

Article

Alternative Communications about Sustainability Education

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Abstract: In preparation for the UN Decade of Education for Sustainable Development, UNESCO communicated its conceptualization of education for sustainable development (ESD). This paper does not assume that UNESCO was ineffective in communicating its approach to ESD; rather, the premise is that UNESCO's *actual message* was not well received by everyone, with some pushing back with alternative communications of their own. This paper identifies and profiles seven vanguard theoretical and pedagogical approaches to the problem of unsustainability, including, but not limited to: sustainable contraction, unlearning unsustainability, a 3D-heuristic, an integrative, place-based approach, and a Gaia-informed, ecological approach. It concludes with a discussion of seven overarching alternative messages for communicating about sustainability including: refocused education; complexity, chaos and living systems; Gaia and ecology; paradigm shifts for uncertainty; knowledge integration; existentialism; and fear and hope. Intellectual and pedagogical discourse can be kindled and stimulated by drawing on alternative communications about the normative concept of sustainability.

Keywords: education for sustainable development; sustainable contraction; alternative ESD pedagogies; curriculum for sustainability; UNDESD; communicating about sustainability; complexity theory; chaos theory; living systems theory; post-normal science

1. Introduction

The Editors of this special issue of *Sustainability* define sustainability communication as “a process of mutual understanding of the normative concept of sustainability as well as the individual and societal possibilities of taking action” [1]. A concept is normative if it is concerned with how things should or ought to be rather than how they are. Also, a concept is normative if it regards or depends upon the

obligations and permissions (norms) involved in human conduct. When people rely on normative concepts, their reasoning tends to be more sophisticated and self-reflective [2]. It can thus be inferred that people relying on the normative concept of sustainability will make more self-reflective, accountable decisions, especially when one considers that norms pertain to *reasons* to take action, to believe and to feel. For all intents and purposes, sustainability is a *reason* (a norm) for humans to take action, to feel connected to the future and to believe they can change things. Education plays a pivotal role in communicating the normative notion of sustainability so that people's judgments and actions as human beings are more accountable relative to nature and the future [3].

The role of education is so significant that the United Nations approved a Decade for Education for Sustainable Development (DESD) (2005–2014) [3]. In preparation for the DESD, UNESCO communicated its conceptualization of *education for sustainable development* (ESD), a communication strategy that has underpinned global ESD initiatives during the last ten years. Given that virtually every country in the world is a member of the United Nations, UNESCO's approach to ESD received a global audience. UNESCO assumes that development can be sustainable and that people should be educated around this premise (a normative position). UNESCO further assumes that achieving *sustainable development* is enhanced through an approach to education that teaches people to value balanced consideration of three sectors: economics, society and environment.

This paper does not assume that UNESCO [3] was ineffective in communicating its approach to ESD; rather, the premise is that UNESCO's *actual* messages were not well received by everyone, with some pushing back with alternative communications of their own. In more detail, there is general agreement that the future is deeply compromised due to humanity's past and present actions, which are not sustainable. But not everyone agrees with UNESCO's [3] message that development can continue as long as it is sustainable and as long as people are exposed to education *for* sustainable development. "There is an ongoing conceptual critique of ESD in the academic literature, ... [especially] that the 'official' UNESCO concept of ESD contains a number of weaknesses" ([4], p.12). First and foremost, critics of the UNESCO approach to ESD believe there is a particular ideology at play that can all too easily lead to indoctrination with *certain* values and ideas. This ideology (a) views the environment as a pool of resources to be managed; (b) holds that sustained economic development is a precursor to human development; and, (c) inculcates an instrumental, technical pedagogy, focused on predetermined goals, learning objectives and outcomes. The critics "question the intrinsic truth of these ideas and their consistency with the principle of sustainability, [even suggesting that] UNESCO's mandate of ESD may be an ethical and cultural mistake" ([5], p. 24).

Second, the UNESCO approach to ESD is also criticized for its anthropocentric orientation. This human-focused approach negates an ecocentric worldview, privileging humans over other species and nature (egocentricity). Læssøe *et al.* clarify that UNESCO's human focused approach to ESD emphasizes "the needs of current and future *human* generations" ([4], p. 12, emphasis added). In contrast, an ecocentric approach is "about construction of an ethical awareness and a critical understanding of one's relationship with the environment which is a living entity that humans are a part of and not superior to" ([5], p. 24).

Third, the critics further argue that the UN conception of ESD holds the tacit assumption that sustainability and sustainable development are inherently realizable through education. Because of this assumption, critics argue that "UNESCO's conceptions of sustainable development and education are

inherently flawed and possibly even the source of additional problems” ([4], p. 23). “When ESD objectives are defined ‘from the top down’ (involving UNESCO initiatives and guidelines) it is unlikely that students of ESD will be encouraged to engage in public sphere actions that may in fact challenge the top down perspectives” ([6], pages forthcoming). This uncritical pedagogy adds to the slippery slope of the aforementioned indoctrination.

In response to these criticisms of the UNESCO initiative, alternative voices have emerged from the margins, challenging these assumptions and the premise that education *for* sustainable development is the panacea for the problems facing the world. This push back activity in the theoretical and pedagogical margins is significant because when the decade ends in 2014, UNESCO will evaluate its successes and failures. To better ensure theoretical and pedagogical legitimacy and authenticity, it is imperative that any discourse around education for a sustainable future be enriched with alternative viewpoints that augment and/or challenge the mainstream approach communicated by the United Nations [3].

To that end, this paper identifies and profiles seven vanguard approaches to the global problem of unsustainability. Imitating Sauv e’s [7] framing of a similar intellectual exercise, the purpose of this paper is to bring to light and celebrate the richness of alternative ideas, thereby paying homage to the theoretical and pedagogical creativity of these architects of unconventional sustainability messages. The paper strives to inform the discourse around the connections between sustainability, development and education and how those connections are communicated and challenged.

