Transdisciplinarity as Translation

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In doctoral level professional studies and work based learning, we are in a constant and intensified mode of 'trans-lating' across different realms of experience, domains of practice, epistemological paradigms, objects of knowledge, learning and relational styles, values and purposes. The intensification is propelled by survival in a globalised, post modern, technological world of multiple truths, multiple voices, limited resources and indeed limited time. This set of conditions has rekindled interest, or rather an imperative, to regenerate Thoth/Hermes, progenitor of hermeneutics and his outstanding skills in the art of trans-lation which negotiated across difference respecting all sides and holding them in communicative balance so that the 'knowing' on each side could be trans-formed by the 'knowing' of the other. If we are to avoid a paradigmatic colonialism that converts or dominates to arrive at homogeneity, we need to develop higher level skills in negotiating 'between' to co-create knowledge and trans-form how we think and what we do to meet the challenges of the future. Trans-disciplinarity seeks to move forward in this way. This chapter looks at the role of trans-lation and at the leading edge thinking of such fields as environmental sciences and contemporary translation studies to formulate a contribution to explicating and operationalising trans-disciplinarity to arrive at 'metanoia', another way of knowing. This is of interest to those who are planning to undertake collaborative research using a transdisciplinary approach and those involved in supervising doctoral research.

Metania is a term that has been used in a number of ways including 'repentance' which is its original Greek meaning in theology and 'another way of knowing'. It is in the sense of 'another way of knowing' that it is used in this chapter.

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A good place to start is to look at transdisciplinarity's most common loci, purposes and drivers. In the field of professional doctoral research[1], issues have been raised about needing to clarify what it is in order to draw up some guidance as to how to teach, evaluate and assess doctoral level research that purports to be transdisciplinary or whose purpose may benefit from a transdisciplinary approach. In professional doctorates it is both. My knowledge culture is social anthropology, psychotherapy and doctoral level professional studies. In each of these loci, practitioners know what transdisciplinarity is in practice, they experience it, they work with and through it, and they promote it. My purpose in this undertaking is to seek to articulate transdisciplinarity more coherently as an appropriate response to an increasingly complex world where not only discipline/domain/sector islands are increasingly more connected but those connections are also to the public at large as having stakeholdership in solutions for the future. That coherence involves understanding what transdisciplinary refers to so that we might be more able to guide the facilitation and assessment of it regardless of whether it is an approach to knowledge, to research or to the individual's professional practice. Transdiscipinarity is about boundary or border crossing to arrive at knowledge co-creation and co-production but in order to do that it has to challenge existing hegemonies and not become one itself. Nicolescu's vision of transdisciplinarity (1998) is of interconnecting 'bridges', a vision of transdisciplinarity which Klein (2004, p. 516) cites as 'transcultural, transnational and encompasses ethics, spirituality and creativity.'

What is emerging from the literature, with significant contributions from environmental sciences, philosophy, humanities and translation studies, is that transdisciplinarity can be seen as a conceptual framework for research that provides a comprehensive response to increasing social, political and economic complexity in which traditional boundaries have to be crossed to arrive at new thinking and approaches to find solutions at local, regional and global levels to a range of problems from life improvement to human survival. Individual case studies are cited and retrospectives are taking place to find theoretical underpinnings and to refine such a conceptual framework through which to articulate the nature and achievement of knowledge formation and how to attain optimisation of application that is useful to the widest number of stakeholders. One such example to draw on for such purposes is critical theory (Bronner 2011, p. 114)

> Critical theory was originally intended as an interdisciplinary enterprise to which each might bring his or her unique disciplinary talent and expertise. Its representatives highlighted the relationship between philosophy and politics, society and psychology, culture and liberation…The Frankfurt School called outworn concepts into question…They also intimated the need for a new understanding of the relation between theory and practice…Democracy remains unfinished; cosmopolitanism is challenged by identity; socialism requires a new definition…The cultural inheritance of the past has still not been reclaimed… and the ability of audiences to learn still requires criteria concerning what needs to be taught….Engaging in these matters requires an interdisciplinary outlook formed by liberating norms.

