Permaculture and Sustainable Educational Systems

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Abstract

Last summer, I stepped back from my 30 years in education to work in the community garden and discovered a sustainable solution for improved education through gardening. “I feel like I am the band-aid holding broken schools together”, was a repeated refrain in my 30 years working as a teacher and administrator in K-12 schools. I worked beside my colleagues to try everything and anything to heal our schools with data, with big money, through curricular innovation, targeted strategies for three-tiered learning, through teacher training initiatives and performance rubrics to on and off-site professional development. We’ve tried smaller classes, more technology, “making thinking visible” and “backwards by design” scaffolding. Literacy strategies, executive functioning, learning objectives, essential questions, critical friends communities of best practice and growth-mindsets have all been implemented to varying degrees of success and still, the model for schooling fundamentally has not changed since the 1850’s. Instead of simply thinking about what more to do in schools, we need a new way of thinking about a healthy school ecosystem.Last summer, I stepped back from my 30-years in education to work in the community garden and discovered a sustainable solution for improved education through gardening.

Keywords: *Kincentric Ecology, Biodiversity, Qualities of Matter, Eradicating Pollutants, Evolutionary Dynamics.*

For a reason I cannot entirely explain, except to say that I wanted to “get back to nature,” I took the job of Community Gardener Assistant which entailed working 10 hours a week in whatever capacity might be needed in the garden and by the people attempting to live in balance with the one-acre plot outside a small rural New England village. I worked under the Garden Coordinator, whom I will call Bella, to learn something about composting, tending to the bins at the different stages of decomposition, and making sure that nitrogen and carbon combined in the right ways and proportions. I learned how it feels in the body to be a manual laborer, how deep in the soil seeds need to be planted, and how to consider what slugs, blight, and animals were thwarting the full growth of the plants. And I practiced patience to understand the growing process. I would bring baskets of vegetables home to soak and then dry on my kitchen counter. I then picked through and bagged only the best produce to be delivered to the food shelf that is always happy to receive donations. What I didn’t realize I would take away from this experience is a beginning understanding about permaculture and how these principles might help us to redesign our educational systems and our future.

As the name suggests, “permaculture,” coined by Bill Mollison in 1978, refers to a culture that has permanence. Originally it applied to creating man made agricultural ecosystems which mirror nature in terms of diversity, inclusion, cohesion, and balance. However, permaculture practices are in fact grounded in 10,000 years of indigenous technologies which see human activity as an extension of nature. Schools have a tremendous charge in the sustainability project--shaping the human regenerative

capacities for a whole new way of being. This article joins the permaculture movement to envision a systemic shift in school reform. Applying permaculture principles to the ecosystem of schools will compel a new paradigm in school design. Permaculture provides a framework for structural and management plans that prioritize the relational well-being of every species. The five key permaculture principles that would begin to move our thinking about schools are: Kincentric Ecology, Biodiversity, Qualities of Matter, Eradicating Pollutants, and Evolutionary Dynamics.

Kincentric Ecology

In the garden, there was a synergy among the gardens/wilderness/humans as we hauled water to the plants, cut flowers to take home, or picked tomatoes. Bella led educational opportunities of all kinds in the gardens, but this mutuality was most strongly felt with the group from "Jack's Place." Jack's Place was a local community center serving people with mental and physical ability challenges. Bella included me in these sessions as part of my work in the garden. At first, I was surprised by the invitation, since I thought my job was to work with the plants, maintaining the community beds. But after the first session, I understood something profound about what she was teaching me about permaculture; we were all connected to this garden and a part of each other's lives. Bella created a space for the humans the way she included an acceptance of all the life in and around the garden. She checked in with each participant and was able to assess how everyone was feeling that day in order to know what each might be capable of doing. We all practiced introductions, valuable skills that not only improved the quality of our lives, but the lives of each other, bringing us together. This teamwork created an undeniable interconnectedness that I miss today.

