

MODERN NATURE

MODERN NATURE
Essays in Environmental Communication

LUKE STRONGMAN



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Modern Nature: Essays in Environmental Communication

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I

ENVIRONMENTAL COMMUNICATION

Environmental communication is concerned at a basic level with the way that human beings create their own signs and continually encounter, interpret and use the signs created by others. Environmental communication is the enquiry into the methodologies, theories and practices of the ways in which individuals, organizations, societies and cultures construct, receive, interpret, understand, and use messages about and within the environment by human interactions, thoughts, and informational exchanges using a variety of mediums, tools and technologies. It may include interpersonal and business communication, education for sustainable development, communication within virtual communities, communication in professional contexts such as psychology and medicine, participatory and specialist decision making frameworks, and corporate organizational communication. As Dillman (n.d.) suggests, “[n]o act of communication occurs independently of its environment” (para. 1). A further view of environmental communication is that it is a strategic use of communication processes to support environmental sustainability. As such it is complex and interdisciplinary, and often is seen as useful when there are comprehension gaps between public and expert knowledge.

This book presents ten essays about environmental communication. Chapter one introduces the concept of environmental communication and the ways in which it was conceived, imagined, and developed as a form of interdisciplinary enquiry. Chapter two explores the concept of green communication and education for the sustainable development movement. Chapter three is concerned with one of the major underlying socio-cultural influences of the human/nature

divide: that of anthropomorphic or anthropogenic reasoning. Chapter four takes an ecological view of economics and develops an argument for the place of economic intangibles in the modern political economy. Chapters five and six explore specialist aspects of environmental communication practices: Chapter five is concerned with the contexts of psychologist's client and practitioner relationships; and chapter six with the communication domain of the expert courtroom witness. Chapter seven is concerned with exploring the phenomenon of 'social presence' within virtual environments. Chapters eight, nine and ten explore communication practices that are essential within the workplace and organizational environment: Chapter eight frames issues involving understanding ambiguity toleration in business communication; chapter nine explores leadership, management and self-esteem in the organizational communication context; chapter ten discusses the environmental communication contexts of decision-making and organizational trust. The author has written this book for both general and specialist audiences, for students and teachers of environmental communication, and anyone with an interest in the prevalent concerns of 'modern nature' – the current orientation and practices of human communication in natural, virtual and professional spheres. It will also interest students and teachers of workplace organization, including non-governmental organizations and business practitioners.

Varied Characteristics of Environmental Communication

There are many ways that biotic organisms – humans, animals, plants – express themselves in their environment, and in which they exchange and communicate information. This may take the form of an adaptation to environmental conditions (such as noise) or presence, or an absence of light. It may be the way in which the environments affects language and thought (and vice versa) or the development of haptic (touch) communication in virtual reality. It may also include the effects of technology (ergonomics) on human functioning and lifestyle.

Although the focus of this book is on human environmental communication and the corporate topos, we also can learn lessons about environmental communication from the animal world. In order to survive, animals must be able to detect/assess/send signals in their environment, thus animal communication may be affected by environmental conditions at any given time. Consequently, animals

evolve signals that distinguish them in effective feedback loops in the environments the signals are used in. For example, Ord, Charles and Hofer (2011) studied the effect of environmental noise on the communication of *amolis* lizards in Puerto Rica and Jamaica, and surmised that:

Those species communicating to distant receivers and in habitats in which light levels are low (e.g. in full shade) should be under considerable selection pressure to time signals to exploit momentary windows in noise. If so, this might result in predictable variation in signal timing among species living in different habitats and with different ecologies, irrespective of island origin. (p. 55)

Clearly, lizards like people can modify their behavior to communicate in ways that maximize an advantage in their environment. Animals may respond to environmental stimulations as selectively as people do as learned behaviours. Despite the fact that lizards are cold-blooded and people warm-blooded (though sometimes we are prone to draw the zoomorphic comparison), we respond to and learn from our ecologies and constantly communicate what works and what doesn't work well. If genomics has taught us two things, it is that people and animals at the genetic level are not hugely dissimilar, and secondly, that all peoples are genetically very similar. Recent research on the human genome has revealed that “[t]he total amount of DNA carried by an organism [has] little relation to its complexity . . . lilies, salamanders and lungfish all have more DNA than we do” (Finkel, 2012, p. 28). Furthermore, at the biological level our genes are 99.9 identical to one-another. It is how people adapt and respond to their environments and express their genetic inheritance that shapes behavior, identity and communication. As Angrist suggests, “[w]e are more than our genes – we’re the expression of our genes. Looking at differences in expression is going to be much more informative than genotype.” (2010, p. 131) Humans then are characterized by both adaptability and expression. Both of these qualities account for the breadth and depth of human interaction with their ecologies, societies, and workplaces – with environmental communication.