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[1] For the purposes of this chapter, the nomenclature 'professional doctorate' will be used as inclusive of practice based doctorates.

Here there is a clear declaration of the social action element in a coming together of knowledges with the purpose of liberating thinking to deal with new contingencies. However one could go much further back, say, to Confucius and his ideas on education (Ryu 2010, p. 20).

> Education in the Confucian tradition has been considered the most valuable activity in life and a tool for self cultivation of humanity. . . the whole focus of Confucian education is the development of whole persons rather than narrowly trained specialists.

In this example from an applied philosopher who lived two and a half thousand years ago, the advance in a humanity focused world starts with education which needs to be on the development of the self of the child. This idea of self is inextricably linked to community and for the child to become an informed and 'virtuous' human being requires an openness to all kinds of knowledge.

Historically there are many examples in research and in literature of what we can now position as transdisciplinary approaches and individuals as transdisciplinary practitioners, so many in fact that it would seem that our perception of discipline islands that has dominated knowledge in the West for so long is to some extent a false construct. There has traditionally been interdisciplinary exchange within certain clusters of disciplines such as branches of science and social science. It is when the islands have been culturally more distant from each other, such as natural sciences and social sciences, that the differences and preciousness have come into play with language reflecting the perceived nature of relationship at a distance: terms such as *heretical, borrowing, raiding*, *plundering* to refer to what is now acknowledged as *fruitful knowledge exchange*, and *subjective, objective* as distinct criticisms and faults rather than *complementarities*. There was always a plurality of voices, what has shifted is the exponential growth of the plurality and the increased interconnectivity and interdependency of those islands. According to Ruano (2011, p. 44) talking about interdisciplinarity in translation studies

> The key to progress is largely thought to lie in *consensus* rather than disparity, in *integration* rather than dispersion of theories or perspectives, in affirmation of a *shared ground*. . . rather than in the scrutiny of discrepancies; in short . . . in *conciliation* rather than in variety, let alone conflict, of viewpoints, disciplines and paradigms

> *But then goes on to add a warning (Ruano 2011, p. 47) :*

> The current effort at finding a common theoretical basis may result not in strengthening the discipline but in hampering its progress, to the extent that the marginalisation of dissenting voices might prevent it from engaging in self-critical reflection and from being aware of its limitations. . . .claiming absolute comprehensiveness implies denying the complexity of the phenomenon under study, a stance blatantly in contradiction with the trend towards "problematizing" objects of research in the current intellectual climate (Baker 2002, pp. 50–53).

This should not be the aim of transdisciplinarity, to establish a comprehensive and thereby exclusive theoretical and practice framework which, although based on consensus, integration and shared ground, would nevertheless silence dissenting voices. It is rather to do the opposite. It recognises both the need for and value of discipline islands and the flexibility and fluidity of an approach to research that responds to the realties, discontinuities and contingencies that are in a constant state of flux as

location in temporality overtakes geographical location in what Augé (2009) calls a culture of supermodernity.

Osborne (2011, p. 15) pinpoints the concept of transdisciplinarity in the 'post philosophical' theoretical heritage of twentieth century European philosophy and being: "a universalizing conceptual movement that recognizes. . . that the idea of philosophy can only be realised outside the idea of philosophy itself" thereby opening it up to other discourses to engage in it. He proposes that

> The notion of transdisciplinarity is an advance, formally, in denoting a movement across existing fields (as opposed to a thinking *between* them or a *multiplication of* them); and it is an advance in terms of theoretical content, in so far as it locates the source of transdisciplinary dynamics pragmatically in a process of problem-solving related, ultimately, to problems of experience in everyday life. . . transdisciplinarity is not the conceptual product of addressing problems defined as policy challenge . . . but rather of addressing problems that are *culturally and politically* defined in such a way as to be amenable to theoretical reformulation (ibid).

