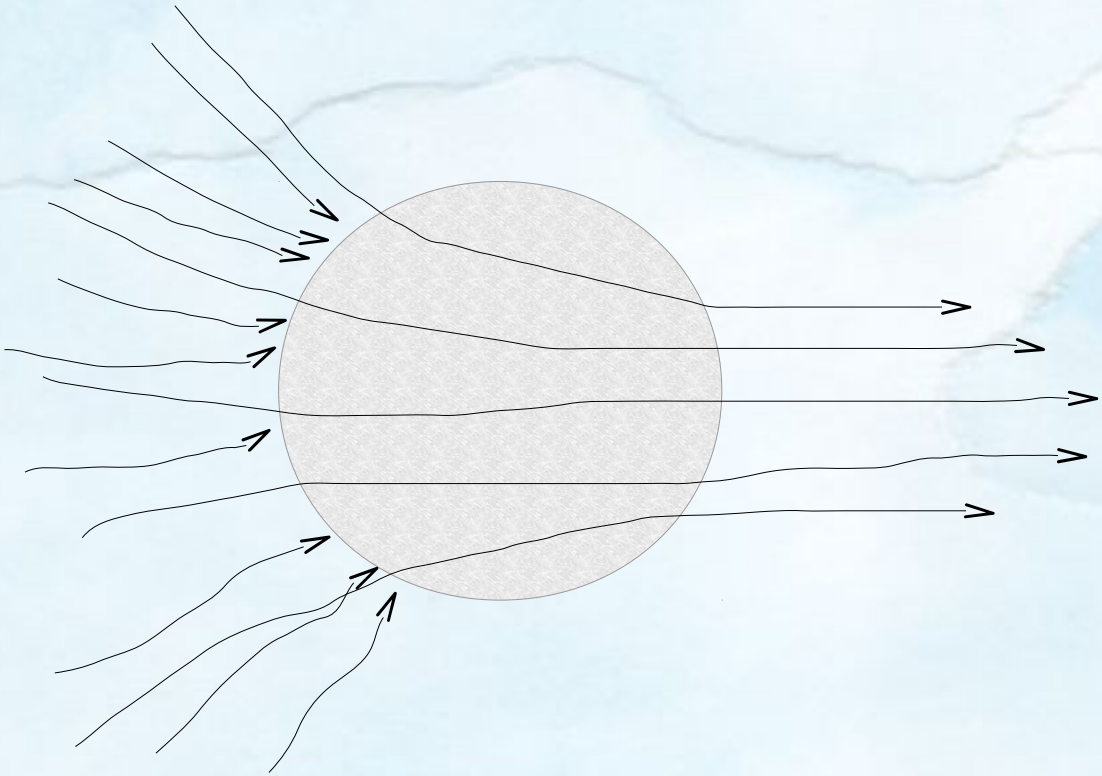
Design is problem solving; programming is problem seeking. The end of the programming process is a statement of the total problem; such a statement is the element that joins programming and design. The "total problem" then serves to point up constituent problems, in terms of four considerations, those of form, function, economy and time. The aim of the programming is to provide a sound basis for effective design. The State of the Problem represents the essense and the uniqueness of the project. Furthermore, it suggests the solution to the problem by defining the main issues and giving direction to the designer (Pena and Focke 1969, 3).

Programming through design, testing and redesign is inefficient



If a client approaches the architect with very little information, the architect may have to respond by programming through design. He could produce sketch after sketch and plan after plan trying to satisfy undefined requirements. Programming through design can involve misuse of talent and, indeed, risks of creating a “solution“ to the wrong problem.
(Pena and Focke 1969).

