

International Journal of Critical Indigenous Studies

Volume 5, Number 2, 2012

## Claiming Interstitial Space for Multicultural, Transdisciplinary Research Through Community-up Values

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### Abstract

The development of *Māori* (Indigenous New Zealanders) research capacity over the past 20 years now begs the question of how *Māori* and *Tauīwi* (non-*Māori*) researchers might authentically partner and undertake transdisciplinary research that upholds the integrity and aspirations of both parties. In this article, the notion of interstitial space is suggested as a middle ground whereby researchers can acknowledge their own worldviews and come together for fruitful transdisciplinary engagements. Seven community-up research values set an engagement context in which researchers are called upon to respect one another, share and listen, be cautious and humble, acknowledge ontological and epistemological differences and build commitment to the development of mutual understandings. A scale is proposed to encourage researcher self-reflection on their readiness to join a multicultural, transdisciplinary research group. The readiness of group members to appropriately engage has the potential to spark successful transdisciplinary research in order to provide strategic solutions to complex, real-life problems.

### Claiming interstitial space for multicultural, transdisciplinary research

Over the past 20–25 years, understandings have grown among *Tauīwi* (non-*Māori*) researchers about how to collaborate with and respect the *Māori* (Indigenous New Zealanders) participants in their research, turning research that would have once been ‘on’ *Māori* to research ‘with’ and ‘for’ *Māori*. This movement has been in line with Arbour and Cook’s (2006, 154) argument that ‘respect for aboriginal culture, knowledge, tradition and values are fundamental to the development of culturally competent research’. At the same time, *Māori* and other Indigenous peoples have developed their own research principles and related ethical practices to guide outsiders who wish to undertake research within their territories (Te Awēkotuku 1991). Such guidelines and protocols have been strengthened by Indigenous declarations that speak to the rights of Indigenous peoples to name themselves and to protect and produce knowledge (United Nations 2007).

Recently, the clear-cut distinction in *Māori* research between *Tauīwi* researchers and *Māori* research participants has become blurred. *Māori* researchers have emerged, often as a result of the mentoring and support of *Tauīwi* researchers and the desire of *Māori* communities to have one of their own undertaking research on their needs and aspirations (Smith 1999). The increased research capacity of *Māori* means that it can no longer be taken for granted that *Māori* will just be participants and collaborators in research, with possibly one or more junior *Māori* researchers included on research groups. It is becoming more usual for *Māori* researchers to lead projects, for research groups to consist of mostly (if not all) *Māori* researchers and for *Māori* researchers to be senior researchers within multicultural research groups.

The pace of change to this new context has been quick and somewhat surprising, given the historical experiences of *Māori* with research that all too often framed *Māori* as different and deficient compared to *Tauīwi* norms and somehow not quite fitting within a colonised society (Smith 1999). In the past, research *on* *Māori* has been used to justify the theft of *Māori* land and the

suppression of Māori language and culture, the incarceration of young Māori men, the educational 'failure' of Māori students, the ill health and early deaths that afflict Māori families and the segregation of Māori communities into areas described as deprived (Robson and Harris 2007; Smith 1999). However, as stated by an Aboriginal elder, 'If we have been researched to death, maybe it's time we started researching ourselves back to life' (Castellano 2004, 98). This article addresses the question of whether such 'life-saving' research can be achieved through Māori researchers partnering with Tauwiwi researchers and, if so, how?

The source of this question is the authors' experiences of both successful and unsuccessful Māori–Tauwiwi research groups. Acknowledging the importance of discussion group processes to successful outcomes led to an exploration of how researchers from different cultures and disciplines might come together to work constructively on common research goals. In this article, we describe *Kaupapa Māori* (by Māori, for Māori) research methodology, introduce transdisciplinary research and explore the notion of interstitial space as a facilitator of transdisciplinary research. We also examine seven community-up research values as a protocol for transdisciplinary research group engagement and pose questions that researchers can use to self-assess their readiness to participate in transdisciplinary research.

