Rethinking Systems Thinking for Systems Changes Learning: Philosophizing, Theorizing, and Methodizing

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ABSTRACT

Systems Change Learning proposes a rethinking of systems thinking, moving beyond the dominant Western premise of stability and its unfreezing-moving-refreezing paradigm. By foregrounding change, this approach challenges the adequacy of 20th-century systems philosophies, sciences, and methods. Grounded in constructivist metaphilosophy, (con)texturalism-dyadicism is introduced as a new world hypothesis. Theorizing through multiparadigm inquiry employs the appreciative systems framework. Methodizing praxis is framed using a process hub with four process spokes. A case study demonstrates preliminary acceptance of an (con)textural action learning cycle in practice. The mindset shift from Western philosophical and scientific presumptions continues to develop imagery that better reflects unfolding change.

Keywords: Systems Thinking, Systems Change, Systems Philosophy, Systems Theory, Systems Methods

1. INTRODUCTION

The rise of systems thinking in the 20th century can be correlated with the founding of the Society for General Systems Research in 1956. This society continues, renamed as the International Society for the Systems Sciences. In the early 21st century, a call for a rethinking of approaches was advanced, particularly for social systems (e.g. the service economy), and ecological systems (e.g the Anthropocene) [1].

Biology profoundly influenced early systems thought, introducing the concept of *homeostasis*: the internal self-regulation of living organisms to maintain steady states through coordinated physiological reactions [2, p. 400]. Walter Cannon initially defined "equilibrium" as a physical arrangement for constancy of organs, distinguishing *homeo* (like or similar, allowing variation) from *homo* (the same, fixed constancy). However, as C.H. Waddington observed, global concerns shifted from stabilizing things to controlling processes. He contrasted homeo*stasis* (preserving stability) with homeo*rhesis* (preserving a flow or a given type of change) [3, p. 105]. Changes in the world "beyond the skin" of a system reorient attention beyond internals.

Interest in *systems change* has recently surged, evidenced by work by the Observatory of Public Sector Innovation [4], [5], the Forum for the Future [6], [7], Stanford Social Innovation scholars [8], and the United Nations Development Programme [9]. Yet, these descriptions often frame change as a singular occurrence, rather than a conglomerate of changes as ongoing processes. This orientation accords with Kurt Lewin's unfreezing → moving → refreezing three steps, which was a post hoc reconstruction of his work [10].

All systems changes do not originate from human initiatives. With the passing of an era of predictable stable states, enduring dynamism calls for continuous adaptation and learning [11]. Interdependencies and processes external to a primary system of interest can give rise to turbulent fields [12]. In Western philosophy, Aristotle's emphasis on substance and causality largely suppressed Heraclitus's ancient Greek doctrine (circa 500 BCE) of a world in continual flux [13], [14]. In Chinese culture from the Warring States Period (403-221 BCE), a more processual philosophy traces back to the School of Naturalists, also known as the Yinyang School [15].

Authentic systems methods are founded on systems theories. Conventional theories rooted on Western science stem from an Enlightment-era philosophy of science (from Descartes 1687 CE, to Kant 1804 CE). Consequently, redeveloping systems methods in a processual mode necessitates alternative foundational theories and a different philosophy of science.

2. HISTORIES OF SYSTEMS IN PHILOSOPHIES, SCIENCES AND METHODS

The science of systems is inherently transdisciplinary, contributing knowledge by spanning disciplines [16], [17]. Systems thinking, in practice, integrates methods, sciences, and philosophy. Historically, a mindset prioritizing stability has often overshadowed the dynamic nature of systems. This section examines the historical development of systems philosophies, sciences, and methods, questioning their adequacy in addressing continuous change.

2.1 History of philosophies of science on systems

Galilean topology was at the root for Kurt Lewin (1890-1947) in his applied psychology on social change [18], [19]. A single physical space could have a plurality of psychological worlds [20]. This legacy led Fred Emery and Eric Trist into characterizing vectors and lawfulness in their studies of Socio-Technical Systems (STS) and Socio-Ecological Systems (SES) perspectives. When analyzing systems changes, this foundation of linking physical space to human psychology has sustained concepts like punctuated equilibria and the unfreeze-move-refreeze stages.

Organism was at the root for systems biology, and the General Systems Theory (GST) of Ludwig von Bertalanffy (1901-1972) [21], [22]. For Kenneth Boulding, GST was not as "a general theory of practically everything", but "the skeleton of science" [23]. Concurrent with the release of a systems philosophy by Ervin Laszlo, von Bertalanffy championed a new paradigm of a

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synthetic philosophy [24]. Inquiring into systems changes, putting things together (i.e. synthesis) as developmental and/or evolutionary was foregrounded over the tradition of taking things apart (i.e. analysis).

Non-relativistic pragmatism was at the root of Russell Ackoff's (1919-2009) idealized design and C. West Churchman's (1913-2004) inquiring systems. Descending from William James (1842-1910), Edgar A. Singer Jr. (1873-1954) saw pragmatism in a struggle between realism and idealism [25]. Churchman and Ackoff continued this tradition counter to logical positivism and critical rationalism, advocating for sciencing as a collective endeavour, rather than just individual opinions [26]. Researching systems changes, the struggles towards desired collective futures and immediate feasible practicalities commonly appear.

Causal texture in psychology was extended into organizational theory by Eric L. Trist (1909-1993), partnered with Fred E. Emery (1925-1997). Trist narrowed von Bertalanffy's general systems scope into a theory of open systems in human relations. Social organizations were expressed as systems of interdependencies, following Andras Angyal's (1902-1960) dynamic holism [27]. While Emery was committed to purposiveness (i.e. goal-directed behaviour), Trist stayed halfway between ateleological and teleological positions. In 1968, Trist turned philosophically towards organizational ecology [28, p. 230] via Sir Geoffrey Vickers' *Appreciative Behaviour* [29]. Emery complemented the turn in recognizing the emergence of the psychological ecology of J.J. Gibson [30], [31]. These turns led to theoretical advancements in Socio-Psychological Systems (SPS), STS, and SES perspectives in structuring work organizing, through periods of transition.

The *phenomenology* of Martin Heidegger is a foundation for history-making disclosing by Charles Spinosa, Fernando Flores, and Hubert Dreyfus (1929-2017) [32]. *History-making* is an ontological skill for regularly seeing oneself and the world, in disclosing new ways of being. A *new world* is a disclosive space, in which webs of practices and things have meaning that is no longer strange. *Style* is a ground of meaning in human activity, on which practices are conserved, a basis for developing new practices. The customary disclosing of general everyday activity is distinguished from historical disclosing as changing style. Skills for recognizing these types of systems changes, can be developed both in individuals and in groups.

Complex ecology extends ecosystem ecology, which links biotic and abiotic components through nutrient cycles and energy flows. Timothy F.H. Allen defined complexity as distinct from complicatedness, emphasizing (i) hierarchy, (ii) scale, and (iii) cross-scale interactions [33]. Unlike ecology and conservation that focus on end states, complexity-based approaches highlight the flux between interacting forces, and emerging order and dynamism. For an inquiry into systems changes, appreciation of living systems beyond human beings (e.g. plants) is embraced.

The *systems sciences*, as proposed in "Rethinking Systems Thinking" [1], source Aristotle for the primary intellectual virtues of episteme (know why), techne (know how), and phronesis (know when, know where, know whom). Aristotle sequenced phronesis (practical ethics) ahead of episteme (analytic scientific knowledge), and techne (technology knowledge). For an inquiry into systems changes, the effects of human action (or inaction) are extended beyond rationalism.