As Broditsky (2011) relates, a dominant feature of human intelligence is adaptability – the capacity to invent and rearrange conceptions to suit the changing demands of the environment (p. 43). Lan-

guages reflect both this capacity and the diversity of its effects. In this way, language molds the individual into the environment. Broditsky regards it as an “invaluable guidebook developed and honed by our ancestors” (p. 45). Differences in the environment create differences in language and thinking, and vice versa.

The interaction and effects of people, their environment, and technology is complex. As Germonprez and Zigurs (2009) suggest, “one perspective argues that individuals continually acquire knowledge for action in a dynamic, changing environment and they alter their actions, language, and technology in response to that dynamism” (p. 23). In this respect, people use and adapt technology with changing knowledge and capability. This technology use may reflect the two characteristics of communication: 1) that it can be deterministic in nature – reinforcing social and structural norms, and 2) that it is emergent – capable of creating new meanings (p. 23).

One recent adaptation to virtual technologies is the incorporation of haptic ‘touch’ feedback devices. These are used for example in medical devices for minimal invasive surgery, in remote manipulation by robots in space, and also in collaborative working environments (CVEs). These are digital spaces that allow remote users to work together and to experience tactile communication exchanges in doing so. However, collaboration also requires a shared mental representation. This is referred to as a frame of reference or common ground. As Chellali, Dumas and Milleville-Pennel (2011) suggest, haptic feedback is a direct form of human interaction; it can be used to express feelings of closeness, intimacy and trust (p. 318).

According to Rasmussen (1983) there are three categories of human behavior: skills, rules, and knowledge. The sensory-motor performances are based at the skills level, shared by a reflex behavior. Haptic communication requires physical contact in this modality and is possible even in remote communication, but may involve the oldest regions of the brain.

Environmental Communication and the Concept of Place

The experience of place in environmental communication is a dimension formed by people’s relationship with physical settings and activities. As Najafi and Shariff (2011) points out:

Place identity and ‘sense of place’ are sometimes used synonymously and describe the quality of peoples’ place rela-

tionships. However the two terms differ in subtle ways. Firstly, in studying human-place bonding and attachment, while sense of place may refer to the assignation of value and bonding to a place in terms of an overarching impression. (p. 187)

Sense of place in environmental communication is important to the quality of the environment and human integrity.

Furthermore, place can be distinguished from space in as much as it represents an affective bond between a person and a particular setting. Place is thus concerned with human values whereas 'space' may be a natural term. However, places may be in space and have a unique character. Consequently, sense of place helps to maintain the quality of the environment. It may be involved in connecting people to shared experience and it may help to consolidate community ties. However, sometimes places have a lack of identity or no 'placedness'. As such, they do not convey the minimum of feelings and meanings to people and may be indistinguishable from any other similar environment. In such space one can usually still discern basic features such as perspective, but no implicit feeling of relatedness or relatability. Although designers, architects, and landscapers may create a sense of place where none existed before, some spaces featuring 'placedness' occur naturally. The added element which changes environment to place is the experience provided by the phenomenology of perception. This 'being in the world' is related to placedness, and is a fundamental quality of psychological existence. It may be a product of experiences of quality in existential space. Najafi and Shariff (2011) explain how the phenomenologists' concept of Topophilia is used to represent 'character of place' and 'spirit of place' (p. 188).

As Najafi and Shariff (2011) explain, the experience of place may have several levels (p. 188). The first is familiarity, which may or may not be associated with depth of feeling and meaning. The second level is ordinary familiarity, perhaps the unconscious perception of place. This level is experienced more on a collective and cultural level than a personal level, signifying a deep attachment to place and close attention to its symbols. The third level is that of 'profound familiarity' involving the 'existential insideness' of a person and integration with place (Najafi & Shariff, 2011, p. 188).

