



Scientist and stakeholder perspectives of transdisciplinary research: Early attitudes, expectations, and tensions



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ABSTRACT

Transdisciplinary approaches are becoming increasingly adopted as a way to research complex socio-environmental problems. Conceptually, transdisciplinarity aims to foster meaningful knowledge co-production through integrative and participatory processes that bring together diverse actors, disciplines, and knowledge bases. In practice, transdisciplinarity is more ambiguous. While there is a growing body of literature on such approaches, there remains no widely-accepted definition, concrete framework, or empirical strategy for how to carry out a transdisciplinary project. We propose that this lack of explicit structure and entrenched meaning leaves space for transdisciplinary approaches to be shaped by the evolving network of participating scientists and stakeholders, according to their perspectives of the approach and what it embodies. Here, we examine the perspectives of a diverse group of actors ($n = 42$) embarking on a 10-year transdisciplinary research project focused on building resilience to natural hazards and disasters in New Zealand. We present the findings of qualitative surveys and group interviews that investigate stakeholders' and scientists' early perspectives of transdisciplinary, or co-created, research. The study represents the first stage of longitudinal research that will continue over the course of the project. Results show that early actors in the project share an overall consistent understanding of co-created research. Participants described a process that integrated diverse people and knowledge; created benefits on both a social and personal level; fostered clear, two-way dialogue; and overcame pragmatic and intrinsic challenges. Collectively, participants agreed with adopting transdisciplinary approaches to natural hazard, risk, and resilience research, with stakeholders showing a stronger degree of agreement than scientists. While attitudes towards transdisciplinarity were overall positive, a number of underlying conflicts emerged in regards to carrying out new modes of knowledge production within traditional social and institutional structures. These conflicts result in a tension that is felt by actors involved in transdisciplinary projects early on, and in some cases, influences perception of their ability to fully participate in such an approach. Evaluating actor perspectives and expectations early in the transdisciplinary process can give insight into how attitudes, expectations, and conflicts might shape transdisciplinary efforts, and can provide relevant parameters for assessing change over time.

1. Introduction

The emergence of complex socio-environmental challenges such as climate change adaptation, sustainable development, and disaster risk reduction has coincided with calls for more integrative and participatory approaches to scientific research. Shaped by post-positivist concepts such as “post-normal science” (Funtowicz and Ravetz, 1993), “mode-2 knowledge production” (Gibbons et al., 1994), and “socially robust” knowledge (Nowotny et al., 2001), these integrative approaches argue that a more democratic approach to scientific research is needed

in order to solve intractable ‘wicked’ problems that have a high number of stakeholders, impacts, interdependencies, and uncertainties (Rittel and Webber, 1973; Hirsch Hadorn et al., 2008; Weichselgartner and Truffer, 2015). “Transdisciplinarity” represents one of the highest degrees of integration on the continuum of these research approaches. Moving beyond cooperation of disciplines (*multidisciplinarity*) and integration of disciplines (*interdisciplinarity*), transdisciplinarity represents knowledge co-production which transcends disciplinary, academic, and epistemic boundaries. Broadly, transdisciplinarity is considered a reflexive and inclusive approach to research that aims to solve

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societal problems together with scientific problems through high degrees of cross-fertilization, integration, and collaboration among academic and non-academic actors and diverse bodies of knowledge (Cash et al., 2003; Tress et al., 2004; Pohl and Hirsch Hadron, 2007; Jahn et al., 2012; Lang et al., 2012).

While there is growing consensus in regards to the ontological and conceptual framing of transdisciplinarity in the literature (Hirsch Hadorn et al., 2008; Jahn et al., 2012; Lang et al., 2012), there is not yet a shared understanding of how transdisciplinarity is carried out in practice (Zierhofer and Burger, 2007; Popa et al., 2015; Felt et al., 2016). Felt et al. (2016) observe that, “although there seems to be agreement that these approaches might nurture innovations of a new kind, we know little regarding the research practices” (p. 732). Although transdisciplinary concepts emerged as early as the 1960s and ‘70s, few projects have managed to demonstrate enduring, institutionalized transdisciplinarity (Mittelstrass, 2011; Lang et al., 2012; Brandt et al., 2013; Weichselgartner and Truffer, 2015). In part, this is because transdisciplinary approaches aim to frame and investigate problems in a fundamentally different way to the traditional positivist academic and institutional research approaches that have dominated in the past. Where traditional research approaches tend to conceptualize scientific knowledge as an independent and value-neutral objective truth, transdisciplinary contexts embrace a constructivist view of scientific knowledge, in which its value is tied to its societal relevance (Kuhn, 1962; Functowicz and Ravetz, 1993; Nowotny et al., 2001; Maasen and Lieven, 2006). Accordingly, entrenched funding structures and competitive academic programs that value high-impact disciplinary scholarship, empirical discoveries, and internal validity over external relevancy to practice, present a number of barriers to academic researchers who wish to lead or engage in transdisciplinary research (Payton and Zoback, 2007; Green et al., 2009; Clark et al., 2011; Jahn et al., 2012; Felt et al., 2016). Similarly, institutional constraints, policy settings, and resource limitations introduce a number of similar barriers to stakeholders (Weichselgartner and Kasperson, 2010; Tseng and Penning-Rowsell, 2012; Thaler and Levin-Keitel, 2015). Once underway, projects need to manage an ongoing “balancing act” (Boon et al., 2014, p. 58) between diversifying knowledge types while also aligning knowledge production towards a coherent shared goal (Boon et al., 2014; Klenk and Meehan, 2015). Consequently, transdisciplinary projects require great time, effort, and commitment on behalf of researchers, stakeholders, and funding bodies, yet there is limited guidance on how this hard work can be carried out in a way that guarantees outcomes.

