Enhancing the adaptive capacity of collaboratives through education and learning in South Africa

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ABSTRACT

It is clear that the environmental issues facing us today are prime manifestations of complex or "wicked" public problems and, as such, natural resource governance has to be approached from a complexity science perspective. The rise of adaptive co-management as an approach to ecosystem management and the emergence of innovative and novel collaborative governance models are manifestations of this trend. What is not so clear, however, is how our understanding of complex adaptive systems, resilience thinking, adaptive management and governance should be translated in terms of the role institutions of higher learning must play in their teaching, research and community interaction endeavours. The questions this article wants to explore are: How can the adaptive capacity of socio-ecological systems be enhanced through education and learning, and what is (or should be) the role of institutions of higher learning in this regard? The opportunities and challenges for universities are reflected upon against the background of the emergence of collaborative environmental governance models in the Western Cape Province.

INTRODUCTION

It is clear that that the environmental issues facing us today are prime examples of complex or *wicked* public problems, and that governance in general, and natural resources in particular, should be approached from a complexity science perspective. The rise of adaptive co-management as a governance approach to ecosystem management and the emergence of innovative and novel collaborative governance models are manifestations of this trend. It can be argued that these flexible institutions, which take on a variety of forms ranging from networks, public-private partnerships to not-for-profit companies or public trusts, contribute to increasing the resilience – defined as the amount of disturbance that a system can absorb without undergoing major change in its character or function – of the governance system.

An important element of this ability to adapt to change and respond to disturbances – the adaptive capacity of the governance system – is to develop the ability to learn flexibly in a variety of ways, contexts and circumstances. This adaptive capacity depends on the characteristics of individuals, institutions and organisations that foster learning in the context of change and uncertainty. The question, therefore, is how to enhance the adaptive capacity of socio-ecological systems through leadership development, education and learning? And more specifically, how can institutions of higher learning contribute in this regard?

As there is a general acceptance that many of today's environmental challenges must be solved through collaborative governance arrangements, it is not surprising that the growing scholarly interest in *collaboratives* recognises that the capacity for collaborative learning may play a critical role in their success. As the Western Cape Province, world renowned for the Cape Floristic Region and one of the world's 25 most threatened biodiversity hotspots, has also experienced a proliferation of collaboratives, it presents a unique opportunity to study these processes of organisational and social learning and adaptation as they unfold. In an effort to contribute to our knowledge and understanding of building adaptive capacity in these types of complex socio-ecological governance settings, this article focuses on the evolution of some of these new forms from an organisational learning perspective, before in conclusion, reflecting on the question of how to enhance the adaptive capacity of the socio-ecological systems through education and learning.

COLLABORATIVE GOVERNANCE AS RESPONSE TO COMPLEXITY

Before addressing the question of how the adaptive capacity of socio-ecological systems can be enhanced through education and learning in general, and more specifically what role institutions of higher learning should play in this regard, some of the basic theoretical concepts will be discussed as theoretical points of departure.

Complexity Science

The environmental issues facing us today can be viewed as prime examples of complex or *wicked* public problems. Natural resource management is increasingly viewed from a complexity science perspective. In his study on *Complexity and Leadership: Conceptual and Competency Implications*, Rønn (2011:online) argues that complexity may be perceived to be, among other things, a science, a method of thought, a specific worldview, or perhaps more accurately a combination of all of these features. Complex systems have various characteristics; for instance, they consist of a large number of short-range interactions which are dynamic, non-linear and fairly rich. The patterns of these systems are co-determined through a dynamic interaction between the history of the system and the interaction with its local environment.

Resilience Thinking

In their 2006 book, *Resilience Thinking* Brian Walker and David Salt offer the emerging paradigm of resilience as a different way of understanding the world necessitated by the

realisation that cracks are increasingly appearing in the capacity of communities, ecosystems and landscapes to provide the goods and services that sustain our planet's wellbeing. The central building block of resilience thinking, according to Walker and Salt (2006), is the concept of a socio-ecological system in which cultural, political, social, economic, ecological, technological and other components interact as complex adaptive systems continually adjusting through cycles of change and that can exist in more than one kind of stable state. The key to sustainability lies not in optimising isolated components of the system, as the outcome of that has the effect of making the total system more vulnerable to shocks and disturbances. It instead lies in enhancing the resilience of socio-ecological systems, where "resilience" is defined as the capacity of a system to absorb disturbance and still retain its basic function and structure.

