Viewpoint
The Discomfort of Interdisciplinarity: New ways of looking at familiar things

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'No problem can be solved from the same consciousness that created it. We have to learn to see the world anew.' Albert Einstein

'The major problems in the world are the result of the differences between the way nature works and the way people think.' Gregory Bateson

Abstract

As the requirements of sustainable development become less and less questionable and as we discover that many of our issues that are usually considered separate are actually interwoven in all sorts of mutually dependent ways, we are being called upon to consider how to more effectively deal with interlocking issues. This paper introduces some of the issues and challenges around working across disciplines and attempts to draw attention to perceptions, challenges, misunderstandings, contradictions and pitfalls of interdisciplinary initiatives. Overall the paper aims to offer new insights and perspectives and to contribute towards developing more interest, curiosity and competence in this challenging topic. The focus of discussion and the research questions raised relate to the university environment.

Background and Introduction

This Viewpoint paper deliberates the idea that the world today is in the grip of multiple crises, and what this may mean for universities and their traditional history of disciplinarity. It considers the perspective that the livability of our planet is in danger and our current patterns of life are being challenged as they become increasingly untenable and more complex. These views of the current context are linked to an understanding that human activity has expanded to such a degree as to now constitute a global, interdependent society that shapes the biosphere at multiple temporal and spatial scales. Simultaneous transitions are occurring in terms of our economy, urbanisation and our ecological life support systems. This requires a particular kind of societal engagement, one which accounts for complexity and inter-relatedness.

As the public media and numerous scientific products tell us, we are living in momentous, extraordinary times where we are globally aware of each other and the multiple dangers that threaten civilisation. Such meta-understanding is taking place on an unprecedented level, and yet we have remarkably little knowledge about the future. Against a backdrop of multiple crises

that exacerbate poverty and accentuate social risks and costs, and against a backdrop of global environmental collapse as well as potential and real systemic failures, the urgency and viability of education for sustainable development (ESD) is profound and valid. The viewpoint put forward here is that unless people have the tools to understand and analyse the world around them, they will not be able to address the challenges that face society and the environment. Current generations require leaders and citizens who can think ecologically, understand the interconnectedness of human and natural systems, and have the will, ability and courage to act.

In this viewpoint paper, I put forward the position that while there is a growing international environmental education and ESD movement, not enough questions are being asked about the appropriateness of our schooling and university systems for today's world; or perhaps the wrong kinds of questions are being asked. Neither are enough questions being raised about the meaning of human learning in the context of our turbulently changing planetary society as distinct from the much more linearly conceived world of the past. I propose that new interdisciplinary and transdisciplinary approaches to science that cut across scientific disciplines and interact with policy and practice are necessary in the quest for sustainable solutions to the massive socio-ecological challenges facing humanity. This experimental area is particularly important considering the current state of the world. There is an increasing realisation that business-as-usual pathways into the future are not viable. Thus I present an opening perspective on a research agenda for interdisciplinarity in universities in such a context.

This viewpoint piece suggests that by valuing and mainstreaming interdisciplinarity in research and education, universities can contribute to more effectively engage and reverse trends as well as deepen understanding. It raises this as a researchable question.

With this in mind, I discuss and shed some light on the debate and questions about the need for interdisciplinary approaches and for building bridges that link the university's fragmented structures. The purpose of this paper is to review arguments and stimulate discussion and thought on this urgent topic, highlight some unexplored questions and assumptions, and to put forward some ideas on how to nurture and foster skills to better traverse disciplines.

The University Tradition and its Gaps

Sustainable development requires an extension of thought beyond that which was the norm for most of the 20th century, towards a much more integrative perspective that brings together (at least) society, economy and the environment with present and future dimensions (Sterling, 2003). In recent years, there has been an encouraging shift in approaches to sustainable development – partly in response to the limitations of traditional models and partly in response to a global trend amongst scientists, economists and environmentalists away from narrow determinism towards developing a world view that embraces the complexity of natural and social systems.

Sustainability is now largely understood to rest on a simple premise: the interconnectedness of all things. This premise challenges the dualisms subject–object, nature–culture that are at the core of modern thought. There is a need to challenge the old settlements between society and nature, between humans and the rest, between matter and mattering, and to refigure the

ontological practice of research.