Klein (2004) and many contemporary commentators and researchers concur that transdisciplinarity is not a single form of knowledge but a dialogue of forms. Such a dialogue is between disciplines, systems and languages, as well as between our different ways of knowing, the plurality of epistemes which include perceiving, sensing, understanding, conceptualising, explaining causality and meaning making. To approach local and global sticky problems requires an engagement with difference across cultural, social and cognitive contexts and across prefigurative and sense making views, in other words, an engagement with the purpose and relevance of any action for a range of stakeholders. Pohl and Hirsch Hadorn (2007), of the Swiss Federal Institute of Technology, working on research and sustainability, have offered three different types of knowledge that can be used to characterise transdisciplinary research: systems, target and transformation, as well as the challenges embedded within them: reflecting on and dealing with uncertainties through real world experiments; clarification and priority setting of various values in relation to the common good as a regulatory principle, and learning how to make existing technologies, regulations, practices and power relations more flexible. As Edgar Morin (2001, p. 5), the French philosopher, points out

> One of the greatest problems we face today is how to adjust our way of thinking to meet the challenge of an increasingly complex, rapidly changing, unpredictable world. We must rethink our way of organising knowledge.

To achieve these transversals or border crossings or interweavings of the 'metissage' (Nouss 2005) that might reorganise and interconnect knowledge for the future, sophisticated bridges of existing knowledge exchange are required to produce new learnings and syntheses sustained by skilled translation between these different realms of knowledge, experience and practice. In such a scenario, researchers are key pollinators and change agents fundamental to the change/solution being sought. Although there are different emphases rather than perspectives on transdisciplinarity, it is the properties, purposes and advantages of transdisciplinarity as embodied in practitioners, the innovation and problematisng which they are dealing with in the complexities of their sectors/domains of practice as well as attention to other stakeholders, that is of interest in this chapter. Through such a focus, the skills

and attributes of a transdisciplinary research supervisor/facilitator or, in this changing knowledge landscape, the translator or navigator of the transversals, may be revealed or indicated.

The field of translational studies, like professional studies, has progressed rapidly in the last twenty years. Its current discourses have relevance to transdisciplinarity and therefore to the research undertaken in professional doctorates which interweave theory and practice and different sectors and domains: it has refined debates on conceptual frameworks for responding to complexity using spatial metaphors to define relationships between the different discipline islands—interdisciplinary, multidisciplinary, transdisciplinary; it contributes to emerging pedagogy which underpins professional doctoral level study that goes beyond interdisciplinarity and multidisciplinarity into the co-creation of new knowledge and concepts; and it offers us language in which to 'translate' what we do more efficiently and effectively (Duarte et al. 2006). This chapter will not over concern itself with the differences between inter, multi and trans but rather concentrate on the emergent field of transdisciplinarity where professional studies is increasingly situated.

Transdisciplinarity can be said to be, like translation, an *area of knowledge,* as stated by Nouss cited in Duarte et al. (2006, p. 3),

> After 'consciousness' in the nineteenth century and 'language' in the twentieth, 'translation' can be considered to define the contemporary ethos. As an area of knowledge, it calls for an innovative, transversal and metis [interweaving] epistemology (2005, p. 228).

an *approach to knowledge and research* which is participatory with the non academic as argued by Cronin (2008, p. 2) in her support of the views of Hirsch Hadorn et al. (2008):

> Transdisciplinary research [TDR] is a new field of research emerging in the 'knowledge society', which links science and policy to address issues such as environmental degradation, new technologies public health and social change. Through transdisciplinary approaches researchers from a wide range of disciplines work with each other and external stakeholders to address real world issues

the approach to knowledge creation for the future according to Russell et al. (2008, p. 2) involving three areas:

> problem focus (research originates from and is contextualized in 'real-world' problems), evolving methodology (the research involves iterative, reflective processes that are responsive to the particular questions, settings, and research groupings) and collaboration (including collaboration between transdisciplinarity researchers, disciplinary researchers and external actors with interests in the research

and, the pursuit of coherence, not unity, within paradoxes of different realities as proposed by Ramadier (2004) from his work in urban studies which involves the input of several disciplines and the constant negotiation of concrete and abstract spatial boundaries.

