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# Learning to Survive: Wicked Problem Education for the Anthropocene Age

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## Abstract

This article addresses major lacunae in higher education from the standpoint of Anthropocenic survival. *Wicked problems* transcend national, cultural and disciplinary boundaries. Eco-survival, international migration, destabilized global markets, shifts in the balance of strategic power, population pressures, cultural imperialism, post-secular quests for meaning-in-life, ambivalence of bio-scientific progress, to name a selection, are *global*. The case is put that features of a *postmodern* orientation to the academic curriculum—transdisciplinarity, transnationalism, wicked problem engagement—are better equipped to meet the *fuzzy* knowledge interests of tomorrow's world than traditional mono-disciplinary curricula. However, both subject-based and transdisciplinary approaches can coexist with profit in the education of tomorrow's global citizens. A paradigm shift in how we educate for survival is proposed here.

**Keywords:** Anthropocene, curriculum, internationalization, paradigm shift, transdisciplinarity

“[N]o society can predict, scientifically, its own future states of knowledge.”  
(Popper, 1962, p. viii)

## Introduction

### *Wicked Problems in Anthropocenic Perspective*

All roads lead to the Anthropocene. The human-made environment threatens global extinction. This article addresses major lacunae in higher education from the standpoint of Anthropocenic survival. *Wicked problems* (WPs) may be defined as multi-faceted, complex, changeable problems of indeterminate scope and scale which defy definitive formulation, have no foreseeable *once and for all* solutions, transcend national, cultural and disciplinary boundaries, and engage the scientific, intellectual, political, economic, technological and ideological concerns of multiple stakeholders with diverse and frequently competing perspectives and interests (Brown, 2010; Rittel & Weber, 1973; Weber & Khademian, 2008; Weber et al., 2017). Eco-survival, international migration, destabilized global markets, shifts in the balance of strategic power, population pressures, cultural imperialism, post-secular quests for meaning-in-life, ambivalence of bio-scientific progress, megafire hazards, to name a selection, are examples of global WPs.

As poverty alleviation might be deemed the *conscience problematic* of the last century, global warming can be regarded as the universal conscience issue poster case of the early decades of the third millennium. The two uber-wicked problems are inextricably connected (Sedmak, 2016) and, as such, are but the tip of a vast and looming *post-natural age* (Arias-Maldonado, 2016, p.1)

wicked problem iceberg. We are, after all, “an infrastructure species”, as Purdy calls us in *This Land Is Our Land* (2020, p. 78). The combined effects of planetary threats of such magnitude—some would say, immanence—are, if nothing else, educationally pressing. Knowledge, *transformative education* sensitively calibrated to wicked problem existential reality, may be the only conscientious survival power available. Can it be channeled for the common good?

The case is presented that salient features of a *postmodern* orientation to the academic curriculum—transdisciplinarity, transnationalism, wicked problem engagement—are better equipped to meet the *fuzzy* knowledge interests of tomorrow’s world than traditional single subject disciplinary structures. However, both subject-based and transdisciplinary approaches can coexist with profit in the education of tomorrow’s global citizens. The big risk issues confronting planetary survival are numerous and growing in number, scale, complexity, impact, and in capacity, to propel life—albeit not, it is vital to emphasize, inexorably—towards Armageddon (Willis & Willis, 2005). Anthropocenic problems are, indeed, *wicked*, in both the intellectual and ethical senses of the term. International reports abound on the issues involved. From the Brandt Reports of the 1980s (Quilligan, 2002) to the World Wildlife Fund Report of 2018 (Grooten & Almond, 2018), the *grand narrative* is the same: Act now to avoid Apocalypse. The *Schoolchildren’s Protests and Extinction Rebellion* of 2019 that emerged in many cities around the globe are an indication of the contemporary depth and gathering momentum of public concern. And, perhaps, the educational potential to serve future generations.

As primarily global risk issues, whose definition and ramifications transcend the knowledge boundaries of single academic disciplines or of neighboring subject areas working in close intellectual cooperation, considerable intellectual and diplomatic burdens are placed upon those who would take up the professional pedagogical challenges in this area. The ground has been partially tilled, of course, by valuable, if relatively small-scale, and limited interdisciplinary exercises in which colleagues from different, usually adjacent, academic fields come together on a research project or as part of a volunteer teaching team. More than a duo or trio of the like-minded would be rare; and comprehensively transdisciplinary teams and full-on WP-centred programmes rarer still, like stardust. Finding scarce curricular space within a module or a unit within a subject-based teaching programme is not straightforward. It cannot be stressed enough, however, that WPs exceed the unavoidably limited *territorial* intellectual boundaries and restricted sapiential horizons of subject-based education. Those brave intrepid souls who attempt to open up a local wicked furrow here or there share the same kind of daring pioneer spirit as the astronauts. They cannot know exactly what they will unearth. A pedagogical starship enterprise indeed!

