INTUITIVE THOUGHT IN PROCESS KNOWLEDGE: IMPLICATIONS FOR CURRICULUM THEORIZING

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TABLE OF CONTENTS

CHAPTER I

EXCELLENCE IN EDUCATION:
A HOLISTIC PERSPECTIVE

Introduction

The social, political, and economic changes that took place in the nineteenth century greatly influenced the path curriculum followed in later years. During this era immigration threatened the values and norms of middle America. Scientific management theory, designed for efficiency and control in the work place, developed in response to rapid industrial growth. In reaction to these events, educators and social scientists of the time produced a culturally conservative technical model for curriculum study that reflected the school as an institution of acculturation and economic adjustment (Kliebard, 1975; 1988).

Two influential proponents of this conservative technical model were curriculum theorists John Franklin Bobbitt and W. W. Charters who adapted and applied principles of scientific management to the schools (Kliebard, 1988). Continuing in this tradition, Ralph Tyler viewed the instructional program as a "functioning

instrument of education," and proposed ways to formulate, organize and evaluate educational objectives chosen for the curriculum (Tyler, 1949). More recently, Madeline Hunter, Barak Rosenshine, and Lee Cantor herald this approach to educational practice with effective teaching strategies that emphasize direct instruction and external reinforcement.

The philosophies of these curriculum specialists illustrate how our educational system, modeled on industrial efficiency and a belief in cultural amelioration, pays homage to reified "scientific" solutions for the problems in our schools. From this, we see that educators distort the logic of science by their desire to control and predict curricular practices. The ability to record and report what is observed is taken beyond its domain of validity to deny that there are additional factors that make up the whole of reality. Reality, thus conceived, becomes an absolute phenomenon viewed largely as quantifiable and objective, and science becomes a strictly empirical endeavor known as scientism.

Contemporary followers and others of this tradition rally together under the banner of EXCELLENCE IN EDUCATION. Excellence is the buzz word upon which the educational movement in the 90's hangs its hat. Eisner (1985b) maintains that proponents believe that excellence promotes rationally guided action that delivers the highest form of skill in the teaching arena. Unfortunately, this narrow definition of excellence is couched in an epistemological

framework that dismisses the speculative knowledge of aesthetic insights into the tacit foundation of knowledge. Furthermore, the limited notion of excellence characterized through the implementation of such curricular practices as accountability standards, quality control, time on task, and mastery learning, does not bring about true superiority in the learning process. The result of this limited interpretation is the reification and reduction of curriculum into inert pieces of information that hold little meaning or value.

This fragmented piecemeal approach to curriculum heavily influences not only what we teach but how we teach. Furthermore, our preoccupation with quantification that manifests itself in excessive student achievement testing and the implementation of accountability standards stifles the quest for knowledge. It is assumed from this posture that knowledge of what is "out there" is obtainable only through scientific means and that learning takes place through the transmission of information. This position poses challenging questions that for our very existence may not be ignored.

A reconsideration of the conservative technical model of excellence presents solutions to these pressing questions. A new vision of curriculum theorizing occurs when we consider the possibility that "understanding of reality lies beyond the capabilities of rational thought" alone (Zukav, 1979, p. 38). While rational thought that

remains within its realm of validity is necessary for the understanding of reality in general and curriculum theorizing in particular, alone it is inadequate and severely limited. Thus, when we look outside rational concerns, we meet with the components of the aesthetic domain. These elements composed of the raw material of our intellect, our intuitions, emotions, feelings, and imaginative possibilities, contribute a qualitative definition to experience that serves to heighten awareness. This added dimension offers to actuality the ability to go beyond thought based in commonsense everyday habits of mind that emerge from a solely felt and seen reality. In addition, it counters and softens our desire to observe and measure through exclusively quantitative means and suggests that this type of restrictive inquiry is no longer appropriate for the world in which we live. The very nature of the universe makes it infeasible to predict how an idea will unfold. As soon as we begin to question, to probe, the idea changes. "What we observe is not nature itself, Heisenburg states, but nature exposed to our method of questioning" (cited in Saltz, 1990, p. 392). There is no way of looking at the forest except by the light of our own reason, and this light determines the particular kind of forest seen" (Pearce, 1971, p. 133).

