

# Seeding a new transdisciplinary community of practice

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## Abstract

Transdisciplinary research is a bundle of interwoven social practices taking different forms in different contexts. There is no single such practice; instead, there are many different transdisciplinaritys. Each has its own particular meanings, materials and skills, in addition to shared elements. In this chapter, I use social practice theory as a lens to guide personal reflection on my role in establishing a new community of transdisciplinary research practice at Wintec in New Zealand. In sharing my particular practice with the Wintec community, I played the role of a catalyst or seed for a new community of practice. The emerging practice at Wintec resembles my own, but departs from it in ways that respond to the local context. In this dynamic engagement with the Wintec practitioners, my own practice changed and deepened. I conclude that there is a critical need for diverse transdisciplinary communities of practice to prioritise mutual engagement.

## Introduction: The practice of transdisciplinary research

Transdisciplinary research is a rich, complex, contested body of theory and practice that rose to prominence over the last four decades. Klein (2015) identifies three overlapping discourses that capture the concerns driving this rise: transcendence; problem solving; and transgression. Transdisciplinary research aims to transcend the fragmentation of knowledge into disciplines by synthesising knowledge towards a more holistic view. It is concerned with delivering more effective responses to wicked problems (Rittel and Webber 1973) and sustainability challenges. Finally, it transgresses traditional scientific boundaries by recognising the value of knowledge held by actors outside of academia.

While Klein's analysis provides valuable orientation, it is a high-level view. I am interested in how these discourses play out in practice, at the scale of practitioner communities. In this chapter, I explore the 'doing' of transdisciplinary research in two practitioner communities, drawing on theories of social practice. Reckwitz (2002: 249) defines a social practice as:

A routinized type of behaviour which consists of several elements, interconnected to one [an]other: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge.

When people do transdisciplinary research, they engage in particular physical and mental activities, using particular tools, frameworks and knowledge, with particular motivations. These practices vary to suit the local context so that there is no single transdisciplinary research practice; instead, there are many transdisciplinaritys. I am interested here in how the nature of transdisciplinary research practice shifts and changes as it moves from one context

to another. To explore this question, I draw on a recent experience of ‘carrying’ elements of my own transdisciplinary research practice from one context to another.

In 2013, Wintec (the Waikato Institute of Technology, located in Hamilton, New Zealand) approached the Institute for Sustainable Futures (ISF) (at the University of Technology Sydney, Australia) to assist with the establishment of a new research degree – a Masters of Transdisciplinary Research and Innovation. ISF offers a Masters in Sustainable Futures (by research) and a Doctorate in Sustainable Futures. Since these programs commenced in 1997, 26 students have graduated and 35 students are currently enrolled. ISF’s research degree program has two core principles. The first is a commitment to ISF’s mission to create change towards sustainable futures. The second is a conviction that transdisciplinary research is the most appropriate research practice for achieving that mission. The team at Wintec were interested in learning about ISF’s experiences with running a research degree program that supports transdisciplinary research.

I have worked at ISF since 2000, first as a doctoral student, then as a member of academic staff. I have supervised research students at ISF and in 2014 became the Director of ISF’s Higher Degree Research (HDR) Program. Between 2014 and 2016, I visited Wintec five times to run supervisor workshops, engage in a transdisciplinary research project and provide mentoring and support. During these visits, I recorded observations about research and supervision practices at Wintec. I also held two focus groups and one interview with research supervisors to specifically explore the individual research supervision practices of Wintec staff, as a way of learning about the existing context. These observations and focus groups are the primary data sources for this chapter, alongside observations and critical reflection on research practices (including my own).

The process of helping to establish a transdisciplinary research practice in a new context has clarified and altered my own practice, while also revealing some of the ways in which the practice of transdisciplinary research responds to context. In the next section, I outline the social practice framework that I use in this chapter. I then characterise transdisciplinary research using this framework, before describing the two study sites in more detail, and moving on to explore three elements of transdisciplinary practice: meanings; materials; and competences.

### **A social practice framework**

There are many theories of social practice. Central to most accounts is the idea that practices transcend the dualism of structure and agency; practice theorists argue that individual actors are both constrained by social structures, and involved in continually shaping and reproducing those structures (Shove et al. 2012). Social practices are the entities that integrate agents and structures and Giddens (1984) argued that they should be the basic domain of study of the social sciences. Certainly, social practice theories offer a distinct way to view the social world – a lens that reveals characteristics that may not otherwise be apparent.