As a concept, the Anthropocene awaits full scientific approval. For its critics, it is part of the intemperate vocabulary of a self-righteous and mordant millenarianism (Horowitz, 2020). However, it has been carried along beyond the lunatic fringe within an increasingly powerful thought-stream continuously refreshed by a motley crew of mystics and spiritual guides, academics and scientists, documentary filmmakers, politicians, celebrities, public intellectuals—Sir Lauren van der Post, Teilhard de Chardin, Fred Pearce, Chico Mendes, Jane Goodall, Al Gore, Douglas Adams, Jane Fonda, Sir David Attenborough, Princes Charles and William, Elizabeth Kolbert, Leonardo DiCaprio, Peter Sale, for example (Lewis & Maslin, 2015; Pearce, 2007)—to denote the influence, often malignant and species-threatening, of human behavior over centuries on the evolution of Life and on the material structures, processes and possible futures of the Earth (Davies, 2016; Ellis, 2018). Thunberg (2019) may be the new kid on the Anthropocene block, but

she stands on the shoulders of strange bedfellows united in common cause. In some versions of the narrative, the scale change and the acceleration of the human effects on the planet are such as to constitute a new geological epoch (Lewis & Maslin, 2018; Moore, 2016;). Shrouding the story of the Anthropocene (Bonneuil & Fressoz, 2017) is a host of nightmarish terms—doomsday, end-times, Armageddon, global holocaust, extinction—to pluck a few from the catalogue of doom. The sense of a tipping-point pervades the subject, a hunch that the future of everything recognizable as life hangs in the balance (Dawson, 2016; Hamilton, 2017). Each new scenario outdoes the previous one in its horrifying portrayal of what the human-made order of things has become (Wojcik, 1997).

What humans have made—the human-made world that engulfs Nature—threatens, like Frankenstein, to put the matter dramatically, to destroy its makers. How, then, is education in *planetary citizenship* (Haigh, 2008) feasible when the very survival threats facing the life-world in all its modalities and forms are themselves largely products—unintended and generally unforeseen, to put the most benign *human* species-friendly spin on it—of the very educational systems inherited and autopoietic? What *become* globalized problems have at least some of their deepest roots in knowledges—misapplied, tainted by maladroitness motives, developed in the wrong direction, though they may in cases be—in schools, colleges, universities, and corporate laboratories. Nevertheless, WPs do not start off as global or wicked. They develop that way over time, under variable circumstances, at different rates. Here is not the place to provide natural histories of such phenomena or their imputed malevolent cosmic genealogy. The point is that education and research, unavoidably, as the engine and driver of new knowledge and its diffusion, have had a part to play and will continue to have a part—for good or ill—in their genesis and evolution as new WPs emerge in the future, as surely as night follows day. Evidence-based education wisely tuned to the nature and scale of the issue(s) to hand, can—must—have a part to play, too, in their future identification, analysis and remedy, albeit exactly what part cannot yet be known, and can, at best, only be conjectured (Popper, 1969).

A free space for *wild thinking* has opened, perhaps. Vital, here, is a place for hope and optimism lest future generations become confined within a straitjacket of pessimism and despair. The paradox of research-led education, particularly in the secular scientific age, is that while it equips humankind to progress in so many ways and directions, technological, political, social and cultural; at the same time, it provides the technical and scientific means and, some, an anti-science lobby might suggest (Berners-Lee, 2019; Money, 2019) the *mentalité*, for planetary self-destruction. Nuclear and chemical weaponry, toxic plastics, pesticides, global warming itself all-too-readily spring to mind in this context. Are non-toxic, non-lethal, systems of production, distribution and consumption possible in the late modern era? Is regress to *stone-age economics* the only benign answer? *Wicked problem education* (WPE) provides an opportunity-context for paying these matters sustained attention at stages in life when thought-modes, attitudes and hearts have not entirely hardened.

WPE is the transdisciplinary academic study of boundaryless global risk issues. This article constitutes a meta-level analysis of transdisciplinary education appropriate to the multifaceted *big issues* confronting global life. WPE it is suggested here, may be the best investment, not only for *another possible economy* (Castells, 2017), but for Anthropocenic damage-limitation and planetary renewal. It offers a *way* forward that is short-run alert and long-term conscious; responsive to practical day-to-day interventions; imaginative in its futuristic horizon; and intensively down-to-earth and radical in vision. This is the larger intellectual-cum-practical

background of the interest here in WPE, the enterprise of developing academic curricula appropriate to the global existential Anthropocenic threat in consequence of the proliferation of WPs. The thesis advanced here proposes *the resilient academy*, a postmodern institutional higher education framework hospitable to transdisciplinarity and encouraging of post-subject learning cooperatives (Keenan & Schnell, 2012), is a fitting setting for the construction and delivery of *wicked problem-centered curricula*. It is further contended WPE is particularly congenial to the learning potentialities of increasing transnational student flows. It should be emphasized that transdisciplinarity in the present context does not equate to *post-Truth* or the perception of academic subjects and their *rent-seeking* professional supports (journals, conferences, symposia, etc.) as *protection rackets* (Fuller, 2019); nor to *the death of expertise* (Nichols, 2017). Factual knowledge will always be necessary, the more so in the context of new strains of chiasm and apocalypticism (Landes, 2011; Singer, 2002). *Science denial* (Macintyre, 2017) is entirely counter-productive. Faith and reason need to listen to each other. What matters most is that all knowledge hands are called to the pump if WPs are to be addressed with clarity, conviction, and confidence.

The perspective developed here does not immerse too deeply in the turbulent waves of postmodern theory (Lyotard, 1984); or take sides in the ongoing disputations on the reality, viability or desirability of the postmodern university (Smith & Webster, 2002); or engage with such vexatious philosophy of science questions as *commensurability* (Feyerabend, 1993) and epistemological *equal validity* (Boghossian, 2006). All that definitional intricacy and wrangling is abundantly addressed elsewhere in the literature (Bertens, 1995; Keenan, 1993, 2014; Keenan & Schnell, 2012; Taylor & Winqvist, 2001). Suffice to say, for present purposes, that all subject fields are accorded parity of esteem in the conversation about WPs and each has a right in principle to participate in the unended quest for improved knowledge and understanding. Relative to the traditional subject-based curriculum, the greater epistemological and pedagogical *liquidity*, as Bauman puts it (Bauman, 2011), offered by WPE, it is argued, is fitting to the intellectual issues of the third millennium and the ever-growing life-world issues confronting future citizens. A postmodern orientation to the academic curriculum in which transdisciplinarity features highly, provides a conducive means of classifying and framing knowledge that is *object-adequate* (Elias, 1978) to the complex intellectual challenges of WPE.