Ecological epistemology underpins the relational developmental anthropology of Tim Ingold, evolving over decades. The first stage revisited Heidegger on dwelling [34] where most readers foreground space over temporality. *The Perception of the Environment* [35] elevated temporality beyond chronological time (viz. clock time) or historical occurrences (viz. events), into lives as concurrent cycles in complex interweavings. The second stage in *Being Alive* [36] extended the processual view to include movement, as lives expressed as lines, threads, and traces, entangled in textures of meshworks. In the third stage of *Imagining for Real* [37], knots turned more participative as human correspondence (viz. lifelines journeying alongside each other, co-responding). For systems changes, useful metaphors foregrounding time and living are unpacked.

Contextual-dyadic thinking, as explained by Keekok Lee in *The Philosophical Foundations of Classical Chinese Medicine* [38], conveys a processual understanding of yinyang. In dyadic thinking, a term presupposes its opposite, e.g. "filling" implies "emptying". Unlike dualism built on context-independence (e.g. a drug works universally), dyadicism is context-coupled (e.g. herbs that nourish yang qi in winter cause an excess in summer). The philosophy of science is associated with the Yinyang School of Naturalists (770-221 BCE), as one of six philosophies in the Warring States period [15]. Engaging with yinyang philosophy tangles three threads: (i) the *YiJing* (Book of Changes) for processual foundations; (ii) *Daojia* (the philosophical branch of Daoism, distinct from the religious branch of *Daojiao*), both source from the *DaoDeJing* (The Way and its Virtue); and (iii) the *Huangdi Neijing* (The Yellow Emperor's Inner Classic). The processual nature of the School of Naturalists is an alternative foundation for systems changes, in a philosophy of body relevant to centuries of Chinese medical practices.

Pluralist pragmatism, from Stephen C. Pepper (1891-1972) traces a lineage from William James (1842-1910) [39] that extends into the Causal Texture Theory of Emery and Trist [12]. Michael C. Jackson notes Pepper's "much neglected contribution" to Critical Systems Practice [40, p. 585]. While some philosophers seek a "world theory" that objectively reasons through reality, pragmatism is a philosophy of doubt. Thus, "hypothesis" is used where others might declare "theory", in a middle course between utter skepticism and dogmatism. Pepper outlined four World Hypotheses with root metaphors, as shown in Table 1 below: formism, mechanism, organicism, and contextualism [41]. Contextualism is most misunderstood.

Table 1: Four relatively adequate world hypotheses.

	Dispersive	*Integrative*
Analytic	**Formism** *Root metaphor*: Similarity, are recurrence of recognizable feature	**Mechanism** *Root metaphor*: Machine, where exerting force or energy produces predictable outcomes
Synthetic	**Contexualism** *Root metaphor*: Situation, as a historic event in its living actuality	**Organicism** *Root metaphor*: Constructive development, with orderliness of changes from stage to stage

Attention should be drawn to the schema dimensions, as (i) theoretical mode of reasoning as analytic or synthetic, and (ii)

theoretical model of organizing evidence as dispersive or integrative.

Analytic world theories presume parts in relations, and each whole is inferred. *Synthetic* world theories presume wholes, and parts in relations are inferred. *Dispersive* world theories presume unpredictability, denying determinate order. *Integrative* world theories presume determinate order, denying unpredictability. The schema dimensions are clearer in Table 2, below.

Table 2: Ways evidence is recognized and interpreted.

	Dispersive manner of organizing evidence	*Integrative manner of organizing evidence*
Analytic	**Formism** *Analytic*: parts in relations are presumed; each whole is inferred. *Dispersive*: unpredictability (non-determinism) is presumed; determinate order is denied.	**Mechanism** *Analytic*: parts in relations are presumed; each whole is inferred. *Integrative*: determinate order is presumed; unpredictability (non-determinism) is denied.
Synthetic	**Contexualism** *Synthetic*: wholes are presumed; parts in relations are inferred. *Dispersive*: unpredictability (non-determinism) is presumed; determinate order is denied.	**Organicism** *Synthetic*: wholes are presumed; parts in relations are inferred. *Integrative*: determinate order is presumed; unpredictability (non-determinism) is denied.

Formism is analytic and dispersive. The root metaphor of *similarity* reasons from parts into a whole, with evidence arriving unpredictably for organizing.

Mechanism is analytic and integrative. The root metaphor of a *machine* reasons from parts into a whole, with evidence arriving in a determinate order.

Contextualism is synthetic and dispersive. The root metaphor of *situation* reasons from the whole into parts, with evidence arriving unpredictably for organizing.

Organicism is synthetic and integrative. The root metaphor of *constructive development* reasons from the whole into parts, with evidence arriving in a determinate order.

World hypotheses include maxims such as "each world hypothesis is autonomous", and "eclecticism is confusing" [41, pp. 98–113]. Pepper suggested the systems philosophy of Ervin Laszlo be regarded as world hypothesis, with a root metaphor of "dynamic self-regulating system" [42]. Pepper himself proposed *selectivism* as a fifth world hypothesis emphasizing choice and interpretation of knowledge, with some doubt of sufficient contrast from contextualism [43], [44]. Ronald Hoeflin found selectivism inadequate, then proposing neoselectivism as an adequate world hypothesis [45]. Given pragmatism's pluralistic nature, the development of new world hypotheses remains open.

Ultimately, a systems theory is built upon a philosophy of science. As Keekok Lee aptly states regarding classical Chinese philosophy in a Western-dominated world "one should not judge a cat show by the standards of a dog show" [46, p. 4]. Expanding the scope to explore systems changes approaches offers an opportunity to support new theories beyond Western traditions.

2.2 History of sciences on systems

The theoretical underpinnings of contemporary systems thinking trace back to WWII. Many 21st century systems theories stand on the shoulders of 20th century first- and second-generation researchers. Reducing the systems sciences into a discipline is counterproductive. Advancements that expand the field in a post-Internet, post-globalization era should be embraced.

The mid-20th century saw the founding of the sciences of systems. The Macy Conferences (1946-1953) on "Feedback Mechanisms and Circular Causal Systems in Biological and Social Systems" gave rise to cybernetics. Emerging from the American Association for the Advancement of Science in 1956, the Society for General Systems Research was founded to emphasize wholism, interdisciplinarity, and the identification of unifying principles.

Researchers from the Open University have clustered 20th century systems thinkers into seven groups: (i) Early Cybernetics includes Gregory Bateson, Norbert Wiener, Warren McCulloch, Margaret Mead, and W. Ross Ashby; (ii) General Systems Theory includes Ludwig von Bertalanffy, Kenneth Boulding, Geoffrey Vickers, and Howard Odum; (iii) System Dynamics includes Jay Forrester, Donella Meadow, and Peter Senge; (iv) Soft and Critical Systems includes C. West Churchman, Russell Ackoff, Peter Checkland, Werner Ulrich, and Michael C. Jackson; (v) Later Cybernetics includes Heinz von Foerster, Stafford Beer, Humberto Maturana, Niklas Luhmann, and Paul Watzlawick; (vi) Complexity Theory includes Ilya Prigogine, Stuart Kauffman, and James Lovelock; (vii) Learning Systems includes Kurt Lewin, Eric Trist, Chris Argyris, Donald Schon, and Mary Catherine Bateson [47].

This research into systems changes initiated in 2019 most closely aligns with (i) General Systems Theory, (ii) Soft and Critical Systems, and (iii) Learning Systems. A new generation of 21st century researchers should be recognized as contributors towards expanding the systems sciences. The seven groups of systems thinkers above can be extended with five emerging groupings.

Practice Theory has extended social theories of learning with new information technologies. Hubert Dreyfus built on Heideggerian phenomenology with models of skill acquisition and competencies that "computers can't do" [48], [49]. Entrepreneur Fernando Flores advanced speech act theory into the Language Action Perspective of commitment management, and the disclosing of new worlds [50], [51], [52]. Education theorist Etienne Wenger extended research connecting social and technological aspects of work from the Xerox Institute for Research of Learning into communities of practice [53]. Unlike the Learning Systems group above focused on industrial production, these advances in practice theory addressed mediated communications amongst workers, not necessarily collocated.

