Bells that still can ring: systems thinking in practice[1]

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Abstract

Complexity science has generated significant insight regarding the interrelatedness of factors and actors constituting our real world and emergent effects from such interrelationships. But the translation of such rich insight towards developing appropriate tools for improving real world situations of change and uncertainty provides a further significant challenge. Systems thinking in practice is a heuristic framework based upon ideas of boundary critique for guiding the use and development of tools from different traditions in managing complex realities. By reference to five systems approaches, each embodying more than 30 years of experiential use, three interrelated features of the framework are drawn out – contexts of systemic change, practitioners as change agents, and tools as systems constructs that can themselves change through adaptation. The 'bells that still can ring' refer to tools associated with the Systems tradition which have demonstrable capacity to change and adapt by continual iteration with changing context of use and different practitioners using them. It is in the practice of using such tools whilst being aware of significant 'cracks' associated with traps in managing complex realities that enables systems thinking in practice to evolve. Complexity tools as examples of systems thinking can inadvertently invite traps of reductionism within *contexts*, dogmatism amongst *practitioners*, and fetishism of our *tools* as conceptual constructs associated with ultimately undeliverable promises towards achieving holism and pluralism. The heuristic provides a guiding framework on monitoring the development of tools from different traditions for improving complex realities and avoiding such traps.

Introduction

Ring the bells that still can ring
Forget your perfect offering
There is a crack in everything
That's how the light gets in
(Cohen, 1993)

I first read this verse written by Canadian songwriter and poet Leonard Cohen in a small book called *Inside Out* (Huston 2007 p.8) written by an experienced systems practitioner, Tracy Huston. The book has the sub-title *Stories and Methods for Generating Collective Will to Create the Future We Want.* It is about planning for the future and in particular generating meaningful organisational change drawing upon our existing untapped *internal* human resources rather than continually seeking *external* answers. With the insightful revelations of complexity science on the nature of reality, the book prompts thinking about how such insight may interface with practitioners wanting to effect meaningful change. What is it about complex situations of systemic change that may inform our use and development of tools – as internal systems constructs – for improving such situations? The question signals a point of departure between two closely affiliated traditions – Complexity thinking and Systems thinking. How might the more explicitly purposeful orientation of systems thinking provide offerings to the development of complexity tools?

The words in Cohen's verse capture for me something of the importance behind five systems approaches chosen by myself with a team of academics for a publication *Systems Approaches to Managing Change: A Practical Guide* (Reynolds and Holwell 2010). The approaches chosen are *System Dynamics* (SD), the *Viable Systems Model* (VSM), *Strategic Options Development Analysis with Cognitive Mapping* (SODA), *Soft Systems Methodology* (SSM), and *Critical Systems Heuristics* (CSH). They were chosen from a vast array of systems approaches because they shared three qualities: (i) adaptability to variable complex situations, (ii) an appeal to different practitioner communities, and (iii) an underpinning constructivist mindset enabling different conceptual use of the tools dependent on different complex situations of use and different practitioner communities using them.

The five approaches are drawn from three philosophical traditions underpinning systems thinking: SD and VSM from the cybernetics tradition (primarily dealing with feedback interrelationships and interdependencies) which also informs much of complexity thinking; SSM and SODA from the interpretivist tradition (primarily focusing on multiple perspectives); and CSH from the tradition of American philosophical pragmatism and European critical social theory (primarily addressing issues of ethics and politics). The five approaches cover the fundamental concepts of systems thinking and the essential elements of the different perspectives across the main theoretical strands of systems thinking in practice.

The five approaches collectively provide significant tools in systems thinking. Each approach embodies at least 30 years of experiential use – 30 years of road-testing. They are the 'bells that still can ring', with a pedigree of time and experience. Over that period, challenges have exposed new offerings, insightful ways on how better to use these approaches in the light of invaluable experience. They are presented not as new tools to replace old tools, but as composite tool sets that have been adapted to deal with different contexts and changing circumstances. Box 1 provides a brief description of each approach.

Box 1 Five systems approaches described (adapted from Reynolds and Howell, 2010 pp.18-21

1 System dynamics was founded in the late 1950s by Jay W. Forrester of the MIT Sloan School of Management with the establishment of the MIT System Dynamics Group (Forrester 1961). It is an approach to understanding the behaviour of complex systems over time. It deals with internal feedback loops and time delays that affect the behaviour of the entire system. What makes using system dynamics different from other approaches to studying complex systems is the use of feedback loops and stocks and flows in displaying nonlinearity.

2 Viable systems model was developed by the cybernetician Stafford Beer (Beer 1974a; Beer 1972). It describes the necessary and sufficient conditions for the viability of systems in order to keep an independent existence. To do so it needs to be organised in such a way as to meet the demands of surviving in a changing environment. The principles of recursion (whereby a viable system itself can be seen as either part of a wider system or constitutive of many viable systems), and Ashby's law of requisite variety (capacity to exhibit diversity) are central to VSM.

3 Strategic options development and analysis (with cognitive mapping) is an approach developed in the 1970s by Colin Eden – an Operational Researcher - for revealing and actively shaping the mental models, or belief systems (mind maps, cognitive models) that people use to perceive, contextualize, simplify, and make sense of otherwise complex problems. Whilst being appropriate at the individual level in clarifying thoughts around a particular issue, work on SODA encompasses much wider contexts of strategic thinking; neatly encapsulated through the software acronym JOURNEY making (JOintly Understanding Reflecting and NEgotiating strategY). SODA is the methodology used for cultivating organisational change through attention to and valuing of individual perspectives in a concerted manner (Ackermann, Eden and Brown 2005)

4 Soft Systems Methodology is an approach to process modelling developed in England by academics lead by Peter Checkland at the University of Lancaster Systems Department through a program of action research (Checkland 1981; Checkland and Scholes 1990). The primary use of SSM is in the analysis of complex situations where there are divergent views about the definition of the problem - 'soft problems' (e.g. how to improve health services delivery, or what to do about homelessness amongst young people?). In such situations even the actual problem to be addressed may not be easy to agree. The soft systems approach uses the notion of a 'system' as an interrogative learning device that will enable debate amongst concerned parties

5 Critical systems heuristics represents the first systematic attempt at providing both a philosophical foundation and a practical framework for critical systems thinking (Ulrich 1983). CSH is a framework for reflective practice based on practical philosophy and systems thinking, developed originally by Werner Ulrich. The basic idea of CSH is to support boundary critique – a systematic effort of handling boundary judgments critically. Boundary judgments determine which empirical observations and value considerations count as relevant and which others are left out or are considered less important. Because they condition both 'facts' and 'values', boundary judgments play an essential role when it comes to assessing the meaning and merits of a claim.

