

**Consciousness-Based Education:
Cultivating Sustainable Minds**

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prepared for

2011 International Faith and Spirit at Work Conference

Theme: "Faith, Spirituality and Sustainability"

Pedagogy Area of Focus

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November 7 to 9, 2011

Abstract

This paper describes a pedagogical approach to personal transformation toward greater wholeness, compassion, and creativity as a foundation for socially and environmentally responsible performance in the workplace. We describe three integrated aspects of the approach of Consciousness-Based Education as practiced at Maharishi University of Management. These three aspects are knower, process of knowing, and known. The knower component of Consciousness-Based Education includes practices to systematically cultivate experiences of transcendence and personal growth toward higher stages of human development. The process of

knowing component involves specific instructional methods for constructing meaning through connecting parts and wholes. The known component explores transdisciplinary principles for gaining holistic understanding of natural and social systems. Together, these components of Consciousness-Based education constitute an integrated approach of educational practice which can be adapted to diverse educational and organizational contexts to address the calls for profound and widespread mind change to address global sustainability challenges.

Keywords

spirituality

human development

meditation

consciousness

sustainability

pedagogy

Sustainable Minds for a Sustainable World

A number of writers in the field of sustainability and management have identified “consciousness” or “mindset” to be the chief constraint to addressing the global sustainability crisis. Several leading thinkers about managing for sustainability, including Cooperrider, Senge, and McDonough cite the following notion from Albert Einstein: “We cannot solve the problems that come with the world we have made thus far from the same level of consciousness at which we created them (quoted in Cooperrider & Khalsa, 1997, p. 335).” Similarly, Doppelt (2010, p. 14) has argued:

The world is teetering on the precipice of irreversible climate change. At the most fundamental level, this is not a scientific or environmental problem. Rising temperatures are the result of maladaptive beliefs, assumptions and thought patterns that have produced deeply entrenched dysfunctional behavioral patterns as well as social and economic systems... [T]he most powerful first lever is to alter the thinking, assumptions and beliefs that led to the current way the organization functions.

Also, Lazslo’s (2008) explains that whether or not leaders understand that business value can be created through ameliorating negative stakeholder outcomes is a function of their mindset or hidden beliefs.

Such analyses imply that changing mindset entails something more than providing business decision makers with new scientific information such as models and measures relating business impacts to climate change. What is called for is some transformation of the underlying level of mental development through which one constructs knowledge about oneself, others and the environment.

The relevance of such developmental transformations to the field of management has been described by developmental psychologist Robert Kegan, who argued that the mental demands of modern life require not just “a new set of skills to be ‘put in’ but a new threshold of consciousness” (Kegan, 1994, p. 165). Kegan (1994; Kegan and Lahey, 2009) has discussed how new forms of organization entail expectations that all organizational members will function with greater personal autonomy as well as more genuine collaboration, behaviors are beyond the capacity of many adults at their current levels of development. The expectations that workers will be self-initiating, self-correcting and able to conceive of the whole organization demand not

merely skills which can be taught but a qualitative reordering of mental complexity.

Similarly, it can be argued that the current requirements for a sustainable mindset require advances in the mental development of individuals. The basis for a sustainable world is cultivation of sustainable minds—minds which have enhanced capacities for wholeness, compassion, and creativity. These three attributes are referred to by Senge, Smith, Kruschwitz, Laur and Schley (2010) as the three learning capabilities necessary to create a sustainable world; in their words: 1) seeing systems, 2) collaborating across boundaries, and 3) creating desired futures. Sustainability requires integrative thinking which takes into account larger systems and long-term strategies, and does not simply fix isolated problems. Sustainability also depends on collaborative social relations which embrace and integrate diverse perspectives. And change toward sustainability requires positive initiative to build toward visions of what we want to exist. Each of these three learning capabilities can be understood to be a function of one's level of psychological development—as higher stages of development do entail new capacities for systemic thinking, for orchestrating individual perspectives, and for proactive leadership (Fisher, Merron, & Torbert. 1987; Cook-Greuter, 2002; Heaton & Schmidt-Wilk, 2008).

Fisher et al. (1987, p. 266) thus concluded “Human development would seem to be a central concern of management educators in universities, management trainers in organizations, and organizational development professionals.” Likewise we argue that facilitating developmental advances needs to be an essential aim of pedagogy to cultivate the capacity to manage for sustainability. The following section introduces a pedagogical system called Consciousness-Based education (CBE) ^[1] and its application to foster student development toward “sustainable minds”.

