CQUniversity, Australia

Clive Graham & Donna Lee Brien

Beyond both literary and writing studies: using transdisciplinary studies to facilitate mode 2 learning in the creative industries and creative arts

Abstract:

This paper looks beyond both literary studies and writing studies as individual disciplines, to investigate how a transdisciplinary approach can be mobilised in educational contexts in order to facilitate Mode 2 learning in the creative arts, where a Mode 2 knowledge approach is that which focuses on the creative use of knowledge and skills for problem-solving. The examples outlined in this paper reveal include own shift to an approach where the foundation of our teaching and learning has become based upon the industry-based problems faced by working professionals. In our situation, this is an approach that has come about in response to the strong demand for innovators to drive the economic advantages of creative industries in many developing nations (see, for example, Florida 2002).

Biographical notes:

Clive Graham is a Senior Lecturer at CQUniversity, Australia and academic coordinator of the Creative Enterprise area. He is also CEO of The Centre for Working Futures and the author of numerous texts including "Enterprise Education: Connecting Schools to the Creative Knowledge Economy", "Negotiating China", "Negotiating the Middle East" and "Negotiating India". He received a Law Foundation Fellowship and a Commonwealth Project Fellowship to research overseas developments in mediation and negotiation and was awarded the Queensland Award for Excellence in Educational Research in 2005. Clive was an advisor for the national Enterprise Education project and for the advancement of CIE (Creativity, Innovation, Enterprise) in both Singapore and Australia. His most recent research has been on the potential of the Creative Industries in Bangkok and Shanghai.

Donna Lee Brien is Associate Professor of Creative Industries; Acting Dean, the School of Creative and Performing Arts; and Acting Director of the Central Queensland Conservatorium of Music at CQUniversity, Australia. Founding Editor of *dotlit: The Online Journal of Creative Writing* (2000-2004) and *Assistant Editor of Imago: New Writing* (1999-2003), Donna is currently an Associate Editor of *New Writing: The International Journal for the Practice and Theory of Creative Writing* (UK), Special Issues Editor for *TEXT: The Journal of Writing and Writing Courses*, and the Immediate Past President of the Australian Association of Writing Programs.

Keywords:

Transdisciplinary studies—Creative arts—Mode-2 learning

Introduction: defining transdisciplinarity

In higher education, the terms multidisciplinary and interdisciplinary have been used to describe ways of working within, and across, a number of academic disciplines. Multidisciplinary approaches to teaching and project research involves several disciplines working in parallel but is limited to the framework of a single discipline in framing the approaches to that teaching or research (Nicolescu 2007: 4). Interdisciplinary projects, in contrast, involve several disciplines integrated by way of the transfer of methods from one discipline to another (ibid). The kindred term 'transdisciplinarity' is used in a number of different contexts. These include in what could be called 'new age' contexts such as when Boothby (2001) explores a transdisciplinary approach to Maharishi consciousness which aims to establish a set of universal principles that can be located in all disciplines in order to provide a unified and coherent view of the elements of the transcendental meditation technique, and Negre's (1999) attempt to unify Jungian psychology, quantum realities and Ptolemaic symbols in a transdisciplinary model of the universe as an indivisible totality. The second is in the context of unifying various approaches to knowledge that exist in what could be described as multiple, co-existing realities. This context, as asserted by the International Centre for Transdisciplinary Research (CIRET) (1994), has a large following who believe that 'subjecting the human being to reductive analyses within a framework of formal structures is incompatible with the transdisciplinary vision ' (CIRET 1994: Article 1). This is due to the core 'recognition of the existence of different levels of reality governed by different types of logic ' (CIRET 1994: Article 2). Essentially, this theoretical concept of transdisciplinarity assumes the quantum logic of multiple realities as iterated by the wave-particle duality identified by Niels Bohr and Werner Heisenberg that repudiates the classical concepts of wave and particle.

