Evaluating diagramming as praxis

Book Section

Chapter Nine

Evaluating diagramming as praxis

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Editors' introduction[1]

This chapter provides a stark contrast to the previous chapters dealing with the practice of using diagrams in participatory research. The author steps back to look at his development over many years of some diagrammatic representations of core systems principles and ideas discussed in Chapter 2; diagrammatic representations that can be used for evaluating diagramming as praxis in environmental sustainability. This braiding of theory and practice, including braiding between systems ideas and diagramming, is aimed at providing a robust and comprehensive approach to evaluation, which is an increasingly important part of all funded projects and programmes. We have seen in other chapters how funders and stakeholders are looking for 'measurable' outcomes or impacts from many of the projects being described in terms of changes to policy and/or practice. However, in this chapter the author examines what types of 'conversation' are needed in different situations in order to evaluate diagramming used in environmental sustainability projects and programmes.

Introduction

Since the beginning of the Millennium increasing concern has been expressed amongst researchers wanting to influence policy makers, programme commissioners, commissioners of evaluations, and evaluators themselves, of failures with interventions addressing complex environmental issues (Fukasaku, 2000) and of sustainable development issues more widely (Ramalingham, 2013). Whilst many helpful discussions have emerged on the relevance of systems-based and complexity-based approaches towards evaluation (Williams and Iman, 2007; Forss et al, 2011; Reynolds et al, 2012), concern amongst commissioners and evaluators alike have been expressed at the lack of uptake of new ideas (Stern et al, 2012; Befani et al, 2015). Relevant stakeholders appear to be talking past each other. Prevailing evidence-based approaches and contingency approaches to planning and evaluation appear not to be providing the way for valuing systems thinking generally, and visual-based techniques specifically. The urgency of developing alternative ways of using research for planning and evaluating using different tools and ideas have increased markedly with the publication of The 2030 Agenda for Sustainable Development (United Nations, 2015) and associated implementation of the sustainable development goals (SDGs) in succession to the 2000-2015 millennium development goals (MDGs).

[1] Andrew Lane and Sue Oreszyn (eds.) (2017) *Mapping Environmental Sustainability*. Policy Press. University of Bristol

Researching into systemic failure associated with complex situations of environmental sustainability involves many different interactions amongst many different entities (human and non-human). For example, the trigger of global warming (caused primarily by use of fossil fuels in developed countries) has encouraged the rapid development of biofuel agriculture through grants from rich countries in the global North to Brazil and other tropical countries in the global South. This has generated what Sawyer (2008) calls an eco-social collapse: involving both ecological problems (deforestation, pesticide pollution, etc.) and socio-economic problems (particularly with concentration of land tenure, very poor working conditions for those forced to provide cheap labour for biofuel plantations, and increasing food prices for the population). To what extent might such a situation arise from breakdowns in the quality of communications? Apart from researching the importance of inter-human communication, there might also be important factors associated with the quality of our 'communication' with the natural world.

As evidenced in the case study chapters (3-8), diagramming can be a powerful tool for expressing the complicatedness of inter-relationships, the complexity of multiple perspectives, and the conflicts of contrasting boundary judgements on issues of environmental sustainability. So how might it be possible to better evaluate such attributes? This chapter is about using diagramming both as a means of praxis generally, and more specifically, as a means for evaluating environmental sustainability as praxis. Praxis is understood here as the braiding together of theory (thinking) and action (practice). Praxis encompasses all forms of research into environmental sustainability. Good environmental praxis can thus be summarised as thinking-in-practice for supporting a flourishing sustainable natural (including human) environment.

In this chapter I use the metaphor of 'conversation' for describing praxis. The chapter weaves together three stories about diagramming as a means of developing sustainability through praxis. The first story provides some context. It is about evaluation in the field of sustainable development, and particularly the conversation between what might be called big 'E' evaluation – institutionalised demands for evidence-based guarantors or assurances for successful interventions as expected, for example, by funders of research – and small 'e' evaluation – the multitude of practices including visual based tools that may contribute towards developing value in, for example, a funded research project. The story tracks the growing importance of what has been called 'developmental evaluation' (Patton, 2011) – a tradition involving research evaluation – as a means of conversing between big 'E' and small 'e'.

The second and third stories track the history of a particular diagram developed by the author; a representation of praxis that has been shaken-up, messed-about with, and adapted for different uses during the past 15 years. The first of these two stories relates to representing the praxis of environmental responsibility (as a core constituent of developing environmental sustainability), and the second relates to making visual representations of developmental evaluation. Both stories narrate the changing form of the diagramming to suit particular needs. The purpose here is to demonstrate how a diagrammatic representation might allow space for 'conversation' at different levels of practice, including disciplinary (amongst specialist experts), interdisciplinary (between different experts) and transdisciplinary (between experts and civil society) practices.

Weaving the stories together, a mapping tool – the heuristic of systemic triangulation – is presented as a systems-based influence diagram. The tool can be used for evaluating interventions at different levels, including the intervention of using visual techniques.

Diagramming and 'conversing' with sustainability

As noted earlier, I use the metaphor of 'conversation' to capture the notion of research praxis as thinking-in-practice. In line with other contributing authors to this compilation, I further invoke the use of 'diagramming' as a core language tool for enacting the conversation. The 'conversation' between thinking and practice has a number of manifestations in relation to researching environmental sustainability. Talbott (2004), identifies communication as a key problem in promoting sustainability – both communication *with* the natural world and communication amongst humans *about* the natural world. In making the case for a different type of relationship with nature, Talbott explores 'conversation' as a means of revealing what might constitute a more constructive and respectful relationship.

Chapter 1 highlighted the multiple definitions of environmental sustainability which in part arise from the meanings placed on these words by different disciplinary traditions. However these meanings also reflect different worldviews in terms of how people within those traditions act towards the natural (ecological) environment. The idea of conversing with nature is not particularly new, though more often it is associated with endeavours of the 'arts' (poetry, prose, music, performance arts, etc.) rather than scientific pursuits, where the notion is traditionally seen as being 'irrational'. Talbott brings out the tensions between two perspectives on ecological issues: the more eco-centric 'radical preservationist' tradition, and the more anthropocentric 'scientific management' tradition. His essay explores what it means to undertake an ecological conversation, using this as a metaphor to overcome the sometimes intransigent positioning of each tradition.