Introducing Consciousness-Based Education at Maharishi University of Management

Maharishi University of Management (MUM) is an accredited university which offers degree programs in a variety of fields at the bachelor, masters, and doctoral levels. It is located in Iowa in the United States. The Consciousness-Based education approach as practiced at MUM has previously been described in an article in the *Journal of Management Education* (Schmidt-Wilk, Heaton, & Steingard, 2000), in its special issue “Spirituality in Contemporary Work: Its Place, Space, and Role in Management Education.”

Figure 1 (from Pearson, 2011), illustrates three components of knowledge that are handled in unique ways at MUM. Any education entails all three components: there is something to be

known, there is someone to know it, and there is a process of learning connecting the knower and the known. At MUM all three components contribute to cultivating a more holistic mind (Maharishi University of Management, 2011a; International Foundation of Consciousness-Based Education, 2011b). With reference to the knower, CBE entails practices for experiencing and stabilizing a state of being established in inner freedom while engaged in the boundaries of activity. These practices include daily experience of the Transcendental Meditation (TM) program as part of the curriculum, as well as an emphasis on diet, daily living, and physical environment to promote holistic development. With reference to the process of knowing, CBE uses teaching and learning methodologies that cultivate comprehension of connectedness of the specifics of knowledge with each other and with one's self in a holistic context. The known, the body of knowledge in any discipline at MUM, is made more profound and more unified with reference to a theoretical framework of unifying principles which are connected to one's personal experience through TM practice.



Figure I: Three Facets of Knowledge: Knower, Process of Knowing, and Known

The sections which follow discuss how each of these three aspects of CBE—knower, process of knowing and known—contributes to developing the systemic thinking called for to manage for sustainability.

Developing Higher Consciousness in the Knower

MUM was founded in 1971 as Maharishi International University with the motto “Knowledge is structured in consciousness”. The significance of this expression was explained by the founder Maharishi Mahesh Yogi (1972) in his recorded lectures for the Science of Creative Intelligence (SCI) course, which became the cornerstone of the transdisciplinary framework that is applied in forming and structuring university's curriculum. One meaning of “Knowledge is structured in consciousness” is that there are qualitative changes in how one constructs knowledge as one evolves to higher states of

consciousness. When the knower is different, so also the process of knowing and the known are different as functions of the knower's evolving consciousness. SCI describes a sequence of development of higher states of consciousness toward what it calls unity consciousness—in which one appreciates one's own identity and all objects of perception in terms one unified, universal reality. Such a development endpoint was theoretically described by Abraham Maslow (1998, p. 42):

We must ultimately assume at the highest theoretical levels of enlightened management theory, a preference or tendency to identify with more and more of the world, moving towards the ultimate of ... a fusion with the world, or peak experience;

Similarly, developmental psychologist Robert Kegan theorized:

The ultimate state of development would have to do with some way in which the self has become entirely identified with the world. It would be the recognition essentially of the oneness of the universe, which is something we have heard over and over again in wisdom literatures of the East and West (in Debold, 2002, p. 2).

Through its integrated approach of CBE, MUM can be seen to be implementing an approach to spirituality in management education, based on an understanding of spirituality as “the basic feeling of being connected with one's complete self, others and the entire universe (Mitroff & Denton, 1999, p. 83).” Teaching of sustainability at MUM is grounded in the experience and understanding of growth toward unity consciousness. For example, the concluding point of a business lesson on stakeholder management is that unity consciousness finds a natural congruence between self-interest (universal Self) and creating good for the society. In this way, the academic content conveys a theoretical perspective that development of consciousness leads to a capacity for managing in a manner that produces positive impacts for all parties (Maharishi Mahesh Yogi, 1995) and that the lack of development to such a unified identity is the fundamental cause of thinking and behavior that produces life-damaging social and environmental impacts. At MUM, that perspective is not presented just as a theoretical ideal, but is related to personal experiences of developing consciousness gained by daily practice of the Transcendental Meditation (TM) technique.

