

Appendix 1

Systemic co-inquiry

An explanation of the lines of thinking behind the development of systemic co-inquiry as a methodology is given, starting with developing a systems view. Further explanation of method is attended by a description of systemic inquiry and cooperative inquiry as articulated by Ray Ison and John Heron respectively. Systemic co-inquiry as developed by Foster et al (2018) is summarised as well as our application of the method for the research addressed by this paper.

Developing a systems view

The International Society of Systems Science has a primer to introduce systems science with some basic tenets of systems theory possibly dating back to the 1970s (Banathy, 'A Taste of Systemics' n.d.), as:

- A systems view is a way of looking at the world from many perspectives
- A system can be viewed as a configuration of parts connected and joined together through a web of relationships
- A systems view is one of how things are working together and thus enables viewers to see the effect of different parts working as a whole
- The joining and integrating of a web of relationships creates emergent properties
- Because these properties are the result of relationships they will not be found in any analysis of the parts or from a single viewpoint

The value of systems theory is that wholeness cannot be seen in the parts that make up the system and therefore requires a multi-perspective view to grasp and show the effect of interacting parts.

According to Banathy systems inquiry is a research model (paradigm¹) of how things work together to attain wholeness. When taken as a whole, systems inquiry is a prescription for action - it both produces systems knowledge and applies systems knowledge to address real world situations. The aim is to effect change (e.g., in understanding and practice) that results in improved performance of systems and ongoing learning of those involved in the systems inquiry.

Systems inquiry offers a view into living reality as opposed to abstracted reality where parts are extracted from and analysed separately from real world interactions.

Systems methodology is different from disciplinary methodology in that one selects methods and tools - from a wide range of approaches - that best fit the type of system (as it is perceived), the purpose and nature of inquiry and the specific problem situation.

According to Ray Ison (Pers. Comm.), one has to be aware of the tensions within the Systems community between those who hold – knowingly or not – a commitment to seeing systems as ontologies – things in the world OR to systems as epistemologies brought forth by concerned practitioners/scholars as epistemological devices for knowing about or changing situations systemically or systematically².

¹ Kuhn (1996/1970) defines a scientific paradigm as: "universally recognized scientific achievements that, for a time, provide model problems and solutions for a community of practitioners"

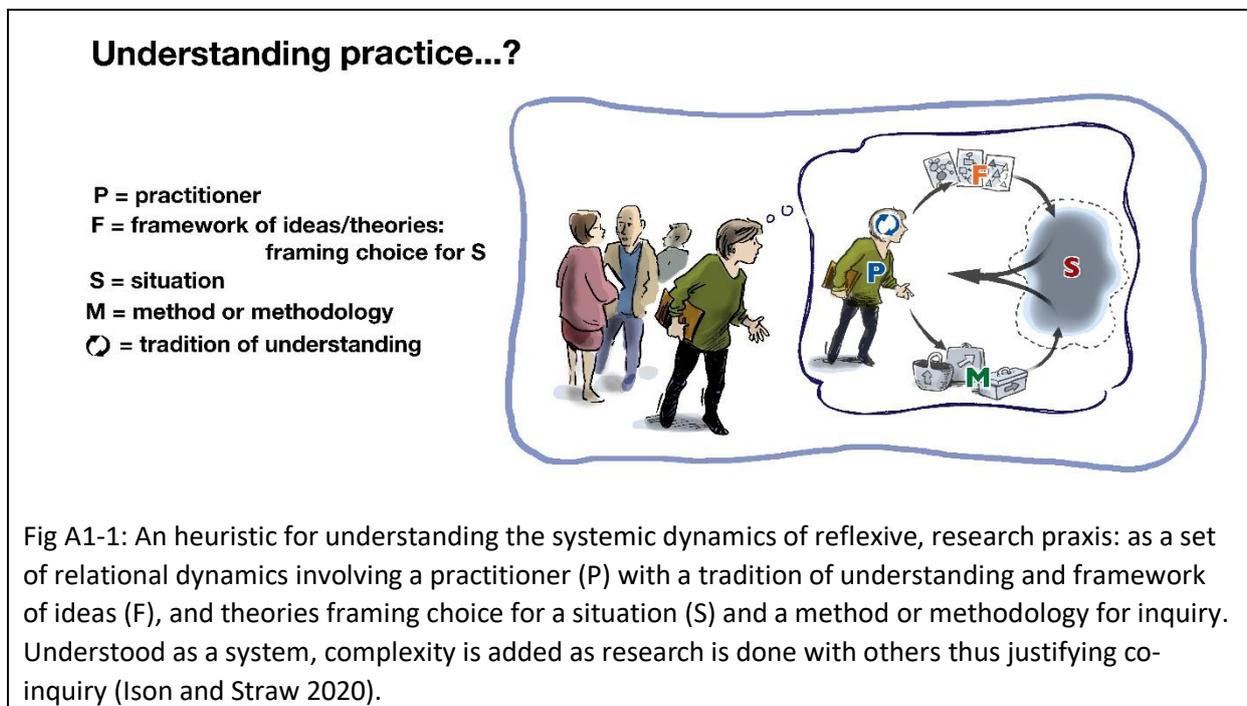
² Ison (2010, Ch2) outlines systemic and systematic as disciplinary differences between systemically looking at a situation as a whole and systematic methodologies of examining them. These are both used in systems science and systemic thinking in practice.