Adaptive Management

According to Allen *et al.* (2011:1340), the concept of *adaptive management* was first introduced in 1978 by C.S Holling, considered to be the father of resilience thinking. Adaptive management is an approach to natural resource management that emphasises learning through management, based on the philosophy that knowledge is incomplete and much of what we think we know is actually wrong, but despite the uncertainty managers and policy makers must act (Allen *et al.* 2011:1340). Adaptive management has an explicit structure, including careful elucidation of goals, identification of alternative management objectives, a hypothesis of causation, and procedures for collection of data followed by evaluation and reiteration.

Adaptive co-management

According to Cundill and Fabricius (2010: online), adaptive co-management can increasingly be seen as a governance-based approach to managing complex adaptive systems by marrying the strengths of adaptive and collaborative management (co-management) through a focus on adaptive learning and on the linkages between actors and organisations operating at multiple levels. Collaborative resource management (or co-management) can be defined as involving a group of diverse stakeholders, including resource users and government agencies, working together to resolve shared dilemmas (Heikkila and Gerlak 2005:583). Adaptive co-management has emerged as an interdisciplinary response to the view that ecosystems should be approached as complex adaptive systems and blends the adaptive management and collaborative management narratives.

Social Capital

Social capital is defined by Blewitt (2008:78) as "a term we can use to denote those relationships by which groups and individuals communicate, network, build trust, enter into dialogue, resolve conflicts, identify and solve problems, and realise collective and individual potential as agents of sustainable development". As the definition is rather vague, it might be more informative to focus on the means by which social capital can be built rather than on social capital itself, so key variables could include relations of trust, reciprocity,

common rules norms and sanctions, and connectedness in networks and groups (Cundill and Fabricius 2010:online).

Adaptive Capacity

Adaptive capacity, according to Walker and Salt (2006), is the ability of the system to adapt to change and respond to disturbances, whereas Armitage (2005) suggests that it depends on the characteristics of individuals, institutions and organisations, as well as on organisations that foster learning in the context of change and uncertainty. The attributes of systems that support innovation and create flexible institutions include key variables such as willingness to learn from mistakes, the willingness to engage in collaborative decision-making, and the extent to which organisational diversity is encouraged and accepted. As adaptive capacity is partly determined by the ability to mobilise collectively around a common problem, and as social capital is a pre-condition for collective action, Cundill and Fabricius (2010:online) argue that initial attention should be focused on the building of social capital and the conditions necessary to enable self-organisation, rather than on adaptive capacity *per se*.

EDUCATION AND LEARNING

This section explores further the implications for leadership in the kind of context that requires a complexity approach to leadership such as adaptive co-management, the leadership challenges in collaborative governance settings and the notion of organisation learning.

Leadership in the context of complexity

The kind of context that requires a complexity approach to leadership is characterised, according to Rønn (2011: online), as highly unpredictable with unclear boundaries and implicates both individual and systemic perspectives. The role and work of a leader takes shape as a result of an emerging process based on a dynamic interaction between human beings and the environment. In a complexity setting, Rønn (2011: online) argues that the main purpose of leadership behaviour is to support emergence. The following describes a number of interconnected and mutually dependent behaviours that will support disequilibrium, self-organisation, and positive and negative feedback:

- As a system which tends towards a state of disequilibrium creates conditions for novelty and innovation, leadership behaviour in complex adaptive systems will, in contrast to traditional approaches aimed at creating balance and stability, disrupt existing patterns by embracing uncertainty, and creating and surfacing conflict.
- In a complexity setting, the use of a set of simple rules – the expression of purpose, intent and values – instead of imposing a detailed control regime, not only creates more freedom and flexibility for the agents in the system but offers some guidance or boundaries for the agents to work within, and in this nourishes the self-organisational processes.
- In a complexity approach to leadership the emphasis is on the interpretation of emerging events, where leaders act as sense-makers with the purpose not so much of providing definite answers, but instead assisting and engaging in an on-going

emergent process of meaning-creation and interactions as the organisation moves through unknown territory.