The TM technique is normally practiced for 20 minutes twice daily sitting quietly with the eyes closed. In this technique a specific sound or *mantra*—utilized for its sound value without

reference to meaning—is used to shift attention away from its habitual outward direction. During meditation the mantra is experienced at progressively deeper and finer levels until the mind settles down to a state of quiet self-awareness beyond thought (Roth 1987). This experience is described as a state of “pure consciousness” because it is wakefulness as its essential nature, unmixed with images, thoughts, feelings, or any other objects of perception; and as “Transcendental Consciousness” because it transcends time, space, and all relative, changing experience. The founder of MUM, Maharishi Mahesh Yogi, (1995, p. 271 fn.) identifies this inner state of pure consciousness as the spiritual essence of life: “eternal silence, which is pure wakefulness, absolute alertness, pure subjectivity, pure spirituality.”

According to Shear, the TM technique makes the experience of transcendental consciousness accessible through a practice that is “independent of all matters of belief and affiliation” (2006, p. 47). This technique has been taught in a consistent manner around the world and thus has lent itself to scientific study on the effects on mind and body during meditation and on the stabilization of those effects outside of meditation as the result of repeated practice. The extensive research on this specific meditation technique includes randomized clinical trials, single blind studies in which the experimenter was blind to group membership, and the use of active controls so that expectancy effects would be similar in treatment and comparison groups.

During the practice of the TM technique there are reductions in heart rate and oxygen consumption, and increased electroencephalographic (EEG) coherence indicative of a state of profound restful alertness, distinct from eyes-closed relaxation or sleep (Dillbeck & Orme-Johnson, 1987; Gaylord, Orme-Johnson, & Travis, 1989; Travis, 2002; Travis, Tecce, Arenander, & Wallace, 2002).

The state of restfulness gained during the practice of the TM technique is said to dissolve the stress in the mind and the body. TM practice is reported to decrease effects of previous stressors and help an individual function better in stressful situations. A series of randomized controlled trials on the effects TM practice on prevention and treatment of cardiac heart disease reported reductions in hypertension, atherosclerosis, left ventricular mass, and CHD morbidity and mortality in high-risk multi-ethnic populations practicing the TM program, compared to controls (Castillo-Richmond et al., 2000; Schneider et al., 1995; Alexander et al, 1996).

The TM technique has been associated with improvements such as decreased anxiety (Eppley, Abrams & Shear, 1989), reduced health insurance utilization (Orme-Johnson, 1987;

Herron, Hillis, Mandarino, Orme-Johnson, & Walton, 1996), decreases in overall incidence of diseases (Orme-Johnson & Herron, 1997), improvements in ego development and moral reasoning (Chandler, Alexander, & Heaton, 2005), self-actualization (Alexander, Rainforth & Gelderloos, 1991), creativity (Travis, 1979; So & Orme-Johnson, 2001), flexibility in concept learning (Dillbeck, 1982), fluid intelligence, constructive thinking, and reaction time (So & Orme-Johnson, 2001; Cranson, Orme-Johnson, Gackenbach, Dillbeck, Jones, & Alexander, 1991). Alexander, Rainforth, and Gelderloos (1991) completed an exhaustive statistical meta-analysis of all existing studies (42 treatment outcomes) on the effects of the TM program and other forms of meditation and relaxation on self-actualization. The effect size, in standard deviation units, of the TM program on overall self-actualization ($ES = .78$) was approximately three times as large as that of other forms of meditation (.26) and relaxation (.27), controlling for duration of treatment and strength of experimental design ($p < .0002$). An explanation given for the differentiated effects of the TM technique is that it differs from other procedures of meditation and relaxation in its effortlessness.

Heaton (2000) has previously observed how positive states of mental and physical health can underlie the capacity for positive social impact in one's work. The inner intelligence of nature which manifest in holistic health, Heaton explained, is also the wellspring of holistic management, which is characterized by maximum achievement with least effort; spontaneous and frictionless coordination; doing well by doing good; and harmony with the natural environment. Steingard, Fitzgibbons, and Heaton (2004) explain that experience of transcendental consciousness overcomes the division of man and nature ; and they hypothesize that development of the knower leads to more sustainable business practice:

Research studies on the outcomes of CBE at MUM do provide evidence supporting the premise that this consciousness-based approach does promote fundamental mental transformation in the knower. A 10 year longitudinal assessment of MUM alumni with comparison groups from other U.S. universities (Chandler, et al. 2005) explored psychological growth using Loevinger's measure of ego development, McAdams' (1982) measure of intimacy motivation, and Rest's (1987) measure of principled moral reasoning. Ego development represents the evolution of "a person's frame of reference" (Loevinger, 1984, p. 57), of how the individual understands or makes sense of his or her world and own self. This concept of ego development encompasses impulse control, character development, conscious preoccupations,

cognitive complexity, and interpersonal style.