Nor does the present article seek to cover ground already ploughed since 2012 by the Max Planck Institute for the History of Science, in its collaborative work with the *Haus der Kulturen der Welt* (HKW) in the now completed two-year *Anthropocene Project*. The follow-up programme, *Technosphere 2015—2019*, is based on international scholarly collaboration focused on the cultivation of an *Anthropocene Curriculum*. This draws on expertise across natural sciences, humanities, design and the arts, social sciences, and engineering. While the general principles informing the Anthropocene project work and the current article overlap, the scale and focus of the two approaches are considerably different, the one bringing a substantial body of international and multi-disciplinary experts together in a rolling programme of workshops, conferences and symposia; the present undertaking having the targeted objective of setting wicked problem curricular praxis in the context of contemporary education in its potential provision for international *globalized* students.

### ***Greening a Glocal Curriculum***

Transdisciplinary education seeks to prepare international—or, better, transnational—students for life in the third millennium and its perceived myriad global challenges. Given the nature of WPs, an appropriately *green* educational response needs to be both transdisciplinary and transnational in conception and, where possible, transmission. Glocal curricula that prepare students to *think globally and act locally*, as the saying goes, are the pedagogical aim of WPE structures. The *greening* of such a futuristic curriculum is imperative. The discordance between a transnational, transdisciplinary education and conventional national, subject-packaged knowledge systems is a key issue for education theory and provision in the late modern era. If the traditional curriculum can be defined as subject-based and modernity-driven, the postmodern curriculum can be defined as transdisciplinary and eco-friendly. Much is implied by the transition between the two ideal-type modes of classifying and framing educational knowledge. The basic argument of this article is that the latter mode is much better suited to WPE than the former. At every level beyond the nursery and primary school, the inherited curriculum is mainly discipline-based. The further we progress in our educational careers, the more narrowly and tightly we become subject bound (in every sense!), till the point where we specialize as masters and doctors in this or that disciplinary—or, more probably, sub-disciplinary—field. The underlying concern here is whether this restricted modernist path to knowledge expertise, for all its merits which are many and proven, is the right or most opportune road to take for the academic education of students as global actors in tomorrow's world. They live in a different world; they face a different future.

The concept of wicked problem first entered the lexicon in 1973 via design theorists Rittel and Webber who employed the term wicked problem to refer to problems which are not only difficult to define but may be inherently unsolvable. In their influential article, they highlight such characteristics of WPs as: a lack of definitive formulation; a no stopping rule to determine when *solutions* are found; lack of immediate and ultimate tests of solutions; lack of criteria that indicate all solutions have been identified; the interconnectedness of WPs; and the responsibility of planners for outcomes of actions taken. One can imagine all these elements entangling within heated exchanges around global warming. Does it herald a *democracy of suffering* (Dufresne, 2019) or *climate apartheid* (Rush, 2019)? *Greening* the curriculum should prove as challenging pedagogically as it is sure to prove lively andragogically.

Without reflecting on each of these aspects in turn, a task for ongoing reflection and research, curriculum development hoping to encompass the full conspectus of wicked problem entailments is a daunting, if not Sisyphean, undertaking. Little wonder that Weber and Khademian (2008) refer to WPs as unstructured, cross-cutting, and relentless. Given the range, variety, and the generally conflicting interests of the multiple stakeholders involved with their cross-cutting, diffuse ties, anything other than a piecemeal approach to educational provision and curriculum-building in this largely uncharted *terra incognita* is likely to prove somewhat romantic and idealistic, if not doomed from the off. The danger is an excess of expectation. Success in this quest is unlikely to come easy or soon. The promotion of wicked problem handbooks intended to help us gain *control over complexity* (Kolko, 2012) would seem, at face value, a colossal act of hubris. Increased globalization grows the scale-change and complexity of actual WPs and their propensity to bring harm and damage to the biosphere, eco-system, and the human political, economic, and socio-cultural order. Education in wicked problem analysis, understanding, strategy development, and policy planning may be the best—perhaps, the only—rational means of addressing such seriously

life-threatening issues as polar ice-cap erosion, ocean acidification, desertification, third world poverty, diseases of affluence, internet crime, species extinction before it is too late. To sigh there is *no end in sight* of these portentous compound problems would appear to be an infelicitous phrase in the context of the funereal litany of *wickedity*.