2. Profile of Seven Alternative ESD Communications

This section profiles seven alternative ESD communications that challenge prevailing thoughts about the normative concept of sustainability, and its association with development. These initiatives were chosen for their well-reasoned arguments in favor of potentialities and possibilities provided by stretching and expanding one’s thinking about the unsustainability of the current tract of humanity. They individually and collectively tried to address how this untenable situation is aggravated by communications around the normative concept of sustainability (and development), each paying sharp attention to the significant role of educators. Their power and influence is paramount relative to a sustainable future. Communications about sustainability will profoundly shape future educational initiatives about sustaining life on the planet.

2.1. Sustainable Contraction: David Selby

“Recognizing there are alternative autopoietic (self-organizing, communitarian) renditions of ‘development’ against the dominant allopoietic (externally imposed or neocolonial) understandings of the term” ([8], p. 41), Selby pushes back against several key ESD communication messages. First, he believes the ESD “agenda is built upon the idea that the path to sustainability lies with a combination of better management, more technological efficiency, and responsible citizenship (usually inferring citizenship that does not overly rock the boat of ‘business as usual’ production and consumption” ([8], p. 37). He maintains that people embracing this approach, despite their best intentions, are actually “deeply complicit in a growth paradigm that is destroying both ecosphere and ethnosphere” ([8], p. 36). Ethnosphere is defined as “the sum total of all thoughts and intuitions, myths and beliefs, ideas and inspirations brought into being by human imagination since the dawn of consciousness” ([9], p. 2).

Second, Selby [10] claims that sustainable development calls for the conservation of development and not the conservation of nature. Sustainable development fails to advocate for reduction in material standards of living (consumerism) or a slow down of the accumulation dynamics. He claims that the result of this message is that people call for alternatives *within* development instead of alternatives *to* development.

Third, Selby [11] takes issue with the term global warming, suggesting instead, global heating. To warm up means to give off heat that is discernible by human senses (still touchable), while to heat up means something gets hot (becomes untouchable). In a counter argument, he claims the term *global heating* helps avoid the palliative effect of the euphemism of getting warm. The notion of *global warming* is too weak because it conveys the impression of relieving or lessening the warmth (palliative), but not curing, mitigating or alleviating the hot pain.

Fourth, and most powerfully, Selby [8,11] faults the mainstream approach to ESD (shaped by UNESCO's [3] conceptualization) as inadequately dealing with fear, denial and uncertainty. The main thrust of his argument is that humans have "a sleepwalked attachment to a distorted [materialistic and growth-oriented] value system," ([8], p. 38) and are consequently walking around with an *eyes wide shut* syndrome, a blind pattern of living. Quoting McIntosh [12], Selby [8] describes our current times as a "ubiquitous quasi-hypnotic condition ... a near universal state of denial, close to collective amnesia [the inability or refusal to experience pain]" ([12], p. 85). Coupling this sleepwalking with that fact that humanity is living in a dark age, Selby asserts that ESD's "failure to engage with the disorientation of darkness" ([8], p. 41) exempts people from *knowing in the darkness*, which in turn compounds their denial and exacerbates their fears. Both can result in inertia, avoidance of truth and uncritical acceptance of sustainable development.

Fifth, in an eye-opening (pun intended) push-back communication, Selby [11] advocates focusing on strong notions of sustainable in concert with taking development right out of the equation, replacing it with *contraction* (and attendant concepts of moderation, restitution and restoration) [8,11]. Selby [11] pioneers the idea of *sustainable contraction*, believing this is a more realistic educational response to the global heating crisis manifested through unsustainable development. The word *contraction* has two meanings. It can mean to become narrower or it can mean to draw together, to come to an agreement [13]. Presuming both, Selby [11] views sustainable contraction as a softer and more ecological concept than development. He envisions the sustainable contraction approach as a "sustainable retreat" ([8], p. 41) leading to a future state of "sustainable moderation" ([8], p. 41). In effect, a retreat would lead to contraction, which would lead to moderation and, ultimately, to restitution and restoration.

In order to develop his argument for movement through retreat-contraction-moderation-restitution-restoration, Selby [8] draws on several other ideas that warrant discussion. First, arguing that people can respond to unsustainable development coming from nine types of fear, he [11] advocates for *fearlessness* [14], gained by intentionally disruptive transformative learning experiences designed to disorient learners and make them face their hidden assumptions and beliefs. People can be afraid to feel the pain the world is experiencing. They can fear feeling despair and guilt and can fear being accused of not being patriotic. People can fear looking weak or of causing others distress by making them aware of the world's angst and their complicity. They can fear feeling powerless and ineffectual and can even fear others viewing them as morbid. Conversely, education for contraction fosters fearlessness and places people in a position of power and agency; leading to renewal, resolve and awakened consciousness.

Second, Selby [8] balances the notion of citizen with that of denizen, someone who occupies or dwells in a *particular place* or *locale*. He defines denizenship as “learning for conscious occupancy and participation in a place” ([8], p. 49). Related to this idea, Selby calls for both localization, a connection to a place, and for place attachment, an approach that assumes learning can be rooted in what is local. Connecting to a place, and learning to live and learn within that locale, are inherent in sustainable contraction (see next).

Third, Selby [8] poignantly recognizes that humans may not be able to flourish in the event of climate change so adverse that zones of inhabitable earth are created, forcing people to split apart and gravitate to southern or northern livable zones. In response to the real possibility of the human civilization retracting to Northern and Southern “zones of habitability” ([8], p. 51), replete with “intergenerational alienation... and the demise of what was familiar to earlier generations” ([8], p. 50), Selby proposes a long-term educational project of restitution and restoration, totally dependent upon the pedagogy of contraction (see McGregor [14]). In more detail, Selby [8] calls for both *earth* restitution and restoration and *soul* restitution and restoration if humanity hopes to survive. Reconciliation of earth and soul is required if humanity is to heal against a very plausible dystopian backdrop. Dystopia is a real or imagined society where the conditions of life and everything else are very bad. Those concerned with dystopian scenarios strive to explore the concept of humans individually and collectively coping, or not, with life conditions that have progressed in a downward spiral far more rapidly than they were prepared to handle.