Permaculture's kincentric ecology is a primary principle that will help realign our thinking with the nature of reality. The word, "kincentric," connotes the connection, familiarity, and respect that would be afforded to relatives. The mutual dependence between humans and nature not only signifies our shared outcomes, but as we become more aware of this dynamic reciprocity, we are returned to indigenous wisdom whose Traditional Ecological Knowledge (TEK) can provide a map for our reintegration with the natural cycles. Observing nature attentively does reveal that everything is connected (Sankowski, 2020). The artificial separations and divisions perpetuated in our thinking and our societal organizations are false premises that even our advanced scientists have confirmed. As physicist David Bohm wrote, "this sort of ability of man to separate himself from his environment and to divide and apportion things ultimately led to a wide range of negative and destructive results, because man lost awareness of what he was doing and thus extended the process of division beyond the limits within which it works properly" (2008, p. 3). As Bohm and others have echoed repeatedly, while it may be possible to apportion the external world of matter, there is an implicate universe underlying all we can perceive with the senses that cannot be broken up in the same way.

Conceptually, and in practice, schools and local communities have a symbiotic relationship. Permaculture offers an ethical system to reintegrate the care and edification of the next generation. This coalescence mutually benefits schools and municipalities. To see our schools as living organisms within a larger ecology highlights the "civic commitment" (McNally & Slutsky, 2017) of individual and collective responsibility. This awareness of the "social-ecological" (SES) approach is necessary as we come to terms with the fact that we are now living in an era known as the Anthropocene. In this epoch, it is recognized that what and how humans think will have a profound effect on the well-being of the planet. Toward a re-integration of schools into our communities, four applications are offered.

Physical Integration

Bike paths to physically connect the entire village is a proposal that has been around some rural towns for a long time. The benefits of making biking a form of transportation in a 15-mile radius are numerous. A bike path would connect the school to the center of town and provide parents/students more safe and healthy options to get to and from school. There are many conveniences and advantages to creating an ecological mode of transportation beyond the reduced carbon emissions. I won't be able to list them all here, but the physical connection will help to promote a psychological connection of an integrated community. In the winter months, bike paths can be used as cross country ski trails which is a sport that has become more popular as an outdoor activity as a result of the pandemic. These paths would attract even more commerce through increased tourism as ecological vacations and back to nature themes are on the forefront of trends.

Village Space Designed With Young People In Mind

The library, for example, as a supervised place for afterschool programs and study is already a feature in many

small towns. There are models to this approach provided by Reggio-Emilia schools in Italy. The community must be conceived as the learning environment not only in the hours of school, but all hours, by design. Let's design spaces in the community for children, teens, and families to play and work together (LeBlanc, 2012). John Dewey believed that true education should stimulate a child "to conceive of himself from the standpoint of the welfare of the group to which he belongs" (Dewey, 1897). The community capacity to care for the public spaces through an educational lens benefits both the schools and the community.

Community-Based Learning Opportunities

Apprenticeship opportunities help create skilled workers for local businesses as well as help students obtain skills. These opportunities allow the students to earn school credits for core competency requirements that the Vermont Agency of Education has outlined in the statewide proficiency initiative: Learner Agency, Global citizenship, Academic proficiency, Communication, Critical Thinking and Problem Solving, Well-being. Research from MIT finds that not only do participants benefit from the practical work-based training in these community apprenticeship opportunities, but monetary gain for employers is calculated to be "7-10 percent return on an investment of $150,000 over four years" (MIT, 2020). With the implementation of Act 77 and the move in Vermont towards Proficiency-Learning, there is no excuse not to fully leverage student learning options with community apprenticeships.

Creating a Community Service Bank

Envision a community barter system in which students can barter their services for things or opportunities they are seeking. In this way, a barter economy gives young workers a chance to create "capital" of their own, while benefiting the community in return. Research for this paper yielded many volunteer databases that match volunteers with organizations. But while they do address opportunities in some small towns, volunteerism is mostly a one way exchange. There is a need for locally run databases that are used in schools in order for students to turn energy and time into desired resources. Furthermore, it might be an attractive proposition to find a way to make the benefits to volunteers more tangible. This database would also include, Service to Schools, a database of community members with expertise who are willing to share in schools for targeted curricular outcomes.