The issues raised in this article have no exclusive relevance to the educational systems of the First, Second, Third or Fourth *Worlds*; nor are they confined to any particular Judeo-Christian, Islamic, Hindu, Buddhist, secular, or any other civilizational heritage or context. From the standpoint here, they are transnational, cross-cultural—global—through and through. The way WPs get addressed is, of course, likely to be inflected by their context of definition and discussion, and the special interests of participants involved; as, indeed, are the very meanings of key terms, such as globalization, interculturality, internationalism, among others, widely employed in the discourse (Kreber, 2009; Maringe, 2010). This simply adds another dimension, a trans-civilizational layer of complexity, perforce, excitement, to those inherent in the ongoing work of cultivating intercultural communication around matters that lie at the heart of meaningful humanistic education. Chan (2009) argues international politics has failed as a consequence of dogmatic and insular singular traditions of philosophy and worldview. This narrow and inward-looking proclivity restricts political and cultural adaptability and limits the capacity to understand power shifts and struggles in an endlessly diverse world. He contends fusing different lines of African, Eastern and religious and philosophical thought, is likely to help us comprehend and address uncertainty. The possibilities of the *wisdom tradition*, *panentheism* and *sacramentalism* (Keenan, 2016) could be explored here in conjunction with a *greenshift* in political cultures (Dryzek & Pickering, 2018; Klein, 2019). The fruits of hybridic explorations across ancient and modern thought-worlds cannot be guaranteed, of course. But greater openness to the *cultures* of the *other*, be that historical or contemporary (O'Malley, 2004), could be deemed invaluable in the hunt for globally viable insights and interventions.

That there now exists ongoing, albeit tentative, debate around the world as to which WPs matter most, where and to whom, is a hopeful sign that the search for shared understanding and steps toward agreed strategies of intervention are underway, whatever uncertainties exist as to the scale, pace and direction of effort. While some pundits argue that this or that WP issue is exaggerated or invented for political purposes, the fact that there is a degree of public interest in the matter creates an opportunity context for further educational initiatives and political negotiation. *Greening* the curriculum is certainly a place to start. Globalization introduces large-scale heteronomous knowledge problems that of their nature are largely unforeseen and unpredictable in advance of their occurrence (Clifford & Montgomery, 2014; Jones, 2009). While Klein (2008, 2019) has characterized these as problems of *disaster capitalism*, Dawson (2017) portrays the self-same problems confronting megacities—smog pollution, population pressures, homelessness, traffic congestion, welfare dependency, unemployment, poverty, criminal trafficking, narcotic addictions, infrastructural collapse, and security at every level from intimate to international relations—in terms of *disaster communism*. The present article side-steps the political and ideological debate here and focuses on mapping out aspects of the wicked problem problematic that lend themselves to an *educational* approach.

### *Post-Disciplinarity and Wicked Problem Curricula*

The more *development occurs*, the more discoveries are made of what remains unknown about the consequences of what is known. To take just one example: a lot is known about plastics, their make-up, manufacture and uses. However, impact knowledge is only just beginning to emerge about their multiple negative effects; and, crucially, what might be done to contain or reverse these. WPs, of such a type, are at the epicenter of the emerging new world sapiential order. As these problems are very much characteristic of the big issues confronting the global world of the late modern period, coming to grips with them is at the heart of appropriate international higher education. The rigidity of the traditional disciplinary framework of inherited *modern* curriculum structures needs to be exchanged for a considerably more *flexi-spec, detraditionalized, postmodern* (Dijk, 1995; Walker, 1995) approach to the organization, patterning and structuration of knowledge. WPE will take not necessarily in every institutional and sapiential context. Where congenial institutional opportunities exist, WPE has a chance to develop and flourish appropriate to student level. It is the *deep culture* (Entwistle, 2009; Shaules, 2007) of interdisciplinarity that is the focus here in particular; notably the ways in which the modern university in its contemporary figuration needs itself to open up to the challenges and opportunities of transdisciplinarity in order to engage with wicked or fuzzy problems of the type growing increasingly salient in the world of today.

Indeed, one might argue the case that the big issues—some plagues (literally and metaphorically), others opportunities, all deadly serious, confronting science and society in the opening decades of the third millennium, can only be *educated* about through learning cooperatives, whatever their location, be that the concrete or the virtual classroom. The heroic notion of the hermetic scholar or researcher shut off with their individual knowledge problem, like the Romantic idea of the artist alone in a garret, has, perhaps, limited relevance to the wicked problem context of the late modern world. Such quintessentially wicked issue areas as: global terrorism, genetically modified foods, eco-destruction, HIV/AIDS pandemics, international financial crises, cybertechnology, internet fraud, transnational narcotic crime, third world dependency, aggressive fideism, demographic imbalance, refugee and migrant flows, modern slavery, people group hate crimes, weaponization of space—are, characteristically, paradigmatically, of an interstitial, para-disciplinary sort. Co-operative, transdisciplinary, transnational ventures in wicked problematics are, surely, the path to follow.

To get a realistic measure of WPs, there is a need to transcend academic subject boundaries, and break reductionist habits of thought and fragmentary curriculum praxis that have grown up with modernity (Klein 1990; Knorr-Cetina, 1999). Putting it boldly, strongly classified subject-based curricula in closed relationship to each other threaten to handicap a capacity to explore wicked *transgressive* areas and issues with insight and imagination (Henry, 2005; Kleinberg, 2008). By definition *wickedness*, educationally considered, is radically hybridic. Merging, melting, meandering may all be appropriate conceptions for the shifting and drifting that occurs around problems and issues that defy fixed categorization and final classification. Though we cannot predict future knowledge, as Popper makes clear in his critique of historicism (Popper, 1962), nevertheless, a reasonable conjecture can be made as to the *frames* which might best serve our educational purposes vis-à-vis the key problems and big issues staring us in the face. Monodisciplinary frameworks will simply not do; they are too limited and limiting in grasping the nature of the WP beasts on the doorstep. It is a good bet, too, however, that the transdisciplinary

