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Challenges, Approaches and Opportunities at the Cusp of History

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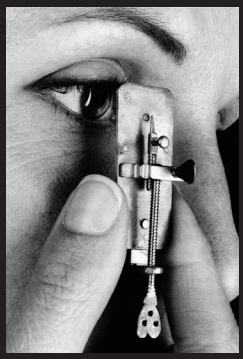

transtechnology research
openaccess papers

Production and Design
Amanda Egbe, Martyn Woodward

Transtechnology Research • Reader 2012/13
Plymouth University
Portland Square, Drake Circus
Plymouth PL4 8AA
United Kingdom

ISBN 978-0-9538332-3-8

Transdisciplinarity: Challenges, Approaches and Opportunities at the Cusp of History

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Until relatively recently science, engineering, art and design each had their own history. Increasingly they are becoming to be understood as components in the broad sweep of the production of knowledge for the good of humankind and the supporting environment. The most convincing evidence of this is in the shift in concern for the immediate and medium-term to the long-term sustainability of the earth as a nurturing environment e.g. approaches to climate change, water resources, holistic science, the socio-political and economic, as a global problem. The recognition of the interrelation and interdependence of hitherto discrete histories as important calls for new modes of interaction that are more than opportunist, convenient or problem-driven. This calls for more strategic approaches to transdisciplinarity as the organizing principle for research collaboration.

Survey concerns

In the last couple of decades voiced discussion around the new topic of transdisciplinarity has led to a growing awareness and application in the practice of more traditional interdisciplinary frameworks. Spearheaded by Helga Nowotny (2008, 2006, 1997; Nowotny et al. 2003) and Michael Gibbons et al. (1994) with a social science focus and by Basarab Niculescu (Camus and Niculescu 1997, Freitas et al. 1994, Niculescu 2008, 2002) with a science and humanities focus, the increasing literature on theoretical approaches and methodological reflections, [2] shows transdisciplinarity to be more than a fashionable turn and is strongly supported by concrete actions and requirements in current research frameworks.

The need for transdisciplinary strategies arises in recent years from the increasingly recognised complexity of contemporary problems, including the exponentially growing data- and information load in segmented fields and formats, the demand for a more inclusive engagement with all sectors and strata of society as well as a closer confrontation and need for integration of the multiplicity of perceived conceptions and models of reality. This need for larger overviews and shared engagements, so it has been argued, requires a robust foundation in disciplinary practices and innovative approaches to collaboration and knowledge production and exchanges in interdisciplinary frameworks. Therefore it can be stated that transdisciplinarity is by necessity informed by the complementary extensions of those methods, views, models and conceptions that the single disciplines in their canonical frameworks and specialisation, and their exchanges among disciplines through interdisciplinary engagement, provide. By the same token, no discipline is ever completely isolated and has to be understood always in relation to other knowledge practices. With the broader awareness of the term transdisciplinarity, however, there occurs a slack use of the term in the context of cross-disciplinary collabora-

tions. It points to an urgent need to seek clarity and to unravel some of the inherent confusions of the meaning and value of transdisciplinarity of some of these interventions if the moment is not to be lost.

Some of the most frequent conflations that have led to misunderstandings in the current trend in the usage of transdisciplinarity are:

* Common confusion of transdisciplinarity with cross- and multi-disciplinarity arising from a generalized and unreconstructed use of the term, particularly as articulated with reference to 'global problems' and 'global thinking'. [3]

* Exclusive application of transdisciplinarity to engagements with non-academic stakeholders as a remedy for the disconnection between knowledge production and societal problems, whereby the term 'discipline' loses its meaning and justification. [4]

* Transdisciplinary as mere 'gap-filler' between disciplinary activities and boundaries in order to bridge communication gaps between the traditionally defined disciplines. [5]

* Misunderstanding of transdisciplinarity as shared fundament of inquiry, as 'common ground' to facilitate knowledge exchange. [6]

