AN EVOLUTIONARY FRAMEWORK FOR
GLOBAL SUSTAINABILITY EDUCATION:
AN INTEGRAL, POSTHUMAN PERSPECTIVE

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ABSTRACT

This article offers a perspective for disciplined inquiry into the proposition that a sustainable 21st century global community is attainable, but urgently requires intervention by civil society to transform our major educational systems via consciously-guided evolutionary learning. As an affirmative framework for global citizenship, evolutionary learning invites expanded visions of humanity and enables healthy societal development through the emergence of human-ecological syntony. The envisioned framework for educational change would lead to engaged learning that develops the human capacities for values-based inquiry across the full spectrum of socially organized and technologically-mediated human activities, while supporting the emergence of human culture that embodies the stability, generativity and resilience of healthy natural systems. Keywords: educational systems design, evolutionary learning, evolutionary consciousness, posthuman, integral theory, global citizenship.

INTRODUCTION

As citizens of an emerging global community, united by powerful digital networking technologies in the early years of the information age, we are awakening to an uncertain human prospect. Ours is the first generation in history to be equipped with technological extensions that allow us to readily access and integrate knowledge derived from around the world, unfettered by past constraints of time and distance. More than ever before, we are in a position to view the Earth's geophysical, biological, socio-economic and other complex systems in holistic perspective, observing their emergent properties and modeling their prevailing trends. From this vantage point, we are witnessing a world that is undergoing profound change; an unraveling of ancient ecological systems occurring at a rate and on a scale that is unprecedented in human history (Suzuki, 2010; Wilson, 2002).

My aim in this essay is to offer a perspective for disciplined inquiry into the proposition that a sustainable 21st century global community is attainable, but urgently requires intervention by civil society to transform our major educational systems via consciously-guided evolutionary learning. As an affirmative framework for global citizenship, evolutionary learning invites expanded visions of humanity and enables healthy societal development through the emergence of human-ecological syntony; a condition favorable to life in all its forms arising from "creative aligning and tuning with the evolutionary processes of which we are a part" (Laszlo & Laszlo,

2004; Jantsch, 1975). A contextually-framed theoretical synthesis sets the stage for inquiry into strategies for educational systems design reflecting evolving structures of human consciousness within our culturally diverse, interdependent and technologically-mediated world. Educational strategies guided by nature-inspired "ideals of universal improvement" (McIntosh, 2007, p. 303) can release potentials enfolded within an expanded subjectivity and enable the transformation of dualistic and maladaptive reality frames (Braidotti, 2013; Selby, 2002; Berry, 1988), inviting life-sustaining innovation and cultural evolution on a global scale by virtue of a generative convergence of human culture and natural ecosystems (Banathy, 2000; Csikszentmihalyi, 1993; Laszlo, 1987).

A key premise guiding this inquiry is that problems of a systemic nature, in particular those that involve *complex and attenuated causal relationships* such as those that link human quality of life with the health of the Earth's diverse natural ecosystems, call for a new worldview that transcends Cartesian separation consciousness and the mechanistic-reductionist mentality of the former industrial era. Our 21st century global challenges demand integrative "new-era" thinking that builds resilient, generative capacities within human culture, allowing us as members of a global *community of life* to consciously evolve towards human-nature symbiosis (Giblett, 2011). Within this new affirmative paradigm, educational systems replicate within themselves and their cultural environments patterns of thought and action that are in harmony with *life's principles*; inviting learners to engage as conscious participants in the healthy and harmonious functioning of interconnected living systems. In this way, humanity can assume its proper role as a keystone species (a species that plays a key role in the overall structure and functioning of an ecosystem, and that is "essential to its integrity") participating in the emergence of an evolving subjective presence that improves the human prospect even as it transcends anthropocentrism, and that is conducive to the flourishing of life on Earth, both human and non-human (Garibaldi & Turner, 2004, p. 1; Wiggins Environmental Ethics, Spring 2010; Benyus, 1997).

A pragmatic turn toward evolutionary learning as a basis for sustainable education, as contemplated, is facilitated by a synthesis of integral and critical posthuman philosophical perspectives. The integral perspective draws from the works of Ken Wilber (1995), Allan Combs (2002), Steve McIntosh (2007), and others who integrate and build upon earlier theoretical works derived from a wide range of disciplines. Specifically, integral philosophy expresses a cannon of shared understandings or "public truths" regarding the evolutionary significance of developmental and intersubjective potentials enfolded within the human psyche. These potentials are realized experientially as states and structures of human conscious that form the basis of an emerging "integral worldview." Combs (2002) describes this evolutionary step as "[t]he achievement of a significant degree of objectivity towards one's own inner process," representing a gain in self-mastery or "inner complexity" that "allows diverse feelings, thoughts, memories, beliefs, and perceptions, to become conscious at the same time" (p. 202).

As an interdisciplinary field of inquiry, therefore, integral philosophy endeavors to describe and map the contours of an adaptive and affirmative human response to the challenges of complexity. It "brings together science, philosophy and spirituality in a [] synthesis that demonstrates the unmistakable reality of the internal universe" (McIntosh, 2007, 155). As an expression of human cultural evolution, it invites inquiry beyond propositional or dualistic truth claims; deep inquiry guided by a search for conscious participation within a larger wholeness that transcends the "value relativism" and other significant limitations of the post-modern worldview (discussed below). In the 21st century context, the integral worldview is emerging

within human culture as "a self-organizing dynamic system with a 'life' of its own" (McIntosh, 2007, pp. 58, 156).

The more outward-looking critical posthuman perspective complements (and arguably balances a tendency toward structural hierarchy contained within) integral philosophy. Like integral philosophy, this perspective invites inquiry into the evolutionary significance, and dynamic/generative qualities, of an expanded (posthuman) subjectivity, as viewed through a non-dualistic lens that locates human consciousness and human agency within a larger, participatory wholeness. In addition, it brings forward a critical perspective with reference to the historically and culturally embedded context of subject formation within a world of increasing complexity. Its shared understandings and public truth claims are informed by philosophical perspectives derived from recent inquiries into the 21st century nature-culture continuum that has been described as the *posthuman* condition (Braidotti, 2013; Verbeek, 2011; Rose, 2007; Kurzweil, 2005; Fukuyama, 2002; Franklin, et al., 2000; Gilroy, 2000).

Braidotti (2013) describes this posthuman condition as the legacy of bio-genetic advanced capitalism, which "actively produces differences for the sake of commodification" thereby transforming our understandings of contemporary subjectivity and subject formation leading to "a paradoxical and rather opportunistic form of post-anthropocentrism on the part of market forces which happily trade on Life itself (p. 58-59). In line with feminism, anti-colonialism, anti-racism, deep ecology and other major branches of post-modern critical theory, the critical posthuman perspective focuses on the shifting location of subjectivity itself and takes, as its starting point

> The anti-humanist death of [Man as the measure of all things] which marks the decline of some of the fundamental premises of the Enlightenment, namely the progress of mankind through a self-regulatory and teleological ordained use of reason and of secular scientific rationality allegedly aimed at the perfectibility of "Man" (p. 37).