### Kaupapa Māori

*Kaupapa Māori*, which literally means a 'Māori way', is a Māori response to the domination of Tauwiwi knowledge and worldviews (Smith 1999). *Kaupapa Māori* takes for granted the right of Māori to be Māori, treasures Māori language and cultural protocols and upholds and facilitates Māori control over Māori cultural aspirations (Smith 1997). As such, *Kaupapa Māori* is a decolonisation project; it is about re-occupying previously colonised space so that Māori can be heard, can be seen, can act and can be valued. An important component of *Kaupapa Māori* is critiquing dominant, Western worldviews that maintain Māori marginalisation within our own land. Through these dual tasks of reclaiming space and critiquing those who have wrongfully occupied it in our stead, we are taking a sovereign stand and (hopefully) explaining our right to that space in a way that can be understood by Tauwiwi (Reid and Cram 2004). *Kaupapa Māori* is also about moving beyond a simplified Māori reality and acknowledging and seeking to understand Māori as a diverse and complex tribal people (Bishop and Glynn 1999).

*Kaupapa Māori* research methodology is prescribed in cultural terms, and makes moral and cultural sense (Durie 1996; Te Awekotuku 1991). Once the *kaupapa* (agenda) of the research is *tika* (true), then the priority for researchers is to find the right methods and the right people (Mead 2003). Our selection of methods is based on their ability to inform theory and uphold the *mana* (status) of Māori. This upholding of *mana* ranges from how research questions are asked and participants treated, to how analysis is done and findings reported (Greene 2007). The selection of the right people is about the inclusion of Māori and Tauwiwi colleagues who have the skills and expertise needed to undertake the research. An important aspect of our research collaborations with Tauwiwi researchers is respectful dialogue across disciplinary and methodological boundaries to ensure mutual understandings and good science in the service of a Māori *kaupapa* (Reid and Robson 2007). While this does not seem a lot to ask, other Indigenous scholars have found that merely speaking and being heard can often be difficult (Fredericks 2009; Grieves 2008).

The research collaborations of Maori and Tauwiwi researchers can be described as multidisciplinary, interdisciplinary or transdisciplinary. Multidisciplinary research allows different disciplines to work within their own paradigms and enables Māori and Tauwiwi researchers to work alongside one another without the pressure of needing to create a common product and outcome. These common products and outcomes are the hallmark of interdisciplinary research (Tötzer, Sedlacek and Knoflacher 2011). In transdisciplinary research, the researchers come together to undertake a real-world, problem-solving project that can only be achieved if there is some integration and cross-fertilisation of their disciplines (Bruder 1994) (see further discussion below, 'Transdisciplinarity').

Being involved in multidisciplinary research projects where each sub-group explores distinctive issues related to a Māori *kaupapa* (agenda) can be satisfying and lead to successful research experiences. The first author was part of a Māori health research project that involved parallel investigations by Māori and Tauwiwi researchers of, respectively, Māori patients' and Tauwiwi medical practitioners' discourses on Māori health (Cram, McCreanor et al. 2006). A similarly structured, successful multidisciplinary research project involved parallel investigations of Māori and Tauwiwi experiences of Native schools within New Zealand (Simon, Smith et al. 2001). The second author was part of a successful research program that involved parallel investigations of the impact of education employment systems on young New Zealanders (Dalziel, Higgins et al. 2007).

By contrast, the parallel investigations that came about in year two of another project were the result of initial attempts at transdisciplinary research that were not successful (Cram, Phillips et al. 2004). Our experience in the first year of the 'transdisciplinary' research project was that Māori ways of knowing, and Māori knowledge were at best misunderstood and at worst discounted as inferior and non-rational (Hipkins 2004). In the second year, we therefore reasserted our right as Māori researchers to undertake Kaupapa Māori research and essentially split from our Tauwiwi colleagues. The resulting parallel investigations by Māori researchers of Māori concerns about new biotechnologies, and Tauwiwi researchers of mainly Tauwiwi concerns, provided a multidisciplinary solution to an otherwise risky and unsafe research environment for the Māori researchers. Even so, our right to ontological and epistemological space had to be continually renegotiated as the tensions about the relevancy and legitimacy of our stand did not disappear overnight.

The second phase of this same research project began two years after this initial split. The presence of new leadership and new colleagues gave us the opportunity to be fully in control of our own Māori research stream, examining the decision-making of Māori tribal bodies about aquaculture and genetic technologies (Cram, Prendergast et al. 2010). As with the other sub-groups in the project, we engaged in our own research and came together for full group meetings. There remains some regret that meaningful and productive transdisciplinarity was not achieved in the initial phase of the project and that the linkages made between groups in the second phase (although much more pleasant and productive than previously) also fell short of being transdisciplinary. However, our goal to move from multidisciplinary research to transdisciplinary research remains. In the next section, we further explore our understanding and expectations of transdisciplinary research.