Here, I want to focus on conversation working at two levels, and to further focus on the value of diagramming as a mediating tool for enabling both conversations. The first level of conversation is that between human agents and the messy (complicated, complex, and conflictual) real world of human and non-human nature. The second level is the more conventional conversation amongst human agents about the real world. As referred to in Chapter 2, researching into environmental sustainability involves making clear the distinction between ontological real world issues of sustainability (*situations* of interest) to which humans will always have inevitably limited knowledge, and the more codified epistemological constructs (*systems* of interest) that we may use for understanding through research into such situations. The distinction is sometimes signalled by the use of upper-case initials for situations (i.e., Situations) and lower-case initials and/or inverted commas for codified constructs (e.g. systems of interest); for example, Nature vs 'nature' (Soper, 1995) or Environment vs environment (Cooper, 1992). Kate Soper makes a distinction between first, 'nature' as a codified construction that is often contested in its meaning (and hence sometimes put in inverted commas), and second, Nature as an extra-discursive reality, something that we acknowledge as existing outside conceptual construction or any attachment to human meaning. David Cooper criticised the conventional view of Environment as too vague – 'just one big … biosphere, the order of things', (Cooper, 1992 p 167) – as used in conventional institutionalised discourse about global warming and climate change amongst scientists and policy makers. He

suggested Environment was too unwieldy, and essentially lacking any sense of significance or purposefulness.

To what extent can we make sense of the idea of a conversation with Nature and Environment, as described by Soper and Cooper respectively, in order to support purposeful evaluation of research into environmental sustainability? And to what extent can we avoid what Talbott (2004) describes as an inadequate conversation with what he calls the 'Other':

> 'There is no such thing as a nature wholly independent of our various acts to preserve (or destroy) it. You cannot define any ecological context over against one of its creatures – least of all over against the human being. If it is true that the creature becomes what it is only by virtue of the context, it is also true that the context becomes what it is only by virtue of the creature.
>
> This can be a hard truth for environmental activists to accept, campaigning as we usually are to save 'it', whatever 'it' may be. In conversational terms, the Other does not exist independently of the conversation. We cannot seek to preserve 'it', because there is no 'it' there; we can only seek to preserve the integrity and coherence of the conversation through which both it and we are continually transforming ourselves.' (Talbott, 2004 pp 43-44)

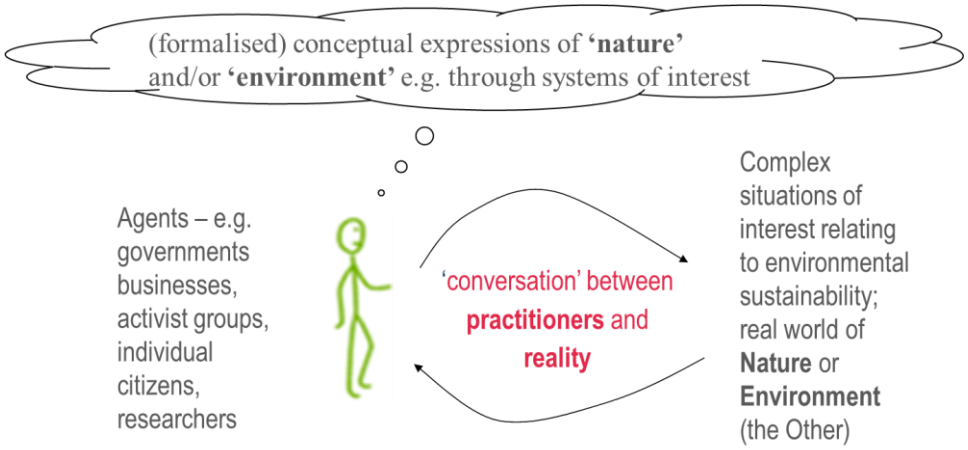
The challenge set by Talbott is how to converse meaningfully with the environment. In fleshing out what 'conversation' on sustainability might look like, it is perhaps as well to remind ourselves as *Homo sapiens* (people, folk, citizens, communities, cities, economies, private corporations, nations, regions and intergovernmental bodies) of three important issues:

1. Whilst environmental praxis involves some understanding of the natural world, there are essential limits to our understanding of the (upper-case) natural world to which we belong, whether this is understood as the extra-discursive realm of integral relationships (including humans) that Soper (1995) calls Nature, or more scientifically as some globalised conception of what Cooper (1992) refers to as Environment.
2. Ideas of nature and environment (using inverted commas) are often contested depending on the practical situation and personal perspective taken. In any particular instance, for example, one person's idea of nature might be more inclusive of, say, humans than another person's perspective; similarly, an environmental issue might be regarded by some people as being more local than global, whereas for others it is the other way round.
3. Given the idea that natures and environments are partial (both in the sense of being incomplete and in the sense of being subject to bias), it is helpful to have some appreciation of the human purpose behind the use of these terms. For example, the different purposes associated with evaluating an intervention based on sustainability may invite particular and contrasting use of terms such as nature and environment respectively.