Understanding context is a key element of systems inquiry where the problem focus can be understood from diverse perspectives acting within or having an effect in that context.

Reflecting from its development as at the late 1970s Banathy characterised systems methodology as having two domains of inquiry; i) the study of methods by which we pursue systems scholarship and produce systems knowledge (how we know about systems), and ii) the identification and descriptions of methods and tools for applying systems theory and system thinking in analytical practice (how we use systems thinking to support practical action).

However, Ison and colleagues have shifted this thinking towards an understanding of how we carry traditions of understanding into our methodological practices. Therefore, our frames and framework of ideas inform how we view the world in 'systems'. This is often transferred via an ontological trick of assuming the world exists outside of our frameworks exactly in the way we have conceptualised.

All knowing and knowledge practices are embedded within human orientations and development of tools for interrogating the world and relationships within it. Ison's (2017) work sets out to understand practice, especially research practice and what makes research practice systems research practice.

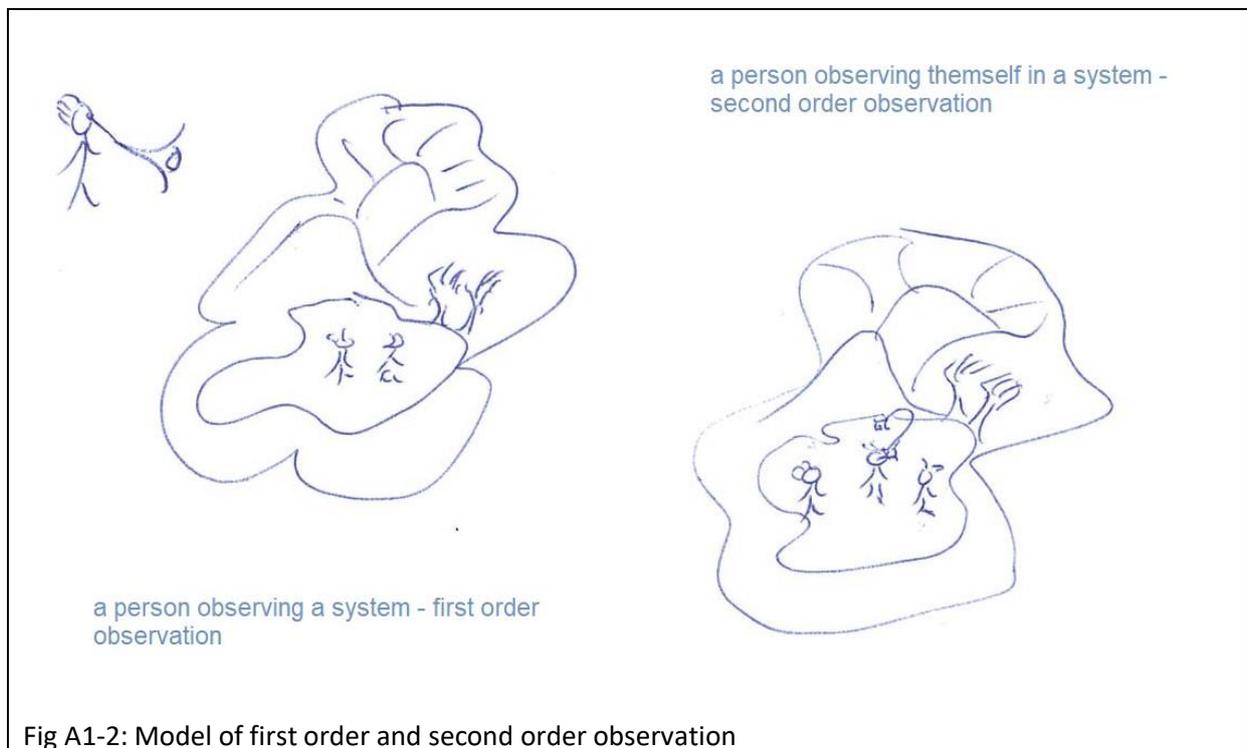


Ison (Pers. Comm.) notes that bringing systems practice to bear through systemic inquiry or co-inquiry involves being:

- open to a situation and our agency in making framing choices for the situation – including as a system
- alert to the need to gain and involve others who collectively offer multiple partial perspectives of a situation of concern
- aware of when it is desirable to engage with a situation systemically and/or systematically (appreciating initial starting conditions)

- able to identify, characterise and classify elements in the situation that can influence formulation (including boundary choices) of a system of our interest and thus what is perceived to be in the environment of the system we have formulated as an epistemological device (this process can be repeated as a means of learning about a situation systemically – and becoming equipped to judge what changes may be systemically desirable and culturally feasible). The concept system carries with it an appreciation that systems can comprise a layered structure (meta-system, system and sub-system) and that there will be emergent properties apparent at different levels that are not predictable from knowing the parts at the lower layer
- equipped to select, identify and characterise specific strategies, methods and tools appropriate to work based on the learning (and possibly implementation) of our particular system of interest

Practices are methodologically tied to our framing choices including epistemic choices of problems and ways of understanding them. We cannot know them to exist independently of our construction of them. The more closely we work with others, the more the shape of systems inquiry melds with their experience and can help to create awareness of what effect they/we are having in the world. Creatively building systems-of-interest from an awareness of when to be able to think and act systemically and/or systematically is central to systems practice of all forms. For a system to be fully comprehended it must include the observer as part of the system, thus entailing the social relations within which the observer sits. Therefore, systemic inquiry acknowledges there is no real objectivity as we are all embedded in social relations that shape the questions we ask and the observations made.