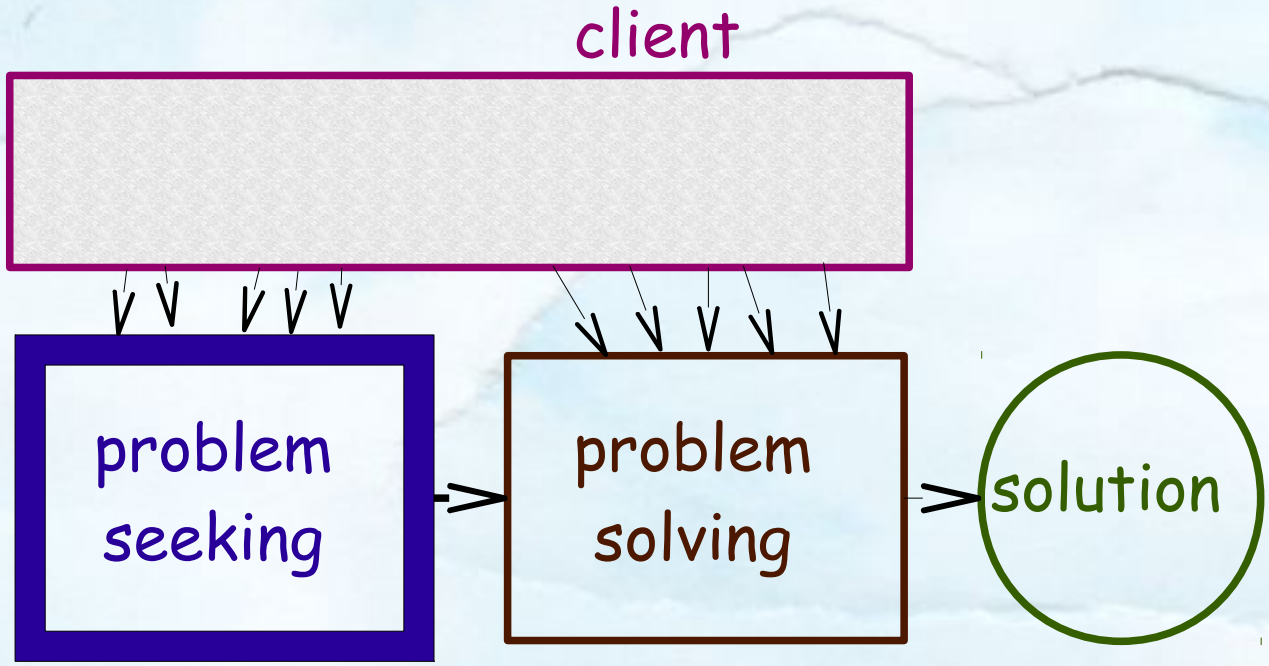
Discrimination between major ideas and details is necessary to avoid confusion in problem solving



On the other hand, a client may present the architect with too much information but involving mostly irrelevant details. The risk here is that the architect's solution will be based on details rather than major ideas. In this case, the architect must plough through an abundance of information and discriminate between major ideas and details (Pena and Focke 1969).

The client is involved in the process of architectural programming

The analytical procedure used by CRS provides a framework for decision making. Within it the architect help the client identify and make decisions that need to be made prior to design. Within it, the architect can suggest alternatives and other information to bring about decisions.



There are times when the architect must evaluate the gains and risks in order to stimulate a decision. Yet, note the emphasis on client decisions; the architect merely participates and at most, recommends.
(Pena and Focke 1969).

Structured methods assume progressing with succeeding or preceding steps, now described as *waterfall*

