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ABSTRACT

Formal and informal assessment of interdisciplinary courses in learning communities indicate that communicating across disciplines is a problem that can diminish the effectiveness of these courses. A new discipline called the Science of Creative Intelligence (SCI) has been used for 27 years at Maharishi University of Management (Iowa) to facilitate cross-disciplinary communication. This paper describes two primary components of SCI: a laboratory or experiential approach based on student and faculty practice of the transcendental meditation program; and a theoretical approach in which faculty refer in all courses to a set of universal principles of natural law that can be located in all disciplines. These principles, derived from analyses of experiences during the transcendental meditation technique, are stated in common language and provide students with a unified and coherent view of the relationship between all disciplines. In addition, the document includes a review of the field theory of consciousness presented in SCI, and offers empirical research documenting the success of its laboratory approach in developing the broader comprehension and wisdom that is a goal of interdisciplinary studies programs. (Contains 14 references.) (Author/JM)

Supplementing Interdisciplinary Studies Programs with a Consciousness-based Transdisciplinary Approach to Increase Students' Holistic Development

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Abstract: Formal and informal assessment of interdisciplinary courses in learning communities indicate that communicating across disciplines is a problem that can diminish the effectiveness of these courses. This presentation will review a new discipline, called the Science of Creative Intelligence (SCI), whose use for the last 27 years at Maharishi University of Management has been experienced to facilitate cross-disciplinary communication. It will describe SCI's two primary components: 1) a laboratory or experiential approach, based on student and faculty practice of the Transcendental Meditation program, and 2) a theoretical approach, in which faculty refer in all courses to a set of universal principles of natural law that can be located in all disciplines. These principles, derived from analysis of experiences during the Transcendental Meditation technique, are stated in a common language and provide students with a unified and coherent view of the relationship between all disciplines. The presentation will also include a short review of the field theory of consciousness presented in SCI, and empirical research documenting the success of its laboratory approach in developing the broader comprehension and wisdom that is a goal of interdisciplinary studies programs.

When I first submitted my session topic I meant to emphasize the contribution a transdisciplinary approach to interdisciplinary studies can add to the holistic development of students, ie. to the development of what has traditionally been understood as wisdom. By wisdom, I mean broad comprehension and an integrated personality. The term transdisciplinary in this context, refers to a set of principles, expressed in a common language, that can be located in all disciplines. In this session I wanted to describe a unique transdisciplinary approach that can supplement the thematic courses used in many learning communities, because research at our university has indicated this approach facilitates the growth of wisdom in students, as indicated for example by longitudinal research using Loevinger's ego development scale.

I will get to this outcome, but before I do, I want to begin on another tack, because in looking at current research on learning communities I came across an issue that is also related to the transdisciplinary approach I wanted to describe in this session, but to a very practical challenge that occurs among faculty from different disciplines teaching theme based, interdisciplinary courses. This is the challenge of faculty with different training and backgrounds communicating effectively with each other (and therefore with the students). Tussman noted difficulties in this area as a rationale for the early experiments with learning communities at Berkeley:

> The university is a collection of highly trained specialists who work with skill, persistence, and devotion. . .but it pays the price of its success. The price is specialization, and it supports two unsympathetic jibes: the individual specialized scholar may find that, as with Oedipus, the pursuit of knowledge leads to impairment of vision; and, the community of scholars, speaking its special tongues, has suffered the fate of Babel. (quoted in Gabelnick, p. 12-13)

The fate of Babel, of course, was incoherence, a failure to communicate with each other.