In the discussion that follows, I explore how strategic intervention to foster such evolutionary learning at the organizational and inter-organizational levels within educational systems can leverage change by building our shared capacities for dealing with socio-technical and ecological complexity in a world defined by real physical, cognitive and thermodynamic limits.

THE GLOBAL CONTEXT OF EDUCATION

In education, as in other human activity systems, context matters. Factors framing the context of education today include global trade and the increasing interdependence of communities worldwide, economic stress and social uncertainty occasioned by a growing wealth gap, and the rapid diffusion of digital technology that has revolutionized global communication and access to information (Senge et al. 2012, 10-13). Each year, new technologies are being introduced into the streams of commerce with little regard given to the potential for hidden or long term costs to society or the earth's life-sustaining natural systems (Huesemann & Huesemann, 2011). Economic activities that once were subject to the mediating influences of locality, climate and custom today are occurring on a global scale in a manner that undermines rational decision-making by increasing the spatial and temporal distance between actions and their socio-ecological consequences; depriving decision-makers of opportunities for adaptive, context-specific learning and adjustment. In dealing with the earth's complex systems, our predominant mode of operating has been that of *the Sorcerer's Apprentice* (von Goethe, 1797); essentially a process of trial and error, with each new technologically-enabled imposition on our

limited resource base potentially raising the moral and existential stakes for humanity and the future (Verbeek, 2011).

As we assume the privileges and burdens of 21st century global citizenship, we are confronted with an unprecedented challenge. Worldwide patterns of social and environmental change are reflected in deteriorating conditions found in the physical landscape, and in an accumulation of socio-economic stresses undermining quality of life within our place-based communities. A growing interdisciplinary body of evidence reveals global trends that are converging to undermine human quality of life, including: population growth, a widening wealth gap, exhaustion of fossil energy resources, climate change, deforestation, loss of biological and cultural diversity, depletion of soil and fresh water resources, desertification and toxic contamination (McKibben, 2010; Hartmann, 1998/2004; Wilson, 2002). These converging trends reveal a more fundamental pattern of change: the modern-industrial processes of resource extraction, production, consumption and waste disposal are eroding the economic and human resource base worldwide and undermining the regenerative capacity of natural systems that sustain life as we know it (Meadows et al. 2004).

With some notable exceptions (Senge et al. 2008/2010; Doppelt, 2003; Adams, 2000), the predominant "cradle to grave" processes that define business as usual for the global industrial economy is mainly powered by fossil fuels and supported, incentivized and perpetuated by entrenched political, economic and cultural institutions. (UN Panel on Global Sustainability 2012; Hartmann, 1998/2004)**.**   By insidiously wasting natural capital while inducing irrationally wasteful consumerism and bringing about premature obsolescence of technical skills and capital investments, this predominant model of global economic development strains the ability of individuals, organizations and communities to formulate adaptive responses to a rising tide of global challenges. In all regions of the world, landscapes and cultures shaped by centuries of rapacious colonization and dominated by pernicious visions of unbounded material consumption are devolving upon the present and future generations environmental conditions less and less favorable to the healthy expression of life in all its forms (Giblett, 2011; Meadows et al., 2004).

To understand the global dimensions of the present sustainability crisis, we need not resort to speculation or abstraction. In a landmark report issued in 2005, the world community through an interdisciplinary panel of leading scientists reviewed a massive body of empirical evidence derived from all regions of the world and determined that despite local gains in quality of life for some members of the human family, *on the whole* human mismanagement is degrading the Earth's life-sustaining ecosystems and the quality of life services they provide at an alarming rate. These "ecosystem services" include:

> the benefits people obtain from ecosystems … provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; and supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious and other nonmaterial benefits (Millennium Ecosystem Assessment, 2005, Summary, p. 2).

In January 2012, the United Nations High-Level Panel on Global Sustainability (the UN Panel) published a report entitled *Resilient People, Resilient Planet* concluding that the global vision of sustainable development articulated a quarter century ago by the World Commission on Environment and Development (1987) remains unfulfilled.   The UN Panel included

representatives of scientific organizations, UN agencies, governments, private sector entities, non-governmental leaders, and indigenous groups. It determined that progress in achieving sustainable development goals has been impeded by two major factors: 1) a lack of political incentive to implement sustainable practices when the policy dividend is long-term or intergenerational, and 2) a failure to integrate environmental and social issues into economic policy decision-making. (United Nations Secretary-General's High-Level Panel on Global Sustainability, 2012). Based on these findings, the UN Panel reaffirmed the need to align national economic and development policies with an agenda for urgent action to avert ecological and social catastrophe. The Panel asserted that the international community needs "a new political economy" for sustainable development, to be achieved by "radically improving the interface between environmental science and policy" in a manner that "[makes] explicit the economic, social and environmental costs of action and inaction" (p. 5).

Clearly, humanity has reached a cross-roads where the prospect of doing nothing but more of the same poses an unacceptably high risk of global catastrophe. The well-vetted evidence assembled by the United Nations in its 2005 Report showing a steady decline of ecological services across the globe underscores the need for fundamental change to our predominant patterns of thought and behavior, lest we forfeit our ability to secure long-term human well-being in areas as basic as food security, public health and access to fresh water resources (Millenium Ecosystem Assessment, 2005). As stated by the authors of the 2005 study, "any progress achieved in addressing … poverty and hunger eradication, improved health, and environmental sustainability is unlikely to be sustained if most of the ecosystem services on which humanity relies continue to be degraded" (p. 2). Furthermore, our continued unsustainable use of ecosystem services is "increasing the likelihood of nonlinear (including accelerating, abrupt, and potentially irreversible changes)" to natural systems that threaten to permanently undermine human quality of life (p. 11**).**

Considering that anthropogenically-induced global change, under its current trajectory, may be approaching or exceeding thresholds where opportunities for corrective intervention to maintain essential ecological functions and secure the future of a burgeoning human population are permanently foreclosed, the global narrative may appear bleak (Lovelock, 2009). Even as nations rally under the vaguely instrumentalist banner of "sustainable development," our public and private institutions struggle to maintain a semblance of control over the unintended consequences of economic globalization. Waning popular interest in global environmental concerns, evident since the financial collapse of 2008 and the 2009 failure of the UN Climate Summit in Copenhangen, indicates the possible emergence of a vicious cycle where failed leadership erodes public confidence in the prospect of reaching real solutions, which in turn erodes the ability or willingness of leaders to secure a popular mandate for change (Masters, 2013).