The particular social practice lens I employ in this chapter is described by Shove et al. (2012) in their book *The Dynamics of Social Practice*. This lens is appealing because of its specific focus on how social practices change over time, which coincides with my focus in this chapter on how practices differ between sites. In their exploration of the dynamics of social practices, Shove et al. (2012: 14) identify three elements of a social practice:

- Materials – ‘including things, technologies, tangible physical entities, and the stuff of which objects are made’
- Competences – ‘which encompasses skill, know-how and technique’
- Meanings – ‘in which we include symbolic meanings, ideas and aspirations’.

A practice integrates these three elements through ongoing performance. A mundane example is the practice of driving, which integrates: materials such as a motor vehicle, a road network and a driver’s licence; competence in starting, manoeuvring and stopping the vehicle, following road rules and coping with different driving conditions; and meanings such as the sense of freedom and independence promoted in motor vehicle advertising, frustration at traffic, and so on. I will go on to explore the materials, competences and meanings that make up transdisciplinary research shortly.

Shove et al. (2012) use the concept of elements of a practice to make a distinction that is important for the topic of this chapter. They argue that practices are necessarily local and bound to a context. Practices do not travel. While practices such as driving are recognisable all around the world, they have particular local characteristics that make driving a qualitatively different experience wherever it happens. These local versions of a practice are shaped by and embedded in the local context. In contrast, elements do travel. For example, the same models of motor vehicle are integrated into local driving practices around the world. The custom of driving on the left (or right) side of the road reappears in various local driving practices and practice theorists can trace the historical movement of that custom from one local practice to another.

Returning to the case of transdisciplinary research, a social practice lens leads me to conclude that there will be many local versions of transdisciplinary research that respond to the local context. Context is defined broadly by social practice theorists to include factors such as local history, geography, material infrastructure, financial resources and culture. I carried elements of my own transdisciplinary research practice to Wintec to try and incorporate them into a local Wintec transdisciplinary research practice.

My own practice is shaped by the community of practice that I participate in at ISF. Community of practice (CoP) is a concept that is closely related to social practice theory. A CoP is ‘a group of people who share an interest or a passion for something that they practice, and who learn how to do it better through regular interaction’ (Cundill et al. 2015: 22). CoPs organize around a shared domain of interest, engage in joint activities and actively test ideas (Cundill et al. 2015). CoPs can support a practice of transdisciplinary research (Cundill et al. 2015) and I argue that ISF is home to a transdisciplinary CoP. This CoP is diverse, such that the elements of the practice I carried to Wintec would be recognizable to members of the ISF CoP, but each would describe their practice at least slightly differently.

In the next section, I provide more definitional clarity by asking whether transdisciplinary research is actually a practice.

### **Is transdisciplinary research a practice?**

What exactly constitutes a practice is a matter of some debate. Shove et al. (2012) define a practice as anything that is recognised as such by actual or potential practitioners. In this sense, if there are researchers that claim to be doing transdisciplinary research (and there are), then I can usefully explore transdisciplinary research as a practice. This approach is

temptingly simple, but is complicated by disagreement over what transdisciplinary research is. The literature presents many different models of transdisciplinary research, from Nicolescu's (2010) philosophical approach to Bammer's (2013) integration and implementation sciences to Mitchell et al's (2015) transdisciplinary outcome spaces, to name just a few. Following on from the discussion above, this is hardly surprising. Each local version of transdisciplinary research will have its own form, shaped by the local context (broadly defined). What this means, however, is that defining transdisciplinary research as a single practice delivers limited analytical value. If different practitioners do not recognise each other's practices as transdisciplinary research, then they will be unconvinced by this kind of analysis.

To address this complication, I draw on another concept discussed by Shove et al. (2012) – the idea of a bundle of practices. Practice bundles are loose-knit patterns of coincident practices. Defining transdisciplinary research as a bundle of linked practices, rather than a single practice, offers some analytical advantages. It recognises that transdisciplinary research is an attempt to incorporate novel practices and elements into an existing bundle of practices that are already well-established as part of disciplinary research (such as searching for literature, reading, writing, publishing, presenting, communicating with other researchers and participants, and so on). These existing practices can constrain and compete with the novel practices, and the novel practices can depart more or less from the traditional bundle of research practices.