Research on the Berkeley experiments indicated this was a problem, and research on current learning communities indicates it continues to be a challenge. Just getting specialists from different disciplines to agree to co-teach courses around interesting themes does not ensure a sudden blossoming of communication. As our host institution has noted in assessment of its own learning communities experiments:

> . . .we have been surprised to observe the difficulties faculty face when crossing disciplinary borders. While faculty may share pedagogical goals (to inspire critical thinking, for example), they may use different approaches to achieve goals. They may use conflicting measures to evaluate whether students have achieved goals. They may use different disciplinary terms to describe similar concepts. (Moxley, 1998, p. 3)

Overcoming this point of using different disciplinary terms to describe similar concepts is a goal of a transdisciplinary approach to interdisciplinary studies. Many transdisciplinary candidates have emerged in recent years including synergetics, neuronal networks, quantum computing, chaos theory, non-linear dynamics, and general systems theory. In this session, however, I would like to review a different approach we have been using at Maharishi University of Management (M.U.M.) for the past 26 years.

Knowledge and Experience

One approach to transdisciplinarity is to create a new discipline that analyzes other disciplines in the light of common principles. This is the kind of thing that is done with, for example, systems theory. However, the usefulness of this kind of intellectual approach to transdisciplinarity would be greatly enhanced if its common principles do not remain abstractions, but are related directly to experiences that students and faculty have. This is the specialty of our university's approach.

At M.U.M. all faculty and students practice the Transcendental Meditation (TM) technique. This technique has been taught throughout the world for about 40 years and, due to the extensive research conducted on it, is well known as an effective technique for improving health, combating the effects of stress, and enhancing the growth of creativity

and intelligence in practitioners. All of these benefits are useful to both students and faculty and can be shown to directly affect their ability to learn. The M.U.M. faculty developed our curriculum, therefore, as an experiment to see what the effects of integrating the practice of TM into the undergraduate and graduate education would be.

In 1972, Maharishi Mahesh Yogi, the founder of M.U.M. and the teacher who brought TM out of India and began training teachers to offer it throughout the world, video-taped a 33-lesson course which he titled *Science of Creative Intelligence-Knowledge and Experience.* This course presents a systematic analysis of the principles guiding the growth of creative intelligence in individuals who practice TM. M.U.M.'s first catalogue described the intellectual content of this course as follows:

> Because nature is found to be orderly, man's mind by nature has the power to order; therefore it is the element of orderliness, or intelligence itself, common to both man and nature, that is fundamental to all knowledge. Furthermore, the universal quality of life, of intelligence, is to grow, evolve, expand, and progress-it is creative. This element of creative intelligence in itself is the subject matter of the Science of Creative Intelligence, which may be defined as the study of the nature and growth of orderliness in man and, through him, in the world at large. (Maharishi International University, 1974, p. 132)

In this course, Maharishi does not limit his analysis to the growth of creative intelligence through TM. He also relates these principles and qualities of creative intelligence to the laws of nature governing other natural phenomena as studied by modern science. Some examples of these principles, as expressed in the language of everyday speech, are the principle of least action, the principle of gravity, and the principle of purification (Maharishi, 1972, p. 31-2). In various lessons Maharishi explains how these same principles operate in physics and biology to illustrate their universal character. For example, he locates the principle of gravity in the Transcendental Meditation technique and in physics.

> In diving, the body gravitates towards the depth of the water. In meditation, the mind gravitates towards the experience of the pure field of creative intelligence in a spontaneous manner.
>
> This is similar to a phenomenon described by physics, occurring when the atom relaxes to the ground state. The ground state is the natural field of rest for the atom. The attraction of the electron towards the nucleus enables the phenomenon of increasingly reduced activity to take place, until the ground state is gained. (1972, p. 14-5)

With examples such as this, Maharishi modeled how the principles governing the expression of creative intelligence in human experience can be located throughout

creation in every area studied by modern disciplines. Using this model, the M.U.M. faculty began to create lectures and student exercises that located these principles in all the standard disciplines we teach at the university.

For the past 26 years, all students who have attended M.U.M. take the 33 Science of Creative Intelligence (SCI) lessons as their first course. Our experience has been that intellectual understanding of these basic principles and qualities gained through this course serves a useful integrative function in our curriculum. The vocabulary of the SCI curriculum addresses the need for a common language that can mediate between the specialized languages of the disciplines. In addition, when faculty locate these principles and qualities in each of the different modern disciplines, students intuitively see the commonalties, as well as the differences, between these disciplines.