Social Ecological Systems emerged from ecosystem ecology, focusing on energy flows through living and non-living systems. Ecologist C. S. Holling (1930-2019), part of the Resilience Alliance, devised an integrated theory of change leading to

panarchy and the adaptive cycle [54], [55]. Botanist Timothy F.H. Allen (1942-2025), also of the Resilience Alliance, developed hierarchy theory emphasizing levels of organization and scale, leading to understanding complexity and complicatedness in sustainability [33], [56], [57]. Systems ecologist Johan Rockström introduced the planetary boundaries framework, identifying nine global change processes where threshold transgressions could lead to irreversible, deleterious, or catastrophic regime shifts [58], [59]. This grouping originates from a Complexity Theory hard science view of ecology, broadened with an embrace of General Systems Theory.

Service Science emerged with the information revolution. Business theorist Richard Normann (1943-2003) foreshadowed the field as service management [60], economic offerings, and value creation. Computer scientist Jim Spohrer initiated service science in industry [61], fostering a new academic discipline [62]. Systems theorist Gary S. Metcalf provided insights from the systems sciences into service science [63]. This domain of study was not conceivable in the mainframe or personal computing eras.

Systemic Design has encouraged design researchers to move beyond products and services to address larger societal issues. The challenge of complex sociotechnical systems spurred a DesignX movement combining expertise in multidisciplinary teams [64], [65], [66]. The intersection of systems sciences and design traces back to the 1970s Berkeley Bubble [67], with the inception of wicked problems [68]. Design theorist Harold Nelson proposed a philosophy of design rooted in systems inquiry and action [69]. From 2012, industrial designer Birger Sevaldson in Oslo and human factors designer Peter Jones in Toronto initiated symposiums on Relating Systems Thinking and Design [70]. This tradition continues in Systemic Design Association.

Ecological Anthropology reorients the study of human systems towards relational and processual perspectives. Ecological psychologist J.J. Gibson (1904-1979) devised the concept of affordance [30], counter to the behavioral psychology focus on "what is inside your head" to "what your head is inside" [71]. Anthropologist Gregory Bateson (1904-1980) advocated an ecological epistemology, with organisms knowing through engaging and participating in shared common experiences [72], [73]. Anthropologist Tim Ingold refined this processual ecological approach from "becoming with" to "becoming alongside" as correspondence [74]. These perspectives provide a better articulation of systems changes, offering more precise vocabulary through an appreciation of threads (or lines) in time, knots conjoined for varying durations, and meshworks as imperfect weavings.

Postcolonial and Classical Chinese Philosophy of Science constructs a hybrid alternative to modernist approaches originating from the 17th century Scientific Revolution. Keekok Lee synthesizes *The Philosophical Foundations of Classical Chinese Medicine*, introducing contextual-dyadic thinking as a systems science aligned with process ontology, in contrast to Western biomedicine [38]. Sinologist François Jullien counters the western perspective on causality, through propensity in inclination and disposition, for taking action with auspicious timing [75], [76]. Science and Technology Studies (STS) scholar John Law, following the correlative thinking of Chinese philosophy [77], has inquired into postcolonial practices through ethnographic studies of Chinese medical professionals [78], [79], [80]. The science of Chinese medicine, grounded in an alternative philosophy of science, opens opportunities to recast an appreciation of living systems.

The five groupings of research above advance the rethinking of systems beyond the 20th century mindset.

Research on change, with lesser emphasis on systems, has also advanced. Concerns about the validity of scaling pilot program to full implementation led to *Theory-Driven Evaluation* [81]. *Theory-Based Evaluation* collects data in the phases of causes and effects (i.e. program theory) sequences to enable pinpointing breakdowns [82]. *Theory of Change* has matured as comprising (i) program theory of how activities should generate change, and (ii) implementation theory on how the program should practically work [83]. The audience for the evaluation community is primarily funders, interested in before-and-after testing and validation. For members inside a system of interest, interests of self-healing or allowing natures to take their courses is more probably preferred to an externally-drive intervention.

The systems sciences were originally conceived to develop theories applicable across more than one discipline. In this spirit, the legacy of 20th century luminaries should welcome complements sweeping-in the work of researchers today.

2.3 History of systems methods

Systems methods and systems methodologies derive from diverse branches of systems theories and their underlying philosophies. While *systemic practice* involves "thinking in terms of wholes", *systematic practice* implies "linear, step-by-step thinking" [84, p. 148]. Systems engineers and systems scientists jointly created a working definition of "systems praxis" as translating theory into action by thinking and acting in terms of systems; and the act of engaging, applying, exercising, realizing, or practicing ideas about systems [85], [86]. For systemicists, *method* is "a procedure that can be regularly applied to solve some kind of problems or to manage some types of issues" [87]. A *methodology* "in general, is defined as a set of coherent, related, and internally consistent methods applicable to pursuing disciplined inquiry" [88, p. 27]. These methods and methodologies can be associated with organizational restructuring, social systems design, ecosystem approaches, systemic design, and pattern language.

Organizational restructuring traces back to post-WWII psychologists at the Tavistock Institute for Human Relations developing three perspectives [89, p. 294].

The Socio-Psychological Systems (SPS) perspective addressed social phenomena in primary groups (i.e. work teams), families, organizations, and broader society [90, p. 37]. Kurt Lewin theorized establishing permanent change through three aspects: "unfreezing (if necessary) the present level L^1, moving to the new level L^2, and freezing group life on the new level", securing the force field against catharsis [91, pp. 34–35]. Leon Festinger, a student of Lewin, relabelled the new level as "refreezing", that subsequently has been repackaged and marketed in the discipline of change management [10].

The Socio-Technical Systems (SPS) perspective championed action research as its primary method [92, p. 557], [93]. Two organization genotypes were proposed for the design of working systems: Design Principle 1 (DP1) with *redundancy of parts* as replaceable plug-ins, and Design Principle 2 (DP2) with

redundancy of function as human capable of assuming varied roles [94]. The rise of interorganizational value creation and creative collaborations further led to a Design Principle 3 (DP3) as a redundancy of potentialities, as latent options available for activation in response to unexpected changes [95]. The STS perspective originating with industrial machines has been extended into 21st century workplaces centered on microprocessors [96], [97], [98], [99].

The Socio-Ecological Systems (SES) perspective arose with large organizations facing increasingly rapidly complex environmental contexts. Lawful connections were identified as: L_{11} processes within the organization, L_{12} and L_{21} exchanges between the organization and environment, and L_{22} causal textures in which processes in the environment interdependently relate to each other. This categorization of connections yielded four types of causal textures: (i) a placid, randomized environment; (ii) a placid, clustered environment; (iii) a disturbed-reactive environment; and (iv) turbulent fields [12]. After a long history of collaboration since the 1960s, the two researchers diverged on methods in the 1970s. Emery promoted 2-day offsite search conferences, sequenced according to the lawful connections [100]. Trist closed out his academic career developing contextual action research, visiting the Action Learning Group at York University in Toronto [101].

The SPS and STS traditions have become embedded in industrial psychology and organizational development. The SES heritage has extended into environmental deterioration [102], [103] and scenario planning [104], generally, orienting towards methods for futures thinking and management.

Social Systems Design methods have largely progressed from Critical Systems Theory into multimethodology. A *System of Systems Methodologies* (SOSM), initially developed in 1984, was expanded into a six-cell grid of problem contexts, for (i) systems as complex, complicated, and simple; and (ii) stakeholders as unitary, pluralist, and coercive [40, pp. 162–166]. Critical Systems Practice has four stages, as EPIC: (i) Explore the problem situation; (ii) Produce an intervention strategy; (iii) Intervene flexibly; and (iv) Check on progress [105]. These approaches focus on human systems, useful both in public and private organizations.