The purpose here is not to present these five approaches as tools for supporting complex decision-making activities. That task is fulfilled through the Reynolds and Howell publication in which each approach is updated by originators and/or experienced practitioners using a common simple template (what it is, how it's done, and why it is important).

The 'tool' being offered in this paper is a framework for guiding the use of tools more generally in supporting decision making for improving complex realities. I call it a framework for systems thinking in practice – the namesake of the UK-based Open University (OU) postgraduate programme to which the book contributes as a Reader on the core module *Thinking Strategically: systems tools for managing change* (Open University, 2010).

In what follows, I'll briefly explain the heuristic framework for systems thinking in practice relating to three constituent activities and associated entities. Features of each entity and the framework as a whole are then examined.

What is systems thinking in practice?

Systems thinking in terms of promoting a more holistic perspective is not new. In emphasising the integral relationship between human and non-human nature, systems thinking can be traced back to spiritual traditions of Hinduism (e.g., through ancient texts like the Upanishads and Bhagavad Gita), Buddhism (oral traditions of the Dhama), Taoism (basis of acupuncture and holistic medicine), sufi-Islam (in translations of the *Kashf al-Mahjûb* of Hujwiri, and the *Risâla* of Qushayri), and ancient Greek philosophy (particularly Hericles and Aristotle). It is also prevalent through the oral traditions of many indigenous tribal spiritual traditions which have existed for tens of thousands of years.

Since the early 20th century when Bertalanffy published his first papers on systems theory, there has grown a multitude of systems approaches, many of which, like the traditions in complexity sciences, deal with the essential ontological challenge in developing more holistic understandings of reality. Systems thinking in the later part of the 20th century took on more the epistemological challenge of dealing with multiple perspectives on reality, and the ethical and political challenge of confronting power relations associated with different realities. These constitute what have been called the 'soft' and 'critical' systems traditions respectively (Jackson, 2000).

Bringing these different traditions together and appreciating systems as conceptual constructs, systems thinking *in practice* involves three interrelated activities: (i) stepping back from messy situations of complexity, change, and uncertainty, and *understanding* key interrelationships and perspectives on the situation; (ii) *practically* engaging with multiple often contrasting perspectives amongst stakeholders involved with and affected by the situation, and (iii) *responsibly* directing joined-up thinking with action to bring about morally justifiable improvements. Elsewhere I have described these activities as being supported by three (sub)frameworks respectively – framework for understanding (fwU), framework for practice (fwP), and a framework for responsibility (fwR) - constituting an overall critical systems framework (Reynolds 2008a). The activities can be represented as a triadic interplay of making judgements associated with boundary critique (Ulrich 2000). This involves continual

revising of boundary judgements (systems thinking) with judgements of 'fact' (observing) and value judgements (evaluating) (see Figure 1).

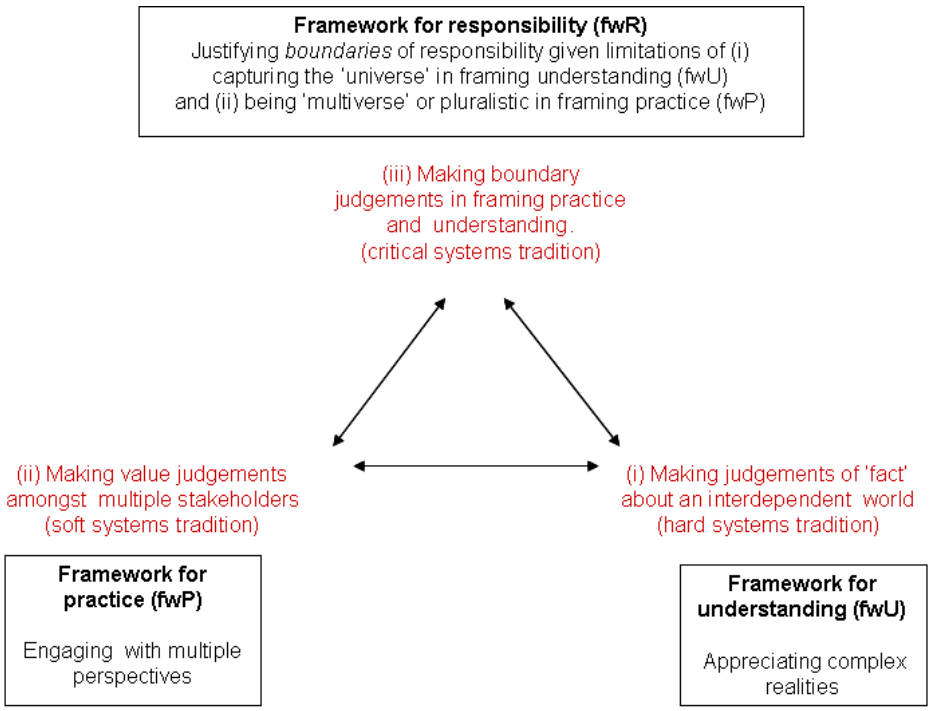

Figure 1 Critical systems framework illustrating systems thinking in practice activities (adapted from Reynolds (2008a p.386)

In developing this into a broader heuristic for systems thinking in practice, three complementary entities can be added: (1) real-world *contexts* of change and uncertainty, (2) people or *practitioners* involved with making change, and (3) the ideas and concepts – including systems - as *tools* for effecting change. Figure 2 illustrates the constituent activities and entities of the heuristic framework for systems thinking in practice.