As developed by Nicolescu (2007), transdisciplinarity involves a complex structure of multiple levels of reality: 'every level is what it is because all the levels exist at the same time '. With reference to the theory of Stephan Lapasco (1951), Nicolescu (1999a: URL) reasons:

> If one remains at a single level of Reality, all manifestation appears as a struggle between two contradictory elements (example: wave A and corpuscle non-A). The third dynamic, that of the T-state, is exercised at another level of Reality, where that which appears to be disunited (wave or corpuscle) is in fact united (quanton), and that which appears contradictory is perceived as non-contradictor.

While this may at first seem somewhat abstruse, it is a popular theory of transdisciplinarity in which analogous thinking (from numerous disciplines) is employed to reconcile apparently irreconcilable differences and, in the process, the distinctions between discrete disciplines might also be reconciled. The CIRET model of transdisciplinarity thus ponders an altruistic 'return to a Golden Age ' (Nicolescu 1999b) of knowledge production, as much as unifying knowledge for solving problems:

> ... transdisciplinarity takes into account the consequences of a flow of information circulating between the various branches of knowledge, permitting the emergence of

unity amidst the diversity and diversity through the unity. Its objective is to lay bare the nature and characteristics of this flow of information and its principal task is the elaboration of a new language, a new logic, and new concepts to permit the emergence of a real dialogue between the specialists in the different domains of knowledge.' (CIRET 1987: Article 3)

Alongside this theoretical context, transdisciplinarity is also used as a phenomenological concept in relation to a form of knowledge production that is especially attuned to economic imperatives (Gibbons *et al* 1994; Nowotny *et al* 2001). Whereas the CIRET model perceives the fragmentation of knowledge into disciplines as leading 'man to see himself as a stranger in a world invaded by an incomprehensible complexity ' (CIRET 1987: Article 2) and as throwing 'open the doors to absurdity, to non-sense, to violence and to implacable dynamic of self-destruction ' (ibid), phenomenological transdisciplinarity gathers empirical and social evidence to portray the modern phenomenon by which industry contextualises knowledge in economic production by transgressing academic disciplines for economic advantage in what Graham (2005) describes as 'knowledge capitalism '. As described by Gibbons, Nowotny *et al*, the moral project of CIRET's theoretical transdisciplinarity gives way to capital advantage in phenomenological transdisciplinarity. Whereas the CIRET transdisciplinary model conceives 'a new scientific and cultural approach ... in an attempt to reconstitute a coherent picture of the world ' (CIRET 1987:2), phenomenological transdisciplinarity sees humankind as being democratically empowered by the transdisciplinary production of new knowledge. This democratic empowerment involves the ability to accept or reject scientific knowledge in a socially robust socio-economic milieu (Nowotny *et al* 2001).

Transdisciplinary and the creative arts

Within these three differing but related contexts, a number of variations exist that further differentiate the transdisciplinary approach. For example, Ramadier (2004) conceives transdisciplinarity as a collaborative, creative, higher order thinking that allows the integration of consciousness; Thompson-Klein (2004) refers to transdisciplinarity as a methodology to produce new knowledge and new resolutions to problems; and Max-Neef (2005) proposes that transdisciplinarity is a means of coordinating various levels of knowledge production from the empirical to the values-oriented.

This paper thus works from the phenomenological transdisciplinary perspective developed by Gibbons and Nowotny and their co-authors, but inflected by aspects of the collaborative, creative and higher order thinking of Ramadier, the problem solving focus of Thompson-Klein, and the values-oriented attitude as indicated by Max-Neef. From the perspective of the creative arts, our way of understanding transdiciplinarity thus has clear linkages to the current academic and higher education bureaucratic interest in identifying, supporting, exploiting and accounting for the influence and outputs of what is now widely known as the creative industries sector, as well as the

collaborative, creative, problem solving and value-oriented approach that many academics and students in the creative arts work within.

