

Chapter 2

Social learning and environmental management

The notion of sustainability as a social learning process is now pervasive in environmental and natural resource literature. (Tàbara & Pahl-Wostl 2007)

2.1 Introduction

In theory, if not in practice, identification of the need for more effective, adaptive policy in the area of complex problem solving is not new. Authors exploring the theoretical underpinnings of this new approach to environmental problem solving have emphasised differing elements. These include the importance of the cumulative and incremental learning of new ideas (Allen 2001), the systematic trialling and testing of possible approaches through adaptive management (Lee 1993; Gunderson et al. 1995), and the addressing of the social factors that influence the relative power and voice of stakeholders in problem solving (co-management theory) (Berkes et al. 1991; Berkes 2006). More recently the concept of ‘social learning’ has emerged as a possible hybrid of approaches; a meta-framework of the process of engagement, learning and institutional support required for complex environmental problem solving.

This chapter examines the theoretical basis, core concepts, varying contexts of application, and ultimately the potential value of the social learning concept. It concludes with a summary of key elements of social learning and some commentary on the challenges associated with building capacity for social learning in an environmental management context.

2.2 Definitions, descriptions, and relationships between ideas

In their review of theoretical perspectives on social learning, Parson and Clark (1995) comment on the great diversity of perspectives concealed by the same term, noting:

That many researchers describe the phenomena they are examining as social learning does not necessarily indicate a common theoretical perspective, disciplinary heritage or even language...the deepest difference is that for some social learning means learning by individuals that takes place in social settings and/or is socially conditioned; for others it means learning by social aggregates.

Early origins of the term social learning stem from behaviourist psychology theory, when researchers first became interested in how people learned through observation of others and of role models. Albert Bandura is the name most commonly associated with the development of what was termed ‘observational learning’. Attending to a behaviour; remembering it as a possible model or paradigm; and playing out how it may work for them in different situations (rehearsal) are key aspects of observational learning (Parson & Clark 1995; Smith 2005b; Pahl-Wostl 2006). Webler et al. (1995, p. 445) point out several trajectories emerging from Bandura’s initial work: including those who have examined the possible biological roots of social learning (e.g. Webler et al. 1995), and those who have investigated how social organisations learn (notable among these is the seminal author in organisational learning Chris Argyris)¹. Webler also notes a sociological approach to social learning which, while gaining recent momentum has its roots in critical theory as exemplified by the work of Habermas (1979 in Webler et al. 1995). This work seeks to explain social change as a process of social learning, with cognitive and normative dimensions.

The development of a concept termed social learning in the context of policy, planning and environmental management is comparatively recent², and it is difficult to say for certain that it intentionally shares any theoretical heritage with the work stemming from Bandura’s observational learning. In appearance at least it shares some commonality with later developments to observational learning postulated by Lave and Wenger in the 1990s (Smith 2005a). Their theory, termed situational learning, concentrates less on the idea of learning as the acquisition of knowledge but rather looks at the kinds of social engagements that provide the context for learning to take place. Their focus is on the ways in which learning is *an evolving, continuously renewed set of relations* (Lave & Wenger 1991, p. 50). It is not so much that learners acquire structures or models to understand the world, but they participate in frameworks that have that structure. Learners therefore join communities of practice, initially at the periphery to that community and later more centrally, as their relationships develop. Hence,

¹ See Argyris and Schon’s much quoted paper on organization learning (Argyris & Schon 1978).

² Friedman and Abonyi’s (1976) paper on social learning in policy research predates Bandura’s social learning theory (1977) and makes no connection to the behaviourist theory. Social learning in policy, planning and environmental management is likely to have emerged from several overlapping theoretical sources. However, my own mention (March 2006) of the possibility of using social learning as a framework for collaborative social science research in climate change met with some surprise from social science colleagues who knew of only Bandura’s work under that name.

learning is a social progression. These communities of practice are influenced by, and may change, social structure (Wenger 1998 in Pahl-Wostl 2004).

Smith (1999) identifies three key points from situational learning theory of importance to social learning for environmental management. The first is around where learning takes place and how it can be assessed. Learning is most commonly measured on the assumption that it is a possession of individuals that can be found inside their heads (ibid.). However, situational learning theory tells us the unit of measurement is rather the relationships between people, the conditions that bring people together and the point of contact that allows for particular pieces of information to take on relevance and meaning. Learning does not belong to individual persons, but to the various conversations of which they are a part.

Secondly, situational learning theory has implications for educators. The significance of the community of practice to the process of learning means the critical role of educators is to facilitate engagement and full participation by this community. In the absence of formal educators, any person or process which shapes the participation of members in a community practice is in effect influencing the learning that will take place. Finally, Smith (ibid.) points out the 'situated' nature of social/situational learning means that the context for this learning is firmly rooted in the everyday experience.

2.2.1 Social learning and collaborative learning

Social learning as it is being applied to the context of complex environmental management, does not appear to be entirely rooted in situational learning, rather it is the constructivist theories of collaborative and cooperative learning that emerge as more closely related.

Collaborative and cooperative learning are constructivist theories (based on the work of John Dewey and Jean Piaget³) about the generation and utilisation of knowledge. There are four fundamental assumptions core to each (Smith & MacGregor 1992). Firstly, is the idea that learners are diverse and unique, functioning independently and bringing individual frameworks, experiences and hence constructions to knowledge. Secondly, that learning is an active,

³ Dewey and Piaget's work spans several decades. See Hein (1991).

constructive process. New knowledge is brought into relationship with existing ideas, causing active reorganisation and prioritisation, (hence the information received is not equivalent to the knowledge generated). Thirdly, learning is highly influenced by context and experience (i.e. the learning environment **is** the environment). Finally, learning is an inherently social process. Meaning making, feedback, and mutual exploration not only enrich the learning process, but are critical to the act of information interpretation and contextualisation.

Bonk and Cunningham (1998, p. 34) note the identification of two or possibly more variations of constructivist theory, namely, cognitive and social constructivism.

Cognitive constructivists tend to draw insight from Piaget and focus on individual constructions of knowledge discovered in interaction with the environment. Social constructivists rely more on Vygotsky (1978) and view learning as connection with, and appropriation from, the socio-cultural context within which we are all immersed.

The implications for those developing collaborative learning practices or tools (in the case of Bonk and Cunningham their interest is in computer-supported collaborative learning) of the two branches of constructivism is not insignificant. Bonk and Cunningham (ibid.) observe that whereas cognitive constructivists focus on making learning more relevant, building on the prior knowledge of participants, posing contradictions and addressing misconceptions, social constructivists emphasise human dialogue, interaction, negotiation and collaboration.

Despite these generally recognised constructivist roots, collaborative and cooperative learning appear to lack a commonly accepted and used definition. There are two possible interlinked reasons for this. The term collaborative learning occurs in a wide range of disciplines. Examples of its use abound in areas as diverse as education, psychology, computer science, community development and environmental management. With such diverse usage it is more than likely that collaborative learning actually refers to multiple, co-evolved ideas about social interaction and learning. Dillenbourg (1999) concludes, after several workshops on collaborative learning with colleagues from education, psychology and computer science, that the only common definition for collaborative learning they could come up with is an unsatisfactory one...*it is a situation in which two or more people learn, or attempt to learn something together* (ibid., p. 1). Dillenbourg further states that collaborative learning is not a process but a situation in which certain boundaries and conditions are determined (i.e. that this

group will work together within a time and space and on a particular task that involves learning) and within this situation certain processes may be introduced.

A second likely reason for the lack of a consistent definition is poor linkages between theory derived from practice (where practitioners explore the nuances of their experiences with collaborative and cooperative learning) and constructivist theory development per se. Bonk and Cunningham (1998, p. 33 referencing Harris & Pressley 1991) note with some regret that:

...although constructivist revolutionaries have ventured onto the battlefield of epistemological change, most have not provided practicing educators with the wherewithal to reconstitute and embed constructivist ideas within their personal philosophies and teaching practices. Teachers might, in fact, design useful constructivist learning environments and strategies, but may not recognize that they operate from a constructivist paradigm.

Interestingly, similar observations have been made about the concept of social learning. Pahl-Wostl (2002, p. 400) notes that the theoretical basis for social learning in environmental management is still weak and conceptual approaches are scattered over different fields of the social sciences. My review of literature on social learning over the past twenty years has yielded little in terms of empirical or critical analysis of social learning in practice. What has been done seldom shares a common conceptual framework.

What has emerged from the review of the literature is the possibility of at least two trajectories of social learning theory which are worth exploring. Social learning as it has been discussed in the planning and policy literature (Webler et al. 1995; Forester 1999; Hayward 2000; Fiorino 2001) and social learning as a concept emerging in environmental management and sustainable development (Dale 1989; Wollenberg 2001; Pahl-Wostl 2002, 2006; Pahl-Wostl et al. 2004; Keen et al. 2005). To this I add a discussion around a third context for social learning theory and practice, the increasingly popular area of integrated and transdisciplinary environmental research.

2.2.2 Social learning in planning and policymaking

A year before Bandura published his paper on observational learning, Friedman and Abonyi (1976) wrote on the challenges of undertaking effective policy research, particularly linking

researchers with policymakers. Their complaint was that the prevailing market model of policy research, with its linear client–researcher relationship, did not adequately support policy development. The problem they identified was that *knowledge treated as though it were a mere commodity cannot be understood, translated and fitted into the ongoing stream of decisions and actions that permeate the life of public agencies* (Friedman & Abonyi 1976, p. 932). Their proposed solution to this was essentially an action-research model of policy making which they termed the social-learning model. Friedman and Abonyi described the social practice of policymaking as an interaction of four dynamically related processes:

- Formulation of a theory of reality (i.e. what is going on in the problem situation?)
- Articulation of relevant social values (i.e. what does the policymaker consider important about this situation?)
- Selection of an appropriate political strategy (i.e. what should be done?)
- Implementation of practical measures (i.e. how will it be done?)