As we face the prospect of a slow apocalypse brought about by human agency, various culturally-mediated influences that reinforce the psychology of despair and apathy present themselves as significant limiting factors shaping real world outcomes (Joseph, 2013; Levitt, 2009). Yet, given our shared capacities for systemic thinking, transformative learning and collective action, no person living today can justify an attitude of hopelessness or helplessness. As life-sustaining ecosystems are being fundamentally altered from pole to pole by an ever-expanding human "footprint," responsibility for the integrity of the biosphere and the future of

its myriad life forms falls squarely on our shoulders (Hartmann, 1998/2004). Whereas in the past we might have been content to throw in our lots with the comforting allure of Adam Smith's "invisible hand," or with the palliative illusions of techno-optimism, any such uncritical resort to dogmatic abstraction in a world of systemic complexity amidst converging evidence of a true global crisis would amount to a dangerous plunge into the dark (Huesemann & Huesemann, 2011). We seem to have reached a crossroads: the well-travelled road of progress is beginning to look like a road to ruin. So where do we go from here?

A weighty burden of responsibility has descended upon on this generation of global citizens. With the future of humanity at stake, conscious change is the order of the day. As global citizens, we must identify some way to orchestrate a rapid paradigm shift in both thought and action to guide us toward a world favorable to the continued existence and development of human societies in harmony with the rest of the life world. Neither scientific uncertainty nor political expediency can justify a continued failure to act. Even as we continue to build our knowledge regarding the complexity and dynamic nature of ecological systems that are being profoundly altered by present human activities, we must proceed with the understanding that there is no safe harbor for humanity that would allow us to simply defer the need for timely intervention.

A 21st century education must foster global citizenship by equipping learners with the cognitive, socio-emotional and practical skills that will enable us to creatively navigate the complexities and uncertainties of our era while steering a true course toward ecological health and social justice. Educational systems must empower learners to alter the current trajectory of socio-ecological change by leading strategic interventions that will restore the integrity and resilience of our communities with reference to sustainable values: satisfaction of basic human needs, human and ecological health, democratic self-determination, quality and meaning of life.

All this brings us to a new point of departure in our inquiry over the role of education in transforming the global-industrialized *status quo*. Prominent advocates for ecoliteracy and education for sustainability, including David Orr (2004, 2010), David Suzuki (2010), Fritjof Capra (2005); Peter Senge (2012); Sir Ken Robinson (2001/2011), Richard Louv (2008); Edmund O'Sullivan (2002); Daniel Goleman and colleagues (2012) and many others agree that a paradigm change in education is essential if we are to avert the worst potential consequence of the current global crisis. These thought leaders, while focusing on diverse aspects of our educational agenda, represent a consensus view that schools "should be primary sources, key institutions, for the fundamental long-term changes that humanity needs" (Senge 2012, 565).

EDUCATION, VALUES, AND THE POSTHUMAN CONDITION

Sir Ken Robinson (2001/2011) puts the problem of education succinctly: "the creative capacities of generations of people have been sacrificed needlessly to an academic illusion" (p. 79, citing James Hemming). This illusion reflects a "distinct phase in the cultural evolution of humanity" (p. 87) which originated in the consolidation of intellectual thought traditions of the western Enlightenment era, and marked the rise of the modern industrial economy, along with its predominant "ideology of rationalism, objectivity and propositional knowledge" (p. 81). It is an illusion insofar as it perpetuates narrowing assumptions about the nature of academic ability that

exclude human capacities associated with "feelings, imagination and self-expression," including embodied-qualitative knowledge, development of moral character, social and practical skills and the entire domain of the arts, while privileging reductionist science as the sole arbiter of fact and truth (p. 106). Images of technological mastery born of these entrenched assumptions seduce educators and policy-makers alike to retreat into an "ideological comfort zone" (p. 107) which, according to Robinson (2001/2011), Senge (2012), Orr (2010) and other critics of our mainstream educational systems, has contributed to a growing gap between the human capacities currently developed in formal education and those that are actually needed in facing complex societal challenges of the 21st century. In view of the urgent warning signals being sent up by the world's scientists, ethicists and many government officials, civil society is well justified in demanding new affirmative agendas for education as a basis for responsible global citizenship. Educators who open new lines of inquiry within board rooms, teacher's lounges, and classrooms are affirming the need to advance beyond the current societal dialectic regarding education, with its emotionally-charged debates over everything from instructional methods to the very purposes of education in society.

However, despite considerable momentum behind the call for change in education, the very process of articulating common values as a basis for societal consensus often is undermined by our collective failure to transcend the political economy of difference. In the United States, schools have become a "hotbed of controversy" fueled by the polarizing dialectics of a media-driven political culture. Important topics related to education are often swept into a struggle between competing ideologies: "Liberal versus Conservative … Democrat versus Republican; … Secular versus Religious; Evolutionist versus Creationist; Feminist versus Traditionalist; MSNBC versus Fox" (Perry, 2013, ¶ 1).

Certainly, an air of crisis can bring people together with a sense of common purpose, making it possible to rally under a common cause even while enduring hardships imposed by circumstances as dire as warfare, terrorism and natural disasters; circumstances that touch upon our basic survival interests. Equally certain is the fact that a sense of unity coalescing around a public crisis can be exploited by those pursuing ulterior political agendas. History is replete with examples showing this to be the case, including the exploitation of national unity following the September 11, 2001 attacks on New York and Washington by public officials bent on war who subsequently misrepresented a common threat in the form of "weapons of mass destruction." However, the global ecological crisis presents a different type of challenge: Customary approaches to mobilization in response to a common threat using a conflict-based model and various iterations of the "war on …." metaphor are ill-suited to deal with problems of true systemic complexity.

As mentioned above, the international community has concluded that no policy intervention within the current or potential capability of public sector institutions will be sufficient to turn the tide of global environmental degradation and economic dislocation. World leaders explicitly have called upon civil society to somehow orchestrate a paradigm change at the level of the global political economy (UN Panel on Global Sustainability 2012). In essence, we as citizens of the world are called upon to transform the very cultural lens that unites civil society at the level of human values; the deeper level at which we understand the nature of our problems in relation to the common stakes involved. To accomplish this, we must find a way to transform a contentious societal dialectic in a manner that allows us to move beyond polarized debate that

regularly devolves into hyper-abstraction and "cultural warfare." We must find a way to forge a common understanding of our paramount civic responsibilities, to effectively prepare this generation of learners to build towards a sustainable and socially just global community amidst inherited environmental, socio-political and economic challenges. In sum, this generation of organizational leaders and educators is facing a distinctly post-modern dilemma: *a global complex of pragmatic imperatives demanding urgent response amidst controversy over the very culturally-mediated value propositions that once served as a basis for collective action.*

Among the seemingly irreconcilable binaries that shape the political dialectic over education is the divide over the role of education in cultural transmission. This controversy arises specifically over the question of "[w]ho has the right to choose what or how young people are taught about controversial issues" (Perry, 2013, ¶ 4). As currently framed in the American media culture, this question tends to devolve into a debate between those who fear schools are becoming vehicles for government-mandated liberal brainwashing, and those who fear that a default to religiously-infused education is depriving learners of access to basic knowledge needed for responsible citizenship. At times, participants in this polarized debate have converged on the notion that "[p]ublic schools should be as neutral as possible, and leave the controversy to the dinner table and Sunday School" (¶ 6). This default proposition is often cited as an expression of the principle of separation between church and state. However, it also reflects a deeper shift in the prevailing worldview marked by the ascendency of post-modern cultural relativism; the idea that formal education can and should maintain a stance of *neutrality not just with regard to religious doctrine, but with regard to the moral foundations of culture itself.* This manner of conflict-resolution-by-avoidance might assuage the concerns of traditionalists who jealously guard parental and church prerogatives in educating their children, as well as those with a post-modern sensibility who tend to view *any* movement towards universal value propositions with suspicion. However, as discussed below, a stance of presumed neutrality amidst culture wars offers no real solution. It ends up privileging a variety of secular education that denies its own relevance to the entire realm of subjective experience, even as it presumes to impose universal objective standards for human development. Such education inevitably fails to deliver meaningful instruction regarding "how to live," or "what concerns to we share in common," or similar issues of inherent concern to the developing human being. It therefore fails to serve as a reliable basis for citizenship or cultural transmission, and drives change towards a world where reason itself loses its power to unify and guide collective action in the public sphere.