- In a complex adaptive system setting, the emphasis is on an indirect approach to leadership, where leadership behaviour is focussed on making things possible instead of making them happen, as opposed to being at the centre of events either doing, directing or creating.
- The belief that small changes in the initial condition may grow to emerge as big changes supports the notion that freedom of action must be present on the lowest levels; from this it follows that tolerance of uncertainty and risk-taking, and the empowerment of the employees are crucial elements in leadership behaviour that supports bottom-up processes.
- An important facet of leadership in a complexity setting is being able to value the informal processes in an organisation by facilitating dialogue across artificial hierarchical and functional boundaries, and recognising the importance of informal conversational processes as an important source of fuel for innovation and novelty.
- Leadership behaviour that encourages novelty is considered crucial and is supported by allowing experimentation and the tolerance of fluctuations in the organisation, as well as the encouragement of interaction between agents and collective action which can potentially lead to unexpected and new solutions to existing challenges.
- The articulation of a vision and values, and the mobilisation of support around them, are considered to be important features of contemporary leadership, but in a complexity setting these are not articulated by an individual but emerge within the organisation through an evolutionary process. From a complexity point of view, a vision and values are thus not an expression of a desired objective, but rather symbols of emergent processes. This emphasises the fact that even though a vision and values may be considered as immaterial and intangible, yet they may be materialised and visualised in the patterns the system produces, for instance, in the way people behave.
- The emphasis on participation, relationships and interaction in complex systems necessitates the use of what can be characterised as soft management tools, such as facilitation of processes to support emergence and soft value-oriented leadership behaviour such as inspiring, empowering, listening, understanding and coaching, instead of hard traditional management tools, which in turn emphasises the growing importance of emotional intelligence and human capital.
- Acknowledging that micro-level interaction between people is at the centre of attention implies that our understanding of organisations in complexity settings as merely collections of individuals who perform specific roles must be expanded to include the intricate and dynamic relationships between the interacting individuals.

In his study Rønn (2011:online) translated appropriate leadership behaviour into eight meta-competencies (Table 1), which he argues are necessary to enable the individual as well as the system to develop adequate adaptive capacity and to nourish a state of resilience. This is necessary for the system to be able to create and renew itself in a dynamic way, enabling and empowering leaders and systems not only to develop the adequate competencies required to adapt to on-going short- and long-term challenges but also to lead through dynamic processes of change.

Table 1: Meta-leadership competencies

Meta-leadership competency	The ability to
Heterogeneity	nourish diversity not only as a means of survival, but also as a prerequisite for a system to flourish, in that it increases the memory of the system in the way in which it introduces variety and richness to the structure, facilitating more responses to become available to a given situation
Androgyny	to display adaptive behaviour as individuals possess both masculine features (such as being persistent, rational, strong-willed and task oriented), in addition to feminine features (such as being non-competitive, compassionate, warm and relationship oriented)
Cognitive flexibility	ability of human subjects to structure or restructure their own knowledge, in many ways, in order to respond to a variety of situational demands
Ethical reasoning	because of the inherent vagueness of complex phenomena and the boundaries and limitations to our knowledge, every moment of choice has a normative dimension, as we cannot escape the reality of how that choice will be manifested in the complex reality
Cross-cultural competence	comprehend, then appropriately and effectively engage, individuals from distinct cultural backgrounds in order to achieve the desired effects, despite not having an in-depth knowledge of the other culture and even though fundamental aspects of the other cultures may contradict one's own taken-for-granted assumptions/ deeply-held beliefs
Intuition	to take risks because of the uncertainty, which necessitates trust in intangible and abstract processes that one cannot fully comprehend or rationally or logically explain
Identity	to gather self-related feedback, to form an accurate self-perception, and to change one's self-concept as appropriate, which relates to lifelong learning as a resource for self-renewal and an enabler of self-organisation
Courage	the voluntary willingness to act, with or without varying levels of fear, in response to a threat to achieve an important, perhaps moral, outcome or goal, as any organic system requires risk-taking and facing the fear of the unknown

Source: Adapted from Rønn (2011:online)

