

Transdisciplinary research and practice for sustainable outcomes: introduction

Dr Jane Palmer
Vice-Chancellor's Research Fellow (Community Futures)
Institute for Resilient Regions
University of Southern Queensland
Toowoomba QLD 4350, Australia
Jane.Palmer@usq.edu.au

Dr Chris Riedy
Associate Professor
Institute for Sustainable Futures
University of Technology Sydney
PO Box 123 Broadway NSW, 2007, Australia
criedy@uts.edu.au

Dr Dena Fam
Institute for Sustainable Futures
University of Technology Sydney
PO Box 123, Broadway, NSW, 2007, Australia
Dena.Fam@uts.edu.au

Professor Cynthia Mitchell
Institute for Sustainable Futures
University of Technology Sydney
PO Box 123, Broadway, NSW, 2007, Australia
Cynthia.Mitchell@uts.edu.au

Why has transdisciplinarity, in its various forms, emerged as a different way of doing research? What makes it relevant, and arguably essential, for research and associated practice that contributes to social, economic and environmental sustainability? Alongside these questions is another that is even more fundamental: What motivates an engagement with the world that crosses traditional academic and professional boundaries? Such engagement is certainly not easy to achieve. It can be complex to imagine, difficult to practice, intellectually and emotionally testing, and often risky. Yet many researchers are turning to a transdisciplinary research practice because of its potential to deliver transformative and groundbreaking responses to the sustainability challenges of our time.

The idea for this book arose as a result of the editors' experience of working in an organisation that has been built upon a motivation for transdisciplinary engagement: the Institute for Sustainable Futures at the University of Technology Sydney. It is an organisation whose mission is to create change towards sustainable futures. In pursuing this mission, the Institute has not only permitted, but supported and conceptually advanced, transdisciplinary research and practice. Researchers and practitioners at the Institute realized early in the life of the organisation that creating change that made a real difference to local and global sustainability required more than cross-disciplinary collaboration. It required a willingness on the part of each team member to challenge their own worldview and intellectual assumptions, in order to see the potential contribution of others to resolving complex issues. This in turn required systems that: supported experimentation; used training and shared learning to foster an open and reflexive way of working; and gave researchers and practitioners the skills and

materials with which to convince others that a transdisciplinary approach would lead to better outcomes. It also required new conceptualisations of collaborator and stakeholder relationships. Within the Institute, understandings of transdisciplinarity vary and continue to evolve. The development of systems that support transdisciplinary work is ongoing, as new projects and new team members bring with them different challenges and ways of thinking.

Theory and practice in the academy: framing and teaching transdisciplinarity

We are now at a point where there is global interest and a significant body of work on transdisciplinarity. This creates the opportunity for a more specific focus on the application of transdisciplinarity to sustainability issues, and its translation into practices that create change. The book's theoretical and historical components trace the way that transdisciplinarity has become connected to inquiry and practice in the field of sustainability. Julie Thompson Klein (Chapter 2) canvasses the originating quests of proponents of transdisciplinarity – the quest for a transcendent 'unity' of knowledge, whether at the level of a particular set of stakeholders or a comprehensive 'worldview', and the transgressive, postmodernist quest that rejected discipline-based inquiry in favour of problem-driven, or social-justice-oriented research. The chapter leads us flawlessly to transdisciplinarity's inevitable connection with sustainability research, and with community and experiential knowledge, then develops discussions on the kind of space where transdisciplinary work flourishes, the development of transdisciplinary education and learning models, the techniques of translation that enable transdisciplinary researchers to work with other stakeholders, and forms of researcher reflexivity.

An evolving understanding of transdisciplinarity that addresses its connection with practice is presented by Cynthia Mitchell, Dana Cordell and Dena Fam (Chapter 3) who introduce a novel framework for designing, undertaking and reflecting on transdisciplinary research – the outcome spaces. They argue for 'beginning at the end', where the end is engagement with the world, and suggest that a transdisciplinary researcher maintains a clear view of three types of desired outcome: changing the situation being addressed; making a contribution to stocks and flows of knowledge; and bringing about mutual and transformative learning. The desired outcomes aim to guide research design and help clarify key decisions during the research process, and they require researchers to be clear about their worldviews and intentions from the outset. Gabrielle Bammer (Chapter 4) takes a somewhat different focus on practical resources, tools and methods for conducting transdisciplinary research. She presents a framework for thinking systemically about transdisciplinarity by categorising tools and methods into those that are useful for (a) synthesizing disciplinary/stakeholder knowledge, (b) understanding and managing diverse unknowns and (c) providing integrated research support for policy and practice change. This collation of tools (and repositories for accessing them) will be a valuable resource for transdisciplinary researchers/practitioners.