The Science of Creative Intelligence curriculum goes far beyond a purely intellectual approach in its fulfillment of the integrative goal of interdisciplinary study, however. As mentioned earlier, many universities have experimented with courses based on meta-sciences, like systems or chaos theory, that attempt to provide a language and foundation for intellectual integration of all knowledge. The truly unique component of Maharishi's approach to interdisciplinary studies, however, which has the most far reaching implications for educational outcomes, is the laboratory component of his Science of Creative Intelligence curriculum referred to above-the Transcendental Meditation program. As described in the original catalogue:

> A field of knowledge is only said to be a science if it includes a procedure for laboratory verification of its principles and systematic expansion of its experiences. Therefore the theoretical aspect of SCI described above is never taught alone. It is an intellectual understanding that is valuable only if it accompanies an actual practical technique that any individual can use to verify directly each and every theoretical statement in his own personal experience. (Maharishi International University, 1974, p. 135)

Maharishi derived the principles of the SCI curriculum through analysis of experiences during TM. But these principles would be abstract insights for students if left only to intellectual discussion and verification. However, because at M.U.M. students and faculty systematically experience and verify these principles and qualities in their own lives, through the laboratory component of the SCI curriculum, the integration of knowledge based on this daily experience becomes lively and relevant for them in a way that abstract intellectual understanding could not.

We began this presentation with Tussman's reference to the tower of Babel that can occur when faculty from various disciplines try to teach together. At M.U.M., we have found over the past 25 years that faculty trained in all the different disciplines, with their

unique vocabularies and approaches to research, can communicate effectively with each other using these SCI principles as a transdisciplinary bridge between their disciplines. I have attended numerous faculty meetings in which presentations on the latest developments in various disciplines were presented to the faculty as a whole, and they were understood by everyone present because they were explicitly related to SCI principles.

In the same way, teaching all disciplines in the light of these principles-that is, using the principles as advanced organizers when introducing new disciplinary material-helps the students to understand this new material as it is related to concepts they already understand. As an extra value, of course, students also feel more connected to the disciplinary knowledge being presented when it is related to principles that are associated with a feature of their life that is intimate and personally important to them-their experience during TM.

It may seem like this transdisciplinary approach is too unique to be useful at any other universities. It is not necessary, however, for a university to adopt this approach wholesale. It is, I feel, an approach that is uniquely suited to the learning communities model where small cohorts of students and faculty are engaged in creating an on going community of knowledge. Centers where students and faculty can learn the TM technique during a simple 4-day course (2 hours per day) are available in most university towns. These centers can also arrange to offer the 33-lesson SCI course at any university. (Over the years it has been offered at many universities, for example the University of Colorado, the University of California at Sacramento, Los Angeles and Humbolt, and the University of Massachusetts, as well as at community colleges like Roger Williams in Rhode Island and Miami-Dade in Florida.) If a particular learning community wanted to experiment with the ways in which this combination of knowledge and experience would facilitate the interdisciplinary approach of their program, the practicality of making TM and SCI available could therefore be arranged. And there is research that indicates there are further reasons, beyond the value of the transdisciplinary communication it fosters, for considering this option.

Holistic versus Fragmented Understanding

I began this paper by purposely getting sidetracked from the topic which I originally submitted to the conference organizers, namely how TM and SCI facilitate the holistic growth of students at M.U.M. and therefore how they might do the same in any learning community. I'd like to close with a few remarks about this topic.

Learning communities, and especially those that take a thematic, interdisciplinary

approach to their curriculum, have emerged in part as a response to the over-specialization that characterizes higher education. A key rationale for these thematic courses is the fact that many of the problems that confront society do not fall neatly within particular disciplinary boundaries and therefore require knowledge from many different disciplines in order to be properly addressed. Connected to this principle is the reality that because there is so much knowledge in the world, it is no longer practical to create "Renaissance" men and women-individuals who are expert in many different areas. Instead, most current approaches to problems in business and government involve the creation of teams, whose members have different areas of expertise. [Just as an aside: Critical to the success of these teams is the ability to communicate with each other. The above discussion of a transdisciplinary language like SCI is, of course, helpful in this context also.]