> . . . the notion of unity becomes obsolete, and this is true even at the level of the studied object… This, when a given entity changes, it is not only part of the object that changes, but the object itself. For example, each city has a history, a transport infrastructure, and a heterogeneous social make up. However, each city is different owing to the precise nature

and interrelations between all the components. In other words, there is no such thing as "the city", there are only "cities" (2004, p. 452)… Thus, transdisciplinarity is based on controlled conflict generated by paradoxes. (2004, p. 434)

Klein (2004) who has written extensively on transdisciplinarity reminds us of the significant contribution of Nicolescu (2008) and his founding of CIRET (International Centre for Transdisciplinary Research) in 1996 which shifted notions of knowledge from the one dimensionality of classical thought to a multidimensional frame, 'a scientific and cultural approach'. In the Manifesto, and the essay "New Vision of the World", Nicolescu identified three pillars of transdisciplinarity: complexity, multiple levels of reality, and the logic of the included middle (2004, p. 515).

To further differentiate it, it could be said that interdisciplinarity and multidisciplinarity are terms which usually imply a process of cooperation or collaboration between two or more disciplines which are either logical because they are linked in such as in neuroscience and psychotherapy and may bring about changes in both, or because they come together to solve a problem which requires different inputs, for example, a multidisciplinary approach to mental health. This cooperation does not primarily seek to change the individual discipline's epistemology, methodology or content. Transdisciplinarity, on the other hand, can imply a qualitatively different relationship between disciplines and practices. It is not so much a process of co-operation or collaboration which defines it but an intentional approach to transcend boundaries of disciplines and practices to create a new knowledge synthesis within the individual or domain of practice and indeed in society. As Cronin (2008, p. 2) and others would argue, its aim is *to overcome the gap between knowledge production on the one hand and the demand for knowledge to contribute to the solution of social problems on the other.* In professional studies doctorates this may be the medical devices inventor who, in order to 'translate' his/her invention from bench to the clinic to save lives, needs to visit and learn from the other domains such as regulation; public health policies; insurance; monopolies; media that facilitate or block progress to achieve a creative solution; or it may be the senior non academic practitioner whose intentional engagement with academia changes both domains. Such change agents act as pollinators between the different domains causing new thinking, applications, solutions and practices to emerge.

Key components of transdisciplinarity include stakeholders' views; real world problem solving; change agency; knowledge production; new synthesis; exchange between disciplines and practices with the intention of achieving action that influences the disciplines and practices themselves; mapping and remapping; academic and non academic participation and social responsibility. This author supports social action/responsibility as a key element but recognises that this aspect of transdisciplinarity, while considered by some as the core element that makes transdisciplinarity the most appropriate response to complexity, 'problematising and political' (Osborne 2011, p. 16), it is thought of by others as the unnecessary inclusion of a moral dimension to an approach to knowledge.

These core elements of transdisciplinarity can lead to what can be called *metanoia*, another way of knowing; a knowing 'beyond' which is creative and transformative. This poses challenges for transdisciplinary approaches at doctoral level about the skills and attributes required of those who have the task of facilitating and negotiating

this understanding between different realms of experience, thinking and cultures so that a *metanoia* can take place that supports the arriving at a change or response that is of benefit to the largest number of stakeholders. This involves not only the role of academics but the roles of the public in various forms such as the workplace senior practitioner; the spokesperson for a public health charity; the CEO of a major energy company; the people in a location where major change is being researched which will affect their lives and livelihoods; governments and international institutions tasked with protecting human rights and global sustainability through policies, guidelines and regulations.