Further, working with bundles of practices recognises that the component practices in the bundle may differ from site to site, or at least receive stronger or weaker emphasis. This helps to explain why so many different conceptions of transdisciplinary research exist in the literature. The bundle of practices that make up transdisciplinary research is far from settled and is shaped by local context. The two different contexts in which I have undertaken transdisciplinary research provide an opportunity to examine how the bundle of practices differs from site to site. In the next section, I provide necessary background to establish the context at the two sites.

## **The practice sites**

The Institute for Sustainable Futures is a transdisciplinary research institute of the University of Technology Sydney (Australia), established in 1997. Its mission is to create change towards sustainable futures. It pursues this mission primarily through contract research projects for clients in government, industry and the community, and through a higher degree research program offering Masters and Doctoral degrees. Given the focus on change creation, the typical ISF project involves working collaboratively with clients to achieve some sort of short-term positive change towards sustainable futures in a real problem situation. The relationship may be initiated from either direction; sometimes ISF responds to client funding calls, while other times ISF develops research ideas and seeks potential funders. Relatively fewer projects are supported by long-term traditional research funding. ISF employs 52 full-time equivalent staff from diverse disciplinary backgrounds, in addition to 35 research students. Its research is diverse, covering fields such as energy and climate change, water and sanitation, international development, resource futures, social change, and transport. ISF has been consciously engaged in transdisciplinary research since at least 2002, although it also undertakes many projects that would not be considered transdisciplinary. Nevertheless, there is an active core of researchers engaged in transdisciplinary research that acts as a CoP.

Wintec (the Waikato Institute of Technology) is one of New Zealand's largest Institutes of Technology/Polytechnics (ITPs), located in Hamilton. ITPs are government-owned educational institutions that deliver technical, vocational and professional education, as well as promoting applied and technological research. They are distinct from universities in that their primary focus is on education rather than research and that they deliver education in practical, workplace settings. Wintec began as Hamilton Technical College in 1924. Its mission is to build a stronger community through education, research and career development.

The Master of Transdisciplinary Research and Innovation is a new degree program at Wintec commencing in 2016. Students execute and evaluate a research project in the workplace using a transdisciplinary research framework. The degree follows a project-based learning model, with the student as the project leader. Students work closely with both academic and industry supervisors. My visits to Wintec spanned the period when the degree moved from development into operation. At the start, transdisciplinarity was a new idea for the organisation, not yet an established bundle of practices. There was a group of potential supervisors, management and support staff with a keen interest in transdisciplinarity, with the potential to develop into a CoP.

As noted above, practices do not travel, but elements of practice do. My travels between these two practice sites carried elements of practice in both directions but could not hope to carry entire practices. I therefore structure the discussion in the next three sections around the three categories of element identified by Shove et al. (2012).

### **Meanings: transdisciplinary ideals**

The meanings that practitioners bring to transdisciplinary research are diverse. They include the theoretical frameworks and ideas brought to bear in the research, motivations for doing transdisciplinary research rather than other kinds of research, and the various mental states experienced when doing transdisciplinary research. For each practitioner, meanings include ideal visions of why and how transdisciplinary research should be done. However, there is certainly no consensus on these ideals. For example, Nicolescu (2010: 22) argues that:

*Transdisciplinarity* concerns that which is at once between the disciplines, across the different disciplines, and beyond all disciplines. Its goal is the understanding of the present world, of which one of the imperatives is the unity of knowledge.

Scholz and Steiner (2015) label this philosophical focus on unity of knowledge as Mode 1 transdisciplinarity. They describe an alternative Mode 2 transdisciplinarity:

conceived as a facilitated process of *mutual learning* between science and society that relates a *targeted multidisciplinary or interdisciplinary research process* and a *multi-stakeholder discourse* for developing *socially robust orientations* about a specific real-world issue (either a problem or a case) (Scholz and Steiner 2015: 531).

