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SYSTEMS PRACTICE AND THE DESIGN OF LEARNING SYSTEMS: ORCHESTRATING AN ECOLOGICAL CONVERSATION¹

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A praxeology is outlined for stakeholder responsibility and response-ability in natural resource management. It is argued that capacity building in systems practice, involving systemic inquiry and the design of learning systems, is central to this praxeology. The research reported is a response to a perceived need by natural resource managers and researchers to *think about their thinking* and to be *aware* of how particular modes of thinking become reified into practices and institutional arrangements that are no longer relevant to the circumstances at hand..

Systems practice is introduced as a means to orchestrate a particular type of conversation; it is also an ecological conversation. As a species our unique selling point is that we can engage in conversation. In the process we bring forth both ourselves and our world. To converse is to turn together, to dance, and thus an ecological conversation is a tango of responsibility that is inventive, unpredictable and local. The relationship between *responsibility* and *response-ability* is explored in the light of emerging critiques of the prevailing Western attitude to reason and a second-order cybernetic perspective on ethics and language. This perspective recognises that because human beings live in language only they can take responsibility for how they think and act.

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NSW Agriculture

INTRODUCTION

I want to explore what it might mean to conduct an ‘ecological conversation’ by reflecting on research that colleagues and I have conducted over the last 15 years. I also draw on work done by, and with, my colleagues in the Systems Discipline at the Open University. From my perspective, the main theme we have pursued is that above all else we need to *think about our thinking* and to be *aware* of how our thinking becomes reified into practices and institutional arrangements that are no longer relevant to the circumstances at hand – particularly those circumstances which determine how we, as a species, relate to our biophysical environment and each other. In recent years this has involved developing a praxeology² as a basis for systems practice.

In an essay on ‘ethics as practice’ the late Heinz von Foerster (1992) asked:

"Am I apart from the universe? That is, whenever I look am I looking through a peephole upon an unfolding universe?"

OR

'Am I part of the universe? That is, whenever I act, am I changing myself and the universe as well?'

These questions are ultimately unanswerable (von Foerster and Poerkson 2002) but responding to them is an act of epistemological awareness.³ The questions also draw attention to what understandings of *response* are appropriate? I claim that the answer we give to these two questions, whether implicitly or explicitly, governs both our own and others' capacity to be *response-able*, as a process, and *responsible*, as an ethic (McClintock and Ison 1994ab). My awareness of the distinctions of response-ability and responsibility arose in my own practice as an educator – as a facilitator of learning, as a parent and as a researcher concerned with the design and conduct of agricultural research and extension. The following story is from my practice as a parent. I remember vividly a time when my daughter was five years old when we were preparing to go outside the house for some purpose. I said to her: ‘Nicky, it is cold outside, I want you to put a jumper on’. She turned to me with hands on hips and said: ‘Dad, it is my body and I know whether it is cold or not!’ I immediately recognised that in my concern as a parent I had attempted to take responsibility for her in ways that potentially denied her own response-ability. Fortunately she felt able to respond in the circumstances but others might have felt less able to do so - I have experienced different, often negative, outcomes when the dynamic has been played out between teacher and student and between researcher (or expert) and non-expert. For example, in my current research concerned with social learning and water management it is becoming apparent that implementation of the new European Water Framework Directive (WFD) is proceeding, for the most part, in ways that preclude stakeholders becoming response-able (Ison 2003; Box 1).

In my formulation response-ability and responsibility are recursively related to form a duality – a unity. Because human beings live in language only they can take responsibility for how

² Praxeology – the branch of knowledge that deals with practical activity and human conduct, the science of efficient action (SOED 1991)

³ Ison and Russell (2000a) have characterised the main recognisable responses to these questions as first and second-order traditions of understanding respectively which in turn give rise to first and second order R&D. It is important to emphasise that both first and second-order traditions are *modes of doing* R&D, not labels for 'a tradition'.

they think and act but to do so requires certain conditions to be met – the capacity to engage in responding⁴. Early 21st century life has evolved many ways to undermine ‘responsibility’ – one can see it in highly prescribed curricula, in imposed targets from policy makers, in performance measures etc. It is also undermined when the outcomes of practices such as science are used to claim that ‘I am right and you are wrong’. By acting with an awareness of these issues my colleagues and I place an emphasis in our developing systems praxeology on starting out systemically. We do so by exploring the context of issues recognising that social processes, as with many physical phenomena, are sensitive to initial starting conditions⁵.