The communication of relatedness to place and sense of place is important to environmental psychologists as the physical environ-

ment plays a role in both the immediate and long term impact of human behavior and mental health. Consequently, the design of place involves both emotional and functional qualities. Thus, 'sense of place' encompasses the relation between humans and place. Najafi and Shariff (2011) suggest it is defined by three elements: location, landscape, and personal involvement. Furthermore, Rogen et al. (2005) define a psychologically comfortable environment as being legible, capable of qualitative perception, and preferable, in other words, compatible for human living (Cited in Najafi et al., 2011, p. 189).

Najafi and Shariff (2011) identify seven levels of human interaction with 'sense of place' in the environment (p. 188):

- Not having any sense of place
- Knowledge of being located in a place
- Identifying with a place and its purposes
- Involvement in a place
- Belonging to a place
- Attachment to a place
- Sacrifice for a place

Involvement with sense of place as a phenomenological experience is thus psychological, social/interactional, and physical. Peoples' relationship with place may also be transactional, i.e., people either give or take, or experience positive or negative associations with place. There may be eleven factors influencing place attachment: 1) the emotions people feel for place, 2) socio-demographic characteristics, 3) environmental experiences, 4) the nature and type of peoples' involvement with place, 5) peoples' degree of familiarity with place, 6) peoples' expertise with place, 7) the experience of culture in relation to place, 8) peoples' satisfaction with place, 9) peoples' preference or attachment to place, 10) the kinds of activities people experience with place, and 11) the phenomenological experience of place itself (Najafi & Shariff, 2011, p. 191).

Environmental Communication and the Human Organism

Environmental communication spans both the material and non-material in human interaction. Behavior and thought, as Simpson (1964) suggests, "living things have been affected for . . . billions of

years by historical processes . . . results for those processes are systems different in kind from any nonliving systems and almost incomparably more complicated” (p. 106). This suggests that the laws of perception, behavior and communication are ecological and defined in terms of the organism and its environment (Gibson, 1986). As Stewart (2007) suggests, “individual psychologist believe that . . . lifestyle depends upon myriad organismic and environmental influences that people experience as they pursue the tasks of family, work and community” (p. 67). Adler (1938), for example maintained that organismic and environmental variables are inherently interactive and are significant in affecting personality. The relationship between a conscious organism and its function are complex; the actions of the organisms are intrinsically to do with its functioning and ‘construction’. For German enlightenment philosopher Immanuel Kant (1784 version), an organism can be distinguished from a machine for this reason: “The parts act together to meet the thing’s purpose; their actions, however, have nothing to do with the thing’s construction. The thing and its parts rely on efficient causes arising from outside themselves for their origin and function” (p. 46).

Consequently, a conscientious organism that is capable of self-organization and holds an ecological property are synonymous; the parts are not easily separated from outside of the whole they comprise. Such an organism is not fractionable (Petrusz & Turvey, 2010, p. 47). For example, in the self-organizing process in the evolution of a bird’s wing, the propulsion and lift it offers the bird are not defined outside of the form and function of their whole (Petrusz & Turvey, 2010). As Barad’s concept of ‘agential realism’ (as cited in Francovich, 2010, p. 311) “captures the paradox of the observer and the observed by means of the argument that relationship precedes related and that we as individuals/organisms are in a flux of continuous emergence that is fundamentally nondual”. Environmental communication takes a slightly materialistic slant towards the investigation of the form and function of the human organism and the environment in which that human is situated – which it co-creates. After all, living organisms are subject to the same physical laws as any other entity; they are nevertheless fewer in number. This has led to the belief that the conscious organism is divisible into theories of the non-living forces. However, this deconstructivist tendency runs against the properties of an ecological system: that it comprises the environment which defines its purpose as living entity. Living systems are creative.

Petrusz and Turvey (2010) argue that there are four kinds of laws that define a 'science of the animate' in psychological and environmental communication terms. These are as follows: Firstly, human behavior is guided by the capacities of the organism-environment as a whole, defined in terms of intentions or opportunities for realizing them. They may be understood in terms of lower level physical features and non-fractionable higher level features. Secondly, human behavior is guided at the ecological scale of the organism and the environment not of their components. They are defined by a meaningful physics of semantic affordance. Thirdly, the human organism is more general than (not a special case of) the laws of an animate system. It is not the case that only laws that govern animate systems are those that govern their physical components (p. 65). As Petrusz and Turvey suggest, "the causal entailment of animate systems exceeds that of physical (inanimate systems) (p. 64). Fourthly, they make reference to themselves in an impredicative manner, perception-action is self-referential.