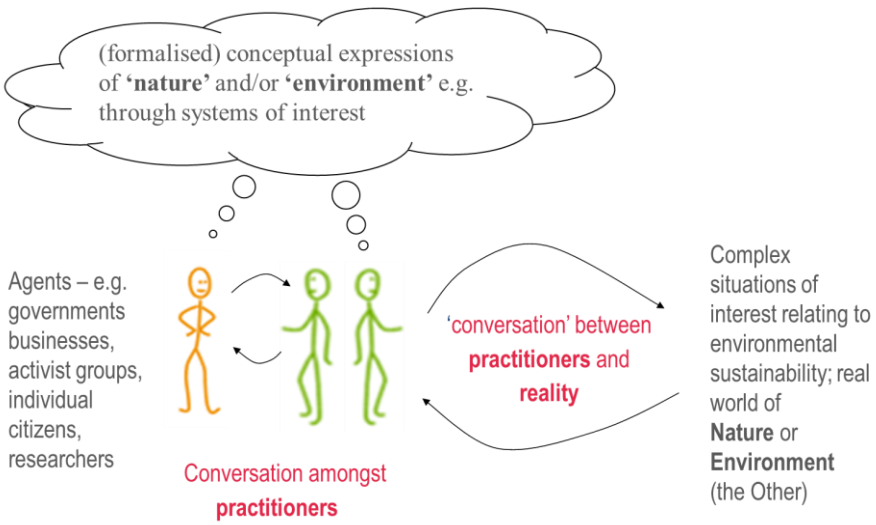
Talbott's distinction between 'radical preservationist' and 'scientific management' signals what he describes as 'two very different conversations' (Talbott, 2004 p 55). Figure 9.1 gives my impression of this conversation through a simple mental model.

Figure 9.1 Mental model or visualisation of environmental conversation showing (a) 1st order 'conversation' between practitioners and reality of environmental issues, and (b) 2nd order conversation amongst practitioners about the reality of environmental issues; both mediated through formalised expressions of systems, including diagramming (adapted from Reynolds and Howell, 2010 p.7; and Reynolds, 2014a). © Martin Reynolds, 2017

(a) 1st order conversation



(b) 2nd order conversation (alongside 1st order conversation)



The two orders of conversation depicted in Figure 9.1 itself provides a formalised expression of environmental praxis - thinking-in-practice – which is used for both depicting the reality of praxis from my perspective, and for conveying this understanding (my 'reality') to you as a reader.

First and second order conversations concur respectively with two aspects of using diagrams for research discussed in Chapter 2 – working alone and working with others. The six case study illustrations in this book can be regarded as examples of using diagramming and mapping as mediating devices – conceptual expressions – for conversing both with reality and with others about that reality, in order to not only improve the reality but improve the understandings of that reality (through improved research).

The two ensuing stories exemplify separate though related sets of conversations. Both stories encompass both orders of conversation. The second story describes the evolution of a mental model for evaluating issues of sustainability; an account principally focusing on 1st order conversation. The first story is more focussed on a 2nd order conversation amongst practitioners about the use of tools for evaluating sustainability. I start with this story as a means of providing the context for the on-going development of diagramming for environmental praxis, and diagramming for evaluating environmental praxis.

Story 1: Evaluating environmental praxis

A common conceptual understanding of evaluation suggests a practice comprising three elements: an *evaluand* – the real world situation being evaluated, usually an intervention of some kind (project, programme, or policy); *evaluators* – human agents either professionally commissioned and/or intervention personnel responsible for providing some kind of feedback on the value of the intervention; and the actual formalised notions of *evaluations* – that is, bounded value judgements on the intervention. There is a general consensus in the formalised field of evaluation practice, amongst professional evaluators, that an evaluation comprises value judgements of merit, worth, and/or significance of an intervention (Scriven, 1995). In relation to the mental model of environmental conversation (Figure 9.1(b)), big 'E' evaluation comprises the real world institutionalised practices and demands made for formal evaluations associated with environmental interventions, whereas small 'e' evaluation comprise various ways of formalising (bounding) value judgements regarding sustainability as part of the evaluation process.

Following the launch of the 17 SDGs and associated 169 targets (United Nations, 2015) attention is growing on big 'E' evaluation – institutionalised demands from, and services to, policy makers, funders and commissioners, for formalised evaluations of projects, programs, policies and/or other interventions associated broadly with research on implementing SDGs. Small 'e' evaluations comprise the multitude of human endeavours (including professional practices) engaged in pursuit of making and developing value judgements. There have developed a range of models for bridging the gap between the small 'e' world of making value judgements and the big 'E' world of needing formalised evaluations. These range from logical framework approach (LFA) or 'logframes' and experimental design including randomised control trials, based on positivist epistemological worldviews, to more interpretivist and constructivist ideas including realist evaluation, 'theories of change', systems-based evaluation and complexity approaches to evaluation (See Patton, 2011, and Stern et al., 2012, for overview descriptions). Many of the small 'e' evaluation practices use visual artefacts to some degree, ranging from simple tables in a 'logframe' to more elaborated forms of rich pictures often used in depicting 'theories of change' (Note 1).

Notwithstanding this range of possibilities, interventions in the big 'E' world – both in planning and evaluating - remain more rooted in the positivist mode of experimental design based on simple causal attribution. Such attribution is conventionally regarded using a simple linear mental model: moving seamlessly from 'planned work' (inputs to activities) towards 'intended results' (outputs to outcomes to impacts) (Note 2).

From a small 'e' world perspective of systems thinking, three problems arise with this simple 'mental mapping' in conversing between the reality of evaluands and evaluators' evaluations (Reynolds et al, 2016). First, the reality of sustainability issues being evaluated – the evaluand – never conforms to linearity. Sustainability issues in particular are always non-linear – comprising multiple feedback connections and loops. Second, given the infinite inter-connectedness of the 'reality' being evaluated, an 'evaluator' (professional or otherwise), as with any research practitioner, has an inevitably partial position as an attributor in attributing causality. In complex situations with many actors as well as many factors, such attribution can be very problematic (Forss et al., 2011). Other attributes and attributions may be valid from other perspectives. Third, an intervention – whether an intervention being evaluated or an evaluation itself – is a real-world activity subject to ongoing change. Reality does not stand still. Rigid input-output models for evaluation are by definition likely to be poorly adaptive to changes in the evaluand.