Thus, while the logical, rational methods by necessity make up a portion of our inquiry process, I argue that it is the acceptance of the light of our own reason, found through

the aesthetic domain and afforded equal stature in constructing knowledge, that permits a different vision of excellence to shine. The knowledge that emerges from the reappraisal of excellence promises the capacity for intuitive insights to enrich our lives and counters the inability of a conservative technical model mired in scientism to go beyond strictly empirical information. The limitations inherent in this mode of inquiry stifle rather than develop the ability to "see" more deeply into the world and ourselves; consequently, from this position we restrict the fulfillment of the native desire to inquire and the reflective critical responses that occur in search of an inner truth that harbors meaning. Thus, the union of logical and aesthetic dimensions is necessary to produce a wholeness that transcends the short-sighted inadequate view of excellence to promote, instead, a search for what is real, true, and beautiful in life.

I postulate that a new conceptualization of excellence results in a transformational process. Reality emerges as a dynamic structure, a continuous synergistic unit that ultimately redefines the mission of education. Salient to the notion of education from the new perspective is Eric Jantsch's (cited in Haggerson, 1988) stream metaphor. Jantsch suggests "the stream, in four separate applications, portrays multiple realities available to curriculum theorists, teachers, and students" (cited in Dobson & Smiley, 1992, p. 7). It is the third image that is

appropriate for this dissertation. Curriculum theorizing in this sense involves the "subject as both source and agent of the stream, the subject and object. This image is one of changing reality" (p. 87). Learning in this manner becomes an educational experience of heightened vitality (Dewey, 1958) as opposed to an act of reconstructed doing. It is here we enter into relationships where being is constituted by becoming (Oliver, 1989). Thus, a simple event touched by the conditions of its being opens paths of complexity in its becoming that reflect new vistas and evolve into patterns that mirror the complexities of reality. From this, curricular decisions, of both students and teachers, are concerned less with beginning and end, and emphasize instead the event. The objective of learning becomes growth oriented and invites diversity and creativity. Work undertaken from a subjective perspective, guided through an internal locus of control comprised of intuitions, insights, and imaginative possibilities of the aesthetic domain, results in decisions that reflect grounded values and dispositions. This educational strategy promotes what Purpel (1989) believes to be the "critical and creative consciousness that contributes to the creation and vitalization of a vision of meaning" (p. 28).

This transformed vision is about looking for evolving patterns and questioning absolute reality; it brings us to the realization that there is no "My Way" that is separate from the world around us (Zukav, 1979). Instead, it fosters

coming to know in the educational process through the emergence of personal feeling, knowing, and doing inherent in occasions that occur when the similar joins with the dissimilar and unites at a deeper emotional level. Jantsch (cited in Haggerson, 1987) calls this the evolutionary paradigm. The subject shapes in his\her image by virtue of feeling and being an agent of evolution, "of sharing the essence of universal motion..." (cited in Haggerson, 1987, p. 87). Object and subject flow together in an evolutionary approach that empowers their unity. This cooperative, relational perspective brings to the construction of knowledge a unifying wholeness.

Matters of curriculum thought require the construction of knowledge. How we construct that knowledge is essential to the final form produced. When we look at the experience from a holistic perspective, as a unification of logic and aesthetic, an active, spiritual, emotional, and open ended process, we emancipate the desire for knowledge. The new vision of excellence embraces this belief. It deals not with knowledge in the traditional sense but with knowledge that begins as intuitions, vague sensibilities, feelings, and inarticulate thoughts (Oliver, 1990). This knowing is more than a collection of inert facts; rather, based in Polanyi's (1966) tacit dimension, the process of indwelling born through logic and aesthetic, grasps the parts and molds them into a comprehensive whole. From this emerges a three dimensional form that stores and later recreates and evolves

into a holographic image that perpetually reflects the kaleidoscopic process of becoming. Excellence in education requires curriculum to reflect the belief that it is understandings of the interdependent fluid relationships between these two essential parts of coming to know, the rational and nonrational, that organize experiences into emerging aspects of reality.

From this perspective, the new paradigm's evolving forms of reality bring about basic alterations in the manner in which we view truth. Personal truth is the foundation upon which human values arise. It is either explicitly or implicitly a map of the nature of reality and what comprises our roles. Education is a conveyor of this truth and plays a vital part in what we perceive to be of value. A shift in human views of reality and self forces change in our beliefs about truth. Thus, rational thought and observation alone can never construct truth in the new order. This assumption of truth mirrors the reductionist view of the world. Instead, a consideration of all systems and their interrelations as they flow together provides a coherent framework from which we may find more appropriate truths for mankind. "As Bohm and Prigogine... demonstrated we must speak of an ecology of particles,... new forms that transcend their components" (Schwartz, 1979, p. 404). In curriculum thought, we must shift from the idea of one truth toward belief in the plurality of perspective, that there may be a myriad of truths, and alternative ways of knowing.