Biodiversity

Not only did Jack's Place participants contribute to the maintenance of the garden, to each other, and to everyone who had the privilege to be in their presence, my thinking about the benefits of (bio)diversity was triggered. Bella tried to teach me about the effects of cross-pollinations of diverse plants. This is why she valued the wild clover that attracted bees and honey bees, the milkweed and goldenrod that attracted hummingbirds, butterflies, and moths outside the plot. All my life I had lived with the misconception that these ubiquitous plants were weeds that simply took over the Vermont fields. Bella raised and tagged Monarch butterflies that she said would be on the list of endangered species if the list weren't already so long. The US Fish and Wildlife service confirms the inclusion of Monarch butterflies is warranted on the list of endangered species; however, precluded for the reason Bella told me.

The science shows that biodiversity is critical to the resilience and continuance of ecosystems. In this way, not only are diverse school populations needed, but the multifunctionality of diversified human capacities is vital to our future. Instead of setting up the limitations of student's participation in schools to the measurable outcomes of our standards, we have to diversify the domains of knowledge beyond disciplinarity. This diversity will not only allow students to live into their inherent capacities and fulfill their own "opportunity freedoms" (Hart, 2012), but a recognition of the advantages of our multifunctionalities will, in fact, enhance our school-community ecosystems. More dialogue is needed to recognize that the misguided Western scientific premise of schools must be re-considered to foster a more comprehensive understanding of existence. Two complex proposals are identified here.

Opportunity Outcomes

The academic standards measured in standardized tests dictate what we do in schools and even how topics are approached. Colleges now admit to the limitations of SAT/ACT type tests by waiving them as an application requirement. However, this recognition is just a start. A solution has already been laid out by Hart (2012) which has been taken up by Sen & Bourdieu in an Analytical Framework (Figure 1). This framework takes the premise of Nobel Prize winner, Amartya Sen's "Opportunity Outcomes" to measure the ***real*** value of achievement. This value measures a person's ability to actualize desired life choices. Pierre Bourdieu's contribution had been a

redefinition of capital and economic systems. Together their framework provides a road map for re-envisioning school outcomes around an individual's desired capabilities.

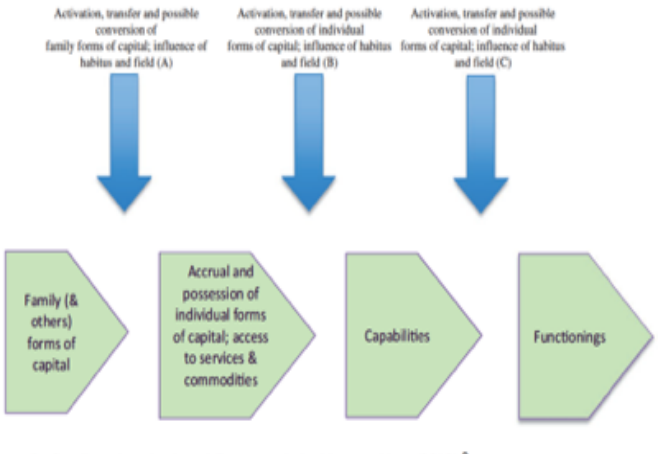

Figure 1: Sen-Bourdieu Analytical Framework, building on Hart (2012).

Growth Opportunities For All

Free two-year community college for all regardless of age, background or income will be provided. Community college for all is obviously not a new concept given President Biden's federal attempt to extend this privilege to those who cannot afford it. While funding has not yet come through on the federal level, local communities might find ways to work with the state to extend this opportunity. It is not unprecedented. "Successful models include wrap-around services that provide participants with supports like child care or transportation" (MIT, 2020). This kind of local commitment to local citizens will be of mutual benefit. Such community support may even be able to curb the declining population the state has been facing since the mid-1980s.