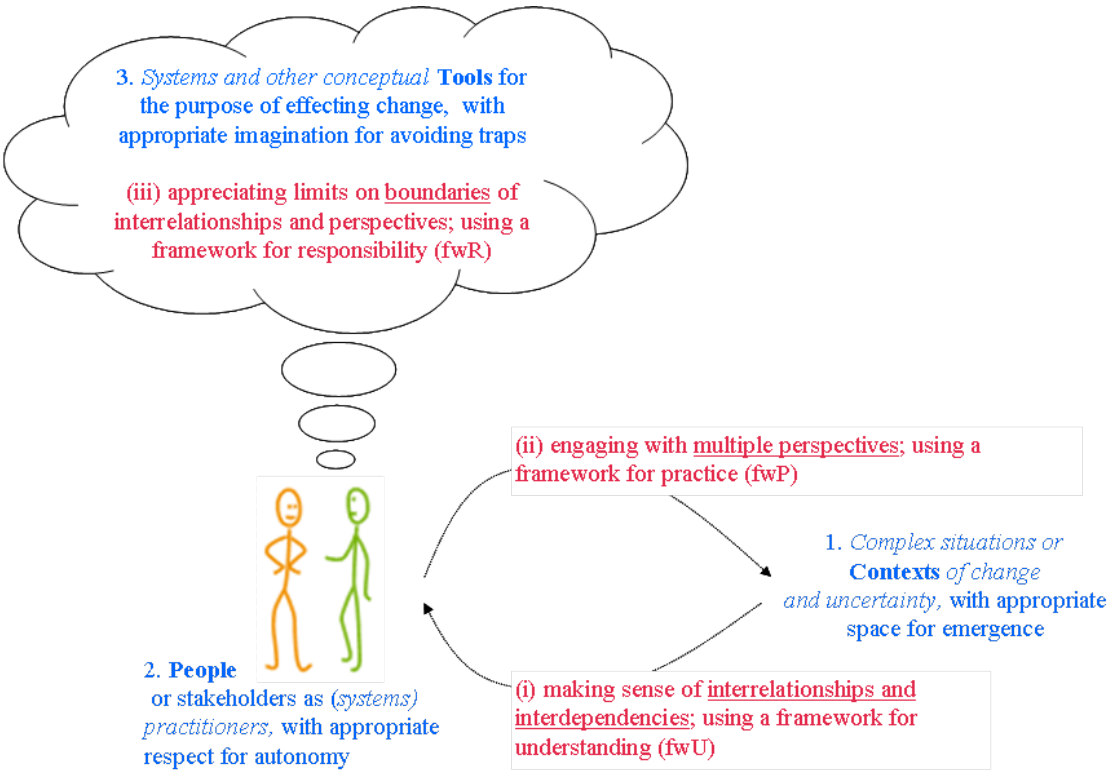

Figure 2 Heuristic framework of systems thinking in practice

The heuristic provides a benchmark for gauging effective action in managing change. Whilst some tools may have a particular focus on one of the three activities and associated entities, the effectiveness of use in supporting decision making can be gauged according to how well all three entities are dealt with. The five systems approaches described in Box 1 each qualify with a particular strength in one of the three activities, but they each also have a track record of adaptation towards addressing all three domains.

At present the heuristic tool resides in an OU distance learning module *Thinking strategically: systems tools for managing change* (Open University 2010). The module provides a framework for students to engage with each of the five systems approaches but using their own chosen area of professional practice and developing their own particular life experiences and skills. The heuristic framework is used in the module to gauge the competence of a practitioner in systems thinking in practice (see Appendix). Here though I want to illustrate how the tool might be used to appreciate the value of complexity thinking and complexity sciences in general, the potential in conversation between complexity and systems thinking in practice, and the limitations of claims made by complexity and systems traditions. The following section examines each entity and associated activity of the heuristic tool in turn.

What matters in systems thinking in practice

The rich history and current variety of systems tools prompt questions as to how they may relate to each other and what emphasis is given to the context of use, the users or practitioners, or the actual tools being used. The tools used in systems thinking in practice need not be exclusively recognised as being derived from what some recognise as the Systems tradition. They may derive from traditions ranging from Complexity science to Performance arts such as puppetry. Any tools that attempt to (i) make sense of a context of complex realities whilst (ii) enabling amongst practitioners different perspectives on such realities to flourish in order to (iii) enable systemic improvement in the real world, qualify to be exemplars of systems thinking in practice. What matters in systems thinking in practice are the expression of these three entities, but also the interplay amongst all three entities and associated activities, and the resultant dynamics of change that emerge.

1 Context matters

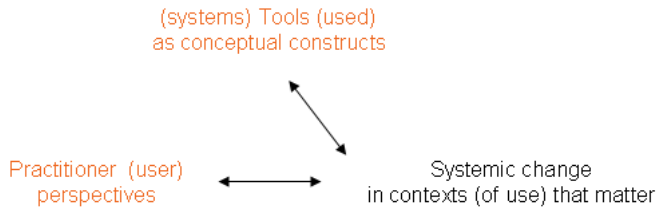

Figure 3 Contexts in relation to practitioners and tools

> "It's confusing, but we have a right to be confused. Perhaps even a need. The trick is to enjoy it: to savor complexity and resist the easy answers; to let diversity flower into creativity." (Mary Catherine Bateson, 2004, "Afterword: To Wander and Wonder", p 410).
>
> "You cannot step twice into the same river." Heraclitus of Ephesus (c.6th Century BC)

These depictions of context capture important notions of systemic change implicit in complexity thinking. As an ontological point of departure from Complexity science, in Systems thinking complexity resides not in systems but the situations to which systems speak. To use a well-worn though significant adage amongst systems practitioners, a system is merely a *map* of a situation or territory, not to be confused with the actual *territory*. Arguably the prime purpose of systems thinking is to make simple the complex – that is, to bound the unbounded ontological complex realities variously referred to by systems thinkers as messes (Russell Ackoff), the swamp (Donald Schön), or wicked problems (Horst Rittel). Drawing on the signal-to-noise ratio used in the language of communications engineering (cf. Richardson 2010 p. 2), systems as conceptual constructs provide purposeful ways for generating meaningful 'signals' or patterns of abstracted data sets from the cacophonous 'noise' of reality.

Real world complexities represent something that exists outside of any one conceptualisation of context. Whereas complexity science has made valuable and intriguing strides in capturing real world complexity, particularly through computational modelling (see both Richardson and Rzevski contributions in this compilation), systems thinking prompts a more cautionary note against achieving some ultimate understanding of reality.