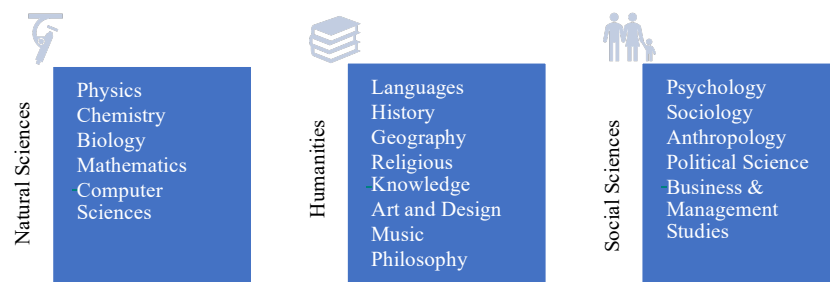


packages fabricated to hold tentative, conjectural WP knowledge will have holes in them, and much will slip through the net. To put it technically, what is true of integrated *weakly* classified curricula in open relation to neighboring areas of study with blurred boundaries, namely their provisionality, fallibility and conjectural character, is as true of subject-rooted *collection* codes. The significant difference is in the kinds of *knowledges*—the one, integrated; the other, *silo-ed*, that elude—perhaps, *pro tem*—our grasp. That said, WPE leans strongly in the direction of transdisciplinary framing if for no other reason that its *object-adequacy*, its better fit with the WPs confronting late modernity.

Before going further to elucidate the different character of the two primary codes and modes of curriculum construction, it is worth pointing out that each of them—the subject and the integrated types—can in reality come in different forms. They exist *by degrees*, on a continuum, some expressions milder or more absolute than others. This potential for mixed mode curricular construction is important for the trial-and-error approach to WPE proposed here. As Ingram (1979) puts it: “integrated and subject approaches to the curriculum are not necessarily antithetical, but complementary, the one being an extension of the principles, procedures and practices of the other.” (p. 82)

The basic structuration of the two ideal-type curricular codes can be represented diagrammatically as follows:

**Figure 1.** Monodisciplinarity: Disaggregated Knowledge



**Figure 2.** Transdisciplinarity: Aggregated Knowledge

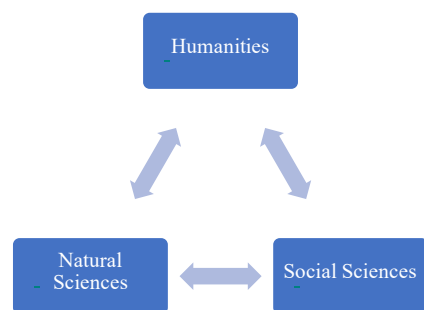


Figure 1 indicates a *subject-problem* focus, while Figure 2 is *wicked problem*-focused. These figures are heuristics only and do not cover the full range and variety of subjects and subject clusters. They indicate what arrangements might be feasible in approaching curriculum redesign. Local educational staffing, settings, and policies—and funding—will play a considerable part in the design and delivery of provision.

By way of a surprise point of departure, perhaps, to a consideration of the respective merits and demerits of these two model curricular types for WPE uses, we may learn from *our kin under the skin*, the pachyderms, the ur-postmodern *order Proboscidea*. Bradshaw (2009), in a synoptical piece of trans-species science, writes:

Elephant society is not composed of discrete, isolated units arrayed like chess pieces; as we have learned, they are made up of *fission-fusion nodes* in fluid, highly interconnected, multitiered social and psychological networks with communication systems capable of bridging miles. (p. 234)

Monodisciplinarity is anathema to the fluid fission-fusion nodes essential for effective WPE. It is too narrow an intellectual horizon, too limited an academic framework. By and large, it side-lines the defining big issues of the times, leaving them to the piecemeal attentions of random *engaged* specialists within their separate fields of study. Calculations of just how many disciplines, subjects, fields—and all their myriad *sub*-sets, hybrids, fusions and interfaces—exist vary from 50, to 500 to 1,000 and more. Of course, the shifting sands of knowledge classification and framing are as ancient as the pursuit of knowledge itself, predating the Platonic Academy and the changeful status balances between the *trivium* and *quadrivium* down the centuries (Clark & Jain 2014; Musgrave, 1988; Wyatt, 1991). For Foucault (1984), the establishment of new disciplines as *discursive fields* not only reflects current changes in prevailing discourses, but also generates the terms in which people are likely to *think* in the anticipated future (Foucault 2000). Most importantly, a new knowledge regime—the *episteme*—defines, as Baker (1996) puts it “what is considered appropriate or inappropriate, imaginable or unimaginable to pursue” (p. 107) in a given field. Harmonizing problem-type with thought-mode seems eminently sensible educational praxis.

### ***Breaking Through to Transdisciplinarity***

In a world where subject areas grow exponentially, we cannot afford to be too custodial and retentive about *our* knowledges. Knowledge, notably new, frontier knowledge, is likely to be *wild*, cutting across disciplinary and, in relation to conventional research arrangements and teaching curricula, institutional boundaries (Klein, 1996). If we take Figure 1 above, it is clearly possible to incorporate any number of fields of study that have *broken through* in recent decades, such as Sports Sciences, Fashion Studies, Computer Games Studies, Media Studies, Environmental Studies, Tourism and Hospitality Studies, for instance. In the Biosciences alone, there has been a veritable rush to couple with the *mother science* of Biology—*vide* Bio-Chem/Eng/Mech/Med/Phys/Tech., etc. Already there are intimations of multidisciplinary, interdisciplinarity, cross-disciplinarity, and transdisciplinarity at work (Frodeman et al., 2010; Renn, 2019). It is not always easy to slip a cigarette paper (a facetious non-green allusion) between them. There are many switch partner and mixer dance configurations within the whirling disciplinary choreography of the contemporary academy. Actively seeking out the transdisciplinary and *green* potentialities of knowledge fields *whatever* their provenance is, arguably, the most pressing part of pedagogical problematics in the postmodern period.