Friedman and Abonyi observe that contracted research for policy typically targets only the formation of the theory of reality⁴). A social-learning model, they argued, embraces all stages of the policy process in an open-ended experimentation, involving not only researchers and policymakers but also the stakeholders of the problem context. The emphasis of the social learning approach is on designing a dynamic research and policymaking process, directly interwoven with on-the-ground problem solving.

Friedman later advocated for a social-learning approach to planning, challenging the planner to engage in social learning through *radical transactive planning* in which the planners and the community acquire knowledge through planning action (Hayward 2000). This marks a transition of social learning from being proffered as a pragmatic solution to a more effective policy development and research relationship, to a platform for participatory democracy and social transformation.

⁴ While this was an observation made in 1976, discussions with New Zealand local government environmental policy and planning staff during this PhD research indicated this is a relevant issue today. Their observations particularly noted the difficulty in funding policy research beyond reviews of best practice, and cursory problem scoping (Crawford, personal. communication, August 2005; Kirkland-Smith , 2008).

The work of Hayward (2000) in her PhD thesis *Beyond Consensus: Social Learning in Urban Planning* highlights how far learning, in the planning context, has moved from an experimental approach to policy research to both a goal and core process component in a new deliberative approach to planning. This deliberative approach is advocated by those who argue the role and scope of planning activity should be extended to address the complexity of problems associated with modern urbanisation. Deliberative planning is grounded in assumptions about justice and democracy and the essential role of the planner is to *assist the community to reach some understanding about what actions to take to address concerns which have been raised in discussion* (Hayward 2000, p. 18). Hayward explores the work of leading theorists of deliberative planning such as Healey (1992, 1995, 1996 in Hayward 2000) and Forester (1989, 1993, 1999 in Hayward 2000), and in particular their differently argued models and transformative aims for deliberative planning based on consensus building (Healey) and social learning (Forester) (ibid.).

Forester advocates for the transformative potential of deliberative planning, not because of its ability to promote consensus, but for its potential to enhance social learning (Hayward 2000, p. 52). The challenge of democratic deliberation, according to Forester, is not to transcend or avoid conflict, but to deal with differences, encouraging learning and relationship building which he argues is a process far beyond consensus building or deal making (ibid.). Social learning in this usage then refers to the particular development of capacity in participants to engage in more open and accepting interactions within their community. Social learning is thus about encouraging *public learning about social significance as well as about positive fact, about historical identity and difference as well as shared common ground* (Forester 1999, 61). For Forester, then, social learning is a desired end state, a goal of deliberative planning and, at its broadest level, a theory of social transformation⁵.

A point of confusion in Forester's and Hayward's respective promotion and critique of social learning is the vacillation between viewing social learning as process or as end state, i.e. a way

⁵ Forester's social learning as a basis for social transformation has attracted some criticism, e.g. Warren (1992 in Hayward 2000, p. 54) *...when people are engaged in participatory action they are bound to learn something, but may become more enlightened without becoming more tolerant or public spirited.*

of doing things versus a goal to be reached. This tension is apparent throughout the emergent literature on social learning. For instance, writing on social learning in the field of impact assessment, Webler et al. (1995) typify this conflict. Firstly, Webler et al. (1995) reaffirm the potentially socially transformative quality of social learning when they argue:

When citizens become involved in working out a mutually acceptable solution to a project or problem that affects their community and their personal lives, they mature into responsible democratic citizens and reaffirm democracy (Barber, 1984). One way of describing this phenomenon on a societal level is to use the term 'social learning.'

They expand on this definition stating that social learning means more than merely individuals learning in a social situation; rather it encompasses a community of people with diverse personal interests, but also common interests, who must come together to reach agreement on collective action to solve a mutual problem. Social learning then refers to the process by which changes in the social condition occur – particularly changes in popular awareness and changes in how individuals see their private interests linked with the shared interests of their fellow citizens (ibid., p. 445). The virtue of such learning is that it enables people to overcome tendencies to *pursue egoistic aims before collective ones*. So Webler et al. have described social learning as both outcome and process in the same page. Furthermore, since their discussion includes making a distinction between learning that occurs within a public engagement process and outside the process (ibid., p. 445), they appear to envisage social learning as occurring within discrete events. This is consistent with the premise of their paper which is to explore the potential for public participation processes within social and environmental impact assessment exercises to be undertaken in a way that will enhance learning. Finally since they echo earlier authors (Fiorino 1990 and Laird 1993 in Webler et al. 1995, p. 460) in proposing that a new measure for the evaluation of public participation should include that it enhance learning, there is more evidence that social learning is a desirable 'goal'.

Significantly, and consistent with their development of social learning as 'end state', Webler et al. (1995, pp. 445–446) outline two general capacities to which a process that facilitates social learning leads: (i) cognitive enhancement and (ii) moral development. The former referring to learning about both the technical and process aspects of problem solving and the latter referring to what might be regarded as socialisation characteristics such as increased respect for divergent viewpoints and capacity to address conflict and progress cooperative

endeavour. They regard evaluating the evidence for these to be a useful part of the assessment of the worth of any public participation processes (see Table 2.1).

Table 2.1 Components of social learning (from Webler et al. 1995)

Cognitive enhancement	Moral development
Learning about the state of the problem (information and knowledge)	Developing a sense of self-respect and responsibility to oneself and others regardless of impact on own personal interests and values
Learning about the possible solutions and consequences of these	Being able to take on the perspective of others
Learning about other people's interests and values	Developing skills for moral reasoning and problem solving, that enables one to solve conflicts as they arise
Learning about own personal interests (reflection)	Developing a sense of group solidarity
Learning about methods, tools, strategies to communicate and reach decisions	Learning how to integrate new cognitive knowledge into one's opinion
Learning about practising holistic or integrative thinking	Learning how to cooperate with one another

What still appears to be missing from this framework is some exploration around the 'how to' of social learning. In the planning and policymaking literature, this is at least furthered by the recent work of Daniel Fiorino (2001), if not specifically addressed. In writing a review of progressive learning trends of environmental policy in the US Fiorino (2001) comments that *the current generation of policy makers and reformers have been calling for a better capacity for social learning without using the term*. Fiorino identified three waves of policy learning in the US. The first he termed 'technical learning' – the search for new policy instruments in the context of fixed policy objectives. Technical learning relies on centralised control and emphasises acquisition of the **right** knowledge and implementation of the **right** policy instrument. In the face of perceived shortcomings in the technical learning approach, 'conceptual learning' has emerged. This places greater emphasis on the redefinition of policy goals and adjustment of problem definitions. By the 1990s policymakers recognised the need for a further set of capacities encapsulated by social learning. Social learning, as Fiorino describes it, focuses on interactions and communications among actors. It builds on the

cognitive capacities of technical learning, and the rethinking of objectives present in conceptual learning, but emphasises relations among actors and the quality of dialogue (ibid. p. 324).

That the incentives for developing a social learning approach to public policy have emerged from the shift from the rational-objectivist model to the argument-based subjectivist approach to public policy is also supported by Knoepfel and Kissling-Naff (1998), who observe that in this context, specific learning must be shared, evaluated and accepted by a wider group in order for it to matter. Hence the ‘network’ becomes the primary mediating institution for the development of public policy. Fiorino (2001, p. 324) argues that the incentives for social learning have come largely from dissatisfaction with aspects of environmental regulation, especially adversarial relationships and lack of capacity for cooperative problem solving. In response to this need conceptual learning offers a change in the scale of problem definitions, the search for integrated strategies, growing use of consensus-based approaches, and attention to novel policy instruments. However, social learning, as Fiorino (ibid.) advocates, adds to this in three important ways:

1. **Structural openness.** Social learning approaches to policy and planning imply and rely on less direct control by government. Kooiman (1993 in Fiorino 2001) describes this as *sociopolitical governance* which is more or less continuous processes of interaction between social actors, groups and forces and semi-public organisations, institutions or authorities.
2. **Cooperative approach.** Social learning also implies a different approach to implementation, replacing hierarchical control with a cooperative model of shared responsibility for achieving policy goals among industry, government and others.
3. **Recognition of uncertainty.** Social learning recognises the inherent ‘unknowability’ within complex problems and emphasises the need for communication among stakeholders to negotiate action in the absence of scientific certainty (ibid., p. 328.).

In advocating social learning as the necessary evolutionary trajectory for policy development Fiorino (ibid.) is not specific about social learning as process (although he is clear that it is process rather than end state), nor does he offer any advice about transforming policy processes in line with a social learning approach. However, he does identify the core challenges facing

such a transformation. The primary difficulty he acknowledges is putting social learning into practice in an institutional framework based on technical learning (ibid., p. 330). Social learning implies a different, although not necessarily lesser, role for the state (ibid., p. 332); however, current reliance on a technical learning approach limits the ability of actors in the policy system to change behaviour based on what is learnt.

In summary, social learning in policy and planning clearly has connections, if not roots, in the communicative rationality of Habermas (Maarleveld & Dangbégnon 1999), and the constructivist theories of learning, derived from the work of Piaget and Vitorsky (in Smith 2005b). The distinction between definitions, roles and purposes of social learning as it has emerged in the policy and planning literature as compared with the environmental management and sustainable development literature is largely a matter of focus. For the former, social learning is an add-on to the central subject which is, for example, how to get policy done or how to enact participatory democracy. In Hayward (2000) for instance, the question explored is: ‘is social learning a better goal for deliberative planning than consensus building?’ Or, in the case of Webler et al. (1995) social learning is a desirable and possibly essential outcome of public engagement (among others) and should be considered another criterion for evaluating the effectiveness and value of a public participation exercise (i.e. checking how well the social learning went, as well as more established criteria such as the degree of empowerment, degree of influence and subject satisfaction).