As a final push back, Selby [10] challenges educating *for* anything, calling instead for other forms of education, perhaps sustainable education. He notes that if we should be educating *for* anything, it should be *for* ephemerality (lasting for a short time), *for* elusiveness (escaping notice) and *for* ineffability (too great to be described in words). Educating for these aspects of living in a consumer society mitigates people’s propensity to consume in unsustainable ways. Respectively, people would appreciate that things do not last forever, and that many of the power nuances of the current global context do escape their notice and never appear on their radar. Because of the absence of these layers of consuming, people remain unable to clearly articulate their roles and accountability to themselves, others and the Earth. The import of not acting responsibly is simply too great to put into words. Sustainable contraction requires that people be taught to deal with ephemerality, elusiveness and ineffability.

2.2. Unlearn Unsustainability: Arjen Wals

Wals’ [15] most intriguing counter-communication is that people have to “unlearn unsustainability” instead of being educated *for* sustainability. Learning our way out of unsustainability would entail an emancipatory approach to learning rather than the conventional instrumental approach. Emancipatory learning respects (a) hybridity (fusion and crisscrossing); (b) synergy; (c) blurring of boundaries; and, (d) permeable boundaries in the form of openness between generations, cultures, institutions, sectors and so on. Educators are encouraged to (e) help students reach tipping points wherein their thinking is pushed over the edge to make sure their mind is unfrozen. This necessitates (f) creating internal doubt and push back to ensure mind shifts (akin to Selby’s [8] education for ephemerality, elusiveness and ineffability).

Even more challenging, Wals [15] argues that in order to unlearn unsustainability, educators have to ensure students experience *gestaltswitching*. Gestalt means mind set, with Wals calling for integrative switching back and forth between five different mindsets (gestalts): trans-cultural, trans-spatial, trans-discipline, trans-temporal and trans-human (imagine the world from the perspective of non-humans). He claims that with social cohesion (group chemistry amongst diverse learners), students are better able to gestaltswitch. The plurality and heterogeneity of a collection of diverse learners enables “transformative disruptions to emerge” ([15], p. 23), meaning people are able to gestaltshift to a new way of seeing things or of being (akin to Kelly’s [16] envisioned paradigm shift). If one has unlearned unsustainability, one has gained “*sustainability competence* [which] refers to one’s ability to respond to a sustainability challenge with all these Gestalts in mind and to consider the challenge from a range of vantage points” ([15], p. 24).

Finally, drawing on Siemens’ [17] learning ecology concept, Wals [15] explains that unlearning unsustainability depends upon the concept of *connectivism*, meaning knowledge exists in the world and in networks rather than in the heads of individuals. While a network is largely a structured process, with nodes and connectors comprising the structure, an ecology is a living organism. It influences the formation of the network itself. The health of the living ecology determines the ability of the network to emerge, flourish and grow [17]. Hence, in order for people to unlearn unsustainability, educators have to create a learning ecology that helps people make connections, create networks and gestalt switch [15]. Not surprisingly, the learning ecology approach integrates principles from chaos theory, network theory and complexity theory leading to a *learning configuration* that ensures people see links and become connected. The learning ecology approach is concerned with “the flow and dynamics of connection creation” such that learning is viewed as a “connection-forming (network-creation) process” ([17], p. 1).

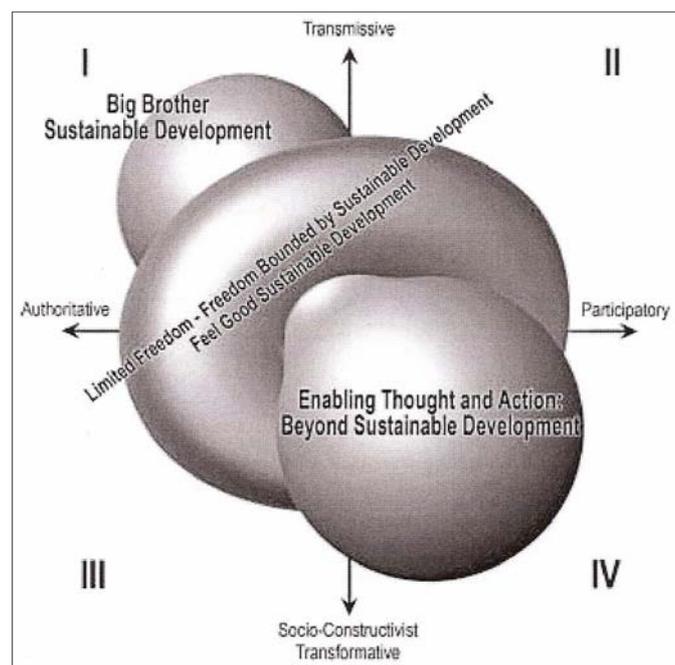
2.3. 3D-Heuristic: Bob Jickling and Arjen Wals

Finding fault with the static nature of “frameworks for education for sustainable development”, especially that from UNESCO [3], Jickling and Wals [18] tender a 3D-heuristic for questioning sustainability, to better convey generation and discovery. They intend educators and other practitioners to use the heuristic to place themselves within the contemporary ESD discourse. From this positioning, people would be better able to critique their own pedagogy and educational assumptions and more critically engage with the concept of education for sustainable development. Indeed, Jickling and Wals posit that sustainable development (SD) is just one social construct of our times. They are many, many other ways to help “engage people in existential questions about the way human beings and other species live on this earth” ([18], p. 18).

This philosophical and paradigmatic reflective tool is aptly named. Heuristic is Greek Εὐρίσκω, for to find or to discover [13]. A heuristic is a tool that helps people learn something *by* themselves. Heuristics are information-processing rules used by the brain to make decisions or reach judgments (remember, normative concepts like sustainability shape people’s reasoning processes [2]). Heuristics reduce the complexity of judgments, leading to better decisions because people are less inclined to reproduce their biases. In an attempt to prevent people from uncritically embracing ESD, Jickling and Wals [18] created this heuristic to help people avoid ESD cognitive biases.

