

The Designer's Role in Facilitating Sustainable Solutions

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Introduction

Sustainability is rapidly becoming an issue of critical importance for designers and society as a whole. A complexity of dynamically interrelated ecological, social, cultural, economic, and psychological (awareness) problems interact and converge in the current crisis of our unsustainable civilization. However, in a constantly changing environment, sustainability is not some ultimate endpoint, but instead is a continuous process of learning and adaptation. Designing for sustainability not only requires the redesign of our habits, lifestyles, and practices, but also the way we think about design. Sustainability is a process of coevolution and co-design that involves diverse communities in making flexible and adaptable design decisions on local, regional, and global scales. The transition towards sustainability is about co-creating a human civilization that flourishes within the ecological limits of the planetary life support system.

Design is fundamental to all human activity. At the nexus of values, attitudes, needs, and actions, designers have the potential to act as transdisciplinary integrators and facilitators. The map of value systems and perspectives described by Beck and Cowan¹ as "Spiral Dynamics" can serve as a tool in facilitating "transdisciplinary design dialogue." Such dialogue will help to integrate the multiple perspectives and diverse knowledge base of different disciplines, value systems, and stakeholders. Further expansion of the "integral vision" by Wilber² consolidates a framework for understanding, acknowledging, and weaving together different perspectives and worldviews. Esbjörn-Hargens and Brown³ describe the application of this framework to solving complex problems of local and global relevance, and to sustainable development. When applied to design, this kind of framework can help us to conceptualize how different value systems and different onto-epistemological assumptions change our experience of reality, and therefore intentionality behind design. This change in *why* we design things and processes in turn affects *what* and *how* we design.

Since sustainability requires widespread participation, communities everywhere need to begin to shape local, regional, and global visions of sustainability, and to offer strategies to engage humanity collectively in cooperative processes that will turn visions

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1. D. Beck and C.C. Cowan, *Spiral Dynamics: Mastering Values, Leadership, and Change* (Cambridge: Blackwell, 1996).
 2. K. Wilber, *A Theory of Everything: An Integral Vision of Business, Politics, Science and Spirituality* (Dublin: Gateway, 2001).
 3. S. Esbjörn-Hargens, "Integral Ecology: The *What, Who, and How* of Environmental Phenomena" in "World Futures," *Journal of General Evolution* 61:1–2 (2005): 5–49; and B.C. Brown, "Theory and Practice of Integral Sustainable Development (Part 1)," *AQAL Journal of Integral Theory and Practice* 1:2 (2006): 1–39.

(designs) into reality. However, rather than believing that we can design universally applicable blueprints to bring about sustainability by prediction and control-based, top-down engineering, it may be more useful and appropriate to think of the outcome(s) as an emergent property of the complex dynamic system in which we all participate, co-create, and adapt to interdependent biophysical and psycho-social processes. Such a view has enormous consequences for the way we view design. As an integrative and transdisciplinary process, design thinking can inform more integral/holistic solutions that promote the emergence of systemic health and sustainability as properties of the complex dynamic system that contains culture and nature, and of which we are integral participants. This paper is a contribution to the project of rethinking how we think about design in the context of an urgent need for sustainable solutions in the face of uncertainty, turbulence, and rapid change.

Metadesign Shapes, Awareness, and Intentionality

Design can most broadly be defined as the expression of intentionality through interactions and relationships. At the *downstream* end of this process our cultural artifacts, institutions, patterns of production, and consumption express intentionality materially. *Upstream*, in the immaterial dimension, the “metadesign” of our conscious awareness, value systems, worldviews, and aspirations defines the intentionality behind materialized design. Here, the term “metadesign” refers to the concepts and onto-epistemological assumptions we employ to define ourselves, and to make sense of experiencing our participatory involvement in complex ecological, cultural, and social processes. The perspectives of different cultural worldviews, and of different academic and professional disciplines, all are shaped by the metadesign of the intentions, aspirations, and basic assumptions that inform them. Each of these different perspectives generates different specialized knowledge about certain aspects of perceived reality. Appropriate decision-making, within complex eco-social dynamics, requires us to consider insights generated by a diverse range of perspectives and disciplines. Richard Buchanan writes:

There is no area of contemporary life where design—the plan, project or working hypothesis which constitutes the “intention” in intentional operations—is not a significant factor in shaping human experience. Design even extends into the core of traditional scientific activities, where it is employed to cultivate the subject matters that are the focus of scientific curiosity.⁴

Materially, the intentionality behind design, is expressed through the interactions and relationships formed by consumer products, transport systems, economies, systems of governance, settlement patterns, and resource and energy use, with the complexity of

4 R. Buchanan, “Wicked Problems in Design Thinking” in *The Idea of Design*, V. Margolin and R. Buchanan, eds. (Cambridge, MA: The MIT Press, 1995), 6.

social and ecological processes. *Immaterially*, our organizing ideas, worldviews, and value systems express how we make sense of our experience of reality through metadesign. Transdisciplinary dialogue and collaboration can encourage researchers and practitioners to contextualize and situate their specialist knowledge within a larger holistic/integral meta-perspective that acknowledges the validity and contributions of multiple points of view. Changes in the culturally dominant worldview, value system, and aspirations will lead to fundamental changes in intentionality and lifestyle. Such metadesign-induced changes are catalytic in the transition towards a sustainable human civilization.

In general, sustainable decision-making and design processes must be open to contributions from diverse disciplines and perspectives and, at the same time, they must remain aware of the epistemological and ontological metadesign assumptions that define the perspective of each discipline. There is an important visionary element to design that affects how we experience and shape our environment. "Designers deal with possible worlds and with opinions about what the parts and the whole of the human environment should be."⁵

The transformation towards a more sustainable human civilization requires a process of inclusive and participatory dialogue that ultimately will turn visions of sustainability into reality. This will require the individual and collective participation of everyone. In the face of climate change, national and international inequity, social and ecological disintegration, and rapid resource depletion, nothing less than a societal and civilizational change—without precedence in scale and profundity in the history of our species—is *urgently* required. It has to occur during the next few decades if humanity wants to avoid ecological and social meltdown.

David Orr argues: "The very idea that we need to build a sustainable civilization needs to be invented or rediscovered, then widely disseminated, and put into practice quickly."⁶ Design plays a central role in shaping a sustainable civilization. It does so in the material dimensions of product design, architecture, industrial design, and town and regional planning, as well as in the immaterial dimension of the metadesign of concepts and inclusive multi-perspectives from which a holistic/integral worldview can emerge.

Choosing Sustainable Futures by Design

This paper proposes that transdisciplinary design dialogue, guided by the underlying intention to create healthier and more appropriate solutions to the complex challenges of sustainability, can be a powerful tool for societal change. Buchanan calls design thinking the "new liberal art of technological culture" and points towards its potential in integrating the knowledge of the natural, social, and

5 R. Buchanan "Rhetoric, Humanism and Design" in *Discovering Design*, R. Buchanan and V. Margolin, eds. (Chicago, IL: The University of Chicago Press, 1995), 25.

6 D.W. Orr, *The Nature of Design: Ecology, Culture, and Human Intention* (Oxford: Oxford University Press, 2002), 50.

humanistic sciences into adequate solutions to the wicked problems of design.⁷ Wahl has suggested that the transition towards a sustainable human presence in the world is *the* wicked problem for design in the twenty-first century.⁸

Based on the work of Horst Rittel in the 1960s, Buchanan proposed that most of the problems faced by designers are “wicked problems,” defined by Rittel as “a class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications of the whole system are thoroughly confusing.”⁹ Basically, wicked problems are real-world problems that acknowledge the complex interdependence of diverse factors and stakeholders, rather than simplistic, linear cause and effect abstractions that isolate the product of design from its context. Wicked problems call for integrated and flexible design solutions that are appropriately adapted to the eco-social complexity of their scale-linking context.