EXPLORING CONTEXT

This paper was for a workshop labelled as ‘an interdisciplinary dialogue’ on ‘agricultural production and integrated ecosystem management of soil and water’. The workshop was sponsored by the OECD who adopt a particular conceptual framework for considering NRM (natural resource management) issues *viz* the pressure-state-response model (PSR). It was conducted in the community of Ballina, NSW in the Richmond River catchment where a number of environmental problems (e.g. acid sulphate soils) and opportunities have been named or are being contested. The organisers drew together a diverse array of people who each have a different history and thus engage in what Russell and Ison (2000a) describe as different traditions of understanding. In the meeting the participants may, or may not, have realised that: *‘My world is different to your world and this must always be so. The common ground which is the basis of our ability to communicate with one another, comes through the use of common processes of perceiving and conceptualising. The process might be common but the end products are never the same, we do not share a common experiential world.’* By drawing attention to these factors I am engaging in what we at the Open University in our MSc in environmental decision making (EDM) call starting out systemically by ‘exploring the context of issues’ (Figure 1).

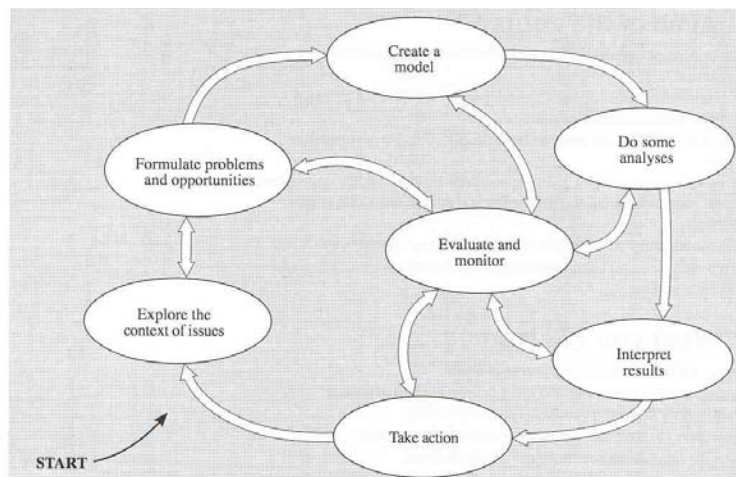


Figure 1. An environmental decision-making framework around which the OU course 'Environmental Decision Making: a systems approach' (T860) is conceptualised (see Blackmore and Morris 2001)

⁴ The human expansion of language involves a recursion that is not present in other species – i.e. the coordination of the coordination of behaviour.

⁵ A substantial glossary relating to concepts in this paper can be found in Ison and Russell (2000a) – space does not permit its use here.

The use of a framework (as a heuristic device, not a prescription or blueprint to be followed) as in Figure 1 cannot be divorced from a user in a particular context⁶. For example, in the context of the course students are encouraged to see Figure 1 as encompassing both systemic and systematic practice⁷. My main point is that the exploration of the context that I began to outline above will be a product of the history of the describer (or describers) and the explanation, or history of the context that the describer makes or accepts. I have depicted this dynamic in Figure 2. I will use this figure to explicate some of the findings from our research and pedagogical developments.

Figure 2 depicts a person (a living system) over time; as unique human beings we are part of a lineage and our history is a product of biological development as well as social development which I will call an individual tradition. An individual tradition is the history of our *being* in the world. I shall further define a tradition as an individual network of prejudices that provide possible answers and strategies for action. The word prejudices may be literally understood as a pre-understanding, so another way of defining tradition is as a network of pre-understandings. A tradition for any individual is not only a way to see and act but also a way to conceal – an inevitable consequence of any seeing and acting (Russell and Ison 2000a)⁸.