They [18] call it a 3D-heuristic because it comprises three dimensions: (a) two conceptions of education, (b) two views of what constitutes an educated person, and at their interface on a four quadrant axis, (c) three realms of possibilities to help people focus their discussions and reflections on the relationship between SD and education (see Figure 1). They intend their 3D-heuristic to be generative, to get people to intentionally engage with the tensions related to the sustainable development (SD) agenda and how that agenda determines what kind of education results (transmission or transformative), which in turn determines what kind of educated person is formed (compliant or participatory). They use the concept of force fields to convey the tensions inherent in the SD agenda. When these force fields collide, three possible approaches for discussing the relationship between SD and education are generated: (a) state controlled, business as usual (Big Brother SD), (b) false sense of consensus about SD, and (c) enabling people to think and act beyond SD (called three realms of possibility). Jickling and Wals [18] want people to use their 3D-heuristic to challenge their own perspectives and questions and then reframe their approach to education, rather than blindly accept the conventional approach to ESD.

Figure 1. Jickling and Wals' [18] 3D-Heuristic for Questioning Sustainability Education (used with permission).



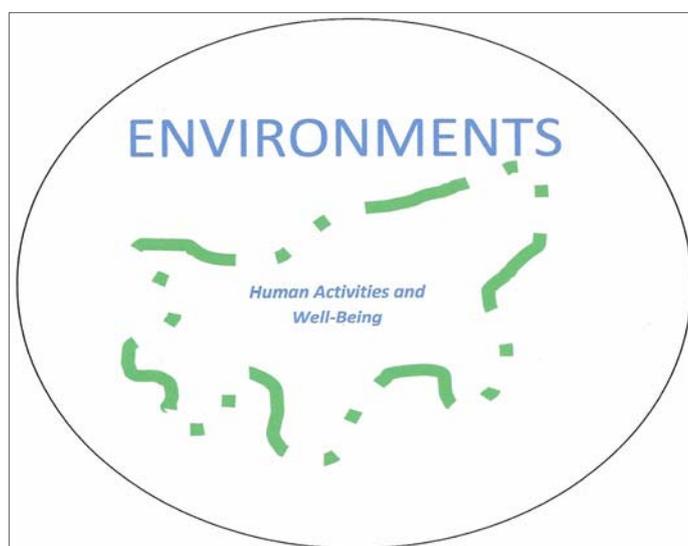
2.4. Non-Sectoral: Giddings, Hopwood, and O'Brien

Also commenting on the UNESCO [3] conceptualization of ESD, specifically its use of the interface of three sectors, economic, social and environmental, Giddings, Hopwood, and O'Brien [19] tender a sectorless approach, focused on the well-being of humanity. They observe that when people focus on the *sustainable* part of sustainable development, they tend to use a Venn diagram and focus on political reality, separating the economy from social and environment. When people focus on the development part, they tend to use a nested cup diagram focused on material reality, positioning the economy as a subset of society and environment, dependent upon them.

Giddings *et al.* [19] advocate for an approach that places economies and societies *within* environments (note the use of plural words instead of articles: a, the, an). In more detail, they push back against UNESCO's [3] sector approach, claiming it assumes there is *an* environment, *a* society and *an* economy. In reality, there are multiple environments, societies and economies. And, these exist along multiple layers (micro (local), meso (regional), macro (continent) and mega (global)), all shaped by complex interactions, changing over time. This approach respects integrated, holistic, emergent, complex, and trans perspectives. With this integral logic, people can no longer assume there are dominant parts, because multiplicity and complexity presume diversity and difference (plurality). Hence, people need a new way to conceptualize and visually represent this multi-layered reality, which is different from the political reality (overlapping circles) and material reality (nested circles) [19].

To that end, Giddings *et al.* [19] create a rudimentary representation of their idea of not separating economy from the other two sectors. Separation inflates the importance of the market, neglects human needs and reinforces the notion that the environment is *there for the taking*. Instead, they focus on the activities of humans to achieve well-being, drawing a fuzzy line around this concept, and they position human well-being within environments - humans live *within* environments (see Figure 2, adapted from Giddings *et al.* [19], p. 193).

Figure 2. Non-Sectoral Approach to Education for Sustainable Development.



“The boundary between the environment and human activity is itself not neat and sharp; rather it is fuzzy. There is a constant flow of materials and energy between human activities and the environment and both constantly interact with each other” ([19], p.193). Giddings *et al.* [19] feel this dynamic relationship is not adequately conveyed in static Venn diagrams or nested cup configurations. The fuzzy line represents the blurring of boundaries between societies and economies, merging them and opening them up to environments. The new human activity component within the fuzzy line includes material (economics), culture (society) and technology (political realities), which exist within social and cultural relationships. Human activities and well-being are surrounded with a permeable boundary, open to environments. They accept the term sustainable development, but believe achieving “it will need a shift in how humans see the world. Humans are part of a web of connections... To have long term meaning, sustainable development will require an integrated... outlook on human life and the world” ([19], p. 195).