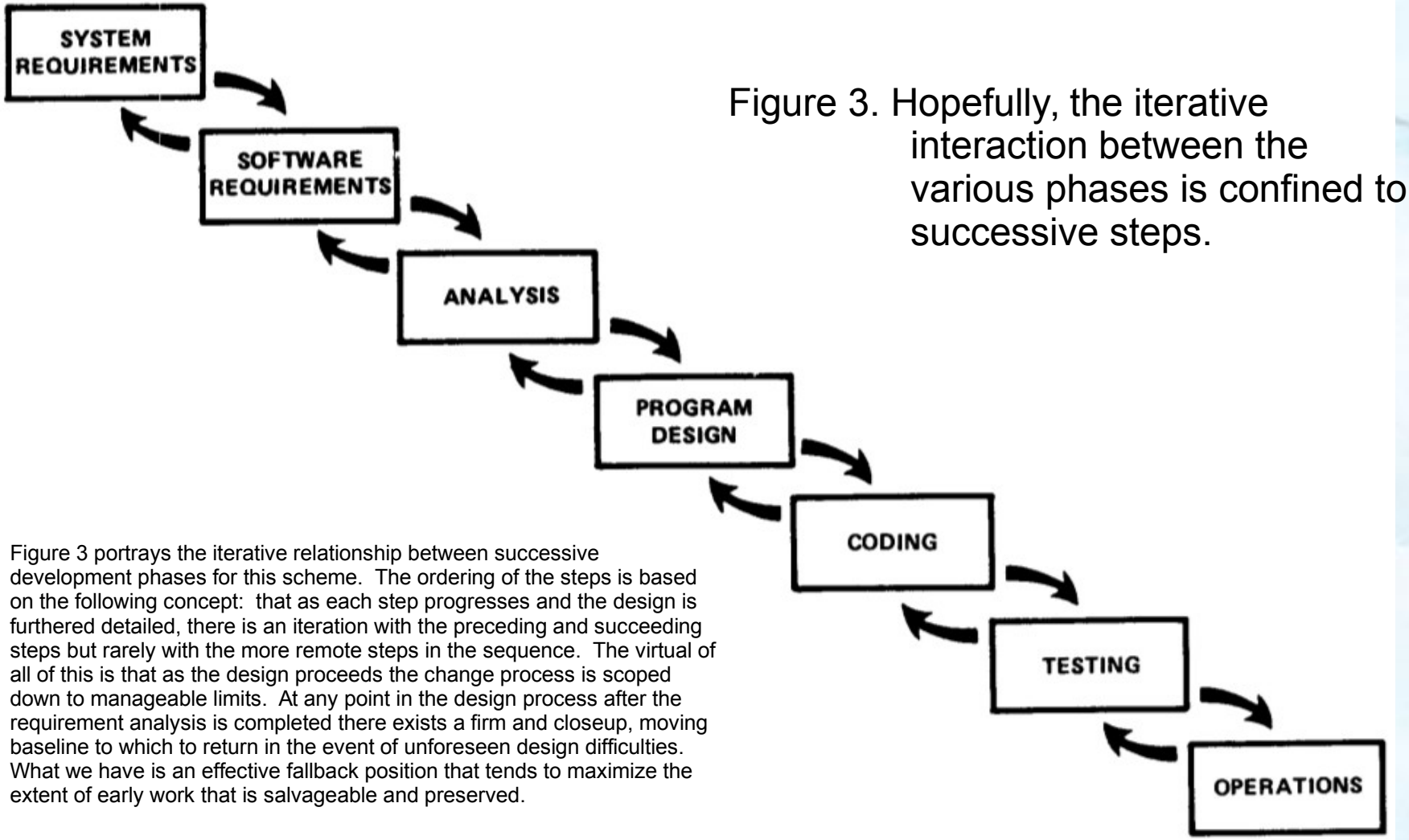


Figure 3. Hopefully, the iterative interaction between the various phases is confined to successive steps.

Figure 3 portrays the iterative relationship between successive development phases for this scheme. The ordering of the steps is based on the following concept: that as each step progresses and the design is furthered detailed, there is an iteration with the preceding and succeeding steps but rarely with the more remote steps in the sequence. The virtual of all of this is that as the design proceeds the change process is scoped down to manageable limits. At any point in the design process after the requirement analysis is completed there exists a firm and closeup, moving baseline to which to return in the event of unforeseen design difficulties. What we have is an effective fallback position that tends to maximize the extent of early work that is salvageable and preserved.

Source: Winston W. Royce, "Managing the Development of Large Software Projects", IEEE Wescon 1970 (Figure 3)

If testing fails, a major design is required, which could lead to necessary modifications in requirements