Qualities of Matter

My teacher, the Garden Coordinator, had an uncanny talent for knowing about the species whose lives intersected with the garden. She could tell when the same chickadee appeared in the same spot each day. She managed the garden by example, always seeing the life of the garden in relation to its various inhabitants and to human beings. She seemed to sense what the plants and surroundings needed. She could read nature, able to tell if the white decay on the plants was blight or slug induced. She respected the water in the river below and the trees outside the fence as part of her scope and purview. She calculated where the sun was in the morning/night and watched as it changed with the progression of summer.

Part of what permaculture does is attempt to deeply understand Nature and human interaction. One of the biggest obstacles for managing our precarious future is the "assumption of a materialistic world composed of things" (McGilchrist, 2021). Scholars, philosophers, and scientists are coming to the realization that "Something deeper and more mysterious, knits together the fabric of the world" (McGilchrist, 2021). The inanimate world and all matter, as physics has now confirmed, is not static. Heisenberg's uncertainty principle of "the observer affects the observed" (1927), along with other converging scientific and philosophical analysis recognizes the animate and fluid nature of reality. As Heisenberg, Bohm, and others conclude, quantum physics reveals an implicit order in which matter may act as a particle or a wave. All of the science is echoing what indigenous people have been trying to tell us for over 2000 years. The implicit order, the invisible processes at work in the quantum field, is as real as the explicit, measurable one.

The question for schools ultimately becomes, what are we measuring? What assets have value? In the dominant capitalist system, money is valued. In the context of permaculture, any ability, talent, or positive contribution is an asset. "In this sense, social sustainability blends traditional social policy areas and principles, such as equity and health, with emerging issues concerning participation, needs, social capital, the economy, the environment, and more recently, with the notions of happiness, well-being and quality of life" (Ricee, 2021). As previously stated, Bourdieu first introduced the idea of different forms of capital rather than solely the monetary form (Bourdieu, 1986). His conceptualization of capital enriches the understanding of what a commodity is. Our thoughts, knowledge and good will are assets (UNESCO, 2021). Kindness and caretaking are valuable assets. The ethics of permaculture still lie in Mollison's original "care of earth, care of people, and dispersal of surplus time, money and material towards these ends" (1991, p. 3). Recognizing the value of all forms, cooperation is a premium over competition. Two educational perspectives can be blended into a coherent instructional system.

Personal learning plans

While Personalized Learning Plans (PLP) are nothing new to many educators, using them to full effect is. Instead of the planning process being a bureaucratic add-on, PLPs would take on a central role in creating individualized educational paths that mattered to students. Giving students more say in what and how they would like to learn goes a long way to incentivize engagement. On their website, www.nextgenlearning.org , Next Gen offers guidance, tools, and samples to help schools build students' reflective capacities. The more engaged students are, the more they learn and the more competent they become which establishes a positive feedback loop. By the time students are in high school, they should have increasing flexibility to make and manage their own daily schedules. Through blended learning opportunities, students learn executive functioning skills through managing their own lives.

Wrap-around supports

Wrap-around supports are coordinated to extend past the walls of the school. Student support services extend into "neighborhoods" that organize groupings of families in order to form a network of services. These distribution channels allow for the basic necessities, food, healthcare, shelter, and clothing to be freely available. No individual should have to worry about having access to survival imperatives. School and social safety networks work together and in tandem to ensure children have what they need in order to maximize opportunity outcomes.