The meanings associated with Mode 1 and Mode 2 transdisciplinarity are vastly different. The former favours scientific integration with an eye towards a 'theory of everything'. The latter favours social participation in science with the goal of developing robust, context-dependent responses to social problems. Similarly, different practitioners place very different emphasis on Klein's discourses of transcendence, problem solving and transgression, with which I opened the chapter. With such different meanings at play, it is little wonder that the

bundles of social practices that make up transdisciplinary research are diverse and contested. Practices aimed at generating a theory of everything are very different to those aimed at co-producing a local response to a social problem. Likewise, practices that emphasise problem solving are very different to those that emphasise transcendent knowledge integration.

Different practitioners of transdisciplinary research will navigate these contested meanings in different ways. For the purposes of this chapter, it is important to reflect on the personal meanings that I carried with me to Wintec and shared with their CoP. The key meanings that animated the practice of transdisciplinarity for me included:

1. Integrating knowledge and perspectives across different disciplines results in a more complete picture of the whole, opening up new insights and actions (a transcendence discourse)
2. Bringing stakeholders or practitioners into multi-stakeholder discourses to co-design, co-produce and co-disseminate research (see Mauser et al. 2013) leads to more socially robust outcomes and greater ownership during implementation (a transgression discourse)
3. As a result of the above, transdisciplinary research has greater utility for working with real-world sustainability challenges and other kinds of wicked problems (see Rittel and Webber 1973) (a problem solving discourse)
4. Transdisciplinary research generates three kinds of outcome: an improvement within the 'situation' or field of inquiry; the generation of relevant stocks and flows of knowledge; and mutual and transformational learning by researchers and research participants to increase the likelihood of persistent change (Mitchell et al. 2015).

In my visits to Wintec, I presented these principles and the literature and experience underpinning them to potential supervisors of students in the new Masters program. In general, the meanings embedded in these principles were welcomed and I have seen them integrated into the emerging practices of transdisciplinary research at Wintec over time, but with local contextual variations. Below, I offer observations on how meanings moved between my personal practices and the emerging practices at Wintec.

It should be clear from the summary above that I favour a Mode 2 version of transdisciplinarity. Early in the engagement with Wintec I did share the Mode 1 version of transdisciplinarity with supervisors but it was Mode 2 transdisciplinarity that Wintec participants found most engaging. I would characterize the emerging Wintec practices as consistent with Mode 2. While my preferences may have influenced the adoption of this meaning, Wintec's context as an industry-engaged research organisation focused on local problems makes Mode 2 transdisciplinarity a natural fit.

During my visits to Wintec, I discussed all three of Klein's discourses of transdisciplinarity (transcendence, problem solving and transgression) but emphasised knowledge integration (a simplified version of the transcendence discourse) and stakeholder participation (a simplified version of the transgression discourse) as the key defining characteristics of transdisciplinary research. In this, I was influenced by a body of literature that positions knowledge integration and stakeholder collaboration as the defining characteristics of transdisciplinary research (Tress et al. 2005, Mauser et al. 2013, Mobjork 2010). In hindsight, this binary definition of transdisciplinarity is too simplistic but it was the meaning I carried with me at the time.

The discourse of stakeholder participation found more fertile ground at Wintec than the discourse of knowledge integration. This emphasis is readily explained by Wintec's context. As a vocational education institution it has stronger roots in industry-based learning than in academic research. Its Masters program is designed so that students will undertake their research while actively working in industry, making industry participation essential. Both organisations use industry funding and research publications as measures of success, however the emphasis at Wintec is much more strongly on industry engagement than it is at ISF; ISF is situated within a university that is seeking to increase its research publication output. It is not surprising then that the emerging Wintec practices of transdisciplinarity emphasise stakeholder collaboration much more than knowledge integration. In part, this may also be a response to what is feasible in a research Masters; an individual research student, working under time constraints, can cover few different knowledge perspectives. Integration is arguably more relevant when teams of researchers bring their diverse disciplinary perspectives together.