Social Ecological Systems methods trace their origins with Buzz Holling in 1982 in The Resilience Project. This was initiated under the premise of conflict between ecologists and economists working at different scales [106, p. 72]. Six years later, the open access *Ecology & Society*, "a journal of integrative science for resilience and sustainability", began inviting contributions that "treat humans as a part of and not apart from nature" [107]. The Resilience Alliance led research meetings, resulting in the three books: *Discontinuity in Ecosystems, Navigating Social-Ecological Systems*, and *Panarchy*. The fourth book on "Discontinuities in Economics" was not produced, as economists and decision theorists accustomed to models based on one or two variables resisted exploring the complexity of multi-stable states [106, p. 80]. This research problem has endured in Ecological Economics, where countering the "focus on efficiency over resilience" continues [108, p. 205]. Another branch further developing theory on Self-Organizing Holarchic Open (SOHO) systems [109], has evolved into the Adaptive Methodology for Ecosystem Sustainability and Health (AMESH) [110], [111]. In 2025, the Resilience Alliance joined with the Program on Ecosystem Change and Society (PECS) to form the Society for Social-Ecological Systems (SocSES).

Systemic Design methods in the 21st century have expanded beyond innovation in products and services, towards social transformation and leadership. Design 4.0, as social transformation design, was introduced as visual sensemaking through design research and co-creation [112]. Extending research on wicked problems [68], Peter Jones categorized a fourth generation of design as generative, with 10 principles: (i) idealization; (ii) appreciating complexity; (iii) purpose finding; (iv) boundary framing; (v) requisite variety; (vi) feedback coordination; (vii) system ordering; (viii) generative emergence; (ix) continuous adaptation; and (x) self-organizing [113]. Birger Sevaldson pioneered Gigamapping methods to investigate relations across layers and scales, leading to boundary critique and reframing [114], [115], [116]. Synthesis maps are related, with an emphasis on critical reasoning and creative making [117]. In parallel, a Design Journeys handbook aids participatory practices guided with a Systemic Design Toolkit [113], [118]. Traditional theories of change criticized as linear and reductive may be approached more systemically with causal loop diagrams and leverage analysis to identify high-impact intervention points [119]. In the UK, Design Council research explored challenges of moving from discrete problems with workable solutions, towards transitions that address the unfolding nature of systemic opportunities [120]. This led to updating the Double Diamond (i.e. discover, define, develop, deliver) with design principles and a methods bank as a Framework for Innovation [121]. This framework underpins a Systemic Design Toolkit for Design for Planet, aiming for (i) zero emissions, (ii) circular economy, and (iii) regenerating biodiversity and community skills [122].

Pattern Language methods for built environments originating in the 1970s from Christopher Alexander [123], [124], [125], [126] were fully explicated in a high school project in Japan [127]. These methods became cross-appropriated in the 1990s by members of the Hillside Group for software design [128], [129], and development methods [130], [131]. Card decks have been developed across a variety of application contexts [132]. The Liberating Voices pattern language encourages collaboration and civic intelligence for democratic societies [133]. Applications of pattern languages for social change have also been explored [134], [135], [136]. In corporate work, IBM received a patent for a "System and method for systems integration" based on pattern language [137]. Development method content was authored as the Open Unified Process and released under open source licensing [138], [139]. This Unified Method Architecture became standardized in 2008 as a "Software & Systems Process Engineering Metamodel" version 2.0, published by the Object Management Group [140]. With the patent expired in 2022, and tools available under open source licensing, this enterprise-scale approach shows potential for renewal.

These historical developments in systems methods reveal a distinct shift: less concern for legacy and more emphasis on innovation. Accelerating change and critical perspectives on the scope of interventions, have blurred disciplinary boundaries, leading to new approaches that embrace diverse challenges.

3. RESEARCH APPROACH ON SYSTEMS CHANGES

Research into Systems Changes Learning began in 2019 as an espoused 10-year action learning initiative, as a deliberate departure from mainstream systems thinking, [4]. This initiative

concurrently developed in three co-related streams: philosophizing, theorizing, and methodizing.

3.1 Philosophizing: Metaphilosophical and constructionist

While Western systems thinking rests primordially on substance philosophy, research into systems changes is better served by a processual philosophy. Beyond scientific paradigms and metascience, the conceptual divergence elevating processes leads to exploring metaphilosophy.

In the 1970s, Ervin Laszlo advocated "A Case for Systems Philosophy", countering "analysis-dominated philosophy" [5, p. 139]. Ludwig von Bertalanffy, the father of General Systems Theory, concurred with thus call for a "synthetic" philosophy [6]. Reviewing Lazslo's book, Stephen C. Pepper proposed "Systems Philosophy as a World Hypothesis" [7]. A published response by Laszlo to this proposal has not been found.

Taking an explicit metaphilosophical position, Pepper "insisted that there is more than one type of value", arguing that more than one world hypothesis would be adequate to "explain or describe our world" [8, p. 375]. Comparative philosophy, especially across classical Western and Chinese traditions, contrasts cultural and regional distinctions.

Ronnie Littlejohn proposes "constructionist philosophy" that gives "birth to an emerging standpoint different from both the history of Chinese philosophy and that of Western philosophy" [9, p. 152]. This approach, leveraging traditions preserved through diasporic lineages, supports critical reflection on a philosophy of science where classical Chinese philosophy has largely been subsumed by modern rationalism in section 4 below.

3.2 Theorizing: Multiparadigm with appreciative systems

Multiparadigm inquiry in management research encourages moving beyond a single scientific paradigm to "explore plurality and paradox" [10, p. 252]. Seeds for multiparadigm inquiry originate in the sociological paradigms of Burrell and Morgan, with dimensions of the nature of social science (subjective – objective) and the nature of society (regulation and radical change) [11]. Those four paradigms of accepted theories, methods, and assumptions within a scientific discipline have been extended and broadened in the systems literature.

Appreciative systems, as distinguished by Sir Geoffrey Vickers, offers a practical framework for understanding systems theories across epistemology, evaluation, and the world of action. Appreciation has three components: (i) *reality judgments* "concerning what is or is not the case", (ii) *value judgments* "concerning what ought or ought not be the case", and *instrumental judgments* "concerning the best means available to reduce the mismatch between is and ought" [15, p. xix]. This framework of three judgments is useful for comparing the variety of systems changes approaches in section 5 below.

Abductive theory creation is a "cyclical process of identifying and confirming anomalies and generating and evaluating hunches at individual and collective levels" [12]. Development in multiparadigm interplay is performed in three steps: (i) "separate analyses are conducted in each paradigm", (ii) "the analyses are then contrasted", and (iii) ", the analyses are placed in interaction" in a new theoretical framework [13, p. 433].

Theorizing through an interplay of appreciative systems across architectural design, ecological anthropology, Chinese Medicine and rhythm, a theory of systems rhythms is abduced on section 5 below,

3.3 Methodizing: Contextural action learning longitudinally

(Con)textural Action Learning has been developed as a methodological approach that aligns with theorizing and philosophizing. It aims to reduce misleading metaphors for novices by providing reasoned guidance for practitioners, grounded in a coherent philosophy of science for mentors.

Educating of attention, for novices and advanced beginners, reorients from presumptions of intention. This involves shifts in: (i) praxis from behavioral → ecological; (ii) theoria from changelessness → temporality; and (iii) poiesis from causality → propensity.

