The Systems Praxis Framework, a joint project of the International Council on Systems Engineering and the International Society for the Systems Sciences

Scientific Disciplines e.g., Physics, Neuroscience

Humanistic Disciplines e.g., Psychology, Culture, Rhetoric

Pragmatic Disciplines e.g., Accounting, Design, Law

Formal Disciplines e.g., Math, Logic, Computation

INTEGRATIVE SYSTEMS SCIENCE

Identifying, exploring, and understanding patterns of complexity through contributions from

Foundations

Meta-theories of Methodology, Ontology, Epistemology, Axiology, Praxiology (theory of effective action), Teleology, Semiotics and Semiosis, Categories, etc.

Theories

General Systems Theory, Systems Pathology, Complexity, Anticipatory Systems, Cybernetics, Autopoiesis, Living Systems, Science of Generic Design, Organization Theory, etc.

Representations

Models, Dynamics, Networks, Cellular Automata, Life Cycles, Queues, Graphs, Rich Pictures, Narratives, Games and Dramas, Agent-based Simulations, etc.

practice informs theory

SYSTEMS THINKING

Appreciative and reflective practice using 'systems-paradigm' concepts, principles, patterns, etc.

theory informs practice

SYSTEMS APPROACHES TO PRACTICE

Addressing complex problems/opportunities using methods, tools, frameworks, practice patterns, etc.

direct input from disciplines

measured and specified data, metrics, etc.

input from experience and legacy practices

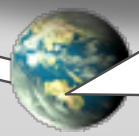
solicited local values, knowledge, etc.

Pragmatic, Pluralist, or Critical multi-methodology uses heuristics, prototyping, model unfolding, boundary critiques, etc., to understand assumptions, contexts, and constraints, including complexity from stakeholder values and valuations; chooses appropriate mix of 'hard', 'soft', and custom methods; sees systems as networks, societies of agents, organisms, ecosystems, rhizomes, discourses, machines, etc.

'Hard' methods are suited to solving well-defined problems with reliable data, clear optimization goals, and at most objective complexity; use machine metaphor and realist/functionalist foundations.

'Soft' methods are suited to structuring problems involving incomplete data, unclear goals, perspective and role complexity, etc.; use learning system metaphor and constructivist/interpretivist foundations.

Outcomes



Actions

http://www.systemspraxis.org

The Systems Praxis Framework

systemspraxis.org

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The challenges of complex systems require people to work together across disciplines. To work together, we must first communicate; and to communicate, we must first connect. All those who work with systems can connect through appreciating their synergistic roles in systems praxis.

Praxis is "integrating theory and practice". **Systems Praxis** refers to the entire intellectual and practical endeavor of creating holistic solutions to complex system challenges. Systems concepts, principles, and methods are designed to be integrative across traditional domain boundaries. However, multiple dimensions of complexity (social, technical, environmental, etc.) may require a blend of approaches and techniques from disparate systems traditions. Terminology for the various systems domains, scales, and types may appear similar; but assumptions underpinning worldview, culture, and success criteria are not necessarily shared. The result is that systems practitioners and theorists are apt to find that, while they all are focused on "systems", numerous subtle differences result in their being "divided by a common language".

The **Systems Praxis Framework** gives systems researchers and practitioners a common "map" wherein they can recognize and appreciate the complementary roles played by all participants and stakeholders in the complex process of systems praxis.

Systems Thinking is the core integrative element of the framework. It binds the foundations, theories and representations of systems science together with the pragmatic, "hard", and "soft" approaches of systems practice. In systems praxis, there is a constant interplay of theory informing practice and outcomes from practice informing theory. Systems thinking guides this ongoing activity, reflecting on and appreciating systems and contexts, in order to choose appropriate adaptations.

Integrative Systems Science has a very wide scope and is grouped into three broad areas:

- **Foundations**, which help us to organize knowledge, learning, and discovery;
- **Theories** about systems, identifying patterns abstracted from and applicable across domains and specialties;
- **Representations**, which allow insight into and communication about systems and their contexts by describing, exploring, analyzing, making predictions, etc.

Systems Approaches to Practice aim to produce desired outcomes while being mindful of unintended consequences. No one branch of systems science or practice provides a satisfactory explanation for all aspects of a typical system "problematique", so practice needs to involve the range of knowledge appropriate to the system of interest and its wider context.

- A **Pragmatic** (also called Pluralist, Critical, or multi-methodological) approach judiciously selects a mix of "hard", "soft", and custom methods, tools and patterns, drawing from different foundations and systems-specific and domain-specific traditions as appropriate to the situation. The approach is open to whatever is useful for gaining sufficient insights to address the issues at hand and achieve desired combinations of emergent properties. Heuristics, "boundary critiques", "model unfolding", etc., allow assumptions, contexts, and constraints to be challenged and understood, uncovering hidden sources of complexity, such as from different stakeholders' values and valuations. Systems may be viewed as hierarchies, networks, societies of agents, organisms, ecosystems, rhizomes, discourses, machines, etc.
- **"Hard"** methods are suited to solving well-defined problems with reliable data and clear goals, using analytical methods and quantitative techniques. Strongly influenced by "machine" metaphors, they focus on technical systems, objective complexity, and optimization. They are based on "realist", "functionalist", and "positivist" foundations.
- **"Soft"** methods are suited to resolving or structuring problems and opportunities involving incomplete data, unclear goals, or open inquiries using a "learning system" metaphor. They focus on communication, subjective and inter-subjective complexity, interpretations, and roles. They are based on "social-constructivist", "interpretivist", and "humanist" foundations.

Systems Praxis is part of a wider ecosystem of knowledge, learning, and action. Successful integration with this wider ecosystem is the key to success with "real-world" systems. Systems science draws on and integrates insights regarding complex problems from the differentiated disciplines, including "hard" scientific disciplines such as physics and neuroscience; formal disciplines such as mathematics, logic, and computation; humanistic disciplines such as psychology, culture, and rhetoric; and pragmatic disciplines, such as accounting, design, and law. Systems approaches to practice depend on: measured data and specified metrics relevant to the problem or opportunity situation and domain; understanding of local values and knowledge; and pragmatic integration of experience, legacy practices, and discipline knowledge.

In summary: **Integrative Systems Science** allows us to identify, explore, and understand patterns of complexity relevant to a problematique; **Systems Approaches to Practice** draw on integrative systems science to address complex problems and opportunities; **Systems Thinking** binds the two together through appreciative and reflective practice using systems-paradigm concepts, principles, and patterns; and, finally, observing the results of systems practice enhances both practice and theory.

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