Collaborative governance and leadership challenges

According to Salamon (2002:16), unlike traditional public administration, the governance approach shifts the emphasis from management skills and the control of large public organisations to enablement skills, the skills required to engage partners arrayed horizontally in networks, and the skills required to bring multiple stakeholders together for a common end in a situation of interdependence. In this regard Salamon (2002:608) points out that indirect government puts a premium on three skills: *firstly,* activation skills – the ability to mobilise and activate the complex partnerships that public action increasingly requires; *secondly,* orchestration skills, that is the ability to blend the partners involved in complex public action into effectively functioning systems rather than warring fiefdoms; and *thirdly,* modulation skills, that is the ability to find the right combination of incentives and disincentives to elicit the necessary cooperation among the interdependent players of a complex network without providing windfall benefits to one or another actor for doing what

they would have done anyway. At operational level this requires capability in the functions of goal setting, negotiation, communication, financial management and bridge building (Salamon, 2002:608).

It might be worthwhile revisiting the theoretical underpinnings of collaboratives to identify some pointers as to the leadership style and skills which might be required to create public value in these complex settings. According to Margerum (2008), the common theory base across all types of collaboratives relates to the literature on consensus building, conflict resolution, group dynamics and facilitation. However, other aspects of the collaboratives vary, particularly during the implementation phase, when participants are trying to translate consensus into results. The theoretical underpinnings of action collaboratives are found in the literature on social capital and civil society, whereas for organisational collaboratives the theory relating to inter-organisational coordination, networks, transaction costs and public participation provides important insights. Policy collaboratives, have a strong theoretical basis in the literature on policy negotiation, advocacy, coalitions, mediation and collaborative planning.

While stressing the continued need for an active public role, collaboration acknowledges that command and control are not the appropriate features of a leadership approach in the world of network relationships that are increasingly coming to prevail. Given the pervasive interdependence that characterises such networks, no entity, including the state, is in a position to enforce its will on the others over the long run (Salamon 2002:15). Under these circumstances negotiation and persuasion replace command and control as the desired leadership approach. Public leaders must inspire and mobilise around a shared vision and must learn how to create incentives for the outcomes they desire from actors over whom they have only imperfect control. Therefore it seems reasonable to conclude that collaborative leadership requires strong strategic thinking skills combined with process skills such as advocacy, mobilisation, facilitation, consensus seeking, persuasion, coalition building, negotiation, mediation, conflict resolution, coordination, integration and social entrepreneurship (Müller 2010:147).

Social learning

The notion of social learning is increasingly cited as an essential component for the collaborative management of natural resources. The concept is defined by Schusler *et al*. (2003:311) as "learning that occurs when people engage one another, sharing diverse perspectives and experiences to develop a common framework of understanding and basis for joint action". The foundations of social learning can be conceptualised as a group process taking place in networks or *communities of practice*. Such communities emphasise the development of shared meanings and practices that characterise the social entity as a whole; they go beyond participation and are linked to joint practice; they are embedded in a structural governance context and produce specific outcomes (Pahl-Wostl *et al.* 2007: online). It is assumed that high-quality processes in this type of multi-stakeholder collaboration lead to outcomes that are of better quality both in technical and relational terms.

After reviewing the literature on social learning, Cundill and Fabricius (2009:3205) point out that there is no universal theoretical basis or terminology for social learning, with some authors placing the emphasis on learning by individuals in social settings, while others refer to learning at the level of the group or society. So a working definition for social learning would be the collective action and reflection that take place amongst both individuals and

groups when they work to improve the management of the interrelationships between social and ecological systems.

A learning-based approach of monitoring in adaptive co-management that actively seeks to engender reflexive learning as a means to deal with uncertainty in natural resource management is proposed by Cundill and Fabricius (2009:3205). Their social learning approach is based on user-driven collaborative approaches aimed at promoting learning and stakeholder buy-in and entails a cyclical process of problem identification (what is), visioning (what could be), monitoring and taking action (do what is possible), reflection and redefining the problem (what is next?).

The collaborative approaches focus on the *how* and offer insight from the social learning literature in the form of the following principles (Cundill and Fabricius 2009:3207–3208):

- Be reflexive and encourage on-going reflection on the learning that has taken place.
- Involve decision makers directly in a collaborative process that encourage input from multiple knowledge systems.
- As effective learning is about practice, it should therefore feed directly into decision-making and encourage experimentation and action.
- Encourage participants to work towards an ideal or best practice and visioning about what could be alongside what is currently possible through a process of collective sense-making.