Systemic inquiry

The process of systemic inquiry is enacted as a learning process between those who have a stake in a situation of concern (something problematic about what they are experiencing) that presents an opportunity for change. Designing a systemic inquiry is open to anyone who can make a connection between a theoretical framework, a methodological approach and a given situation (Ison 2010). Systemic inquiry does not happen in the abstract as such but happens through an interaction between abstract thought and actual practice, in the real world.

It is therefore not reductionist but systemic and embracing of different things happening in different parts of the system, including how they are perceived by practitioners.

Systemic inquiry for handling complexity and uncertainty

Ison (2010) in his book 'How to live in a climate change world?', argues the case for systemic inquiry as a social technology, or form of, for dealing with complex societal or ecological problems involving uncertainty and requiring adaptation. He describes systemic inquiry as a "meta-platform for project or programme managing" that can be used in a way that facilitates "social learning or concerted action ... toward better understanding" (p. 236). Further visualisation and valuation of systemic inquiry is provided through worked examples by Ison (2010, pp. 168, 172, Table 7.3).

With respect to seeing problems from multiple partial perspectives (as outlined above by Banathy), Ison explains:

"Within systems practice in general, and systemic inquiry in particular, the surfacing and valuing of multiple partial perspectives is an important means to address the question of what constitutes change for the better. There is never one single right answer or perspective in relation to complex and uncertain issues. Hence processes of decision making that employ and value different perspectives are likely to lead to decisions that are more robust and fit for purpose." (p. 231)

Following Ison, (2010, p. 239), there is no definitive way of setting up a systemic inquiry or of enacting one. In addition to ongoing involvement, capabilities are required for: understanding context; appreciating multiple viewpoints; addressing and clarifying purpose; distinguishing what, how and why; facilitating action that is purposeful (i.e., systemically desirable and culturally feasible); and institutionalising ongoing use of the approach and its outcomes.

Moreover, systemic inquiry is an approach to practice drawing explicitly from systems thinking/science, theories of learning, action research, cooperative inquiry and adaptive management (Ison 2010, p. 240). Changes arising from enacting systemic inquiry are manifest as changes in understanding and practice, changes in social relations amongst those involved, and changes in process or changes in structure (p. 241). Clearly the need for time to establish these relationships and work in a systemic way is important, and this is often not possible within the 1-5 year cycles of research funding.