2.5. Frame of Mind: John Huckle

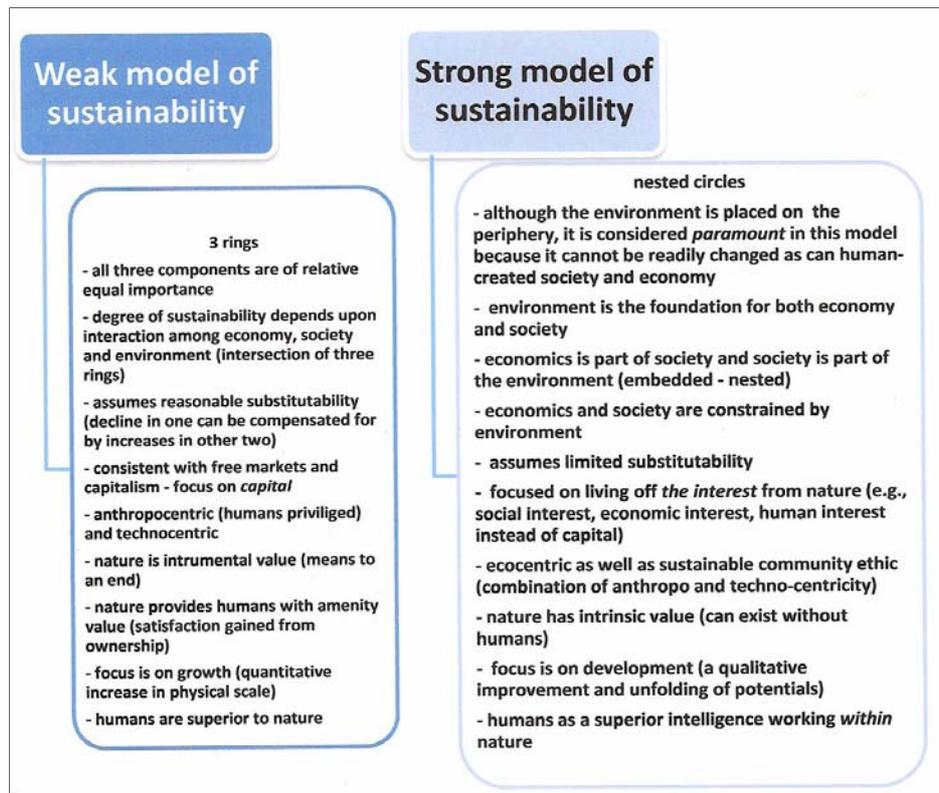
Like Selby [10,11], Huckle [20] also takes issue with the over reliance on a weak model of sustainable, calling for a strong model, supported with several counter sentiments. First of all he identifies two sustainable development discourses, reformist and radical, asserting a continua of political beliefs that link and stretch between these two approaches to messaging ESD. The reformist discourse holds that we need to reform the existing industrial complex and global economy, seeking balance between economic growth and social welfare and environmental considerations. In this discourse, fostered by linear and reductionist thinking, sustainability is viewed within the growth mode. In contrast, the radical discourse calls for the democratization of the global system (social justice), supported by holistic and systemic thinking. The intent is to reshape and generate social and economic welfare within ecological limits. Dolter and Arbuthnott [21] respectively label these approaches as green market views (reformist) and deep ecology views (radical).

Second, Huckle [20] believes educators should view sustainability as a frame of mind rather than a state of affairs. He maintains that conventional approaches to ESD opt for a state of affairs wherein students are expected to develop positive attitudes and behaviors (scientific values), achieve specific learning outcomes and measurable sustainability indicators, and learn predetermined knowledge and skills. The state of affairs approach is grounded in the reformist discourse. Helping students live life from a *frame of mind* means ESD would focus on ecological aesthetics, existential issues, spiritual values, ethics, principles, and a sense of attachment to place, all learned thorough poetic and non-manipulative arts and humanities. A frame of mind influences people's attitudes and actions and their outlook on life. A frame of mind approach is entrenched in the radical discourse.

Third, Huckle [20] further explains that ESD can be shaped by one of two philosophies of knowledge, that of normal science and post-normal science. From the perspective of normal science, knowledge is informed by neoliberal, neoclassical economic theory. Amongst other things, knowledge is value neutral, linear, reductionist, and rational. People learn to value individualism, equilibrium, optimization and homogeneity. Post-normal science draws on complexity economics, predicated on complexity theory (see also Wals [15] and Ireland [22]). Amongst other things, knowledge through this perspective is emergent, dynamic and self-organizing. Learners come to appreciate chaos and tensions, the importance of change and evolution, and they gain a deep respect for uncertainty and discontinuity. Respecting holism and synergy, they learn to search for patterns, connections and networks, and problem-solve using a plurality of perspectives and points of view. This distinction is similar to Wals' [15] aforementioned instrumental and emancipatory approaches to unlearning unsustainability.

2.6. Integrative, Place-Based Paradigm Shift: Terry Kelly

Also worthy of mention is Kelly's [16] challenge to the notion of weak and strong models of sustainability. Unlike Selby [10] and Huckle [20], who challenge the concept of sustainable development, Kelly has no qualms with the notion of development, per se. His concern is with the irresponsible use of *weak* notions of sustainable. Citing Morgan and Peters [23], Kelly maintains ESD is a "long-term project of worldview transition" ([23], p. 72) and that the requisite paradigm shift will not hold, or even take place, unless a *strong* model of sustainable is employed. Kelly's [16] notion of weak and strong models of sustainability is set out in Figure 3.

Figure 3. Kelly's [16] Overview of Weak and Strong Models of Sustainability.

Kelly [16] questions educators' ability to get the strong model of sustainability to really take hold if people do not shift paradigms to view sustainability as focused on (a) development (a qualitative improvement and unfolding of potentials) rather than on (b) growth (a quantitative increase in physical size or scale). Otherwise, he argues, educators are only shifting deck chairs while the ship goes down instead of shifting people's view of their place in the world, through an integrative worldview. Achieving the latter involves a different pedagogical approach, one focused on an integrative philosophy and place-based education. An integrative philosophy entails transformative, participatory and active learning. Educators would focus on whole systems thinking, the importance of context and on moral norms. They would also respect empowerment, enablement and self-organizing complex systems as major foci of curricula [16].

Place-based education sits comfortably with Kelly's [16] envisioned paradigm shift. It is predicated on the worldview that humans, who are part of the interconnected earth, live in harmony with the natural world. They are a superior intelligence working *within* nature (rather than dominating it); they assume that nature has intrinsic value in that it can exist without humans (see also Ireland [22]). This intrinsicity must be respected if people are to change paradigms. Kelly maintains that bringing place into learning, and bringing learning into place, facilitates the integration required for a shift in worldviews [16].