There is a third rationale that is also proposed for the importance of interdisciplinary studies programs, stemming from the reasons for general education requirements at most universities. The argument runs somewhat as follows:

1. The proliferation of specializations in our universities is the natural result of the reductionist, analytic approach to knowledge that characterizes the scientific method.
2. Because of its success, this analytic method is not restricted to the sciences, but has been adapted and adopted by all modern disciplines.
3. The analytic approach by definition breaks wholes into parts to study their causal relationships. The idea is that the whole can eventually be reconstructed, once we understand how all the parts work.
4. However, without interdisciplinary courses, this second step is rarely attempted. This integration of knowledge usually is left up to each individual student to accomplish on his or her own time.

One natural outcome of these points is that faculty and students who spend the majority of their time dealing with specialized, selected sections of the life will likely have a fragmented, rather than holistic, understanding of life. As Jones (1987) has noted in the context of an article on environmental studies, the emphasis on specialization at our universities

> . . .has the effect of *fragmenting* reality into discrete elements so that separate analysis of the causal relationships between the parts is possible. But by acting in this way, there is a tendency to perceive reality as though it is fragmented, with interactions between the parts operating mechanistically, rather than being dynamically integrated in an infinite web of interconnectedness without beginning and without end. (p. 237)

He concludes: "What is needed is the development of an holistic epistemology which postulates the *oneness* of all reality with a total embeddedness of all the parts in

the whole" (p. 239).

At M.U.M., we have found that an SCI-based approach to the curriculum can significantly contribute to this particular requirement of balancing specialized knowledge with an understanding of the integrated and holistic character of life. However, in order to describe how this works requires that I present a somewhat more detailed description of both SCI and its laboratory component, the Transcendental Meditation technique.

A Brief Overview of Competing Theories of Consciousness

In contrast to the common understanding that consciousness is *created* by the activity of the brain, in the SCI course, Maharishi proposes that the individualized qualities of waking state experience is actually a partial *reflection* of a field of *pure consciousness*-pure in the sense of unmixed with any content (sensations, thoughts, feelings, perceptions, etc.) other than awareness itself. He further explains that the reason only a partial reflection of this field is experienced normally is because of chemical and structural abnormalities in the nervous system and physiology as a whole, created by the stress of life. Without a completely normal or pure functioning of the nervous system, the experience of pure consciousness is hidden or lost.

Transcendental Meditation is a technique which, in this context, serves as a method to both give a deep level of rest that allows the body to repair deep-rooted chemical and structural abnormalities and, at the same time, allow the mind to conduct systematic research in consciousness to verify which of these two explanations of consciousness seems to be correct. Is consciousness a field, an underlying reality of the universe as basic as, for example, the electromagnetic or gravitational fields? Or is it an epiphenomenon unique only to human beings manufactured by their complicated brains? Twenty-five years of research in consciousness at M.U.M., using the TM technique as our primary experimental method, seems to confirm the former explanation. During TM many individuals have reported experiencing pure consciousness, that is, consciousness devoid of any particular thoughts, feelings or sensations, but experienced as an unbounded field of awareness or knowingness.

Is this a delusion, a kind of collective dream or collective expectation effect? To answer this question we have also created a number of ongoing *objective* research programs to complement the *subjective* research during TM. One example: In the past several decades, physiological research on waking, dreaming, and sleep has demonstrated that each of these unique states of consciousness has correspondingly unique physiological parameters, such as EEG, biochemistry, etc. (cf. Wallace, 1970, p. 43). One approach we have taken at M.U.M. to verify claims about the existence of pure

consciousness (which Maharishi indicates is a state of consciousness as unique as waking, dreaming, or sleeping) is to predict that individuals claiming to experience pure consciousness will have corresponding physiological parameters accompanying the experience that are quite different from those observed accompanying waking, dreaming, or sleep.