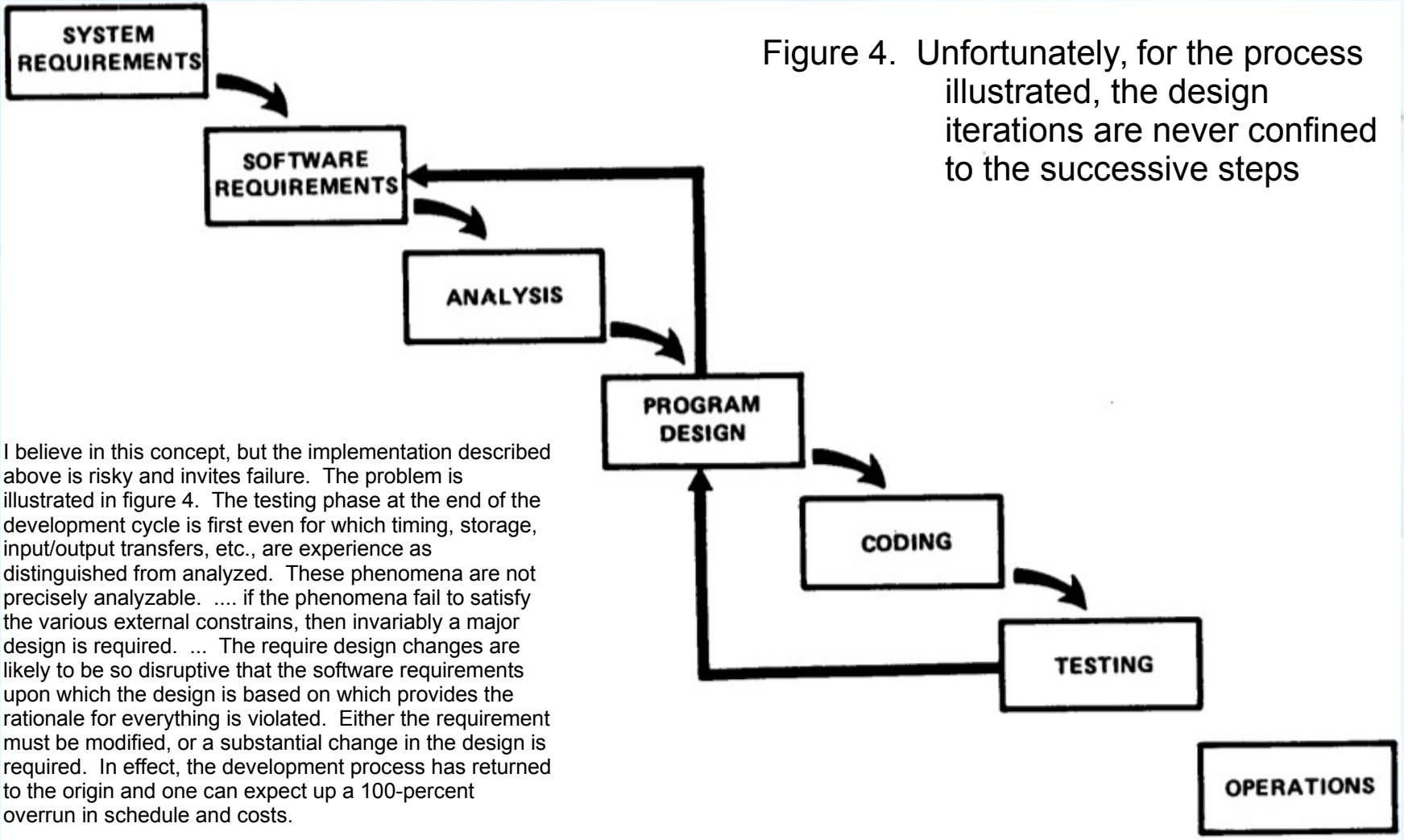
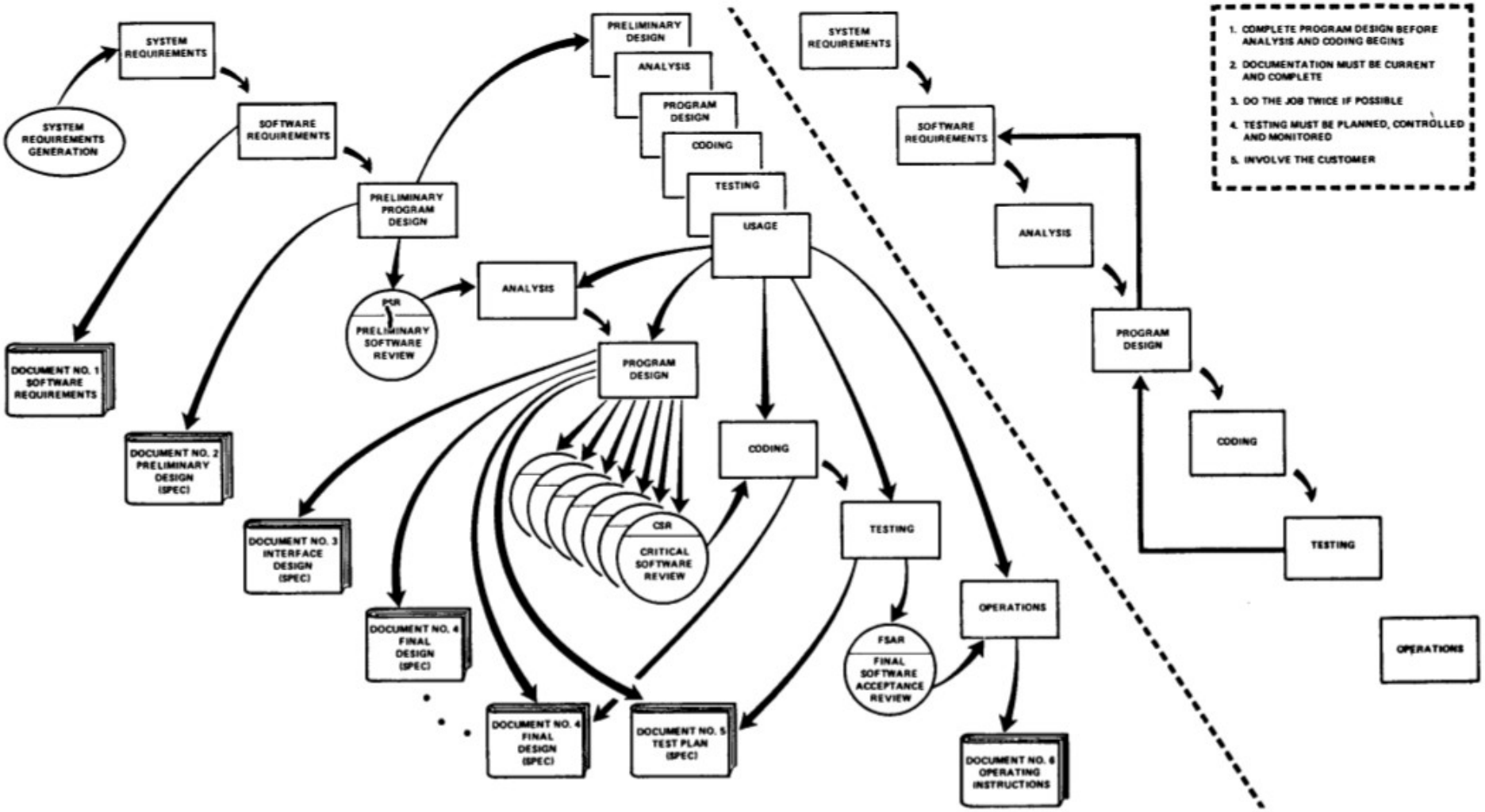


Figure 4. Unfortunately, for the process illustrated, the design iterations are never confined to the successive steps

I believe in this concept, but the implementation described above is risky and invites failure. The problem is illustrated in figure 4. The testing phase at the end of the development cycle is first even for which timing, storage, input/output transfers, etc., are experience as distinguished from analyzed. These phenomena are not precisely analyzable. .... if the phenomena fail to satisfy the various external constrains, then invariably a major design is required. ... The require design changes are likely to be so disruptive that the software requirements upon which the design is based on which provides the rationale for everything is violated. Either the requirement must be modified, or a substantial change in the design is required. In effect, the development process has returned to the origin and one can expect up a 100-percent overrun in schedule and costs.

