

Educational Implications of the Trinity Paradigm of Intelligence

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Abstract

The body of literature on human intelligence includes studies that stimulate human thinking and shed light on who we are as living entities and how we survive in complex situations. However, these studies lack one vital aspect of intelligence, the transpersonal aspect. A holistic approach would take into consideration the interdependence of the embodied mind and transpersonal dynamics of who we are and how we make sense of our day-to-day living and enactment. Therefore, the intention of this article is to explore a holistic approach to human intelligence and its implications for education in general and mathematics education in particular.

Key words: human intelligence, education, mathematics education, human development.

Introduction

Buddha saw into the nature of man during his enlightenment. He realized intuitively that his own true-self was intrinsically perfect, that all men are inherently perfect, i.e., every man possesses the potentials of perfection waiting to be actualized. He experienced the reconciliation of opposites—time and eternity, life and death, reason and intuition, hence, his doctrine of oneness. Man's function in the universe, Buddha concluded, "...is to awaken one's original-mind that has been covered over by the dust of intellection and delusions of the relative world, to identify with universal consciousness through self-realization" (Tart, 1992, p. 164-165).

Since the advent of psychometric ideology, the field of psychology in general, and educational psychology in particular, has been occupied with materialization and objectification of the nature of intelligence, the focus of which has been cognitive development. The cognitive approaches have helped *train* students at different levels of education to become *skillful* workers. Globally, as we enter the 21st century, skillfulness alone is not sufficient for survival. In the postmodern era, with declining occupational opportunities due to automation and technology, there arises a need for skillful workers who are critical thinkers, creative, intuitive, emotionally intelligent, responsible, moral, interdependent, and spiritual. Therefore, a unified concept of intelligence is needed for learning, understanding, and problem solving in this complex and ever-evolving world.

Review of Literature

Gardner (1993) proposed multiple intelligences theory including logical-mathematical intelligence. Ceci (1990), in agreement with Vygotsky and his successors (e.g., Bronfenbrenner), believes that one's intelligence depends considerably on one's particular lifetime experiences. Jantsch's (1989) self-organizing paradigm stresses the interconnectedness of natural dynamics at all levels of evolving micro and macro systems, which offers a new sense of meaning. Goody's (1995) elaboration on evolving human intelligence points out that there is a growing view that intelligence evolves as a product of social interdependence. Sternberg's (1985) triarchic theory explains the relationships among three different facets of intelligent behavior (i.e., individual's mental world, individual's experience, and individual's external world).

According to autopoiesis, proposed by Maturana (1980, 1981), the notion of cognition is extended to fully cover an organism's effective interactions. Acting is knowing and knowing is acting (Mingers, 1995). Human beings are communal beings. Cobb (1990) contends that whereas the modern theories propose that each individual acts from pure self-interest, the postmodern theory sees that

communities are interdependent. Similar to Cobb's idea, the autopoietic principles emphasize the autonomy of the individuals and their interdependence on each other. Humanistic psychology emphasizes the human capacity for goodness, creativity, and freedom. Monte (1999) expresses that humanistic psychology construes the human being as a spiritual, rational, purposeful, and autonomous creature. Although each of these theories may address some dimensions of intelligence, they lack a common-ground concept that includes all components of intelligence (i.e., intrapersonal, interpersonal, and transpersonal). Therefore a search for a holistic theory for understanding human intelligence is needed.

Exploring a Holistic Approach

Apart from many *experts* who believe that intelligence is what intelligence tests measure, a consensus, based on a review of literature, points to three main themes: (a) the capacity to learn, (b) the total knowledge a person has acquired, and (c) the ability to adapt successfully to new situations.

To explore the topic holistically, a qualitative research was conducted (Ghaffari, 2000). Internal Review Board approval was obtained. There were 48 participants from academic and nonacademic professions (N=48), age range 24-64. The interviews were audiotaped. The researcher analyzed the verbatim transcripts using interpretive phenomenological methodology. A transcript of the interview was sent to each participant to review and make necessary corrections and modifications.