> In this era of post-modern relativism, the absence of plenary values needed to foster global citizenship while guiding and informing educational system design begs a deeper level of analysis.

According to the critical posthuman perspective, classical human-centered value propositions enfolded within the secular notions of liberty, equality and justice stand on truth claims that are neither self-evident nor pre-ordained when viewed through the lens of the global economy and outside the perspective of a common cultural heritage. In the context of economic globalization, these secular ideals proclaimed as universal by political and economic elites of the former colonial powers engender a form of pan-humanism based on a Eurocentric notion of the ideal human subject. Value propositions once construed with reference to place-based religious and folk traditions mediated by plural enclaves of common cultural heritage now are universally

delineated for a global community by means of a classical Eurocentric image of the ideal human subject. This image arrogates to itself an ideal status within human subjectivity by excluding, through negative reference, everyone (and everything) that populates various categories of "other". The resulting dualistic paradigm "implies the dialectics of self and other, and the binary logic of identity and otherness as respectively the motor for and the cultural logic of universal Humanism" (Braidotti, 2013, p. 15).

Consequently, those who defend the more abstract truth claims of classical secularism often are unaware of the implicit claims of privilege carried in their scientific analysis or political messaging, which in the face of actual social inequities perpetuates a neo-colonial brand of Western exceptionalism. By privileging abstract rationality above all else, including its own non-rational basis in a disembodied subjectivity posited three centuries ago by Renee Descartes and later described by Ryle (1949) as "the ghost in the machine," modern dualistic thinking as a continuing legacy within the post-modern cultural context has given rise to a brand of secular fundamentalism in the name of "hard" science that implicitly denies the moral authority and teleological validity of all other cultural variants (Wallis, 2005). This thinking presumes to avoid moral hazard and transcend the need for public morality by construing "nature as dead machine" devoid of intrinsic value or subjective being-ness, thereby freeing the neo-colonial agenda of global industrial expansion from virtually all moral constraints (Giblett, 2011, p. 23).

However in today's post-modern society, the question of how we understand core values is inseparable from the question of how we understand the nature of subjectivity and subjective identity. When, as described above, a denial of the subjective realm in the public sphere of education occurs under the pretext of moral neutrality, such denial perpetuates an insidious form of neo-colonialism by training students to conceive of knowledge in strictly mechanistic terms. By conveniently side-stepping values-based curriculum that might draw learners into deeper exploration of the self as moral agent, or that might invite transformative learning through challenging encounters with the human or non-human "other," post-modern education reinforces habits of thought that infuse cultural relativism with a flavor of unconscious privilege. Such habitual default into the axioms of classical humanism alienates learners from the larger life world by assigning an inferior status to the entire domain of qualitative knowledge. Through alienation, learners are deprived of vast and diverse domains of knowledge, including relational and self-knowledge as interpreted through the world's vast diversity of indigenous, religious, and aesthetic traditions, as well as holistic and practical knowledge that contemplates non-linear and self-organizing causal structures of complex systems, all of which are deemed to lie outside the privileged domain of a mechanistic "empirical reality."

A dualistic worldview which employs the binary of self-and-other to distinguish, objectify and colonize the entire domain of empirical reality, necessarily relies on a disembodied abstraction of the human subject as its universal ideal. This worldview thereby divorces the western conception of "the humanities" as a pedagogical category from the universal truth claims of modern science. While building its logic on a series of fatal binaries, it constructs objective reality in a way that denies the intrinsic value of all things real, allowing for the objectification and commodification of all living and non-living forms, including all human "others" deemed to have an inferior status in proportion to their distance from the universal subjective ideal. We thus encounter "the paradoxical and violent global context where the posture of Western 'exceptionalism' has taken the form of self-aggrandizing praise of the Enlightenment Humanist legacy;" a legacy which disenfranchises the plural voices of religion, cultural diversity and integrative thought that are the very ones needed to carry on inter-subjective dialogue that might

coalesce around common values in the public sphere (Braidotti, 2013, p. 36-37, Wallis, 2005). What remains after pedagogical disenfranchisement and the clash of fatal binaries is a passionless, disembodied form of education which invites the "twin pitfalls of conservative nostalgia and neo-liberal euphoria," while failing to equip learners with the knowledge, skills and perspectives needed for engaged global citizenship (Braidotti, 2013, p. 11).

RE-VALUING EDUCATION VIA AN INTEGRAL, POSTHUMAN PERSPECTIVE

Beginning in the early twentieth century, an undercurrent of concern over an ever-widening gap between espoused ideals and lived realities in the modern era inspired an interdisciplinary literature critically deconstructing the major premises of the modern industrial society. By mid-century, this post-modern desconstructionism gained prominence in the Western political economy, and a growing number of engaged citizens came to doubt the moral legitimacy of conventional problem-solving approaches adopted by governments and organizational leaders, and taught in the mainstream educational institutions. In historical perspective, the recent era of critical deconstruction can be understood as a quest to redeem the classical humanistic agenda of emancipation and self-determination for all members of the human family. Accordingly, from the perspective of post-modern consciousness, an appropriate response to the current global crisis must include recognition of the plurality and relativism of culturally-mediated worldviews, *and a restoration of the dignity of subjective experience* so as to "reinclude at a higher level what the modernist stage had previously left behind in its transcendence" (McIntosh, 2007, p. 57).

However, postmodernism so far has been ineffective at deconstructing that particular aspect of classical secularism that imposes a universal, and therefore privileged, panhuman set of ideals within the public sphere of global capitalism. Lacking a viable, unifying alternative to replace the universal truth claims of classical secularism, postmodern criticism has fallen prey to binary thinking as it has located nearly all moral value within the relativistic domain of the private sphere. Consequently, postmodern criticism has largely failed to remedy, or even acknowledge, the current *absence of consensus over public values needed to guide decision-making* in an increasingly interdependent world. Within the popular culture of the West, post-modern consciousness over time has devolved into a more or less dogmatic cultural relativism. In recent decades, a corresponding *value relativism* has arisen as a new problem condition or cultural "pathology" embedded within the post-modern worldview (McIntosh, 2007, p. 56). This move towards value relativism as a critical pluralistic response to neo-colonialism has so far failed to produce a global framework for unified action in the public sphere, as warranted by the current ecological crisis.