Similarly, according to Holling (2004:online), a strategic sense of how to proceed in times of transformation and uncertainty entails the following:

- Encourage innovation through a rich variety of experiments and transformative approaches that probe possible directions.
- Reduce inhibitions about change, which is common when systems get so locked up
- Protect and communicate the accumulated knowledge and experiences needed for change.
- Promote discourse among all parties involved to try to understand where we are going and how to achieve it.
- Encourage new foundations for renewal that build and sustain the ability to deal with change.
- Allow sufficient time as this pulse of transformation is a global phenomenon and could potentially affect all levels of the hierarchy.

CHALLENGES AND PROSPECTS FOR EDUCATION AND LEARNING

In this section the focus will fall on the emergence of collaborative environmental governance in the Western Cape Province and the opportunities and challenges for education and learning. The significance of the natural resources and the context will be briefly described before attention will shift to the prospects for enhancing adaptive capacity through education and learning.

South Africa boasts one of the world's richest and most diverse natural landscapes and is world renowned for its biodiversity. The Cape Floristic Region (CFR), in particular, is the

world's sixth and smallest floral kingdom and the only one located within the confines of a single country and predominantly within the Western Cape Province. There are more than 9 000 plant species in this region, which is half of South Africa's total biodiversity in only 4 % of the country's surface area. This region is considered as one of the world's 25 most threatened biodiversity hotspots, with 2 400 species considered threatened and another 300 species critically endangered. Most (80%) of the priority areas fall outside of existing statutorily protected areas and are mostly on privately owned land. The traditional governmental response of acquiring land by buying or expropriating it to conserve and manage as nature reserves is thus not a feasible policy option any longer and alternative governance approaches were sought.

A key trend in natural resource management in South Africa over the past two decades was the emergence of collaborative partnerships and other novel governance forms incorporating different stakeholders. This trend was facilitated by the lack of capacity at the local level and limited state capacity and resources to implement environmental management policies effectively. It was also encouraged by an openness and willingness after 1994 to experiment with new ideas coupled with international support and sharing *best practice* models.

In the context of the Western Cape Province a whole range of novel collaborative governance models have emerged. A few examples ranging from the more and formal centrally steered arrangements to bottom-up informal arrangements are described. On the one end of the spectrum is the *Breede-Overberg Catchment Management Agency* (BOCMA), which is only the second catchment management agency (CMA) to be established in South Africa (and the first in the Western Cape Province); it is one of a new breed of primary water resource management catchment-based institutions to be established in the different water-management areas (WMA). A CMA is a legal entity mandated by law, headed by a governing board, which must be representative of all the relevant stakeholders in its particular WMA, and must facilitate decentralised decision-making based on a participatory approach to water resources management through the involvement of stakeholders. On the other end of the spectrum is the *Upper Breede Collaborative Extension Group (UBCEG),* an informal forum representing local public and private stakeholders in the upper Breede River Valley to resolve a variety of problems around land management in the Breede River Valley.

While BOCMA is an example of a government-led collaborative, the three biosphere reserves in the Western Cape Province (out of seven in South Africa) were championed by civil society – they are *Kogelberg (KBR),* the *Cape West Coast* (CWCBR) and *Cape Winelands* Biosphere (CWBR) Reserves. The biosphere reserves are managed by not-for-profit companies steered by a board of directors, who were elected by the members (public and corporate). Other examples include a public-private partnership between the government and the commercial forestry sector under the name of *Working on Fire (WoF)* to create an efficient and effective nationally co-ordinated fire-fighting network by pooling and sharing resources as well as *CAPE (Cape Action for People and the Environment)* – a network of 21 governmental, scientific and civil society stakeholders – to implement a strategic plan developed in response to the threat to the Cape Floristic Region on a project-by-project basis.