This discussion also brings our own experiences both inside and out of the academy in creative arts projects that have involved representatives of more than one discipline, where those discipline representatives worked together to solve complex problems, and where the actual frame put around that project transcended any single disciplinary perspective. We have also both experienced working within work units which were forced amalgamations of disciplines (into large schools and faculties), where there was a significant framing rhetoric of multi- inter- and even transdisciplinary approaches, but where discipline silos continued to operate and were often even encouraged or mandated by various operational processes and structures. (The various research evaluation exercises in Australia (the ERA), New Zealand (REA), UK (RAE) and other countries, for instance, actively encourage a single disciplinary perspective.)

Transdisciplinarity and its value

More than a decade ago, Gibbons *et al* demonstrated that only some five per cent of the population of practicing academic knowledge producers were, at that time, making the majority of scientific advances (1994). Interestingly, these advances largely involved cooperative ventures between universities, governments and industry, and were termed as 'Mode-2 knowledge production' (Gibbons *et al* 1994). In 2001, Nowotny *et al* broadened the distinction between Mode-1 (that is, traditional single discipline-based research/knowledge production) and Mode-2 knowledge production to one in which these modes represent two contrasting forms of economies: those of high modernity and post-modernity respectively (2001). Other researchers, for example Chabbal and Chesnais (1992), had previously advocated the need for knowledge production to be regarded as a function of the market and society's needs, but it was Gibbons *et al* (1994) and Nowotny *et al* (2001) who documented the transition from Mode-1 disciplinary-based, university-centred knowledge production to a Mode-2 transdisciplinary knowledge production system that moves outside the university to partner with industry and governments who are all seeking global socio-economic advantage.

Integral to Gibbons and Nowotny's theses is the concept of the 'agora', the ancient Greek public open space used for assemblies, markets and other collective activities. Nowotny *et al* (2001) contend that in Mode-2 society, science is opened to, and conducted by, people other than scientists who collectively collaborate on socially generated problems in the public arena. In this public agora, science is regulated not by Mode-1 homogenous knowledge producers (scientists/academics) but by a social robustness test (Nowotny *et al* 2001). Social robustness in this context is tested by the disparate and potentially in-conflict project participants, who operate in what Nowotny *et al* refer to as a mode whereby the context 'speaks back ' to science. For example, the most popular selling model of mobile phone may not necessarily be the most superior technically, but perhaps one with the most 'bells and whistles' that appeal to the 15 to 25 age demographic which is less concerned with technical superiority than with gadgetry. In response to this demographic, research and

development departments in telecommunications spend as much money perfecting gadgetry as they do technology. Science is thus contextualised in the economic as much as in the scientific realm, and social demographics speak back to knowledge producers by way of market purchases. Nowotny *et al* (2001:65) acknowledge that this is the 'sense that we talk of the contextualisation of science, as an enlargement of its scope and an enrichment of its potential, and not as an instrumentalist alternative '.

In a Mode-2 society, the cognitive authority of academia is thus diminished and, in order to maintain public confidence, the agora—the multiple demographic of the users of scientific knowledge—assumes a dominant position for the regulation of that knowledge. A society operating in Mode-2 thus implies the contextualization of knowledge production that is simultaneously socially robust but individuated according to the multiple demographics of the uses of scientific knowledge and therefore devoid of the metanarratives of Mode-1 modernism. In Mode-1 society, what constitutes what can be termed 'good' writing, art and music, for example, is determined by the relevant academic fraternity. In Mode-2 society, knowledge producers respond to the multiple values of different demographics such that the knowledge itself becomes the significant driving force of the social, political and economic institutions that trade knowledge as capital. In Mode-2 society, the notion of defining what is 'good' thus shifts to the agora where 'good' is determined by the conflicting demographics who define the multiple contexts of application and economic viability.