2.7. Gaia-Informed, Ecological: Liza Ireland

Wals [15] and Selby [24] call for quantum learning, ecological learning and endogenous learning from within. In the same spirit, Ireland [22] created a Gaia-informed, ecological approach to *educating*

Ireland recommends to teach education for sustainability (EfS): mutually responsible place- and context-based learning of teacher and learners, scaffolded with a learning network structure. The fruits of knowledge fall back to the earth to nurture the roots (the worldview and paradigm), leading to implicate wisdom (called “slow knowledge” ([22], p. 361).

To illustrate the power of this counter-message to conventional ESD, the following text will focus mainly on the root system because it provides support for the entire educational enterprise. Ireland [22] posits that EfS requires grounding in deep-ecology, chaos, Gaia, Bohm’s intricate and explicate order, and intuition and spirituality. The concept of Gaia was explained above. Deep ecology is a current philosophy that rejects the idea of relative value (*i.e.*, some things are more important/superior than others) and embraces inherent and intrinsic value (the core of the tree). If something is intrinsic, it is valued for its internal essence regardless of whether it can be used for gain by others (e.g., nature) [22].

Deep ecology assumes that humanity and all other beings are aspects of a single, unfolding, continually emerging, reality, thorough implicate (fold in) and explicate (unfold) order. At the explicate level, people tend to see things as relatively separate, but quantum physics teaches us to look for the implicate as well. At the implicate level, things are folded into a whole, and the whole is an integral (inseparable) part of everything (imagine a helical spring slinky toy). Ireland [22] calls the hidden root system the implicate order and the visible branches and leaves (*i.e.*, pedagogy) the explicate order. She believes that with the right pedagogy, and with the fruits of knowledge slowly continuing to nurture the roots (the learning paradigm), learners have the chance to gain implicate wisdom. Citing Bohm [27], Ireland explains that the future is carried as yet unfolded within the implicate order, meaning the future is ever-present (although invisible), rather than far off, in the distance.

Chaos is another concept in the root system of her ecological metaphor for EfS. Chaos means order is emerging, just not predictably. The energy play within emergent order is ripe with tensions, which hold things together as they evolve. From this perspective, Ireland [22] explains that learning can be stable yet have constant flows of energy (causing points of instability). At these points of instability in learning, new structures and forms of order can emerge; that is, new learning can occur. Chaos theory lets educators assume that a radical shift in perceptions (perhaps entire worldviews) is happening from stability to instability, from order to disorder (order emerging), from balance to imbalance, and from beginning to becoming. This learning, which is focused on an ever present future, must teach humility (the bark of the tree). The stability and strength of learning depends upon students rejecting the idea that they are superior and more important than nature, meaning they are humble.

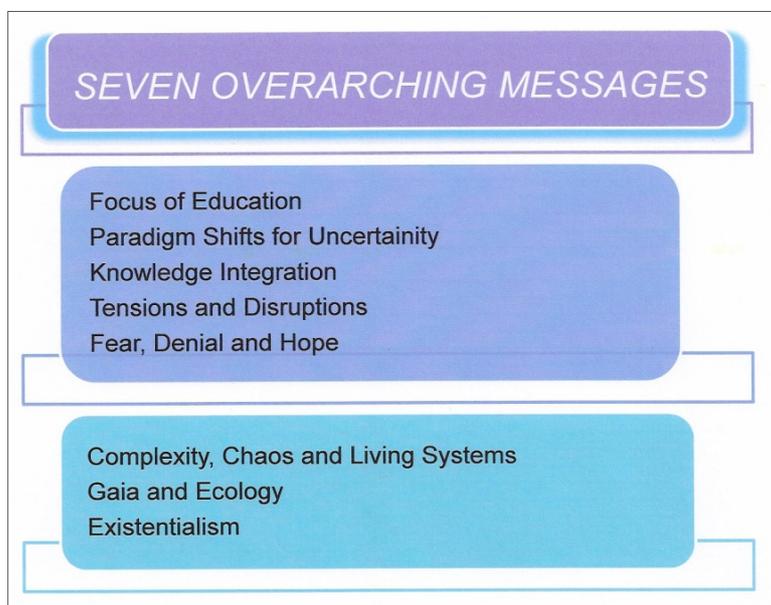
Finally, holism is the other key component of learning stability (the trunk); everything is connected and cannot be understood in isolation. Each individual element does its part but it does so within the context of the whole (imagine a jazz quartet). Wholes have properties that their parts do not. Holism is a celebration of the complex and a way to ensure that learners engage with as many people and perspectives as possible. They create something greater by working together than they would by working alone [22].

3. Discussion of Overarching Counter Messages

An iterative, analytical reading of these alternative perspectives to communicating about the normative concept of sustainability revealed seven overarching messages (see Figure 5). Taken together,

they create a powerful, compelling reframing of how to educate for a sustainable future, where one can appreciate that the future is ever-present, ripe with potential and possibilities [22,27].

Figure 5. Overview of Seven Overarching Alternative Messages for Sustainability Education.



3.1. Focus of Education

Ideally, education would not be “for” anything (risk of indoctrination is too great) [8] and definitely not “for” sustainable development. If education *is* “for” anything, it would be for the greater good or for a sustainable future: education for the 21st century, education for a sustainable society, education for sustainability (EfS). From a truly vanguard position, Selby [8,10] suggests education for sustainable contraction and moderation, which go hand-in-hand with education for ephemerality, elusiveness and ineffability. Ireland [18] recommends education *around* sustainability. Wals [15] poses a radical approach, “unlearning unsustainability” using an emancipatory pedagogy. Huckle [20] recommends a late modern and postmodern “orientation to learning” focused on holism, complexity, transformation, reflexivity and indeterminacy (post normal science).