The early work of Friedman and Abonyi (1976) and the later work of Fiorino (2001) placed social learning as an approach to policy research and development, but still focused on the central task of policymaking. For those writing in the context of environmental management and sustainable development, social learning is more frequently regarded as process rather than outcome (or both) and is oriented toward collective problem-solving. To do this, one may need the support of public participation processes as a component of social learning. Hence, social learning comes to be referred to as both the collective learning processes and the public participation processes. The distinction may be subtle but it has led to a differing trajectory for the theoretical development and application of the concept of social learning.

2.2.3 Social learning in environmental management and sustainable development

As with the planning and policy literature, it is hard to trace a legitimate path for the development of the concept of social learning through the works of those writing in environmental management and sustainable development⁶. Although authors may reference each other, their uses of social learning are often so broad as to enable them to do so and still be developing widely differing themes. As Maarleveld and Dangbégnon (1999, p. 268) note:

The concept [of social learning] has come to comprise a collection of phenomena that includes: learning by individuals through observation or interaction with their social context, learning by social aggregates, learning pertaining to social issues, and learning that results in recognizable social entities such as collective decision making procedures, culture, etc.

What these various definitions share, Maarleveld and Dangbégnon argue, is a focus on *the interplay of individual and situational factors in generating human behaviour* (ibid., p. 268). The authors in this area also share an interest in social learning as a means to an end. The end, in this case, is to address complex problems resistant to solution which require the presence of multiple disciplines and perspectives and a fundamental change in social and institutional impediments (Dale 1989). This same purpose, i.e. addressing complexity, and empowering decision makers at multiple levels, has driven the parallel development of the concepts of ‘adaptive management’ and ‘collaborative learning’. Both these discourses lay claim to a more holistic approach to resource management than previous generations of theory and practice (Guijt 2008, p. 44). The basis to adaptive management is recognition that knowledge about any problem system is always incomplete and the approach to management needs must be based on incremental, experiential learning and decision-making. Collaborative learning places emphasis on the participation of stakeholders and the processes used for collectively bounding the problem system, interpreting the diverse knowledge held and choosing future actions. My review of the literature suggests social learning is emerging as a linking construct between these approaches.

Authors such as Maarleveld and Dangbégnon (1999) regard social learning as a normative framework for environmental management. As such its aim is to convey the manner in which

⁶ The reason I distinguish between planning and policy, and environmental management and sustainable development is primarily the different literature referenced by those writing about social learning. With the odd exception (Fiorino, for instance, is referenced by both), the environmental management and sustainable development authors use literature from the ‘development’ world rather than policy and planning.

people learn (and need to learn) how to gain insight into, predict, and control the way their actions affect the natural and human domains. For this purpose they propose three value principles for social learning, which have been added to and prioritised but largely accepted by subsequent authors in this area. These are (i) systems thinking, (ii) experimentation, and (iii) communicative rationality. In a summary of Maarleveld and Dangbégnon's argument (ibid., p. 269), systems thinking is required to counter the blind spots of reductionist analytical traditions⁷; an experimental approach is one which is explicit about expectations when designing management strategies and evaluation methods and collects information to check assumptions with practice, and communicative rationality⁸ is the guiding principle for the necessary interactions of scientists, resource users, planners and managers (needed for the systems thinking and the experimental approach). Systems thinking and explicit experimentation are cornerstones of adaptive management (Lee 1993; Gunderson 1999). Communicative rationality, and its constructivist implications, is at the base of theory on collaborative learning, and collaborative management.

However, to suggest that social learning has developed as some kind of meta-theory of modern approaches to environmental management would be inaccurate. The relative newness of the field, and the fact that many authors are contributing from a pragmatic rather than theoretically driven perspective, means that concepts like collaborative learning and social learning are used synonymously or even as subsets of one another. For instance, authors such as Daniels & Walker (1996) and Schusler et al. (2003) regard social learning as a subsidiary concept or outcome of collaborative learning and collaborative management (co-management) respectively. Despite this their contributions to the concept overall are still worth reviewing.

Schusler et al. (ibid.) regard social learning as learning which happens across a collective and, like Webler et al. (1995), consider it a measurable outcome of a collaborative process. They view its main contribution is the increased knowledge that can be made available for community-based management, around facts, values, problems and opportunities, areas of agreement and disagreement, alternative actions, and possibilities for working together.

⁷ Systems thinking' includes methods, tools and principles oriented toward understanding the interrelatedness of forces and elements and viewing them as part of a common purpose (Senge 1990 in Daniels & Walker 1996).

⁸ Maarleveld and Dangbégnon (1999, p. 269) describe Habermas's (1984 in ibid) communicative rationality as the necessary ideal to guide interaction as this captures the notions of free exchange for all participants that is conducted in *understandable, legitimate and truthful manner*.

However, echoing criticism of Forester's (1999) social learning for deliberative planning (see footnote 4) they note that not all learning is positive or accurate. The possibility of 'mistaken learning' means that the process of social learning needs to be ongoing so inaccuracies can be worked through (Schusler et al. 2003, p. 322). Furthermore they note that not all interactions lead to positive relationships. Social learning can foster negative perceptions of participants and powerful interests may co-opt the less powerful, even when no overt conflict is apparent. Also learning may not lead to action, and what is needed beyond social learning is a locally based change agent to follow up on initiatives (ibid.).

Daniels and Walker's (1996) framework for collaborative learning shares some commonality with Maarleveld and Dangbégnon's (1999) in that it links systems thinking (specifically through soft systems methodology⁹), with communicative competence. They see social learning as both a process *of framing issues, analyzing alternatives, and debating choices* (Daniels & Walker 1996, p. 73) and as an outcome – *social learning happens in the process of defining the problem as constituencies sort out their own and other's values, orientations and priorities* (ibid.). What they add to the concept is an emphasis on alternative dispute resolution and some clarity around the underpinning assumptions about learning, since the purpose of social learning, is...*not to resolve or eliminate conflict; rather it is to learn about complex issues in an inherently conflictual environment* (ibid., p. 74).

Maarleveld and Dangbégnon's work is comparatively recent, but as social learning has gained momentum it has often been cited. What has been added to it has largely come from a pragmatic discourse around what works and is perceived necessary for addressing complex questions of environmental management or sustainable development. Authors such as Buck et al. (2001), Wollenberg (2001), Keen et al. (2005), and Pahl-Wostl et al. (2002, 2006) have furthered both the concept and its popularity but are not postulating new theory. Largely they are collecting together the most influential ideas, phenomena, and conditions for learning and behaviour change operating at a social level. Social learning as it is increasingly being referred to in the literature is something of a 'grab bag' of useful concepts that have been ordered, grouped and prioritised for the author's purpose.

⁹ Soft systems methodology, devised by Peter Checkland in the 1960s and used widely today, applies theoretical work on systems and experiential learning. The term 'soft' is used to refer to systems that are hard to define or bound, commonly rich in social or political elements (Checkland 1999).

At this point, it is most useful to look at the common emerging factors that give insight into the value of the social learning concept in the context of environmental management. Most authors, view the concept more holistically than ‘community participation’ or ‘learning in a group setting’. Social learning includes: understanding the limitations of existing institutions and management systems and experimenting with learning oriented and participatory forms of governance (Bouwen & Taillieu 2004). Furthermore social learning goes beyond single events and involves iterative and ongoing processes which generate transformations in the socio-ecological system unique to each context (Pahl-Wostl & Hare 2004).

A social learning approach is necessary where the situation is such that either the problem definition or desired outcomes are unknown or contentious; there is disparity in power, resources and knowledge; an interdependence between stakeholders; conflicting or adversarial relationships; and the need for coordinated action at multiple levels¹⁰ (Daniels & Walker 1996; Lee 1999; Buck et al. 2001; Craps, 2003; Bouwen & Taillieu 2004; Pahl-Wostl & Hare 2004). It is often implied, if not stated, that a social learning approach is useful in situations where structural changes or new organisational forms are neither feasible nor desirable.

Common to authors also is the idea that social learning has a variety of dimensions and that paying attention to each of the multiple strands is necessary to the concept as a whole. As mentioned, it is commonly recognised that the various aspects of social learning are not easily divisible, and there is some variability in how they have been identified. I will expand on each of four general theme areas: (i) learning, (ii) systems thinking, (iii) collaboration and networks, and (iv) political systems and decision making.

The ‘learning’ of social learning

Buck et al. (2001, p. 5) observe that social learning can be advanced by understanding more about the learning process itself and a number of authors have looked at the different kinds of learning required in a social learning approach. Pahl-Wostl & Hare (2004, p. 195) say social learning involves a combination of *soft relational and hard factual aspects of analyzing and*

¹⁰ These conditions bring to mind conflict management. Although explicit reference to conflict management theory is not extensive in the social learning literature, it plays a central role in social learning’s cousin concept, ‘collaborative learning’ (Allen & Kilvington 2000).

managing a human-environment system. This in turn implies a combination of methods is required – hard-system ones (such as data collection and quantitative analysis), and soft-system ones (such as knowledge elicitation and engineering, group model building, and qualitative analysis). As noted earlier, Webler et al. (2005), uses the terms ‘conceptual’ and ‘moral’ to distinguish learning types within social learning. Craps (2003, pp. 8–9) rebrands this, identifying two types of learning critical to a social learning process as *cognitions* and *attitudes*. Cognitions describes learning about both technical information and social processes, such as how to deal with interdependence amongst actors. Learning around attitudes is essentially Webler’s *moral development* and examples include developing a sense of responsibility and a willingness to accept different perspectives (see Table 2.1).