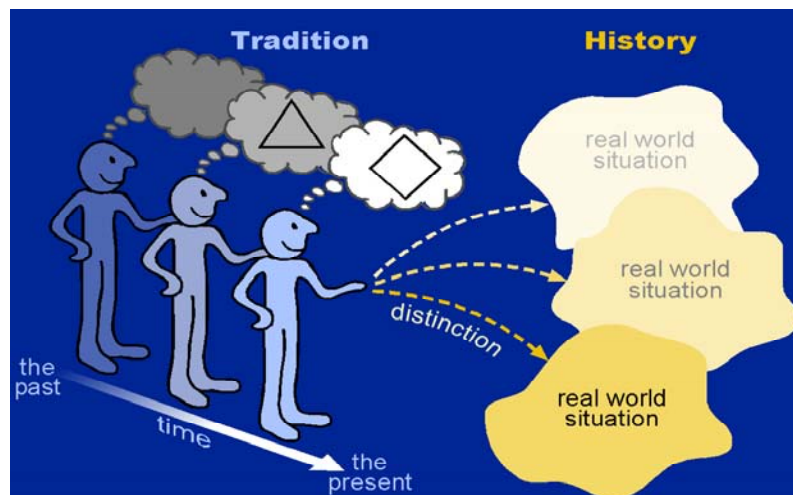


Figure 2. What happens when a researcher with a history, called a tradition, engages with a context, called a ‘real world’ situation (which also has a history that can be constructed) through the act of making a distinction.

Traditions aggregated in a culture embed what has, over time, been judged to be useful practice. In their book Ison and Russell (2000a) point to particular traditions of understanding enacted in the conduct of R&D that have become reified (or institutionalised) in ways that no longer seem helpful. Many of these same traditions are still being enacted in other contexts e.g. the ‘knowledge transfer strategy’ of certain agencies (Ison 2002a). The risk for any culture, including an R&D culture, is that a tradition can become a blind spot when it evolves into practice lacking any manner of critical reflection being connected to it.

⁶ This is the basis of methodology

⁷ Two adjectives arise from the word system. *Systemic* thinking, thinking in terms of wholes, may be contrasted with *systematic* thinking, which is linear, step-by-step thinking. Likewise, it is possible to recognize systemic practice and systematic practice.

⁸ We do not see what we do not see – for example theories act to determine what we see (often inappropriately) as explored in Russell and Ison (2000a) for rangeland R&D.

The effects of blind spots can be observed at the level of the individual, the group, an organization, the nation or culture and in the metaphors and discourses in which we are immersed.

Examples relevant to this workshop exemplify further what I mean:

1. Acid sulphate soils

When I left Australia nine years ago acid sulphate soils were not a widely recognised ‘problem’ yet the science of acid sulphate soils was well developed. The processes by which it became accepted as a problem demanding of a response and the extent to which particular perspectives on the nature of the problem were censured is worthy of more investigation of the type reported in Ison (2000). That investigation explores, with respect to NRM organisations in NSW, how particular traditions of understanding are muted, censored or cultivated and enabled. Similar processes are occurring with respect to ‘native vegetation’ and GM crops.

2. The PSR model

My main recent exposure to the PSR model has been in my capacity as a Programme Committee Member for WWF-UK. The PSR model’s role in monitoring and evaluating WWF-UK’s activities has been under discussion for several years. The questions WWF-UK are attempting to address are: ‘Are we making a difference?’ and ‘What are the most cost effective and efficient ways to deliver on our global, regional and local conservation priorities?’ In an attempt to sort out terminology Hammond (2000) distinguishes between what he calls ‘PSR Model, monitoring lingo and logframe lingo’ (Table 1).

Table 1. Three clusters of terminology for monitoring and evaluation (Source: Hammond 2000).

PSR Model	Monitoring lingo	Logframe lingo
State	Impact	Goals/Objectives
Pressure	Achievement	Targets/Purpose
Response	Performance	Outputs/Activities

The three columns of distinctions in Table 1 are not equivalent and lead to different ways of seeing and acting. If, during our Ballina workshop, we had listened carefully to the language-in-use and thus metaphors in use, it should have been possible to detect connections being made by individuals with each of these three clusters or with other traditions of understanding. When we hear these connections being made, either by ourselves, or someone else, we will become aware of a particular tradition of understanding. Being aware of these will increase the repertoire of choices we have at our disposal through creating the space for new understandings to emerge.