### Transdisciplinarity

Transdisciplinarity complements rather than replaces discipline-based enquiry (Gray 2008). Tötzer, Sedlacek and Knoflacher (2011, 840–1) describe transdisciplinarity as 'research across disciplinary boundaries and in cooperation with stakeholders ... [that] orients scientific research towards issues of social concern'. The characteristics of transdisciplinary research, therefore, are that it transcends disciplinary boundaries and integrates knowledges, leads to the evolution of research methods and methodologies, and has a practical, problem orientation (Carew and Wickson 2010). In other words, transdisciplinarity brings a wide range of perspectives to problem-oriented research and supports the development and implementation of complex, strategic solutions within real life contexts (Gray 2008; Tötzer, Sedlacek and Knoflacher 2011). The potential payoffs of transdisciplinary research include new concepts, methods and policies (Rosenfield 1992).

Transdisciplinary research is an exciting opportunity for Indigenous peoples. Indigenous research capacity is growing and with it the ability of Indigenous peoples to turn the 'bogeyman of otherness' on its head (World Health Organization 1996, 10). However, the complex issues and disparities faced by Indigenous peoples often require research expertise from disciplines where Indigenous researchers remain scarce. Transdisciplinary research that involves Indigenous and non-Indigenous researchers and stakeholders provides a response to Walsh's (2011, 9) call for a collaborative environment that offers 'viable solutions to modern ecological and social issues affecting Indigenous communities'.

It is, however, acknowledged that building a transdisciplinary research team is difficult. The team is essentially a complex adaptive system in which the formation of relationships and shared understandings is unpredictable (Roux, Stirzaker et al. 2010). A conceivable challenge for non-Indigenous researchers (and possibly also Indigenous researchers) in transdisciplinary research groups will be the honouring of Indigenous self-determination, alongside the acknowledgement of colonisation and racism as key determinants of the marginalisation and exclusion of Indigenous peoples (Castagno and Brayboy 2008; Smith 1999).

The role of stakeholder cooperation in transdisciplinary research remains under discussion. Klein (2004) endorses the involvement of stakeholders in all stages of the research, even from the definition of the problem. Pohl (2008) describes this close collaboration as the co-production of knowledge and distinguishes it from transdisciplinarity where the boundary between scientists and stakeholders remains. Indigenous research guidelines developed by research funding agencies and Indigenous tribes themselves call for power sharing and mutual understandings (American Association for the Advancement of Science 2003; Assembly of First Nations 2012; Te Awakotuku 1991). Transdisciplinarity potentially moves traditional forms of participatory research that are the usual response to these guidelines into the realm of active Indigenous stakeholder contributions to sense-making, intervention

development and a transfer of knowledge in both directions: researchers to stakeholders and vice versa (Clapham 2011; Tötzer, Sedlacek and Knoflacher 2011).

Transdisciplinary research requires a safe, non-threatening, neutral space where people from different traditions can meet, build relationships, converse and debate and possibly even contemplate the transformation of society as we know it in the pursuit of social and cultural justice. We suggest that the notion of 'interstitial space' offers a way of conceptualising this meeting place.

### Interstitial space

Within architecture, interstitial spaces are spaces that connect recognised spaces but are often overlooked and therefore under-designed. Examples include the space around an office water-cooler where people gather, or the front porch of a house that connects the personal, inner house with the public, outer world. In both examples, the under-designed space provides an opportunity for rituals of encounter and the potential for relationship building. Wallace (2010) describes these spaces as 'remainder space' or 'gaps in structure'. Žižek refers to them as 'uncanny spaces ignored in the overall scheme of the building' (2010, 276) and as 'a third place of mediation between ... extremes' (Nadir 2009, 6). Žižek (2010, 278) goes on to question whether they are:

... functionally empty spaces open for exaptation? The struggle is up for grabs here—the struggle over who will appropriate them. These 'interstitial spaces' are thus the proper place for utopian dreaming.

Within education, Mulcahy (2011) invokes interstitial spaces in her research with graduate teachers to describe where the complex connections between the worlds of learning and work form, move and mutate. An interstitial space can therefore be pictured as a shoreline; that is, 'a meeting place of continuous activity, of constant negotiation between earth and water, relations shifting by the hour and the season. What is land at noon may be sea at three' (Doty 1997, 181). Her use of interstitial space allows Mulcahy (2011) to attend to the movement of knowledge between places (academy to workplace) and spaces (education to work) in a way that is more relational than when knowledge is conceived of as 'held collectively in communities and constructed by learners *in situ*' and therefore needing to be moved between spaces and places by processes of transfer, integration or boundary crossing (Mulcahy 2011, 205). While Mulcahy is describing the journey of graduate students to professional teachers, the critiques she draws upon are of knowledge being seen as constructed and bounded within scientific communities. Interstitial spaces are therefore conducive to the construction of complex connections among scientific disciplines.