We propose that the ambiguity associated with transdisciplinary practice leaves space for the approach to be adapted and shaped by participating actors’ perspectives of what the approach embodies. While a project may conceptually adopt a “transdisciplinary” approach by facilitating shared governance, integrative structures, and collaborative processes, inevitably, the act of *co-creating* research will be done by the individual actors within the project – the “architects of participation” (Felt et al., 2012, p. 7). The scale and scope of transdisciplinary projects means that there are often many actors involved, who are likely to come from a broad range of backgrounds with varying worldviews and perspectives of integrative approaches. For example, actors from different institutions may have participated in inherently different styles of interdisciplinary collaboration in the past, under different organizational and epistemic contexts (Lengwiler, 2006). Actors may also have different individual views on the value, importance, and meaning of integrative research concepts. While there may be an imperative to “engage” in a transdisciplinary project, individual actors may have different perspectives about the importance, type, and timing of engagement that needs to take place (Allen et al., 2013; Bieluch et al., 2016). The concept of participatory research itself may be associated with a “plethora of meanings” (Felt et al., 2012, p. 26). Additionally, although a large body of scholars, practitioners, and funding agencies embrace and advocate integrative transdisciplinary

approaches, there remains ardent criticism of the approach as a means of “politicizing” science (Weingart, 1982; Maasen and Weingart, 2005). The individual attitudes of actors drawn into a large societal-scale project are likely to lie across a spectrum of such stances.

Collectively, these individual and social perspectives may have an impact on the decisions, engagement pathways, and outcomes of large transdisciplinary projects (Pohl et al., 2010; Rosendahl et al., 2015). Reflecting on a decade of transdisciplinary initiatives in Austria, Felt et al. (2016) observed that researchers translated transdisciplinary concepts into practice in different ways, adopting individual strategies that reflected their perceptions of how engagement and integration of actors should occur. Similarly, Swan et al. (2010) observe that the translation of integrative research concepts into practice often relies on the way that individual actors mobilize and adapt approaches as they confront challenges. Here, we examine actors’ perspectives at the beginning of a transdisciplinary project in order to explore the way that actors initially view and understand the approach, and to establish a reference point for observing changes in perspective over time. The study is framed around the interpretivist assumption that each participating actor will hold an individual perspective of the transdisciplinary research process, which is reflected in their attitude, perceived values, and expectations for the approach, and that this will evolve over the course of their experience in the project. We explore these perspectives through qualitative surveys and group interviews with stakeholders and scientists involved in the onset phase of a 10-year disaster resilience research project in New Zealand, the Resilience Challenge.

The purpose of carrying out this study at the onset of the Resilience Challenge project is to understand early actors’ perspectives of transdisciplinary, or co-created, research. This purpose serves two aims: (1) to understand the expectations and attitudes of a group of actors initiating a long-term transdisciplinary research project, and (2) to establish a relevant set of parameters upon which to monitor changes in the project’s actors’ perspectives over time. This study does not evaluate the effectiveness of the project or its approach. Rather, it examines how actors view and understand the transdisciplinary process. Understanding collective expectations and attitudes towards transdisciplinary research early-on, and revisiting these longitudinally, may contribute insight into ways that transdisciplinarity evolves reflexively over time (Swan et al., 2010; Cradock-Henry et al., 2017). A number of authors have proposed lists of the key conceptual elements, phases, or attributes of transdisciplinary science (e.g., Lang et al., 2012; Klenk and Meehan, 2015; Polk, 2015). These provide a valuable framework for understanding transdisciplinary projects. However, having an actor-based, context-specific set of goals and expectations may foster more sensitive observations of a particular project’s transdisciplinary practice. In addition to establishing a meaningful common ground for observing longitudinal change, we aim to bring project-specific context and definition to a loosely-defined approach. While a number of studies have reflected on project experience retrospectively (e.g., Felt et al., 2012, 2016; Boon et al., 2014), there is less work investigating actor perspectives of transdisciplinarity before the project commences. Understanding initial attitudes and expectations for the process may be useful for identifying any potential issues early on. Exploring actor understandings of the transdisciplinary process also allows for comparison of how the perspectives of a diverse group of individual actors align with conceptualizations of transdisciplinarity in the literature.

2. Resilience to Nature's Challenges

Natural disasters are caused by the cascading impacts of natural hazards on society. Events such as cyclones, earthquakes, landslides, tsunamis, and volcanic eruptions are natural processes in Earth’s dynamic landscape. However, these processes can become sources of extreme risk when they impact communities, infrastructure, and valuable societal resources such as crop land, lifeline utilities, and fresh water. Disasters result when a society’s ability to cope with these

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