Systems thinking features strongly in Bammer's framework, and in several of the other contributions, including Ray Ison's (Chapter 5). Ison takes us even deeper into exploring a particular set of systems tools and methods for transdisciplinary research. Ison highlights the importance of cybernetic-systems thinking for responding to the complex environment in which researchers and practitioners work. Introducing a vast array of cyber-systemic practice traditions, associated concepts, methods, tools and techniques and discussing their value for a reflective transdisciplinary/action researcher, he provides a rich historical lineage of systems thinking. In doing so, he situates the emergence of 'transdisciplinarity as transformation'. This book for the first time also consolidates work by a number of researchers on supporting and assessing transdisciplinary research at the doctoral level, the development of

transdisciplinary communities of (research) practice, and the qualities that need to be strengthened in researchers to enable them to engage effectively in transdisciplinary research. In Chapter 6, Dena Fam, Dana Cordell and Tanzi Smith reflect upon and dissect the skills and dispositions of a transdisciplinary researcher. This is a much-needed contribution to the conversation about how transdisciplinary research takes place at the level of the individual researcher. The authors identify a mix of transdisciplinary skills, orientations, dispositions and attributes, some of which, they contend, may be learnable while others may not. They identify creativity, curiosity, commitment, critical awareness, communication and connectedness as the necessary skills, and note that these have significant implications for both individual professional development and institutions wishing to foster transdisciplinary research.

Early in the development of many transdisciplinary researchers is the critical process of undertaking a transdisciplinary research degree. Catherine Manathunga (Chapter 8) examines a particularly important relationship in this process – that between supervisor and student. Noting that disciplines are cultures, she draws on her recent work on transcultural supervision practices to inform the characteristics of transdisciplinary supervision. Manathunga develops the concept of trans-supervision, which has both transcendent and transgressive elements. In particular, she posits that transdisciplinary supervisors need to cultivate epistemological flexibility and reflexivity to support the development of the next generation of transdisciplinary researchers.

However, the submission of a thesis is just the beginning of another challenge for students, supervisors and examiners. Juliet Willetts and Cynthia Mitchell (Chapter 9) foreground the inherent challenges of examining and assessing transdisciplinary postgraduate research and in the process develop five quality criteria to support examiners. These criteria, developed through case study research and practice, ask whether students have (a) sought broad societal outcomes in their original contribution to new knowledge (b) demonstrated reflexivity and responsiveness (c) demonstrated research integrity (d) engaged appropriately with research context and literature and (e) developed a coherent argument. The authors note the reality of transdisciplinary practitioners reverting to disciplinary norms during thesis examination, leading to a suggestion that the examination process be expanded to include a self-reflexive component in the examiner's report, recording and reflecting on the experience of the examination process.

Moving from the individual to the social, Chris Riedy (Chapter 7) takes the innovative step of viewing transdisciplinary research through a social practice lens. This lens focuses attention on the ways in which the practice of transdisciplinary research is socially and materially mediated, and the meanings, materials and competencies that make up the many forms of transdisciplinary research practice. He goes on to apply the framework to his reflections on collaborating with a practice-oriented agricultural institute in New Zealand looking to develop and launch a Masters of Transdisciplinary Research and Innovation.

Taken together, the contributions in this part of the book build up a rich picture of the conceptual frameworks used to frame transdisciplinary research and guide its practice in different contexts. The next part of the book dives deeper into practice through case studies of transdisciplinary research in action.

Case studies: framing and stretching transdisciplinary practice

A key contribution of the book is its strong focus on practice, and the case studies, including several international examples, demonstrate vividly the challenges and rewards of transdisciplinary work, whether in the sphere of sustainable international development, community development, the management of river catchments, the impact of the global phosphorous cycle on food security, or climate adaptation.

Several of the case studies are field projects and demonstrate the value of working within an identified transdisciplinary framework. For example Dana Cordell, Genevieve Metson, David Iwaniec and a long list of collaborators (Chapter 10), reflect on how a focus on transdisciplinary outcomes (see Chapter 3) provided shape to the transformative approach taken to addressing the issue of global phosphorus security. Phosphorus is a critical nutrient for food production which is being rapidly depleted. The authors drew together a global network of researchers to take a transdisciplinary approach to this under-recognised global sustainability challenge. Katie Ross and Cynthia Mitchell (Chapter 12) share four guidelines for transdisciplinary research praxis: ways of knowing, ways of being, diversity of disciplines involved and processes for structuring interactions. The guidelines can harness the potential within rich and complex mixes of stakeholders as well as provide a valuable vantage point for noticing emergence and conducting synthesis. The authors illustrate the power and impact of the guidelines through their project on improving the governance of decentralised sanitation in Indonesia. Tanzi Smith (Chapter 15) draws on her experience of working with Vietnamese communities to develop a deeper understanding of how to facilitate a capacity to aspire to sustainability through the use of systemic sustainability principles. Smith reframes sustainability as an empowering endeavour with the potential to improve social wellbeing and environmental health. The transdisciplinary nature of this case study lies in the evolving and iterative methodology and in the framework used to co-create sustainability in light of people's experiences of unsustainability, with input from multiple forms of knowledge and a diverse range of theoretical perspectives.