When different disciplinary communities converge within interstitial spaces, the heterogeneity of knowledge and practices that exist within these spaces can be described as an 'amalgam of places, bodies, voices, skills, practices, technical devices, theories, social strategies and collective work' (Turnbull 2000, 43–4). Turnbull adopts Deleuze and Guattari's (1987) term 'assemblage' to capture the evolving and spatial relations that form and reform among the seemingly incompatible componentry of an amalgam. By their very nature, interstitial spaces allow an assemblage to form, move and evolve as these spaces have the potential for, and are predisposed toward, adaptation.

Interstitial space is similar to the 'middle-ground' described in the work of the philosopher of science, Isabelle Stenger. According to Jensen (2010), Stenger gave thought to how 'antagonistic oppositions' could be processed through each other and thereby become 'productive intellectual contrasts'. She posited that:

Productivity would be created at the middle-ground, where no position would be able to silence any other, and where differences would therefore have to be respected, rather than made to disappear (either by force or by consensus; which is often a more invidious force since it is rarely recognized as such) (Jensen 2010, 2).

In addition to a respect for difference, Gouth (2002) quotes Turnball (1997, 56) to argue that interstitial space must be created by 'the reinclusion of the performative side of knowledge' so that, within this interstitial space, diverse knowledge systems can co-exist. Turnbull's (1997, 560-1), view is that:

Knowledge, in so far as it is portrayed as essentially a form of representation, will tend towards universal homogenous information at the expense of local knowledge traditions. If knowledge is recognised as both representational and performative it will be possible to create a space in which knowledge traditions can be performed together.

This may be more straightforward for Indigenous peoples who have not abandoned an understanding of knowledge as performative. Simpson (2004, 27), for example, writes that 'Indigenous Knowledge systems are highly contextual, *how* one learns is as important as *what* one learns'. For Indigenous peoples, Māori included, the past is invariably an essential part of this context (Trask 1991). For those from Western traditions, the notion that knowledge is performative may require an acknowledgement of context, location and history, including the naming of their own role and place.

The context for engagement with others offered by the notion of interstitial space also sits well with the relational nature of Indigenous ontologies and epistemologies (Walsh 2011). As Wilson (2008) explains, the Indigenous world is not about relationships, it *is* relationships.

It is argued here that the connections between disciplines and the creation of joint interpretations within transdisciplinary research groups requires interstitial spaces. Within such spaces, meetings can focus on the research purpose, researchers' philosophical approaches to a topic and debate about how their disciplinary backgrounds complement and challenge one another. Serious time and energy can be devoted to philosophical and methodological interrogation and integration. Disagreements and debate about these 'big picture' issues can expose researchers to deep ideological tensions and push boundaries (Bruder 1994; Dewult et al. 2007). Although this sets the context for meeting, the protocols needed for these meetings to promote respect and inclusiveness remain to be canvassed. The next section proposes a set of community-up research values as a protocol, alongside a series of questions that have been designed for researchers to self-reflect on their readiness to take part in transdisciplinary research.

### Community-up research values

Seven values for 'community-up' research can guide multicultural, transdisciplinary research in ways that uphold and value the epistemological and ontological spaces occupied by different group members. The 'community-up' approach to defining research conduct that has been explored by Smith (1999, 2006) and Cram (2001, 2009) is an acknowledgement of the performative side of knowledge (see Table 1).

**Table 1: 'Community-up' approach to defining research conduct**

Cultural values (Smith 1999)	Researcher guidelines (Cram 2001)
1. Aroha ki te tangata	A respect for people—allow people to define their own space and meet on their own terms.
2. He kanohi kitea	It is important to meet people face to face and to also be a face that is known to and seen within a community.
3. Titiro, whakarongo ... kōrero	Looking and listening (and then maybe speaking)— develop understanding in order to find a place from which to speak.
4. Manaaki ki te tangata	Sharing, hosting, being generous.

5. Kia tupato	Be cautious—be politically astute, culturally safe and reflective about insider/outsider status.
6. Kaua e takahia te mana o te tangata	Do not trample on the 'mana' or dignity of a person.
7. Kia mahaki	Be humble—do not flaunt your knowledge; find ways of sharing it.