Learning for co-relating, for competent and proficient skill levels, reorients fields *temporally and spatially*. This includes: (i) praxis as action-agencing from knowing-in-action with step-by-step practices → reflecting-in-action with situational adjustments; (ii) theoria as processual-enskilling, from linear analysis → pathological traps of yinyang dyads in contextures; and (iii) poiesis as methods weaving as (a) learning *which* shifts matter, (b) learning *what* rhythmic disorders prevail, (c) learning *why* a prognosis is preferred, (d) learning *whom-when-where* resets are valued or disfavoured, and (e) learning *how* new ways become everyday practice.

Learning for articulating shifts in styles, for experts, reorients from analytic decision-making to intuition. This involves: (i) praxis as action-guiding from deductive modelling to situation → inductive situation through concerns; (ii) theoria as western science → post-colonial science; and (iii) poiesis as methods-composing, from invention → mass customization.

In a learning-by-doing style, the Systems Changes Learning Circle comprising practitioners, theorists, and philosophers, progressing methodizing through mutual engagement and reification of meaning.

4. PHILOSOPHIZING ON SYSTEMS CHANGES

A 21st-century constructionist philosophy reinterprets language and culture, fostering a pluralistic view that leverages and re-creates meaning from diverse texts and traditions [141].

4.1 Bridging Western and Classical Chinese Traditions

Western studies of Chinese philosophy have historically followed three paradigms: exclusionist, comparative, and constructionist: (i) exclusionist, (ii) comparative, and (iii) constructionist [142]. A constructionist approach to post-colonial science, by Wen-Yuan Lin and John Law, learns from systems practices of medical practitioners in Taiwan [78].

Contextural Action Learning [143] developed 1978-1983 by the *Action Research Group* at York University [144], [145] evolved from the SES perspective of Eric Trist. This understanding of contextualism can be complemented with 21st century advances in ecological anthropology (e.g. lines and meshwork [146]). Metaphilosophizing further sweeps in contextual-dyadic thinking [147], yinyang in CCM [148], [149], and Euro-Chinese philosophy (e.g. efficacy [75]). While the temporality in process philosophy (e.g. Alfred North Whitehead), and recent research into rhythms of strategy [150] are acknowledged, a distinct

philosophy of kairotic systems rhythms is defined by beings defined as living.

To reduce misdirection, contextualism extended with dyadicism is explicitly signified as (con)texturalism-dyadicism.

Qi is basic ontological category accounting for *wanwu* (countless things) in life, embodying the processual view of dyadic transformations of *yang* (as immaterial) from/to *yin* (as material). Interpreting from the *Zhuangzi*: "*Qi* was capable of two modes of existence or being .... These two modes of being may be called: (a) *Qi*-in-concentrating-mode (*qi ju* / 气聚); (b) *Qi*-in-dissipating-mode (*qi san* / 气散) …. These two modes of being are inter-related, inter-transformable [151, pp. 42–43].

(Con)texturalism-dyadicism is a processual systems approach with an ecological perspective. It simultaneously observes (i) changes in yinyang in a body, alongside (ii) changes in yinyang in the natural world. In the yinyang relationship within a living being: "*Yin* is the structure (*ti* 體), and *yang* is the function (*yong* 用)" [152, pp. 172–173]. From processual systems orientation, *Qi*-in-dissipating mode signifies *functioning*, and *Qi*-in-concentrating mode signifies *structuring*.

4.2 Philosophizing Systems Based on World Hypotheses

Maxims of world hypotheses dictate that "each world hypothesis is autonomous", and "eclecticism is confusing" [41, pp. 98–113]. Given a STS perspective related to organicism and SES perspective related to contextualism, the (con)texturalist-dyadic view is offered as a new world hypothesis with a distinct root metaphor. Reiterating the features of Contextualism and Organicism in Table 3 below, (Con)texturalism-Dyadicism follows a synthetic mode of reasoning, while dissolving the distinction between dispersive and integrative manners for organizing evidence.

A *root metaphor* of yinyang dancing through [four] seasons expresses the complexity of (con)texturalism-dyadicism. Four seasons correspond to four directions or regions (Sifang 四方). An alternative of eight seasons would be compatible with the next level of detail (i.e. bagua 八卦) as eight trigrams.

The dyadicism of "yinyang dancing" is expressed as "((*yin qi*) ∝ 1/(*yang qi*)) wayfaring". The mathematical symbol ∝ is not an alpha, and should be read as "is proportional". *Yin qi* and *yang qi* are inversely proportional, i.e. *yin qi* increases as *yang qi* decreases, and vice versa. Wayfaring denotes *yin* and *yang* as *kairotic*, yet deterministic. A simile for yinyang is a couple engaged in ballroom dancing.

The (con)textualism of "[four] seasons" manifests as an "unfolding *wanwu* [concentrating ⇌ dissipating] texture. The right-left harpoon arrows (⇌), normally used to denote equilibrium in chemistry, here represent the reversibility of dissipating process alongside concentrating process. The textures comprise myriad (countless) temporal strands, and are rhythmically cyclical.

The *theory of truth* of (con)texturalism-dyadicism is entailment, a traceability back through history, with anticipated outcomes indetermined. "Entailment and causality are linked concepts, the difference being that causality is 'what does happen' and entailment refers to 'what COULD happen'. Nothing can happen that isn't entailed" [154]. Thus, (con)texturalism allows tracing an outcome back through entailments, without assuming forward-looking causality, e.g. the existence of a child entails parents, but a couple marrying doesn't necessarily cause children. Dyadicism maintains coherence through continuing processual eurhythmia, where living systems can overcome temporary periods of incoherence, as arrhythmia.

Table 3. Contextualism and Organicism, with a new world hypothesis in (Con)texturalism-Dyadicism

<table>
<tr><td></td><td>Dispersive manner for organizing evidence</td><td>Integrative manner for organizing evidence</td></tr>
<tr><td rowspan="3">Synthetic mode or reasoning</td><td>Contextualism
Root metaphor:
Situation, as a historic event in its living actuality

Theory of truth:
Operationalism, via qualitative confirmation of solving a specific problem
Categories:
Strands, texture, quality, novelty
Nature of time:
Qualitative duration, event relative to a specious present</td><td>Organicism
Root metaphor:
Constructive development, with orderliness of changes from stage to stage
Theory of truth:
Coherence, where fragments cohere with their nexus, free of contradiction
Categories:
Progression (steps), final outcome (ideal)
Nature of time:
Directional arrow, successive integrations</td></tr>
<tr><td colspan="2">(Con)texturalism – Dyadicism
Root metaphor: Yinyang dancing through [four] seasons, as ((yin qi) ∝ 1/(yang qi)) wayfaring in unfolding wanwu [concentrating ⇌ dissipating] textures
Theory of truth: Entailment, traceability back through history, with anticipated outcomes indetermined
Categories: Rhythmic shifts in (con)textures, situational propensity, dyadic diachrony
Nature of time: Kairotic, with propitious periods and inopportune periods</td></tr>
<tr><td></td><td colspan="2">Dispersive + integrative manner for organizing evidence</td></tr>
</table>

Categories for (con)texturalism-dyadicism include (i) rhythmic shifts in (con)textures, (ii) situational propensity, and (iii) dyadic diachrony. Temporality is conveyed through a rhythmic (life)line, woven into the evolving fabric of (con)textures. Eurhythmia may be disrupted when the system of interest, as a thread, pulses out of step with its texture, or vice versa. Situational propensity is a predisposition inherent in the nature of a thread or texture, unfolding through phases of opportunities and adversity. These movements are non-causal, shaped more by contextual complexities than by linear determinism [155], [76]. Dyadic diachrony involves the interweaving of pairs of complementary strands together in the dynamic interplay between yang and yin through time. Rhythms are generative rhythms, with yang *qi* (as function, radiating, expanding) and yin *qi* (as structure, absorbing, contracting) evolving in the weaves.