Two types of knowledge frame the multiplicity of approaches to truth. Schools pursue the factual, verified by logic and scientific methods, but disregard the knowledge of understanding, the intuitive feeling aroused when we contemplate some distant event or try to empathize with another human being. Maritain (1953) speaks of these as speculative and practical knowledge. Practical knowledge known through rational processes offers clarification and enlightenment of purpose. It directs thought toward an immediate method of action toward an attainment of an end. Speculative knowledge is demand for freedom of thought which seeks complete understanding. Born of the intuitive mode, it is knowing through inclination, inspiration, or imagination; it is looking at and relying on inner bents or emotions in the creation of reality.

> Emotion raised to the level of intellect through which reality is grasped becomes a determining means, an instrumental vehicle through which the things which have impressed this emotion on the soul, and the deeper invisible things that are contained in them or connected with them, and which have ineffable correspondence or coaptation with the soul thus affected and which resound in it are grasped and known. (Maritain, 1953, p. 123)

Thus, the quest for truth in an educational system characterized by the transformative process involves that which is emergent from an interconnected reality, based in

the aesthetic domain, influenced by values, and defined through participation and direct experience. From this creativity of spirit emerges a subjective-objective ontology. "The essential need for the individual is to create, but he cannot do so without passing through the door of knowing of his own subjectivity. This is inseparable from the grasping of objective reality of outer and inner world" (Maritain, 1953, p. 115). Truth derived from knowledge formed in this manner is reborn in our imagination and projects into life our emotions and perceptions that are integral parts of human experience; consequently, we gain a greater awareness and ability to understand the totality of the universe and ourselves as part of that entity.

The regard we hold for the totality of the universe mirrors our aesthetic insights. It reflects the manner in which we involve ourselves in conscious cooperation between inner self and outer world resulting in a dynamic relationship. This process called "worldmaking" involves "learning in the widest sense" (Cobb, 1977, p. 66); it culminates in the understanding that reality, organized around the concept of self and nature as relational aspects of reality, have a common formative purpose. In curriculum theorizing as an evolutionary process, we come to understand that the learner is also an open system, interacting with the environment, integrating, reordering his or her worldview, to incorporate the new.

The creation of a world image is ultimately a search

for form. To produce form, a product of one's own inventiveness, is the central aim of personal knowledge construction (Eisner, 1985c). The adherence to a process philosophy for curriculum theorizing ensures that the form created is not an ends-in-view, single-minded proposition, but, rather, a mind's eye view held as an image (Eisner, 1985b). The holographic figure is an appropriate metaphor for producing such a form because it adds a dynamic quality to the process. The information that resides in all parts of the image creates a vast network of patterns characterized by complexity and mutual causality. With these conditions exist the ingredients for qualitative change, where new structures arise out of the old. Form seen as a multi-dimensional structure, produced through knowledge derived from the conjunction of rational processes and aesthetic logic, elevates the creation to the status of true excellence.

The acknowledgment of the unified plurality in the construction of knowledge and our knowing is central to the commitment of true change in education as well as the intellectual efforts of the curriculum theorist. The traditional one dimensional view of knowledge is no longer appropriate to measure excellence and success. This obsolete viewpoint diminishes the learning process and thwarts excellence through prescriptions that shackle our efforts to use our innate logical and intuitive abilities in the construction of our world. A shift in humanity's image

of reality and self demands the acknowledgment of the aesthetic domain with the logical process in knowledge construction. This dimension acts as an inner ear and eye and makes available the vast reservoir of our tacit understandings (Noddings, 1984). It also presents the moral dimension that implies responsibility for the consequences of action. These intuitive insights offer a new perspective, what J. C. Pearce (1971) calls an autistic process, Eisner (1985b) believes is the educational imagination and John Dewey labeled flexible purposing (in Eisner, 1985b), that acts on all possibilities. It is lateral thinking intertwined with the horizontal or logical in the construction of knowledge that inspires new ideas and ultimately offers a transformed reality.