In their pursuit of innovation as capital to be traded in the global economy, Mode-1 nation-states transition their control of knowledge to a Mode-2 global knowledge democracy. This knowledge democracy is facilitated by the information technologies that compress space, time and distance (Nowotny *et al* 2001) and thereby accelerate the growth of knowledge capitalism. Hence, knowledge is becoming increasingly defined in terms of its economic value, and the highest valued information and knowledge moves beyond the locus of the nation-state into the global economy generating economic prosperity. Further development of innovation is encouraged by the global interconnectedness of individuals, enterprises and nations, providing the opportunity and capability to connect for knowledge-intensive and learning-intensive relationships that ultimately determine the socio-economic position of individuals, firms and even nations.

The primary driver for curriculum and pedagogy to incorporate both information about, and ways to actualise, this global connectivity is to enhance students' potential to become innovators. This requires forging global networks, adopting and responding to international values, and mixing and morphing knowledge(s) and approaches to knowledge to create knowledge. Thus, transdisciplinarity is emerging as a promising instrument of knowledge production for individuals in the higher education system, because it embraces inquiry and innovation in the multifarious setting of the global society rather than solely in the insular discipline, institute or nation-state itself. This is important as, in the global milieu, societies (and the individuals within them) face complex, multidimensional problems that cannot be resolved within a single disciplinary framework but which require knowledge (including diverse methodological approaches) from multiple disciplines. Current world problems such

as how to ensure environmental sustainability, food security, health and eradicate poverty have been expressed in these terms. For example, McMurtry (2000) refers to a broad transdisciplinary mix of environmental policy, social science, biology and ethics for the study of ecological issues; the US National Cancer Institute funds transdisciplinary research involving biology, genomics, and genetics to determine behavioural, socio-cultural, and environmental influences upon nutrition, physical activity, weight, energetics, and cancer risk (National Cancer Institute US 2010); the Parsons New School of Design, New York, offers a transdisciplinary Master of Fine Arts that applies design thinking to study the intersection of cities, services and ecosystems (Core77 2010); and the Duke University Transdisciplinary Research Prevention Centre integrates eight administrative departments and seven disciplines, ranging from pharmacology and genetics to economics and sociology, to foster the innovative translation of theories across disciplines and projects (Duke University 2010). This is because, by combining different types of knowledge and knowledge-producing methodologies from different disciplines, transdisciplinarity produces knowledge in which 'the whole is more than the sum of its parts ' (Ramadier 2004: 432)—unifying disparate pieces of, and ways to, knowledge to create 'a new knowledge mix'. It is thus that Nicolescu (2007: 4) defines transdisciplinarity as:

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

As Wickson *et al* (2006) note, transdisciplinarity is also characterised by its nature as an applied system—as we are asserting above in its application to societal problems. In this, it is a system of problem solving that could be said to operate 'in the world and in an actual way' rather than 'in my head and in a more conceptual manner'. This can, obviously, operate in an altruistic manner, but also has personal and supra-advantages.

The creative industries sector—those knowledge-intensive industries that rely on creativity and talent as core attributes, and that systematise and circulate the intellectual property generated by these creative workers—has increasingly been recognised as sustaining the growth momentum of advanced economies. The central tenet of the creative industries is that the creative arts are not a discrete realm of society, relevant only to an elite group of artists and connoisseurs, but a vital part of contemporary business, making a significant contribution to local communities and national economies as well as individual lives. Although recognised before Richard Florida popularised the term (see, for example, Landry 2000), Florida's influential analysis of the ways in which creative individuals both contribute to a nation's economy and reinvigorate the locations in which they live, set a now international agenda with statements such as the following: 'Any country that doesn't keep building its creative strengths—with broad support for creative activities, and with policies that bring more citizens into the creative sector rather than under-employing them—will fall behind ' (2002).

The connection between knowledge production and economic advantage underpins Florida's documentation of the rise of what he terms a 'creative class ' who, he

asserts, constitute a considerable component of the USA workforce and who have a higher than average annual income (Florida 2002: 76). Florida's research has been duplicated in Australia, Canada and the United Kingdom with similar outcomes that seeks to demonstrate that the creative class is the driver of economic advantage for both the individuals involved as well as the companies, institutions and countries in which they work.