My main concern with respect to the PSR model is that it potentially reifies a way of thinking that focuses on ‘*the* state of *an* environment’, a pressure ‘*on a* resource’ and ‘*the* response *by an* ecosystem’. The language is that of first-order R&D. Ison and Russell (2000a) define first order R&D as when learning and action are based on the belief in a transcendent reality - a ‘real world’ - which can be approached and discovered objectively. It has been characterised by a reliance on a high level of disciplinary knowledge (more recently, multi disciplinary knowledge) and a ‘fix’ mentality - expose the breakdown and attempt to fix it. In first-order

R&D, the problem is clearly defined, the solution is a technological one, and the barriers to adopting the solution are placed fairly and squarely with the end-user community. A first-order response characterises the implementation of the WFD in Europe, with the possible exception of the Netherlands where there is a greater history of social learning born out of the imperative to manage floods (Ison 2003; Box 1).

Box 1. First-order R&D persists!

In Scotland the baseline status of all waters which the WFD requires to be in place by the end of 2004 will be conducted in-house by SEPA (Scottish Environmental Protection Authority) based on existing technical data and 'professional judgement'. For SEPA the goal is to meet the reporting deadline mandated by the WFD legislation and in the process they have not considered:

- (i) who learns or could learn in the process of developing the baseline data? (i.e. who might relevant stakeholders be and how might they be involved?)
- (ii) who, apart from professionals may have relevant data to contribute? (e.g. anglers, gillies, estate managers, school children etc?)
- (iii) whether *how* they are enacting the WFD will deliver *what* it aspires to deliver in say 2020? (there has been no backcasting, for example, and little consideration of whether the model of implementation they are embarking upon is sustainable in human resource and transaction cost terms. In addition, because there is no capacity within SEPA, participation is seen as a luxury that can wait till later, when one might argue on theoretical grounds that it is how you start off – i.e. who participates - that determines where you end up).

On the other hand if, as a conceptual device, the PSR model triggers an ecological conversation in which those who participate are both response-able and responsible then it may reveal new insights and actions that are more sustainable in a systemic sense. If this happened it would be consistent with second – order R&D which Ison and Russell (2000a) describe as seeking to avoid being either subjective (particular to the individual) or objective (independent of the individual), because the objects of our actions and perceptions are not independent of the very actions/perceptions that we make. Thus problems and solutions are both generated in the conversations that take place between the key stakeholders and do not arise, or exist, outside of such engagements. Second-order R&D is built on the understanding that human beings determine the world that they experience. From a second-order perspective the opportunity that is being lost in the implementation of the WFD (Box 1) is for 'social learning', defined as the capacity for self-organizing collaborative action in which emergent outcomes include enhanced citizen eco-literacy.

How is it possible to move from first-order to second order R&D practices? The short answer is that it is not easy and more likely to happen by accident than by design. Experiential learning is the key to making the shift but that requires an appreciation of what is meant by 'experience'.

EXPERIENCE ARISES IN THE ACT OF MAKING A DISTINCTION

Figure 2 is a heuristic device to draw attention to the possibility that our repertoire of actions in a given context is circumscribed by our individual traditions of understanding⁹. The way in which this repertoire is circumscribed is through our incapacity to make alternative, novel, distinctions¹⁰. Following Maturana (1988), experience is seen as arising in the act of making a distinction. If there is no distinction (say drawing a line on paper) there is no experience (of say a circle); in the process something emerges from a background (e.g. a circle from a blank sheet of paper). Many of our activities in developing a systems praxeology are concerned with enabling new distinctions to be made where none existed before so as to increase the choices available to a systems practitioner. Systems practice thus has a particular 'take' on experiential learning.

The act of being listened too, unconditionally, is a very powerful way for triggering new distinctions and thus understandings. Ethnography and narrative and reflective inquiry are some of the ways to reveal particular traditions of understanding within a second-order understanding particularly when enacted in ways that involve active listening. In our research we have explored a number of ways to trigger new distinctions as a basis for collaborative R&D. These include 'enthusiasm', 'dialogue' and systemic inquiry based on metaphor.