There have been many studies in this area which verify this hypothesis and document the unique EEG and biochemistry associated with this experience (see Orme-Johnson & Farrow, 1977; Chalmers, et al., 1989; Wallace, et al., 1990). EEG studies, for example, show a unique brain wave coherence during the practice of TM. These physiological studies add to our confidence that the experiences of pure consciousness reported during TM practice are not illusory psychological experiences; they reflect a universally available experience that is supported by a unique functioning of the human nervous system, but in patterns that are different from the common experience of waking state.

This research gives us confidence the experience of pure consciousness is as real as waking, dreaming, or sleep states, but it does not help us decide whether the experience of pure consciousness is created by the brain, or whether pure consciousness has its own independent ontological reality. Evidence from another area of objective research helps decide this question.

If our waking state experiences are the result of a partial reflection of a field of pure consciousness, rather than phenomena created by individual nervous systems, then it should be possible to create *field effects* through contact with this field during the practice of the Transcendental Meditation technique. Field effects are the accepted explanation in modern science for phenomena of action at a distance, that is, phenomena like gravity where the bodies affected are not in physical contact with each other (Hagelin, 1987).

In SCI, the field nature of consciousness has been objectively investigated by research on what is termed the *Maharishi Effect.* The Maharishi Effect is the name given to trends in various measurable societal activities-such as crime rate, hospital admissions, automobile accidents, the activity of the stock markets-being positively affected by sufficiently large numbers of individuals practicing the Transcendental Meditation technique and, in particular, an advanced practice that Maharishi has been teaching since 1975 termed the TM-Sidhi program. Maharishi describes the TM technique as a means to experience pure consciousness. The TM-Sidhi program trains an individual to think and act from this level (see Gelderloos & van den Berg, 1989 for a more detailed explanation of the TM-Sidhi program).

In the context of the field nature of consciousness hypothesis, these positive trends

are understood to be the result of an increase of creativity and other life-supporting qualities in the collective consciousness (the sum total of individual consciousness) of the area affected. Maharishi explains that the experience of pure consciousness during practice of the TM and TM-Sidhi program stimulates or "enlivens" its inherent creative, and therefore life-supporting, qualities. Being a field that underlies and permeates all expressions of individual consciousness, when the creative qualities of pure consciousness are enlivened at the level of the field, they are enlivened in all members who are connected, either consciously or unconsciously, to the field. Because in SCI all subjectivity is explained as a reflection of the field of pure consciousness, all individuals will be affected in a positive way when the life-supporting qualities of this field are enlivened.

Empirical data indicates that the Maharishi Effect is particularly evident when pure consciousness is enlivened by large assemblies of individuals practicing Transcendental Meditation and TM-Sidhi program. To date over 40 studies, several of which have been published in top refereed journals, have confirmed the Maharishi Effect as created by such large assemblies (Orme-Johnson, 1992). As this effect cannot be explained by the materialist explanation of consciousness (consciousness as created by the brain), it provides substantial confirmation of the field theory of consciousness given in SCI.

Back to Holistic Development

This understanding obviously fulfills Jones' request for an epistemology that "postulates the *oneness* of all reality with a total embeddedness of all the parts in the whole." It goes an important step further, however, because rather than just postulating the oneness of reality, it explains the nature of that oneness. In SCI, consciousness is understood as not just one of many fundamental substances, like matter and energy, that exist in creation. It is the *primordial* substance that exists as the fundamental constituent of all subjective experiences and also of all objective manifestations of the material world-all objects of the senses. From this understanding, the principles of SCI described as the basis of a transdisciplinary approach to teaching in the first section of this paper are uniquely and comprehensively transdisciplinary because they are a description of the fundamental mechanics of natural law originating at the unified source of creation, the elusive unified field of natural law sought by quantum mechanics. (See Hagelin 1987 for more on the relationship between pure consciousness and the unified field.)