Although it was not part of how I defined transdisciplinary research, I did draw on elements of problem solving discourse frequently in my discussions with Wintec practitioners, particularly the concept of wicked problems (Rittel and Webber 1973) and the argument that transdisciplinary research is an appropriate (and perhaps necessary) response to wicked problems. This discourse also found fertile ground at Wintec and reminded me of how central problem solving discourse is to many conceptions of transdisciplinary research. Wintec supervisors almost universally expressed a curiosity and thirst for knowledge and problem-solving was not constrained by disciplinary boundaries. They expressed a sense of needing to go wherever was necessary, in knowledge terms, to address the problem at hand. However, the nature of the problems Wintec is addressing is different to those that ISF is concerned with. Whereas ISF is driven by a mission to create change towards sustainable futures, Wintec is grappling with problems that are more closely tied to the challenges of the local community in Hamilton and the Waikato region and the industries that are prevalent there, primarily agriculture. I believe this has contributed to the stronger emphasis on stakeholder participation outlined above. For the local challenges Wintec is working on, stakeholder participation is clearly valuable but crossing disciplinary boundaries will not always be necessary, making integration less critical.

The mutual learning that Mitchell et al. (2015) identify as one of the three desirable outcomes of transdisciplinary research also constituted an important meaning for the Wintec supervisors. In our discussions, they passionately articulated the central role of co-learning in transdisciplinary research. In disciplinary research, supervisors act as teachers to pass on disciplinary knowledge to students. In transdisciplinary research, they argued, supervisors go on a learning journey with students and other collaborators in which all parties learn.

The final point I will make here about meanings is that the emerging CoP at Wintec has had less time to negotiate shared meanings than the more established CoP at ISF. ISF researchers all sit in the same organisation, in a single office space, working towards a shared mission, and have been talking together about transdisciplinary research for well over a decade. The Wintec researchers that are engaged with the Masters program come from many different parts of Wintec, occupy different physical locations, have distinctly different research objectives and are just beginning their conversation about transdisciplinary research. This means that Wintec currently has less shared culture in which to ground the new practices, although this is likely to develop over time.

While meanings animate practice, practices also comprise material elements and competences. The diverse ideals of transdisciplinary research that practitioners hold may not be realised in the actual practice due to material and competence constraints. In the next two sections, I will examine the ways in which the materials and competences practitioners are able to bring to bear in their practices can act as constraints on achievement of their transdisciplinary ideal.

### **Materials: Resources for transdisciplinary research**

The materials – the tangible physical entities – that make up a bundle of transdisciplinary research practices include the people engaged in the practice, the locations they inhabit, the tools and technologies and resources they use to do the research, the physical contexts in which the research takes place, and the data that emerges from the research practice. Time and funding are key material resources for undertaking research, and both tend to be in short supply. In contrast, information is now available in surplus. Once, transdisciplinary research was materially constrained by the difficulty of physically accessing relevant knowledge from other fields. In the information age, Google Scholar can deliver thousands of relevant articles on our particular research problem from myriad disciplinary perspectives. The material accessibility of disciplinary knowledge is a key factor in the rise of transdisciplinary research.

When focusing on materials, it is apparent that space can shape how a practice develops. The ISF office is an open plan space occupying a single floor. Most researchers sit in ‘pods’ of four people, separated from other pods by partitions. Meeting rooms and the kitchen act as hubs at different ends of the office that attract people throughout the day. In this environment, there are many opportunities for serendipitous meetings and ‘corridor chats’ with people from very different disciplinary backgrounds, which enables the emergence of cross-disciplinary understanding. The Wintec postgraduate offices are more traditional in form, with formal offices for the staff behind closed doors, although these typically have multiple occupants. Many of the potential Masters supervisors sit in completely different parts of Wintec, or only travel to Wintec occasionally. The opportunities for informal cross-disciplinary engagement are constrained by these material realities, which means Wintec needs to put more effort into creating such opportunities. The emerging practices at Wintec include scheduled supervisor and student meetings to actively bring people together for cross-disciplinary engagement.

Time is a critical resource for transdisciplinary research. Ledford (2015: 310) writes that ‘the most common mistake is underestimating the depth of commitment and personal relationships needed for a successful interdisciplinary project’. These relationships take a lot of time to develop. Research participants need to build up trust, find common ground and resolve differences in worldview, perspective and language over multiple engagements. As a recent editorial in *Nature* put it, ‘true interdisciplinary science cannot be rushed, not least because the best course of investigation is rarely clear at the outset’ (Anon. 2015: 290).