Securing the implementation of sustainable development goals provides a real world evaluand of interdependent issues. Patton (2016) has responded to the challenge of evaluating SDGs in rethinking the evaluand in terms of 'the Blue Marble' – the famous photographic image of planet Earth taken in 1972, by the crew of Apollo 17 (Note 3). As Patton describes it, the Blue Marble perspective means thinking globally, holistically, and systemically: in essence, thinking of the world and its peoples as the evaluand. Blue Marble is a powerful image which more closely depicts Nature or the Environment rather than formalised conceptual notions of 'nature' or 'environment' as described respectively by Soper (1995) and Cooper (1992). To use the long-serving systems adage, Blue Marble represents the *territory* not the *map* (Korzybski, 1941). As with using the metaphor of conversation more generically (see Chapter 2), systemic evaluation involves three orders of conversation: (i) speaking to the real world of Environment in gaining factual judgements; (ii) speaking to other stakeholders in order to develop value judgements; and (iii) 'speaking' to, and reflecting on, the boundaries that are used for formulating both factual and value judgements.

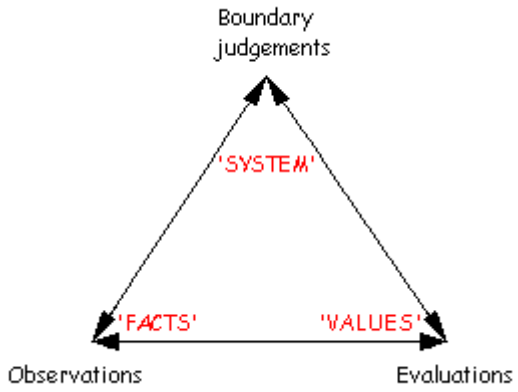
The conventional impoverished first-order 'conversation' between the real ('factual' based) world of complicatedness, complexity and conflict, and the human (values-based) world of making evaluations, presents particular challenges amongst practitioners equipped in the small 'e' world of systems thinking, and the particular mobilisation of diagramming for (evaluating) environmental sustainability. The challenge for myself as someone working in the small 'e' world of evaluation from a tradition of systems thinking, has been to explore the use of diagramming to mobilise interest towards more systemic evaluation practice amongst practitioners in both the small 'e' world and big 'E' worlds of evaluation.

Story 2: Diagramming environmental responsibility as praxis

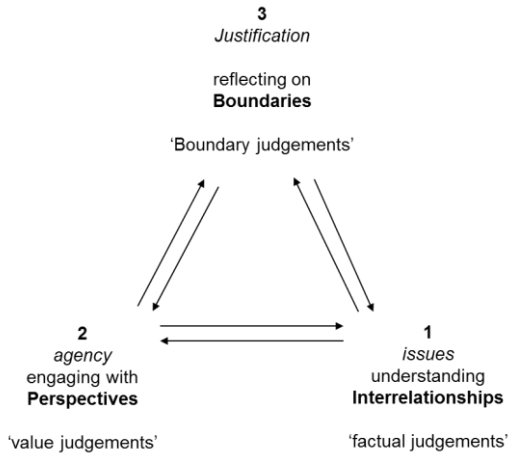
The source of getting a visual representation of praxis – an appropriate mapping of thinking-in-practice – came from Ulrich (2000) and his ideas of boundary critique and systemic triangulation which he presented as an 'eternal triangle'. The three elements of the triangle are real world 'facts', human 'values', and bounded 'systems'. Systems are understood by Ulrich as being conceptual constructs used as essentially 'thinking' devices – boundary judgements (see also chapter2) – for the 'practice' of mediating between making judgements of fact and value judgements. Later, boundary critique was described by Ulrich and myself in dual terms of (i) boundary reflection and (ii) boundary discourse, each illustrated with an empirical case study related to managing natural resources (Ulrich and Reynolds, 2010). The two types of boundary critique conform respectively with 1st order and 2nd order conversations, in turn, correlating with diagramming for working alone and working with others (see Chapter 2).

Figure 9.2 presents an evolutionary storyboard of the development of a diagrammatic learning device (heuristic) for understanding environmental responsibility (Reynolds and Blackmore, 2013) based on principles of systemic triangulation. The heuristic was developed with colleagues for teaching a postgraduate module entitled 'Environmental Responsibility: ethics, policy and action' for mature-age, part-time students, many of whom were professionally engaged with environmental management (Reynolds et al., 2009).

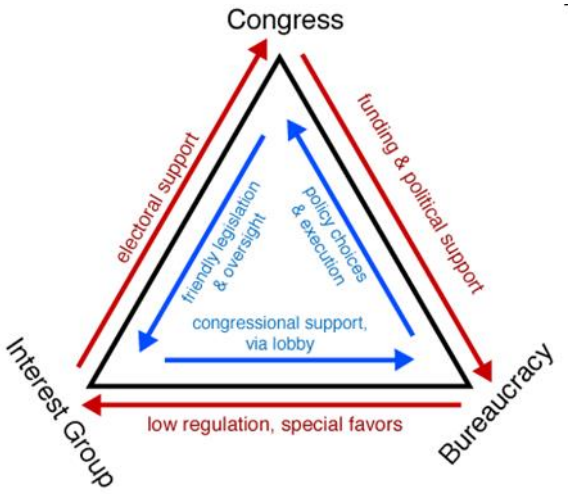
Figure 9.2 Evolutionary storyboard of an environmental responsibility heuristic



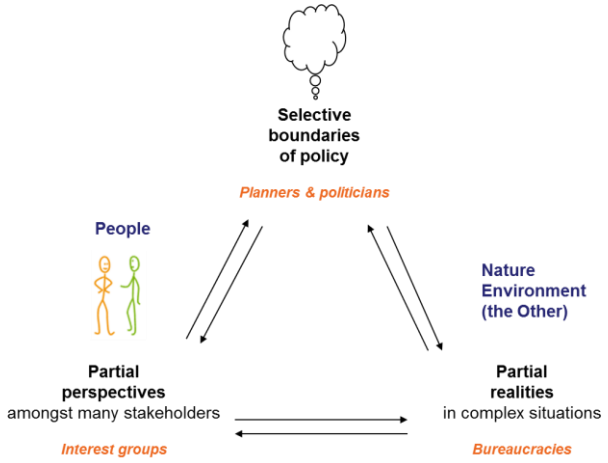
(a) Eternal triangle of systemic triangulation (Ulrich, 2000, p.252)