While neither Craps nor Webler et al. make comment on how learning around cognitive or moral issues can be facilitated, there is a common recognition among authors on social learning theory and practice that the learning that takes place must go beyond revealing the basic facts of the social and environmental system¹¹. Social learning processes must also include learning that questions fundamental assumptions about the system, and, beyond this, learning that critiques the learning process itself, examining who is learning and what is being learnt. This is referred to as double-loop learning (Maarleveld & Dangbégnon 1999; Keen et al. 2005) and draws on the organisational psychology work of Argyris and Schön (1978).

For Argyris and Schön (in Smith 2005a), single-loop learning is straightforward detection of error and correction which enables the basic policies or objectives of an organisation or project to be achieved. An alternative response to detection of error is to question the governing variables themselves (double-loop learning). Such learning enables a shift in the way the entire policy or objectives have been framed, and it is this kind of learning that is essential in the kind of problem situations where a social learning approach might be employed. While double-loop learning is the desired outcome, the platform this rests on is ‘reflection’.

Keen et al. (2005, p. 10) regard reflection as one of the five core strands integral to a social learning approach, stating that:

¹¹ In the case story chapters 5 and 7 I refer to this as content and process knowledge

Reflectivity in environmental management is an important lever for social change because it can reveal how theoretical, cultural, institutional and political contexts affect our learning processes, actions and values.

They describe the process of reflection as a series of learning cycles – diagnosing what matters, designing what could be, doing what can be done, and developing a deeper understanding by evaluation. This reflection occurs at a personal and interpersonal level (e.g. between people and groups); at a community level (e.g. in the process of identifying shared visions); and at a social level (e.g. through the evaluation of the impacts of laws and regulations) (ibid., p. 10). Keen et al. (2005) argue motivation for such reflective practice needs some form of catalyst, and they propose adaptive management approaches (with their reliance on articulation of experimental elements in policy and management, followed by active monitoring and evaluation), and multi-stakeholder collaborations which challenge participants to consider new knowledge and insights. However, this argument seems somewhat tautological since elsewhere it is proposed that adaptive management and multi-stakeholder processes rely on good reflective practice to fulfil their potential.

Certainly, in adaptive management, the role of reflection is given formal dimensions and made explicit by the notion of taking an ‘experimental approach’ to resource management.

Maarleveld and Dangbégnon (1999, p. 268) observe that:

An experimental approach to resource management is explicit about expectations when designing management strategies and evaluation methods, collects information to check assumptions with practice, and translates comparison into learning-by correcting errors, improving understanding, and changing plans and actions.

This interweaving between adaptive management and social learning can be confusing with different authors implying that the one concept subsumes the other. For instance, in their work outlining a framework for social learning Maarleveld and Dangbégnon (1999) cite well-known authors in adaptive management’ (Holling 1978, 1995; Lee 1993). Lee (1993 in Buck et al. 2001, p. 3) also views social learning as a combination of adaptive management *involving conscious learning from policy experiments* and politics. Lee (1993) states that policy development using adaptive management, applies experimentation to the conception and implementation of natural-resource and environmental policies, and is designed from the outset to test clearly formulated hypotheses about the behaviour of a system. Consciously or

unconsciously, this echoes Friedman and Abonyi (1976) and their early suggestions that social learning be used as an action-research framework for policy development.

Overall, the learning component of social learning falls well short of establishing a rigorous and widely agreed theoretical basis. This is not surprising, given comments on the paucity of theory around learning in complex multi-level social situations. Parson and Clark (1995, p. 436) conclude that *the best-developed theories of learning are clearly at the level of individual learners, and to a lesser extent at the level of small, face-to-face groups*. This is also supported by Argyris and Schon's (1996) later work on triple-loop learning, i.e. learning which involves the development of new knowledge about how to engage in double-loop learning. This 'learning how to learn', they argued was critical to organisational development, but rarely practised¹². Indeed Buck et al. (2001), in their book which collates the experience of practitioners in community forestry programmes, noted a fundamental lack of vocabulary when it came to describing their experiences of social learning.

[While] language characterizing collaboration and partnership formation was familiar... What was missing was conceptual language describing the role of learning in collaboration... Concepts such as learning groups, learning platforms, discovery groups, discovery learning, group experimentation, double-loop learning, appreciative inquiry, facilitation of platform processes, ecological knowledge systems, collective learning in actor networks and others helped us appreciate how learning is organized to support collaboration, and how people organize collaboratively to learn. (Buck et al. 2001, p. 6)

The kind of theory about learning that writers on social learning are generally agreed upon is, at its most fundamental, most closely described by Kolb's learning cycle (Kolb 1984 in Merriam & Clark 1993). The learning cycle is based on the idea that reflection on experience can transform this into new knowledge. It involves four stages: experiencing, where the individual, group or collective is immersed in 'doing' an activity; reflection, which involves stepping back from task involvement and reviewing what has been done; conceptualisation, where the significance and meaning of events are interpreted; and planning, which takes the new understanding and uses it to either make predictions about what is likely to happen next or decide what actions should be taken to refine the way the task is handled.

¹² This comes from Argyris and Schon's *Organizational Learning II* and is similar to what another known organisational learning theorist, Gregory Bateson, referred to as 'deuterolearning' (Davies 1998).

Daniels and Walker (1996, pp. 76–79) include Kolb’s adult learning theory in what they regard as the assumptions underpinning collaborative learning. These are:

1. Learning is more likely in active rather than passive situations
2. Learning involves different modes of thinking
3. Learning styles vary and approaches to promote learning need to be flexible
4. Learning is improved by systems thinking.

The importance of recognising that learning involves different modes of thinking (assumption 2) fits with the earlier discussions around single- and double-loop learning. It is also reflected in Pahl-Wostl’s (2002, p. 400) idea that social learning needs to capture processes of both apprehension (knowing through concrete experience) and comprehension (knowing through abstract concepts). That learning styles vary (assumption 3), and that there is a need to address this variation is echoed by Buck et al. (2001, p. 10) when they state:

The overarching theme here is the need for learning styles and approaches to be responsive to stakeholders’ preferences, culture and changes in management needs. Multiple approaches are likely if the goal is to reach all the necessary parties and to be relevant to changing conditions over time.

The importance of systems thinking to support the learning component of social learning (assumption 4) has already been referred to by Maarleveld and Dangbégnon (1999) as one of three value-critical principles of social learning. This is common to a number of authors and will be discussed below.

Social learning and systems thinking

The necessity for a way of thinking about environmental management problems that avoids the traps of traditional, reductionist; analytical thinking is a corner stone of theory building around sustainability. Systems thinking is a way of interpreting the relationships between multiple components of a system, reassessing their character and the priority they are accorded in problem solving. The nature of systems thinking makes it attractive for addressing the most difficult types of problems: those involving complex issues whose solutions are not obvious, those that depend on past or ongoing actions of multiple actors, and those stemming from

ineffective coordination amongst stakeholders (Aronson 1998). Systems thinking requires re-examination of boundaries (physical and ideological) and critical system elements, (human and non-human). A systems thinking approach accepts the uncertainty and dynamism inherent in the system and concentrates on clarifying patterns and processes rather than looking at events or seeking endpoints (Keen et al. 2005).

Owen and Lambert (1995) identify three main characteristics of systems thinking. Firstly, systems thinking requires appreciation of the characteristics of systems, i.e. that each element will affect the operation of the whole, parts of the system are interdependent, and the grouping of parts of the system results in emergent properties that are the same as that of the parts but not the system as a whole. The focus of systems thinking is therefore on interaction. Secondly, systems thinking requires a shift of mind, particularly an understanding of our relationship to the system from within rather than externally. It looks at underlying systemic structures and beyond discrete events and patterns of behaviour. Thirdly, systems thinking in the environmental management context is about developing in-depth knowledge about programmes and policies and their organisational implications, across biophysical, socio-cultural and economic components of the system in question. The purpose of a systems-thinking-based inquiry is to seek leverage, seeing where actions and changes in structures can lead to significant and enduring improvements.

The importance to social learning of understanding both the complexity of the management system under scrutiny and the interdependence of actors is widely recognised by authors in the field, (e.g. Buck et al. 2001; Pahl-Wostl & Hare 2004; Keen et al. 2005). However, methods to promote systems thinking are not nearly so well developed and practised as the enthusiasm for the concept. One of the best known approaches to systems thinking is ‘Soft Systems Methodology’ (SSM) which was developed by Checkland in the 1960s but gained most currency in the 1980s. SSM has received substantial reworking over the years, but the core ingredients of reflection, and participatory development of conceptual models have remained. More of a framework than a step-by-step method, SSM proposes a series of seven stages (see Table 2.2). The SSM approach relies heavily on the ability of the participants to engage in active and critical reflection and, in his overview of SSM, Checkland (1999) reveals his confidence in the power of reflective thinking:

The process of learning by relating experience to ideas is always both rich and confusing. But as long as the interaction between the rhetoric and the experienced 'reality' is the subject of conscious and continual reflection, there is a good chance of recognizing and pinning down the learning which has occurred.

Although in practical application Checkland himself found the seven stages of SSM challenging to successfully integrate into ordinary activities of an organisation (Jackson, 2000, p. 255), the principles are comparable if not at the base of other efforts to promote systems thinking in resource management problem solving. Participatory modelling approaches used in learning groups (e.g. Cole et al. 2007) and the collaborative construction of mental models (Dyball et al. 2005) are attempts to elicit more holistic and intuitive understandings of complex systems, often with a view to developing shared understanding among participants, and enabling joint decisions on further actions or research.