Three main themes—intrapersonal, interpersonal, and transpersonal—emerged from this study. The first theme, intrapersonal, is within the realm of a person. Such a personal boundary encases and connects those elements that interact at the cellular, tissue, organ, and finally whole body function. The findings in this area correlate with the data that exist in the area of cognitive intelligence. A few examples are good organizational skills, analytical abilities, and mathematical abilities. Another subcategory relates to emotional functioning such as planning ahead, being passionate, and being motivated. From integration of the cognitive and emotional functioning emerge the next subcategories, which relate to learning and application of learned knowledge. Examples include the desire to learn continuously, the ability to transfer knowledge from one context to another, and the aptitude for survival. Another subcategory represents the attributes that deal with a whole person, such as being healthy, knowledgeable about oneself, and self-reflective. The emergence of the state of wholeness can be considered as a stage of self-initiation or freedom to a state of personhood. From this state, the attributes such as creativity, imagination, and innovation would be nurtured and freed.

The second theme, interpersonal attributes, represents interdependence and interconnectivity between the individual and others/environment. Examples are being a good friend, a good parent, articulate, artistic, able to relate to environment, able to adapt, altruistic, caring, able to make commitments, and loyal.

The third theme is transpersonal. These attributes include interconnection of one to oneself and then to friends, family, community, society, environment, and ecosystem through a realization of a sense of wholeness, which enables one the freedom to get closer and ultimately unite with his or her spiritual essence. The attributes in this category univocally express self-realization, such as knowledge of the art of living a human life, self-actualization, liberation of mind, and spirituality.

The main theme that emerged from the study is “interdependence,” the essence of the Trinity Paradigm of Intelligence (TPI). Accordingly, any actions, behaviors, intentions, and feelings that help in initiating, maintaining, and evolving the interdependence in three realms are considered “intelligent.”

Implication for Education

This paper focuses on the implications of this holistic approach for education. I will discuss why such a holistic approach is needed for creativity and intuition in learning. I will also briefly discuss the events and situations that impede their development. To illustrate my points, I start with a short

discussion on problem solving followed by the importance of problem finding. Then, I focus on the notion of emotion and intuition, and conclude with final remarks on the implication of my proposed holistic approach for education.

On Problem Solving

Mathematical ability has been recognized as a major category of human intelligence. This has been studied extensively from the psychometric and information-processing approaches to ability (Mayer, 1994). Psychological studies of higher-order intellectual functioning have focused on problem-solving strategies. There is increasing evidence that the higher level of mental operation involves a process of problem finding where creative thought has a great importance (Csikszentmihalyi, 1994). Due to the lack of a unified theory or an integrated, holistic theoretical concept of intelligence, many components and subcomponents of human intelligence functioning, including learning and mathematical abilities, have been partially investigated.

To explore the source of mathematics, Lakoff and Nunez (2000) examined the concept through multiple modalities (i.e., history of human evolution, cognitive science, culture, and neurobiology). They concluded that mathematics arises from our minds and our everyday experiences in the world. Human evolution and culture characterize the effectiveness of mathematics in the world, and that effectiveness results from a combination of mathematical knowledge and connectedness to the world. According to Lakoff and Nunez, "Mathematics is a natural part of being human" (2000, p. 377).

Overall, there are four stages in problem solving: (a) understanding and representing the problem, or *translating*; (b) selecting the solution, or *integrating*; (c) executing the plan; and (d) evaluating the results, or *planning / monitoring / reviewing*. A critical element in solving problems in school is accurately representing the problem. To search for a solution, two general procedures are possible, algorithmic and heuristic (Mayer, 1994; Woolfolk, 1990).

Since Plato, the major rationale for the teaching of mathematics was the development of mental discipline. The concept of mentalism eventually died down due to the rise of behaviorism. However, years later, Piaget's work established the basis for a constructivist perspective. Then, there were Gestaltists who were interested in higher order thinking and problem solving. During the mid-1950s, information processing and its approach to cognition appeared. By the end of the 1980s, the cognitive and sociocultural perspectives on human behavior were well on their ways. While the cognitive domain focused on knowledge of subject matter, concepts such as mathematics anxiety and student/teacher/general societal beliefs about doing mathematics were separated and designated to belong to the affective domain (Kilpatrick, 1992).

Development of mathematical thinking by emphasizing enhancement of conceptual knowledge (understanding) helps one to develop a broader perspective of his or her experiential world. While there is an abundance of research on mathematics problem solving and the related issues (National Council of Teachers of Mathematics [NCTM], 2000a), the problem-finding matter has received very minimal and much less attention. Problem finding is an important constructive process.