Universities and educational institutions have an enormous responsibility to prepare current and next generations for the future. I hold the view that until a realisation of interconnections and interdependencies and more integrative perspectives become part of our education and a principle basis of its orientation, environmental justice, social responsiveness, transformation and restoration are improbable.

There is urgency to bring new depth, clarity and compassion to every level of human endeavour – from unlocking individual potential to finding new approaches to global problems. We need to focus on research, education and leadership for humanity's most pressing problems. This raises the question of whether universities provide adequate tools and are able to generate these new conceptual and experiential resources to prepare students for a preferred future.

The dawn of the 21st century arguably sees humanity in a bind: our most pressing problems are complex and inter-disciplinary. The university, as a long-lived institution has to face deep, unresolved questions. This crisis is more serious in some universities than in others but concerns all of them. Academics, scientific and artistic leaders are trained to be deeply functional experts in one area, while the problems they face spill over every imaginable boundary.

In a collection of essays, *Wholeness and the Implicate Order*, physicist David Bohm (1980) argued that the process of separation has gone too far and that it has become time to reconnect with ourselves and discipline our minds to see wholeness rather than wholes that are reconstituted from independent fragments. This requires having a worldview that we probably all had when we began our lives, but subsequently were taught to lose.

According to Nicolescu (2008) there are more than 8 000 academic disciplines today, which means that one might be an expert in one intellectual task but an 'ignoramus' in 7 999 other things. He argues further that the fragmentation of our knowledge has lead to the fragmentation of our world and societies fanatically committed to individualism (Nicolescu, 2008). A dominant focus on 'I' and 'my' is not commensurate with the current emergence of a new focus on 'we', the global commons and an interconnected global system.

For almost a whole millennium, the university evolved from the general to the particular (Max-Neef, 2005). In the beginning, the focus was on a small set of broad subjects: theology, law, philosophy and medicine. The general movement was towards the definition of clear borders among the disciplines. New fields of science emerged mainly by splitting from existing disciplines, acquiring status of independency and establishing their own rules and codes.

The traditional view of an academic discipline is an area of study with its own theories, methods and content, distinctiveness being recognised institutionally by the existence of distinct departments, chairs, courses and so on. The academic disciplines as we know them today are widely considered to be largely discrete and autonomous, although not homogenous.

Disciplines have been described as providing the structure of knowledge that trains and socialises members of a faculty. It also includes the production of 'relevant' research, the process of peer review and a system of rewards related to these practices. A discipline is a system of concepts; more than a body of content knowledge, it is also a discourse, a use of language and a way of thinking, the latter points often being more hidden, less explicit, and less acknowledged. A discipline further has an epistemic and a cognitive social base – a 'who

is who'. There is an established community of practice, a power hierarchy, an important social dimension of knowledge. Implicit in the structure and organisation therefore is a protocol with regards to how far, how much, and who you can talk to. At times it would appear that one is predominantly encouraged to talk to one's own 'clones', facilitating monologues which paradoxically look like dialogues.

Under this traditional notion of academic discipline as discrete and autonomous, there is a standard educational pathway for students. The disciplines influence students' views about what is known, what is valued and what is capable of investigation.

The way universities evolved by seeking specialisation, as described above, has led to producing a formidable array of disciplines in a growing number of isolated and arguably self–centred fields (Max–Neef, 2005). This circle of segmentation of disciplines arguably increases the gaps that separate them. Integrating parts that seem in many ways to evolve away from each other in an irreconcilable way and implanting interdisciplinary exchanges in an institution not set up originally for this purpose is likely to create problems.

Discussion

The word 'interdisciplinarity' is receiving much attention and the concept is increasingly used, often somewhat meaninglessly, in academic, corporate and business prose to make proposals palatable, relevant, cutting-edge, fashionable and contemporary. As there is an apparent willingness and eagerness to jump on the interdisciplinary bandwagon, the term is readily used in universities to describe programmes and courses. However, to a large extent, many issues, challenges, paradoxes and complexities are ignored – not explicitly addressed, recognised or understood. Also although there are many examples of successful interdisciplinary projects and programmes and faculty in universities around the world, the question is whether universities' procedures, traditions, structures and attitudes towards interdisciplinarity are consistent with these objectives. Well–intentioned efforts towards interdisciplinary research can serve to privilege a single discipline or one epistemology over another in question formulation and research.