In contrast to these rather loose and unreconstructed responses to transdisciplinarity, the more robust and critical debate has been developed recently; we see this as crucial in order to ensure that the opportunity of new approaches to knowledge acquisition and development are not squandered. It can be summarised that at the very minimum, transdisciplinary research exceeds a mere cooperation among disciplines identified as multi-disciplinarity (Newell 2000: 230) and exceeds interdisciplinary research in that it leads to the transformation of the very identity of disciplines by identifying new topics and concerns. Transdisciplinarity extends the scope, methods and perspectives of existing disciplines whilst at the same time respecting and using the existing disciplinary frameworks. Ideally, emerging new practices, methods, paradigms consequently lead to a re-evaluation of disciplinary tools and concerns through interactive reflection and knowledge exchange, which can lead to transformative long-term impact on the development of disciplinary practice. In this way transdisciplinarity is a complementary practice in addition to inter , multi- and disciplinary practices. [7] Without aiming at replacing any of the existing disciplines, it rather draws significantly on their foundations and specialisms. It has been frequently pointed out that most researchers engaged with transdisciplinarity move between disciplinary, inter- and multidisciplinary engagements and modalities. The window of opportunity to define transdisciplinarity (or even transdisciplinarities) with precision is limited and there is an immediate need for a mature understanding and synthesis of the existing approaches that often substantially differ in their focus and sometimes even in their key aims and methodological underpinnings.

Although heavily reliant on topic-led approaches, interdisciplinary research (understood as integrative knowledge practice and exchange among two or more disciplines) has become an established practice in academia and also in the strategic policies of the research councils' national and international funding regimes. However, more sophisticated strategies are required in order to facilitate and build future trajectories for world-class research in terms of scholarly quality and also in term of their inclusivity of integral, ethically viable and creatively innovative concerns that transcend cultural,

economic, geographical and social boundaries.

Since 2010 the International Network for Transdisciplinary Research (INTR) led by Transtechnology Research, Plymouth University, has brought together eminent researchers to consider more precise and useable understandings of transdisciplinarity in response to the urgency of high-grade collaborations led by immediate and burgeoning needs. It has proceeded from an enquiry into the daily practices of research in the Arts, Humanities and Sciences by experts who habitually reflect on their processes of knowledge production. The intention of INTR is to develop a robust framework to think and practice transdisciplinarity in action (rather than as a meta-theory), which departs from an integrative model of engagement that accommodates difference, paradox and speculative research. ***Proceeding from this we take the view that a key aim of transdisciplinarity is to facilitate emergent insight, knowledge and interaction that could not have been foreseen or designed in anticipation of a specific outcome or solution to a problem.***

The model of transdisciplinarity proposed here takes a modest approach, in which the emergence of a new or differently posed question, an unexpected facet of perspective or an entirely new question completely independent of the inquiry in process, are valued in their own right and not sidelined through the common problem-driven approaches that limit the inquiry through the pressures on short-term, or immediately economically or materially viable, outcomes. ***It calls for the development of theoretical, conceptual and practice-oriented approaches to transdisciplinarity as both, a post-hoc analytical process for the qualitative synthesis of collaborative research in interdisciplinary frameworks, and as methodological framework to forge innovative approaches to research collaboration that is inquiry-driven and seeks to identify new topics and concerns.*** In this way transdisciplinarity is sought to bridge disparate areas of discourse and research topics not merely by transcending or transgressing disciplinary boundaries around problem-driven inquiries, but by letting the inquiry in itself drive the methods, tools and theoretical formation in order to stimulate the identification of new concerns, insights and topics that emerge from this cross-fertilisation of rigorous and imaginative scholarly research.