Source: Adapted from Smith (2006, 12, Diagram 1)

The seven cultural values provide guidance for researchers that is sourced from Māori cultural teachings and practices that seek to uphold the *mana* (status) of all those involved in research and build knowledge that serves the needs and aspirations of Māori communities. This approach has mainly been used to inform the practice of Indigenous and non-Indigenous researchers who wish to work with and for Indigenous communities (Kennedy and Cram 2010). Given that a key barrier to transdisciplinary research is the absence of process skills (Gray 2008), the cultural values also speak to how transdisciplinary research colleagues might behave toward one another and thus create their own interstitial space that promotes collaboration.

In this article, Mâsse et al.'s (2008) list of transdisciplinary integration items has been adapted to produce a readiness scale based on the seven values (see Table 2). This scale is similar to assessments of intercultural competence, with the focus here being on researchers' readiness to participate in multicultural, transdisciplinary research (Sinicrope, Norris and Watanabe 2007). Such assessments are often used as a preliminary stocktake of capability or capacity to engage in an initiative (e.g. whether nursing students are ready for inter-professional learning and cooperating with other professionals (Wilhelmsson et al 2011)).

**Table 2: Transdisciplinary research readiness scale (TRRS)**

<p><i>Aroha ki te tangata</i></p> <ol style="list-style-type: none"> <li>1. I am interested in engaging with knowledge and expertise outside of my discipline and culture.*</li> <li>2. I appreciate that I bring just one perspective to research issues and that colleagues from other fields and cultures may bring different perspectives.</li> <li>3. I am comfortable showing the gaps and limitations in my knowledge to those with whom I collaborate.<sup>1</sup></li> </ol> <p><i>He kanohi kitea</i></p> <ol style="list-style-type: none"> <li>4. The time taken to meet and discuss research with colleagues from other disciplines and cultures is well worth it.*</li> <li>5. Collaborating with colleagues from other disciplines and cultures is sustainable for me in the long haul.*</li> <li>6. Generally speaking, I believe that the benefits of working with colleagues from other disciplines and cultures outweighs the inconveniences and costs of such work.*</li> </ol> <p><i>Titiro, whakarongo ... korero</i></p> <ol style="list-style-type: none"> <li>7. I am comfortable working with colleagues from other disciplines and cultures.*</li> <li>8. Shared learning with colleagues from other disciplines and cultures will increase my ability to understand issues.<sup>#</sup></li> <li>9. I believe I am open to hearing the views of colleagues from other disciplines and cultures.</li> </ol>
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***Manaaki ki te tangata***

10. Discussing research with colleagues from other disciplines and cultures will stimulate me to change my own thinking.\*
11. I am willing to change the way I pursue research ideas because of the input of colleagues from other disciplines and cultures.\*
12. I believe that engaging with colleagues from other disciplines and cultures will improve the way I conduct research.\*

***Kia tupato***

13. I value opportunities for collaborating with colleagues from other disciplines and cultures.\*
14. Working on issues with colleagues from other disciplines and cultures will increase my own productivity.\*
15. I am optimistic that working with colleagues from other disciplines and cultures will lead to valuable scientific outcomes that would not occur otherwise.\*
16. Working with colleagues from other disciplines and cultures improves the interventions that are developed from research.\*

***Kaua e takahia te mana o te tangata***

17. I am open-minded about considering research perspectives from fields and cultures other than my own.\*
18. I am able to critique other people's ideas in thoughtful and respectful ways.
19. I value the contribution that colleagues from other disciplines and cultures can make to my understanding of an issue.

***Kia mahaki***

20. My involvement in research with colleagues from other disciplines and cultures will increase my understanding of what my own discipline brings to others.\*
21. I believe I am able to communicate my ideas in ways that colleagues from other fields and cultures can understand.
22. I am willing to share my knowledge and expertise with colleagues from other disciplines and cultures.
23. **Overall**, I am willing to put in the effort needed to engage with colleagues from other disciplines and cultures.\*

***Legend:***

<sup>1</sup> Adapted from Mâsse et al. (2008, Appendix A: List of collaboration times).

\* Adapted from Mâsse et al. (2008, Appendix B: Transdisciplinary integration items).

# Adapted from Wilhelmsson et al. (2011, Figures 1, 3).

In the next section, the community-up research values and the readiness scale items are discussed.