From a perspective of environmental psychology, the study of human-environment relationships is a wide field and includes topics such as: territoriality, personal space, crowd effects, environmental stress, scholarly, business and work environments, home environments, environmental influences on behavior, attachment to place, isolation and contained environments, the assessment of environments, and it also values beliefs and attitudes concerning the environment (Stewart, 2007, pp. 68-69). Thus the literature of environmental communication and psychology is informed by laboratory, virtual, field, and ecological settings as well as from architecture, design, and industry. There are three main paradigms. Firstly, the adjustment paradigm views the environment as physical, social, interpersonal, all of which are communicative influences on people as they adapt, respond and function in the environment, for example to stress, arousal or stimulus (Stewart, 2007, p. 69). The opportunity structures paradigm studies how people function in a socio-physical environment to meet their needs, goals, wants, and how they perform their roles within it. Thirdly, the socio-cultural paradigm is the study of how culture and society shape the socio-physical environment and relationships within it (Stewart, 2007, p. 69). Consequently, environment may shape behavior and to some extent personality, but it is also true that peoples' attitude and behavior towards the environment can affect the psychological well-being of the individual and that of other people (Stewart, 2007, p. 78). Obviously, having a

tolerant, open and enhancing attitude to the environment will foster a more healthy psychological state of being as the environment will be co-created in a more accepting and balanced way and be more likely to be sustaining.

As Binne-Dawson suggests, (1982, p. 397) the bio-social approach to environmental psychology and environmental stress is permissive of three main orientations towards the environment: 1) Behavior occurs within an environmental context which imposes condition and constraints on the functions of the individual within it; 2) Some environmental conditions such as over or under stimulation or climate extremes, will have more general effects on systems of response within the individual; and 3) Behavior is instigated by particular environmental attributes and characteristics. Environmental adaptation is a social as well as physical process. Social systems as well as physical systems lead to adaptations in perceptual and cognitive abilities, attitudes, and values, which in turn affects ecological survival (Binnie-Dawson, 1982, p. 199). As Lakoff (2011) suggests, people are nature – “nature is not separate from us . . . what is good is the use of nature that doesn’t use up nature” (para. 5).

Environmental Influences on Social Behavior

As Stewart (2007) suggests, “Behavioral settings refer to systems emerging from the temporal and spatial arrangement of social and physical characteristics of small-scale environments” (p. 71). One of the main environmental influences on behavior is crowding. There is some evidence that crowding has a negative impact on the social behavior of children. The reasons for this are that it may produce an adverse subjective experience on more vulnerable and younger children leading to relationship difficulties arising from restrictions on behavioral freedom, excessive stimulation, or intimacy that is too intense or inappropriate (Stewart, 2007, p. 70). Under-population of the environment may also lead to less than optimum development of meaningful interpersonal roles. Under-population theory holds that there will be a maximum amount of positive psychological benefits when there are more behavioral settings and roles to be fulfilled and experienced than there are individual people competing to assume those roles (Stewart, 2007, p. 71). Under-populated social environments according to Barker (1968) and Schoggen (1989) operate in a *centripetal* manner such that interpersonal communications and behaviors provide feedback, participation, and cohesiveness to main-

tain a frame of social reference for any given task or activity (Stewart, 2007, p. 72). Overpopulated social environments may lead to the marginalization through *centrifugal* social forces.

Gibson (1979) is attributed with founding the field of ecological psychology with influences on both cognitive psychology and environmental communication. Ecological psychologists characterize ‘information’ as the ‘patterning of energy that occurs as it passes through a medium and interacts with objects’ (Jordan, 2009, p. 130). There is a quite profound difference between this model of human perception and that of cognitive psychologists. Instead of emphasizing the ambiguity of information and the brain’s capacity for specialization in processing it, ecological psychologists distinguish less between the person and their environment, arguing instead that the brain and sensory system ‘resonate to environmental information’ (Jordan, 2009, p. 130). Under this conceptualization, the behavioral possibilities that a stimulus affords is equally as important as its perceptual qualities. Thus instead of emphasizing the ability to perceive and cognate an object internally (to assess size, shape and color), ecological psychologists emphasize the affordances of such perception in terms of the possibilities it offers the individual for use – what can be ‘done’ with an object.