Kaplan (2002) states that because we have achieved so much success in our use of the material world which lies outside of ourselves, the way of thinking which supports such usage has come to be taken as the legitimate way of approaching the world. It has come to be taken as given. Yet simply because a particular way works with respect to certain phenomena does not mean that it is universal, it does not mean that all phemomena should be regarded in the same way. Vaclav Havel (in Kaplan, 2002:xv) noted in an address to the World Economic Forum many years ago: 'What is needed is something larger (than the scientific method). Human's attitude in the world must be radically changed. We have to abandon the arrogant belief that the world is merely a puzzle to be solved, a machine with instructions for use waiting to be discovered…'.

Berry (1981) argues further that the problem with our approach to solving problems is that it usually causes a host of other problems in its wake – problems that in turn need solving. Increasingly there are calls to fundamentally change the way science is practiced, to

create more flexible and creative work environments in order to generate new insights and solutions. Human-induced climate change is an obvious example. It is an enormous system-wide challenge that affects every person and every country. It requires sweeping change in every aspect of human life. It also questions many fundamental beliefs about growth and the market economy and threatens powerful interests. We are neither accustomed nor encouraged to address a system of solutions; the current system focuses us on addressing individual solutions. The dominant discourse, approach and negotiations regarding climate change predominantly focus on one aspect (rising temperature), applying a dominant, structurally entrenched yet arguably flawed mechanistic worldview. This approach (e.g. focusing on reduction of parts per million) is not focused on the health and maintaining the integrity of the whole system or living well.

If scientific assessments are to be usefully applied, they should be conducted in a context that situates them within the real world. This requires an accurate understanding of how socio-ecological systems function. In this context the term 'resilience' is appearing more frequently in discussions about environmental and societal concerns. Resilience thinking offers different ways of understanding the world around us and of managing our natural resources (Walker & Salt, 2006). It makes an important distinction between the amount of knowledge and the kind of knowledge we pursue and acquire (Walker & Salt, 2006). The philosophy of resilience emphasises an accurate understanding of socio-ecological systems and how they function – it conceives resource systems and people as part of them (Walker & Salt, 2006).

Adaptation planning for climate change will need to rely on an emerging interdisciplinary scientific field which couples human and natural systems and their interactions. New research fields are emerging that meld science and policy, drawing on complexity studies and systems analysis (examples being the resilience research mentioned above).

Part of the present crisis of the university is due to its ontological dilemma: on the one hand, it is pushed toward a sharpening of its competence and increasing specialisation, at the risk of losing the overall view; on the other hand, there is an increasing need to reconcile with its universal mission and tackle complex interrogations that demand more than specialities (Burzstyn, 2008).

In my own profession, planning professional bodies have agreed that future planners will need to be able to go beyond the 'basics' to be leaders and innovators in promoting sustainability (Birch & Silver, 2009). At recent planning conferences a consensus has emerged with regard to what our next generation of city and regional planners will need to know; such as being able to identify and interact with diverse interests, mediate differences, and undertake consensus building to help different constituencies reach agreement in the face of new global energy and climate challenges. These are all tall orders that assume interdisciplinarity and promoting transformative agendas for sustainability.

Much has been written about universities being emptied of agency (assuming they had such agency in the first place) and becoming appendages of the global political economy. Nandy (2009) asks whether universities are becoming centres of knowledge management rather than knowledge production and creation. Universities are supposed to represent the pinnacle of organised, expert knowledge and the mission of universities across the world is to extend

its activities to the society as a whole. However, with more and more energy being spent on bureaucratic procedures and 'managing' knowledge, universities are arguably more set upon their own agendas than they are concerned with the rest of society (Nandy, 2009).

By interdisciplinary research and teaching, I imagine that we are referring to scientific investigation of questions that require assumptions, methods and tools from fields or disciplines that are traditionally distinct and not formally connected. That this constitutes a departure from 'normal' science and the depth and implications of what that might entail is perhaps not clear and obvious to many practitioners. It might mean opening oneself to a 'fresh degree of truth', new truths, assumptions and behaviours – new ways of looking at familiar things.

Call to Action and Areas for Further Research

A new emphasis on understanding inter-relationships and connections is emerging in all fields. There are also pressures and expectations from outside of our universities, such as requirements for professional accreditation that stress this new emphasis. Teachers are becoming more willing to cross disciplinary boundaries so that learning can become more integrated and students constantly demand broader learning opportunities.

While a theoretical account of critical interdiscipinarity has been offered by a multitude of writers, there is a need to understand how the concept is developing – and the term itself is being understood – in academic environments.