Bill Bellotti (Chapter 15) on the other hand retrospectively adopts a transdisciplinary framework to reflect critically upon an agricultural development project in India, in which 'research for development' was a key component. His chapter draws particular attention to the ways in which this project conformed with a transdisciplinary framework, and the ways in which it diverged. It conformed in that a definition of the 'problem' was shared by both scientists and development practitioners; it diverged in that a shared research objective was not developed. The author concludes that in future the establishment of a clear conceptual model for transdisciplinary research would help all stakeholders to clarify their roles, responsibilities and expectations.

Even where a clearly articulated transdisciplinary framework is adopted from the outset, projects can be challenging, as we are reminded by Dena Fam and Zoe Sofoulis (Chapter 16). The authors present a clear picture of issues on the ground in transdisciplinary and community-engaged research. They evocatively describe the divergent 'paradigms of knowledge' – knowledge ecologies – that underlie development work by engineers and by social scientists and design practitioners, in the context of a water development project for remote villages in Alaska. The authors outline the initial barriers to communication between the different 'knowers' and how each learned to communicate better with the other through a range of 'translation devices.' While the Alaska project fell short of its potential as a participatory design process, this detailed study of the process offers valuable lessons for future transdisciplinary and community-engaged research.

Alongside the frameworks adopted by these practitioners, other chapters seek to stretch transdisciplinary practice into new fields, especially in the humanities and the arts. This is, as Klein (Chapter 2) suggests, an under-researched area, and at least two chapters make an important contribution. Jennifer Williams, Dena Fam and Abby Mellick Lopes (Chapter 11) encourage us to extend visual communication design practice into transdisciplinary research. The authors are passionate about expanding the remit of designers, particularly design researchers, to fulfil their potential to contribute across all the stages of the transdisciplinary research enterprise, both as participants, and as knowledge creators in their own right. To do this requires shifts in design education. The authors draw on their experiences of student projects integrated into a 'sustainable sanitation' transdisciplinary research project to illustrate this point. Jane Palmer (Chapter 13) takes a different perspective, challenging us as researchers to engage more richly and deeply with the individuals whose lives we research. She introduces us to 'storytelling ethnography', and argues that the special qualities of transdisciplinarity are in fact qualities of storytelling ethnography. Palmer goes on to make a strong argument for how storytelling ethnography can add value as both a model and a tool for researchers and the researched, exemplified through a moving adaptation and resilience case study encompassing older people's life histories in Aceh.

The case studies embody the interplay between transdisciplinary theory and practice. In their descriptions of experiences in the field, we can see conceptual frameworks being tested, revised and rebuilt in response to the realities of the research context. None of the authors simply apply transdisciplinary theories; all contribute to the iterative development of such theories and provide guidance for praxis.

The future

In light of these recent trajectories of transdisciplinary research and practice, what further developments might still be possible to enhance transdisciplinarity's value for sustainability in the future? Underlying all of the work described in these chapters is a deep commitment to changing the world towards socially, economically and environmentally preferable outcomes, and to thinking that transcends disciplinary boundaries. However, the chapters also make clear that there is more work to be done in supporting transdisciplinary research and researchers at institutional and policy levels, in developing communities of practice nationally and globally, and in seeking greater contributions from the humanities and social sciences. Those theorising transdisciplinarity, and those engaged in transdisciplinary practice, may have much to learn from other scholars who are using mixed methods, theorising and teaching intercultural competence, developing new forms of collaboration, and writing up their research findings in new, more creative ways. Supporting inter-institutional collaboration, and building upon the experience of other researchers who have worked 'in the field' in different contexts or across disciplines, will be part of an ongoing process of clarifying conceptions of transdisciplinarity, developing the skills of practitioners, and enabling them to best serve the social, environmental, cultural and economic objectives of sustainability.

To return to the questions we posed in opening this chapter, it is now abundantly clear that transdisciplinary research is a key piece of the puzzle of facilitating a transformation towards a thriving, sustainable future. While such work is not easy, it can offer an effective response to sustainability challenges. We hope that this book makes some small contribution towards deepening and broadening transdisciplinary practice for sustainable futures.