'DESIGNS' FOR COLLABORATIVE ACTION

A metaphorical basis for understanding and co-researching

McClintock (1996) investigating the question: 'how can metaphors inspire researching with people?' concluded that:

- i. metaphors provide a way to understand our understandings, and how language is used;
- ii. metaphors provide a way to reflect on research itself;
- iii. metaphors provide a way to understand a research context and to appreciate a diversity of understandings (held by different stakeholders);
- iv. metaphors provide ways of creating space for understandings to emerge; and
- v. metaphors inspired a research approach that can be used in diverse stakeholder contexts.

His conclusions contribute to an agenda for enhancing professional practice to meet demands for increased transparency and participation in environmental decision making and the building of social capital. For example, the WFD demands transparency of decision making and public participation in its implementation yet, as outlined in Box 1, there is limited theoretical and practical understanding of what this entails in the heavily institutionalised EU context.¹¹

McClintock's conclusions also need to be considered in the light of recent claims from Lakoff and Johnson (1999). They challenge prevailing models of Western thought and argue that *reason* (on which much practice is built, including research practice) is: (i) embodied;

⁹ This explication of traditions of understanding is built on Maturana and Varela's (1988) biological theory of cognition, and particularly that of structural coupling and structure determined systems (Fell and Russell 2000).

¹⁰ Making new distinctions is a form of learning that triggers new understandings.

¹¹ See slim.open.ac.uk

(ii) evolutionary; (iii) universal only in that it is a capacity all humans share; (iv) mostly unconscious; (v) largely metaphorical and imaginative and (vi) emotionally engaged and not dispassionate (see McClintock, Ison and Armson 2003 a, b). Their claims are not commonly appreciated and are clearly contested in R&D circles but ironically are informed by the last 30 years of cognitive science research¹². These points are relevant because R&D practice as well as environmental planning and management have as much to do with our modes of thinking and acting as they do with the phenomena themselves. Recognising that *reason* is largely metaphorical and imaginative also provides an opportunity to look at cognitive blind spots via the process of becoming aware of metaphor in conversation. Ison (2002a) demonstrates how this might be done as a process of systemic inquiry with civil servants responsible for developing a 'knowledge transfer strategy'.

SYSTEMIC INQUIRY AND LEARNING SYSTEMS

Systemic inquiry proceeds by enacting a learning process with those who have a stake in a situation experienced as problematic or as presenting an opportunity. The possibility of designing a systemic inquiry is open to anyone who is able to make a connection between a theoretical framework (in this case concerned with systems thinking and practice) a methodological approach and a given situation (Open University 2000). For example, Checkland (2001) argues that the enactment of Soft Systems Methodology (SSM) is an exemplar of systemic inquiry that results in changing modes of thinking – the result is a learning system. He says: 'It is a process in which the thinking (of individuals and groups) is shifted to a different level. It produces 'meta-thinking' – that is, thinking about how you are thinking about the phenomenal world' and 'This mode of thinking rearranges people's mental furniture and enables plausible action-to-improve to be achieved'.

Exploring metaphors-in-use and what they may reveal or conceal is one of many ways to explore the context of issues in the process of environmental decision making. It may also be used as a process to explore and trigger enthusiasms – where enthusiasm is a predisposition to action (Russell and Ison 2000b). The relationship between responsibility and response-ability can also be explored in the light of these emerging critiques to the prevailing models of reason. Our research is guided by attempts to create a space where response-ability can occur. This space is seen as allowing understandings to emerge through dialogue (Kersten and Ison 1998). Elsewhere I have argued that systems practice is concerned with orchestrating a particular type of conversation. Some considerations for the design of learning systems are shown in Table 2.

¹² Since about 1950 the prevailing view in cognitive science has been that the nervous system picks up information from the environment and processes it so as to provide a representation of the outside world in our brain. We can now say instead, to paraphrase Varela (1979), that the nervous system is closed, without inputs or outputs, and that its cognitive operation reflects only its own organisation and that, because of this, we are imposing our constructed information (or our meaning) onto the environment, rather than the other way around. This implies that our interactions with the "real world", including other people, can never be instructive, i.e. there are no unambiguous external signals. Instead our interactions consist of non-specific triggers which we will interpret strictly according to our own internal structural dynamics (Fell and Russell 2000).