Ten-year longitudinal data indicated that MUM subjects increased markedly in ego development in contrast to three control groups matched for gender and age over the same time period. At posttest 38% (N=34) scored at or beyond the Loevinger's Autonomous level versus 1% of controls. MUM subjects also increased to very high levels of principled moral reasoning and intimacy. These unique developmental outcomes are attributed principally to practice of the TM technique, and are consistent with other evidence that TM promotes psychological development, as reviewed in Orme-Johnson (2000). Because the educational experience at MUM involves not just the TM practice but also other components of Consciousness-based education, these developmental outcomes in the MUM context cannot be attributed solely to TM practice. Just as prior research, such as Fisher et al. (1987) has found evidence relating more innovating and integrating leadership to more mature stages of ego development, so also we predict that higher development can be demonstrated to be correlated with performance measures of business decisions that favor sustainability. Some supporting research in the workplace has been published by Herriott, Schmidt-Wilk and Heaton (2009), who found that entrepreneurs who were long-term practitioners of the Transcendental reported experience of a pervasive sense of being part of a larger wholeness which were related to adopting more universal values: going beyond individual interests to the wider interests of employees, community, or environment as a whole.

An additional future area for research can be to examine performance measures of sustainability in relation to the types of changes in brain functioning found in student assessment research at MUM. The Brain Integration Scale (BIS) is part of a MUM's system of assessment of psychological and physiology effects of CBE (Maharishi University of Management, 2011b). Brain integration refers to the degree to which individual modules of the brain are working as an integrated whole. BIS measures patterns of ordering connecting different parts of the brain (Travis, Tecce, Arenander, & Wallace, 2002; Travis, 2002). Travis and Arenander (2006) reported evidence of concrete effects of the TM technique on students' brain functioning at MUM. They found that frontal coherence is achieved during TM practice even in beginning meditators, and also that the result of TM practice is growing frontal coherence not only during meditation but during activity. Higher levels of brain integration correlate positively with higher emotional stability, higher moral reasoning, and more openness to experience; and correlates

negatively with anxiety (Travis, Arenander, & DuBois, 2004).

Schmidt-Wilk et al. (2000) reviewed studies on students at five other universities, with positive outcomes on EEG coherence, self-concept, anxiety, creativity, perception, and academic performance. Travis, Haaga, et al. (2009) reported changes in EEG coherence and power in university subjects randomly assigned to TM practice, compared to eyes-closed rest. Such studies suggest that the results of Consciousness-Based Education, which have been demonstrated at MUM, merit further investigation in other university settings.

Psychological and physiological effects of the Transcendental Meditation program, such as those reviewed above, indicate how Consciousness-Based education develops the consciousness of the knower. By culturing self-awareness, inner stability, relaxed alertness, and a connected brain, the knower component of CBE broadens and deepens awareness as a foundation for more sustainable thinking and behavior. The two other components of CBE—the process of knowing and the known—function in synergy with CBE’s practices for development of the knower to also cultivate growing wholeness of awareness.

Structuring Wholeness through the Process of Knowing

CBE also involves specific educational methodologies to facilitate learning of the academic disciplines. We describe some of those practices here and then discuss their value in light of education theories of other educational scholars. The rationale for these CBE methodologies is explained by Maharishi University of Management in terms of promoting the development of higher consciousness for the knower. Their general purpose is to enable the learner to appreciate any specific knowledge with reference to a greater holistic context and to see the relation of the parts of knowledge and the greater wholeness to the ultimate nature of the learner’s own Self. The cultivation of this kind of systemic cognition helps develop the mental competencies for sustainability—which requires comprehending the ecology of interrelatedness in human systems and the natural environment.

Teachers at MUM participate in faculty development seminars in which they gain practice in constructing and utilizing a number of tools for curriculum design and instruction. These tools are based on educational guidelines from Maharishi Mahesh Yogi, the founder of the university. One such tool is called the Unified Field Chart. This is a visual illustration of the structure of knowledge of a particular discipline. Specific parts of the discipline are organized in a display

which shows the relationship of different parts to each other. Vertically the knowledge is in layers from the most subtle underlying causes to the most manifest and applied aspects of the discipline. For example, a chart used in teaching sustainable business the subtle levels of the chart concern managerial mindset, learning capabilities, and evolving societal expectation. Applied levels include stakeholder impact assessment and sustainability reporting. At the most basic level of every discipline is the field of transcendental consciousness which in CBE is regarded as the common source of all streams of knowledge. Thus through seeing multiple unified field charts across various disciplines of study, the student gains a sense that all branches of knowledge are connected to a unifying basis and that the basis of all knowledge is accessible within one's own mind.