Eradicating Pollutants

There were mornings I arrived early in the garden. The sun coming from the east was peeking through the leaves imprinting shapely shadows on the ground. In the slanted light, I could almost see the air alive with particles, seemingly random patterns of movement. There was a scent of green grass mingled with dirt and wafts of sweet milkweed or the acrid arugula. It all fused together. My hands were tired from staking the tomatoes the day before, tying up the vines with stretchy string to expose the fruit to light. Once in a while, I ate a thin green bean, the juicy green chlorophyll tantalizing my taste buds reassuringly. In the quiet, I could hear the rustling of the moles who burrowed underneath the ground and a gentle whistling of a whole host of birds. The euphonious symphony mingled with the natural elements, a breeze of gracious generosity lightly welcoming me. But you have to slow down to see, smell, feel, taste, hear this world. It was as if a veil had been lifted. This was the real world. And even as I picked up the 30-pound water buckets sensing my muscles expanding and contracting, there was a peace, a harmony I had entered here, like a magical portal, beyond our man made representations. I realize only now that this was the feeling of my own well-being as I found my place in the give and take of natural processes and cycles. Bringing my whole self and being to this garden, we worked together. We depended on each other. And I want to believe that we were both better off because of this exchange.

Behind the disconnect with our environment is the thinking that has manifested this divide between human and nature. The epistemic commons have become as polluted as our environment. Clear thinking is a major component of personal well-being (Glaser, 2012) and bad sensemaking threatens our physical and mental health. Narrative warfare is happening in the public sphere with increasing clashes and increasing casualties. Reliable information is needed for good sensemaking, while disinformation is creating a negative feedback loop in which people defer their own sensemaking sovereignty to others, thereby perpetuating even more disinformation. How do we fix our own sensemaking? Permaculture even has an answer for this. Personal intention and effort must be trained. People need to be empowered not to yield to another's interpretations. Reflection means thinking about our thinking, holding up the mirror to see the taken-for-granted assumptions we carry into any conversation and appreciating how our mental models may limit us (Schmactenberger, 2019). This is a critical step. The rivalrous ways of interacting shaped by the dominant capitalist economic system, are part of the problem. Disinformation has become incentivized in the zero-sum game. This is a ruinous map for our present and future. Through shared reflection and generative conversations, we can redraw this map by hearing another's point of view and appreciating each other's reality. Building understanding of these interactions and proximities with other human beings are first steps in clearing the epistemological domain.

In other words, to clear up our thinking is, in fact, a way to clear up the external consequences of an obsolete way of perceiving the world. Educational systems will have to come to terms with the fact that while there are four irreducible epistemic approaches to knowing and that our school systems heavily favor the scientific methodology of measuring phenomena. This conditioning provides a distorted image of reality focused on the material world and

disqualifies other ways of knowing. Recognizing the knowledge that comes from subjective insights, cultural beliefs or systemic realities would actually disallow some of the predatory practices of market dynamics whose primary goal is profit. Putting a premium on well-being means we employ all technologies to maximize species health. This starts with clear thinking that can be applied judiciously to re-imagining healthier economic and social systems to maximizing our individual health.

Reconciling Knowledges

There are any number of frameworks or disciplines which describe the implicate order. I will refer to one called the Four Quadrants by Ken Wilber (2000) as seen in Figure 2. This graphic relates the four ways of knowing in terms of subjective and objective approaches combined with the singular and collective perspectives as ways we discern phenomena. What is important is that each domain has a dynamic effect on every other in simultaneous reciprocity. This lens suggests that reality is multidimensional and can only be fully understood in its complexity. Making these four dimensions visible, even perhaps as an organizing principle for a curricular framework, will provide students with the tools to better cope with reality.