(b) Systems thinking in practice heuristic (adapted from Reynolds, 2008; Reynolds and Howell, 2010; and Reynolds, 2011)

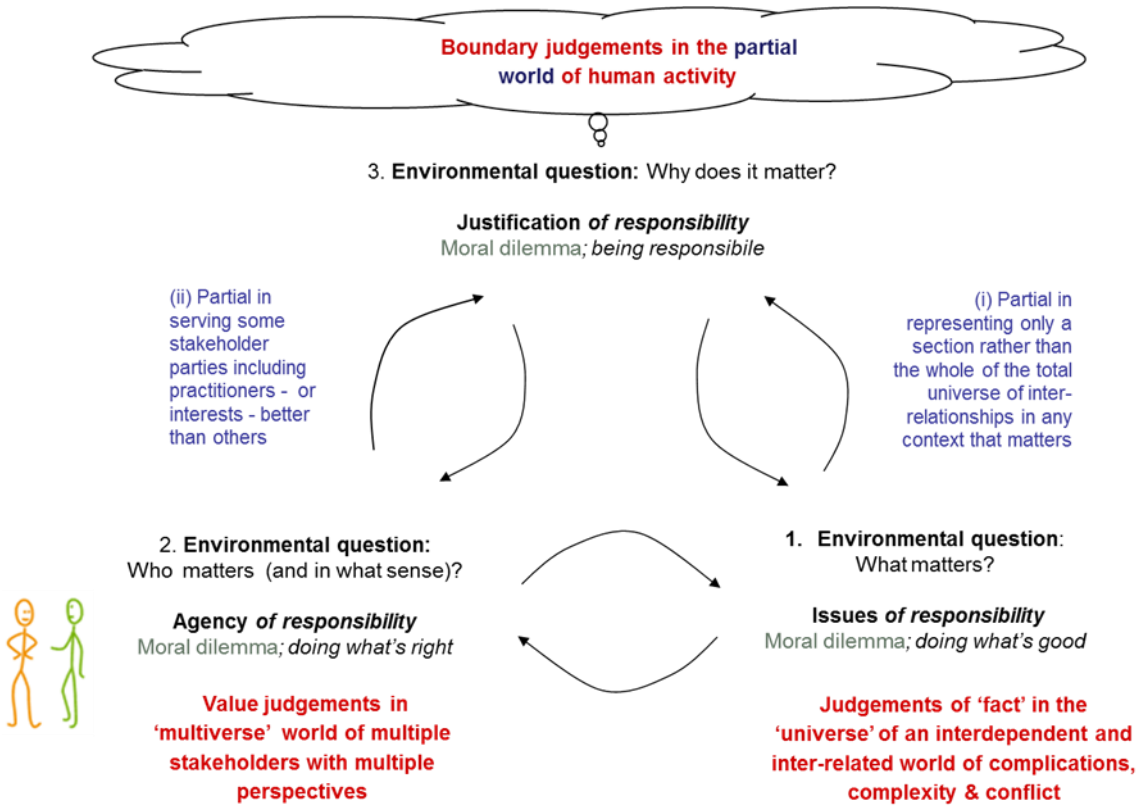


(c) Iron Triangle (Pulitzer, 1919) and Military Industrial Complex (Eisenhower, 1961)



(d) Systemic triangulation and 'conversation' (adapted from Reynolds, 2008; Reynolds and Blackmore, 2013; and Reynolds, 2014a)

Figure 9.2 Evolutionary storyboard of an environmental responsibility heuristic (continued)



(e) Environmental responsibility heuristic (adapted from Reynolds and Blackmore, 2013)

The notes below draw on Figure 9.2 captions in narrating the evolution of the heuristic for environmental responsibility.

Figure 9.2 (a) - *Systemic triangulation* - depicts how real world judgements of fact (regarding, say, Nature or Environment) relate to value judgements (human agency) through the medium of boundary judgements:

> '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 2003 p 334).

The important thing about systemic triangulation is the essential partiality involved with the 'practice' of making judgements. All boundary judgements (associated with the 'thinking' world) are

inevitably partial in the sense of being selective. They are (in the 'practical' world) selective of facts deemed relevant to the task at hand, and selective of values and norms associated with practitioners' own views.

Figure 9.2(b) - *The Systems thinking in practice heuristic (or systemic triangulator)* - arose from wanting to develop a model of understanding and teaching 'systems thinking in practice' as part of a postgraduate programme of that name. A simple understanding was initially developed based on the idea of systems thinking in practice serving three purposes: (i) understanding inter-relationships, (ii) engaging with multiple perspectives, and (iii) reflecting on boundary judgements (Reynolds and Howell, 2010; Reynolds, 2011). The systemic triangulator was developed building on Ulrich's original figurative triangle of facts, values and boundary judgements. In my rendition: 'facts' relate to real world situations of change, or issues, associated with all entities in infinite *inter-relationships*; 'values' relate to practitioners – human agents involved with managing change – having varied and unique *perspectives*; and 'boundaries' relate to the conceptual realm of ideas/tools/models used by practitioners for decision making about managing change, and justifying such decisions by reflecting on *boundary* judgements (Note 4).

Aside from embellishing Ulrich's eternal triangle with slightly different terminology, there are two changes to Ulrich's original diagram that I made. First, I numerically sequenced the three component parts and exchanged the sides on which 'facts' and 'values' were situated. My reason for this is to make the triangulator more work-able for practitioners to systematically engage with the heuristic. The postgraduate module for which the triangulator was developed – was structured so as to deal sequentially with understanding inter-relationships, engaging with perspectives, and reflecting on boundaries. Inter-changing the 'facts' and 'values' enabled an initially more intuitive clockwise pass through the triangulator for heuristic purposes.