One significant reference system for depicting contexts generated in complexity sciences is offered by the Cynefin framework (Kurtz and Snowden, 2003). The framework demarcates between simple, complicated, complex and chaotic contexts. A situation is regarded as complex when there is no evident central controlling element but there are strong connections between elements. A complicated situation also has strong connections between elements but is regarded as more knowable and predictable then complex situations because of there being a central controlling element. Simple situations have a very strong controlling element with little interconnections, and chaotic situations have no controlling element and little interconnections between elements.

A similar reference system used by systems practitioners for appreciating the importance of context is total systems intervention (TSI) (Flood and Jackson 1991a). TSI draws upon a system of system methodologies (SOSM) typology to classify situations into six different types. SOSM maps 'appropriate' systems approaches that might be suitable for implementing change in different situations (Jackson 1990). Table 1 illustrates the SOSM classification along two dimensions – level of complexity (simple or complex), and the degree of shared purpose amongst stakeholders (unitary, pluralist, coercive) along with some typical alignment of systems approaches (including my own guess of where users might likely align VSM and SODA according to the traditions from which they have arisen) relating to perceived realities.

		Stakeholder perspectives		
		Unitary 'hard' systems based on mechanistic metaphor	*Pluralist* 'soft' systems based on organismic metaphor	*Coercive* 'critical' systems based on prison metaphor
Systems view of problem situations	*Simple*	Simple unitary: e.g. systems engineering	Simple pluralist: e.g. Strategic assumption surfacing and testing	Simple coercive: e.g., critical systems heuristics
	Complex	Complex unitary: e.g., system dynamics, viable systems model	Complex pluralist: e.g. soft systems methodology, strategic options development and analysis	Complex coercive: (non available!)

Table 1 System of systems methodologies (adapted from Jackson, 2000 p.359)

A significant difficulty with TSI as with Cynefin is in assuming from the outset that a problem situation can somehow be easily identified as constituting one of the 'problem situation' or 'context' types. Both Cynefin and TSI make assumptions about knowing whether a situation can be type-cast from the outset. As Bob Williams notes the Cynefin framework does acknowledge possibilities of differing perspectives on the situation amongst stakeholders involved in the situation (Williams and Hummelbrunner, 2010 p.173), but there appears little acknowledgement that the expert practitioner doing the typecasting may also have a skewed perspective. Contexts that are initially regarded through expert intervention as unitary or simple

may often turn out to be very complex. A further difficulty with TSI is in the 'fixing' or pigeon-holing of particular systems approaches as being only suitable for specific types of situation. Such pigeon-holing, dependent on the root paradigms of intellectual tradition to which they are perceived to belong, denies the potential for systems approaches to themselves adapt and develop through different contexts of use. It also detracts from opinions on where different systems approaches 'fit' based upon actual experiences of using the approach.

Box 2 gives a few examples of some different contexts in which our five systems approaches have been used through the passage of time.

Box 2 Systems approaches in different contexts

SD started with work on servo-mechanism devices to control radar in the late 1950s, before moving into the field of industrial relations, and later modelling global resource depletion (Meadows et al. 1972; Meadows et al. 1992). System dynamics provided the crux of the systems approach to organisational development advocated as the Fifth Discipline in the celebrated book of the same title (Senge 1990).

VSM has been used in contexts ranging from promoting efficiency in small organizations and communities to large corporate bodies (Hoverstadt 2008). It has been deployed for organising national economies (Beer 1974b) and guiding major environmental policy at national and regional levels (cf. Espejo 1990; Espinosa and Harden 2008)

SODA has been used in various contexts ranging from dealing with individual decision making to small and large enterprises (Eden and Ackermann 1998; Ackermann, Eden and Brown, 2005),. It has also been recommended for dealing with wider international inter-organisational relationships (Robinson, Hewitt and Harriss 2000) and environmental planning (Open University 2006)

SSM has been used to examine organisational change in large multinational corporations, with several hundred participants in the study; it can be used by an individual to manage, for example, personal recovery from substance abuse; it has been used to research Inuit fishing in Labrador; by an NGO volunteer to engage local people in mine clearance after war in the Middle East; by members of a women's forum in Japan to make sense of the impacts of societal changes on their lives; by consultants working on information systems planning in the NHS. (Checkland and Poulter 2006)

CSH has been deployed in environmental management (Reynolds, 1998; Midgley and Reynolds, 2004; Ulrich and Reynolds 2010) health care planning, city and regional planning, and energy and transportation planning (Ulrich 1987, p.276), enhancing prison service support (Flood and Jackson 1991b) promoting an alternative lens for corporate responsibility (Reynolds, 2008a) and informing international development initiatives (McIntyre-Mills 2004; Reynolds 2008b).

As a general rule, any context of use is best regarded as being complex from the outset. From a Systems perspective (described below) this means a context with variable perspectives on what needs to be done. Systemic failure in intervention can often be attributed to the sidelining of such perspectives. Another rule is that tools – whether derived from Systems or other traditions such as Complexity sciences - are adaptable to different contexts of use depending on different users' experiences.

2 Practitioner matters

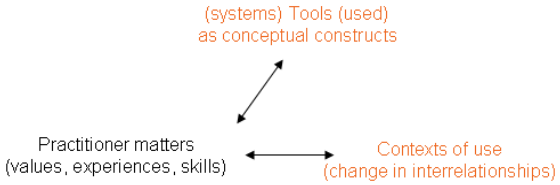

Figure 4 Practitioner matters in relation to contexts and tools

> *"A systems approach begins when first you see the world through the eyes of another"* (Churchman 1968 p.231)

For West Churchman systems thinking not only requires 'building a bigger picture' of the situation – for which he described a process of unfolding increasingly more variables from the context of use – but also appreciating other conceptual constructs or perspectives on the situation. The transition speaks of two worlds; one, the holistic ontological real-world 'universe' of interdependent elements, encapsulating complex interrelationships; another, an epistemological socially constructed world of 'multiverse' (cf. Maturana and Poerksen 2004 p.38), encapsulating differing constructs on reality.