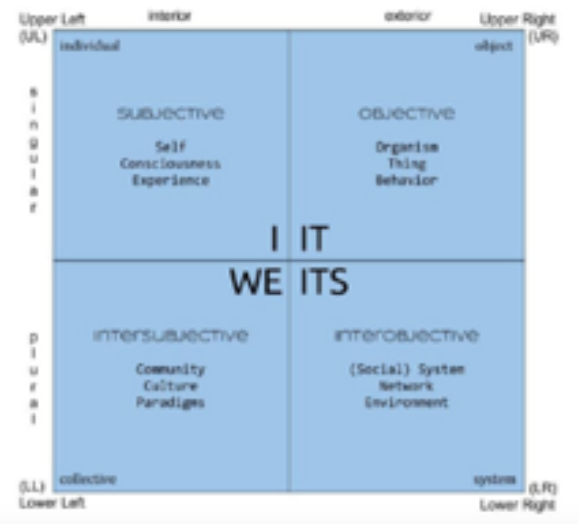

Figure 2: The Four Quadrants (Wilber, 2000)

De-incentivize Rivalrous Relationships

In order to clear the epistemic pollution, we need to agree on meaning-making principles. We need to de-incentivize greed and exploitation of each other and the world around us. We need to be in conversation with others who are thoughtful and dis-entangle egos from deciphering the world and our place in it. Manipulating the truth for economic ends, rewarding profiteering to advance a selfish agenda destroys people and the planet. The key will be to encourage young people, and everybody, to think for themselves. We cannot defer our sensemaking to others. We have got to take responsibility for finding the answers to our many questions. Clear thinking is a vital aspect to well-being. We can clear the pollutants of the epistemic commons and bring back balanced and verifiable sensemaking.

Growing Food Year Round

Well-being applies to all aspects of mind, body, and emotional health. A critical aspect of healthy living is healthy eating year-round. We should apply the latest technologies to grow hydroponic vegetables year-round in empty trucking containers. In a collective action towards applying the latest science, we also teach young people valuable skills and provide sustenance to community members as well. Figure 3 is one such company that offers turnkey containers with all the hydroponic equipment installed.

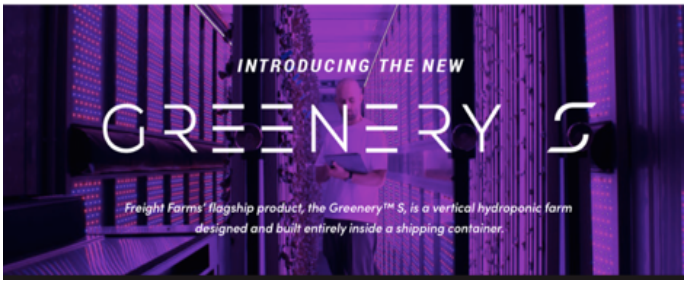

Figure 3

Mindfulness

Mindfulness and self-care need to be a part of our curriculum. Well-being is a skill (Davidson, 2015). Once students and teachers appreciate the routine of taking 7-15 minutes out to stop, reset, and reboot, they begin to understand the value of this. Now over two decades in, the mindfulness in education movement has accumulated data about the positive effects mindfulness practices have on learning and social development. The self-mastery that comes from conscious centering rituals that release habitual thought patterns give people a chance to manage their internal lives.

Evolutionary Dynamics

After the pandemic, I felt fragile. I had left my big job as Head of School in Rio de Janeiro and had returned to Vermont as a way to protect myself from all the possible dangers I saw lurking. I had worked in schools so long that I thought applying to principal jobs was what was next for me. But something changed for me in that garden. I still cannot tell exactly what it was, but I didn't want to go back to finding a job out of reflexive habit. Not only had I spent 30 years working in schools, I had spent the first 25 years of my life attending these institutions. While I loved learning, I had to admit that there were painful aspects to the effort and striving and long hours of schooling. The impersonal knowledge with its point accumulation game is a way to categorize human beings, putting an artificial stamp on the future and psyche of a young person. Students were stressed to the point of illness about the external classifications meted out by our educational institutions. And it wasn't just the students who suffered. I had been a Head of School trying to provide a vision, to make the school a welcoming place with a compelling curricular framework, social-emotional support systems, a safe and collaborative environment, fun service-learning, and field trips. However, I had not done much to change the inherent nature of the school experience. All I had done was to rearrange the academic furniture within the stressful culture of the school. I have felt considerably despondent about that for some time.