The *nature of time* in (con)texturalism-dyadicism is kairotic, rather than chronotic, observed as complex cycles of propitious phases and inopportune intervals for activities. Simply, *kairos* is qualitative duration as felt time "of human activity, of

opportunity"; *chronos* is clock time "measured by the chronometer not by purpose" [153, p. 686]. (Con)texturalism places an event in its specious present of textures of polyrhythms. Dyadicism in a system of interest generally follows pairs of rhythms symmetrically, with brief arrythmia of rushing or dragging tolerable.

Developing an adequate new world hypothesis is inherently philosophical. For those who prefer to remain within scientific discourse, section 5 explores paradigms.

5. THEORIZING ON SYSTEMS CHANGES LEARNING

Building a new theory of systems changes through multiparadigm inquiry involves two steps. First, four existing systems approaches are detailed using the appreciative systems framework. Second, a fifth theory is proposed as an abductive step.

5.1 Theorizing Systems Changes via Architecture

Systems changes in architectural design primarily center on built environments. Christopher Alexander pioneered pattern languages for towns, neighborhoods, gardens, and rooms.

Reality judgments on *differentiating space* were based on building physically on the land, not on the drawing of blueprints.
Value judgments on *living order* introduced as "systems generating systems" became "The Quality Without a Name".
Instrumental judgements on *unfolding patterns* of constructing and repairing elaborated in the generative unfolding of order.

While interpreters of Heidegger might read dwelling (*bauen* [34]) as being in place, dwelling can also unfold in time.

5.2 Theorizing Systems Changes via Ecological Anthropology

Systems changes, in an ecology of life, can be represented as threads woven with other strands.

Reality judgments on *lines of becoming* view lifelines as intersecting to form knots of varying durations, culminating in meshworks.
Value judgments on *continuity of living alongside other beings* include non-anthropocentric negotiations of sustainability.
Instrumental judgments on *form-giving as weaving* emcompass (i) growing as material accumulation, and (ii) making artifacts.

This subdomain of anthropology as ecological situates the task of humaning in the matrix of a common Earth.

5.3 Theorizing Systems Changes via Chinese Medicine

Systems changes in a healthy biology are observed, in CCM, as mutually transforming processes flowing naturally. Dysfunction or illness can be described as dysmutuality (e.g. blocked transforming), or dysdiachrony (e.g. impaired generating).

Reality judgments on *diseases as internal* are based on a philosophy of body, with pathogenic factors invading from the exterior, or dysfunctions between interior subsystems.
Value judgments on *wei* (action) prefer *wuwei* (unfolding effortless efficacy) over *youwei* (purposive intervention).
Instrumental judgments on *root issues(s) and manifestation(s*) are sequenced as acute or chronic conditions, treated by (i) tonifying yin or yang, or (ii) expelling pathogenic factors.

Chinese Medicine favours the self-healing of dyadic transforms within a body, responsive to diurnal and seasonal variations.

5.4 Theorizing Systems Changes via Rhythm

Systems changes of rhythms are typically approached through either movement (e.g. dance), or perception (e.g. music). While all rhythms are processes, not all processes are rhythms.

Reality judgments on *repetition in time* emphasizes *kairos* as felt by individuals, alongside *chronos* coordinating with others.
Value judgements on *collective polyrhythmia* are associated by individuals contributing towards eurhythmia or arrhythmia.
Instrumental judgments by individuals may *reduce to the personal (eigenrhythmus)* or *enskill to the whole (allrhythmus)*

Living systems are anticipatory with rhythms; e.g. expecting the next breath or heartbeat extends from the past. Rhythmic shifts, whether ephemeral or permanent, can challenge sustainability.

5.5 Abducing a Theory of Systems Rhythms

The four preceding theories each contribute distinct insights. Architecture demonstrates material evolution. Ecological anthropology adds the dimension of life alongside life. CCM introduces yinyang dyadicism. Rhythm infers anticipation. Abducing a theory of systems rhythms aims to surface ways to better appreciate shifts.

Abducing a reality judgment of systems changes as *rhythmic shifts in textures* puts mundane normal cycles into the background, drawing attention to outliers. A rhythmic shift might manifest as a thread either dragging or rushing in the texture, or the texture losing coherency through a diachronic unravelling. This processual approach to systems changes dissolves the traditional identification of a system and its boundaries.

Abducing a value judgment of systems changes as *situational propensity* emphasizes an inclination with contexturality. The emphasis in value shifts from what+why dichotomy of idealism⇋realism, towards the when+where of auspicious or unfortunate conditions. Judging value through timing contrasts to a presumption of "set the mind, and the body will follow", or gathering a "coalition of the willing" and then pressuring the less willing to join.

Abducing an instrumental judgment of systems changes as *reordering pacing* recognizes dyadic diachrony at play. A thread can couple with, and decouple from, (i) substantial weaves exhibiting heft and longevity, and (ii) ephemeral strands exhibiting agility and fluidity. The bindings and knots are generative relations that coevolve, leading to symbiotic interdependencies or speciation. Diachronic emergence sees novel properties developing unpredictably over time, with potential both for favourable or unfavourable outcomes. Dyadic genetics sees monadic reproduction as cloning, only as replication of a code that already exists. Dyadic recombination is the simplest of polyadic conditions (i.e. tetradic, octadic, etc.) towards moving beyond monadic. Metaphorically, coupling and decoupling at varying paces is akin to a traveler starting off on a bus, transferring to a train, and then boarding an aircraft.

A theory of changes based on systems rhythms embraces generativity with concurrent dissipating (emptying) and concentration (filling) processes in a synthetic (putting parts

together) mode. Living systems are selectively open to attaching and detaching with other threads, and/or textures.

6. CASE STUDY, METHODIZING PILOT

In March 2022, a workshop on "Systems Thinking through Changes" was conducted in cooperation with Code for Canada, for the Canadian Digital Service (CDS) [156]. Participants were guided through a framework employing a praxis process hub with four process spokes, as shown in Figure 1 below.

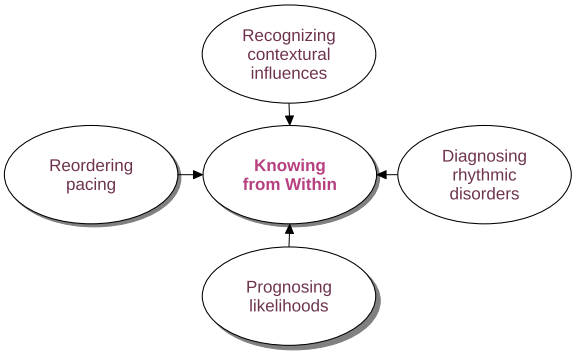


Figure 1. Praxis process hub with four process spokes

The framework is specified using the Object Process Methodology (OPM) [157] distinctions between essence (physical or informational), and origin (systemic or environmental). The central process of *Knowing from Within* has four process parts: (i) Recognizing contextural influences; (ii) Diagnosing rhythmic disorders; (iii) Prognosing likelihoods; and (iv) Reordering pacing.

6.1 Knowing from Within ≡ physical ∧ systemic

An inquiry on *Knowing from Within* specifies the primary system of interest for which kairotic rhythms have become a concern. That system should have the autonomy to respond, and the capacity to adopt treatments that might persist as remedies. Guiding questions include: (i) Which rhythmic shift(s) is/are more present to you? (ii) Which is your system of interest that (a) can should know, and (b) can adapt and/or learn?; and (iii) Which two dyadic processes carry on synthesizing to sustain living? During a timeboxed session, priority is on converging a primary system of interest, and listing rhythmic shifts of concern.