Buchanan argues that the creative power behind design thinking is in “turning to the modality of *impossibility*,” and recognizing that the impossible “may actually only be a limitation of imagination that can be overcome by better design thinking.” He suggests design thinking in this context is “not thinking directed toward a technological ‘quick fix’ in hardware but toward new integrations of signs, things, actions, and environment that address the concrete needs and values of human beings in diverse circumstances.”¹⁰ Metadesign and design both envision and create the future, just as they often perpetuate past design decisions.

John Wood also stresses the need for designers to engage in cross-disciplinary co-operation and a “professional discourse that acknowledges the complexity of wholeness.” He argues that, while engaging in the design of individual products, we simultaneously have to be aware of the kind of “meta-design” these products effect in human culture. What kind of society uses such products and how? Designers “will alternatively need to ‘step further back’ in order to acknowledge the ‘bigger picture,’ whilst engaging self-reflexively in the system itself.”¹¹ This process can be facilitated by transdisciplinary design dialogue. Integrative and transdisciplinary design thinking can ensure that our choices are conscious and well-informed by a holistic/integral perspective, rather than hastily forced and based on the limited perspective of a specific discipline.

As *Homo faber*—humans as makers—our material actions, mental constructs, and value systems shape our world and guide our perception of it. Design, when broadly conceived, can help us to integrate the remarkable wealth of specialized knowledge and skill that rests within humanity. Design is fundamentally worldview-dependent. Rittel suggested in 1972: “For every *wicked problem* there is always more than one possible explanation, with explanations depending on the *Weltanschauung* [worldview] of the designer.”¹²

7 R. Buchanan, “Wicked Problems in Design Thinking,” 3.

8 D. C. Wahl, “Bionics vs. Biomimicry: From Control of Nature to Sustainable Participation in Nature,” *Transactions on Ecology and the Environment*, 87: 289–298 (2006).

9 R. Buchanan, “Wicked Problems in Design Thinking,” 14.

10 *Ibid.*, 19–20.

11 J. Wood, “(How) Can Designers Enhance Organic Synergy within Complex Systems?” *European Academy of Design Conference Proceedings* (Bremen 2005), Paper No. 96, 1.

12 R. Buchanan, “Wicked Problems in Design Thinking,” 14.

Since all design decisions are fundamentally worldview and value-system dependent, a dynamic map of the emergence of progressively more inclusive worldviews in human society could help us to understand past design decisions, as well as provide a way to make future design decisions from a more holistic and inclusive perspective. Through transdisciplinary design dialogue, it will be possible to create engaging local, regional, and global visions of sustainability. Transdisciplinary design dialogue can help humanity to face the intricate complexity of sustainability as *the* wicked problem of design. In a fundamentally unpredictable and constantly changing complex dynamic system there are no guarantees of success. Nevertheless, humanity can—with imagination, humility, and caution—*intend* to choose and materialize *sustainability by design*.

Transdisciplinary Design Dialogue, Spiral Dynamics, and Integral Theory

In a complexly interconnected system, collective and inclusive decision-making is likely to create more sustainable solutions, since it is informed by a broader knowledge base than decisions that are based on the advice of only a single specialist discipline. Transdisciplinary integration, synthesis, and decision-making will require mediation between the perspectives of different stakeholders. “Spiral Dynamics” provides a useful tool to structure transdisciplinary design dialogues, thereby offering a framework for mediation and integration. Dialogue is used here in the sense first proposed by David Bohm,¹³ but with a significant distinction. While, for Bohm, dialogue was not goal-oriented, here dialogue is explored as a tool to create more sustainable solutions. Such dialogue draws on the contributions of all the diverse fields of human knowledge. It maintains that different perspectives are not something that should be avoided through dogmatic adherence to a particular set of onto-epistemological assumptions, exemplified by the exclusively reductionistic, dualistic, and materialistic perspective that defines most contemporary science. Rather, dialogue acknowledges the pluralism of perspectives as an expression of the evolution of human consciousness itself. It aims to explore the wisdom of many minds and multiple perspectives. According to Bohm:

... dialogue is a multifaceted process, looking well beyond typical notions of conversational parlance and exchange.... Perhaps most importantly, dialogue explores the manner in which thought [viewed by Bohm as an inherently limited medium, rather than an objective representation of reality] is generated and sustained at a collective level. Such an inquiry necessarily calls into question deeply held assumptions regarding culture, meaning and identity. In its deepest

13 D. Bohm, *On Dialogue* (London: Routledge, 1996).

sense, then, dialogue is an invitation to test the viability of traditional definitions of what it means to be human, and collectively to explore the prospect of an enhanced humanity.¹⁴

In order to create a sustainable civilization, we have to confront the issue of how different value systems and worldviews are affecting our design solutions and how—at the metadesign level—our material and immaterial design decisions create the culture we live in. The interrelated social and ecological dynamics that link the local, regional, and global scale are now so complex, and humanity has become such a dominating influence on the health and resilience of the complex dynamic system in which we participate, that it now is crucially important to raise widespread awareness of the effects of our actions and attitudes, and to take responsibility for our collective future. This process has to occur simultaneously and cooperatively at a local, regional, and global scale. This is no small challenge, but it is likely to be crucial to the survival of our species.

Graves's map of psychological types and "spiral dynamics" may help us to better understand and acknowledge the valuable contributions offered by varying perspectives and ways of knowing; and Bohmian dialogue offers a participatory process through which we can gain a more holistic perspective. The intention here is to suggest, and begin to demonstrate, that the application of dialogue, spiral dynamics, and integral theory to design thinking and practice make it possible to integrate diverse perspectives into a more inclusive basis for complex decision-making and more sustainable design solutions. The remainder of this paper expands on these ideas.

In 1974, the American psychologist Clare Graves published a paper entitled "Human Nature Prepares for a Momentous Leap" in which he argued that human society is facing a period of fundamental change, "... the most difficult, but at the same time most exciting transition the human race has faced to date." Graves believed that humanity was at the beginning of "... not merely a transition to a new level of existence, but the start of a new movement in the symphony of human history."¹⁵

After more than a quarter of a century of research into how human beings live, act, engage in decision-making processes, and change as participants of complex systems, Graves provided a dynamic map of the developmental stages of human consciousness, value systems, and worldviews. He described a number of behavioral systems, based on the biological, psychological, and social interactions and relationships that these "biopsychosocial systems" result in.¹⁶ The Gravesian model so far "has been tested in more than fifty thousand people from around the world, and there have been no major exceptions found to the general scheme."¹⁷ Graves himself summarized his model of human development as follows:

14 Ibid., vii

15 D. Beck and C.C. Cowan, *Spiral Dynamics: Mastering Values, Leadership, and Change*, 319.

16 Ibid., 49.

17 K. Wilber, *A Theory of Everything: An Integral Vision of Business, Politics, Science and Spirituality*, 6.

Briefly what I am proposing is that the psychology of the mature human being is an unfolding, emergent, oscillating spiraling process marked by progressive subordination of older, lower order behavioural systems to newer, higher-order systems as an individual's existential problems change. Each successive stage, wave, or level of existence is a state through which people pass on their way to other states of being. When the human is centralized in one state of existence, he or she has a psychology which is particular to that state. His or her feelings, motivations, ethics and values, biochemistry, degree of neurological activation, learning system, belief system, conception of mental health, ideas to what mental illness is and how it should be treated, conceptions of and preferences for management, education, economics, political theory and practice are all appropriate to that stage.¹⁸

Don Beck and Christopher Cowan, both former research associates of Clare Graves, then developed the Gravesian model further, changing some of the terminology but little of its content. They suggested that "a spiral vortex best depicts [the] emergence of human systems as they evolve through levels of increasing complexity" and argued that "each upward turn of the spiral marks the awakening of a more elaborate version on top of what already exists." Their dynamic spiral map "consists of a coiled string of value systems, worldviews and mindsets, each the product of its times and conditions."¹⁹ Beck and Cowan proposed:

The same principles of Spiral Dynamics apply to a single person, an organization, or an entire society. Since it describes human nature in a universal sense rather than through personality types or racial, gender, and ethnic traits, the model provides a common language for grappling with both local and global problems. It offers a unifying framework that makes genuinely holistic thinking and actions possible.²⁰

One of the changes in terminology proposed by Beck and Cowan relates to what Graves called "biopsychosocial systems," which they renamed "vMEMEs" as a shorthand for value memes. First described within a limited neo-Darwinian context by Dawkins,²¹ Csikszentmihalyi subsequently used the word "meme" (from Greek *mimesis* meaning imitation) as a descriptive term for a unit of cultural information, attitude, or way of thinking that is replicated through cultural tradition and imitation. Csikszentmihalyi defines it as "any permanent pattern of matter or information produced by an act of human intentionality."²² As such, vMEMEs can be understood as patterns of metadesign that determine *why*, *what*, and *how* we design.

18 Ibid., 5–6.

19 D. Beck and C.C. Cowan, *Spiral Dynamics: Mastering Values, Leadership, and Change*, 29.

20 Ibid., 30.

21 R. Dawkins, *The Selfish Gene* (Oxford: Oxford University Press, 1976).

22 M. Csikszentmihalyi, *The Evolving Self: A Psychology for the Third Millennium* (New York: HarperCollins, 1993), 120.

Beck and Cowan proposed “vMEMEs are so vital they reach across whole groups of people and begin to structure mindsets on their own. [In doing so] they structure the thinking, value systems, political forms, and worldviews of entire civilizations.” Each person may operate from the position described by a different vMEME in a different context or situation and various vMEMEs can be active at the same time. The vMEME stacks that are active within an individual are central to our personalities and cause us to form relationships in a certain way.²³ Beck and Cowan explain: “A vMEME transposes itself into a world *view*, a value *system*, a *level* of psychological existence, a belief *structure*, an organizing *principle*, a *way* of thinking, and a *mode* of living.”²⁴ Clearly, vMEMEs are an important influence on how and what we design. They describe patterns of metadesign.

Wilber explains: “[vMEMEs] are not rigid levels but flowing waves, with much overlap and interweaving, resulting in a meshwork or dynamic spiral of consciousness unfolding.”²⁵ He used the work of Graves, Beck, and Cowan to develop the framework of integral theory. Wilber emphasizes that all the memes are potentially available to everyone, and that this redraws the lines of social tension completely, since they no longer are “based on skin colour, economic class, or political clout, but on the type of meme a person is operating from.” He stresses the importance of understanding that “the focus is not on types *of* people, but types *in* people.”²⁶

While new vMEMEs might emerge during the evolution of consciousness, currently, eight basic vMEMEs have been described. In distinguishing these different vMEMEs, the aim is not to sort people into different boxes, but rather to make certain value systems and modes of thinking more intelligible. It is possible to stand at several places on the spiral vortex at once.²⁷ Each of these biopsychosocial systems has important and appropriate contributions to make, depending on the circumstances. Each level higher up the spiral transcends and includes the attitudes and thought patterns of the preceding levels. Wilber refers to Howard Gardner’s idea that “the whole course of human development can be viewed as continuing decline in egocentrism.” He suggests that there is an expansion of empathy and identification along the spiral that moves from egocentrism to ethnocentrism to world centrism, as the perspective becomes more encompassing.²⁸

Graves pointed out that individuals, companies, and societies alike, “respond positively only to those managerial principles, motivational appeals, educational formulas, and legal or ethical codes that are appropriate to their current level of human existence.”²⁹ This insight has important implications for the practice of transdisciplinary design dialogue aimed at creating more sustainable solutions. The dialogue about transdisciplinary integration and collaboration has to meet participants at their corresponding perspective on the spiral—working with people where they are at, not where you want them to be.