If education *is* focused on sustainable development, it should eschew development per se and focus on strong models of sustainable [10,15,16,18–20]. Strong sustainability moves away from perceiving sustainable development as a static state of affairs toward seeing it as a frame of mind underpinned by values that support the development of both human and non-human nature [20]. Wals [15] lobbies for approaches to strong sustainable development that respect connectivity, chaos and complexity. Likewise, Selby [10] calls for people to embrace uncertainty, turbulence and instability. He asks people to respect dynamics, flux, flow, unpredictability, disarray, dislocation, impermanence, networks and diversity. These approaches contrast weak models that embrace anthropocentric, technocentric, instrumental, managerial, neo-liberal and capitalistic notions of development. They view nature as a means to an end to increase economic growth [16]. Finally, Selby [10] characterizes the weak approach as being on *shaky grounds* because it ignores the human condition crises; assumes that humans *can* actually hold things together; and, unrealistically, reinforces predictability, permanence, orderliness and constancy.

3.2. Complexity, Chaos and Living Systems

We live “in a ‘systemic world’ characterized by multiple causation, interactions, complex feedback loops and the inevitable uncertainty, and unpredictability” ([15], p. 11). We are “confronted by a world of increasing disarray and dislocation” ([10], p. 363). This reality means education around sustainability must draw on the new sciences of complexity theory, chaos theory and living systems theory, what is known as post-normal science [8,15,20,22]. Huckle [20] recommends that educators draw on a post-normal science philosophy of knowledge when teaching students about sustainability. Normal science is what most scientists do all of the time and what all scientists do most of the time; that is what makes it *normal*. Post-normal science (the new sciences) rejects the assumptions of normal science because normalcy cannot address today’s nuanced reality. Post-normal science is key to achieving more sustainable futures because it provides an alternative approach to dealing with highly complicated, complex, global and wicked problems [28].

Wals ([15], p. 6) refers to the “urgency, systemic nature, magnitude, uncertainty, ambiguity, complexity as well as the moral and ethical underpinnings of the sustainability challenge”. “The nature of the sustainability crisis—characterized among other things by high levels of complexity and uncertainty—suggests that people will need to develop capacities and qualities that will allow them to contribute to alternative behaviors, lifestyles and systems.” ([15], p. 21). Selby [10,11] agrees when he recommends educators draw on the new sciences when teaching students about contraction and moderation. “Education for Sustainable Contraction [must be] holistic and systemic [in order to accommodate] the complex, multiple ramifications and reverberations of [unsustainable] actions” ([10], p. 264).

On a more radical note, Selby advocates for “quantum learning for sustainability” ([24], p. 178) made possible by drawing on concepts from chaos theory: the holomovement principle, intricate and explicate order, generative order, waves and particles, and quantum leaps. This sort of education is necessary because nature herself “is inherently disorderly and liable to bouts of disturbance and chaotic turbulence” ([10], p. 362). Ireland also draws on chaos theory and living systems theory for her ecological pedagogy of education around sustainability, arguing that sustainability is a profoundly complex concept requiring an “emergent, transformative, holistic, integrative view of knowledge and learning” ([22], p. 453). Giddings *et al.*’s [19] non-sectoral approach to education for sustainability is predicated on the inherent multiplicity and complexity of the human condition, couched within environments.

3.3. Gaia and Ecology

Framing education for a sustainable future often includes a deep respect for ecological integrity and the connections between humans and nature. Both Selby [8] and Ireland [22] draw on Lovelock’s [25,26] notion of Gaia to frame very intriguing approaches to education focused on sustainability. According to Gaia theory, life creates conditions for its own existence. The connections between all living and non-living elements are essential to the overall health of the planet. Alterations to one aspect will cause reactions throughout the system to compensate for the changes. Especially, Ireland draws on insights from deep ecology, of which the most defining premises are that human beings are placed within a context of a family of other species (an Earth family) and that Nature has intrinsic value. Selby [11] claims long-term education projects are required that strive for restitution and restoration of humanity’s soul and of earth’s soul (to live in harmony with Gaia), through sustainable contraction. Wals [15] even

calls for a *learning ecology* approach to education that helps people make connections, create networks and gestalt switch.

3.4. Paradigm Shifts for Uncertainty

Many of the alter-architects claim achieving sustainability requires profound shifts in worldviews [8,15,16,19,20,22,24]. Wals [15] calls for transformative disruptions during the learning process so that people can gestaltshift to new ways of seeing things or of being. Kelly [16] advocates for an integrative world view and a place-based approach to education if we ever hope to get people to shift paradigms towards a strong model of sustainable focused on the improvement and unfolding of potentials. Huckle [20] prefers a shift in education paradigms that embraces postmodern, ecological and holistic forms of learning.

Ireland [22] provides an extensive discussion of the need for paradigm shifts in education around sustainability. She notes that “for schools to lead the change towards an ecological worldview or paradigm shift, schools would need to be free to adopt an alternative vision of education, ethos and particular organizational structures” ([22], p. iv). Wals references “the emergent uncertainty paradigm” in sustainability education. “Instead of teaching students to minimize uncertainty and maximize predictability, it might be more fruitful to put our energy towards *living with* uncertainty: seeing it as a given, something that cannot be conquered” ([15], p. 25), see also Selby [11]. Huckle [20] encourages educators to help learners come to appreciate chaos and tensions, realize the importance of change and evolution, and gain a deep respect for uncertainty and discontinuity.