In the first consciously transdisciplinary research project I participated in, a group of researchers from across UTS met fortnightly for a year to co-design a research project. In that time, we barely made it beyond co-design and into doing actual research. It took a lot of time and dialogue to break down disciplinary barriers created by our different ways of seeing the world and the different jargon that had meaning in our disciplinary worlds. Similarly, part of my engagement with Wintec was to co-facilitate a small research project with potential supervisors in the Masters program to build their capacity and experience of doing

transdisciplinary research. All were surprised by how much time it took to simply define the project, before we could start what felt like ‘the real work’. In focus groups, Wintec supervisors spoke about the challenge of finding a common language across their disciplines and the significant amount of time required, although they did recognise the value that emerged after that time was spent.

The kind of intense dialogue needed to co-design transdisciplinary research is currently easier to do face-to-face than it is to do using virtual collaboration tools. Thus physical proximity becomes an important material resource for transdisciplinary research; while not essential, it makes for a smoother process. As noted above, ISF has an advantage here in that our researchers share an office space, whereas Wintec’s researchers are more dispersed. Beyond the physical co-location of researchers, travel is often necessary to create physical proximity with other participants in the research, including stakeholders.

Time and travel both require funding. While funding opportunities for transdisciplinary research are improving, there are still structural barriers to securing funding (Holm et al. 2013). For example, the Australian Research Council uses discipline-based panels drawn from its College of Experts to assess grant funding applications. There may be good intentions to support transdisciplinary research but a lack of familiarity amongst assessors and bureaucratic inertia can undermine these intentions (Holm et al. 2013). Outside traditional research funding channels, organisations considering the funding of contract research may hesitate at supporting the relatively open-ended processes that characterise transdisciplinary research due to uncertainty as to what may emerge and the perceived risk of failure.

These material challenges are amplified in the context of a research degree. The duration of the research project is bounded, funding resources tend to be limited, and it can be difficult to engage stakeholders that are looking for short-term outcomes in the longer, slower process of a research degree. Further, a student enrolled in a research degree needs to clearly demonstrate their own contribution to knowledge as a condition of receiving their degree. This contribution can be more difficult to tease out in a transdisciplinary research project where many participants are working collaboratively.

As a consequence of these material and structural barriers, it can be difficult for any CoP to achieve its ideal vision of transdisciplinary research. Compromises are inevitable, between the discourses identified by Klein (2015), the outcome spaces identified by Mitchell et al. (2015), or any other set of dimensions used to characterise transdisciplinary research. In research degrees, the material resources available to a student will normally constrain knowledge integration to a handful of fields and limit opportunities for genuine co-design and co-production of research with stakeholders, unless specific steps are taken to overcome material constraints. At Wintec, the new Masters degree is designed so that students will sit in industry workplaces, with both an industry supervisor and an academic supervisor. This creates a structure in which stakeholder participation is built in from the start and secured by industry funding for the research. UTS is taking its own steps in this direction with the development of an Industry Doctorate program, although no ISF students have yet gone down this path. Such approaches are not without risk, as the source of funding can lead to perceptions of influence or bias that undermine the research outcomes (Mitchell et al. 2015). Other possible strategies to overcome material constraints include integrating students into larger team-based transdisciplinary research projects, or recruiting cohorts of students to bring different disciplinary perspectives to a shared research challenge.

## **Competence: Learning by doing**

I will only touch very briefly here on the competences needed for transdisciplinary research practice, as this topic is covered in detail elsewhere in the book (Fam et al. Chapter xxx). The core skills and practical knowledge needed to do transdisciplinary research are largely shared with disciplinary research practices. Like disciplinary researchers, transdisciplinary researchers need to be good at tasks such as searching for and obtaining information, reading critically, explaining their ideas succinctly and logically in oral and written forms, securing funding, and so on. Of more interest here is what distinctly new skills or competence are needed to do transdisciplinary research. Augsburg (2014) and Fam et al. (Chapter xxx) provide useful lists of these competences.

In my work with Wintec, I particularly focused on building local supervisor capacity for critical thinking, working with industry, stakeholder mapping, integration, facilitation and adaptation, which I saw as core skills for transdisciplinary research. I was very conscious, however, of the difficulty of ‘teaching’ these skills in the abstract. In my experience, these skills are best acquired and deepened through experiencing transdisciplinary research – learning by doing. Researchers pick up the practices of transdisciplinary research by looking to proficient practitioners. I therefore worked with Wintec to set up a real research project, with a supportive client, as a space in which the Wintec supervisors could come together and practice transdisciplinary research. By overcoming challenges together, the Wintec team began to develop their own unique local competence in doing transdisciplinary research. I introduced particular frameworks and approaches into this space, such as systems mapping approaches from soft systems methodology (Checkland and Poulter 2010). It felt like these frameworks were more readily taken up because they were immediately applied and tested on a real case.