As Jordan (2009) points out, the ecological psychology view of human-object relations affordance is consistent with the theory of perception-action coupling termed ‘Theory of Event’ coding. Theory of event coding asserts that: 1) Actions are planned in terms of the distal effects produced, (i.e. outcome in the environment), and 2) cognate perception, planning, and action use overlapping neural resources (Jordan, 2009, p. 131). This would imply that perception is inherently intentional because planning alters the neural configurations of perception, which in turn is consistent with the ecological psychology view that perception is made in terms of affordances (behavioral possibilities detected by perception (2009, p. 131). Affordant properties are emergent contextual and based on perceptual perspectives, as Francovich (2010) suggests, “. . . the behavior of any organism can be understood as melded or continuously fused to the medium, surfaces, and substances of contact experience . . . in continual emergence” (p. 313). Intentional induction, for example putting one’s hand over one’s eyes to scan the horizon is one such example. Ecological psychology also renders the explanation of experiencing the intentions, desires or beliefs of another in less fractal terms than computational approaches. We experience the mental

contents of another person because we experience the distal effects they generate in the environment, as well as the actions and means that generate in the context of our own embodied action-effect contingencies. This differs from either the computational or cognitive models of mind in so much as, “instead of being ‘trapped’ inside non-observable, symbol-manipulation systems, as is assumed in computational approaches, the resonance-based approach asserts intentionality as entailed in the continuous synergistic, multi-scale couplings that constitute intentional context, including neutrally embodied action-effect regularities, neuro-muscular architectures, and the external regularities such architectures give rise to and are embedded within” (Jordan, 2007, p. 137). This has large repercussions for environmental communication in so far as the ability to couple individual intentional contexts within group contexts is fundamental to an ability to generate, use, and sustain sign systems (Jordan, 2007, p. 139). As Craik (1977) suggests, the perceptions an observer derives from a setting depend not only on physical attributes, but other factors such as: 1) the cognitive set, 2) how the place is encountered, 3) the available formats for responses and affordances (p. 149). Furthermore, as Francovich (2010) contends, it is inherently related to the creation of self and environment, “self [is] a dynamic emergent process that comprises the ‘living present’ . . . whereby reflective consciousness creates the symbolic world of spatial and temporal independence and thereby stabilizes the appearance of enduring subjects before static and/or dynamic objects (artifacts of reflective consciousness) in a timeless space regulated or metered by spaceless time” (p. 315). However, environmental perception is arguably at its most complex when the encounter is with other people. As Adams (2007, p. 24) states, interrelating is fundamental to human culture and can be characterized in three ways: Firstly, it is there from the beginning of every presencing moment. Secondly, it forms the basis of human interaction – it is the progenitor of health, justice and compassion for humankind. Thirdly, it is the ‘ever-present’ path by means of which we carry out our ‘inter-existence’. Fourthly, there is an ethical imperative to cultivate interrelation in a way which serves others and the non-human natural community. Furthermore, arguably the socialization of inter-relation contributes to the development of human consciousness deriving from environmental communication. As Francovich (2010) suggests:

The significant gestures (Mead's term) that organisms employ are happening on an evolutionary ladder of increasing coordination via communication amongst entrained interlocutors that eventually, and through pressures of increased social complexity and evolved neurobiological structures, result in a 'phase shift' in communications. The conversation of gestures, according to Mead, results in homo sapiens internalizing via the significant symbol first specific to others (family) and then through a progressive process of role taking and role playing eventually come to the generalized other and creation of the reflective self. This internalised [sic] generalised [sic] other becomes the 'me' of the reflective consciousness and is the beginning of the deep patterning that we come to know as our subjective selves. (p. 314)

Consequently the need to improve the ecological environment is not only a biological imperative but a social, technological and ethical one, requiring the exercise of authentic relationships. Inherently our use of language links us to the perceptual participation in the phenomenal world in a system of inter-relations, signifying the evolution of the human species, the individual development of the child and also exists in the moment of co-presence with others (Adams, 2007, p. 50). However, as Adams suggests, extreme versions of linguistic primacy may lead to the anthropogenic argument that humankind is both self-sufficient and self-sustaining (Adams, 2007, p. 51). Thus human communication and human culture are interrelated. They both have pattern, some form of order, and consequently an evaluative dimension that is dynamic over time.