Whereas Complexity science regards complexity as residing in the ontological features of dynamic *interrelationships* in the situation (e.g., see Rzevski's criteria of complexity in this compilation – interactions, non-linearity, emergence, disequilibria etc.), complexity as understood in the Systems thinking in practice tradition presented here resides on the layering of differing *perspectives* on the dynamic interrelationships in the situation.
People are pivotal to the systems thinking in practice heuristic framework. As described in the anthology, *Systems Thinkers* (Ramage and Shipp 2009), our own individual experiences, competencies, skills, as well as weaknesses, shape how we engage with any particular context of change. Part of my own academic and practical experience for example is situated in a context of life-science education and international development. The conceptual tools derived from these disciplines, along with my experiences in using them, have helped me value different tools differently, and to reshape and mould them accordingly in different contexts of use.

In shifting emphases from explicating tools according to contexts of use, towards practitioner experiences and influences as users of tools, Ison and Maiteny captured

some of the wider influences and cross-fertilisation that generates innovative development of systems approaches. The aim was to broaden the understanding and practice of spheres of influence both with respect to other tools and approaches outside the traditional systems toolbox, and to other contexts in which such approaches were evident (Figure 5).

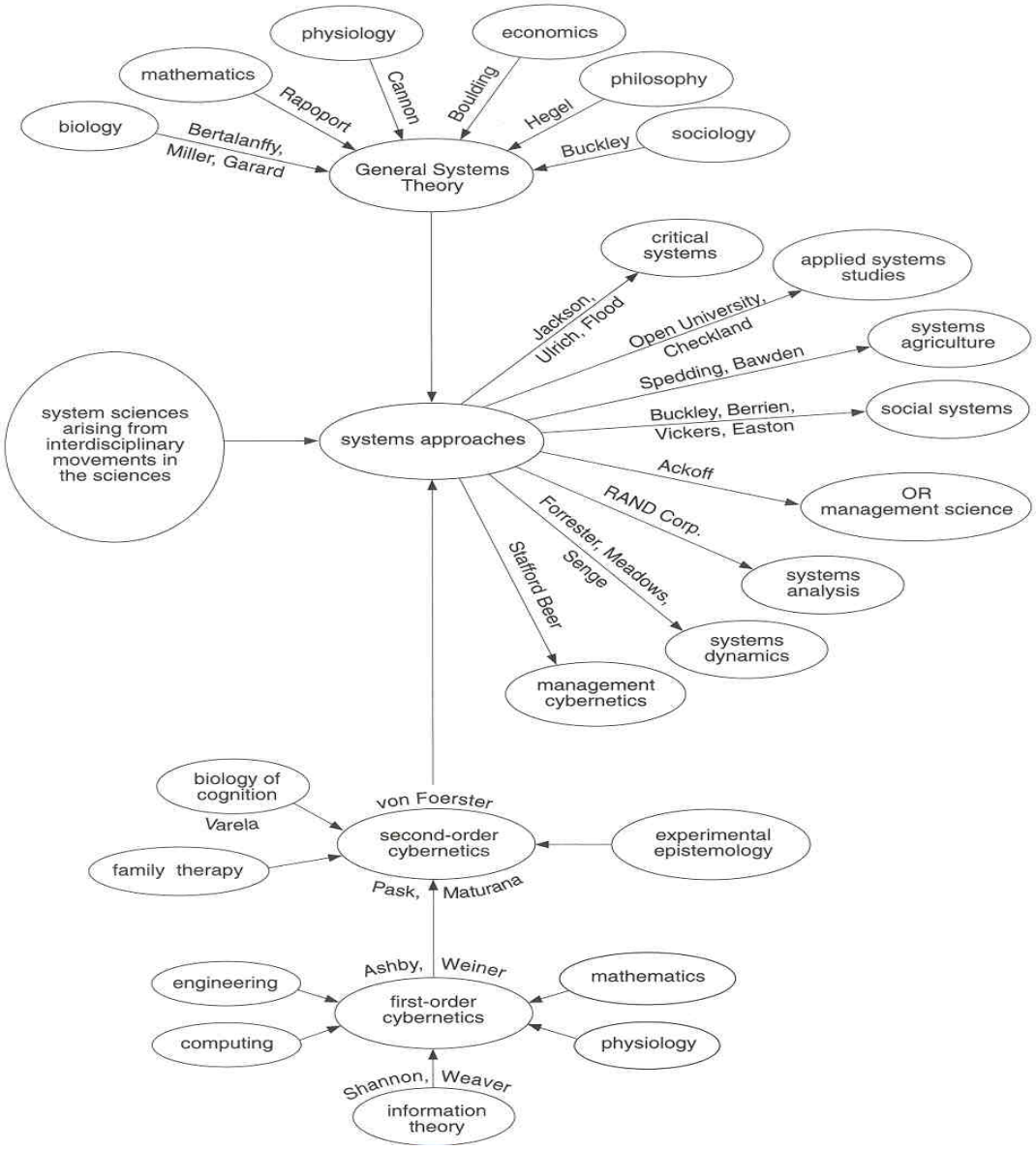

Figure 5 An influence diagram of different systems traditions and some key practitioners which have shaped contemporary systems practice (Maiteny and Ison 2000)

Box 3 provides brief biographical sketches of original authors to the five systems approaches.

Box 3 Systems approaches derived from different experiences

Jay Forrester was influenced by his practical problem-solving upbringing in a rural agriculture and cattle ranching context before starting work on servo-mechanism devices to control radar in the late 1950s. He then significantly moved into the field of, first, industrial relations, and later modelling global resource depletion through invitations to construct 'world systems models' on sustainability from the influential Club of Rome. .

Stafford Beer's ideas arose out of a synthesis of Eastern and Western thought. His time in India as a very young man and subsequently his interest in Eastern thought, particularly Indian cultural traditions, was a very important factor in the emergence of the VSM. Beer's own engagement with practicing VSM was most notably carried out under invitation to Allende's Chile in the early 1970s before the military coup. Beer effectively founded management cybernetics - now known as Organisational Cybernetics.

Colin Eden worked as an Operational Researcher in the engineering industry followed by a period as a management consultant specialising in small business problems before focussing interest on University teaching and research. Eden's ideas developed originally from an interest in Kelly's psychological work on 'personal construct theory' (Kelly, 1955). He received support from institutions ranging from British Telecom to the Northern Ireland Office to help processes of making strategy with cognitive mapping and the practice of 'action research'.

Peter Checkland was interested in applying Systems Engineering (SE) to management issues. After15 years as a manager in the synthetic fibre industry Checkland joined Lancaster University in what became a thirty-year programme of action research in organizations. The 'failure' of the early work on SE highlighted a different direction that ultimately yielded SSM as an approach to tackling the multi-faceted problems which managers face.