On the Importance of Problem Finding

Csikszentmihalyi (1994) asserts that the process of problem finding consists of:

- (1) it usually originates from an intrinsic desire to use a skill for its own sake, "without conscious aim,"
- (2) as the skill begins to be used, an interaction arises between the person and the medium (drawing, sculpting, mathematics, music, chemical experimentation, and so on), and
- (3) the person, reacting to the results of this interaction begins to organize and control consciously the emerging pattern, which may or may not suggest new possibilities and new problems. (p. 837)

The first systematic definition of problem finding was the work of Getzels (cited in Csikszentmihalyi, 1994). Getzels, after a broad review of related literature from Piaget to Guilford and Freud, developed

a model that consisted of 10 problem types. The model started with the problems ranging from *presented*, *discovered*, and finally *created* problems. Brown and Walter (1993) and Kilpatrick (1987) are among the researchers who advocate and stress developing a problem-finding (formulating) strategy that promotes the formulation of new problems by changing the conditions of a current problem. "Most creative achievements involve fewer degrees of uncertainty and consist of finding either novel solutions, or developing new methods, or discovering new problems, but not all three" (Csikszentmihalyi, 1994, p. 838). Critical thinking and intuitive understanding are essential in planning, performing, and evaluating in every life situation. To help students develop their critical thinking, teach them how to think instead of what to think.

Davis (1995) states that "the key to a good solution is identifying the real problem that needs to be solved" (p. 1). To help mathematics education faculty to provide relevant educational experiences that prepare graduates for successful careers outside of academia, and to help industry make better use of the productive potential of mathematics, Davis (1995) conducted a study and interviewed 26 industrial mathematicians. While many students in fields such as mathematics and engineering capitalize on their learned formulas and knowledge of specific subject matter in order to succeed in real-life situations, what emerged from Davis' study revealed that the defining criteria for success are more cultural than purely intellectual.

These are a few examples illustrating that mathematical intelligence, which for a long time was considered purely cognitive ability, in fact goes beyond that to include cognition, intuition, culture, and emotion. Therefore, the TPI encompasses all these aspects and helps us help our students deepen their understanding of mathematical concepts.

On the Notion of Emotion and Intuition

Cognitive and emotional activities occur together. Intuition ensues from their interactions. Experience plays a fundamental role in shaping intuitions. Insight and intuition are referred to as "higher mental events" (Bastick, 1982). Monsay (1997) listed the following types of intuitions: physical, visual, spatial or geometric, sensible, kinesthetic, and intellectual. Bruner, cited in Noddings and Shore (1984), was one of a few educators who considered the important role of intuition in education. He defined intuition as the act of grasping the meaning/significance/structure of a problem without explicit reliance on analytic means. Similarly, according to Poincare, cited in Kilpatrick (1992), "It is by logic that one proves, but it is by intuition that one invents" (p. 7).

What is the role of mathematics in one's transcendence? McFarlane (1995; cited in Visnu, 2002) states, "There was a common belief among ancient cultures that the laws of numbers have practical meaning as well as mystical and religious ones. For example, for Plato and Pythagoras the primary function of the intellect was spiritual realization and mathematics first and foremost was a spiritual activity. "Spiritually advanced cultures were not ignorant of the principles of mathematics, but they saw no necessity to explore those principles beyond that which was helpful in the advancement of God realization" (Visnu, 2002, p. 1). One such culture is the ancient Indian civilization and its Vedic mathematics. Unlike Greek mathematics and its position that knowledge was for its own sake, mathematics in ancient India served as a bridge between understanding material reality and the spiritual conception. Visnu, elaborating on the gist of the Vedic worldview regarding the culture of knowledge, says, "While culturing transcendental knowledge, one can also come to understand the intricacies of the phenomenal world" (p. 3).

Mathematical ability is one of the major categories of human intelligence. Intelligence is where our thinking, feeling, and acting originate. Since ancient time, the concept of intelligence has been a matter of interest and fascination for many researchers and philosophers. Unlike cognitive and information-processing theories of intelligence, the Trinity Paradigm of Intelligence addresses all aspects of mathematical ability including spiritual aspect.

Implication of a Holistic Approach for Education

Culture, social interaction, and communication have a profound impact on the development of human intelligence. Current research supports the claim that a child's home, school, and community help direct the child's intellectual development by providing and/or constraining the child's opportunities both to practice and develop specific intellectual skills, and to gain familiarity with and develop experience in a specific knowledge area. Parents may contribute to their children's intellectual development through a genetic component, through direct interaction with the child, and through indirect communication. Schooling provides children with the opportunities to learn strategies for solving selected types of problems. The question many researchers are currently addressing concerns the ability to connect the skills learned in school to problems arising in other contexts, such as work environments.