The second change involving separation of double-headed arrows into separate single headed arrows may seem minor and insignificant. The use of arrows in systems diagramming is very important in that they signal a substantive relationship – an action of some kind, or a relationship of causality or influence. In reality, the lines on the arrows going in different directions are never directly equivalent; they are always different and peculiar to the direction of the arrow. The way in which 'values' inform factual judgements, for example, is very different from the way in which value judgements might be informed by observation of 'facts'. Double-headed arrows can often mask rather than clarify relationships between entities.

Figure 9.2 (c) - *the Iron Triangle* - provides a potential bridge between different academic disciplines and professional traditions. One of the challenges in teaching systems thinking ideas to professional practitioners involved with, say, environmental planning or international development, is over-coming the language barrier. One example relevant to this book is in the way in which the term 'system' is understood. From a scientific viewpoint (including complexity science and social science, as well as natural science) most researchers would tend to adopt a conventional 'lay' perspective of systems as real world (ontological) entities existing outside of any human perception, to be researched on. Alternatively, the authors in this compilation invite you to view systems more philosophically as conceptual (epistemological) constructs used actively for researching. Simplifying systems thinking in practice in terms of dealing with entities of inter-relationships, perspectives, and boundaries, goes some way towards gaining a basic understanding of what the components are, but

how they connect up remains a challenge. Whilst systems thinking can remain conceptually challenging to understand, the notion of systemic failure or systemic breakdown is intuitively understood particularly in the media (both professional and social) and amongst politicians. However, explaining the mechanism of such processes can again be tricky. Researchers are increasingly reminded of the need to make their ideas, findings, recommendations, intelligible to policy makers. Addressing policy analysts and policy makers from a social science tradition, I have found the notion of the 'iron triangle' helpful in leveraging interest in the mechanisms of systemic triangulation (Reynolds, 2014b; 2015a).

The iron triangle metaphor provides a useful handle on which to explain systemic failure. The idea was first expressed by Ralph Pulitzer, a political journalist reporting critically on the Paris Peace Conference amongst victorious allied governments following World War 1 in 1919 (see Pulitzer and Grasty, 1919). Pulitzer warned against the damaging confluence of interests amongst three exclusive sets of actors – military personnel (soldiers experiencing reality of conflict), military industry (with vested interests), and politicians making the decisions. Whilst not using the term 'systemic failure' Pulitzer at the time warned against the longer-term success of a treaty built on limited conversations; a prophetic judgement given the events leading to the Second World War in the late 1930s. Later, the notion of the iron triangle and its visual image proved a powerful means in speaking to a wider sense of systemic failure; one popular expression being the 'military-industrial complex' used by American President Dwight Eisenhower during his 1961 Presidential resignation speech (Eisenhower, 1961). Political activists like Arundhati Roy have adapted ideas of the 'iron triangle' to surface pernicious confluences of interest regarding, for example, the building of dams in Narmada Valley in India; interventions that have had considerable ecological as well as rural socio-economic disruptive impact (Roy, 2001).

The iron triangle metaphor is generically used to describe interaction between three entities '(i) some loosely defined 'bureaucratic' entity which represents the site of real world implementation of decisions (e.g. civil servants, managers and administrators), (ii) interest groups/ individuals who stand to benefit from the implementation of decisions (e.g. commercial and corporate interests of various kinds, or commissioned advisory groups whose task is to capture different interests), and (iii) decision makers themselves responsible for making and justifying decisions (e.g. Congress or Parliament, or at a lower level, commissioners of interventions)' (Reynolds, 2015a).

With Figure 9.2 (d) - *Systemic triangulation and 'conversation'* - the triadic points on the visual representation of the iron triangle - Figure 9.2(c) - conforms conveniently to the systemic triangulator depicting systems thinking in practice - Figure 9.2(b). Pulitzer's original metaphor signalled the impoverished conversations being held drawing up the Versailles Peace Treaty, with particular reference to exclusion of important parties like representatives of civil society and representatives of the vanquished ('enemy') of Germany. In developing the visual model so that it spoke to the mental model of conversation developed earlier (Figure 9.1), ideas of partiality in systems thinking became particularly important. Figure 9.2(d) is an attempt to use ideas of the iron triangle to signal impoverished) environmental conversations. In sequence, the three axes of the triangle can be used to represent (i) real world Nature or Environment, (ii) inevitably partial or biased value judgements of environmental actors (stakeholders) regarding the reality, and (iii) inevitably partial or incomplete boundary judgements from environmental decision makers (planners and politicians) (Reynolds and Blackmore, 2013).

Figure 9.2 (e) the Environmental responsibility heuristic is a model used for understanding and teaching environmental responsibility (adapted from Reynolds and Blackmore, 2013) derived from a confluence of ideas across different disciplines and traditions including systems thinking, political economy, development management, environmental studies, business studies, and ethics. The heuristic is built on several underpinning principals.

First, the issues of environmental responsibility can be understood either as an extra-discursive reality – something that exists outside conceptual construction or any attachment to human meaning (i.e. Nature) – or as contested ideas relating to human conceptual meanings (i.e. 'nature').

Second, two views of environment can be understood in terms of a radical preservationist viewpoint and a more scientific resource-based viewpoint as depicted by Talbott (2004). The third, 'integral', view of nature constitutes a focal point for environmental responsibility and is one that might be expressed in terms of forging an ecological conversation. Using an integral view helps in understanding responsibility. It involves perceiving environment in terms of both the 'natural' and the 'human' worlds, deeply interlocked.