Table 2.2 Seven stages of soft systems methodology (Checkland 1985)

<ol style="list-style-type: none"> 1. The problem situation unstructured: conducting basic research, identifying key actors and processes 2. The problem situation expressed: using 'rich pictures' to draw together knowledge of the situation from diverse perspectives 3. Root definitions of the system determined: deciding from what different perspectives the situation will be viewed 4. Building conceptual models of the system 5. Comparison of the conceptual models with the real-world 6. Identifying feasible and desirable changes 7. Making recommendations for taking action
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A systems thinking approach is reliant on the ability of individuals or groups to critically reflect but is also dependent on building the kind of relationships between individuals that enables useful information exchange. Thus networks, building trust, dealing with conflict, and eliciting participation are factors on which social learning is also dependent.

Social learning, networks and collaboration

It is a truism to state that social learning is reliant on social interaction. More specifically social learning is dependent on processes of coordination, dialogue and collaboration. The art of social learning, say Bouwen and Taillieu (2004, p. 144), *is to create situations where people can learn collectively to improve a situation*. This may not mean all stakeholders are together at any one

time. Rather, it implies a number of relational practices that involve combinations of stakeholders working in diverse ways over periods of years. The practical history of facilitating networks and supporting collaboration is by the far the richest component of social learning. A wealth of experience exists around identifying stakeholders, learning to work together, developing shared visions or problem definitions, negotiating, collective decision making, leadership, exchanging information, and developing trust. There is a correspondingly diverse range of tools to support these practices, such as stakeholder analysis, conflict resolution, constructive conversations, and a significant depth of understanding around group behaviours. Fulsome as this area is, there are still some particular issues that test the operationalisation of social learning.

Firstly, social learning in practice rests heavily on capabilities in facilitation and the creation of 'platforms' or opportunities for collaborators to come together to learn (Buck et al. 2001; Keen et al. 2005). While the role of facilitation is widely agreed to be critical in promoting social learning, there are still important questions that contribute to its effectiveness. For instance who takes on the role of facilitation? How does the facilitation deal with the existing relationships between actors (Buck et al. 2001)? How does facilitation enable experts and laypersons to recognise the potentials and limitations of their own knowledge and the expertise of others (Craps 2003)? And how does facilitation build the formal and informal networks and foster perceptions of interdependence that underpin a social learning approach? Doctoral work by King (2000b) has closely examined the relationship between facilitation and learning, developing a proposed set of competencies for facilitators of social learning in sustainable agriculture that extend beyond current common skills, and which draw on a more extensive knowledge about theories of learning, cognition and systems (King & Jiggins 2002).

Platforms are the spaces – real or figurative – that need to be constructed so that stakeholders can interact and learn together (Buck et al. 2001, p. 9). Given the ongoing nature of social learning, these can range across time and space, and include both structural and process aspects. They may include one-off meetings or ongoing sessions with the same participants. They may take the form of formal boards or committees or more spontaneous associations. Platforms may also include 'virtual' conversations taking place online. The role of Internet technology, with its capacity to bridge distance and store knowledge, making it accessible to participants beyond those participating in direct exchanges, is of growing interest in the arena of environmental

management in general (Allen & Kilvington 2000). Learning more about the variety of platforms, and their suitability to different contexts, is an important part of the social learning capacity of any given problem situation. Specifically, learning about platforms that can bridge existing social barriers, such as between management agencies, NGOs and other stakeholders, and enable vertical (across experts, policymakers, and community) and horizontal integration (across disciplines) of knowledge is critical to a social learning approach (Klein 2004 in Lélé & Norgaard 2005).

Social learning, politics and decision-making

To be useful as a framework for addressing complex environmental management problems, social learning needs to be cognizant of the politics of the problem context and the decision-making constraints and opportunities. This is certainly a ‘last but not least’ element of the social learning discourse. As Keen et al. (2005, p. 14) comment:

[Discussion about] the benefits of reflexive, systemic and integrative approaches to the social learning process...could bring with it a mistaken idea that the different communities, professions and agencies, with their associated values, knowledge and sets of skills, come together easily and work seamlessly in environmental management. Nothing could be further from the truth.

To be operationalised Pahl-Wostl et al. (2004) see processes of social learning as needing to be embedded not only in the environmental context of the problem, but also in the governance process. Furthermore, to have a chance of contributing to complex problem solving, a social learning approach has to include processes of negotiation and conflict resolution which are sensitive to the real challenges of diverse power arrangements. Schusler et al. (2003) identify democratic structure as one of the key elements that foster learning in multi-stakeholder environmental situations. In particular they emphasise (and here they are drawing on Forester (1999)) the need for ‘structured unpredictability’. That is to say the institutional arrangements that support open exchange and knowledge building amongst parties needs to avoid the common trap of favouring and validating the a priori knowledge held by agencies. As Korten (1981, p. 613 in Schusler et al. 2003, p. 321) notes:

The key to social learning is not analytical method, but organizational process; and the central methodological concern is not with the isolation of variables or the control of bureaucratic deviations from centrally defined blueprints, but with effectively engaging

the necessary participation of system members in contributing to the collective knowledge of the system and in generating policy choices.

Some of the key aspects of the political and decision-making context that impact on the social learning approach are better illustrated by some of the challenges, as yet unresolved, that they create for the concept. These include, firstly, addressing the not always overt influence of power differences among stakeholders and managing conflict so that it operates as an incentive to dialogue not a barrier; and secondly, gaining access to 'real' decision-making. Without this latter point groups can become learning empowered but frustrated in action.

Associated with the issues of access to real decision-making is the question of scale. Scale in relation to environmental management is most commonly thought of in terms of geography (and not far behind that, 'time' and 'jurisdiction') and at its most basic the question of scale and its impact on social learning is 'at what level can deliberative processes be run effectively and how can those beyond an immediate group be included in a social learning process?' (Schusler et al. 2003). However, Cash et al. (2006) suggest other notions of scale that have important considerations for institutional arrangements. For instance there can be a mismatch in scales of knowledge between the generalised knowledge of science and the localised knowledge of practice. What happens when institutionally conceived strategies, plans, and policy responses are at a different operational scale to the available knowledge (e.g. planning for regional responses to issues when information is only available at a local or national level)? How can political and decision-making arrangements be responsive to the systems thinking and collaborative learning demands of social learning? Reminiscent of comments on the inherent need for institutional arrangements that reflect structural openness and a cooperative approach in order to facilitate social learning (Fiorino 2001), Cash et al.'s responses to issues of scale include what they term 'institutional interplay' (the interaction of agencies at different levels of jurisdiction); co-management (sharing of power and responsibility between governments and communities) and boundary organisations that actively promote the convening, translation and co-ordination of complementary expertise.

What does not appear to be addressed anywhere in the literature reviewed here is the question of just who assumes the responsibility for pursuing a social learning approach. There are likely different but equally significant demands for whoever this is, in any given context. Agencies

mandated with the responsibility for environmental management decision-making are equally as unskilled in many of the components of social learning as their lay counterparts. Developing the capacity for social learning within governance structures is a significant challenge.

In summary, in the arena of environmental management and sustainable development, social learning has emerged as an approach to complex problem solving similar to, and sharing common elements of, adaptive management or collaborative management. Although authors vary in the grouping of components in the framework of social learning there is general agreement over the need to address aspects of learning, to embrace processes of systems thinking, become adept at collaborative processes and responsive to issues of politics and decision-making. There is also wide agreement on the goals of social learning. Fundamentally these are: achieving better (democratic) solutions to environmental problems, transforming conflict into a process for enriching the diversity of knowledge about a situation, and fostering implementation measures that have been agreed upon by the stakeholders (Pahl-Wostl 2002, p. 400).

There is another realm in which theory (and in some few cases, practice) around social learning is emerging. This is the area of science methodology, where the overall motivations for developing and understanding something like a social learning based approach are comparable to that of environmental management (i.e. the need to address ever more complex problems) but the focus is different. Here the interest is in the way science and scientists approach their role as decipherers of phenomena and ‘seekers of truth’ in a post- modern world.

2.2.4. Social learning and science

My observation from the literature is that the term social learning is not widely used by science theorists, but there are a few emerging and potent concepts that share the same qualities, namely, ‘sustainability science’ and ‘post-normal science’ (also referred to as mode II science). In an Australian radio broadcast in June 2001, Ian Lowe (Honorary Professor, Department of Science, Griffith University, Brisbane) spoke at some depth about the new field of science he termed ‘sustainability science’. In essence, the distinction in the kind of science to which he was referring lies in the recognition of several core principles. These are: integration, cyclic forms of inquiry, social learning, and science and science knowledge playing the role of

stakeholders as relevant elements within problem systems, not as independent information providers outside the nature–society complex (Lowe 2001).

Ian Lowe's talk highlighted the importance of integration by referencing the failures of solving complex environmental problems through *piecemeal efforts that focused on one aspect of the problem to the exclusion of other equally important aspects*. He concluded...*great damage can be done by applying narrow specialized knowledge without an appreciation of the complexity of natural systems* (Lowe 2001). Checkland (1999, p. 60) made similar observations in his advocacy for counteracting the silo thinking of reductionist science through a systems thinking approach. He specifically noted that: *it is not nature which divides itself into physics, biology, psychology, sociology, etc. it is we who impose these divisions on nature; and they become so ingrained in our thinking that we find it hard to see the unity which underlies the divisions*.