Another commonly used tool is called the Main Point Chart. There are two elements in the chart. The first element is to express about three most significant points of the lesson, in one or two sentences for each point. A second part is to relate that main point to some more universal principle of natural law from the Science of Creative Intelligence (SCI). A sample of SCI principles is provided in the section of the paper below which concerns the known in CBE.

The main point chart serves to organize the content of the lesson. Each main point is developed with supporting logic, evidence, and detailed explanation, and then restated so that the main idea is clear and easy to remember. The SCI points are intended to make the knowledge more relevant by connecting to the inner life of the learner. By seeing the same universal principles can be meaningful in a variety of academic fields, the student can grow to appreciate that nature is not compartmentalized into fragmented disciplines but is a unified whole. In this way, the process of knowing aspect of CBE contributes to the type of integrative understanding of nature that is helpful for sustainability.

Main point charts, including SCI points, are displayed as posters on the wall during a particular lesson and are left there for reference during subsequent classes—when connections can be drawn between what is happening in class and main points from prior lessons, as selected by the faculty. An exercise can be for learners to bring to class main points of assigned readings. This puts the learner in a purposeful frame of mind to get more meaning out of the reading by asking learners to formulate the deepest or most significant points.

Many MUM teachers assign students to create main points of their own. Professor John Collins will present his main points again after the lesson and invite students to challenge his

main points or the corresponding SCI principle, thus sparking debate, active engagement, and critical reflection. Professor Travis Cox presents his main points at the conclusion of a lesson and works with the class to draw the connections to SCI, He likes to have the students “teach” him, explain the principles to him.

By participating in the construction of such unified field charts to map some area of knowledge, students in CBE exercise their capacity to make connections and to simultaneously focus on specific details while maintaining comprehension of a larger context. Further, by actively participating in designing a model of a field of knowledge, learners come to appreciate how ideas are not fixed entities but living human constructions. Likewise the active construction of main point charts involves generative learning. The process involves firstly discerning what are the important ideas, and then further finding some interdisciplinary principle to illumine the discipline point.

CBE and Generative Learning

In their landmark 1995 article, “From Teaching to Learning: A New Paradigm for Undergraduate Education”, Barr and Tagg articulate the learning paradigm, which they contrast to the instructional paradigm. Educators in the instruction paradigm conceptualize educational content as discrete particles, objects of knowing that can be transmitted from a source, such as a book, or a lecture, directly into the memory of student where it is later recalled and made useful. It is education which puts the emphasis on what is known. Barr and Tagg sound the call for educators to recognize that all students learn differently and that the lecture is but one of many tools available to the teacher. The role of the teacher, in the learning paradigm, is to maximize the learning of each student “by whatever means work best”. Barr and Tagg are to be commended for recognizing the emerging, and much needed, shift from an educational paradigm emphasizing teaching and instruction to a paradigm which puts the emphasis on learning—the process of knowing. CBE, particularly when carried out in a way that involves learners in the active analysis and synthesis of knowledge, provides specific methodologies for implementing the learning paradigm.

The main point charts, unified field charts and other teaching methodologies used in at Maharishi University of Management (MUM) can be also understood as strategies to promote generative learning. According to generative learning theory, the learner is not a passive recipient of information but an active generator of knowledge (Grabowski, 2004). Through

connecting new stimuli, information and experiences to previous experiences and understanding the learner generates new knowledge, new understanding (Wittrock, 2010). The knowledge generated by the learner, in any situation will be dependent upon the context in which the stimuli is presented/experienced, the state of consciousness of the learner (emotions, clarity of mind, level of psychological maturity), the learners previous knowledge, and the objectives of the learner. The goal of generative learning is increased retention, comprehension, and transferability of knowledge by the learner, in short, “learning with understanding (Wittrock, 2010)”. To promote generative learning, the teacher may give explanations, metaphors, analogies, flow charts, paraphrases, main points, advanced organizers, and activities.