References

- Adams, W. A. (2007). 'The primacy of interrelating: Practicing ecological psychology with Buber, Levinas and Merleau-Ponty'. *Journal of Phenomenological Psychology*, 38, 24-61.
- Adler, A. (1938). *Social interest: A challenge to mankind*. (J. Linton & R. Vaughan Trans.). London: Faber and Faber Ltd.
- Angrist, M. (2010). *Here Is a Human Being. At the Dawn of Genomics*. New York: Harper Collins.
- Barker, R. (1968). *Ecological psychology*. Stanford, CA: Stanford University Press.

- Binnie-Dawson, J. L. M. (1982). 'A bio-social approach to environmental psychology and problems of stress'. *International Journal of Psychology*, 17, 397-435.
- Broditsky, L. (2011). 'How language shapes thought'. *Scientific American*, 304 (2). Available from <http://www.scientificamerican.com/article.cfm?id=how-language-shapes-thought>, 42-45.
- Chellali, A., Dumas, C., Milleville-Pennel, I. (2011). 'Influences of haptic communication on a shred manual task'. *Interacting with Computers*, 23, 317-328.
- Craik, K. H. (1977). 'Multiple scientific paradigms in environmental psychology'. *International Journal of Psychology*, 12 (2), 1467-157.
- Dillman, R. (n.d.) 'The Communication Environment'. *HFCL Tutorial*. Retrieved from: <http://www.rdillman.com/HFCL/TUTOR/ComEnv/ComEnv1.html>
- Finkel, E. (2012). *The Genome Generation*. Melbourne: Melbourne University Press.
- Francovich, C. (2010). 'An interpretation of the continuous adaptation of the self/environment process'. *The International Journal of Interdisciplinary Social Sciences*, 5 (3), 307-322.
- Germonprez, M., & Zigurs, I. (2009). 'Task technology, and tailoring in communicative action: An in-depth analysis of group communication'. *Information and Organization*, 19, 22-46.
- Gibson, J. J. (1986). *The ecological approach to visual perception*. Hillsdale, NJ: Erlbaum.
- Jordan, S. (2009) 'Forward-Looking aspects of perception-action coupling as a basis for embodied communication'. *Discourse Processes*, 46, 127-44.
- Kant, I. (1784). *What is enlightenment?* Retrieved from <http://www.english.upenn.edu/~mgamer/Etexts/kant.html>
- Lakoff, G. (2011). 'Why environmental understanding or "framing" matters: An evaluation of the EcoAmerica Summary report'. Retrieved from: <http://not4p.wordpress.com/resources-and-readings/why-environmental-understanding-or-framing-matters-an-evaluation-of-the-ecoamerica-summary-report/>
- Najafi, M., Shariff, M. K. B. M. (2011). 'The concept of place and sense of place in architectural studies'. *International Journal of Human and Social Sciences*, 6 (3), 187-193.
- Ord, T. J., Charles, G. K. M. Hofer, R. K. (2011). 'The evolution of alternative adaptive strategies for effective communication in noisy environments'. *The American Naturalist*, 177 (1), 54-64.

- Petrusz, S. C., Turvey, M. T. (2010). 'On the distinctive features of ecological laws'. *Ecological Psychology*, 22, 44-68.
- Stewart, A. E. (2007). 'Individual psychology and environmental psychology'. *The Journal of Individual Psychology*, 63 (1), 67-85.
- Rasmussen, J. (1983). 'Skills, rules, knowledge: signals, signs and symbols and other distinctions in human performance models'. *IEEE Transactions on SMC*, 13 (3), 257-267.
- Rogan, R, O'Connor, M., Horwitza, P. (2005). 'Nowhere to hide: Awareness and perceptions of environmental change, and their influence on relationships with place.' *Journal of Environmental Psychology*, 25, 147-158.
- Schoggen, P. (1989). *Behavior settings: A revision and extension of Roger G. Barker's Ecological Psychology*. Stanford, CA: Stanford University Press.
- Simpson, G. G. (1964). *This view of life*. New York: Harcourt, Brace & World.

GREEN COMMUNICATION

Education for Sustainable Environmental Development

This chapter draws on a range of literature in the field of sustainability to outline the main ways in which sustainability has been defined. It explores the central debates within the emergent sustainability movement and traces the interdisciplinary connections between sustainability values in indigenous models, eco-psychology, business, and higher education. It also seeks to synthesize the core principles of sustainable practices for individuals, business and educators.