Formulating and Predications

Transdisciplinarity is, according to Klein (2004, p. 521), simultaneously an attitude and a form of action. A key consideration is how to conceptualise transdisciplinary research in a way that reveals what is needed to develop, evaluate and assess it. For these purposes I suggest formulating transdisciplinary research as i) that carried out by an individual for the purposes of attending to a challenge or a problem resulting in innovative and impactful outcomes in a local context through critical reflexivity relating to context and practices including their own with attention to the complexity of the 'situation', the ethics of participation and the implications of intended/consequential change ii) that carried out by a group, group being anything more than one, who come together to solve a problem and in doing that new knowledge is created and new thinking emerges of value to all the participants. The first part of the formulation is predicated on the premise that all modern practitioners and prospective practitioners are by definition transdisciplinary to varying degrees: the engineer who runs a business; the banker who takes courses in human resource management; the technologist who develops academic programmes; the teacher who in practice is a counsellor; the small town engineer who believes he or she has something to offer a multinational enterprise; the aspiring graduate seeking membership or fellowship of a professional body. The research that such senior professionals in sectors or communities of practice, or prospective professionals undertake is most likely to be an individual enterprise in the domain of epistemic plurality and border crossing with intended impact on the context locality in which the research activity is grounded—the real everyday world. The second part of the formulation is predicated on the notion that researchers from academic and practice discipline islands are coming together to contribute to resolving challenges of the macrocosm even if they are working at the microcosmic level by global standards, each willing to set aside or be flexible about the structures, beliefs and practices which are the pillars of their individual island cultures and all intending to engage in some way with a range of stakeholders who are part of the 'context', from members of the public to government bodies. Klein (2004, p. 517) citing Nowotny et al. (2001) captures this aspect of the formulation as the extension of

> The concept of Mode 2 in the idea of "contextualisation", moving from the strict realm of application to the *agora* of public debate

The transdisciplinary group enters, in a sense, a virtual world, a helicopter view, of not only problem solving but problem choosing, suspending post figurative hierarchies of the epistemes and practices of their discipline or sector cultures to trade or transform old lamps into new ones that will evolve knowledge in a way that optimises inclusion in an equitable future related to sustainability of resources and optimal distribution. In other words, to achieve what Klein (2004, p. 519) has distilled from other transdisciplinary proponents, the concept of a 'genuinely human science', releasing a knowledge genie from the lamp more appropriate to our accelerated world.

I would suggest that enabling a transdisciplinary approach to research and knowledge in an individual or group requires something different from the traditional role of supervisor whose expertise in the discipline is privileged over any relational, reflexive, observational, enabling, coaching, interpretative, 'trans' skills that have come to be the attributes of the transdisciplinary adviser[2] in professional doctorates. I would also suggest that to be a successful transdisciplinary adviser is not predicated solely on mastering disciplines but mastering how to facilitate connections and communications in a way that results in creative and practical change agency transforming of not only the researcher, their professional environment and society but of the adviser and their evolving pedagogy and of the trandisciplinary group and their evolving epistemologies in a process of mutual learning. The individual and the group approaches to transdisciplinary research are both figurations of applied research that go beyond application to new theories and approaches that need to involve other constituents beyond the researchers and their sponsors.

Mobjörk (2010, p. 866) raises this issue of the roles of the various actors and conceptualises the transdisciplinary framework as involving a range of actors in consultative roles and in participatory researcher roles.

> Transdisciplinarity is currently perceived as an extended knowledge production including a variety of actors and with an open perception of the relevance of different forms of scientific and lay knowledge. By stressing scope of collaboration, a clearer distinction can be established between interdisciplinarity and transdisciplinarity than was possible with the former focus on degree of integration. However, integration is still an essential feature of transdisciplinarity and in emphasising the need to acknowledge the different roles actors can play in knowledge production a distinction can be identified between two different forms of transdisciplinarity; consulting versus participatory transdisciplinarity.

Mobjörk (2010, p. 869) is also making a case for clearer articulation as this has implications for funders of research, clearly delineated areas of responsibility and ownership and criteria for evaluating the research and its outcomes. He confirms that on the subject of methodology, which has always been a required skill in research supervisors, that it is not a specific methodological approach that is needed but a focus on the context. Such a focus will yield the questions that need to be asked and define the methods most appropriate to extract the data.

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[2] Nomenclature: in some professional doctorates involving doctorates undertaken by senior practitioners, the doctoral supervisor or director of studies is referred to as the 'adviser' in recognition of the collaborative, dialogic and knowledge exchange elements of the relationship.