Barriers to transdisciplinarity

In universities, overcoming the rigidity of mono-disciplinarity in siloised organisational structures is a challenge for advocates of transdisciplinarity. Despite sometimes adopting Florida's findings as a rhetorical underpinning to ways of clustering disciplines in organisational structures, universities have been slow to implement real, functioning transdisciplinary mixes, whether in approaches to learning and teaching, or to research. Max-Neef notes that the power of individual disciplines is significant inside individual institutions

> … for the maintenance of disciplinary autonomies, for the competition of research funds, and for the consolidation of academic prestige. Professors and disciples develop and enhance disciplinary loyalties up to the point of frequently feeling that theirs is the most important of the entire University (2005: 6).

It is, often, difficult, for instance, for different organisational units to agree on mechanisms to fund, let al one facilitate, cross-unit teaching or research student supervision. In Australian universities, moreover, individual creative arts disciplines have struggled to find a home among a series of multi-disciplinary contexts that have neither particularly welcomed them nor embraced them to the point of delivering collaboratively developed approaches. The tensions between the creative writing and literature disciplines is an example of this dissonance. In (a valid) response, many individual disciplines have developed their own professional organisations (such as the Australasian Association of Writing Programs for writing, and NACTMUS for music). While there are current discussions in Australia regarding defining common standards of achievement for all levels of undergraduate and postgraduate course work degrees for the creative arts as a group, other broad subject areas, such the Humanities, are defining their standards discipline by discipline, for example, separately in History from Geography (ALTC 2009).

International examples

Models do, however, exist. The US National Science Foundation Integrative Graduate Education and Research (IGERT) scheme has, for example, funded more than one hundred doctoral programs that have produced interdisciplinary research graduates skilled in at least two disciplines (NSF 2010). Manathunga *et al* (2006) describe one such PhD program at the University of Texas in Austin, which involves a dual advisory structure, multidisciplinary coursework, and research utilising at least two different disciplines. These examples have in common, as most degrees operating in this area, the mobilisation of a post-graduate transdisciplinary research pedagogy.

Examples at a coursework level are rare, but include the Parsons New School of Design's Master of Fine Arts (Transdisciplinary Design) referred to above (commences in September 2010), and the Zurich University of the Arts' (ZUA) Transdisciplinary Master of Arts, allegedly the first course of its kind in Europe, which has the following rationale:

> The transdisciplinary MA takes a coherent transdisciplinary approach to 'multimedia'. There can be no doubt that business, politics, and society are strongly interrelated as are the various disciplines in the arts and design. Transdisciplinarity is now conceived as a form of cooperation between various disciplines committed to jointly developing new perspectives, questions, and solutions. Transdisciplinary processes are essentially rich in innovation, calling for a professional approach to establishing and analyzing such practices and their contexts. The transdisciplinary MA focuses on the current interaction between the various arts, design, and other areas of society. It investigates how such interaction emerges, how it needs to be understood and analyzed, and how it can be developed further in other practice (Zurich University of the Arts 2010: URL).

The degree admits students on the basis of a bachelor degree in 'the arts, design, architecture, science, the humanities and cultural studies, economics, or other degrees aligned with the MA profile ' (ibid). In line with the concept of joint venture that permeates the societal nature of transdisciplinarity, team applications are accepted for groups of students to work together. The curriculum and pedagogy of this program focuses on harnessing and developing a wide-ranging set of skills in its students. These are described as:

> analytical skills for transdisciplinary work situated between the arts, design, and other fields; practical skills for transdisciplinary art projects, demonstrating the ability to take position in such fields; and interdisciplinary transfer skills, enabling graduates to understand and connect the terms and content of various discourses ' (ibid).