Werner Ulrich, like Checkland, was influenced by the ethical systems tradition promoted through the works of the American systems philosopher C. West Churchman. Ulrich's own work in developing CSH as a means of supporting social planning was also influenced by traditions of American philosophical pragmatism and European critical social theory.

The importance of simple 'conversation' and language is key to improving situations of change (see McKergow., Dalmau and Tideman, and Michiotis in this compilation). The tendency for practitioners belonging to a community of practice to become self-referential and insular applies as much to some systems practitioners and complexity

thinkers as other communities. The message here is to avoid seeking some methodological purism in testing out any one approach, but rather to explore its validity and adaptation in conjunction with other approaches familiar to the user. A particular feature of the five systems approaches referred to in this paper is the sought-after working relationships and dialogues with communities of practice outside of the practitioner community associated with any one approach. Such interactions enhance not only the practice but also serve to strengthen the theoretical underpinning associated with each approach. They also serve to protect against the risk of becoming trapped in 'group-think' that can sometimes be a feature of long-standing communities. The increasing dialogue between complexity theorists and policy makers provides a healthy check against such insularity (cf. Boulton, 2010)

3 Systems matter

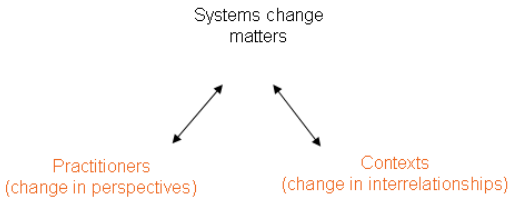

Figure 6 Systems matter in relation to practitioners and contexts

> "To a man with a hammer, everything looks like a nail" (Mark Twain)

> "True scientific simplicity is never reductive; it is always a relevant simplicity that is a creative achievement…The true grandeur of science is not power but the demanding quest for relevance…How to learn? How to pay attention? How to acquire new habits of thinking? How to concentrate or explore other kinds of experiences? Those are questions that matter" Michael Lissack interpreting Isabelle Stengers (Stengers 2004:p.92).

Our tools and models, including cognitive frameworks as systems tools, can often be sub-consciously overpowering in determining how we approach issues. Similarly, adopting 'new' systems runs the risk of elevating the notion of 'a system' to a fetish status; the panacea for resolving a crisis. Here I use the term 'system' generically, referring both to an ontological construct representing a real world situation (i.e., a 'complex system'), and as an epistemological tool for inquiry into reality.

The trap of systems maintenance, or being obsessive with the tools we construct, lies in reifying and privileging the 'system' - whether it's old or new – as though it has some usefulness, existence and worth outside of the user and some status beyond its value in a context of use. Perhaps the most pervasive example of an implicit system resilient to change is a conventional model of management hierarchically imposed and indiscriminately applied across all parts of an organisation, regarding stakeholders as objects rather than subjects. It is a pervasive way of thinking that continues to hold a widespread grip on management practice. There are many other

'systems' that similarly entrap our understanding and practice. A generic descriptor for these is 'business as usual' (BAU) – frameworks for understanding and practice that stifle innovation. For example, think of the annual cycles of organisational planning, target setting, budgeting, the development of performance indicators and performance related pay incentives etc. BAU models maintain existing 'systems' principally because of a fear for change. But the fear is not evenly distributed amongst all stakeholders. Some fear change more than others simply because the system works in a partial manner. The system works for some and not for others.

All systems are partial. They are necessarily partial – or selective – in the dual sense of (i) representing only a section rather than the whole of the total universe of interrelationships in any context that matters, and (ii) serving some stakeholder parties including practitioners - or interests - better than others (cf. Ulrich 2002 p.41). As described elsewhere, no proposal, no decision, no action, no methodology, no approach, no tool, no system can get a total grip on the situation nor get it right for everyone (Reynolds, 2008a). In using and designing systems we need to keep an eye on changing contexts and practitioner matters.

With an eye on appreciating matters of context and changing complex realities, there is an imperative to continually ask questions of 'systems'; to appreciate them as *judgements* of fact rather than *matters* of fact. For example, when confronted with situations that appear simple or even complicated, we should be wary of disregarding unvoiced perspectives that may reveal complexity or even chaos. Or when confronted with arguments of an iniquitous 'economic system' generating continual social and ecological impoverishment, or an 'education system' that systematically continues to marginalise particular sectors of our community, as systems practitioners we have a responsibility to create space for, and help support the framing of, better systems, rather than perpetuating the myth that these are some God-given realities that we need to simply live with.

With an eye on appreciating practitioner matters, the risk of systems obsession is akin to moralism. Humberto Maturana makes a relevant point distinguishing between being moralistic and ethical. Moralists, he suggests, "lack awareness of their own responsibility. People acting as moralists do not see their fellow human beings because they are completely occupied by the upholding of rules and imperatives; that is a particular systems design. They know with certainty what to be done and how everybody else has to behave" (Maturana & Poerksen 2004 p.207). Being ethical, in contrast requires giving legitimacy to people, and particularly those who may disagree with the rules (see also MacGillivray in this compilation).

Systems matter not because they provide some ultimate reification of complex realities, but rather because they provide a cross-disciplinary and transdisciplinary literacy for identifying traps in conventional thinking. SD and VSM arising from a holistic cybernetics tradition are particularly good for countering traps of *reductionism* (focusing on parts rather than the whole). SODA and SSM coming from a pluralist interpretivist tradition counter tendencies towards *dogmatism* (privileging one particular perspective). CSH addresses similar aspirations but also takes a step back in reminding practitioners of the need to be both modest in making holistic claims - seeing the *whole* big picture (trap of *holism*) - and cautious about claims of

being multiverse - taking in *all* perspectives equitably (trap of *pluralism*). Figure 7 illustrates these traps through a causal loop diagram.