Table 2. Two independent sets of design considerations for the design of learning systems based on A) Open University teaching of Systems and B) a community-based R&D project in the south-west of England (Source: Ison 2002a).

A) Eight design features of Systems courses at the Open University	B) Ten design considerations for the SWARD (UK) project including some key initial starting conditions
1. Ground concepts and action as much as possible in the student's own experience;	(i). A perceived issue or need which had local identity;
2. Learn from case studies of failure;	(ii). Active listening to stakeholder perceptions of the issue/need;
3. Develop diagramming (and other modelling) skills as a means for students to engage with and learn about complexity;	(iii). Good staff – in this case young, motivated and proactive women;
4. Take responsibility as authors (or researchers) for what we say and do (epistemological awareness);	(iv). No, or very limited forms of, control;
5. Recognise that learning involves an interplay between our emotional and rational selves;	(v). Proper resourcing particularly in the early stages;
6. Develop skills in iterating - seeing learning as arising from processes that are not deterministic;	(vi). A minimum number of initial group leaders who acted as 'key attractors';
7. Introduce other systems concepts, tools, methods, and methodological approaches so as to develop skills in 'formulating systems of interest.....for purposeful action' (an example would be an exploration based on metaphors);	(vii). Scope for self-organisation around particular enthusiasms;
8. Use verbs not nouns! (i.e. verbs denote relationships and activity and are key to the process of activity modelling which is one of the main features of SSM).	(viii). An appropriately experienced participant conceptualiser;
	(ix). Some small 'carrots' for participants at the beginning.
	(x). A supportive local press creating a positive publicity network.

Responsibility and response-ability – some theoretical connections

The understandings co-researchers and I have developed to the question of 'response' have evolved in two settings over the last 30 years. The first is that of the Systems Group at the Open University who, in the context of supported open learning, have pioneered a particular form of pedagogy to build capacity in systems thinking and practice (e.g. Table 2; Maiteny and Ison 2000; Ison 2002c; Blackmore and Morris 2001).

The second is in my own research career, particularly over the last 15 years. Part of this endeavour has involved exploring and developing, with collaborators, my understandings of the biological basis of cognition, the relationship between organization and structure in change management and the role of metaphor. Our explorations have drawn on work of Chilean neurobiologists Maturana and Varela (the so-called Santiago school of cognition – e.g. Capra 1996) and others, who have been labelled as second-order cyberneticians (Fell and

Russell 2000)¹³. It has also drawn on work associated with dialogue (Isaacs 1993) metaphor (Lakoff and Johnson 1999) learning systems (see Bawden and Ison 1992; Ison 1994; Ison et al 2000), social learning (Blackmore et al 2002) and systemic inquiry (see Checkland, 2001; Ison 2002a).

My own concerns as, with von Foerster's questions, go beyond a reasoned concern with epistemology, the nature of knowledge, to a concern with practice – reflections on what we do when we do what we do. Another way of describing this is how can we *be* ethical? Von Foerster's answer is given in his response to his own two questions (see Introduction): "*Whenever I reflect upon these two alternatives, I am surprised again and again by the depth of the abyss that separates the two fundamentally different worlds that can be created by such a choice: either to see myself as a citizen of an independent universe, whose regularities, rules and customs I may eventually discover, or to see myself as the participant in a conspiracy whose customs, rules and regulations we are now inventing.*" For von Foerster acceptable answers to his questions unfold in our living as we do what we do – it is how we experience *others* and *ourselves*. He rejects an answer based on principle, as in the articulation of an ethical code to be followed (i.e. a normative set of rules) as this ignores how we do what we do. Thus, addressing his concerns is not an academic exercise, it is a practical task. Following von Foerster it has involved us in building a systems praxeology which I define as the capacity to embody and thus enact systems theories and practice, in novel contexts (e.g. McClintock, Ison and Armson 2003a).