Third, in understanding issues of environmental responsibility ('nature' matters) three integral questions might be asked – what particular issues matter?; who matters and in what way?; and why do these things matter? For instance, what matters can be associated with what's good and vice versa. If I consider clean air to be something that matters, what's good might be determined by action that contributes as little as possible to air pollution, like riding a bicycle instead of driving a car. What matters (goodness in terms of air quality) drives who matters and how (rights and duties of stakeholders). Doing what's right might similarly be related to an assessment of who matters and how; in other words, questions regarding agency in a situation invite attention to the idea of doing the right thing. Given the situation, what is the right thing to do and who should be doing it? If the situation is air quality (without making a claim about whether it is good or bad), a right course of action might be considered to be 'penalising polluters' or conversely 'educating citizens/consumers'. This in itself suggests who matters and how they matter. Finally, being responsible (or virtuous) can be related to an assessment of why it is that these matters are regarded as important, and why some agents and their particular roles matter and not others.

Fourth, Systems thinking provides a practical way of framing matters that works in two ways: as a 1st order of conversation, it frames our understanding of Nature in terms of thinking about the natural world as holistic systems with interrelated and interdependent parts; and as a 2nd order of conversation, it offers opportunities for exploring different framings – framings representing multiple and often conflicting perspectives on Nature. Framing issues of environmental responsibility for policy design and action requires appropriate discursive space for dealing with our limitations on being holistic and being 'multiverse' (that is, tolerant of multiple perspectives). It requires framing that allows for new frameworks amongst experts of different disciplines, and between those experts and citizens.

The environmental responsibility heuristic enables conversation (being response-able) at two levels; one in understanding systemic failure and breakdown associated with interventions associated with sustainability; another at not only teaching environmental responsibility but planning for better environmental responsibility. The third story illustrates how the visual ideas of systemic

triangulation can be adopted and adapted for evaluating sustainability interventions including interventions associated with implementing the SDGs.

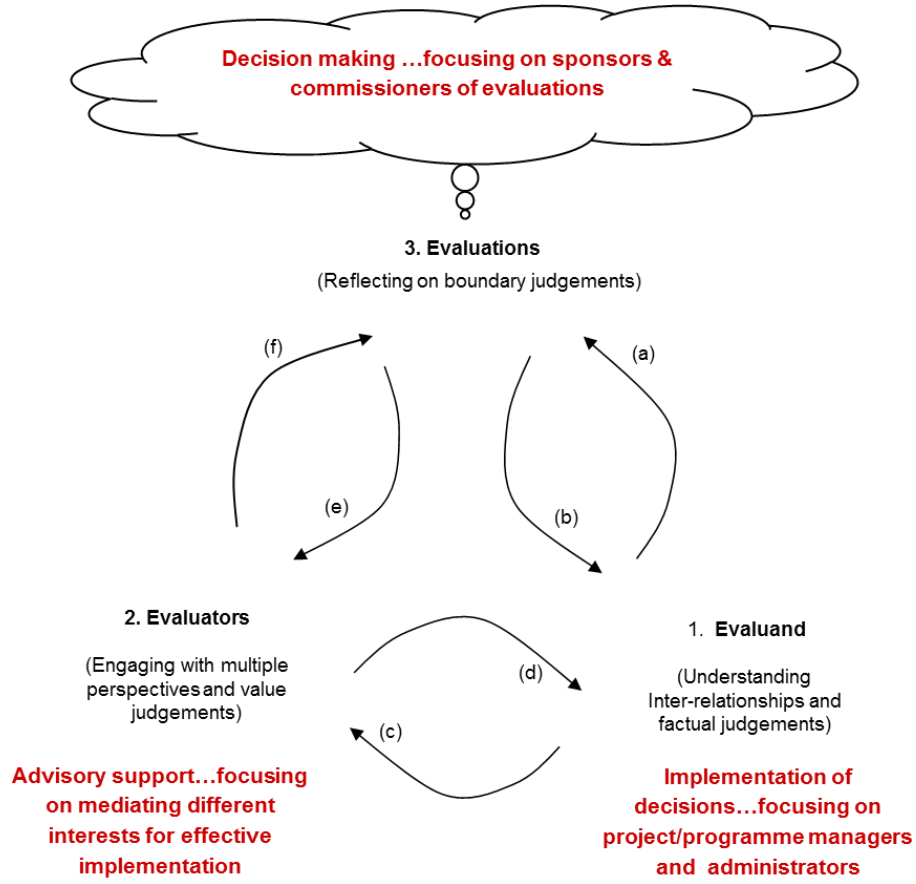
Story 3: Diagramming evaluation as praxis for sustainable development

In a paper entitled *(Breaking) The iron triangle of evaluation* (Reynolds, 2015a) an attempt was made to understand the current situation of big 'E' evaluation as described in Story 1 above. In the paper I drew explicitly on the metaphor of the iron triangle and adapted the visual representation of the Military-Industrial Complex (M-IC) to what might be an equivalent of an Evaluation-Industrial Complex (E-IC). My primary aim as part of a 1st order conversation was to give more concise expression of misgivings regarding the big 'E' world of evaluation. In order to do this, I was keen to put a meaning on each of the six arrows as is done with the M-IC visual representation in Figure 9.2(c). This addresses one of the issues raised in the preceding story about the need for (systems) diagramming to be explicit and transparent about the meaning of the arrows.

The three corners of the triangulator were re-presented in terms of (i) evaluand, including managers/administrators implementing interventions, representing the real world of inter-related issues of complications, complexity, and conflict; (ii) evaluators, with the task of representing (and inevitably) privileging different interests, in short, representing different perspectives; and (iii) evaluations, as expressions of advice to decision makers (commissioners of interventions), as representing, in short, boundary judgements.

In drafting the paper I was encouraged by the editor and other colleagues to explore an alternative form of evaluation practice – what might be referred to as small 'e' evaluation – to counter some of the more impoverished aspects of contemporary institutionalised big 'E' evaluation. In effect, I became engaged with developing an alternative model of what I called an Evaluation-Adaptive Complex (E-AC); an expression of 2nd order conversation promoting more purposeful deliberation on improving evaluation practice amongst evaluation practitioners. Figure 9.3 illustrates the generic broad representation of the triadic relationships between the three domains for what might be called 'evaluation-in-practice' or evaluation as praxis.