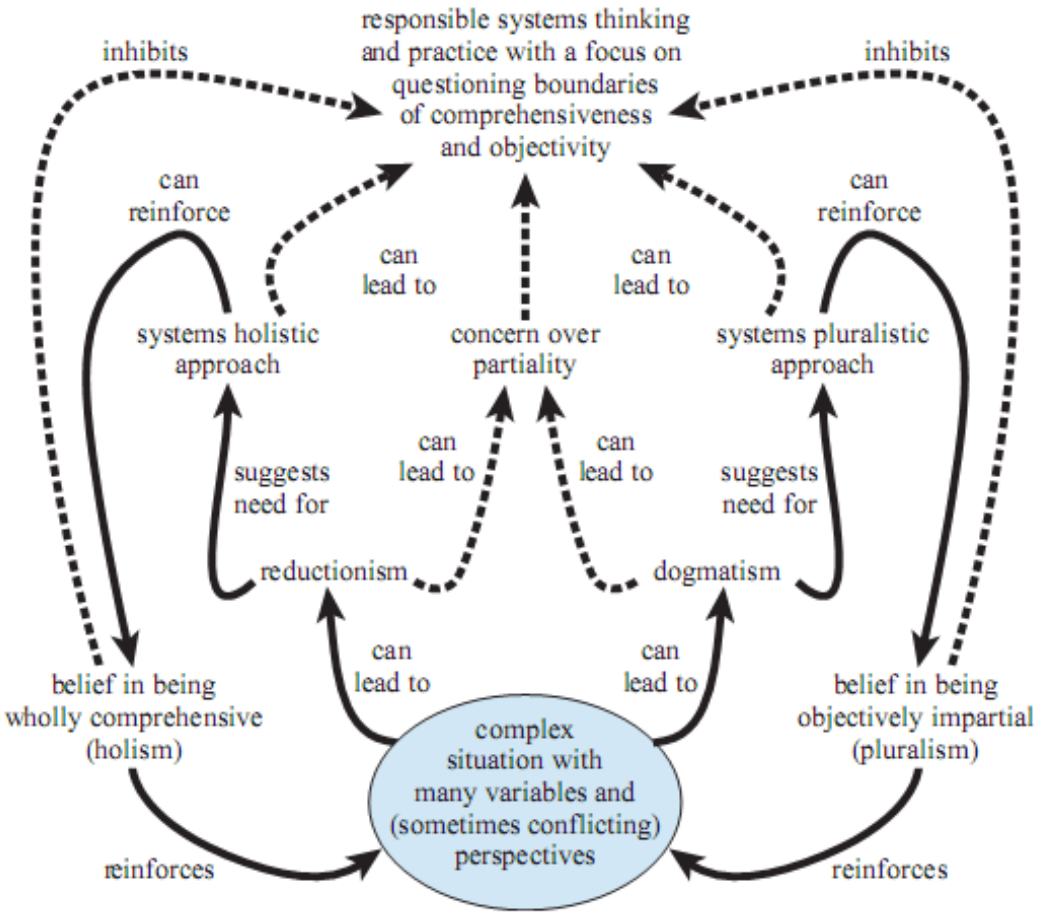

Figure 7 Reflective systems thinking in practice

Whilst the five systems approaches have traditional strengths in springing particular traps, all five have evolved with a capacity for dealing with each trap. This evolution and ongoing development of each approach has been a function of the variety of contexts of use and the different users through processes of iteration.

4 Iteration matters

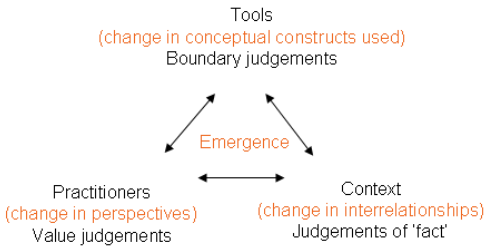

Figure 8 Iteration in relation to change in context, practitioners and tools

> "Thinking through the triangle means to consider each of its corners in the light of the other two. For example, what new facts become relevant if we expand the boundaries of the reference system or modify our value judgments? How do our valuations look if we consider new facts that refer to a modified reference system? In what way may our reference system fail to do justice to the perspective of different stakeholder groups? Any claim that does not reflect on the underpinning 'triangle' of boundary judgments, judgments of facts, and value judgments, risks claiming too much, by not disclosing its built-in selectivity." (Ulrich, 2002, p. 42)

Systems thinking in practice might be seen as an expression of Ulrich's eternal triangle of boundary critique described above. All five approaches assume that complex realities in the form of messes cannot be resolved or improved upon without engaging in a process that is cyclic and iterative; recognising for example that changes in perspective reveal new insights that require continual revisiting of earlier judgements of the context, and refinement of the conceptual tools with which we use to frame our understanding of, and practice in, contexts of change and uncertainty. There is an ongoing dynamic between ideas (tools), the situation (context), and the practitioner for any given approach.

This iterative quality is akin to the artistic practice of improvisation; a quality associated with the works of Donald Schön:

> "…Schön, who stresses reflection in the midst of action … frequently used jazz as an image of reflection-in-action: the process of improvisation in the moment based on a response to the situation (what other musicians are playing, the audience's response etc), to the established rhythm and melody of the piece, and also on one's own abilities and enthusiasms." (Ramage and Shipp 2009, p.292).

The notion of improvisation is helpful in grasping some of the nuances of systems thinking in practice as a literacy – a form of communication amongst scientists, systems practitioners and others, in dealing with complex realities.

Summary

"Systems literacy is not just about measurement. The learning journey up the ladder of complexity—from quarks, to atoms, to molecules, to organisms, to ecosystems—will be made using judgment as much as instruments. Simulations about key scientific ideas and visualizations of complex knowledge can attract attention—but the best learning takes place when groups of people interact physically and perceptually with scientific knowledge, and with each other, in a critical spirit. The point of systems literacy is to enable collaborative action, to develop a shared vision of where we want to be." (Thackara, 2005)

The name - systems thinking in practice - suggests an important interplay between understanding and practice; systems thinking continually being informed, moulded and (re)shaped by ongoing practice. It provides a tool for nurturing the type of systems literacy alluded to by John Thackara.. It is this interplay between conceptual tools and practice that resonates for me the idea of 'bells that still can ring'.