While there is ample reason to be concerned that the current societal dialectic may be evolving toward a sharply regressive turn, including dogmatic crusades by some cultural warriors who would reinstitute various forms of education by indoctrination. Historical analysis also suggests that many of today's messy global challenges may be emerging from within the very shadows of Enlightenment-era thinking:

> Despite the cult of rationality, modern history has been punctuated by witch-hunts and world wars which have been explosions of unreason. Without the ability to approach the deeper regions of the psyche, which the old myths, liturgies, and mystical practices of the best conservative faith once provided, it seemed that reason sometimes lost its mind in our brave new world (Armstrong, 2001, p. 367).

Whether today's culture wars might be a prelude to a bifurcation leading to the emergence of a new global cosmology is an open question. Upon further elaboration of this posthuman turn in philosophy, we may find that we are standing on the threshold of a second Enlightenment; one involving a global shift in consciousness affirming the unity of all life. This possibility is eloquently treated in the visionary writings of Thomas Berry (1990) and Brian Swimme (2005), among others. Yet, from a pragmatic perspective, it should be noted that neither these nor other writers on the topic of cultural evolution (e.g., Giblett, 2011; Robinson, 2001/2011; Laszlo & Laszlo, 2004; McIntosh, 2007; Banathy, 2000; Wilber, 1996; Czikszentmihalyi, 1993; Bergeson, 1911) espouse a passive attitude in regard to the implications of the current global crisis. To the contrary, these writers articulate our generational challenge: to consciously engage in processes of learning that will allow us to align human culture with the living systems that sustain us and to do so in a manner that works in the current, historically-embedded context of cultural plurality and global socio-technical change.

We must look beyond the limits of the post-modern worldview, and determine how best to guide the course of our own evolution in a manner that encompasses the whole of the mind-body system (Banathy, 2000; Csikszentmihalyi, 1993), even as the boundaries of that system appear to be changing by virtue of our 21st century technological extensions (Fukuyama, 2002). In the present context of global interdependence, those who call for the emergence of a new global cosmology need not abandon their post-modern critique of classical secularism and its colonizing proclivities. Rather, something like a global cosmology is needed to guide generative civic engagement at the level of scale needed to reconcile human and natural systems for the long term (Spretnak, 1999; Orr, 1992).

Recent developments in integral philosophy and critical post-humanism, respectively, present an opportunity for synthesis within a framework of evolutionary inquiry (discussed below). Integral philosophy seeks "a new understanding of how the influences of evolution affect the development of consciousness and culture" (McIntosh, 2007, p. 2; Combs, 1995/2002). It exalts evolution as a primary value in the cultural sphere and as a *prime directive*: "to work to maintain the health and sustainability of the entire channel of cultural evolution, the spiral of development as a whole" (McIntosh, 207, p. 79).

Drawing from earlier pioneering works of William James, Henri Bergson, Pierre Teihard de Chardin and others (McIntosh, 2007; Combs, 2002; Capra, 2002), an interdisciplinary convergence of theoretical development and empirical research spanning the past 50 plus years has given rise to a new, historically-significant worldview, recently synthesized in works of integral philosophy (McIntosh, 2007; Lakoff & Johnson, 1999; Wilber, 1996; 2000). This integral perspective illuminates the *external realm* of biology and cosmology with a new understanding of life based on the science of complexity and non-linear dynamics (Capra, 2002), and it illuminates the *internal realm* of consciousness and culture with "a new ontological grasp of the structures of the internal universe" confirmed by a "broad empiricism" that recognizes the empirical validity of direct and reproducible subjective experience (McIntosh, 2007, p. 209; Wilber, 2000; James, 1936) .

A complementary 21st century perspective, also arising from the ashes of post-modern deconstruction, critical posthumanism combines critique with creativity to "help us re-think the basic unit of reference for the human in the bio-genetic age known as the 'anthropocene', the historical moment when the Human has become a geological force capable of affecting all life on

this planet (Braidotti, 2013, p. 5). It maintains an affirmative, ethical stance in favor of a "situate and accountable perspective" that rejects the "unitary subject position upheld by Humanism" including the "self-appointed missionary role of Europe as the alleged center of the world" (p. 53-54).

> As a brand of vital materialism, posthuman theory contests the arrogance of anthropocentrism and the 'exceptionalism' of the Human as a transcendental category. It strikes instead and alliance with the productive and immanent force of *zoe*, or life in its non-human aspects (p. 66).

Similar appeals to replace anthropocentrism with a life-centered value orientation are expressed in the seminal writings of Lovelock (1979/1987), Berry (1988), Abram (1996), Merchant (2005), and Giblett (2011).

Educational systems change via evolutionary learning.

Having offered a partial synthesis of post-human and integral perspectives as an evolutionary framework for organizational transformation within educational systems, it is now appropriate to revisit what I have posited as the pragmatic question of central concern to education in the 21st century context: *Whether and how educational systems can serve to guide the evolutionary transformation of human culture(s) as needed to build a global civil society that secures a high quality of life for all via a non-dualistic, generative alignment of human and natural systems.*

Our task going forward, therefore, is three-fold: *First*, to gain a deeper understanding of our global situation through the lens of evolutionary theory, which serves well as a framework for cross-disciplinary integration of relevant ideas concerning the role of human agency in driving socio-ecological change; *second*, to examine how culture, as the embodiment and extension of human "mental processes that are (or can be) subject to social transmission" (Ross 2004, 61) drives a co-evolutionary dynamic involving both biology and culture (Richerson and Boyd 2005) related to the conscious and unconscious imitation of ideas (memes) having the power to replicate from one human mind to another; and *third*, to consider the role of conscious biomimetic design as an educational strategy for societal transformation, enabling learners to consciously emancipate themselves from the grip of maladaptive memes and actively steer the course of human and societal evolution toward higher levels of organization aligned with "life's principles" (Biomimicry 3.8 2012; Banathy 2000; Benyus 1997; Brodie 1996).

In the context of a world undergoing rapid socio-ecological change, inquiry as structured above promises to illuminate the theoretical and practical foundation of a new educational paradigm. The shift would recast the purpose of education to facilitate the emergence of sustainable culture leading to sustainable society. Under this new paradigm, education is conceived as a process of human development and cultural transmission that enables learners to assume conscious control of the reflective, mimetic and enactive processes governing their thoughts, believes and actions, respectively, with the aim of replicating in themselves and their environments the qualities found in healthy natural ecosystems: including diversity, functional integration, cyclical processes and self-maintenance, harmony and resilience (Zolli 2012; Van der Ryn and Cowan, 1996/2007).