Source: Winston W. Royce, "Managing the Development of Large Software Projects", IEEE Wescon 1970 (Figure 4)

The recommended solution is a preliminary design before analysis and program design. [See details, next page]



Source: Winston W. Royce, "Managing the Development of Large Software Projects", IEEE Wescon 1970 (Figure 10)

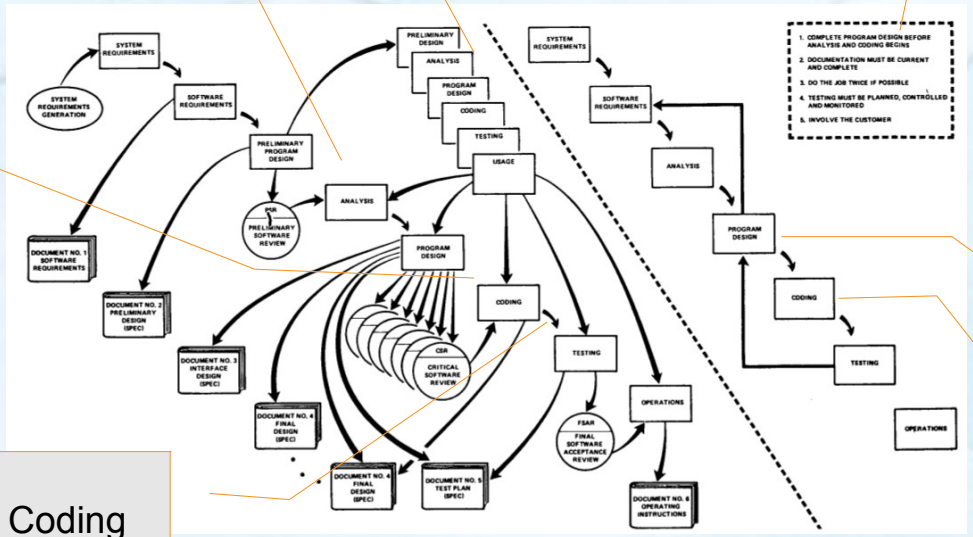
To lower risk, more documentation and a complete program design is recommended before analysis and coding

Preliminary design

Preliminary program design

Program design

Coding



1. Complete program design before analysis and coding begins
2. Documentation must be current and complete.
3. Do the job twice, if possible
4. Testing must be planned, controlled, and monitored
5. Involve the customer