6.2 Contextural influences ≡ informational ∧ environmental

An inquiry on *Recognizing contextural influences* prioritizes concerns with and by rhythms and (non-)shifts in co-responding (life)lines. Guiding questions include: (i) What rhythms and (non-)shifts in the world co-relate into dysrhythmia?; (ii) What are the systems of influence in co-respondence, and are they tightly or loosely woven together?; and (iii) What trends in pacing, acceleration or deceleration in systems of influence are likelihoods anticipated to persist? This first step after *Knowing from Within* primes an ecological approach, outside-in.

6.3 Rhythmic disorders ≡ informational ∧ systemic

An inquiry on *Diagnosing rhythmic disorders* entails pathology as (i) excess/deficient warming/cooling, (ii) full/empty, and (iii) acute/chronic. Guiding questions include: (i) Is an immediate pathology showing with (a) yang or yin, as (b) excess or consumed?; (ii) Is the pathology acute (brief) or chronic (long-lasting)?; and (iii) Is the pathology trapped in a cyclical transformation? The techniques of Classical Chinese Medicine require some appreciation beyond Western science.

6.4 Prognosing likelihoods ≡ physical ∧ environmental

An inquiry on *Prognosing likelihoods* estimates the propensity by co-responding (life)lines in the contexture to resolve a pathology. Guiding questions include: (i) When in the contexture are (i) auspicious and (ii) inopportune times in which a treatment can be paced?; (ii) Where in the contexture is there a propensity (a) with advantage, and (b) with disadvantage?; and (iii) Whom are the likely (a) sponsors, (b) beneficiaries, and (c) disenfranchised from a treatment? Alternative courses of patience and/or action may be arise from a single diagnosis.

6.5 Reordering pacing ≡ physical ∧ systemic

An inquiry on *Reordering pacing* resequences disclosing of subworlds where a "new normal" is adopted and sustained as a style of coordinated actions. Guiding questions include: (i) How will skills be developed to deal with: as (a) unfolding nature, (b) fixing problems, or (c) making history?; (ii) How will the treatment be supported or constrained by (a) slower-larger threads and disorders, and (b) faster-smaller threads?; and (iii) How will negotiations proceed co-responding lines towards commitments of a new texture? From an ecological perspective, responses by a thread into a texture may be easy or difficult.

6.6 Cocreating deliverables came with examples and hints

To illustrate the hub and four spokes more concretely, two examples were offered: (i) a shift from pandemic working-from-home on (family) life; and (ii) a shift into a software app for venue vaccination tracking. The action learning guide presentation began with a 15-minute introduction. Breakout groups were then coached through a fill-in-the-blanks workbook.

As a pilot workshop conducted online for an afternoon, feedback from the CDS participants was positive. A subsequent session for the RCMP was conducted one year later.

7. DISCUSSION

An interest in systems changes reframes static snapshots into kairotic fluidity. A static approach is akin to comparing before-and-after photographs. A fluid approach is akin to video segments spliced together by a story editor pacing for aesthetics. The altered mindset reifies philosophy, theory, and methods.

7.1 Reifying philosophy: ↓ deterministic statics, ↑ polyrhythms + anticipation

Traditional systems analysis often model deterministic statics, moving from one equilibrium to another equilibrium. Scope is set as *ceteris paribus* "all other things being equal". Focusing on linear cause-effect relations simplifies modelling. However, a philosophy for systems changes of (con)texturalism-dyadicism, posits threads tangled up in polyrhythms that aren't static.

The influence of biology introduced *homeostatis* into General Systems Theory describing the way by which living organisms maintain stable internal conditions (e.g. body temperature) despite changing environments. A turn towards ecosystem complexity then introduced *homeorhesis* as the tendency of a system to return to a developmental trajectory, rather than a fixed state. Homeorhesis is quasi-deterministic, channeling

fluctuations and randomness towards consistent outcomes. In Pepper's original four world hypotheses, homeostatis and homeorhesis would be classified as integrative, presuming determinate order, and denying unpredictability.

Parsimony is often favoured in philosophy, with "Ockham's razor" preferring the simplest theory consistent with available evidence [158]. This inquiry into systems changes has approached "learning a more complex model first that facilitates the discovery of a useful parsimonious model" [159, p. 8]. Foregrounding the *changes* in systems changes stems from philosophy of science underpinning Chinese medicine, rather than a wholesale breadth of Chinese philosophy. The School of Naturalists from the Warring States period, like pre-Socratic philosophies (e.g., Heraclitus's flux vs. Parmenides's static being), debated opposing views of reality with contemporaries.

Linear thinking became mainstream in education following the Industrial Revolution, mirroring a factory model of schooling. Modernity favours analytical, logical approaches with direct cause-effect explanations. When stability is seen as the norm and changes are punctuated, charting depicts history as straight lines with occasional jumps.

Categorizing world hypotheses by their root metaphors highlights how systems can be characterized differently. Mechanism expresses movements over time, from wholes into parts. Organicism articulates development over time, from parts into wholes. Contextualism prioritizes processualism, of wholes alongside wholes. (Con)texturalism-dyadicism is associated with living systems, described as rhythms in diachronic unfoldings of wholes co-responding with wholes, like yinyang within changing seasons. Rhythms inherently connote anticipation, as we expect night to be followed by day, and a heart's contracting (systolic) phase to be followed by a filling (diastolic) phase. Rhythmic shifts may be anticipated or a surprise.

Establishing (con)texturalism-dyadicism as a new world hypothesis honours American pragmatism's lineage in the systems sciences, while sweeping in Chinese philosophy. This requires some disentangling of Yinyang from the philosophy of Daojia, parsing away the religions of Daojiao (Taoism) and Confucianism While not everyone will find this philosophizing useful, this approach aims for authenticity beyond superficial similes often espoused as systems thinking.

7.2 Reifying theory: ↓ structural functional, ↑ threads co-responding

Foundational concepts in systems theory are structure (as arrangement in space) and function (as contribution of a part to the whole). A theory of systems changes foregrounds processes (as arrangements in time), with a specific interest in kairotic rhythms. This is expressed through appreciating (i) rhythmic shifts in textures for reality judgments, (ii) situational propensity for value judgments, and (iii) reordering pacing for instrumental judgments. These three judgments have significant implications as an approach for systems changes.

Rhythmic shifts in textures recast systems as (life)lines, that can be engaged both outwardly and inwardly.

Outwardly, a processual representation of threads in time weaving and disconnecting from textures, dissolves the mainstream first step of defining a system through delimiting boundaries. While the identity of a system of interest remains important, the kairotic duration of co-responding with another thread or entire fabric, introduces a dimension of time on co-respondences. Instead of a boundary in space, a thread might be portrayed as following a Chinese yinyang calendar of four or eight seasons.

Inwardly, each thread undergoes the processual coupling of yinyang as dyadic and generative. *Yang qi* and *yin qi* are interdependent, reciprocally complementary transformations. Yang increases as yin decreases, and vice versa. *Yang qi* does not exist without *yin qi*, and vice versa. This dyadic thinking differs from dualism or dialectic. Dualism sees reality as two separable parts, e.g. mind and body, or good and evil. Dialectic sees reality as shaped by contradictions that may be resolved through synthesis, e.g. control vs emergence leading to complexity, fixity vs. instability leading to negotiated order. Dyadicism envisions a cycle of where yin holds the seed of yang, and yang holds the seed of yin.

Classical Chinese Medicine subscribes to a philosophy of body that extends yinyang into wŭxíng (five phases) of mutually engendering and mutually constraining cycles. Extending from dyadic to five phases would require further study of Chinese cosmology, beyond the scope of the theory-building at hand.