An emphasis in this approach to transdisciplinarity lies on 'transformation' in the sense of the transformative potential of transdisciplinarity: in the recursive reflective impact on disciplinary practice, the dynamic interaction between researchers and objects of study that are conceived as integrative processes rather than disparate entities, the consequential flatter model that breaks down certain hierarchical power-structures of the dominant institutionalised frameworks, as well as in the contingencies that dynamically shape the original research question from which the inquiry departed. In this sense transdisciplinarity is not exclusively to be understood as an aspiration to move outside disciplinary frameworks, but can just as well be provoked by an involuntary confrontation with insights and concerns intruding into disciplinary practices which stimulates, or in cases forces, the redefinition of their established scopes, problems and methods.

Roadblocks:

Aside from imprecise use of the term, which contributes to a general skepticism, there are real roadblocks to transdisciplinarity that need to be addressed. These are:

1) Roadblock: Inflexibility of mobility beyond and between institutional frameworks. The increasing sentiment encouraging permeability between industry and universities has encouraged interdisciplinarity but has paradoxically led to an increasingly conservative culture of provision which more closely matches the existing (rather than future) employment market.

Opportunity: Amidst the virtues of disciplinarity it is now widely recognized that important and contributory research topics and concerns have been obscured in the shadow of disciplinary silos. This is evident in the number of hybrid research fields that have become necessary to form coherent communities e.g. biochemistry, techno-science, astrophysics, computational neuroscience, media-anthropology, visual culture, digital humanities, technology and culture, philosophy of science, anthropology of mind, etc. Transdisciplinarity offers the opportunity to maintain the virtues of the disciplines whilst exploring the shadows and avoiding the establishment of new hybrid disciplines which repeat the dynamics of the silos.

Proposed Action: Universities should consider themselves less as bastions of established bodies of knowledge and more as enablers with an emphasis on networks and collaborations and a locus for criteria in relation to methodological practices.

Stakeholders: Universities, funding councils, professional societies, academic journals, publishers, philanthropic organisations, museums, archives, cultural industries,

cultural funding organizations.

2) Roadblock: National funding for university research recognizes the virtues of transdisciplinarity/interdisciplinarity and multi-disciplinarity but still depends upon evaluation processes that rely on established fiats of experts in disciplines not necessarily fluent in approaches beyond their area of specialism.

Opportunity: The increasing focus on transparency and knowledge exchange as a consequence of the naturalization of multi-disciplinary research (i.e. the google scholar, crowd-sourcing and participatory archiving) is being met by equally radical approaches to publishing platforms. This follows a trend in the Arts and Humanities to focus more on impact, which has had the effect of closing the gap between the university and the public.

Proposed Action: If funding regimes wish to pay more than lip-service to transdisciplinarity they will need to consider radical changes to their review processes in order to include equal weighting for transdisciplinarity. For this they may need to consider the value of the network beyond its immediate results and raise the threshold of risk in funding research.

Stakeholders: Funding councils, professional societies, governments, philanthropic organizations, cultural industries, cultural funding organizations.

3) Roadblock: Criteria for existing career and tenure tracks in research are informed by standards and expectations established by professional societies. Individual career tracks in transdisciplinarity are niche pathways in the social sciences and the arts and at best an excursion from the mainstream in the sciences. The ambitions of the market with its short- to medium-term risk are more comfortable with discrete disciplines with substantial long-term track-records of research return. As to the funding structures of the cultural industries, cultural foundations and ministries, bureaucracy or rigid organiza-

tion of a museum or archive with its restricted review processes often inhibit the acquisition and dissemination of new knowledge whilst at the same time marginalizing the appraisal and transfer of 'old' knowledge.

Opportunity: Universities and archives are no longer unchallenged gateways to acquired knowledge as a consequence they are reexamining their constituency and function. This provides new opportunities/challenges for rethinking the role of the University (and the archives/museums) in relation to permeable national boundaries, mass transport, electronic networks, linguistic dominance of English, providing new opportunities/challenges for exchange and comprehension.

Proposed Action: There should be investment in research network developments that regard transdisciplinarity as a pathway to new topics and concerns, liberating research questions currently locked within high-grade research in traditional silos. Hybrid public/private speculative funding of research and development should be encouraged.