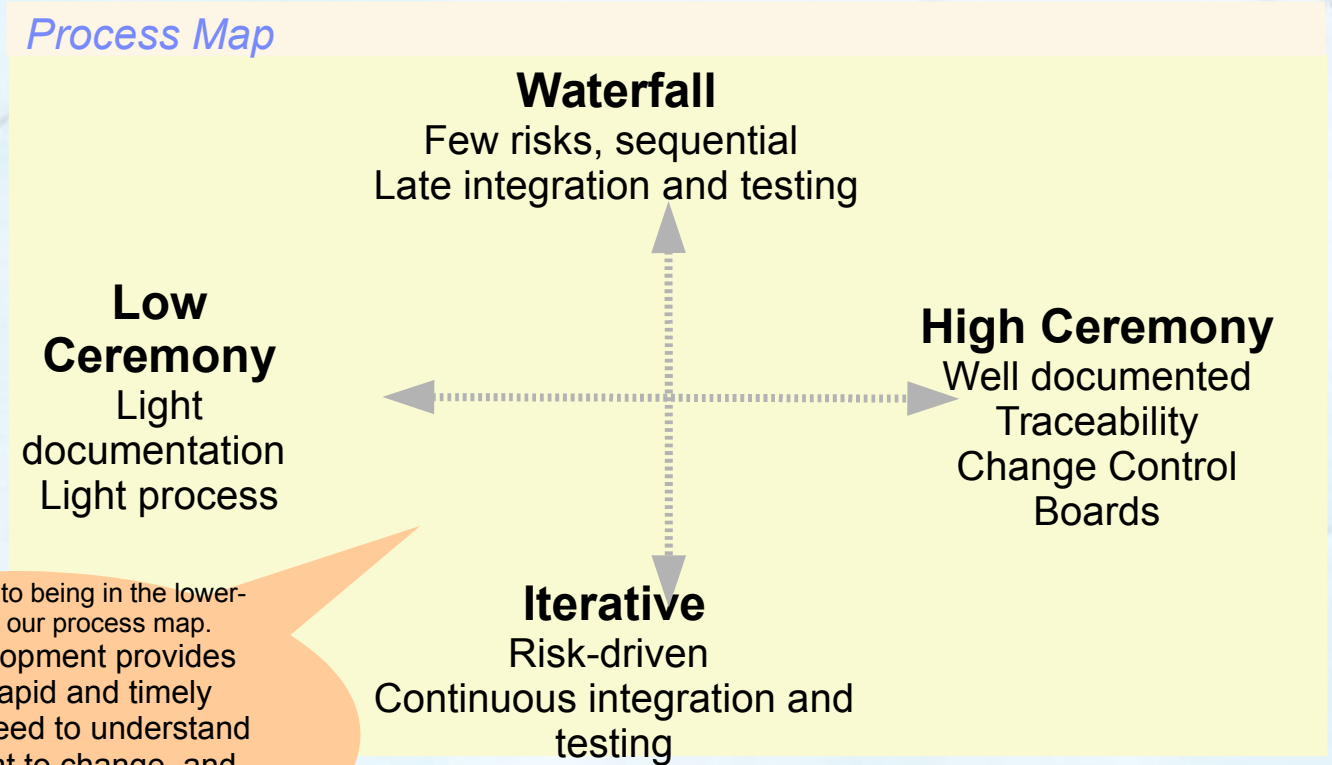
Program design

Coding

Figure 10 summarizes the five steps I feel necessary to transform a risky development project into one that will provide the desired outcome. I would emphasize that each item costs some additional sum of money. If the relatively simpler process without the five complexities described here would work successfully, then of course the additional money is not well spent. In my experience, however, the simpler method has never worked on large development efforts and the costs to recover far exceeded those required to finance the five-step process listed.

Source: Winston W. Royce, "Managing the Development of Large Software Projects", IEEE Wescon 1970 (Figure 10)

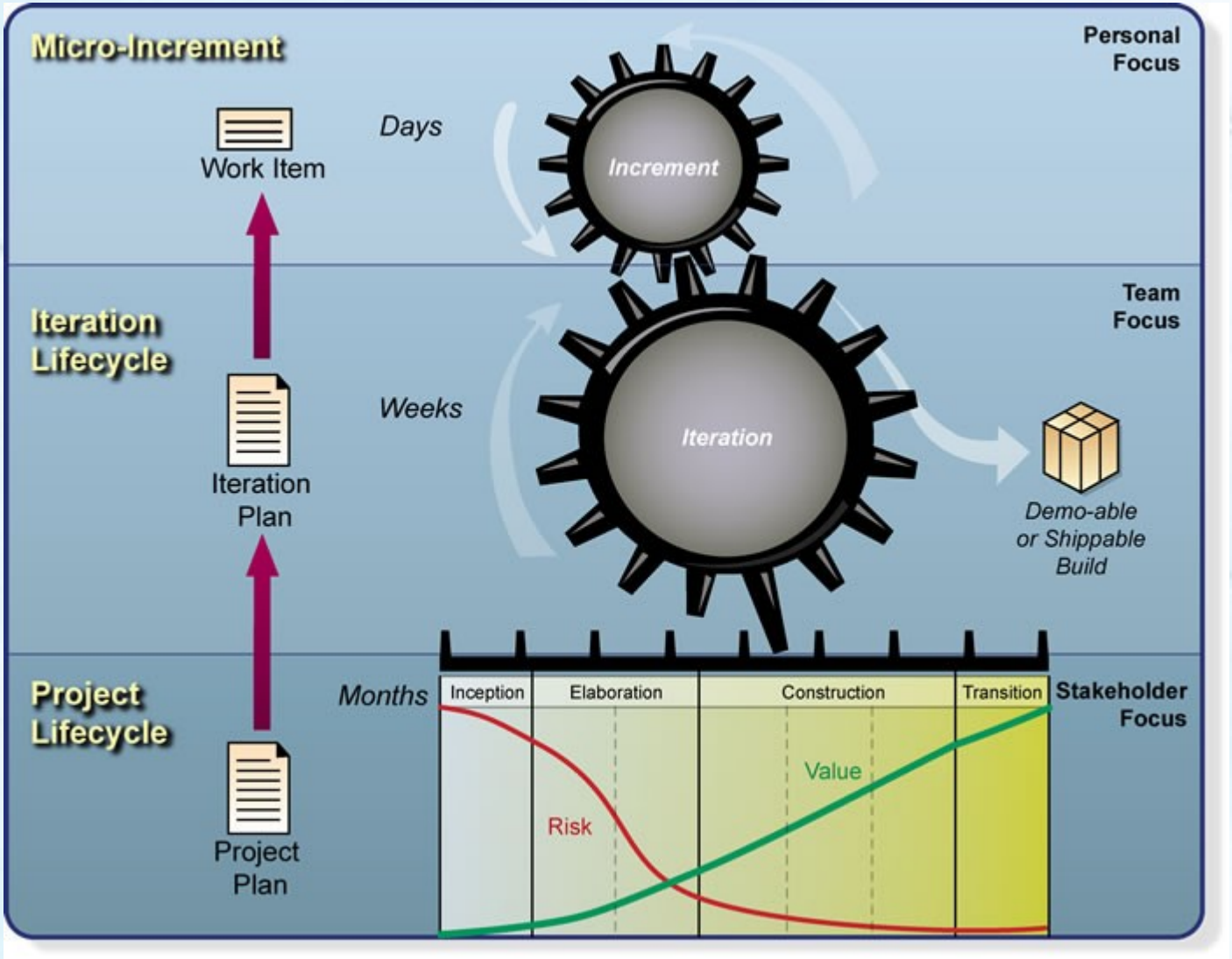
We define agility as the ability to respond to risks rapidly; changing requirements or stakeholders needs, or other changes impacting the application we are building[1]



Agility translates to being in the lower-left quadrant in our process map. Iterative development provides us with the rapid and timely feedback we need to understand when and what to change, and the low ceremony provides us with the ability to execute changes rapidly.