Harvard educational psychologist Howard Gardner (1990 p.3) has found such generative learning to be far too uncommon in education. As Gardner makes clear, our educational system encourages rote memorization of information and knowledge but does not encourage genuine understanding:

In schools – including “good” schools – all over the world, we have come to accept certain performances as signals of knowledge or understanding. If you answer questions on a multiple-choice test correctly, or carry out a problem set in a specified manner, you will be credited with understanding. No one ever asks the further question “but do you *really* understand?” because that would violate an unwritten agreement: a certain kind of performance shall be accepted as adequate for this particular instructional context. The gap between what passes for understanding and genuine understanding remains great.

Beyond genuine understanding which grasps the principles that underlie and guide observed properties and behaviors, according to Ackoff and Greenberg (2009) is wisdom—which described as emerging from examined understanding. Wisdom is qualitatively different from data, information, knowledge, and understanding, which are all concerned with efficiency, with maximizing the probability of achieving an objective while minimizing the expenditure of resources, without considering the value of what is being pursued (i.e. efficient genocide, memorization of facts and figures). Wisdom is examined understanding, it is concerned with doing the right thing. Human beings, according to Ackoff, are incredibly intelligent and creative and can usually achieve anything that they put their mind to; the problem is that, for the most part, we put our mind to achieving the wrong things. In fact, Ackoff puts forward that the most

serious social and environmental problems we are currently facing as a species are the result, not of doing things wrong, but of doing the wrong things (Ackoff & Greenberg, 2009). An educational program which focuses on maximizing learning of knowledge, and even understanding, will only increase our capacity for doing things right.

Creating the sustainable world we want will require that we create the conditions for our citizens to develop wisdom, and begin doing the right things. CBE could argue that because “Knowledge is structured in consciousness” the degree to which learning can become wisdom is a function of the level of consciousness of the student. In CBE the practices which promote growth of higher consciousness in the knower work together with the tools which structure the process of learning toward the end that the learner will grow in wisdom to be able to do the right thing.

In the context of CBE as founded by Maharishi, the purpose served by main point charts, unified field charts and other tools is the growth of enlightenment. These tools of CBE are an intellectual approach which complements the experience of the Transcendental Meditation technique to promote development toward unity consciousness— in which one knows one’s own identity and all objects of perception in terms of the same one universal intelligence. It is this level of consciousness which enables the most natural wisdom to do what is right for oneself, others, and the environment which one holds to be as dear as one’s own Self. In faculty development materials provided to teachers at MUM, the founder Maharishi explains:

Enlightenment is the goal of our study. Therefore we teach the whole, then show how the whole generates the parts. We teach each part thoroughly, see where the parts fit, then step back from all the parts to their common basis, bringing the parts into the mainstream, and the mainstream into the ocean of the Self. All knowledge is made Self-referral by the teacher in every class.

The Known – Universal Principles and Specific Knowledge

Along with the knower and the process of knowing, the third element of CBE is the known. In this section we consider the content of study which can support the cultivation of sustainable minds in the context of CBE.

Sustainability certainly is a holistic subject, not easily circumscribed into a single academic discipline. It calls for human policy decisions that ain accord with how systems operate in nature. How can such a convergent multi-disciplinary way of thinking we realized? In 2009, the

curriculum committee of the Council of Environmental Deans and Directors published a report *Perspectives on Environmental Curriculum and Core Competencies* (CEDD, 2009). The authors interviewed the leaders and administrators of 4-year environmental science and environmental degree programs in order to determine the range of curricular models for environmental programs being offered in the United States, define measures of program success, and establish a set of core competencies that could be agreed upon by program leaders to lend consistency and legitimacy to the field of environmental studies as whole. A central tension that seemed to emerge from their research regarded the focus and purpose of environmental and sustainability education programs: should the focus be on developing job specific skills and knowledge for employment in a sustainable field or on developing a broad framework for sustainability to prepare students for a role as environmental advocates and citizens; in short – breadth or depth.

A commonly heard argument against integrative undergraduate education is that in order for it to be of value to the student, the student must already possess strong disciplinary sophistication in at least one field.

Undergraduate programs in interdisciplinary studies appear fated to wander between two unattractive poles -- either they assume disciplinary sophistication in the students, in which case most, if not all, of the students are left in the dark, unable to manipulate the central issues at stake or -- and this is much more frequently the case -- they assume little, and the program of study is diluted and homogenized to the point where it is almost totally devoid of a critical base (Benson, 1982).