Stakeholders: Universities, professional societies, academic journals, publishers, philanthropic organizations, private sector investors, museums, archives, cultural industries, cultural funding organizations, media industries.

4) Roadblock: There is a genuine and significant anxiety that transdisciplinarity (and even interdisciplinarity) will necessarily lead to a loss of focus and a consequent lack of rigour and authority. This roadblock is compounded by the inevitable difficulties of communications between specialists and competitive funding.

Opportunity: There is an unprecedented structural change in the production, dissemination and storage of knowledge brought about by a more democratic access to databases that need to be negotiated. Interdisciplinarity, multidisciplinarity has facilitated comparative methodologies which have provided a framework for the management of large, disparate data-sets. Transdisciplinarity offers a more systematized way of management, synthesis and evaluation of knowledge.

Proposed Action: The full acknowledgement of transdisciplinarity's bottom-up spirit (both popular and data driven) should be regarded as both a methodological and social intervention. It gives voice to the intellectually disenfranchised who have a stake in the outcomes and as such mirrors many of the issues that have reshaped the Humanities (especially History, Art-History and Literature Studies) in the last three decades. Consequently it demands the vigilance and positive commitment that have been applied elsewhere when oversight and occlusion have become acknowledged.

Stakeholders: Universities, funding councils, professional societies, academic journals, publishers, philanthropic organizations, cultural organizations and social policy makers

5) Roadblock: An increasing fashionable overusage frequently blurs the distinctions between multi-, inter- and transdisciplinarity and works at the disadvantage of, if not damaging to, those who rigorously engage with the conceptualisation and application of a new set of practices across disciplines that emerges from ongoing and current innovative research investigations.

Opportunity: In this regard Julie Thompson Klein (2010: 24-26) speaks of "trendlines" of transdisciplinarity with approaches that in some cases are thinning out to rather loose applications. There is now serious attention to the

topic and high-grade research and initiatives (among others Niculescu's CIRET, Nowotny et al., INTR).

Proposed Action: There should be investment in soliciting meta-approaches to transdisciplinarity informed by grounded research in the Sciences, Humanities and Arts. Greater attention to dealing with the issues exposed by transdiciplinarity (if not in the concept itself) should be explored openly.

Stakeholders: Universities, funding councils, professional societies, philanthropic organizations, cultural organizations and social policy makers, museums, archives, cultural funding organizations.

6) Roadblocks: The requirements that transdisciplinarity places on a researcher can be as demanding as, for example, extending the research period in order to acquire a new language or competence. The necessary delays and deferments that this entails currently can be perceived to make transdisciplinary research more expensive. As a consequence this loads the dice in favour of the disciplinary status quo.

Opportunity: A significant change in first world demographics (longevity, distribution, mobility and kinship) provides new opportunities/challenges for knowledge exchange, storage and transfer as human capital. In particular the educational experience should include 'life-long learning' which can accommodate significant intellectual growth and transformation.

Proposed Action: To learn from the contingencies and expediencies currently applied in dealing with these problems and responses to new forms of funding and dissemination and research practices in the Humanities (digital Humanities) and to see them as a mode of inquiry for example to conceptualize the big data problem as one coextensive with work in the Humanities on representation and archiving rather than as an exclusive domain of datasets.

Stakeholders: Universities, funding councils, professional societies, academic journals, publishers, philanthropic organizations, cultural organizations and social policy makers, museums, archives, cultural funding organizations, media and cultural industries.