Defining transdisciplinarity as 'a third, higher-order principle emerging between the arts, design, and other areas of society ' (ibid), the degree requires students to integrate various disciplines, theoretical positions, media, social and artistic events, and forms of practice that transcend disciplinary boundaries. Focussing student work on 'the analysis and use of artistic strategies in different areas within and beyond the arts ' (ibid)—an echo of Nicolescu's definition above—the program, therefore, and interestingly, requires students to work in collaboration with institutions based neither in the arts nor design on the basis that transdisciplinarity arises when people from significantly different disciplines 'collaborate to create new and unprecedented work involving innovative formats ' (ibid). Its graduates are examined on their abilities to work across a range of contexts ('to interrelate social, political, and economic contexts as well as develop new forms of cooperation between various fields '), abilities which, the degree promises, will service them in the 'unforeseeable professional roles ' (ibid) that we are often told will comprise the future workplace.

Professional Doctorate (Transdisciplinary Studies)

Based on Mode-2 transdisciplinary problem solving and research as described above by Gibbons *et al* (1994) and Nowotny *et al* (2001), and first offered in 2000, this coursework postgraduate award was consciously developed as a shift away from traditional approaches to one where the foundation of our teaching and our students' learning was consciously focused on solving the (often complex) industry-based problems faced by working professionals. Developed initially for international students coming to Australia to study, this was a response to the strong demand for innovators in many of the developing nations from which our students came. Candidates were thus required to identify and then to work to solve practical problems in the day-to-day life of their professions and organizations, rather than being focussed on interests which could be classified as those of a purely 'academic' nature or of a single discipline. As uch work focuses on solving socially and/or commercially relevant problems, the research undertaken n this degree aims to produce a 'product', which is defined as 'a practical application'. The research outcome could therefore be expressed in a written report or as a 'product' in the sense of an innovation: for example, a computer program, literary, musical or other art form, or new policy provided the research was conceptualized as a 'generator of the future ' in terms of the identified problem (CQUniversity 2008: 12). The research process was supervised a university-based academic supervisor and an industry-based project advisor, and examination of the result was similarly shared by external academic and industry-based experts. This professional doctorate, thus, represented a departure from the traditional mono-disciplinary doctorate to one aiming to 'create a substantial new base of business and a new basis for competitiveness ' (Graham & Smith 2002: 7), for the individuals involved, as well as the countries which often sponsored these students' study with national scholarships.

The Professional Doctorate (Transdsiciplinary Studies) has graduated thirty-five transdisciplinary doctors to date and has been embraced by a number of international and Australian professionals not wishing to pursue an academic career but to become industry leaders. Transdisciplinary research outcomes involve music, culture, welfare, education, housing, e-government, transport, engineering and many other applications. One Professional Doctorate research project of relevance to the creative arts involves a model for a Virtual Conservatorium of Music. Utilising studies of a transdisciplinary mix of electronic delivery, intensive mode delivery, software based learning activities, and industry mentors to accommodate students from multiple locations with multiple learning requirements to attain industry standards, the complexity of the topic and disciplines involved required collaborative research. The researchers refer to this as a 'new conservatorium for a new economy ' and the research was nominated for a Telstra innovation award **(**Bofinger and Whateley: 2003). Another Professional Doctorate research project integrates Florida's concept of the creative class with the Sufficiency Economy Philosophy of King Bhumibol Adulyadej of Thailand in order to facilitate the transition of the Thai economy into the global knowledge economy by increasing creativity in Thai secondary education (Pengnate 2009).[1]

Master of Creative Enterprise

Our Master of Creative Enterprise similarly embraces a transdisciplinary dynamic, but this time in a purely coursework and project format. This program draws on multiple disciplines within the creative arts including creative writing, visual arts, theatre, music, film and television, broadcasting and web casting, fashion, graphic and web design, and events management, and organises these within a creative industries and communication arts framework. The content of this coursework Masters degree attempts to integrate theory, critical thinking and creativity, and apply this directly to the student's cultural and social context and their possible future employment and/or creative directions. In consequence, the degree attracts students from diverse cultural backgrounds, a factor which has led to heightened awareness among lecturers of ways to facilitate inter-cultural academic excellence by way of culturally sensitive program design and assessment (Graham 2008). Students graduate with a work-ready portfolio and theories, principles and practices developed during the degree are transferable to creative practice, innovation and entrepreneurship across a broad range of professional creative arts contexts.