Introduction

According to Calder and Clugston (2003), only after the 1992 Rio Earth Summit did the term ‘education for sustainable development’ (also known as EFS, or ‘education for sustainability’) enter the vocabulary of educational reformers (p. 10003). They point out that issues of sustainability were first accepted as areas of study in higher education through the influence of non-governmental organizations, businesses, and environmental lobbyists. After the Brundtland report of 1987 by the World Commission on Environment and Development (WCED), (as cited in Calder & Clugston, 2003, p. 1) government support in the United States, Europe, and some developing countries such as Chile, Ghana and Denmark helped to bring sustainability issues to the attention of academic disciplines and the professions. However, by the second decade of the new millennium issues of climate change and sustainable development are at the fore-

front of international environmental and economic discussion. The Rio + 20 Earth Summit in 2012 will highlight the tension between economic development which is environmentally destructive and that which envisions possibilities for a more sustainable and future-focused ecological inhabitation and the overriding need for co-operation as Earth's population approaches seven billion.

In the new millennium, sustainability is a critical topic on the political agenda internationally. At the 2009 Copenhagen Climate Conference (COP15 United Nations Climate Change Conference 2009), the New Zealand government announced a commitment of \$45 million to fund a research network to reduce carbon emissions from farming. The Copenhagen Global Research Alliance will investigate the relationship between agricultural output and greenhouse gas emissions. The New Zealand-led initiative involves a consortium of 20 countries (including The United States of America, Canada, India and Australia) that plan to investigate farming practices and explore the development of new technologies which reduce emissions from livestock, cropping and rice production. Such developments may assist in the mitigation of climate change and in adaptation to 'green' technologies.

Interest in sustainability as a global movement has grown from the realization that the world has finite resources, which people may be consuming more quickly than they can replace, discover, or invent. Goldman et al. (1999) state:

Among the major factors contributing to the degradation of the environment are population pressures, particularly widespread poverty. (*Educating for a Sustainable Future*, UNESCO) From 2.5 billion in 1950, world population is projected to reach more than eight billion by 2025. The human population places the greatest stress on Earth's resources and natural processes. The US Geological Survey (USGS) estimates that the use of air, water, and other natural resources has increased by a factor of 10 in the past 200 years. A cycle of consumption and overuse is perpetuated as areas are developed, resources exhausted, and populations relocate. Excessive fishing, harvesting, and grazing result from increased demand for food, goods, and services, which increases the demand for natural resources and land use. (p. 15)

Although Daly's (1996, p. 5) model of steady state systems holds that the flow of energy in the universe is constant and the increase of entropy in the overall system is negligible, no theories that are based solely on the physical properties of the universe can easily be applied in delivering sustainable societies. O'Sullivan and Painter (2006) point out that in Daly's view, sustainable growth is not possible since the economy is an open-ended system of the earth's ecosystem. This ecosystem itself is finite and materially 'sealed off' from the universe, except for the sunlight the earth captures, the heat it reflects into space, and the gravitational effects exerted in it by other bodies (O'Sullivan & Painter, 2006, p. 1). As Hamilton (2010) points out, one of the core issues for environmental sustainability is the human-made changes to the naturally occurring carbon-cycle brought about by fossil-fueled industrial energy consumption:

For nearly three million years the natural carbon cycle has ensured the atmosphere has contained less than 300 parts per million (ppm) of CO_2 , just the right amount to keep the planet at a temperature suited to the flourishing of a rich variety of life. But human industrial activity over the last two to three centuries has disturbed this balance. When we dig up and burn coal, over half of the CO_2 released is absorbed by land and ocean sinks. The rest stays in the atmosphere, some of it for a very long time. A quarter will still be affecting the climate after a thousand years and around 10 per cent after a hundred thousand years. (pp. 8-9).

This effect may be longer than the life of radioactive material from nuclear waste (Archer, 2009, p. 1). However, O'Sullivan and Painter (2006) consider that sustainable development may be possible by sustaining natural capital through regimes implemented to maintain the biotic economy (pp. 1-2). As Wilson (1998, p. 277) puts it, "We [*Homo sapiens*] are the first species to become a geophysical force, altering Earth's climate, a role previously reserved for tectonics, sun flares, and glacial cycles." (Wilson's comment is debatable; in terms of biomass the human population is vastly exceeded by the insect population). Such macroscopic aggregations of the effect of *Homo sapiens* on the environment may be an inspiration for many, but to achieve sustainability, the many have to act in an attempt to change their assumptions and behaviors.