Over 35 years ago, the British evolutionary biologist and theorist Richard Dawkins (1976/1989) introduced a fresh neo-Darwinian perspective on evolution through natural selection by offering an image which he describes as a "gene's eye view of nature" (1976/1989, xv). From

this perspective, the basic unit of selection and therefore of the evolution of life itself is not the group, population or species, but a more basic entity which he calls the *replicator,* described as the molecule, gene or similar unit which has the "extraordinary property of being able to create copies of itself" (1976/1989, 15). By viewing Darwinian evolution from the genes eye view, Dawkins distinguishes the "selfish" behavior of genes as replicators from the many observed species or group-level behaviors that exhibit cooperation or the equivalent of altruism as a primary survival strategy. In this way, Dawkins refutes many of the problematic cannons of social Darwinism, while inviting renewed interest in the application of evolutionary theory to the study of social behavior.

A particularly relevant part of Dawkins' (1976/1989) analysis, for purposes of this discussion about the role of education in a post-human world, is his proposition that *in the social sphere* just as in the biological sphere all life evolves by the differential survival of replicating entities. He coined the term "memes" as a way of conveying the idea of "a unit of cultural transmission, or a unit of imitation" that, having the power of self-replication, should be regarded as a living structure in its own right. He compares memes to viruses with the suggestion that "[w]hen you plant a fertile meme in my mind you literally parasitize my brain, turning it into a vehicle for the meme's propagation in just the way that a virus may parasitize the genetic mechanism of a host cell" (1976/1989, 192). Dawkins postulates that memes, like genes, will over time form into co-adapted meme-complexes capable of exploiting the prevailing cultural environment (also consisting of memes) to their own advantage, eventually coalescing into stable meme pools that resists penetration by other competing memes. This articulation of a neo-Darwinian perspective on cultural evolution locates the meme-replicator as a "self-serving" unit of evolutionary development, thereby refuting the classical teleological notion that evolutionary forces *per se* favor the long-term survival and advancement of human culture. In this way, Dawkins offers an important lens for understanding the evolutionary implications of our 21st century, posthuman condition.

A decade after Dawkins introduced the concept of the replicator as the basic unit of Darwinian selection, engendering renewed interest in the application of evolutionary theory to the social sciences, philosopher and systems theorist Ervin Laszlo (1987) published his "grand synthesis" of evolutionary theory. A particularly compelling aspect of Laszlo's work is his application of theory regarding the behavior of complex systems, including the theory of chaotic attractors derived from the empirical work of meteorologist Edward Lorenz and others, to describe a logical pattern of evolutionary change exhibited by self-organizing (autopoietic) systems at all levels of scale, inclusive of physical, biological and social systems alike (Laszlo 1987; Gleick 1987).

Laszlo's work invokes evolutionary theory to challenge the prescriptive and deterministic orientation of the mainstream scientific academy, which views complex systems as entities in or near dynamic equilibrium. He described evolution as a process involving systems in a state of disequalibrium that form structures at progressively higher levels of organization and complexity. Building on these theoretical premises, he described a basic model whereby dynamic systems at a given level of organization and scale enter into a state of disequilibrium that, through mutual attraction and a process of emergence ("bifurcation") enter into a higher level of organization, thereby establishing a hierarchy of self-organizing systems; emerging from subatomic particles up through living cells, organisms, ecologies and societies. In this way, Laszlo reconciled the long-standing conflict between the perceived cosmic implications of

Newton's Second Law of Thermodynamics and Darwinian evolutionary theory, respectively; the former maintaining that all *matter* descends towards a state of entropy, and latter maintaining that all *life* ascends towards progressively higher levels of organization.

> We have now come to see that the conflict between the two great processes—the two arrows of time—is only apparent. Evolving systems are not closed; the universe as a whole is not mechanistic; cosmic processes do not point the arrow of time toward a state of universal heat-death; and life is neither an accidental aberration nor the manifestation of mysterious metaphysical forces (Laszlo, 1987, p. 17).

Like Dawkins, Laszlo posits that both biological and social systems evolve towards progressively higher organizational levels. His writing reveals important agreement with Dawkins: Both theorists account for the much faster rate of evolutionary change observed within social systems, relative to biological systems, *while rejecting any and all deterministic projections regarding the outcome for human existence or quality of life*. However, where Dawkins' theoretical views adhere to the classical Darwinian concept of selection as a step-by-step process of incremental change, Laszlo instead applies the theory of "punctuated equilibria" and the related concept of "convergence" to explain how "high levels of complexity can be achieved in relatively short time frames" (Laszlo 1987, 81-82). The concept of punctuated equilibria

> recognizes the occurrence of long periods of stasis, during which the catalytic cycles that maintain organic species in their environments perform adequately and correct for a limited range of perturbations, and it claims that when the epochs of stasis come to an end, evolution is sudden and unpredictable in detail (1987, 77).

"Convergence" describes a process that allows for rapid change *arriving at progressively higher levels of complexity*. When living systems, whether species, ecosystems or societies, through the processes of mutation and speciation, and through interaction with their environments, enter a state of critical dis-equilibrium, they form catalytic cycles "that maintain two or more dynamic systems in a shared environment through coordinated functions, similar to but even more integrated than symbiosis among organic species" (p. 34). These "hypercycles" allow for dynamic systems to emerge at higher levels of organization. For example, in the context of societal evolution, "[a]s the flows of people, information, energy, and goods intensify, they transcend the formal boundaries of the social system" enabling "neighboring tribes and villages to converge into ethnic communities and integrated states" (p. 90).

Like the evolutionary systems they describe, the major theoretical works of Dawkins (1976/1989) and Laszlo (1987) draw us into a dialectical tension between integration and differentiation. What emerges is a yet more integrative vision of societal evolution that holds the promise of nature-culture continuum converging at a higher level of complexity through complementary processes of *mimesis* and *autopoiesis*. Translation: sustainability through the educational practices of biomimicry and generative (evolutionary) inquiry. Let us now turn to the latter of these two practices as a framework for leveraging the transformative value of the former.

 Bela H. Banathy (2000), whose work in the area of social systems design and consciously-guided societal evolution provides major inspiration for this essay, defines evolutionary inquiry as "a disciplined inquiry by which evolutionary knowledge and

evolutionary competence are developed *and applied* in engaging in conscious evolution" (pp. 263-264, italics added). It is an intentional process of self-organization and transcendence that requires an "[u]nderstanding of how living systems work," where such knowledge is "used constructively to help us design a sustainable societal system" (Taylor, 2008. p. 5). Consistent with the premises of evolutionary systems theory, conscious evolution of society through disciplined inquiry and application of evolutionary knowledge reflects evolved human potentials enfolded within humanity's current postmodern stage of cultural development (Taylor, 2008; McIntosh, 2007; Banathy, 2000). Taylor (2008) summarizes this premise quite elegantly: "At the same time as our civilization has become unsustainable, our species has acquired the ability to redesign living systems" (p. 5).

Banathy (2000) further affirms that evolutionary inquiry proceeds from a core ethical stance:

> The right of people to guide their own destiny, to create authentic, nurturing, sustainable communities, to control their resources, to govern themselves and guide their own evolution is a most fundamental human right (p. 2).