Concluding remarks

Thus, with consideration of the economic transition to Mode-2 knowledge production and society, the authors of this paper suggest that literary and writing studies could more widely embrace transdisciplinarity by way of an integrated Mode-2 approach to the creative industries and creative arts. The model to achieve this should not simply concern transdisciplinary research, which seems to be well documented in academic literature, but focus on practice and application consistent with the Mode-2 theses of Gibbons *et al* (1994) and Nowotny *et al* (2001) to facilitate the development of emergent professionals with skills and knowledges that are flexible and responsive enough to take advantage of the new global economy and our students' need to find a place in it.

Endnotes

1. In response to proposed revisions of the Australian Qualifications Framework, the degree was subsumed by the wholly research Doctor of Professional Studies in 2008. This draws partly from the transdisciplinary base, but reverts to a more traditional academic research model in terms of the option to contain research within the mono-disciplinary framework of a particular profession.

Works cited

Australian Learning and Teaching Council (ALTC) 2009 *Learning and Teaching Academic Standards* project, Sydney: Australian Learning and Teaching Council
http://www.altc.edu.au/standards/overview, (accessed 1 August 2010)

Bofinger, I & Whateley, G 2003 'The Virtual Conservatorium', research project submitted in partial fulfilment of the requirements of the degree of Professional Doctorate, D.Prof (Transdisciplinary Studies), Rockhampton: CQUniversity Library

Boothby, S 2001 *Supplementing Interdisciplinary Studies Programs with a Consciousness-based Transdisciplinary Approach to Increase Students' HolisticDevelopment* http://horizon.unc.edu/conferences/lc/papers/15.html, (accessed 3 July 2010)

Chabbal, R and Chesnais, F 1992 'Tecnologia, crescimento e desenvolvimento: impasses edesafios do final do século XX' *Sociedade e Estado*, VII: 1-2, 7-33

CIRET (International Center for Transdisciplinary Research) 1987 *Moral Project* http://basarab.nicolescu.perso.sfr.fr/ciret/english/projen.htm, (accessed 3 July 2010)

CIRET (International Center for Transdisciplinary Research) 1994 *Charter of Transdisciplinarity, adopted at the First World Congress of Trandisciplinarity, Convento da Arrábida, Portugal, November 2-6, 1994)*, http://perso.club-internet.fr/nicol/ciret/english/charten.htm, (accessed 3 July 2010)

Core77 2010 'Parsons launches new MFA program in transdisciplinary design', 18 February, http://www.core77.com/blog/education/parsons_launches_new_mfa_program_in_transdisciplinary_des ign_15983.asp, (accessed 3 July 2010)

CQUniversity 2008 *The Professional Doctorate* [brochure], July, Rockhampton: CQUniversity

Duke University 2010 'Transdisciplinary Prevention Research Center', http://www.childandfamilypolicy.duke.edu/project_detail.php?id=10 (accessed 3 July 2010)

Florida, Richard 2001 *The economic geography of talent*, Working Paper, Heinz School of Public Policy and Management, Pittsburg, PA: Carnegie Mellon University

Florida, Richard 2002a *The Economic Geography of Talent*, UK: Blackwell Publishing

Florida, Richard 2002b *The Rise of the Creative Class*, New York: Basic Books:

Florida, Richard 2003 'Cities and the Creative Class', in *City and Communication*, Washington DC: American Sociological Association

Florida, Richard, Charlotta, M and Kevin, S 2007 'Inside the Black Box of Regional Development: Human Capital, the Creative Class and Tolerance', *CESIS Electronic Working Paper Series*, paper 88, at http://www.infra.kth.se/cesis/documents/WP88.pdf, (accessed 7 December 2007)