23 D. Beck and C.C. Cowan, *Spiral Dynamics: Mastering Values, Leadership, and Change*, 32.

24 *Ibid.*, 40.

25 K. Wilber, *A Theory of Everything: An Integral Vision of Business, Politics, Science and Spirituality*, 7.

26 *Ibid.*, 6.

27 D. Beck and C.C. Cowan, *Spiral Dynamics: Mastering Values, Leadership, and Change*, 85.

28 K. Wilber, *A Theory of Everything: An Integral Vision of Business, Politics, Science and Spirituality*, 20.

29 D. Beck and C.C. Cowan, *Spiral Dynamics: Mastering Values, Leadership, and Change*, 29.

Table 1 combines the descriptions that Beck, Cowan, and Wilber give to the various levels of human existence first proposed by Graves. The vMEMEs are color-coded in order to facilitate communication about them during processes of transdisciplinary or trans-stakeholder dialogue. The first six levels were described by Graves as the “subsistence levels” of the “first tier,” and the yellow and turquoise vMEMEs express an expansion of consciousness into “second tier” thinking. They are referred to as “being levels.”³⁰ (For a detailed description of the different vMEMEs and their application to the consultancy sector, please refer to *Spiral Dynamics – Mastering Values, Leadership, and Change* by Beck and Cowan.)

All the different levels or vMEMEs always will remain a part of the range of human psychological expression and decision-making, since healthy psychological development moves through all of the levels. Wilber emphasizes that only from a second tier perspective can we begin to fully appreciate the existence of the other vMEMEs.³¹ The bio-centric or world-centric perspective, and the associated values and ethics that are characteristic of second tier thinking, acknowledge the validity of all of the diverse onto-epistemological assumptions on the spiral, and contextualize them on the basis of their effects on human and planetary health. A global perspective appears to be emerging around the need for, and intention to create, sustainability. From this perspective, “finding what makes living healthier for *Homo sapiens* and other living things is the job to be done.”³² Salutogenic or health-generating design, as a framework for transdisciplinary integration and as a cooperative strategy to move toward sustainability, has recently been explored by Wahl.³³

The underlying goals and intentions of design solutions based on second tier thinking are the maintenance and improvement of systemic health and the facilitation of healthy and cooperative interactions across the whole spiral of human worldviews and value systems, as well as across all physical and temporal scales of material design. A holistic/integral perspective fosters conscious and responsible design, and metadesign thinking aimed at the creation of healthy societies in healthy environments.

A change in worldview, intention, and lifestyle, facilitated by dialogue and education, may be a far more effective way of problem-solving than the creation of more artifacts and technical fixes. Being unable to shift between the different levels on the spiral and to acknowledge the insights of diverse perspectives are the most common causes of bad design, because we fail to consider the design within the complexity of its material and immaterial context.

As international consultants, Don Beck and Christopher C. Cowan have applied the principles of spiral dynamics to a wide range of situations, from leadership training, community development, large-scale systems transformation, health care, education, and public safety, to management supervision. Beck was critically

30 Ibid., 45–47.

31 Ibid., 12.

32 D. Beck and C.C. Cowan, *Spiral Dynamics: Mastering Values, Leadership, and Change*, 299.

33 D.C. Wahl, “Design for Human and Planetary Health: A Transdisciplinary Approach to Sustainability” in *Management of Natural Resources, Sustainable Development and Ecological Hazards*, Brebbia, Conti, and Tiezzi, eds. (Southampton: WIT Press, 2006), 285–296.