Purpose of the Study

The study of education, Eisner (1985b) asserts, does not need a new orthodoxy; instead, he maintains "a variety of new assumptions ... that will help us appreciate the richness of educational practice, that will be useful for revealing the subtleties of its consequences for all to see" (p. 23) should be employed in our inquiry process. The overall purpose of this study is to pursue such an ideal. Because this endeavor is theoretical in nature, no hypothesis is offered; rather, through the reconsideration of the conservative, technical notion of excellence in education, it is the researcher's aim to propose a unique

vision of excellence.

The new, more meaningful perspective derives from the acceptance of the aesthetic domain, comprised of our intuitive understandings, as an integral part in the construction of knowledge. It is my belief the addition of this dimension as an equal and integral aspect in the construction of knowledge yields a qualitative component to experience. The heightened awareness could bring about transformation in education. Thus, the intent of this dissertation is to pursue an understanding of the implications of this view of excellence.

Basic Assumptions of the Study

This study is grounded in the belief of the necessity of the integration of reason and intuition in the construction of knowledge. The union of logical and aesthetic brings about a transformation in the current educational posture. Underscoring this philosophy, this work is based upon the following assumptions:

1. There is an inner connectedness of reality and a fundamental unity inherent in the universe. This unity, expressed as process, is a dynamic interaction between the parts of the whole working in cooperative interdependence.
2. Humankind, an integral part of the universe, seeks to cultivate this unity through the use of feelings, perceptions, insights, and intuitions. The rational

mind alone cannot fully grasp the wholeness of reality.

3. Our knowledge is limited in that our intrusive inquiry changes the very nature of reality. The process in coming to know involves an interactive relationship between the observer and the observed.
4. The unity intrinsic to all parts of the Universe rejects the idea of analyzability of the world into separate and independent parts (Zukav, 1979)
5. There is a natural flow found within our universe. That this flux within systems is non-linear, noncausal and non-deterministic is a generalization around which we must weave our philosophical systems.

These beliefs form the links that connect one's reality to the fundamental totality in nature. They also express the essential part the intuitive aesthetic abilities play in interactive thought processes that must be utilized to complete the whole of coming to know. Curriculum viewed as a multiplicity of systems, working interdependently in dynamic unity, is better able to search for answers to epistemological, ontological and axiological questions that arise in the construction of knowledge.

Organization of the Study

The remainder of this dissertation concerns itself with developing the concept of the relational nature of rational and intuitive modes of knowing. It is organized into four chapters. They are arranged in the following manner:

Chapter Two. "The Trivialization of Education" presents a brief historical account of the scientific revolution and the resulting effects of the Cartesian-Newtonian reality. In addition, this chapter deals with the consequences of an exclusively empiric-analytic view of nature that became known as scientism. It explores how this concept has become the "modus operandi" of all curricular practices today. Also presented is the impact and influence this world-view has had on the construction of knowledge.

Chapter Three. "Intuition and Knowledge" specifically examines the importance that the aesthetic mode, made up of intuitive insight, plays in the construction of knowledge. Utilizing Agyakwa's (1988) models of intuition as legitimate sources of knowledge, the beliefs teachers and students hold on the importance of intuition in the construction and nature of knowledge is related. Also presented are the ramifications of wholeness of thought found in the acceptance of rational and nonrational domains.

Chapter Four. "An Inquiry Into The Work of Alfred North Whitehead" investigates the Philosophy of Organism. This section establishes a philosophical base for an alternative paradigm where learning is experienced through the interaction of the logical and aesthetic domains. It is within this open system that a process theory of education may emerge.

Chapter Five. "New Visions in Curriculum Theorizing" offers suggestions for an educational transformation that

provides a framework from which new aspects in curriculum theorizing emerge. This new vision proposes a process perspective, based in Whitehead's ontology, that accepts the rational and intuitive as a dynamic system that brings about wholeness of thought. Through a new conceptual understanding of the nature of knowledge, nature of learning, nature of the learner, and nature of society, curriculum theorizing focuses the educational vision on an ecological spirit that accepts multiplicity in the construction of knowledge and thus constitutes the true method of excellence.