The paper proposes that interdisciplinary teaching and research represent the future. This exploratory discussion is at an early stage, and in ending this paper, I propose a few tentative ideas and suggestions on how to nurture and foster better skills to traverse disciplines and work towards a more pervasive form of boundary crossing – one that involves intersections between all departments and disciplines. These present a potential research agenda that can be considered in more depth and with more rigour in future educational research focusing on this topic in a context of sustainability, and include:

Appropriate systems of reward and institutional support

Purposeful and directed interdisciplinary work requires an appropriate system of reward and institutional support. At present, the principal rewards for academic staff at most universities are by means of disciplinary challenges; such as, for example, publication in top-tier disciplinary journals, evidence of having advanced in their discipline, teaching awards for teaching undertaken in a discipline, and so on. New ways of valuing interdisciplinary work in addition to discipline-specific work needs to be addressed in promotion and recognition criteria.

Creation of interdisciplinary spaces

Universities will need to create interdisciplinary spaces to help look after the 'whole' and to invigorate the creation of knowledge. Bridging boundaries or spaces demands a willingness and legitimacy to connect differentiated entities. Such an interdisciplinary space could serve as an integrating structure and could assist with opening people's minds and creating sectors of sensitivity within all faculties. Values and a common conception of the object/system of inquiry

need to be articulate and shared. Such spaces will help disciplinary researchers working together find ways to accommodate each others' approaches rather than compromise them.

This interdisciplinary space could further assist with advocacy of interdisciplinary work and being very explicit about the need for paradigm change and tolerance for ambiguity. Such multi-modal spaces could also generate a shortlist of key important contextual challenges and facilitate joint seminars. Tackling such challenges could open up silos, build internal reflexivity and connect people.

The possibilities that emerge as universities employ more faculty not steeped in one discipline is also an interesting terrain for further exploration.

Programmes and degrees
Students need to be encouraged to recognise the value and need of interdisciplinary study and work through formal fieldwork programmes, on-site experience and mentoring arrangements. There could also be inclusion of interdisciplinary expectations in a degreed programme. Joint degrees could be encouraged at the highest level, and their impact and effect monitored.

Academic development programmes
Emphasis on broader personal growth and development of academic staff is critical. The challenges of sustainability pose challenges for learning and unlearning. There is a need for unlearning and updating which is more than merely adding to – it also means modifying, throwing things out, learning to let go, learning humility, rearranging things, making new connections, and doing so carefully considering past experience and how that must be (re-) evaluated in light of new experience.

Release of sufficient institutional resources
All of the above ideas will rely on the release of sufficient institutional resources – financial, intellectual and administrative.

Conclusion

The current period of transition to a more sustainable society, where much of the perceived certainty generated in previous centuries is crumbling, presents unique opportunities. An unfolding human consciousness of an interconnected global system could emerge. This requires engaging with the limitations of a dominance of compartmentalised sciences and epistemologies, which are found wanting in terms of engaging more fully with complexity. I end this Viewpoint with open questions for further perusal. For example, how do we bring diverse people together to think beyond their normal boundaries? How do we aggregate rather than segregate? How do we think, communicate and develop shared understanding *across* disciplinary boundaries when for more than three centuries fundamental differences emerged over how we have conceptualised/used nature, science and society? How do we rethink the metaphysics and ontologies of what we do? How can one produce a common base of exploration and explanation? How can we work on our own practices while deepening

appreciation of others? How can scholars offer a more welcoming home to a wider range of knowledge practices? How can universities facilitate rather than impede interdisciplinary endeavours? In my view, these are important questions to take forward with universities.

Notes on the Contributor

Tania Katzschner has an undergraduate BSocSci degree in Environmental and Geographical Science and Anthropology, a postgraduate degree in Master of Town and Regional Planning and professional and project management experience in environmental management, planning and policy development gained over a 15-year period with local government, parastatals, the private sector, NGOs, conservation agencies, and most recently in academia. Tania is a lecturer at the University of Cape Town in the Planning Department and teaches the Masters in City and Regional Planning. Her overarching research question is how to better blend scientific data with intuition, common sense, indigenous knowledge and qualitative research as we try to comprehend the world in which we're immersed. Tania's mission is education for sustainable futures, which she believes is an emerging imperative. Email: tania.katzschner@uct.ac.za.

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