Figure 9.3 Evaluation-in-practice: an influence diagram illustrating six activities - (a) auditing; (b) planning; (c) evaluating (understanding); (d) evaluating (practicing); (e) commissioning; and (f) learning (Source: Reynolds, 2015a p.75)



For a more detailed understanding of the 6 activities associated with evaluation-in-practice (a) – (f), you may like to see original source (Reynolds, 2015a), which also includes a table that represents work in progress towards moving from a model of 'evaluation-in-practice' (viewing evaluation as itself an intervention) towards a more refined model of 'evaluating practice' (evaluating an intervention) (Note 5).

A mapping tool for evaluating environmental praxis

The evaluation-adaptive complex heuristic can be adapted for use with planning and evaluating at different levels of intervention. The E-AC might be used as a conversation device for a more focused level of developmental evaluation in the use of diagramming/ mapping for sustainability.

The notes below provide some generic questions regarding the role of diagramming for researching environmental sustainability based on the six core activities of evaluating practice noted above. They might be applied to any of the diagramming case studies in the preceding chapters, or indeed to your own diagramming praxis.

- Auditing: to what extent might diagramming and mapping give expression to the inevitable complications (inter-relationships), complexity (multiple perspectives) and conflict (boundary judgements) arising from researching environmental sustainability? How might mapping situations support greater clarity for environmental decision makers in their endeavours to understand the contexts in which they work? Possibly helpful diagrammatic forms might be rich pictures and spray diagrams.
- Planning: which entities are important and which are not in terms of being 'inclusive' with researching environmental sustainability? How might visual renditions of planning – e.g. logframes and project cycles etc. – accommodate the necessary iterative (non-linear) nature of purposeful planning? Possibly helpful diagrammatic forms may include systems mapping, influence diagramming, cognitive mapping, multiple cause diagramming etc.
- Evaluating (1) (summative): How may diagramming give appropriate expression to judgements of worth (impacts on most vulnerable, including non-human nature), merit ('rights' of non-human as well as human nature), and significance (behavioural change) generated through researching environmental sustainability? How may diagramming embellish a range of value judgements in a questioning provisional sense, rather than an assertive 'judgementally' didactic and dogmatic sense?
- Evaluating (2) (formative): How may diagramming support conversations with other stakeholders about realities of researching environmental sustainability, whilst developing value in the process? To what extent may diagramming support the notion of developmental evaluation (Patton, 2011) triggering new ways of seeing and thereby valuing? Here it is the value of diagramming for prompting 2nd order conversation that is of particular importance.
- Commissioning (provision of guarantors): how might diagramming provide more wider reaching alternative guarantor-sets for researching environmental sustainability. Funded researchers need to provide assurances of rigour based not only on conventional co-guarantor attributes of 'representation' of environmental reality (objectivity), but also attributes of 'resonance' (speaking to different disciplines and traditions) and 'relevance' (speaking to civil societal and public concerns) (Reynolds, 2015b).
- Learning: how can diagramming enable not just single loop learning (in making appropriate representation of activities either working or not working with interventions), but also double-loop learning – in raising ethical issues around particular interventions, and triple-loop learning in raising political issues of power dynamics associated with researching environmental sustainability (Flood and Romm, 1996; Reynolds, 2014a). Taking the visual representation of the iron triangle as an example, what particular diagramming techniques might foster understanding of power dynamics (1st order conversations) and triggering ideas of alternative power relationships (2nd order conversations) associated with, for example, generating better autonomy (power-within).

Each of the examples of diagramming used in this book compilation can be evaluated individually using these ideas. In this section a more generic evaluation of diagramming is presented.

Concluding thoughts

Talbott (2004) regards the quality of communication, particularly between human and non-human nature, but also between stakeholders, as being fundamental to the kinds of problems associated

with eco-social collapse and systemic failure. This chapter has set out an alternative framing of complex interventions that values diagramming as a core constituent of systems thinking in practice and of researching into environmental sustainability.

The three stories briefly narrated in this chapter together weave a wider story of praxis and the use of diagramming. In narrating the story through a personal trajectory of diagramming development, much of the actual messiness - or what I prefer to call playfulness - of the practice in diagramming has been filtered out. Behind each of the diagrams presented in this chapter there is a raft of iterative and discarded drawings. Diagramming at an individual and collective level is praxis; thinking-in-practice. What this means is that diagramming promotes conversation between thinking and practice – conversation at the level of making sense of reality (1st order), and conversation at the level of exchanging perspectives (2nd order). When both levels of conversation are engaged with reflectively, that is, accommodating inevitable partialities in factual and value judgements, the conversation might be regarded as at 3rd level, thereby generating new senses of reality and new possibilities of change (Reynolds, 2014a). Being mindful and playful of diagramming can not only promote better conversations around sustainable development, but also may mitigate against systemic failure and systemic breakdown of interventions associated with environmental sustainability, including researching environmental sustainability.

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Notes

[1] For example, see the graphic on 'A Theory of Change approach' at http://www.idex.org/blog/2014/01/28/idex-theory-of-change/

[2] See the simple mental model depicting this conventional linear logic of evaluation at http://impactinvesting.marsdd.com/social-impact-measurement/how-social-impact-measurement-tools-and-methods-fit-into-your-logic-model/

[3] See also http://www.utilization-focusedevaluation.org/blue-marble-evaluators

[4] The three triangulator nodes also align with the simple definition of 'system' introduced in chapter two- a collection of entities …interacting together (inter-relationships), as seen by someone (perspectives) in order to do something (judgements of boundary) (Morris, 2009)

[5] Since writing this chapter, research practitioners associated with evaluation have expressed an interest in adopting and adapting E-AC model for evaluating their own areas of research practice. For example, in 2016 I was appointed member of an Advisory Panel for the United Nations Women group on developing guidance for an inclusive systemic evaluation approach called GEMs (gender equality, environments, and voices from the margins). The GEMs Framework is a systemic evaluation approach designed to support human-centred monitoring and evaluation in global development interventions – see http://www2.hull.ac.uk/hubs/pdf/CSS080716.pdf.

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