Table 1

The vMEMEs or Biopsychosocial Systems of Spiral Dynamics³⁴ and Integral Theory.³⁵

vMEME (Biopsychosocial System)	Beck & Cowan (Based on Clare Graves)	Wilber (Based on Beck & Cowan)	Occurrence and Influence (after Wilber)	Mode of Thought
BEIGE Subsistence Level 1 First Tier	SurvivalSense: Staying alive through innate sensory equipment.	Archaic-Instinctual: Distinct self is barely awakened or sustained.	Approximately 0.1% of people and 0% of power.	Automatic: The structures are loose bands; the process is survivalistic
PURPLE Subsistence Level 2 First Tier	KinSpirit: Blood relationships and mysticism in a magical and scary world.	Magical-Animistic: Thinking is animistic and kinship or lineage establishes political links.	Approximately 10% of people and 1% of power.	Animistic: The structures are tribal; the process will be circular.
RED Subsistence Level 3 First Tier	PowerGods: Enforce power over self, others, and nature through exploitive independence.	PowerGods: First emergence of self distinct from the tribe; powerful, impulsive, ego-centric.	Approximately 20% of people and 5% power.	Egocentric: The structures are empires; the process is exploitative.
BLUE Subsistence Level 4 First Tier	TruthForce: Absolute belief in one right way and obedience to authority.	Mythic Order: Life has meaning, direction, and purpose with outcomes determined by an all-powerful "other" or "order."	Approximately 40% of people and 30% of power.	Absolutistic: The structures are pyramidal; the process is authoritarian.
ORANGE Subsistence Level 5 First Tier	StriveDrive: Possibility thinking focused on making things better for self.	Scientific Achievement: The self "escapes" from the "herd mentality" of BLUE and seeks truth and meaning in individualistic terms.	Approximately 30% of people and 50 % of power.	Multiplistic: The structures are delegative; the process is strategic.
GREEN Subsistence Level 6 First Tier	HumanBond: Well-being of people and building consensus get highest priority.	The Sensitive Self: Permeable Self, relational self, communitarian, ecological sensitivity, networking, pluralistic.	Approximately 10% of people and 15% of power.	Relativistic: The structures are egalitarian; the process is consensual.
YELLOW Being Level 1 Second Tier	FlexFlow: Flexible adaptation to change through connected, big-picture views.	Integrative: Life is a kaleidoscope of natural hierarchies [holarchies], systems and forms. Flexibility, spontaneity, awareness of spirals.	Approximately 1% of people and 5% of power.	Systemic: The structures are interactive; the process is integrative.
TURQUOISE Being Level 2 Second Tier	GlobalView: Attention to whole-earth dynamics and macro-level actions.	Holistic: Unites feeling with knowledge; multiple levels interwoven into one conscious system.	Approximately 0.1% of people and 1% of power.	Holistic: The structures are global; the process is flowing and ecological.

involved in facilitating the post-apartheid reconciliation process in South Africa. As such, spiral dynamics already is a well-tested, effective tool for mediation and metadesign. Beck and Cowan suggest that, in applying spiral dynamics to transdisciplinary and trans-stakeholder mediation and decision-making, we can begin to appreciate chaos and start to think “more like a creative designer than a reengineer. The process links functions, people, and ideas into new, more natural flows that add precision, flexibility, rapid response, humanity, and fun to getting the work done.”³⁶

Spiral dynamics, Wilber’s “integral theory,” and their application to the complex ecological and social problems of sustainability in the form of the recently developed approach of “integral ecology”^{37,38} offer informative points of departure for designers intent on acting as transdisciplinary integrators and facilitators in the challenge of creating a more sustainable human civilization.

Brown³⁹ calls the application of the integral framework to sustainable development “natural design.” Baxter⁴⁰ and Wahl⁴¹ have both, independently of Brown, used the term “natural design” to describe a fundamental rethinking and expansion of design in the context of ecological awareness and sustainability. Labels and terminological issues aside, apparently they all agree that an application of integral theory and spiral dynamics to processes of decision-making, complex problem solving, and visioning can support designers in their potential role as transdisciplinary integrators and facilitators of more sustainable solutions.