Research students, whether at Wintec or ISF, have a (more or less) defined research project which provides them with an excellent space for learning by doing. What then becomes important is finding ways to link development of the skills needed for transdisciplinary research with the real research domains students are working in. Wintec locates students in industry, on a project where they can test new approaches and learn by doing. ISF’s higher degree research program designs learning experiences in workshops and annual retreats that include specific activities where students relate presented material to their own research projects. I think more can be done at both organisations to create spaces where students can get a stronger taste of transdisciplinary research by stepping out of their individual projects and into collaborative work, however briefly. This would have the added benefit of preparing them for collaborative work in future workplaces.

One final point to note is that the range of disciplinary experiences available for transdisciplinary research will inevitably shape the nature of that research. For example, the disciplinary homes of the participants in a transdisciplinary research project influence the type of integrative practices that they prefer (Mansilla 2006). Wintec has a particularly strong science, technology and engineering focus, with less involvement from social science and humanities researchers. ISF’s disciplinary range is broader. How this will shape Wintec’s emerging bundle of practices, and whether they will need to reach out to other disciplines, remains to be seen.

## **Conclusion**

I have argued that transdisciplinary research is a bundle of interwoven social practices that takes different forms in different contexts. Different CoPs emphasise different discourses of transdisciplinarity, different outcomes, and different meanings. I was given an opportunity to carry meanings, materials and skills from ISF to Wintec, with the goal of seeding a new transdisciplinary CoP. My travels between ISF and Wintec allowed me to participate in, and compare, two distinct but related practices. I became a temporary bridge between two different transdisciplinary CoPs.

I observed that the meanings, materials and skills I carried with me to Wintec took on new forms as they were integrated into the local context. For example, Wintec emphasised a discourse of stakeholder participation more strongly than a discourse of integration, relative to ISF. Wintec is also dealing with different types of problems, more embedded in their local community, and arguably less wicked than those ISF is addressing.

While I hope that the knowledge I carried with me to Wintec was valuable, I also recognise that knowledge transfer was only part of my role. When introducing me during my most recent trip, the Director of the Centre for Transdisciplinary Research and Innovation called me ‘our transdisciplinary expert’, then added that this ‘basically means someone from overseas who knows about this stuff’. While it was a light-hearted remark, I found it revealing. Alongside other comments, it showed that Wintec did not bring me to New Zealand solely for my specific knowledge or experience but needed me to act as a seed or catalyst for forming their own transdisciplinary CoP. There were political and cultural reasons for bringing an international practitioner in to help the new CoP crystallize. I provided a reason to bring the dispersed potential members of the CoP together and get them engaged in a shared domain, while also creating political capital for the leaders of the Masters program to negotiate their way through the difficult process of getting it approved.

Not surprisingly, then, the emerging bundle of transdisciplinary research practices at Wintec resembles my own but has its own distinct character. Any review of the literature on this topic will quickly reveal the diversity of transdisciplinary research practices that currently exist. Such diversity in practice can be seen as a weakness, because it makes mutual understanding and communication between practitioners more challenging. On the other hand, diversity is also a strength as it drives innovation in practice. When practitioners are exposed to even subtly different practices, they learn and pick up ideas to integrate into their own practice. Certainly, this was my experience in working with Wintec. While I was engaged to carry transdisciplinary research practices to Wintec, the process was very much two-way. I learned a great deal from working with new practitioners and my own practice has consciously (and no doubt unconsciously) shifted as a result of the engagement.

There is currently an opportunity for practitioners of transdisciplinary research to engage with other practitioners in different contexts to improve the quality of their own practice. While this may lead in time to a settling of the practice of transdisciplinary research, I am more interested in how it can lead to more effective local practices in the short-term. I believe that transdisciplinary research is crucial to address the sustainability challenges the world faces in the 21<sup>st</sup> Century, and practitioners need to broaden their CoPs if they are to be more effective in responding to these challenges. This book is a step in the right direction.

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