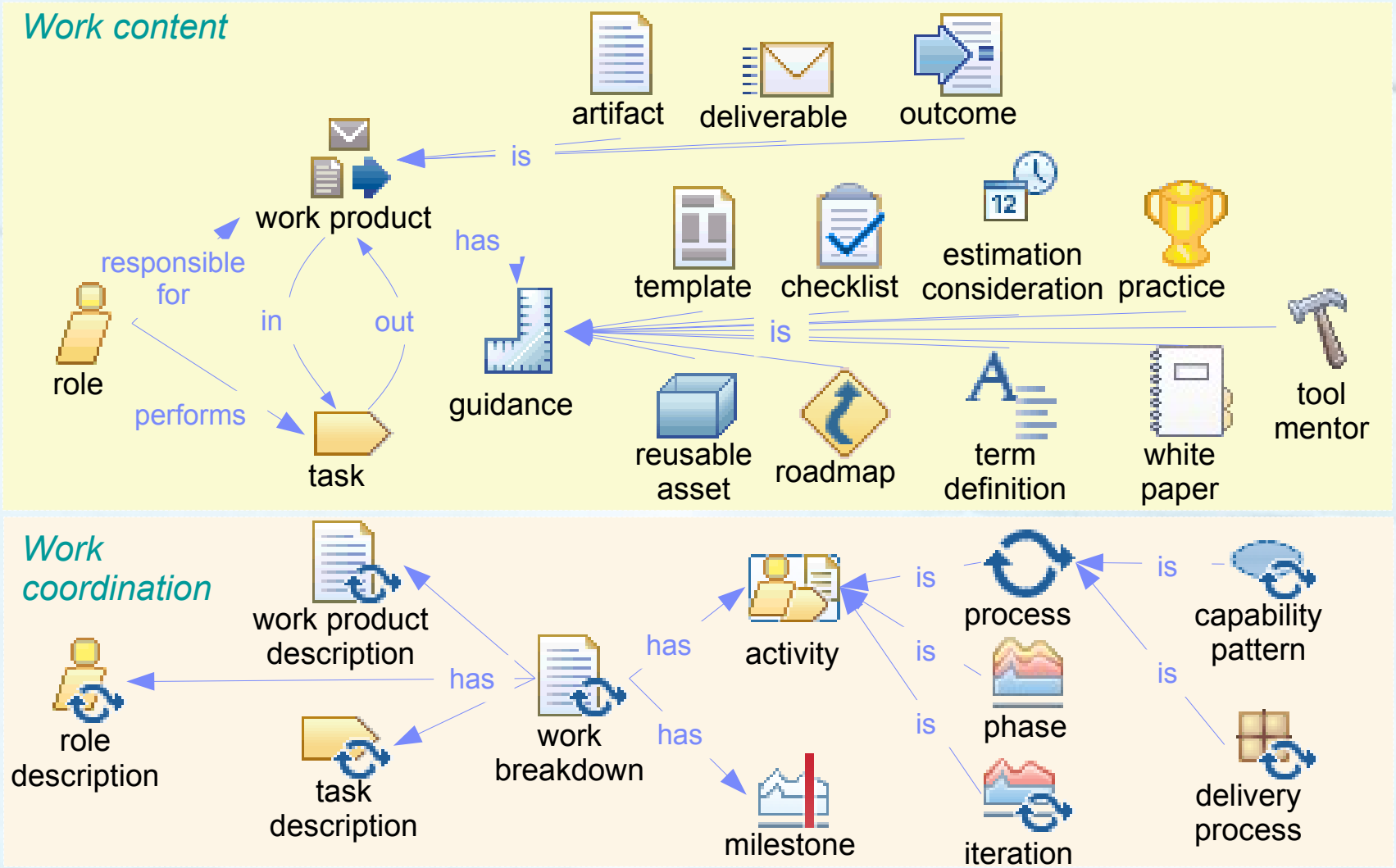
[1] Per Kroll and Bruce MacIsaac. 2006. *Agility and discipline made easy: practices from OpenUP and RUP*. Addison-Wesley. p.6

Work is organized at personal, team and stakeholder levels of micro-increments in iteration lifecycles in project lifecycles