What I decided in the garden last summer was something I could never imagine before. I decided not to return to full time work in schools. I had to tell the truth that for far too long, I felt my best intentions and exhausting efforts were like the band-aid holding the status quo of schools together. I didn't want to do it anymore. That part was becoming clearer and clearer. All these years in the busy-ness of schools, I never had time to reflect, to stop and sit and actually think about what I was doing. In the garden, I did stop and what I realized was even more valuable: I didn't have to go back to the status quo. I could reconsider what I thought we were really doing in schools. I could reimagine what we might do with our schools. I realized what I was learning in the garden was what I wanted for schools in so many ways. While it is scary to assert one's own self-determination in such matters, I realized I had been given no other choice but to claim my unique position and perspective. I had long said that agency is the goal of education, and now I had to stand in my life to do this for myself.

Permaculture recognizes and works with evolutionary dynamics. Higher adaptability is critical to the survival of the species, and in the case of humans, it is the same as having agency. Agency, for individuals as well as societies, means the power to act purposefully to one's advantage (Welzel & Ingelhart, 2010; Bakan, 1966; McAdams, 1993; Guisinger & Blatt, 1994). "All evolutionary processes are antifragile" (McGilchrist, 2021, p. 727). In evolution, agency became most advanced in human beings as the species with the highest intellectual power to act with purpose on this planet. "As an evolutionary shaped capacity, agency is a particularly 'human' capacity. It is indeed a defining characteristic of our species'" (Welzel & Ingelhart, 2010; Maryanski & Turner, 1992). These principles show the significance of self-determination in the well-being of the species. I suggest two tenets as necessary parts of school design.

Democratic Practices

By maximizing student agency in schools through participation in democratic institutions, students are given an increasing voice to co-construct effective school structures. As students take increased responsibility for their education and their learning, these invaluable civic discourses are inculcated through practice. There are living examples of democratic school models in which students play important governing roles in almost every facet of the school. And yes, while increasing student democratic participation is about better schooling and engagement, it is also about increased agency as an essential in evolutionary dynamics. As Welzel & Inglehart citing Birch & Cobb (1981) assert, "one can see the evolutionary trend to increase agency both in the biological evolution of organisms and in the social evolution of civilization." Schools need to be more democratic.

Thoughts = Evolutionary Agency

It has been suggested by both scientists and philosophers alike that our human thoughts impact reality just as reality affects our internal life. Reflecting on the ultimate goal of evolutionary dynamics is to recognize the potential of human participation in co-constructing the future that will serve regenerative purposes and imagining new ways to connect with the natural processes of being human. "Darwin saw organisms as active participants in evolution" (Baldus, 2006). While humans obviously have inherited traits, there is much we can do in deciding where to give our attention. If we understood evolution and the human role in it as a fact,

we would seriously take care of how we must condition our minds.

Conclusion

As Einstein said, "No problem can be solved from the same level of consciousness that created it." The application of permaculture to the educational landscape is an opportunity to see anew the critical challenges to the sustainability of the species, of the planet, and of our school systems. These are interrelated domains that require a collaborative approach to seeing the complexity of nature.

In many regards, the current map that got us here is a blueprint of what not to do. Repeating old solutions in the cause of sustainability is worse than impractical, it's dangerous. As we start to see the epistemic dust settle, we can map a new way forward to design practical and manageable solutions by re-orienting ourselves to the world around us. We need to think and speak into the future, utilizing lateral thinking by taking ideas from divergent disciplines and applying them. We need to be multidimensional thinkers.

What we do and what we think really matters. We are agents of evolution whether we own it or not. There is the evolution that is happening randomly through natural selection and there is also something known as conscious evolution (Hubbard, 2015). Every human being has a unique contribution to make; maximizing each person's individual uniqueness contributes to the whole and the whole is greater than the sum of the self-parts. This is the true vision of our educational potential. Only a self-stabilizing ecology can last into the future. As we are conscious of evolution by design, we become the world we create and create the world through our becoming.

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