***Aroha ki te tangata***

*Aroha ki te tangata* is about having respect for people. Like so many concepts, respect is culturally embedded, meaning different things within different cultural contexts. As a value guiding research, *Aroha ki te tangata* is about allowing people to define their own space and to meet on their own terms (Cram 2001). Transdisciplinary encounters should therefore begin with both an acknowledgement of difference and the consequent need for mutual development of 'rules' for ongoing engagement.

From their research on research collaborations, Dewulf et al. (2007, 6) discuss three challenges to the development of such mutual understandings:

- Very few concepts are self-evident to all participants;
- Considerable confusion about concepts emerges in project meetings; [and]
- The different concepts and meanings are not neutral.

These challenges require each party to set aside their culturally authoritative interpretations and begin an exchange that will create agreed-upon, group meanings for commonly-used terms (see below, 'Titiro, whakarongo ... kōrero'). Fujimoto, Hartel, Hartel and Baker (2000) describe this as each party, each individual, being open to perceived dissimilarity and bringing this openness to their interactions with people from cultural groups different from their own.

Gray's (2008) work on leadership within transdisciplinary research groups raises the possibility of one or more leaders playing a role in facilitating respectful processes. The three effective leadership tasks outlined by Gray (2008) are the provision of a linking vision that motivates researchers (cognitive leadership), building bridges between parties (structural leadership) and encouraging trust and resolving conflicts (processual leadership).

The self-assessment questions for *Aroha ki te tangata* (items 1–3 in Table 2 above) inquire after researchers' interest in engaging with other researchers from outside their discipline and culture, their appreciation of different perspectives and their comfort with their own knowledge limitations and gaps.

### He kanohi kitea

*He kanohi kitea* has been described as people's faces being seen and known, including the importance of opportunities for face-to-face meetings (Smith 1999). The importance of transdisciplinary groups meeting frequently and face-to-face is stressed by Dewulf et al. (2007). Such meetings lay the foundation for the exchange of ideas that, in turn, leads to the development of shared understandings. Dewulf et al. (2007, 7) state that 'relational connecting is much more powerful in face-to-face interaction than through more impersonal means of communication'. Tötzer, Sedlacek and Knoflacher (2011) also report that frequent project meetings, networking activities and workshops enable efficient and effective knowledge management. In addition to project information, sensitive issues identified from group members' responses to regular monitoring and quality assurance questionnaires were discussed at the meetings.

Face-to-face communications let people assess more than just the words they would hear during a telephone conversation or written in a letter or e-mail. During face-to-face meetings, people also get the opportunity to observe people's non-verbal communication. While ensuring that such meetings occur may take a large investment of time and energy by group members, there are potential payoffs in terms of shared understandings and transdisciplinarity.

The self-assessment questions for *He kanohi kitea* (items 4–6 in Table 2 above) examine researchers' valuing of, and commitment to, meeting and collaborating with colleagues from other cultures and disciplines.

### Titiro, whakarongo ... kōrero

*Titiro, whakarongo ... kōrero* is described in Table 1 as using one's eyes and ears to gain an understanding of the place you are in before opening your mouth to speak. For Māori, this is a process of *whakawhitiwhiti kōrero* (shared thoughts), while Sheryl Te Hennepe (1993) describes it as mutual thinking as people take the time to discover others' intricacies. Similarly, Tötzer, Sedlacek and Knoflacher (2011, 842) argue that as a mutual learning process transdisciplinarity:

will only be guaranteed if all involved stakeholders follow the same interests and if they have equal power within the process' (Tötzer, Sedlacek and Knoflacher 2011, 842).

A little more bluntly, Jeffrey (2003, 548) describes this as a willingness to 'shut up and listen', while Bruder (1994) stresses the importance of a communication style that has group members continuously and regularly giving and taking. This is an important component of the development of a common vocabulary that may be unique to the activity of transdisciplinarity. It is also essential to the accomplishment of common research, intervention or service goals (Bruder 1994).

The development of shared understandings and new ways of seeing the world within a transdisciplinary group should, by its very nature, be transformational for group members. Bushe and Kassam (2005) describe two key outcomes as signs that transformation has occurred: new knowledge or new ways of doing things and generative metaphors (i.e. the juxtaposition of two concepts that help shift thinking, for example, sustainable development). They found that these transformational outcomes were associated with changes in the way people think (rather than changes in what they do). In a similar vein, Rosenfield (1993, 1353) described transdisciplinary research as potentially leading to a 'scientific revolution' and new fields of research (e.g. molecular biology).