The challenges posed by multidisciplinary and transdisciplinarity to the status quo of the prevailing mono-subject culture are multiple. They include the following key areas of adjustment:

- Language: familiarization with foreign subject argots;
- Methods: relaxing hegemony of fixed traditions of knowledge acquisition;
- Cognitive constraints: rethinking embedded implicit epistemologies;

- Professional relationships: facilitating parity of subject esteem;
- Knowledge sharing: academic team-building via transdisciplinary dialogue;
- Institutional constraints: renewing academic organizational structures.

All of these fronts and, no doubt, more will have to be tackled to prepare the soil for wicked problem educational growth. A critical frontier in this transformative exercise, is the matter of cultivating collegial human relations amenable to cross-disciplinary pedagogy. Here, creative leadership and innovative organizational flexibility is at a premium, as is support for *ad hocery* (Bennis, 1968; Toffler, 1970) and acceptance of transience, that is to say, the probability, indeed, the likelihood, of *solutions* being more or less rapidly outmoded. Curriculum risk-taking is likely to become a recognized, even celebrated, feature of high caliber pedagogy. Anything that assists reciprocity and mutual aid in cooperative academic endeavors is likely to foster the high trust dynamics conducive to tackling wicked problem educational delivery. In Durkheimian terms, a move from mechanical solidarity to organic solidarity (Durkheim 1893/1997) among academics—or, as Tönnies (1893/1955) had it, from *Gemeinschaft* (community) to *Gesellschaft* (association)—would be WPE-friendly. Knowledge cooperatives are much more *sympatico* in this context than competitive assemblies.

Overly-closed boundaries between academic disciplines serve to impede the full realization of a communitarian vision of the university. Disciplines are artificial holding patterns of inquiry of which the political significance in the academy and in society at large should not be underestimated. Employing Foucauldian language, we can speak critically of the discipline as a *carceral institution*, an internally self-referential regime of legitimation and control. Knowledge validation occurs through the institutionalized matrix of academic subjects and areas of knowledge, *scientific establishments* as these have been called (Elias et al., 1982), each with its exclusive disciplinary control structures, prestige hierarchies and reward systems. A certain inward-looking approach to academic disciplinarity—*subjectism*—is a handicapping condition in the late modern world, particularly from the point of view of knowledge progress and development. Fuzzy problems, such as globalized shifts in the nature and scope of structural unemployment, or the impact of bio-sciences on reproduction, human and otherwise, or the transnational problems of global warming, migration, terrorism, to name a few, are no respecters of retentive intellectual boundaries. To contribute effectively at both the sapiential and the practical-political levels to wicked problematics, the university has to transcend the in-built limitations of fragmented subject monopolies. Modern scientific hyper-specialization impedes the cultivation of a holistic, integrated worldview. The renewal of academic *community*, an open educational society, is a key step in the direction of a postmodern paradigm shift towards WPE.

The *tribal* (Becher, 1989) beliefs and values of the academic disciplines are not, in terms of the commitment and conviction they demand of their adherents, so very unlike the conditions of belonging to this or that political or religious community. They are *pre-rational* linkages, affective bonds with *primitive* roots (Becher, 1989), not readily cast aside. Disciplines and their professional associations form *surrogate faith communities* (Keenan & Schnell 2012, p. 29), quasi-kinship associations bent upon pursuing autochthonous traditions, collective self-interest, and pedagogical and public affairs with limited outside interference. The strong affective bonds between members interplay with the rational and scientific objectives which form the overt rationale for their shared identity and common purpose. They develop a sense of togetherness, belonging and a genealogy; and, at worst, an inclination towards favoritism and cronyism, of territorial suspicion of outsiders

invading *their patch*. The potential for exclusionary tendencies can surface in appointments committees, award and publication decision-making, and other *scarce resource* competitions. Such feuds as spasmodically exist, typically operate within the larger tribal truce. At worst, these sect-like knowledge corporations can, under threat or challenge, assume features of mini-states, curricular caliphates, as it were, holding the monopoly of authority over *legitimate* knowledge production, validation, and credentialization within *their* sphere of dominion in the wider map of knowledge. Disciplines *discipline*; subjects *subject*.

Disciplines are artificial constructs, little—in the grand scheme of knowledge history—epistemic empires. Mamdani (2018), in the context of an analysis of post-colonial African education, refers to “disciplinary nationalism ... the highly patrolled borders of each discipline” (p. 29), claiming they operated as part of “a colonial project from which a large majority of the colonized were excluded” (p. 32). Part of the independence struggle in such contexts was the recovery of indigenous modes of transdisciplinary education in which Western traditions of discursive formations played no sizeable part, except for “mimic men and women” (p. 32), as Mamdani (2018) designates those who pursued the benefits of occidental culture. Ross (2000) refers to the primary goal of post-colonial curricula as the *narration of the nation* (p. 155), an iteration of Bourdieu’s *cultural reproduction*. In effect, curricula, subject-based or integrated, are, in every context, contrivances born of mixed motives and variable powers; and are heavily inflected by situational struggles (Fuller, 2002). In *The Genealogy of Morals* (Nietzsche, 1887/1996), Nietzsche speaks of “reshaping the original relationship of mutual aloofness and suspicion which obtains between the disciplines of philosophy, physiology and medicine into the most amicable and fruitful exchange” (p. 37). This example is worth following in a vastly more fragmented world of epistemic gated communities whose members so often seem, in Nietzsche’s phrase (Nietzsche, 1887/1996), “content in their own little corner” (p. 124). From the standpoint of WPE, perhaps, greater epistemological anarchy and sapiential liberty might be worth celebrating in the classroom. Knowledge control in the late modern world of globalized WPs is a hazardous thing when too loose; and a perilous thing when too tight.