As early as 1934, the architect and writer Lewis Mumford in *Technics and Civilisation*, (as cited in Watson, 2000, p. 288) had proposed that technology was driven by capitalism. He posited three stages in its evolution: the *eotechnic* era characterized by engines made of wood and driven by wind or water power, the *palaeotechnic* era, which corresponds to the first industrial era brought about by the use of iron and steam-powered engines, and the *neotechnic* era, characterized by the use of synthetics, alloys and electricity. In the current era (or second industrial revolution, sometimes described as the post-industrial era despite its reliance on fossil-based fuels), alloys and synthetics are the most consumptive of carbon-based resources and the most generative of non-biodegradable waste in the form of greenhouse gases. Writing on the cusp of the atomic era, Mumford's contribution to the sustainability debate arose from his belief that the social and economic organization of society was not necessarily aligned with its uses of technology, leading to environmental damage.

Sixty years after Mumford, the Stern report (2006) considered that "most climate models show that a doubling of pre-industrial levels of greenhouse gases is very likely to commit the Earth to a rise of between 2–5°C in global mean temperatures" (p. 3). It also suggests that a rise of 5°C in global mean temperatures in the period between 2030 and 2060 would fall outside of the predicted range of historical tolerances for maintaining the status quo of human habitation on the Earth. The Stern report is a stark reminder that issues of sustainability require understanding, forethought and proactive engagement on a very wide scale.

To begin with, sustainability needs critical definition. 'Weak' sustainability holds that some substitution between naturally occurring and synthetic resources is tolerable, as long as the welfare of people within the ecosystem does not decline, thus, 'optimality' is preserved (Beckerman, 1994, p. 195). Daly's (1996) view is that 'strong' sustainability requires synthetic and natural capital to be developed separately (p. 10). Thus, there is trade-off between utility and idealism in these two definitions.

The study by Sustainable Aotearoa New Zealand (2009) suggests that the strong sustainability model contains a concentric arrangement of the biosphere (network of biotic relations), the sociosphere (network of social relations) and the econosphere (network of economic relations). The study argues against the scientific viability of what it terms the 'triple bottom line' cultural model (Adams et al., 2009, p. 6). However, it overlooks the psychological and architectur-

al topos of urban infrastructure (the situation in which most people around the globe live), where sustainable action (and practical difference) occurs at the intersection of the sociosphere, the econosphere and the biosphere.

The model this study offers is precisely the model that industry has followed for decades – one that places the economy as the central hemisphere of a sociosphere within a larger biosphere, which, although not wholly characterized by sustainable action, is nevertheless not fundamentally antithetical to it, unless one regards human-made infrastructure alone as the basis of the real economy. The point is that the econosphere and the sociosphere are consuming the biosphere. In the sustainability paradigm we need to draw distinctions between seven forms of capital:

1. natural capital (aquifers, biomass, soil, microbiology, and atmosphere)
2. physical capital (equipment and infrastructure)
3. human capital (embodied skills, services, and biomedicine)
4. intellectual capital (information, disembodied skills, and knowledge)
5. social capital (formal/informal relations among workers, and organizations)
6. financial capital (savings, loans, sale of stocks, and sale of bonds)
7. cultural capital (art and design, qualifications, standards, and semiology)

Strong sustainability is concerned with restoring a balance between all renewable and non-renewable forms of capital (forms one to four), which may require the application of Bourdieu's (1986) forms five to seven. O'Sullivan and Painter (2006) point out that, while most international assessments have concluded that resource depletion is endemic and waste assimilation pandemic, in some areas of society there is little concern at the individual level (p. 2). This lack of interest leads to inadequate provision of programs for education for sustainability in the environmental politics of many Western economies. In New Zealand for example, while engineers have long recognized a responsibility to maintain the biosphere, sustainability issues have latterly been recognized only by the Resource Management Act 1991 (RAM) and in policy statements such as the Sustainable Development for New Zealand Programme of Action (Ministry for the Environment, 2003), the Sustainable Water Programme of