Understandings arising from the Santiago school of cognition suggest that all knowing is doing and that our capacity to respond is inextricably linked to our languaging and emotioning¹⁴. '*We human beings exist in the braiding of languaging and emotioning. That is, as our emotioning changes in the course of our languaging [and] our languaging changes in the course of our emotioning (see Maturana 1988). We call this braiding of languaging and emotioning conversation*' (Maturana and Verden Zoller pers. comm.). Further, that: '*We human beings exist, are realized as such, in conversations. It is not that we use conversations, we are a flow of conversations. It is not that language is the home of the Dasein, as Heidegger says, our being occurs in languaging, in the flow of conversations. The human being is a dynamic manner of being in language, not a body, not an entity that has an existence independent of language, and which can then use language as an instrument for communication*'¹⁵.

¹³ Steier (1992) claims that circular processes of many kinds are the hallmark of a cybernetic epistemology. The term itself come from the Greek 'steersman' or 'helmsman' thus evoking a form of practice in which the skill is to respond to feedback. Early cybernetic concerns were with circular causal feedback mechanisms and their application e.g. control engineering. In 1968 Margaret Mead spoke of the 'cybernetics of cybernetics' thus turning attention away from the 'controlled' to the 'controller', more commonly referred to as the 'observer', and our observing processes and actions (hence linking this field with the biology of cognition). Steier (ibid) argues that within second-order cybernetics the concern is with 'how WE build up our systems of knowing and acting' – a social process accomplished in dialogue and requiring others.

¹⁴ Languaging is the coexistence with others in a recursive flow of consensual coordinations of behaviors. Emotioning is something we distinguish and connotes by implication the full anatomical and physiological dynamics that determines at that moment the domain of behaviors in which the human or non-human animal moves - it is the emotion or mood, that is, the domain of relational behavior in which a particular doing takes place, that gives that doing its character as a particular action.

¹⁵ Conversation in the sense used here is action – as exemplified in the metaphor of conversation as dance.

WHAT ARE THE IMPLICATIONS OF THIS PERSPECTIVE?

Why are my concerns important? I claim they are central to our reflections on what it is that we do when we do what we do as practitioners of one sort or another in the name of ‘natural resource management’ (Ison 2002b). For example, amongst the group von Foerster refers to as ‘*others*’ I would include the material or biophysical world which is and remains a legitimate concern of us all. What is not clear however is what practices we need to engage in both individually and collectively to address the question of the quality of our relationship (as a species) with our environment (including other species). In a provocative article Steve Talbott (2002) explores some of the paradoxes inherent in these questions. He cites the argument of Jack Turner (1996) that:

‘The ‘preservation as management’ tradition that began with [Aldo] Leopold is finished because there is little reason to trust the experts to make intelligent long-range decisions about nature ... If an ecosystem can’t be known or controlled with scientific data, then why don’t we simply can all the talk of ecosystem health and integrity and admit, honestly, that it is just public policy, not science?’

In his essay Talbott sets out to chart a pathway between the advocates of scientific management and radical conservationists. Responding to Turner’s further claim that ‘*the limits of our knowledge should define the limits of our practice*’ he asks ‘*By what practice can we extend our knowledge, if we may never act without already possessing perfect knowledge?*’ The answer he offers is: ‘*We conduct an ecological conversation*’. Talbott suggests three main features of an ecological conversation: (i) by putting **cautious** questions to the Other¹⁶; (ii) by compensating for past inadequacies – in the sense that in a conversation later words modify the meaning attributed to earlier words; (iii) by recognising that at any stage of a conversation there is never a single, right or wrong response – nor is it an act of making a choice from something predetermined.

As a species conversation is our unique selling point! We engage in conversation and in the process we bring forth ourselves and our world (see Ison and Russell 2000a). To *converse* is to turn together, to dance, and thus an ecological conversation is a tango of responsibility. A conversation is inventive, unpredictable and is always particularizing to place and people (e.g. Shaw 2002). Engaging with this metaphor is not to turn away from the doing of science or ecology, or any other practice rather it is a choice to attribute another purpose and thus **mode** of practice to what is done. For me the key practical element of systems practice is distinguishing a system –environment relationship as part of a systemic inquiry. This experiential activity opens up new possibilities through the act of making new distinctions of a relational nature. Technologies mediate this process, often by amplifying or suppressing our capacity to make distinctions.