Conclusion

A modified form of Bohmian dialogue offers a way to collectively explore how our thought process reflects which vMEMEs or biopsychosocial systems we employ in approaching a design problem, and how we suggest solutions. Transdisciplinary design dialogue can help to contextualize the contributions that diverse perspectives can make to more inclusive decision-making processes that are informed by a wider knowledge base. Often, problems dissolve if we shift to a different perspective. As we explore different scales of context from the perspectives of different value-systems, we might suddenly reconsider the soundness of the underlying design brief, or begin to question the need for, or purpose of, the design in question.

The solutions to the “wicked problems of design” are more likely to be new processes, lifestyles, and changes in meaning, rather than purely material artifacts. Sustainability is an emergent property of appropriate interactions and relationships among active participants in the complex cultural, social, and ecological processes that constitute life in the twenty-first century. The necessary shift towards more appropriate and sustainable modes of participation requires that design and education contribute to a widespread increase in social and ecological awareness through transdisciplinary design dialogues.

34 Ibid., 41–44.

35 K. Wilber, *A Theory of Everything: An Integral Vision of Business, Politics, Science and Spirituality*, 8–13

36 D. Beck and C.C. Cowan, *Spiral Dynamics: Mastering Values, Leadership, and Change*, 107.

37 S. Esbjörn-Hargens, “Integral Ecology: The *What, Who, and How* of Environmental Phenomena.”

38 M.E. Zimmerman, “Integral Ecology: A Perspectival Developmental, and Coordinating Approach to Environmental Problems,” *World Futures, Journal of General Evolution* 61:1–2 (2005): 50–62.

39 B.C. Brown, “Theory and Practice of Integral Sustainable Development (Part 2),” *AQAL Journal of Integral Theory and Practice* 1:2 (2006): 35.

40 S. Baxter, “Deep Design and the Engineer’s Conscience: A Global Primer for Design Education,” *Crossing Design Boundaries*, Rodgers, Brodhurst, and Hepburn, eds. (London: Taylor & Francis Group, 2005), 283–287.

41 D.C. Wahl, *Design for Human and Planetary Health: A Holistic/Integral Approach to Complexity and Sustainability* (Ph.D. Thesis, School of Design, University of Dundee, Scotland, 2006).

Sustainable development is a community-based process of coevolution and learning that involves design decisions informed by a holistic/integral perspective. It requires responsible citizens everywhere to become co-designers of our sustainable future. At the same time we have to remain keenly aware of the indeterminacy of final solutions and the unpredictability of the complex, dynamic, and interconnected systems and/or processes in which we participate on a local *and* global scale. Design for sustainability is not about prediction and control, but about appropriate participation, flexibility, and constant learning.

Acknowledgement of the interconnectedness and interdependence of nature and culture, as social constructs *and* ecological realities, shifts the aim of design towards increasing health throughout the whole system. A holistic/integral perspective can help us to “act locally and plan globally, while acting globally and planning locally at the same time.”⁴²

Sustainability requires the ability of an informed citizenry to engage in the process of continuous lifelong learning through transdisciplinary dialogue. Sustainability depends on the full participation of responsible and informed local communities that meet their needs within the limits of their local ecosystems and the biosphere, thus remaining able to respond and adapt to global and local changes of both nature and culture.

Designers have to become more aware of the power of imagination and visioning at the metadesign level. As facilitators of transdisciplinary integration, designers can help to change culturally dominant worldviews and value systems. In helping to shape the intentionality behind material design, designers can effect changes in life-styles and resource use that will drive the sustainability transition. With a large and influential proportion of humanity arrested in the psychology of the blue and orange MEMEs (see Table 1), our decision-making processes are dominated by the quantity-centered approach of scientific and economic rationalism and materialism. Transdisciplinary design dialogue will help us to incorporate qualitative considerations regarding whole-system health, happiness, well-being, meaning, and quality of life into our decision-making and design processes. Transdisciplinary dialogue about how to design sustainably will help us to integrate the specialist knowledge of diverse disciplines in the search for more meaningful and sustainable solutions.

42 D. Beck and C.C. Cowan, *Spiral Dynamics: Mastering Values, Leadership, and Change*, 13.