Cooperative inquiry

For Heron (1996) the originator of the research method, *Cooperative Inquiry* requires two or more people researching a topic through their own experience and going through cycles of experience and reflecting together. During the experiencing phases, each person is a co-subject and during reflection they are a co-researcher. Like Ison's explication of systemic inquiry (2010, p. 239), this model of research has affinity with other research models including action research and experiential learning, in this case founded in the theoretical developments of Kurt Lewin (1952). Heron, takes these concepts further into practical contexts where persons involved in reciprocal relations of inquiry use a fuller range of sensibilities into understanding their topic. Drawing on the metaphor of

the 'gaze' Heron suggests a deeper engagement with a topic than eyes on physical objects, combining spatial and mental properties of mind, involving participatory non-inferential but partial knowledge of the state of mind of the other. An inherent mutuality of meaning is presupposed and grounded by the use of speech (Heron 1996, p.1) or dialogic engagement of co-inquirers with the topic for discussing and sharing interpretation. Reason (1998), also sought to see the relationship of research from external observation to engaged co-inquiry with people impacted by a topic of interest. Reason notes that he could not adequately research people from outside of their context and needed to engage with ways of knowing through epistemological, political, ecological and spiritual dimensions of participatory research.

Systemic co-inquiry

Combining co-inquiry with systemic inquiry

Foster et al (2018) draw from Heron and Reason (2001) in arguing that participants in a co-inquiry need to be involved as co-researchers and can contribute to the design, implementation, monitoring and evaluation of the research. Systemic co-inquiry draws on systems theory, methodologies and techniques, such as those proposed by Dewey as methods of inquiry into problematic situations (e.g., Schön 1996), developing appreciative systems (e.g., Vickers 1965), and recognising many possible worldviews and perspectives (e.g., Churchman 1971) (Ison 2010, p. 237). Systemic co-inquiry is a mode of investigation or research that is open to changing situations, pursuing new directions, as a result of learning and testing new areas of understanding. It can lead to engaging with new theoretical and methodological frameworks that come out of shared or joint learning experiences and appreciating other people's perspectives (Foster et al 2018, p. 10).

Foster et al (2016) note that

“... systemic co-inquiries proceed by enacting a social learning process with those who have a stake in a situation experienced as problematic or as presenting an opportunity. Thereby, they enable participants to begin their investigations in a different emotional space to that which accompanies the emotion of certainty usually associated with programmes and projects.” (p.16)

A systemic co-inquiry adds the tools and methods of systems thinking to complement the basis of meaning in language and speech framed by co-inquiry to include visualisations of a systemic nature. Beyond conventions of social science, Heron (1996) proposed that doing experiments on and gathering data from other people does not adequately inquire into the nature of the human condition. It requires that the researcher also become a “socially sensitive subject involved in mutual gazing with another” (p.1). There are clear symmetries between Heron's thinking of the human condition and Ison's development of systems practice as inquiry into human activity systems. Second order observations of a person as an inquirer in an inquiry system, pulls away from the social science convention of first order observation from outside of a system of interest (see Figure A1-2).

The approach used in our paper

In our case we allowed our systemic and cooperative inquiries to overlap. However, we started the co-inquiry process reported in this paper by working with our key participants. The cooperative inquiry was a result of a first person systemic inquiry (of the first author reflecting on the need to embed research practice within the worlds of practitioners). We then sought out people who could be worked with, during the process of being shown around the research field through the second authors contacts. Additional networks were created as a result of adapting research to the needs of a dynamic or changing setting, including: creation of FENZ from 41 separate fire brigade/ service organisation; and a major earthquake event during the research period. As the first author met

people in the New Zealand context of wildfire and hazards research and response practice, questions were raised about preparedness and practitioners who were proactive in that space were brought into more focussed discussions. Originally tasked with the challenge of research responding to the question of how to bring those outside of the traditions of rural fire volunteers (e.g., women, youth and elders) into the fire services for building community resilience, we adapted our research question to suit the context and other global developments in research and practice around bringing informal and formal volunteers together to build resilience to natural hazards. The research reported here bodes the beginning of a systemic co-inquiry, in which participants are brought into a context through which they may collectively work towards an unfolding awareness and understanding of community wildfire (as one of many rural community hazards) resilience.

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