Within this framework responding to von Foerster’s two questions is not just an either/or choice (a dualism). One can choose to accept the second position and to then act **as if** the first position holds. The difference is that with awareness comes an acceptance of

¹⁶ The Other may be the biophysical other.

responsibility rather than the need to claim a transcendental truth. It entails the possibility of release and reflection, of making other distinctions and considering their consequences. This act of epistemological awareness is also an act of response - ability because of the repertoire of practices it enables (McClintock and Ison 1994a; Kersten and Ison 1998; Russell and Ison 2000a). It is also the basis of conducting an ecological conversation.

Understanding the dynamic between response-ability and responsibility seems an imperative in the light of recent trends in natural resource management including the stakeholder exploitation and burn-out, institutional inertia and 'rent-seeking' behaviour by organisations concerned with NRM (e.g. Hubert, Ison and Röling 2000; Gleeson and Piper 2002). Too often the scenario depicted by Figure 3 – what I call the 'inverted institutional biomass pyramid' - characterises local realities. Figure 3 depicts the pervasive 'institutional arrangements', which, following North (1990), I describe as 'rules of the game in which individual strategies compete [they] include any form of constraint that human beings devise to shape interaction'¹⁷ Particular 'institutional arrangements shape how NRM and R&D organisations are constituted and their practices (e.g. the 'transfer of technology paradigm' as demonstrated in Ison 2000). There may be competition, as much as co-operation, between agencies and other stakeholder groups (the next level in Figure 3). The least well developed institutional arrangements and practices are those associated with local stakeholders whose capacity to act (to be response-able) is limited by the competing pressures acting at other levels.

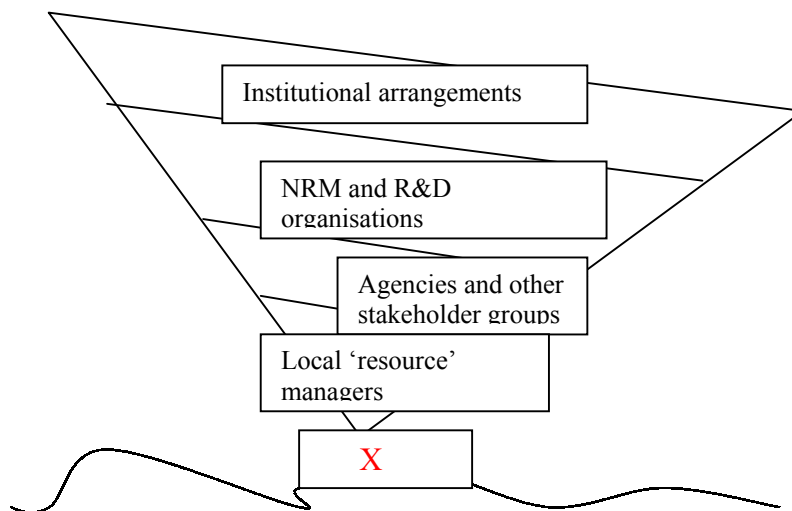


Figure 3. A model as metaphor for lack of local capacity to respond: the 'inverted' institutional biomass pyramid in relational to environmental phenomena X. (NRM – natural resource management; R&D – a noun for the combined practices of research and development).

As Mary Catherine Bateson (1989) has observed: 'self knowledge is empowering' and because 'the landscape through which we move is in constant flux' we also need 'attention and empathy in every context where we encounter other living beings (p.161)'. My current

¹⁷ Elsewhere the term "social technologies" has been used to describe the same phenomenon (Open University 1997); when particular social technologies become everyday or background and continue to be used uncritically then it could be said that they have become institutionalised - they form a tradition.

enthusiasms are to further explore: (i) how ecological conversations might be fostered through the process of systemic inquiry in which social learning is an emergent outcome (e.g. Armson et al 2001) and (ii) how ‘systems practice’ capacity might be built through supported open learning and other novel learning systems in ways which meet emerging needs to manage complexity (e.g. Ison 2002c).

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