What is the effect of education on one's intellectual development? There is an abundance of research that shows the relationships between a school's culture and students' achievements (D'Ambrosio, 2001; Frankenstein, 1995; NCTM, 2001a, 2001b, 2001c; Ogbu, 1987; Secada, 1992). However, my conceptualization of intelligence is a holistic one. Therefore, this description and interpretation are much broader. Here, I am not considering one's achievements in school but achievements in life, survival and adaptations, prosperity and transcendence. Education, in general, does greatly affect one's intellectual development at all three of the constructed categories (i.e., intrapersonal, interpersonal, and transpersonal). Therefore, an inadequacy in education will directly ascribe to one's failure at school as well as in any other context. For many years, scientists focused most of their work on cognitive abilities. However, as explained earlier, it is impossible to separate cognition from emotion. This entire complex is like a web of connectivity and relationship, headed by the *executive system* in the prefrontal cortex. The prefrontal cortex is responsible for self-control and is closely linked to motor planning areas and to the emotional limbic system. Physical experience helps integrate the emotional and executive system. Children need a multisensory and enriched environment to help them develop this complex system (Healy, 1998). Emotional contact plays a critical role in human learning. Strong emotional experiences, a kind word, or an enthusiastic response from a teacher or parent strengthens the memory of what is being learned (Healy, 1998).

A person's current potentials and cognitive abilities are products of development and interactions in many areas, including one's genes and environments. Interpersonal skills and social intelligence will develop as a result of social interactions. The TPI addresses both of these realms, intrapersonal and interpersonal. It helps educators to be cognizant of them, helps their students develop these characteristics, and helps educators to draw out or unfold students' latent potentials.

Transcendent enactment is defined by Jourard (1966) as "a release of latent potentialities, of capabilities to perceive, invent, create, achieve, endure or perform . . . in most people these capacities lie buried under the 'crust' and inertia of habit, rigid role definitions and confining self-concepts" (p. 353). As discussed earlier, intelligence is comprised of the three components of intrapersonal, interpersonal, and transpersonal. They represent physical interdependence, social interdependence, and spiritual interdependence, respectively. Delineating the concept further, for an individual to be considered intelligent, he or she must be in the process of initiating interdependence, establishing interdependence, or supporting and maintaining interdependence at each state of embedding. In our schools and society, each step of this process requires a knowledgeable teacher and/or caregiver who can provide adequate physical, social, and spiritual opportunities. Thus, as soon as individuals, as a result of their own thinking/feeling, deciding, and acting, interrupt the three-stage continuum—and there are no constraints or limitations imposed upon them—they may not meet the intelligence criteria.

Competition and individualism have been topics of debates and arguments among members of different cultures. The point we would like to make is that competition along with mutualism has been and will be the secret to survival of members within and in between species. However, when such competition and individualism refer to self-survival at the cost of ignoring others' rights and jeopardizing others' existence, then it becomes pathologic. Salingaros (1998) explains, "A central component of the human intellect is the ability to establish connections" (p. 2).

Taking into consideration the above, what would be the characteristics of an educated person of the 21st century? Schafer and Amenta, (1995) suggest the following: The educated person of the future

should embody such virtues as holism, altruism, and environmentalism, and should be creative, cooperative, circumspect, and egalitarian. Our perspective on a holistic approach to human intelligence helps in the cultivation of all of these attributes, and helps one to transcend. The human possesses energy or potential (intelligence), which, through the process of becoming, will be actualized; the human enters the circle of being(s) and becoming again. This evolutionary process will continue; subsequently, being becomes becoming and becoming becomes being and so forth. The goal or the purpose is simple and clear. Yet, its process is very complex. It is no wonder that experts in the field of human intelligence, at times, are not clear as to the nature of this potential and its higher actualized states.

Implications of this holistic approach for education include: (a) that all learning and understanding is inherently cultural and social activity of people; (b) that an individual is an organizationally closed entity, which means the individual has his or her identity because the individual is an autonomous entity who has a history of interactions and communication with his or her surroundings; and (c) that a holistic approach to education includes an embodied mind, feeling, enactment, and interdependence. In this sense, an intelligent being recognizes and values the importance of relationship, connectivity, and responsiveness to others' needs. Developing such sensitivities and understandings enables one to become more proactive and see his or her coexistence with the other beings. This is the essence of the holistic approach to the notion of intelligence, according to the Trinity Paradigm of Intelligence.

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