Gibbons, M, Limoges, C, Nowotny, H, Schwartzman, S, Scott, P and Trow, M 1994 *The New Production of Knowledge*, London: Sage Publications

Graham, Clive 2005 *Enterprise education: connecting schools with the creative knowledge economy*, French's Forest: Pearson Education

Graham, Clive 2008 'Leading Inter-Cultural Academic Excellence By Way of Culturally Sensitive Assessment ', UNESCO Conference *Proceedings*, Southern Thailand: Prince of Songla University, April

Graham, Clive & Smith, Richard 2002 'Transdisciplinarity in practice: the Central Queensland University professional doctorate', paper presented at the *Fourth International Professional Doctorates Conference*, Brisbane

Lupasco, S 1951 *Le principe d'antagonisme et la logique de l'énergie,* Paris: Éditions Hermann

Manathunga, C, Lanta, P and Mellicka, G 2006 'Imagining an interdisciplinary doctoral pedagogy' *Teaching in Higher Education* 11: 3, 365-379

Max-Neef, M 2005 'Foundations of transdisciplinarity' *Ecological Economics* 53, 5-16

McMurtry, R R 2000 'Reflections on Transdisciplinarity', in MA Somerville and D.J Raport (eds) (2000) *Transdisciplinarity: Recreating Integrated Knowledge*, Oxford: McGill-Queens University Press

National Cancer Institute US 2010 'Transdisciplinary Research on Energetics and Cancer (TREC) Centers http://cancercontrol.cancer.gov/trec, (accessed 3 July 2010)

Nègre, A 1999 *A Transdisciplinary Approach to Science and Astrology* http://cura.free.fr/quinq/02negre2.html, (accessed 3 July 2010)

Nicolescu, B 1999a 'Gödelian Aspects of Nature and Knowledge', *Bulletin Interactif du Centre International de Recherches et Études transdisciplinaires*, 12 (February) http://perso.club-internet.fr/nicol/ciret/bulletin/b12/b12c3.htm, accessed July 2010

Nicolescu, B 1999b *A New Vision Of The World: Transdisciplinarity* http://perso.club-internet.fr/nicol/ciret/english/visionen.htm, (accessed 3 July 2010)

Nicolescu, B 2007 'Transdisciplinarity as Methodological Framework for Going Beyond the Science-Religion Debate', Transdisciplinarity and the Unity of Knowledge: Beyond the 'Science and Religion Dialogue *Metanexus Conference* at http://www.metanexus.net/magazine/tabid/68/id/10013/Default.aspx, (accessed 17 August 2010)

Nowotny, H, Scott, P and Gibbons, M 2001 *Re-Thinking Science: Knowledge and the Public in an Age of Uncertainty*, Cambridge: Polity Press

NSF National Science Foundation 2010 *Crosscutting and NSF-wide Active Fundin*g *Opportunities* http://www.nsf.gov/funding/pgm_list.jsp?type=xcut.)accessed 3 July 2010)

Pengnate, W 2010 'A Policy Proposal to Develop a Creative Class in Thailand by Way of Secondary Education Reform', research project submitted in partial fulfilment of the requirements of the degree of Professional Doctorate, D.Prof (Transdisciplinary Studies), Sydney: CQUniversity

Ramadier, T 2004 'Transdisciplinarity and its challenges: the case of urban studies' *Futures* 36, 423-29

Thompson Klein, J 2004 'Prospects for transdisciplinarity' *Futures* 36, 515-26

Wikson, F, Carew, AL, and Russell, AW 2006 'Transdisciplinary research: characteristics, quandaries and quality' *Futures* 38, 1046-59

Zurich University of the Arts 2010 'Transdisciplinary Master of Arts' http://www.zhdk.ch/index.php?id=8055, (accessed 3 July 2010)