Implicit within this core ethic is the premise that, by recognizing *self-guided evolution as a fundamental human right,* diverse organizations and societies will be able to self-organize in ways that, from a global perspective, will support the emergence of a harmonious and ecologically sustainable global community. Consistent with this view, any serious consideration of the current and future role of education in society should begin with a clear understanding that the human right to self-determination includes the right to learn and participate in the further shaping of our common evolutionary story.

As a process-oriented discipline aiming at societal transformation through the conscious unfolding of human potentials, evolutionary inquiry "incorporates four interrelated domains: philosophy, theory, epistemology, and functional application." Such inquiry is "*grounded in a great variety of philosophical and theoretical positions in want of synthesis*" (Banathy, 2000, p. 264, italics in original). To fairly and accurately cover these relevant foundational perspectives in depth, it would be necessary to review a substantial body of interdisciplinary literature; a task beyond the limited scope of this essay that must be reserved for another writing. What follows, therefore, is a selective treatment drawn from representative highlights in the literature pointing to a generative synthesis of posthuman and integral thought that is intended to set the stage for further inquiry.

In the context of organizational and educational systems development, a process of evolutionary inquiry informed by a post-human integral perspective provides a dynamic, participatory, collaborative and self-organizing framework for responding to legitimate concerns over the lack of unifying values needed to lead change in the face of a threatened global commons. As the world's political economy becomes increasingly pluralistic and fragmented, the task falls on education to equip learners with the knowledge and skills needed to overcome destructive binary thinking and foster a cosmopolitan form of global citizenship that is guided by a cross-cultural synthesis of unifying values commensurate with the common challenges facing global humanity. Such a pragmatic turn in education would allow learners to transcends abstract binary thinking by nurturing a "generative notion of complexity" and a vital "nomadic" notion of subjectivity (Braidotti, 2013, p. 100). Envisioned is world community that, while still suffering from its colonial legacy, through education and other appropriate means will find its way to a new living wholeness that can endure beyond the current era of cultural and ecological

fragmentation. Such pragmatism coupled with an emphasis on transcendence is in keeping with the critical post-human perspective which is grounded in transformed (monistic) subjectivity and a *vital materialism* (Braidotti, 2013) where life, in all its forms, emerges as the central developmental concern of education, culture and society at large. It also aligns with the emerging integral worldview in that achieves transcendence from the limiting structures of modern exceptionalism and post-modern value relativism by exalting evolution itself, the infinitely complex process through which all living systems self-organize and achieve optimal adaptation within changing environments (McIntosh, 2007; Combs, 1995/2002; Wilber, 1996).

Building on foregoing theoretical synthesis, evolutionary inquiry can explore whether the pedagogical use of learning strategies that are inspired by the study of complex living systems will enable learners to participate in the co-generation of living value without resort to abstract or polarizing value propositions. These generative learning strategies would attend to both interior and exterior domains of knowledge and build practical competencies through collaborative dialogue, social systems design and other practices inspired by images of human and ecological health. Such post-human integrative learning, by emphasizing creativity over competition in the resolution of competing value propositions, readily aligns with enfolded potentials existing within any individual or social group, and builds resilience at multiple levels by virtue of its inherent alliance with the generative and dynamic forces governing life itself. Learning that engages the whole person and is guided by vibrant images of community and ecological health is both self-motivating and self-validating.

Without diminishing the importance of propositional knowledge as a legitimate vehicle for cultural transmission, integrative post-human education can equip learners to embrace and work within the framework of complex of living systems by consciously seeking encounters with the qualities of "beauty, truth and goodness" (McIntosh, 2007, p. 299). Integral theorist Steve McIntosh (2007) posits that these primary qualities "are the lures of perfection, the subtle spiritual *attractors* behind all forms of evolutionary development" (p. 299), and further that

> The existential connection between the beautiful, the true, and the good and the dialectical directions of evolution's advance is evidenced by the kinship that these values share with the differentiated expressions of evolution found in each … of the distinct domains of objective, subjective, and intersubjective evolution. … *Unity-complexity-consciousness, feeling-thought-will, and aesthetics-science-morality* --- each kind of evolution reveals this three-fold striving for perfection in different ways (p. 299-300).

As skillfully applied within the internal domains of human consciousness and culture, such primary value attractors provide "the *method* of integral consciousness" which we practice "when we use integral philosophy to see how every conflict contains a transcendent synthesis that is waiting to be achieved" (p. 309, italics added). A similar three-fold pattern observable in living systems is described by Swimme & Berry (1992) via their Cosmogenetic Principle. This principle describes a familiar pattern whereby opposing forces of integration (the i*nward* pull towards unity) and differentiation (the *outward* pull towards complexity) are resolved by means of transcendence (a shift beyond the duality of conflict into an entirely new domain (McIntosh, 2007; Csikszentmihalyi, 1993; Swimme & Berry, 1992). In a quest for transcendence aligned with Life's familiar cosmogenetic processes, an integral post-human education would invite learners to confront duality and conflict by summoning evolutionary consciousness to engage the whole of the mind-body system. As a turn towards holistic alignment of the conscious self with contextually-situated intimations of a nomadic subjectivity inspired by participatory encounters

with the immanence of life, evolutionary inquiry can foster the emergence of an evolutionary epistemology. Knowledge acquired in this way transcends the classical subject-object binary, while fostering sustainability in the public sphere of civic engagement and avoiding the all-to-common pitfalls of dualistic, "zero-sum" thinking. However, to improve prospects for successfully transforming educational systems via evolutionary learning guided by an integral, post-human perspective and inspired by the immanence of Life-as-primary-value, consideration should also be given to certain common factors that would impede evolutionary learning, and strategies for minimizing their deleterious influence.

Biomimicry as Emancipatory Learning and Convergence with the Life World.

Author Janine Benyus (1997), through her pioneering work on biomimicry as a strategy for adaptive innovation inspired by nature, introduced to the world's business, research and educational communities a vision of the human evolutionary future where we learn to embrace complexity and "come home" to a world of ecological limits; a world where we can "stare deeply into nature's eyes" and there find solutions to the great problems facing humanity (p. 5). Benyus' work seems to have resonated strongly among those who seek a way to reconcile the current mainstream reality of global commerce with increasing concern over the slow progress of the global sustainability agenda. She suggests that, through the practice of "asking Nature," we can find innovative design solutions to many of the world's economic and social problems. In this way, Benyus offers to the public at large a deeply transformative cultural meme via what appears on the surface as a simple metaphor. Richard Louv (2005) similarly used metaphor to capture the attention of a wide public audience, while subtly offering a transformative non-dualistic vision of the human-nature continuum. He accomplished this by coining the phrase "nature deficit disorder" to describe his finding that children suffered developmental harm when deprived of opportunities for unstructured interaction with the natural world.