The focus of this article on the role of institutions for higher learning is on Stellenbosch University, one of four universities in the Western Cape Province and specifically the School of Public Leadership (SPL), which forms part of the Faculty for Economic and Management Sciences. To address the question on how to enhance the adaptive capacity of socio-ecological

systems through education and learning, and more specifically the role of SPL as an institution of higher learning, the classic categorisation of the three universal roles of universities as (1) teaching and learning; (2) research; and (3) community interaction will be used:

- As far as its *teaching and learning* role is concerned, the SPL is uniquely positioned in the South African context with its combination of public governance, the environment and sustainability as strategic focus areas. The SPL is a "school" rather than a "department", precisely because it provides a space for a wide range of disciplines. The diversity of these disciplines in the SPL is reflected not only in the different degree programmes, but in the content of the modules of each degree programme. In this regard all three its postgraduate programmes in governance, environmental management and sustainability are relevant in an adaptive co-management context. Although modules in governance, ethics and complexity are already part of postgraduate curricula, the big question is how the behaviour and competencies for appropriate leadership in the context of complex adaptive systems could be developed? How is the shift in emphasis from management skills to enablement skills mirrored in the course content and teaching methodology? How should/can cross-cultural, process-related and relationship-orientated and other "soft" skills such as advocacy, mobilisation, facilitation, consensus seeking, persuasion, coalition building, negotiation, mediation, conflict resolution, coordination, coaching, empowering, integration, social entrepreneurship be incorporated into formal courses and capacity-building?
- The emergence and proliferation of novel and diverse new governance forms for collaborative resource management in a relatively short period of time in the Western Cape Province to address the challenges of biodiversity conservation in new and different ways create the ideal laboratory for *research* on adaptive co-management in the region. As South Africa is still at a relatively early phase in the evolution of these governance models, it presents a unique opportunity to study the processes of organisational and social learning and adaptation as they unfold. Some of these collaboratives – for example, the Cape West Coast Biosphere Reserve – are apparently quite successful, if the public value added using environmental, process and socioeconomic outcomes as indicators of effectiveness. It therefore seems reasonable to assume that the formation of social capital and organisational learning has contributed towards adaptive co-management of the biosphere. The growing trend in postgraduate master's-level research projects focusing on adaptive co-management in the region is adding value, but this is mostly from a particular disciplinary perspective and findings are published in discipline-based journals. What is needed is a shift to team-based multi- or trans disciplinary research projects and programmes so that there may be on-going reflection on the learning that has taken place during a collaborative process and that learning used to stimulate more learning.
- As learning is defined by social theories of learning as the active social participation in the practices of a community, *community interaction* and engagement is the single most important leverage point the institutions have to enhance the adaptive capacity of adaptive co-management communities-of-practice. From a pedagogical perspective as well, Cundill and Fabricius (2009:3205) argue the growing emphasis on social learning in natural resource management represents a shift away from transmissive expert-based teaching, which characterises traditional conservation

activities, towards transformative community-based teaching. Embracing trans disciplinary methodologies, where university-based teams engage communities-of-practice and co-create knowledge based on a collaborative understanding and definition of the problems and needs, could make a real impact in enhancing the adaptive capacity of co-management communities-of-practice. It can also create new opportunities for universities for capacity-building and teaching as well as for postgraduate research.

SUMMARY AND CONCLUSION

It is clear that the environmental issues facing us today are prime manifestations of complex or *wicked* public problems, and as such, natural resource governance has to be approached from a complexity science perspective. What is not so clear, however, is how our understanding of complex adaptive systems, resilience thinking, adaptive management and governance should be translated in terms of the role institutions of higher learning must play in their teaching, research and community interaction endeavours.

Reflecting on the role of institutions of higher learning, it is suggested that: (1) in teaching and learning the shift of emphasis from management skills to enablement – process and relational – skills should be mirrored in our course content and teaching methodologies; (2) the proliferation of novel governance models in the region creates an ideal laboratory and presents an excellent opportunity for research on adaptive co-management in the region, preferably by team-based research projects; and finally (3) in community interaction the growing emphasis on social learning in natural resource management is the single most important leverage point that institutions of higher learning have to enhance the adaptive capacity of adaptive co-management communities-of-practice through embracing transdisciplinary methodologies and transformative community-based teaching.

NOTES

1 This article is a partly adapted version of a paper entitled "Enhancing the adaptive capacity of collaboratives through education and learning: some reflections from the Western Cape, South Africa", delivered at the *7th World Environmental Education Congress*, in Marrakech, Morocco, 9–14 June 2013 and forms part of an ongoing research programme supported by the National Research Foundation.

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