Most forms of interdisciplinary education, which seeks to draw connections between one or more disciplines, seek to do so by drawing connections on a common theme. For example, an interdisciplinary course on water might bring together faculty from diverse fields, such as chemistry, ecology, political science, from the unique lens of their field. In this way, interdisciplinary education brings understanding from multiple fields to enhance the understanding of a common theme or element.

CBE is a system for transdisciplinary education unites the disciplines on the level of common underlying principles and shows how those principles are manifest in the aspects of creation which are the study of the individual disciplines (Winqvist, 1982). In CBE, discipline-specific content is studied in light of unifying principles of the Science of Creative Intelligence. It could

be argued that students at MUM are always taking two courses simultaneously – one class which provides deep, specific knowledge and one course that gives a breadth of understanding through illustrating principles that are common to all disciplines. The faculty at MUM connect the parts of knowledge, the specific content of their discipline with the whole by relating the main points of each lesson with corresponding SCI principles. The application of familiar principles makes new content both familiar and rich while the content of the discipline gives concrete examples of the manifestation of these laws of creation that are immediately clear and relevant to the students.

The Science of Creative Intelligence (SCI)

The Science of Creative Intelligence (SCI) is a study of the principles of evolution that are at work throughout all of creation. It is a universal framework which connects all disciplines to each other and to the inner life of the learner. The founder of SCI identifies creative intelligence as the impelling progressive and integrative force which continually gives rise to new expressions of life and order (Maharishi Mahesh Yogi, 1972).

SCI teaches that all phenomena in creation, from energy to matter to living beings, are the manifestation of different expressions of creative intelligence. Maharishi compares creative intelligence to an ocean. Creative intelligence, like the ocean, is still and silent at its depth but on the surface manifests itself in ripples and waves. All the diverse objects and expressions are rooted in un-manifest, pure creative intelligence (Maharishi Mahesh Yogi, 1972). Individual waves are nearly indistinguishable at their subtlest expression near the surface of the ocean but are distinct and unique at their tip. In the same way, SCI teaches that all of the disciplines of study are unique and distinct at the surface but they are all formed from the same ocean and are nearly indistinguishable from each other at the base.

“These 16 principles are the Laws of Nature that uphold growth and progress of everyone and everything. They are everywhere, guiding the progress and evolution of the ant and the elephant, the cell and the planets.”

—Maharishi Science of Creative Intelligence for Primary and
Secondary Education, 2006

1. The nature of life is to grow.
2. Order is present everywhere.
3. Life is found in layers.

4. Outer depends on inner.
5. Seek the highest first.
6. Rest and activity are the steps of progress.
7. Enjoy greater efficiency and accomplish more.
8. Every action has a reaction.
9. Purification leads to progress.
10. The field of all possibilities is the source of all solutions.
11. Thought leads to action, action leads to achievement, and achievement leads to fulfillment.
12. Knowledge is gained from inside and outside.
13. Knowledge is structured in consciousness.
14. Harmony exists in diversity.
15. Whole is contained in every part.
16. The whole is greater than the sum of the parts.

Table I. 16 Principles of the Science of Creative Intelligence

Three sources of SCI principles which are commonly used at MUM in main point charts are the 16 Principles of SCI, the 50 qualities of Creative Intelligence, and the five fundamentals of progress. The 16 principles of SCI were chosen by Maharishi for the purpose of organizing curriculum. “These 16 principles are the Laws of Nature that uphold growth and progress of everyone and everything. They are everywhere, guiding the progress and evolution of the ant and the elephant, the cell and the planets.”

One of the key teachings of Maharishi is that the solution to a problem cannot be found on the level at which the problem manifests itself. SCI encourages students to look for the root causes of the problems, and that those causes exist at more fundamental levels of reality. This principle is consistent with the systems literature, in which a distinction is made between symptoms, stimuli, and causes. For example when we are sick we perceive symptoms such as coughing and sneezing. An example of the stimuli would be bacteria that take up residency in our bodies, and the cause would be that our body chemistry is such that constitutes a healthy ecosystem in which pathogens can take residence (Cowan, 2004). The example also demonstrates an application of SCI principle 4, “outer depends on inner”, which in this example is interpreted to mean, outwardly expressed symptoms are the result of structural causes.