Much of this echoes the earlier work of Funtowicz and Ravetz who in 1993 launched the concept of post-normal science. The terminology comes from the notion that a new science is needed that goes beyond 'normal' in the sense outlined by Thomas Kuhn (1962 in Funtowicz & Ravetz 1993). For Kuhn, the normal state of science was where *uncertainties are managed automatically, values are unspoken and foundational problems unheard of* (ibid., p. 740). So why is this new science needed? For the same reasons that Lee (1993, 1999) and countless others have observed: many of the situations where science is requested to shed light are characterised by uncertainty and disputed values, where the stakes are high and the decisions are often urgent – needing to be made well before the timeline of traditional scientific enquiry can run its course.

Funtowicz and Ravetz (1993, p. 740)¹³ go beyond describing the new problem context for post-normal science, and comment on how this confronts traditional tools of scientific endeavour:

These new policy issues have common features that distinguish them from traditional scientific problems. They are universal in their scale and long-term in their impact. Data on their effects, and even data for baselines of 'undisturbed' systems, are radically inadequate. The phenomena, being novel, complex and variable, are themselves not well

¹³ Funtowicz and Ravetz (1993, p. 740) suggest a distinction between types of research based on goals: *applied research is 'mission oriented'; professional consultancy is 'client serving'; and post-normal science is 'issue driven'*. These contrast with traditional or basic research, which is *curiosity-motivated*.

understood. Science cannot always provide well founded theories based on experiments for explanation and prediction, but can frequently achieve at best only mathematical models and computer simulations, which are essentially untestable. On the basis of such uncertain inputs, decisions must be made, under conditions of some uncertainty.

The links between sustainability science, post-normal science and social learning¹⁴ are palpable. Pahl-Wostl (2002), writing on social learning in sustainable water management, observes the need for the science–policy interface to be *shaped as a continuous dialogue rather than as one-directional terminal transfer* and sees processes of enabling this to take place as a core component of a social learning approach. Maarleveld and Dangbégnon (1999, p. 269) also refer to the need for continuous dialogue and deliberation among scientists, planners, managers and users to explore problems and their solutions. In addition, as has already been discussed, central themes to social learning are that such an approach can deal with uncertainties and multiple perspectives, building knowledge from multiple sources, and through recognising and stating core assumptions. Siebenhüner (2004) is one of the few authors who explicitly link social learning and sustainability science. He advocates for participatory processes as part of scientific knowledge production to foster social learning within science and society at large, to address objectives of sustainability. In parallel to this, Funtowicz and Ravetz (1993) see what they term as *extended peer communities* as the central wheel of the post-normal science process. These peer communities are an *ever-growing set of legitimate participants* in the science research process, acting not only as peer reviewers, but themselves undertaking disciplined research that sits alongside that of science professionals.

Funtowicz and Ravetz (1993) foresee a number of difficulties in working out the social dynamics of participants – both science and lay— in the peer-community concept. It is not simply a case of bringing scientists and non-scientists into the same room for discussion. This frequently happens in applied research programmes but, in the absence of appropriate structures or processes, falls well short of a social learning approach. Ison (2005) discusses the influence of context and historical relationships between participants in getting successful dialogue in workshops between scientists (mainly ecologists) and pastoralists. He observes that flaws in the research and development (R&D) system meant that the ecologists were only concerned with formulating research problems from within *their system of doing ecology* and he concludes: *in effect, what they tried to do was to impose their system of interest on the context, rather than allow a jointly conceived system of interest to emerge from the dialogue* (Ison 2005, p. 31).

¹⁴ While the concept of sustainability science is now heard in many locations it is not always consistent with the radical propositions alluded to here. Rather it is used to describe science contributing to questions about environmental sustainability but done as it has always been, rather than through a new methodological approach.

Not surprisingly then, Siebenhüner's (2004) study of a range of processes aimed at social learning through sustainability science came up with a substantial list of difficulties. The processes he explored tended to exclude government agencies in order to maintain a focus on knowledge production rather than decision-making. They thus missed a vital link, in Siebenhüner's view, and led to a poor connection to political decision-making (*ibid.*, p. 157). However, given the difficulties of reconciling the widely different timescales of political and science processes (Daniels & Walker 1996), and the potential clash between research and problem solving goals (Pahl-Wostl & Hare 2004), it is easy to see why it might be attractive to do without this added tension. Similarly, the processes tended to give companies a minor role in order to neutralise commercial interests. Furthermore, the learning in the programmes was not clearly analysed. It was thus difficult to determine what long-term gains had been made, or whether they had triggered ongoing learning beyond the initial group. Finally, with the leadership of the processes (if not the initiative) resting with the researchers, the focus of the processes was dominated by research interests rather than sustainable development needs.

The methodological test for both sustainability science and post-normal science, then, is how to facilitate processes by which science can enter the dialogue of complex problems, not as the independent expert, but as the peer inquirer – ready to combine, without discrimination, the tools of synthesis, analysis, model building and explanation to those of direct experience and contextualised learning. Furthermore, there is the issue of how to embed this science in a real governance and decision-making context. This is clearly dependent on new ways of creating dialogue and collaboration with new audiences, and is analogous to taking a social learning approach.

In New Zealand, an increased interest in science 'delivery of outcomes' has sent a number of messages of change to the science community, predominantly through the research funding structures. Research institutions have largely responded to these change messages by making somewhat superficial adaptations to the existing structures of research programmes, e.g. by involving stakeholders in approving research directions or setting up panels of stakeholders to oversee research programmes. Such efforts are effectively 'add-ons' to traditional research practices and struggle to achieve meaningful shifts in science and stakeholder interrelations. Efforts to go beyond traditional relationships are hampered by a lack of knowledge of the processes by which to link management and science, and an institutional bias against

meaningful participation. Systems of reward within science institutions have been slow to create incentives for scientists to be involved in experimental processes of developing knowledge, particularly when these new ways of working might compromise their ability to perform well in the familiar path of peer review and publication. Furthermore, the institution of science research itself rests on the idea of the scientist as expert. Scientists hesitate to lay their ideas alongside the untested knowledge created within external learning frameworks such as the farm or the district council. In doing so, they face quite legitimate concerns about interpretation, value, misuse, and appropriation of their ideas and information. Equally, of course, other stakeholder groups are concerned about the same things in relation to their own knowledge. Finally, the research culture and short-term funding horizons encourage single-cycle research – a ‘one-shot approach’ to problem solving where the answer emerges from the research without reference to the wider context.

Despite these obstacles, efforts to integrate social learning or to embrace post-normal science are increasing. Case studies 3 and 4 in this thesis take place in an integrated environmental research programme that has attempted to make inroads in this area.

2.3 The challenges of the social learning concept

Social learning is an evolving theoretical construct. At the same time practical applications which both examine and use social learning ideas are ongoing, and it is practitioners who are currently contributing most to its conceptual development (albeit using a variety of different terms). Examples of programmes using social learning ideas can be found at differing scales and in a variety of contexts (see Table 2.3). They range from local-scale community-based resource management and sustainable agricultural in developing and developed world contexts; through to large multi-party catchment management programmes that cross national boundaries.

From the experience of these practitioners, and researchers, and others, it is possible to collate significant issues associated with the social learning concept into challenges of practice (Table 2.4) and challenges of theory.

Table 2.3 Examples of situations utilising social learning ideas

Context	Project/practice	Authors
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Cross-boundary, large-scale governance of complex resource management situations	HarmoniCOP (2002–2005) <i>Harmonising Collaborative Planning</i> . Programme to increase understanding of participatory river basin management involving 15 partners from NGOs, government and other stakeholders across nine European countries	Pahl-Wostl & Hare 2004; Pahl-Wostl et al. 2004, 2007a, 2007b; Mostert et al. 2007; Borowski et al. 2008
	SLIM (2001–2004) <i>Social Learning for the Integrated Management</i> . Programme to investigate the socio-economic aspects of the sustainable use of water. Funded by the EU, involving researchers from France, Italy, the Netherlands, Sweden and the UK	Ison & Watson 2007; Jiggins et al. 2007; Steyaert & Jiggins 2007
Research, development and extension in sustainable agriculture	Developed and developing nations (e.g. India, Australia, Brazil, the Netherlands). Range of situations (e.g. farmer learning groups for pest control, or rangeland management)	King 2000; Guijt & Proost 2002; King & Jiggins 2002; Guijt 2008
Community-based natural resource management	Developed and developing nations (e.g. Nepal, Australia). Range of situations (e.g. community forest management)	Buck et al. 2001; Schusler et al. 2003

2.3.1 Challenges of practice

Authors on social learning, from Friedman and Abonyi (1976) to Keen et al. (2005), frequently comment that the application of social learning is heavily reliant on the commitment of organizations and the responsiveness of institutional arrangements. In 1976 Friedman and Abonyi identified three necessary ingredients to what they termed a social learning approach to policy research. These being (i) commitment of policy agencies to experimentation, (ii) formation of central services in support of experimentation and (iii) expansion of lateral channels of communication for the diffusion of new experiences and learning among the multiple experiments.

The difficulty is that this kind of support relies on an increase in flexibility in institutional arrangements and an upskilling of agency staff, i.e. quite considerable change in policy, management and planning practice. This kind of change, or indeed any change in organisations, has already generated a rich dialogue among organisational learning theorists. Keen et al.

(2005, p. 18) inspired by the technical view of organisational learning¹⁵, cite likely causes of rigidity in institutional arrangements as: administrative traps (e.g. systems becoming inflexible through concerns about efficiency); competency traps (i.e. ‘we are good at this so let’s not change it’); bureaucratic traps (e.g. existing hierarchies in decision-making prevent newcomers contributing); and legitimacy traps (the focus of the system is in maintaining face with a select group). Most importantly it has to be asked whether the argument of the benefits of social learning to environmental problem solving have been accepted or even articulated sufficiently for agencies to trouble themselves about institutional arrangements that support learning when their primary focus is on achieving compliance.