3.5. Knowledge Integration

Ireland [22] is convinced education around sustainability should incorporate an integrative philosophy, one that involves a systemic, interdependent view of knowledge that recognizes context. Wals [15] and Kelly [16] also strongly believe in knowledge integration and an integrative approach to education for sustainability. Wals calls for integrative switching back and forth between five different mindsets (gestalts). In fact, he claims that teaching students to break away from unsustainable life paths means educators must embrace the hybridization of knowledge creation (hybrid refers to an offspring resulting from cross-breeding and cross fertilization). Hybridization refers to the integration of knowledge and ideas from different areas. It involves combining different things to build new, integrative knowledge: multiple stakeholders and sectors, disciplines, ways of knowing/perspectives and different forms of knowledge [15]. The resultant hybridization of knowledge gives a new big picture of a world that is dynamic, flexible and prone to integration. Students learn to *mentally disassemble* a complex, routine system and draw on other ideas to reassemble in a different way [29]. This cognitive process leads to a desired “loss of psychological inertia” ([29], p. 2). Learners would use the new mental energy to critically analyze existing situations, compare them to what is needed and come up with new integrated knowledge [29].

3.6. Tensions and Disruptions

There was a deep respect for the role of disruptions and tensions when communicating about sustainability and designing education for a sustainable future. Selby [8] challenges educators to

intentionally plan for disruptive transformative learning experiences so learners become disoriented, making them face their hidden assumptions and beliefs, their fears and their denials. Wals [15] encourages teaching to ensure that transformative disruptions emerge so people are able to gestaltshift. Ireland [22] draws on chaos theory, which posits that tensions hold things together as they evolve, rather than pushing them apart. Drawing on the concept of dissipative structures, she explains that learning best happens when points of instability are allowed to form, leading to unpredictable paths of learning, while trusting that learning will occur. Learning depends upon tensions and disruptions (interruptions, temporary loss of order and abrupt change), scaffolded with the appropriate pedagogy. Indeed, Huckle [20] encourages educators to help learners gain a deep respect for uncertainty and discontinuity. Selby [24] likens disorienting learning processes to “grit in the oyster, ...a prelude to real transition by eliciting a sense of discomfort and unease combined with an intimation of what is thinkable and what is realizable” (p. 177).

3.7. Existentialism

Gray-Donald and Selby [30] lament the existential crises faced by humanity, the fall out of humans assuming they can dominate nature, leading to unsustainability. To that end, Huckle [20] thinks ESD should include a focus on existential and spiritual values. Wals [15] encourages educators to help learners engage with existential issues, calling these “real issues” (p. 21), meaning significant and serious rather than superficial and shallow. Existential issues reflect people’s ultimate concern for aspirations beyond the self, beyond the superficial. They pertain to how each person is related to the cosmos and to a concern for the human condition [31,32]. Considering existential issues and making sense of one’s existence is an important part of being human [31], especially since focusing on these issues means people grapple with the way human beings and other species live together on this Earth [18].

Behar [33] explains that existential issues have to do with the plight of human *existence*, with the meaning of life, and what meaning, if any, people’s lives have. To deal with these issues, people need to ask particular existential questions, including “With the limited time we have, what is really important? What do we value? What gives us joy and why does it give us meaning? What legacy do we want to leave for other generations and how can we accomplish this legacy?” [33]. An existential approach to education ensures students are taught they have freedom of choice yet have to be responsible for the consequences [34].

3.8. Fear, Denial and Hope

Not accepting the argument that gloom and doom is disabling and disempowering, Selby [8,11] ardently argues for education that helps people address the genuine and legitimate despair (loss of hope), pain, grief and loss they face due to the dire threats facing humanity. He advocates that when communicating about sustainability, educators should replace blue sky thinking with *dark sky thinking* so that people can connect with the perilous state of their world. This shift means educators have to help people confront and move through their denial so they can move forward to healing and renewal. Wals [15] concurs, claiming the study of sustainability can bring people to a state of despair and hopelessness; hence, inaction. Inspired by Freire [31], Wals [15] calls for a pedagogy of hope. Without hope, people are hopeless and cannot begin the struggle to change. If educators teach students to take

critical action, they give them hope; and if they have hope, they will take action (see [6]). Educators need to help students practice hope, anchor it in their daily lives. Hope is their connection to the future [35]. In like-minded thinking, McGregor [14] likens Selby's [8,11,24] approach to a pedagogy of contraction, grounded in hope and despair, because that is the reality people are facing. Pelletier and Sharp [36] suggest that fear-arousing communications about sustainability *do* serve to trigger the process of behavioral change: detection of an issue (due to fear arousal) followed by a decision to take action and then actually following through with a pattern of actions.

4. Conclusions

If people drew on this rich collection of ideas from the margins, future communications about sustainability, development and education would have a distinct flavor, differing markedly from the UNESCO [3] message. Most of the architects of these alternative approaches to education and sustainability agree with earlier noted critics (see Section 1) as well as Jickling and Wals' [37] judgment that ESD, as conceived by the UNDESD, cannot work because the premise on which it is based is completely flawed, that of *sustainable development*. They ardently believe that the concept of ESD is tired and inadequate for the times. They argue that from the start, ESD was "ultimately constrained by the [very] idea of sustainable development ([37], p. 55); it is an "educationally limiting conception" ([37], p. 56). Selby ([24], p. 167) refers to ESD as the educational manifestation of sustainable development, claiming it "fails to engage in diverse and deep connections with the world."

To counter these perceived limitations of ESD, the seven alter-architects profiled in this paper individually and collectively tender a far-ranging, normative discourse about what *should* be communicated about sustainability when people are being taught: to unlearn unsustainability, to live a life of sustainable contraction, to respect Gaia and intrinsicality, to respect complexity, uncertainty and discontinuity. Staving off the challenges of unsustainability, by privileging these creative, innovative and provocative communications about sustainability, will deeply influence the discourse around sustainability. Notions such as contraction and moderation, knowing in the darkness, dark sky thinking, eyes wide shut, collective amnesia, fearlessness, existentialism, Gaia and chaotic emergence are enticing and disconcerting. So are global heating, ethnosphere, unlearning, gestaltswitching, learning disruptions, fuzzy thinking and intrinsicality. These are all powerful examples of push back, vanguard thinking. Intellectual and pedagogical discourse can be kindled and stimulated by drawing on alternative communications about the normative concept of sustainability.

Conflict of Interest

The author declares no conflict of interest.

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