The three self-assessment items for *Titiro, whakarongo ... kōrero* (items 7–9 in Table 2 above) relate to researchers' comfort with sharing, listening to and learning from colleagues from other disciplines and cultures.

### Manaaki ki te tangata

Within transdisciplinary groups *manaaki ki te tangata* is about the care and support that is provided for group members. Differences that arise from professional and/or cultural variances, including power differentials, need to be handled very carefully (Whiteside, Tsey and Cadet-James 2011). Transdisciplinarity is not about 'scientific methods' being used to determine the accuracy or otherwise of traditional knowledge (Walsh 2011). Cultural diversity needs to be addressed at an ontological and epistemological level so that space can be given to the knowledge and ways of knowing of all group members. This involves the contextualisation of knowledge systems as culturally-bound rather than universal. This may be difficult for non-Indigenous and non-minority researchers who are used to thinking of their worldview as 'the' worldview, or indeed 'the world'. However even scientists have 'squabbles ... about the validity of each other's conceptual frameworks' (Gray 2008, S125). Tötzer, Sedlacek and Knoflacher (2011) accepted all stakeholders as experts whose knowledge could be explored in terms of their strengths and weaknesses, but not be overruled. This same protocol could also be applied among research group members so that each feels cared for and supported.

The use of an intermediary (Jeffrey 2003) or facilitator (Dewulf et al. 2007) can help ensure that everyone feels safe within a diverse group environment. Ideally, a facilitator will have knowledge and expertise from more than one of the disciplines and/or cultures represented in the group. In this way, they can build bridges between parties that are based on some of their own understandings of how the different epistemologies and theoretical foundations engage with each other. Alternatively, as described above, effective leadership can achieve the same outcomes (Gray 2008).

The self-assessment items for *Manaaki ki te tangata* (items 10–12 in Table 2 above) relate to researchers' openness to rethinking their own ideas and the way they conduct research.

### Kia tupato

*Kia tupato* is about being careful and considered in actions, thought and word. In transdisciplinary groups, this may be about finding ways to deal with confusion, ambiguity and/or tension in ways that keep all those involved safe (see above, *Manaaki ki te tangata*). Taking care, according to Pohatu (2003), is not about ignoring tensions and conflicts within the group, rather it is about recognising the 'ever-presence of tension' as it offers 'insight and interpretation' that has the potential to open up spaces for change (Phillips and Mitchell 2010). It may also be about admitting that not everyone is suited to transdisciplinary projects. This might be particularly true for researchers who are pushed too far out of their 'comfort zone' when they are required to consider that their own worldview and epistemology is just one of many.

The self-assessment for *Kia tupato* (items 13–16 in Table 2 above) inquire after researchers' valuing of opportunities to work with others and the impact these opportunities may have on their own productivity. Researchers are asked to consider whether they are optimistic about the scientific value of working with colleagues from other cultures and disciplines and whether such work will lead to improved interventions.

### Kaua e takahia te mana o te tangata

*Kaua e takahia te mana o te tangata* is an exhortation not to trample on the prestige and authority of people. Trust is a term often used in descriptions of the relationships between transdisciplinary group members and captures members' belief that their colleagues will treat them with dignity and respect, even when they are critiquing their ideas (Mâsse et al. 2008). This extends to the respect for members' epistemological and ontological standpoint. Trust is therefore fostered in those spaces 'where contrasting rationalities can work together but without the notion of a single transcendent rationality' (Turnbull 2000, 234).

In addition to their frequent meetings, the transdisciplinary group members in Tötzer, Sedlacek and Knoflacher's (2011) research commented on working papers and participated in a web-based collaborative workspace. The result described by the authors was a 'close interchange among the disciplines' (844) that played an important part in the success of their research projects.

The items for *Kaua e takahia te mana o te tangata* (items 17–19 in Table 2 above) ask researchers to self-assess their open-mindedness, ability to constructively critique others, and their valuing of others' contribution to their own understandings.