Circumventing the barriers imposed by existing institutional arrangements may have led to attempts to get social learning processes underway without this support and consequently led to what a number of authors have identified as another difficulty in application of the social learning approach – the lack of tie-in between multi-stakeholder learning processes to real decision-making and political processes (Hayward 2000; Pahl-Wostl 2004; Siebenhüner 2004). How proponents of social learning can overcome institutional barriers and promote the use and development of this approach within appropriate organisational settings is a key challenge.

Issues of power (both gain and loss of power are possible for groups and individuals engaging in social learning; Pahl-Wostl 2004) are also closely tied to political will and is another area where practitioners have found difficulty applying the concept of social learning. Craps (2003, p. 17) makes the interesting observation that not all issues of power are ‘real’, and that the image a stakeholder has about their own capacities, power contribution and roles (their ‘auto-image’) may differ significantly from that held by other stakeholders. While much cognizance is taken of the importance of purposefully managing different stakeholder views about problems and their boundaries, comparatively less attention is paid to the importance of dealing with the different views stakeholders have of themselves and of others. Nowhere is this more obvious than in the issue of ‘expert’ vs ‘non-expert’, where often recognition of ‘expertise’ can

¹⁵ Within organizational learning theory there are essentially two branches of literature – the *technical* view and the *social* view. The assumptions at the base of the technical view are that *organizational learning is about the effective processing, interpretation of and response to, information both inside and outside the organisation*. The social school in contrast sees organisational learning “as socially constructed, as a political process and as implicated in the culture of the organisation (Easterby-Smith & Araujo 2006).

go beyond the boundaries of the actual knowledge held by that group or individual, and lead to deferential valuing of their contributions.

‘Crises of confidence’ was also identified by authors as a limiting factor in social learning processes. Webler et al. (1995) commented that the main obstacles they observed to social learning were, firstly, overcoming participants initial lack of faith in the process (and that it would have an authentic influence over events), and secondly, addressing participants’ perceptions that they were not capable of contributing meaningfully. Webler et al. (ibid.) concluded that learning requires a certain amount of self-confidence and that building this confidence in citizens was a major effort.

That multi-stakeholder processes are often regarded as having failed to deliver expected results does not help the cause of promoting the social learning approach as a valid process within planning and management organisations, or increase the likely confidence of participants. In the cases Hayward (2000) reviewed she sees a possible reason for this as that not enough focus is given to the endpoint of the planning process in an effort to emphasize the deliberative processes. However, Bouwen and Taillieu (2004, p. 150) emphasise that the failure is in the match between expectations and outcomes:

As students and practitioners of multi-party projects we often assume implicitly that participation is a process and an outcome as we intend it to be. But participation may be by definition a paradoxical process. The more you plan and anticipate it, the less you have it.

For Bouwen and Taillieu (ibid., p. 150) then the critical question is *how can multi-party collaboration projects truly create a space for an open ended result?* That is to say, how can the unexpected be accommodated in existing institutional arrangements around complex environmental problem solving?

Lack of confidence in the process can also be attributed to another commonly encountered challenge to social learning practice – the sheer length of time involved. Pahl-Wostl and Hare (2004, p. 204) observe that the slowness of the process can cause trust to break down as actors are not aware what will happen next, and when, *one cannot overlook the costs and difficulties of maintaining a social learning process for long periods of time with people who have other*

work to do: both the research team and the actors. In response to a similar observation, Siebenhüner (2004) concluded there is a pressing need to learn how to keep processes dynamic.

Another commonly encountered question about the application of social learning concerns scale, i.e. bridging different levels at which a project operates and extending social learning opportunities beyond the small group level (Schusler & Decker 2001; Craps 2003; Bouwen & Taillieu 2004). Indeed Craps (2003) regards scale issues as among the most challenging for social learning, and Schusler et al. (2003, p. 322) asks *at what level can deliberative processes be run effectively?* Similarly Buck et al. (2001) observe the incomplete knowledge about the kind of platforms that facilitate social learning in complex networks of interdependent actors.

Finally, a specific area of practice related to social learning that is receiving some notice is that of participatory model development and the use of simulation software and various IC tools¹⁶. Model development plays a significant role in interpreting data and information on complex environmental problems and Pahl-Wostl et al. (2004) observe that different approaches to modelling will provide different contexts in which social learning may or may not thrive.

Table 2.4 summarises practice challenges and needs for building capacity for social learning observed by various authors. They have been grouped as issues of: required competences and resources (e.g. new facilitation capabilities), platforms for learning and collaboration (e.g. how to create opportunities for complex networks of independent actors to collaborate), process issues (e.g. building trust), social and institutional arrangements (e.g. acceptance by agencies of need for increased flexibility) and programme management (e.g. managing and monitoring progress). A number of these practice issues are explored through the cases in chapters 4 to 7.

¹⁶ Pahl-Wostl et al. (2004) define IC tools as a material artefact, device or software that can be used in participatory processes and that support two-way communication between stakeholders.

Table 2.4 Challenges of practice for social learning

Competences & resources	<ul style="list-style-type: none"> ● New competencies in facilitation (King & Jiggins 2002) ● Dialogic, and participatory modelling tools that assist interactive learning and systems interpretation (Pahl-Wostl et al. 2004; SLIM 2004b)
Platforms for learning and collaboration	<ul style="list-style-type: none"> ● Knowledge about the kind of platforms that facilitate social learning in complex networks of interdependent actors (Buck et al. 2001) ● Representation and boundary management (who is in/out?) (Pahl-Wostl et al. 2007) ● Structural issues – e.g. opportunities to meet (Mostert et al. 2007)
Process issues	<ul style="list-style-type: none"> ● Building trust , social capital (Pahl-Wostl et al. 2007b) and participants’ competencies in learning and interaction (Pahl-Wostl & Hare 2004) ● Framing the problem situation – whose problem perception counts? (Mostert et al. 2007; Pahl-Wostl et al. 2007) ● How to keep processes dynamic (Siebenhüner 2004) ● Matching expectations and outcomes (Bouwen & Taillieu 2004) ● Managing confidence in individual’s contribution and process itself (Webler et al. 1995) ● Dealing with issues of power: real differentials and self limiting ideas (Craps 2003) ● Avoiding common traps of favouring and validating apriori knowledge held by agencies (Forester 1999) ● Creating space for an open ended result (Bouwen & Taillieu 2004) ● Organisation of interactions, and design of experiments for interactive learning (SLIM Project 2004b) ● Building and maintaining trust over lengthy projects (Bouwen & Taillieu 2004)
Social and institutional arrangements	<ul style="list-style-type: none"> ● Location within social & institutional structural context – balancing the need for stability and dynamism (Pahl-Wostl et al. 2007) ● Acceptance by agencies of need for increased flexibility in institutional arrangements and upskilling of staff (Friedman & Abonyi 1976; Steyaert & Jiggins 2007); including institutionalised competence to facilitate interactive processes (SLIM Project 2004b) ● Tie-in between multi-stakeholder learning processes and real decision-making (Hayward 2000; Pahl-Wostl 2004; Siebenhüner 2004; SLIM Project 2004b); including match between scale of participatory structure and existing governance regime (Borowski et al. 2008) ● Need for openness to necessity or potential for change in governance as a result of the shared learning process. (SLIM Project 2004b; Steyaert & Jiggins 2007) ● Overcoming institutional barriers to promote the use and development of social learning
Programme management	<ul style="list-style-type: none"> ● Managing and monitoring progress since investment costs are highest at beginning while benefits come later (SLIM Project 2004b) ● Bridging different levels at which a project operates and extending social learning opportunities beyond the small group level (Schusler & Decker 2001; Craps 2003; Bouwen &Taillieu 2004)

2.3.2 Challenges of theory

One of the greatest challenges to developing a strong theoretical basis for social learning must be the sheer diversity of approaches scattered over a wide range of social science fields.

Without common language, and shared arenas for exchange of ideas and experience, theoretical and practical development of the concept is difficult. It is therefore not surprising that authors such as Pahl-Wost (2002) observe that the theoretical basis of the concept is still weak.

A core aspect of social learning in need of good theory is the area of ‘learning’. While much is understood (or at least supported by constantly evolving theory and praxis) about individual learning, far less is known about learning in multi-level networks. It seems that little has changed since Dale’s (1989) review of the literature in 1989 where he notes that authors regard social learning processes as more than just ‘learning by individuals’ and consequently called for studies that explore the learning patterns of groups, and larger collectives interacting over a common conflict or predicament¹⁷.

Maarleveld and Dangbégnon (1999) identify a number of barriers to useful learning practices in social learning. Termed ‘asymmetric learning patterns’ they include: learned helplessness¹⁸ where the failure to influence context through behaviour results in an insurmountable inertia; getting stuck in a learning loop (the possible cause of why some groups or individuals learn and others do not); successful single-loop learning which can mask the root of the problem; individual bias for certain forms of learning; and the inability to motivate learning in non-crisis settings. To this I would add the positivist construction of knowledge that causes reliance on certainty and a fear of being caught ‘not knowing’. However, having identified these barriers, it is a critical, but as yet a missing step, to transform this knowledge into useful techniques or ideas for countering them, for application through the social learning construct.

Social learning theory is hampered by lack of means for assessing practice and impact. Bouwen and Taillieu (2004) have identified a framework for theorising about and intervening in multi-party collaboration. They state that *the quality of a collaboration project can be described in terms of the lived interdependence among the different actors* (ibid., p. 147). This is a far from universally adopted framework and, at least currently, Siebenhüner (2004, p. 150) is justified in

¹⁷ Dale (1989) cites social learning theorists of the 1970s and 1980s, e.g. Dunn (1971), Friedmann (1971), Schon (1971), Michael (1973), and Alexander (1984).