The Five Fundamentals of Progress – Stability, Adaptability, Purification, Integration, Growth – are attributes that are necessary for the evolution or growth of any system, including living systems. Dr. Paul Morehead, of the Physiology and Health faculty at MUM uses the model to integrate the basic functions of a cell:

Stability - The cholesterol and phospholipid bilayer of the cell membrane maintain the integrity and structure of the cell, along with the cytoskeleton, which is a network of fibrous structures that maintain the shape of the cell.

Adaptability - Receptors on cell membrane bring in nutrients, chemical messengers (hormones), electrolytes and other information, which triggers a cascade of events that stimulate the cell to adapt to the changing needs of the body and the cell's environment

Integration - The cell absorbs nutrients and chemical messages from the environment and makes use of them for the cells ongoing activity, energy and functions.

Purification - The cell has several structures including lysosomes and peroxisomes which digest and eliminate unwanted chemicals, toxins, or organisms from outside the cell or produced inside the cell.

Growth - The mitochondria generate energy in the form of the ATP molecule from glucose and oxygen. Also the cell can divide and produce two cells through the process of mitosis, which is triggered by a stimulus to the DNA.

These same five fundamentals have been applied in other diverse subjects such as ecology, organizational change, cross-cultural management, and information systems—illustrating the transdisciplinary power of SCI principles. The 50 qualities of the Creative Intelligence are presented in pairs of contrasting, yet complimentary qualities (Maharishi International University, 1974). These pairs may at first seem paradoxical but resolving the paradox leads to profound insights into the dynamics of Creative Intelligence. For example, the qualities stable and adaptable, Stability implies inertness, resistance to change, whereas, adaptability implies openness and flexibility. All living systems are dissipative structures, structures that maintain a constant form, even while matter and energy are constantly flowing through. Other complimentary pairs include: gentle and strong, discriminating and integrating, independent and helpful, silent and dynamic.

Direct correlation can be found between Maharishi's Science of Creative Intelligence and another expression of transdisciplinary principles in Ken Wilber's (2000) 20 tenets. Wilber's 20

tenets represent, in his words “what we might call ‘patterns of existence’ or ‘tendencies of evolution’ or ‘laws of form’ or propensities of manifestation” that are present in the realms of matter (physics), life (biology and biological evolution), and mind (history and psychology). SCI and Wilber’s tenets seem to be describing the same laws or forces that guide the manifestation and evolution of all forms of matter, life, and energy. The first of Wilber’s tenets is that the universe is composed of neither parts nor wholes but of whole parts, or holons; holons are simultaneously both wholes and parts. They are comprised of parts and together comprise larger wholes. This corresponds to SCI Principles 15 and 16; 16 states that the whole is greater than the sum of the parts and 15 states that the whole is contained in every part.

Transformative Pedagogy for Sustainability

Senge et al. (2010) in their concluding chapter propose that evolution of human consciousness is a possible and necessary solution to the global challenges of sustainability. We have presented three aspects of Consciousness-Based Education and their relevance to cultivating a sustainable mind. Student development toward a sense of a unified consciousness about oneself and one relationship to others and the environment is supported by each of these three integrated streams of MUM’s CBE pedagogy. The *knower* aspect of Consciousness-Based Education, by stimulating brain integration and higher stages of human development, supports a growing capacity to think comprehensively about social and environmental impacts of business for present and future generations. The *process of knowing* aspect involves specific instructional methods for constructing meaning through connecting parts and wholes. The *known* component explores transdisciplinary principles for gaining holistic understanding of natural and social systems. Together, these components of Consciousness-Based education constitute an integrated approach of educational practice which can be adapted to diverse educational and organizational contexts to address the calls for profound and widespread mind change to address global sustainability challenges.

From its founding, the goal of MUM has been the enlightenment of the students and the generation of wisdom through Consciousness Based Education. Wisdom, as defined by Russell Ackoff and Greenberg (2009), is the capacity to apply understanding of the principles and relationships that underlie observable behavior and properties of systems in order to select the right course of action to get the result we truly want. The framework of Consciousness Based Education as applied at Maharishi University of Management facilitates the development of

wisdom because it is generative (educating for understanding by making connections and drawing relationships), transformative (changes the students level of consciousness), and transdisciplinary (integrative, universal, spiritual). Through CBE students gain an understanding the universal laws of nature students, and learn how to leverage action to achieve outcomes which are in harmony with natural law and achieve sustainability.

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