Situational propensity attunes conditions to the unfolding of potential embedded events. A texture of threads has tendencies towards a natural course that is not predetermined, and can be influenced. Proactive agency by a thread may gain momentum within the texture, or become deterred through an interplay of factors. The complexity of situations means moments of opportunity or unfavourability might emerge or subside. The capacity to respond to a window of opportunity may be within the resources of a single thread, or possibly a coalition of threads. This is consistent with Sun Tzu principle on attack by strategem: "He will win who, prepared himself, waits to take the enemy unprepared". Also, on terrain: "with regard to precipitous heights, if you are beforehand with your adversary, you should occupy the raised and sunny spots, and there wait for him to come up". An efficacious approach to systems changes relies not on superior force, but on the judicious selection of time and place.

Reordering pacing acknowledges that not all weaves equally influence the texture. Bundles of threads can range from thick cables to thin cords, with durable permanence or ephemeral existence. Some outcomes might be accelerated, others delayed, and yet other unresponsive to requests. While laws of nature are unforgiving, legal order can be changed by governments, and negotiated order between parties can be revisited. Social relations are arranged through commitments, and every human being has the same number of hours each day. Resequencing or accelerating an activity in a sprint might be possible, but overusing one resource could impact others. Preventive maintenance may be deferred temporarily, but ignoring technical debt could lead to breakdown. Textures can sometimes be rewoven without downtime, whereas major restructuring typically requires suspending operations.

Adopting this theory of systems changes may be contingent on acknowledging the constructivist philosophy of science upon which it is based. Those who deny that CCM is based on science diverging from Enlightenment traditions may discourage, rather than encourage, deeper inquiry.

7.3 Reifying methods: ↓ unfreeze-move-refreeze, ↑ (con)textural dyadic action learning

The framework of hub-and-four-spokes praxis may appear as small increment for those familiar with an action research cycle. On the surface, it shares similes with practices commonly employed by physicians. In detail, however, the OPM notation rigorously follows the (con)textural-dyadic philosophy, and theory of systems changes.

The hub of "Knowing from within" requires concurrence on a system of interest that internalizes a rhythmic shift. Knowing extends beyond cognition, resembling how autonomic subsystems in a body learn to live with external influences. A dysfunction within may or may not be perceptible by the self, or by others. A system of interest has natural constraints and exhibits propensities towards accepting or denying systemic changes. The inclination for a system to "ignore" or "not know" about world-changing conditions may be part of its/his/her nature.

Each of the four spokes are parts of the whole. Sequentiality around the spokes is not a requirement, unlike a typical action learning cycle. Practically, uneasiness within a system of interest usually starts with exploring "Recognizing contextural influences". As we consider how the thread has fallen out of pace with the texture, a clockwise movement to the spoke of "Diagnosing rhythmic disorders" and then "Prognosing likelihoods" follows conventions in medical practice. However, the option of counter-clockwise movement to adjust the texture to the thread, via the "Reordering pacing" spoke, is possible. This alternative correlates with the Socio-Psychological Systems perspective from the Tavistock Institute, which studied how postwar society could adjust to returning soldiers, rather than solely focusing on individual soldier readjustment to a civilian return. A clockwise movement depicts threads reweaving into the texture. A counter-clockwise movement shows the texture accommodating the thread.

For organizational change initiatives that accept the unfreezing-moving-refreezing cycle as recurring in action learning, the hub-and-four-spokes framework may be adopted *prima facie*. While misunderstanding and misuse are likely, diligent users can find deeper theoretical and philosophical guidance through this research.

7.4 Systems Change Learning is a systemic rethinking

As a distinct branch of systems thinking, Systems Changes Learning entails rebuilding an approach from its foundations. When rapid change dominates, approaches focused on restoring stability often fail to endure. Beyond minor adjustments to style or technique, a systemic shift in mindset may be necessary. Reifying methods without associated

Rather than maintaining the substance-based philosophy of classical Greek metaphysics, which views reality as composed of permanent entities with stable identities, process philosophy from classical Chinese philosophy embraces events and change as expressions of dynamic flow. Instead of sciences focused on homeostatis to maintain constant state, living systems are characterized by homeorhesis as "the tendency to return to a trajectory or path of development when made to deviate from it". Finally, rather than methods presuming intervention with humans controlling nature, a natural way of effortless action is preferred.

8. CONCLUSIONS

A philosophy of systems rhythms for systems changes aims to enrich systems theory, and systems methods, without compromising the legacy of luminaries who advanced General Systems Theory. Living systems, as a subtype of systems in general, extend the emphasis on process foregrounding changes over time with a recognition of natural rhythmic pulses. The concurrent co-development of this philosophy, theory, and methods has ensured its internal consistency.

8.1 Philosophical implications: ↑ when+where; ↓ what+why

The School of Naturalists, operating from the Jixia Academy circa 318-284 BCE, established a philosophy of science foundational for Classical Chinese Medicine (CCM). A premise of a natural course of events unfolding over time prompts questions about *when* and *where* purposive intervention are appropriate. The multitude of rhythmic cycles, with varying amplitudes and frequencies, presents auspicious periods interspersed with unfavorable intervals.

When the pace of systems changes becomes the central concern, isolating a current state of *what* is happening is akin to understanding the narrative of a movie by focusing on a still frame. Similarly, explaining *why* events unfold can alter the evidence, much like supporting or eliminating suspects in a whodunit mystery.

Much of 20th-century systems thinking encouraged reframing the root metaphor from mechanism towards organicism. The root metaphor of contextualism has largely been misunderstood. Introducing (con)texturalism-dyadicism as a new world hypothesis invokes metaphilosophy, contributing a pluralist approach to systems philosophies.

8.2 Theoretical implications: ↑ kairotic rhythms + situational propensity + dyadic diachrony, ↓ future state ← current state

A theory of systems changes recognizes that changes don't stop. Rhythms weave through kairotic textures, where auspicious period wax and wane. Favourable situational propensity comes arises from patience for windows of opportunity, or from proactively reshaping the texture ahead. Dyadic (or polyadic) diachrony naturally occurring through cycles of dissipating and concentrating, anticipating generativity. Timelines are not, however, deterministic. Desirable outcomes can result from prioritizing attention to timelines, over intentions towards fixed ends.

Moving a system from an unstable current state often leads to frequent plan revisions. A "north star" future state may not remain fixed in turbulent contexts beyond the system of interest's control.

Rapid systems changes highlight the adage that "plans are useless, but planning is essential." An anticipatory system will navigate uncertainties in the entailments of kairotic rhythms and textures.

8.3 Methodological implications: ↑ doing no harm, ↓ bias for action

Systems changes involve both changes over which human beings have limited influence, and changes where human beings can alter the course of current and future events. With living systems as regenerative, we observe physicians and veterinarians (and maybe gardeners) following the Hippocratic oath to *do no harm*.

While illnesses may be treated symptomatically to relieve discomfort, prognosis may include an option to allow a system the time to recover and/or repair itself. These attitudes put nature first, decoupled from human judgements on morality, ethics, and aesthetics

Since the Enlightenment, Western thinking has harboured an underlying current of human beings taking command over nature. A tendency towards instant gratification fuels a *bias for action*, driven by an impatience for accelerating future outcomes.

Practically, each of us judges whether an effort will or will not make a difference to the situation. Intervening in systems can yield both positive and negative results, depending on who is involved or excluded. Decisions are not without consequences, largely stemming from our beliefs about nature(s).

8.4 A Systems Changes approach recasts systems thinking

The historical philosophies, theories, and methods from the 20th century described above remain relevant for many situations at hand. Where institutions and cultures are viable and stable, incremental change allows continuity with relatively minor inconveniences. The traditional practice of defining systems and their boundaries before addressing changes retains its relevance and utility.

However, when rapid and complex changes become labelled as *polycrisis*, assumptions about the significance of human influence on the world may be questioned. Trends at larger scales and nascent subleties may converge into unanticipated outcomes. The sequencing of thinking *systems* first and then *changes* might be reversed. Attention might be more appropriately directed toward *changes* first, and *systems* second.

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