Regarding methodology, the prevailing consensus within the literature on transdisciplinarity is that there is no single methodology or set of methodologies that can be used to distinguish transdisciplinarity from other research practices. Instead, the focus lies on describing the features common to appropriate methods for transdisciplinary research. An essential consideration within these descriptions is the concept of reflexivity, i.e. transdisciplinary research needs to respond and reflect the problem and context under investigation. As Wickson et al. note, transdisciplinarity is 'characterised by an interpretation of epistemologies in the development of methodology' and thus presents profound epistemological challenges and calls for a pluralistic approach to methodology. . . . it must be able to grasp complexity. Hence, transdisciplinarity needs approaches that can deal with uncertainty and take into account the diversity of perceptions from various actors. Suitable methods for conducting transdisciplinary research must therefore support these requirements and one way of describing this is by using 'context-dependence'. If knowledge is considered context-dependent, the different interests, methods and goals of those producing knowledge must be considered.

Nicolescu (1998) does not propose 'specialists' in transdisciplinarity, Ruona warns against a new transdisciplinarity being an exclusive system of consensus, Klein (2004) makes a case for fluidity and flexibility, Mobjörk (2010) gives a reasoned argument on evolving methodologies and Ramadier (2004) talks of coherence not unity. Such contributions to the development of a conceptual framework for transdisciplinarity have not yet produced the skills and attributes required of a transdisciplinary research supervisor but they do indicate some loose formulation. I suggest, based on existing discourses, that the research supervision nomenclature shift to research facilitation and that the facilitation is not conducted in a hierarchical relationship of apprentice and master or science over humanities or academic over professional or worker but in a collaborative enterprise in which various expertises are made available for exchange and synthesising. The facilitating teams for the individual and for the group would be constituted differently but with shared attributes and values, the values being a commitment to outcomes that contribute to a wider distribution of benefits and inclusion and a perception of knowledge as neither the privilege of the elite or paradigm bound. The suggestions are predicated on the conceptualisation of our world as having the characteristics of the superorganism, an archipelago of islands with their own cultures interconnected through a complex system of networks, what Laplantine and Nouss (2008) refer to as the 'metissage'. Every researcher needs to take into consideration that they cannot nor should be unplugged from the complexity and that exclusion of any part of that complexity in any research activity should not result in marginalisation or exclusivity. There are those who will research on and for the sustainability of the islands, those who research on the exchange between them to keep the connections open and high functioning and those who research the survival of the whole organism. These are different but interconnected areas for research focus. In this scenario there can be 'no final vocabulary' (Rorty 1989, p. 73) but rather a contribution to an emerging metanoic language that captures commonalities and introduces new terms or a new and appropriate application of existing ones. Ramadier (2004, p. 432) continuing on his notion of seeking coherence within paradoxes not unity, places 'articulation' as a key component of transdisciplinarity if it is to achieve its goals.

articulation is what enables us to seek coherence within paradoxes, and not unity. The notion of "articulation", as we have defined it, allows us to perform a transition between the different levels of reality that can generate paradoxes. Thus, the difficulty of transdisciplinarity lies in going beyond the superpositions of realities, through articulation. Indeed, we are often tempted to be satisfied with superposition, in order to avoid paradox.

The superpositions are also sustained by language. Language can inhibit cultural growth or enrich it. Language can facilitate new conceptualisations of knowledge to enhance public as well as discipline or academic understanding. Examples would be Deleuze and Guattari's (1980) use of 'rhizome' the botanical term for mass roots to denote multiplicity and interconnections in non hierarchical structures between all aspects of society, and 'metissage', the interweaving of connections, cultures, ideas (Laplantine and Nouss 2008). Articulating transdisciplinarity as a knowledge approach for the future is inclusive of reflexivity, respect for plural epistemes, knowledge exchange not transfer, social responsibility, which as coda could be described as humanising principles

The advantages of transdisciplinarity vary from large scale to small scale but in the metaphor of the superorganism it is the proverbial butterfly wings; small and large are no longer the most appropriate adjectives for such activities, rather something that describes the context eg local or regional; both can have significant impact or unanticipated outcomes including barely any impact at all or unwanted outcomes. Transdisciplinary notions can contribute to the epistemological implications for our theories of pedagogic practices when universities are facing pressure to feed employability demands and it offers greater opportunity to engage in discourses with researchers, veteran and new, on social responsibility, moral dilemmas and value driven agendas.

Lawrence and Després (2004, p. 403) describe transdisciplinarity in a way that underlines the role of the researcher but which gives indication of what may then be required of the person or people who take a facilitating role in the research choice and undertaking.