At M.U.M., we feel that even more important than the intellectual, transdisciplinary power of SCI is the provision of both subjective and objective experimental techniques that form the basis of an on going research program to verify the theory of consciousness

Maharishi provides in SCI. These techniques allow students and faculty not only to verify the theory experimentally, but to practically apply the theory for their own personal development and, through the Maharishi Effect, to positively influence society as a whole. Those educators interested in implementing interdisciplinary studies programs in their learning communities in order to broaden their students' awareness of life and allow them to develop the wisdom to view the situations and circumstances they face in life with this more comprehensive understanding, will therefore be heartened by one particular longitudinal study that has been conducted on M.U.M. students practicing the TM program.

At M.U.M. we have been using Jane Loevinger's test of ego development as part of our student assessment program for some years. In 1990, one of our Ph.D. in psychology students, Howard Chandler, took data from the 1978 M.U.M. first year class and compared it to follow-up data with these students six years after they graduated from the university (1988-89). As controls, he also compared the results with longitudinal data on students from Utah State University, and two other universities Loevinger has studied but that wish to remain anonymous-a respected midwestern liberal arts university, and a major northeastern technical university-who had been tested with Loevinger's instrument as part of different research projects in the 1970s.

Loevinger and others have associated individuals functioning in the higher stages of ego development with manifesting wisdom. Extensive research by Loevinger and others has indicated, however, that out of six possible stages, stage I-3/4 is probably the modal level for adults in our society and only a small percent of adults score at the highest two stages I-5 and I-6). This finding was confirmed by the data from the control universities in Chandler's study where only 3% of the subjects scored at the highest levels at post-test.

In Chandler's study (1990), subjects at M.U.M. scored higher at pre-test than subjects at the other three universities. Only 3% scored in the second highest stage at one of the three control universities (0% scored at this level at the two other controls). Nine percent of M.U.M. students scored in the highest two stages at pre-test, but this may have been because many of these students had already been practicing TM for some years before they became students. At post-test, 3% of the subjects from two of the control universities scored in the highest stages, whereas 38% of the M.U.M. alumni scored at these levels.

As previous research had indicated that ego development is fundamentally resistant to lasting modification due to the influence of enriched environmental or academic programs, Chandler concluded that the M.U.M. finding was the result of the unique transdisciplinary approach of TM and SCI that differentiates its curriculum from other

universities. He suggested that rather than approaching the development of wisdom with outside enrichment, techniques like TM approach the development of wisdom from the inside-directly unfolding the basis of wisdom, the broad comprehension associated with the regular experience of pure consciousness.

Integrating TM into the M.U.M. curriculum taps this resource during the student years. But even more important, because it is a self development technique that can continue to be practiced after graduation, the personal development initiated during the student years can continue even after graduation. One interesting contrast to this principle was seen in Chandler's research: the students at the mid-western university that accounted for the 3% of control subjects in the I-5 stage during the pre-test, had actually regressed to a lower stage during post-test. The implication of this finding is that for whatever reasons, the wisdom gained during a university education is not guaranteed to continue when exposed to life in society after graduation.

Conclusion

In this presentation I have indicated some of the theoretical and practical reasons why SCI can work as a means of enhancing communication across disciplines to aid interdisciplinary team teaching in learning communities. I've also described how the addition of Transcendental Meditation as a practice for both faculty and students can help realize a number of the goals of interdisciplinary studies programs and, in fact, general education goals as well, as we have experienced at Maharishi University of Management over the past 25 years. Objective evidence of the growth of wisdom, for example, is found in Chandler's study.

We're faced with many challenging problems in the world today. It is the global nature of these problems that has, in part, stimulated the increasing interest in interdisciplinary studies programs and learning communities. I would agree with Clark and Wawrytko, however, when they wrote about our universities: "...what is needed is not simply more information, cleverness, and technology, but rather an altogether different species of knowledge involving reflection, self-criticism, and wisdom" (1990, p. 4). I hope that the description of the role of TM and SCI in our curriculum, given in this session, has clarified the role they can play in communities of learning and interdisciplinary studies programs, of whatever size, to supplement and facilitate whatever other means we are already utilizing for developing these critically needed qualities in our faculty and students.

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