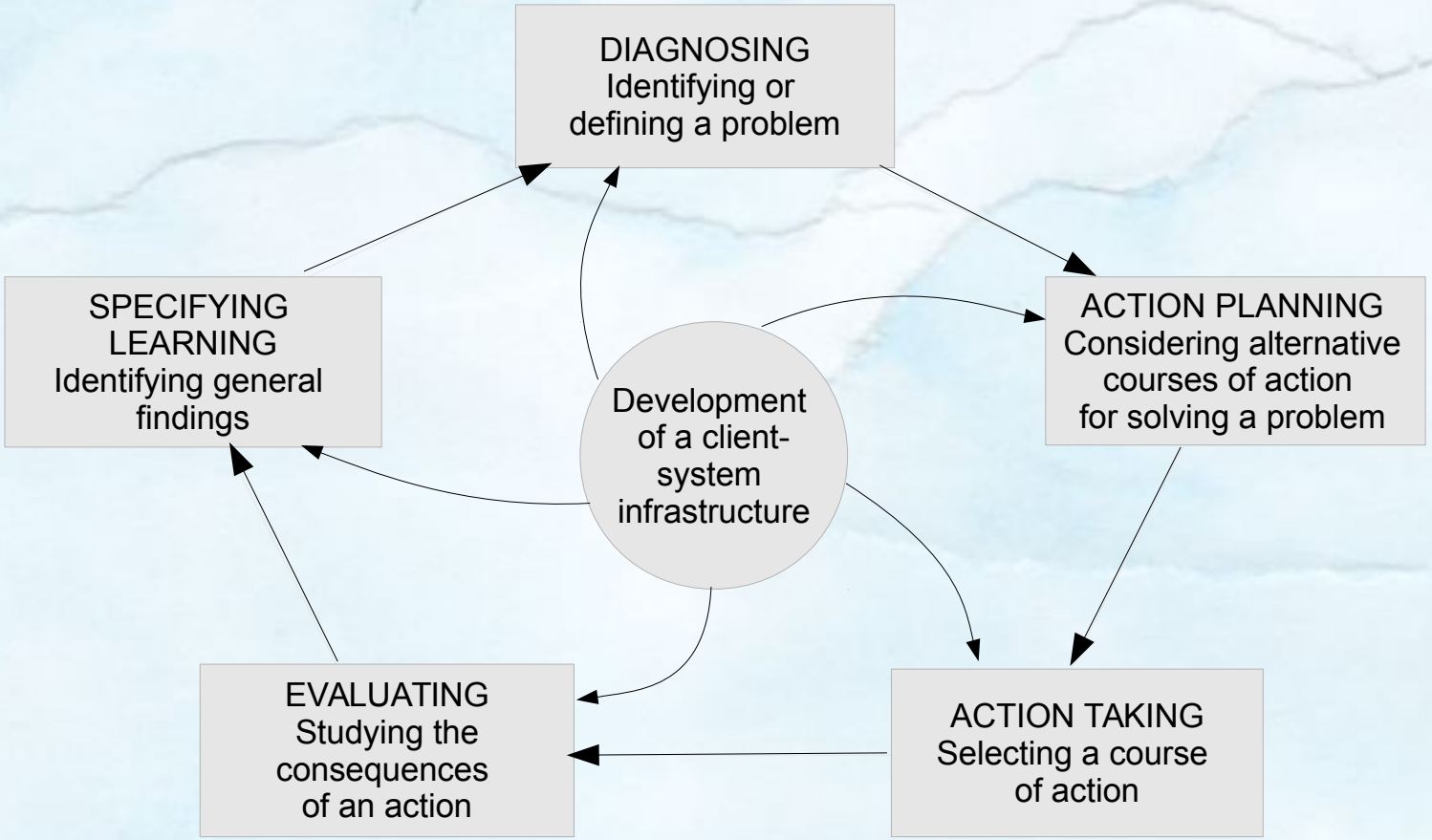
Source: Introduction to OpenUP (Open Unified Process), http://www.eclipse.org/epf/general/getting_started.php

Formalization of the open source agile *Eclipse Process Framework* originated from methods developed at IBM



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

Learning in action research has much in common with agile development methods



Source: Gerald I. Susman and Roger D. Evered. 1978. "An Assessment of the Scientific Merits of Action Research." *Administrative Science Quarterly* 23 (4): 582–603. http://www.jstor.org/stable/10.2307/2392581.

Seeking concurrence

- International Workshop, Jan 2014, Los Angeles
- International Symposium, June 2014, Las Vegas

- Human Side of Service Engineering, July 2014, Krakow

- ISSS 58th Annual Meeting, July 2014, Washington, DC

- Pattern Languages of Programming Conference, September 2014, Allerton, IL

- Relating Systems Thinking and Design Symposium, October 2014, Oslo

- PURPLSOC Pursuit of Pattern Languages for Societal Change Conference, July 2015, Krems

Agenda

1. What could Service Systems Thinking be?
2. Systems Thinking
3. SSMED
   (Service Systems, Management, Enginering and Design)
4. Generative Pattern Language
5. Multiple Perspectives Open Collaboration
6. Contexts that are coevolving?