> . . . transdisciplinarity has become the actor oriented negotiation of knowledge or what Julie Thompson Klein calls "generative form of communicative action that is context- specific".

At a fundamental level, a transdisciplinary facilitator then needs the observational and record keeping skills of the ethnographer, the listening and reflexive skills of a coach or counsellor and the translation skills of a hermenuet—that is one who seeks to facilitate the multiple directional flows of information across different realms of experience prepared to use tricks such a metaphors and frameworks to rapidly conceptualise complex issues and their solutions against a backdrop of fast moving time in which long term reflecting and planning can be surpassed by technologies and changing political landscapes. However drawing on Mobjörk's thinking (2010) around consultative and participatory transdisciplinarity, it would be important to make a further distinction when thinking about transdisciplinary research facilitation and that is whether the researcher is an individual 'de facto' transdisciplinary practitioner intent on making an impact on practice and context or a group of individuals who come from different sectors, disciplines, domains and experiences to

Table 1 Facilitating a transdisciplinary approach

TD doctoral research	Individual	Group	Attributes
Research facilitator	Researcher is primary facilitator of their own research, the leader and manager of the research undertaking with a value system related to social action and distributed benefits eg research motivation is to improve context conditions to optimise benefits for all constituents	Facilitates team communication, providing the optimum conditions for working together and facilitating choice of problem, knowledge exchange, syntheses and creation towards practical outcomes. Part of the context is social action or 'for the common good'	Project Planning Communication Distilling Translating Coaching Mediation Ethical awareness
Subject expert	Works closely with TD expert and/or work/sector specialist to support the researcher through collaborative and dialogic engagement that is context specific	Subject experts are the researchers and their exchanges are facilitated but not controlled by the research facilitator	Subject knowledge expertise but joining the project with the intention of openness to ideas from outside of own knowledge and practice culture
TD expert	One skilled in discourses on border crossings and the interfaces of difference drawing on generic skills from previous successful doctoral candidates, mentors theories of praxis etc	Embodied in the research facilitator	Ability to conceptualise and map complexity and navigate it. Flexibility, imagination, ethical awareness of border crossing and implications of change
Work/sector based specialist effectively a member of the 'context public'—consultative or part of the research activity/evaluation/ assessment	Experienced in work/sector environments of relevance to the research project	Consultant to or part of the TD team	Awareness of ethical dilemmas, regulatory tensions, political and social dimensions of work/sector environments and cultures
Complexity expert	Embodied in the researcher, the TD expert and the subject expert	Manages the practical aspects of the project based on expertise in complexity	Technological expertise impact implications, risk assessment, budgets, feasibility, IP, patents

Table 2 Further features of TD (drawn from literature) which can inform attitudes and attributes of current and potential researchers and practitioners

Sensitizing concept	Generalised capacity
Reflexivity	Suprascientific search for meaning
Reflection on consequences of action	Development of attributes begins at school education level
Deliberative practitioner	Human science
Interdeterminancy	Intuitive judgement

work together on a project. The following table is an attempt, far from exhaustive, to pull together the various strands of conceptualising a transdisciplinary facilitation framework and what may be required to facilitate its successful execution (Tables 1 and 2).

Transdisciplinarity in professional studies doctorates aims to go beyond the 'strait-jacket' (Osborne 2011) of mere problem solving into an era that does not negate disciplines and dilute them into some kind of epistemological soup but rather creates the conditions for more metanoic solutions to managing complexity and the liberating of thinking and action from hegemonic island paradigms. These may be disciplined bound in higher education but in the world of markets, resources and political manoeuvring in which profit and power are synonymous, the hegemonic islands are global companies and super-institutions with vested interests and therefore have more power to exclude, marginalise or reduce the share in the future of large sections of the inhabitants of the planet. A transdisciplinary approach can do in the new hegemonic islands what it has started to do in research education and practice.

> Transdisciplinarity was once one of many terms. It has become a major imperative across all sectors of society and knowledge domains, making it more than a fad or fashion. It has become an essential mode of thought and action Klein (2004, p. 524)

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