### Kia mahaki

*Kia mahaki* is the reminder to be humble. Within a transdisciplinary group, it is the counterpoint to the previous value of not trampling on people's prestige. In other words, we are reminded to acknowledge the status of others while, at the same time, not promoting ourselves. Being humble is also about people being aware of and acknowledging the limitations of their own understandings. These might be disciplinary understandings and/or life experiences. Jeffrey (2003, 549) describes 'an openness about one's own ignorance' as a cornerstone of building relationships. At the same time, people should be aware of what knowledge and understandings they hold and be willing to share these with others. The challenge in this is finding ways of sharing knowledge that connect with the diverse people in a transdisciplinary group. Jeffrey (2003) argues for the role of metaphor as a vehicle for knowledge sharing between disciplines. Likewise, Dewulf et al. (2007, 8) describe the use of concrete case examples in a research project on water management:

Concrete case contexts can provide this necessary common ground when different theoretical approaches have to be dealt with, because they provide a kind of anchor point for keeping the discussion focused and the exploration of different views going.

Those engaging in transdisciplinary research need to find their 'story', their metaphor or concrete case that they can use to talk about how they see the world. They will then be able to more fully explain themselves to others outside their culture and discipline.

The self-assessment items for *Kia mahaki* (items 20–22 in Table 2 above) relate to researchers' belief that their involvement in research with colleagues from other cultures and disciplines will increase their understanding and that they are willing to share their knowledge and expertise and do so in ways that colleagues will understand.

The final item (item 22 in Table 2 above) is an overall assessment of researchers' willingness to put in the effort needed to engage with colleagues from other disciplines and cultures.

### Discussion

Māori have distinct knowledge traditions and, with the growing capacity to conduct research (rather than merely participating in or being consulted about research), Māori researchers who join with Tauwiwi researchers to undertake research are looking for an experience that acknowledges and values their knowledge traditions and enables them to conduct research that has the potential to advance Māori aspirations. Transdisciplinarity holds the promise of bringing together Māori and Tauwiwi researchers from different disciplines to carry out research on complex problems that are of significance to Māori, and to the country as whole.

The development of 'mutual thinking' within a transdisciplinary environment is an outcome of the time that is devoted to relationship building and discovering the intricacies of one another (Te Hennepe 1993). It is recommended that the space in which this might best happen be conceived of as an interstitial space, whereby no one's rules, vocabulary, ontology, epistemology and/or culture dominate. Rather, people come together to learn from one another, to share their own knowledge as well as reflect on the limits of what they know and to develop synergistic understandings of the world. Seven community-up research values set the tone for these engagements and thereby the creation of an interstitial space. This is, however, more than researchers coming together for pleasant and fruitful engagements. Rather, these engagements provide a platform for successful transdisciplinary research that has the 'potential to generate truly novel scientific and societal advances' (Mâsse et al. 2008). Another more personal outcome may be changed attitudes and behaviours among researchers and stakeholders (Tötzer, Sedlacek and Knoflacher 2011).

Such attempts at creating and working within an interstitial space need to be evaluated in order to assess what works well and what does not. In this way, the readiness assessment can be tested and refined. The outcomes of multicultural, transdisciplinary group research also need to be evaluated to examine whether it leads to improvements in scientific integration, productivity, policy and practice. This would add the largely unexplored factor of culture to the growing 'science-of-team-science' field (Croyle 2008; Mâsse et al. 2008; Stokols et al. 2008).

The inclusion of stakeholders in transdisciplinary research is the next step to take. While many Indigenous and non-Indigenous researchers are committed to stakeholder consultation and collaboration, there is a need within transdisciplinary research for the same development of mutual understandings among researchers about what this means. Stakeholder expectations can then be well managed and stakeholders will have the opportunity to make fully informed decisions about their involvement. Additional assessment items may then be required that inquire after the readiness of researchers to manage stakeholder involvement and the further need for flexibility and adaptability that this demands (Tötzer, Sedlacek and Knoflacher 2011). Likewise, stakeholders can also be asked about their own readiness to inform their decision-making process regarding involvement.

Finally, transdisciplinary research is time and resource intensive. It requires readiness as well as commitment and motivation from those involved. We would argue that the potential payoffs in terms of solutions to the complex problems faced by our communities makes transdisciplinarity a worthwhile aim and justifies the long-term investment needed in relationships and processes (Roux, Strizaker et al. 2010). As a traditional Maori proverb makes clear, *Naku te rourou nau te rourou ka ora ai te iwi*—with your basket and my basket the people will live.

### Notes

Many thanks to Joanna Govern for her contribution to the discussions about this paper. Thanks also to Suzanne Pitama for feedback on this paper, as well as two anonymous reviewers. Our greetings to you all. We also acknowledge our colleagues Bevan Tipene-Matua and Murray Parsons who have passed away, and Katrina Taupo and Te Ari Prendergast who walked part of this journey with us.

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