An approach or tool of any kind of itself cannot guarantee, or even determine success, in managing and improving complex realities. Whilst we may discuss different tools in their abstract sense, any claims towards their value in improving situations are dependent on the context of use and the practitioner's purpose, skill and insights. The systems thinking in practice heuristic presented here supports three intentions behind complexity thinking:

1. Making sense of, or simplifying (in *understanding*), relationships between different entities associated with a complex situation. The prime intention is not to get some thorough comprehensive knowledge of situations, but rather to acquire a better appreciation of wider dynamics – to counter *reductionism* - in order to improve the situation.
2. Surfacing and engaging (through *practice*) contrasting perspectives associated with complex situations. The prime intention here is not to embrace all perspectives on a predetermined problem so as to solve the problem, but rather to allow for possibilities in reshaping a problem-situation – to counter *dogmatism* - for improved possibilities of resolution.
3. Exploring and reconciling (with *responsibility*) ethical issues, power relations, and boundary issues associated with inevitable partial understandings of a situation and partiality amongst different stakeholders. The aim here is not to provide yet another ready-to-hand matrix to offer clients through a consultancy, but rather to gently disrupt and unsettle patterns of thinking – including claims of *holism* and *pluralism* - thereby prompting innovative critical thinking in practice.

Figures 1 and 2 provide graphic illustrations of the heuristic. The Appendix provides a tangible expression of an assessment device guiding the development of skills in systems thinking in practice. This paper argues that an effective systems approach to managing real world complex situations embodies all three aspects of systems

thinking in practice – the entities and associated processes. It presents a departure from Total Systems Intervention (TSI) where systems approaches tend rather to be regarded as fixed externalised artefacts suitable for different well-defined contexts.

None of the five approaches has developed out of use in restricted and controlled contexts of *either* low *or* high levels of complicatedness. Neither has any one of them evolved as a consequence of being applied only to situations with *either* presumed stakeholder agreement on purpose, *or* courteous disagreement amongst stakeholders, *or* stakeholder coercion. The paper is not a celebration of abstract 'methodologies', but of theoretically robust approaches that have a genuine pedigree for supporting real world decision-making activities. Taxonomic devices like TSI and particularly Cynefin can provide important spaces for exploring the nuanced dynamics of complex realities, but they are maps of the territory and should not be confused with the actual territory. As with any systems construct the value lies in their respective adaptability towards changing contexts of use and changing users.

The 'bells that still can ring' refer to all tools, whether traditional systems based or belonging to other traditions of professional practices. Behind the concepts and techniques constituting the tools, there are the bell ringers. Not only do they have the experiences that they bring to bear on the skill of bell-ringing but also the uniquely human qualities that determine how and why they do it as they do, and that allow them to enjoy and appreciate it. But you and I are also bell ringers, perhaps as novices wanting to cross between professional traditions and academic boundaries. We should never expect 'perfect offerings' in systems thinking in practice. But the offerings should allow for the joy in further cultivating our approaches – critically appreciating the cracks – in order to meet the challenge of improving complex situations of change and uncertainty.

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Appendix Assessing a *Systems Thinking in Practice* Practitioner

Adapted from assessment overview for OU students undertaking TU811 module (Open University, 2010)

	**Broad systemic characteristics** of *being* a systems thinking in practice practitioner	**1. Understanding situations:** *contextualising* interrelationships and interdependencies	**2. Practicing systems design:** *engaging* with multiple , often contrasting perspectives	**3. Reflective practice 1:** *managing* ethical and political boundaries	**Reflective practice 2:** *complementing* with other (non-Systems) traditions
Weighting:	(100%)... *but* whole is more than sum of parts!	c. 28%	c. 28%	c.28%	c.16%
'Distinctive' systems practitioner *c.80% and above*	Can apply a range of key systems tools with ideas from other traditions in a coherent way for supporting strategic thinking.in situations of change and uncertainty. Can vary approach in line with change in context.	Systems used for imaginatively and creatively relating to realities. Excellent with SD & VSM.* Identifies reductionism	Appreciates importance of developing perspectives in shaping strategy. Excellent with SODA & SSM* Identifies dogmatism.	Reflects on design of methodology - what's at stake and whose stakeholdings are affected. Excellent with CSH* Identifies holism and pluralism.	Open to relevance of other ideas and traditions outside of systems approaches Can fine-tune strategies based upon such ideas.
Systems practitioner with 'merit' *c. 60-80%*	Has a solid grasp of systems tools covering all three traditions, which can be applied over a wide range of contexts - but without the innovative ability to reflect imaginatively as with a 'distinctive' practitioner.	Systems used for imaginatively grasping dynamics and feedback, but less confidence with implications on variety and autonomy	Appreciates need for facilitating perspectives in making strategy. Has a good grasp of systems tools in mapping perspectives	Reflects need for developing ethical and political awareness in strategic thinking amongst stakeholders but with less confidence in practice	Aware of relationship between Systems and other disciplines and traditions.
'Fairly good' systems practitioner *c.50-60%*	Has gist of some systems tools and has some comptetence in a few approaches, but not wholly confident about being a systems practitioner.	Systems used more as direct (residual) representations of the world – rather than as (relational) learning devices	Appreciates multiple perspectives but mostly on a tokenistic level	Ethics and politics seen largely as an interference with systems design for making strategy.	Limited appreciation of other traditions relevant to making strategy.
'Barely adequate' systems practitioner *c.35-50%*	Has gist of a few systems tools and demonstrates limited comptetence in a few approaches, but not confident about being a systems practitioner.	Situations regarded only at levels of complicatedness in a world reduced to component parts.	Limited if any appreciation in importance of different perspectives.	Ethics and politics of situtaions and systems ignored	Has little time or inclination to value other ideas.
'Clearly not' a systems practitioner *c. 35% and below*	Has little or no appreciation of the range of tools in a systems approach. Either not understanding or flouts the principles of systems thinking in practice through being egoistical instead of humble, dogmatic rather than open, and cynical rather than being creatively critical .	Complexity is someone else's fault.. Either wilfully ignores the bigger picture or is not able to grasp simple ideas of dynamics and feedback and emergence.	Not responsive to values, beliefs and circumstances outside practitioners own sphere. Either abuses others' perspectives or ignores them.	Unable to reflect on context and practice. Either ignores and/or does not recognise political and ethical issues amongst stakeholders.	Unable to make cross disciplinary connections. Either a tyrannical belief in only one approach and/or closed to being influenced

* System dynamics (SD), viable systems model (VSM), strategic options development and analysis (SODA), soft systems methodology (SSM), critical systems heuristics (CSH)