### ***A Congenial Context for Glocality***

The surge in demand for international student higher education generates an opportunity context for significant curriculum innovation geared to new millennials and their futures as global citizens (Hudzik, 2014; Killick, 2014). As cultural nomads and an expanding economic power block, transnational students occupy a relatively unique strategic position within the knowledge market. Potentially, they have unique *purchasing power* over the higher education *products* they consume in ever-increasing numbers across the world, West and East. From the standpoint of curriculum reform, this is a largely latent power. It has not been exercised significantly to demand shifts in the knowledge content of the university syllabuses (Williams & Lee, 2015). Yet, given the magnitude of the knowledge gap in relation to the import of the global challenges of the times, a certain urgency has to be recognized not only in the education of researchers and educators (Shaklee & Baily, 2012), but in the knowledge content of the courses and programmes taught (Ninnes & Hellstén, 2005). For WPE to lift-off, subject *nations* will have to cede some of their curricular *sovereignty*.

The movement towards the democratization of disciplines will have to be facilitated not only by WPE champions within subject clusters, but by well-disposed institutional power-brokers within

academic departments and corporate governance. The time cannot be far off when, under the combined pressures from *green* governmental policies, corporate recruiters and student consumers, educational institutions, particularly universities, never averse to looking a providential sapiential gift horse in the mouth, will be alert to the production of sought-after WP-savvy graduates for the marketplace and public services, with early WPE adopters on all sides likely to reap commensurable premium rewards. University Trustees and Governors, Presidents and Vice-Chancellors alongside Deans, Departmental Heads, Professors and Lecturers, Teachers and Researchers and students at every academic level have a role to play in this movement towards education for survival. Faith in the creative and rational powers of autonomous human agency in such matters as transformative education is of the essence. Thunberg (2019), *Time Magazine*'s Person of the Year 2019, says it all in the title of her book (2019): *No One Is Too Small to Make a Difference*.

While numerous *subject* fields are already some distance along the route to internationalizing their academic provision—psychology, business and management studies, feminist studies, anthropology, to name some of the leading examples—, the vast majority of programmes on offer do not add up to anything like comprehensive wicked problem-based curricula. Selected issues amenable to interdisciplinary exploration are built into subject fields—environmental and ecological themes being foremost among them (Bessant et al., 2013; Sterling, 2012). But the curriculum volume as a whole and the surrounding subject matter of the overall programmes are overwhelmingly traditional single subject focused (Augsberg & Henry, 2009). Indeed, guidance to providers of Education for Sustainable Development (EDS) by the Higher Education Academy (HEA) in UK recurrently emphasizes the context of their own discipline (Longhurst et al., 2014; Ryan, 2012). Given the neohegemonic position of *monodisciplinaryism*, turning the curriculum tanker round in the direction of a *Wissenschaft* model entirely accommodating of disparate knowledge fields will require considerable dexterity from the bridge to the engine-room. The wicked problem curriculum structure proposed in broad outline here is designed from scratch to cover a range of global issues through multidisciplinary approaches that draw upon teaching, research, library, Internet, and cultural resources (film, music, art, literature, poetry, museum and site visits, fieldwork) specifically identified to that end.

Throughout the numerous *toolkits* designed by universities to support the internationalization of university curricula—both formal and informal curricula, be it noted—is the Quality Assurance Agency (QAA) HEA in UK, *definition of sustainable literacy* as set out by Longhurst and associates (2014):

Education for sustainable development is the process of equipping students with the knowledge and understanding, skills and attributes needed to work and live in a way that safeguards environmental, social and economic wellbeing, both in the present and for future generations. (p. 5)

Clifford (2009), commenting on the ambition of international educational provision in the round, states that this multi-layered, labyrinthine enterprise exists to cultivate:

Curricula, pedagogies and assessments that foster: understanding of global perspectives and how these intersect and interact with the local and the personal; inter-cultural capabilities in terms of actively engaging with other cultures; and responsible citizenship in terms of addressing different value systems and subsequent actions. (p. 133)

If anything can deliver this, arguably WPE can, perhaps.

### **Conclusion: Bringing the Academy Back In**

In *Beyond All Reason: Living with Ideology in the University*, Barnett (2003) comments:

[T]he corporate world has come onto campus and vice versa ... The university splits asunder as a single coherent project, its increasing constituents going their own way in forming their separate accommodations to the world around them. Behind adjacent rooms on the corridor develop biographies that may have very little in common. (p. 107)

Key to Barnett's undoubtedly partisan analysis of the parlous, even perilous, condition of contemporary academic life are, *inter alia*: the *pernicious ideologies* (Barnett, 2003) he identifies as: *entrepreneurialism*; *extra-mural values* of state-orchestrated competition; the colonizing hegemony of quality *qua* ideology; and the spoiled ideal, now myth of *academic community* within the *marketized, commodified* world of the *knowledge society*. The overall effect, he contends, is undermining collegiality (Barnett, 2003). Worst of all, Barnett suggests, knowledge itself "comes to count only in so far as it leads to some kind of pay-off" (p. 112). He comments:

The market, then, is not benign ... The market comes into the university. It is not just a test of the validity of the university activities; it comes to construct those activities and, ultimately, will come to construct academic identities. Those who live by the market will see the world through the market. They will live out with the university. (p.58)

Drawing on D'Costa's analysis of the secularization of the modern university (D'Costa, 2005), a process that picked up a head of steam in the nineteenth-century (Marsden, 1992), Hauerwas (2007) writes of "the loss of any attempt to maintain a coherent relation between different disciplines" (p. 181) and adds: "Without any common understanding of the good or the true the university becomes subject to what sells" (p. 181). One thinks here of Bauman's (2011) portrayal of liquid modernity as a *culture of seduction* rather than *enlightenment*. What might be done to challenge the hegemony of this anti-intellectualist, aggressive *ed-business* paradigm (Henkel, 2004; Thompson, 1970; Washburn, 2006) and renew the confidence of academics in their ancient *core business*, to borrow from the current managerialist argot, *viz.*, the generation and diffusion of ideas not just for their own sake, but for their civilizational and humane purposes; one might say, their Life-enhancing powers (Keenan, 2010)? In this, a lot of *green* sifting is urgently required. We may refer to this *purist*, even *blue skies* conception of the life of the mind as the *intrinsic* definition of the academic vocation, a *definition of the situation* (Thomas, 1923) antipathetic to the more extreme *business-facing* extrinsic *McDonaldized* attitude to higher education that has grown to prominence within university culture in recent decades (Hartley, 1995; Hayes & Wynyard, 2002; Readings, 1997; Ritzer, 1996). Paradoxically, the university and the business corporation, and the world citizenry at large, have in the greening and glocalization of the curriculum, common cause. Learning to survive puts mutual interest in perspective as nothing else can.

Newman (1852/1960) had his finger on the pulse when he writes of: "[T]he various branches of knowledge, which are the matter of teaching in a university, so hang together, that none can be neglected without prejudice to the perfection of the rest" (p. 52). As "the universe itself in its length and breadth is so intimately knit together", he considers (p. 38)", so, therefore, "a true education" (p. 103), in his philosophy, goes beyond this subject, that area, that field, or that discipline or paradigm, but provides for:

[the] only true enlargement of mind which is the power of viewing many things at once as one whole, of referring them severally to their true place in the universal system, or understanding their respective values, and determining their mutual dependence. (p. 52)

Newman is primarily addressing a Christian idea of a university (Newman, 1854/1859/2001). However, his holistic appreciation of the *communion* and *coinherence* of the fields of knowledge is highly relevant to the WPs of the postmodern Anthropocenic era. Interestingly, von Humboldt, the father of environmentalism (Wulf, 2015), the progenitor of the modern science-based curriculum, subscribed to a Romantic view of Nature as a web of Life in which all elements interweave (Meinhardt, 2019). Both Newman and von Humboldt, one avers, would have much to contribute to greening the curriculum in the late modern era. Both thought globally, valued transdisciplinarity, and had profound veneration for Life. It is in harnessing the deeper civilizational and intellectual purposes of the university (Entwistle, 2009) to pressing practical problems of a utilitarian and broadly political nature, a kind of *global conscientization*, that the academy might make its more significant *Anthropocenic* contributions to both knowledge and humanity. It would look to open out the artificially discrete, analytically separated, domains of life to one another (Alexander, 1995; Freire, 1972; McLune et al., 2017). In this regard, Keenan and Schnell (2012) construed the postmodern resilient academy as providing a *transcendent interspace* in which:

intellectual space between disciplines may be regarded as a sacred, unclaimed terra incognita—terra sancta—lying *out there* beyond our customary cartography of knowledge, an *imaginaire* awaiting fuller, further, freer exploration. (pp. 31-32)

The global high risk issues ahead in *the age of supercomplexity* (Barnett, 2000) may, with the wind in the right direction, be a stimulus to steering the academic curriculum *carousel* (Hawick et al., 2017) in the direction of transdisciplinary, transnationalist, WPE in *caring classrooms* (Kahane, 2009; Samuel, 2017). But it cannot be left to chance. The inexact sciences—in companionship with the counterfactual arts—are exactly the roads to take if there awakens the desire in the hearts as well as the minds of educators and students to take on the challenges of WPEs with some hope of ‘Eureka’ moments, the preludes to, the intimations of, victory.

This article argues for a paradigm shift in how we go about educating for survival, acknowledging the theoretical complexities of culture change in inherited traditional educational settings. *Greenwashing*, just to tide things over, ‘performative greenness’, as the critic of fast fashions, Dana Thomas (2019) calls it, apart from being a failure of nerve, could prove a highly counterproductive waste of irrecoverable resources. The practical problems of piloting curricula in wicked problem directions are formidable and will take precious time—the key and treasured resource in all this—and sustained commitment by all stakeholders. Not just *relevant futures* (Gaisbauer & Sedmak, 2014) are at stake, but *futures* as such. Hopefully, the suggestions in this *scoping* article, with all its limitations of detailed specification and eschewal of firm guidelines for guaranteed outcomes—a pious hope, in any case—will help to guide future research on Anthropocenic pedagogical challenges and motivate experimental curriculum praxis at all levels. It is hard, in concluding, to resist reference here to the *street* usage of the term *wicked* to refer to that which evokes joy and a sense of delight—a well-nigh forgotten aspiration of education on one definition (Reeves, 1998). In the context of global warming, that may, perchance, prove to be *cool*.

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