Notes

[1] A version of this paper has been submitted to the Network for Science, Engineering, Art and Design. We are grateful for the comments, contributions and advice on this paper from Prof. Jan Baetens (Professor of Cultural Studies, University of Leuven), Prof. Sue Denham (Professor in Cognitive and Computational Neuroscience, Plymouth University), Prof. Roger Malina (Distinguished Chair of Arts and Technology and Professor of Physics, University of Texas at Dallas, Mr. Mark-Paul Meyer, Senior Curator at EYE Film Institute Netherlands), Dr. Martin Zierold (Executive Board, International Graduate Center for the Study of Culture, Justus-Liebig University Giessen). The authors are also grateful for the support and collaboration of all those who contributed to the INTR meetings during 2011/12. See: http://trans-techresearch.net/intr

[2] A long and sustained engagement is evident in the theoretical physicist and philosopher Basarab Nicolescu's work and networks (CIRET) of transdisciplinarity, which departed from a scientific context bridging to Humanities concerns, with special interest in philosophical-religious perspectives. Building on seeding events (OECD colloquium Nice 1970; UNESCO Colloquium of Venice 1986 leading to the Venice declaration), Nicolescu has spearheaded a theoretical, discursive engagement with transdisciplinarity and in 1987 founded the International Center for Transdisciplinary Research and Studies (CIRET). The social scientist Helga Nowotny, president of the European Research Council, together with a team of collaborators, a.o. Michael Gibbons, have been leading another core strand in the debate, which emphasises the production of 'socially robust knowledge' and is particularly concerned with the bridging between science and society geared toward a problem-oriented, applied modality. Another strong vector in the debate is marked by the US-based Humanities scholar Julie Thompson Klein (2010, 2001) who has been leading the debate around interdisciplinarity, which provides a core foundation for many aspects that have been informing the discussions around transdisciplinarity. Emerging smaller platforms include the td-net in Switzerland (with a strong leaning on Nowotny's work), and the THESIS convention in 2003 in Goettingen (Brand et al. 2003) to exchange experiences and approaches to transdisciplinarity across the sciences and humanities.

[3] One of the key problems addressed in the debates around disciplinarity has first of all been the demarcation between multi-, inter- and transdisciplinarity. Multi-disciplinarity is understood as an accumulative, juxtaposed multi-perspectival arrangement of disparate disciplines that are brought together around a shared topic or concern. Although the knowledge production results in an accumulative overview, there is, however, no transformational interaction or cross-fertilisation between the disciplines which retain the original identity of their elements and the existing structure of knowledge is not questioned. (See for example Niculescu 2008: 2; Klein 2010: 17) Interdisciplinarity implies the transfer of methods, skills, concepts or paradigms from one discipline to another, which can lead to long-lasting transformations of disciplinary frameworks. (See Niculescu 2008: 2; Thompson Klein 2010: 19) Thompson Klein (2010: 18) indicates the shift from multi- to interdisciplinarity when "integration and interaction become proactive", referring to Lattuca's (2001: 81-3) notion of "linking issues and questions that are not specific to individual disciplines".

[4] As for example identified in the foreword to the Handbook of Transdisciplinary Research (edited by Hirsch Hadorn et al., 2008) or in the profile of the TD Network for Transdisciplinary Research in Switzerland (http://www.transdisciplinarity.ch/e/index.php), wherein transdisciplinarity is identified as catalyst to open scientific knowledge to sociological approaches, the broader public and societal concerns.

[5] See the abstract for A Vision of Transdisciplinarity. Laying Foundations for a World Knowledge Dialogue (edited by Frédéric Darbellay et al. 2008)

[6] The initial coinage of transdisciplinarity, building on Jean Piaget (1972) and Andre Lichnerowicz' contributions at the OECD conference, was conceived as a "common system of axioms" that transcends disciplinary boundaries through an "overarching synthesis" as a kind of universal interlanguage with view to the internal dynamics of science. (Thompson Klein 2010: 24) Since then the debate has moved on and currently understands transdisciplinarity as heterogeneous rather than homogenizing practice, which accepts and respects plurality and diversity. This includes a similar critical view on so-called "holistic" approaches that neglect heterogeneity.

[7] See also article 3 in The Charter of Transdisciplinarity (Freitas et al. 1994).

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* A version of this paper was published through SEAD white papers. For more information please see: http://seadnetwork.wordpress.com/seed-questions-for-sead-report/

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