¹⁸ From Garben & Seligman (1980), Maarleveld & Dangbégnon (1999).

his critique that a lack of criteria on social learning restricts empirical analysis to support theoretical development. Siebenhüner's observation of cases is that the learning in projects is not really analysed and such observations that are made concentrate on mental rather than behavioural changes.

That social learning is being applied, whole or in part, without ubiquitous understanding about the concept, and in often widely different planning, policy and management contexts suggests a short-term future where theoretical development will continue to struggle. A possible means of addressing this is by linking social learning with evaluation methodologies which promote practice and theoretical learning (see Chapter 4).

2.4 Summary – the value of the social learning concept

This chapter traces some of the likely roots and (also likely) coincidental evolutions of the social learning concept. It has examined how social learning has simultaneously emerged in the planning and policy literature, and the environmental management and sustainable development literature. In addition I have reviewed its implications for the arena of post-normal or sustainability science. The multiple venues in which social learning is appearing have led to some divergence in terminology, which poses challenges for the theoretical and practical development of the concept. While in some instances social learning is regarded as an 'end state' (e.g. the improved learning by collectives), more commonly in the environmental management and sustainable development literature social learning is regarded as a 'means to an end', i.e. a framework of ideas that collectively contribute to the capacity for agencies, stakeholders and communities to address environmental problems. Therefore, while it may be possible to measure social learning as an outcome, it is arguably more helpful to regard social learning as a collection of elements critical to understanding and supporting the social and situational factors that underpin complex environmental problem solving. From the analysis of the literature presented in this chapter I propose a Social Learning Framework that draws attention to four interlinked areas for focusing awareness and developing practice in complex

problem solving situations (Figure 2.2): These are:

1. How to manage group participation and interaction
2. How to work with and improve the social and institutional conditions for complex problem solving
3. How to improve the learning of individuals, groups and organisations
4. How to enable systems thinking and the integration of different information

In Table 2.5 I expand on the factors within each section based on those widely recognised in the literature as underpinning social learning¹⁹. In Figure 2.1 I have reserved a unique and central position for the role of reflection. Authors such as Keen et al. (2005) have highlighted the degree to which the particular approaches to learning and thinking proffered through the Social Learning Framework, and even the proper functioning of collaborative and multi-stakeholder processes, and the capacity for institutional arrangements to handle the demands of uncertainty and unpredictability rely on instituted practices of reflection and evaluation.

This comprehensive understanding of social learning means the concept can be a useful basis for maintaining critical observation not only on the problem solving task but on the learning and social interchange processes upon which it rests. I conclude that one of the primary values of social learning as a concept is this breadth and inclusiveness. As a framework it clearly articulates the learning processes of relevance in resource management (Pahl-Wostl 2004), alongside the social and institutional capacity needs. However, equally significant is that it draws attention to the relationship between factors. As Buck et al. (2001. p. 15) observe about social learning, it is the intersection of collaboration and learning which makes it distinctive. This requires *giving attention simultaneously to how to bring interest groups together, as well as to which learning patterns to employ*. Similarly, in using social learning as a theory of the social processes inherent in complex environmental problem solving, researchers and practitioners are encouraged to examine group behaviour within the context of the institutional arrangements that are likely to influence it, or decision-making structures and their relationship to learning. In short, as a theoretical basis to analysis of problem situations it does not constrain researchers or practitioners to exploring group behaviour in isolation of institutional arrangements, or decision-making processes independently of learning.

¹⁹ I acknowledge that different authors give these elements and the subcomponents within them different weight but argue these are consistent across most holistic definitions of social learning.

Table 2.5 Summary of critical elements of social learning theory

Group participation & interaction elements	Social & institutional elements
<p>Social learning is intimately connected to dialogue and communicative rationality and all social processes associated with information sharing (e.g. power relationships, institutional arrangements, and facilitation practices). Two important aspects are :</p> <ul style="list-style-type: none"> • Effective multi-party communication. This includes using communicative competence, (e.g. dispute resolution and conflict management) or communicative rationality as the guiding principle for the interactions of scientists, resource users, planners and managers (Daniels & Walker 1996; Maarleveld & Dangbégnon 1999) • Creation of collaborative platforms, i.e. spaces, real or virtual, which pay attention to both physical and process elements so that stakeholders can interact and learn together (Buck et al.2001). 	<p>Social learning draws attention to the social and institutional arrangements around problem situations, which affect the sharing of knowledge, decision making and action. These include:</p> <ul style="list-style-type: none"> • Management of the political and decision-making context: e.g. balancing power differentials, managing constructive conflict, and providing real access to decision-making. • Structural openness, i.e. facility for ongoing interaction between social actors, groups, semi-public organisations, institutions, or authorities (Kooiman, 1993 in Fiorino 2001) • Structured unpredictability, i.e. institutional arrangements that support open exchange and knowledge building amongst parties, and avoid common traps of favoring a priori knowledge held by agencies Schusler et al.2003).
<p>The ‘learning’ component of social learning</p> <ul style="list-style-type: none"> • In complex environmental problem situations people need to learn facts & information pertinent to the problem, as well as develop understanding of how to manage the interactions of multiple stakeholders with different sources of information, aspirations and mandates. This is referred to as learning that develops technical (task or content knowledge) and process knowledge. Also viewed as <i>cognitive enhancement</i> and <i>moral development</i> (Webler et al. 1995); and <i>soft relational</i> and <i>hard factual</i> aspects of analysing and managing a human–environment system (Pahl-Wostl & Hare 2004). • Social learning also rests on learning, that includes active cycles of action and review, and reflection on assumptions, that leads to new problem diagnosis (double-loop learning); and enhanced awareness of learning strategies (triple loop learning) (Argyris & Schon 1978). 	<p>Thinking elements of social learning</p> <ul style="list-style-type: none"> • Systems thinking: counters blind spots of reductionist analytical traditions, and enables re-examination of boundaries, (physical and ideological), and critical system elements, (human and non-human). Methods to introduce systems thinking vary and include those that are predominantly dialogic (e.g. soft systems methodology), and those which use modelling and information processing technology. (Maarleveld & Dangbégnon 1999) • Managing for uncertainty: social learning recognizes the inherent ‘unknowability’ within complex problems, and advocates processes of negotiated action and learning (e.g. cycles of adaptive management). This relies on an experimental approach to the management of problems that is explicit about goals and intentions, outlines evaluation methods; and collects information to check assumptions with practice (Maarleveld & Dangbégnon 1999)

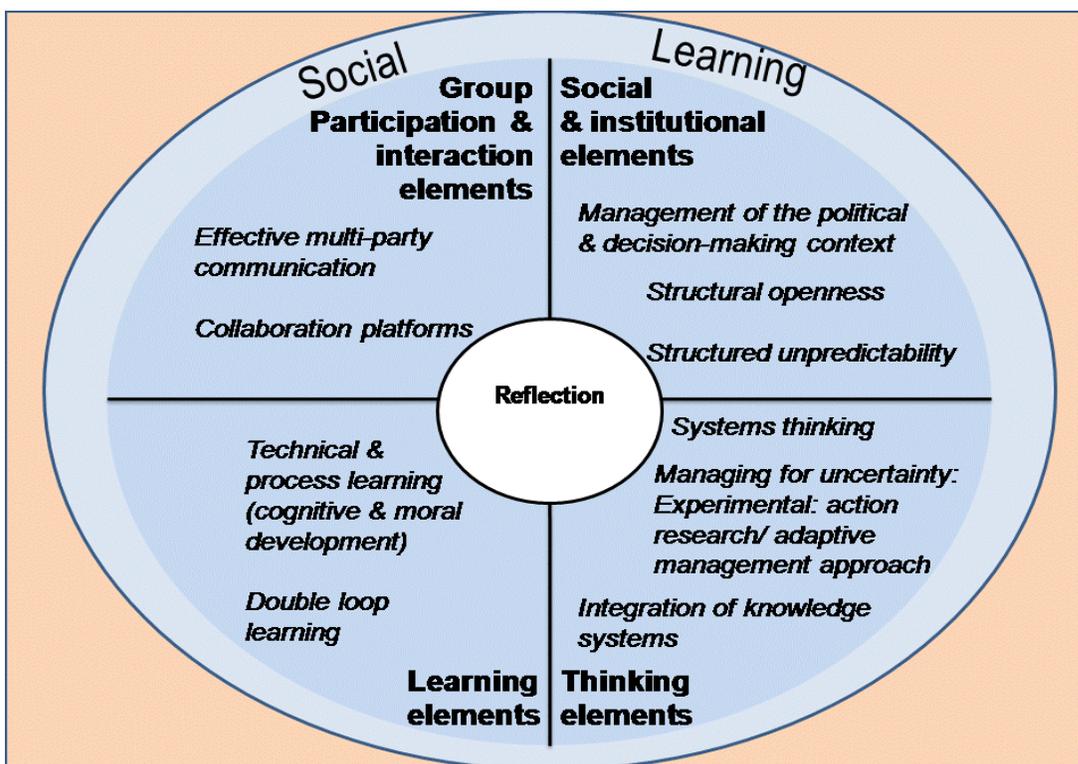


Figure 2.1 Social learning understood as a framework of elements critical to complex environmental problem solving.

While much has been written about the essential elements of a social-learning-oriented approach, practice appears to be incongruent with theory and it is how to operationalise social learning that is posing the greatest challenge (Röling 2002). This includes uncertainty about some of the specific elements of social learning – such as how to facilitate and enable active learning processes that not only add information, but also challenge existing assumptions. More generically the question is how to introduce, let alone embed social learning in ongoing and institutionalised processes of decision-making, and importantly – just who is responsible for this? In the next chapter I turn to the role evaluative practices can play in building capacity for social learning.