Similar appeals to engage with the problems of complexity while working with (or within) an expansive, non-dualistic, conception of Nature are found in the writings of Van Der Ryn & Cowan (1996/2007), Holmgren (2003), Taylor (2008), Giblett (2011), Bejan & Zane (2012), Zolli (2012), and Deacon (2012).   These pioneering writings, by recasting and revising the evolutionary story and providing complementary critical perspectives regarding the legacy of modern scientific inquiry, together frame a new theoretical synthesis founded upon an integral, posthuman philosophical perspective. In practical terms, this perspective opens the way for radical revisioning of the longstanding dualistic and mechanistic worldview that has shaped the evolutionary course of western society. This worldview is quite literally engraved upon the very landscapes, institutional and legal structures, technologies, and patterns of thought and language that are the legacy western colonial expansion, and that are the current reality of global capitalism. Revisionary calls for a non-dualistic, participatory culture of scientific and spiritual inquiry suggests that the emergence of evolutionary consciousness may also signal an epochal movement in the direction of a re-emerging "indigenous consciousness." This process inevitably brings inquirers into challenging (and potentially emancipatory) encounters with the politics of decolonization and shifting identity formations, and with the presence of the ancestral (Kremer, 2002). Explorations of indigenous and "revisioning" perspectives frame the context for conversations across cultures that aim to heal and restore the deep connections that, ultimately unite human societies in community with each other and with the nonhuman presences that weave the intricate fabric of life on our home planet, Earth.   Such exploration of indigenous/spiritual perspectives in conversation with the emerging realities of global

community are offered by Deloria (1973/2003), Devereux (1996), Cajete (2000), Young, Haas & McGown (2010), and Jackson (2010; 2011) among others. Courageous and visionary efforts to transcend the colonial past, as well as post-modern cultural relativism, and forge "new" cosmological perspectives for a living Earth community are found in writings of Barry (1988), Roszak (1992), Haraway (1992), Macy & Brown (1998), Swimm (1996/2005), Tarnas (2006), Abram (2010) and Vaughan-Lee (2013).

This hopeful vision of a transformed worldview within the emerging global community is inspired, in part, by evolutionary theory and the concept of convergence:

> The new science of chaos and complexity tell us that a system that is far from stable is a system ripe for change. Evolution itself is believed to have occurred in fits and starts, plateauing for millions of years and then leaping to a whole new level of creativity after crisis (1997, 5).

As a mimetic science, epistemology, and integrative discipline, biomimicry in education has the potential to: 1) excite the vital interests of the learner-as-designer by aligning learning and discovery with the natural attraction that exist between two converging systems, human culture and the biosphere; 2) employ *conscious* mimicry that provides a stable basis for discernment relative to life's principles and a conception of the self as embodied participant within the larger community of life; and 3) generate cultural memes at the interface between social systems and ecosystems that are uniquely responsive to the problems of complexity and therefore able to compete with maladaptive cultural memes, in essence "beating them at their own game."

Biomimicry also can inform educational system re-design, by inviting decision-makers as participating members of a designing community to conceptualize and inhabit the school/workplace as a living and evolving socio-ecological system. Such a process engages human design intelligence and human agency with the self-generating forms and processes of the natural world. By engaging intellect and imagination informed by the study of healthy ecosystems, learners discover sustainable value and create future images capable of guiding dynamic change that expresses the combined intelligence of people and place, and mobilizes the vital energies of all system participants. This process of educational system re-design is further guided by the broader purposes of community and global sustainability and of adaptive social transformation. In this regard, systems thinking and biomimicry are complementary, as both inspire whole system interventions that extend well beyond curriculum, and encompass whole institutions and districts as learning communities. As a complement to the ideal of the "systems citizen" (Senge 2012, 558-578) who has acquired habits of thought and social competencies that enable mastery of complexity, biomimicry anchors learning in images of health and natural intelligence that are deeply connected with an emerging participatory consciousness.

Furthermore, biomimicry and biomimetic education serves to alleviate the *two great burdens* of society: the first is the "burden of the intervener;" an archetypal pattern observed among social systems that occurs whenever we opt for "a solution to a systemic problem [that] reduces (or disguises) the symptoms, but does nothing to solve the underlying problem." (Meadows, 2008, p. 135). Biomimicry, in essence, reverses the pattern of the "quick fix" leading to a cycle of repeated short term interventions, by tapping the deep intelligence of natural systems to extend the reach of ecological design and ecological services into all domains of human activity. Second, as discussed above, biomimicry education serves alleviate the burden

imposed by competing, maladaptive cultural memes, in essence serving as a form of inoculation that strengthens the human capacity for conscious discernment and future creating design guided by nature's principles.

CONCLUSION

As citizens of the 21st century, we have been able to hold a mirror up to ourselves in an effort to better understand the behavioral and socio-cultural dimensions of the global ecological crisis.   With due respect for the secure ground of hard-won international consensus, we know that human agency lies at the root of the global crises, and that human agency also is needed to effect positive change vis-à-vis our individual and collective capacities for conscious problem-solving.   On the premise of this knowledge, this essay considered how we might identify and transcend those "hidden" structures of human consciousness and culture that perpetuate maladaptive patterns of thought and behavior and that cannot be overcome by policy declarations or externalized incentives alone.

Through a partial synthesis of current literature, I found tentatively support for the proposition that education can only retain its legitimacy if it serves to facilitate the necessary shift toward integral, post-human and biomimetic models of societal development; models that seek to align human consciousness and human activity systems with the principles and patterns expressed by healthy natural ecosystems and ascertainable through ongoing close observation and acceptance of feedback.   This conclusion is echoed in the eloquent words of Mihaly Csikszentmihalyi (1993) written twenty years ago but even more relevant today: "[t]he model for how to go about improving the memes that control our psychic energy – the laws of the land, the rules of conduct, the beliefs, the institutions in which we live – comes straight from evolution itself" (1993, 270).

Learning informed by an integral, posthuman perspective attends to both interior and exterior domains of human knowledge, using a variety of integrative and transformative learning strategies. These learning strategies might include: education for quality of life and integral development (O'Sullivan, 1999/2001), story-telling and creative mythology (Larson, 1990/1996), experiential exercises for reconnecting and revisioning (Macy & Brown, 1998; Young, Haas & McGown, 2010), practices of socially-engaged spirituality and spiritual inquiry (Rothberg, 1993; 1995; Heron, 1998), generative dialogue (Isaacs, 1999), presencing (Kremer, 2002; Scharmer, 2013), and evolutionary learning and design (Banathy, 2000; Laszlo & Laszlo, 2004).   These and other complementary learning strategies facilitate active participation in the shaping of a self-validating, posthuman evolutionary story at all levels when guided by shared inquiry into cross-cultural, nature-inspired, living values that transcend the old binaries (e.g. science vs religion; objective vs experiential) and that are derived from the ethical imperatives of 21st century global citizenship. The envisioned framework for educational change would lead to engaged learning that develops the human capacities for values-based inquiry across the full spectrum of socially organized and technologically-mediated human activities, while supporting the emergence of human culture that embodies the stability, generativity and resilience of healthy natural systems.

With its potential to guide learners in school and society towards fulfillment of their evolutionary potentials, while responding to the urgent task of recovering precious ecological services withnature-inspired solutions to the problems of complexity that have confounded the

generations, education for global citizenship in the age of the *anthropocene* promises to unleash human potentials unrealized in the history of the world.

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