Statement of Intellectual Integrity

The theoretical nature of this study functions within a domain of validity. Phenomenological studies are a search for the core of human experience. Willis (1991) proposes that phenomenological inquiry "strives to communicate what is primary within the experience of individual human beings through the best possible examples" (p. 176). Much of this knowledge may be known only through aesthetic insights, thus, the interpretation and communication of these understandings encompass the domain of phenomenological research. Initially, we must understand that what we consider to be intuitive is subject to influences from our culture; consequently, "these perceptions [may become] tainted by our own meaning" (Willis, 1991, p. 176). In addition, we are taught through the theory of relativity

that one individual's interpretation of meaning may be entirely different from another's. This phenomenon is due to individual perspectives and world views. Language further confuses meaning. Kuhn (1962) speaks of incommensurability, the inability of language to translate effectively across paradigmatic borders. When we attempt interpretation, meaning becomes distorted and confused. Complicating this issue further, is the notion of confirmational bias. The way we inquire determines what is seen. Furthermore, when we inquire into nature we must remember that the multitude of complex systems that comprise reality are dynamic and open to continual change. This impedes the ability to propose absolute solutions. All of these cautions must be taken into consideration when inquiring into the workings of nature.

CHAPTER II

THE TRIVIALIZATION OF EDUCATION

Introduction

Science, the study of natural phenomena, is as old as man. Its progress follows the development and intellectual achievements of humanity through history into this century. Initially, early beings, concerned with survival, looked to nature as a mysterious entity to be conquered. As humanity's ability to survive increased and the responsibility for bare necessities diminished, attention turned to control of the environment. The concern for domination and manipulation of nature was the impetus that provided the motivation for the advancement of societies. Science became the vehicle through which man attempted to control nature and learn of its mysteries.

Today, we enjoy the fruits of the labor of science. The discoveries and inventions amassed throughout history are prodigious. We have the capability to send individuals into space or create artificial intelligence systems that heretofore existed only in science fiction. Medical science repairs the human body and cures diseases that formerly decimated the human race. Science, thus conceived,

culminates in what should be considered its ultimate expression.

While the products of scientific study are a wonderful gift, it is, however, what we do with our science that counts. Berman (1981) suggests that the modern era is characterized by a progressive disenchantment with nature caused by the inappropriate application of science. He asserts that from the 16th century the reference points for science have been matter and motion, a mechanical philosophy that ends with a reification of reality where everything including the self becomes objectified in an inhospitable environment that is not of one's own choosing or making. He asserts, "the cosmos cares nothing for me, and I do not really feel a sense of belonging to it. What I feel, in fact, is a sickness in the soul" (p. 17). Unfortunately, this state of affairs has led to a split between fact and value rooted in the scientific revolution (Berman, 1983). Thus, from this perspective, "scientific consciousness is an alienated consciousness" (Berman, 1983, p. 17).

Wilbur (1983) asserts that this disenchantment of nature is due to the limitations placed upon science through its having committed a "category error"; it looks only to the empiricistic and analytic thought in irreducible fact to ascertain its truths. Thus, Wilbur (1983) states:

> [It is through category error] the sole criterion of truth came to be the empiric criterion that is to say a sensorimotor test...usually based on

> measurement....[and] the empirical verification principle came to apply not only to the eye of the flesh [irreducible facts] which was valid, but to the eye of the mind [self evident or axiomatic truths], and the eye of contemplation [relavatory insights]. (p. 23)

In this manner Whitehead maintains "modern philosophy [was] ruined. (cited in Wilbur, 1983, p. 23). How did we reach this one-sided perception of reality? To answer this question a review of the historical underpinnings of Western science becomes necessary.

Historical Traditions

The beginnings of Western science characterized by the urge for material and intellectual attainments and advancements may be traced to early Greece. Here, Eisler (1988) holds, was the first known secular, scientific approach to reality. Knowledge was no longer received through divine revelation, but was gained through empirically affirmed and disproven facts. Abstract thinkers such as Phythagoras, Heraclitus, and Parmenides offered to civilization diverse views of reality (Siu, 1957). Heraclitus and Pythagorus viewed reality as a dynamic world characterized by harmony. One of the central principles governing this view, Eisler (1988) reports, are the cycles of nature that occur with observable regularity. Berman (1981) describes this as an enchanted cosmos characterized by a participating consciousness that indicates an

identification with one's surroundings. Alternatively, Parmenides viewed reality as stable and changes to be illusions of the senses. Whatever the view, these early scientists pursued theoretical and speculative thinking in an effort to discover "the essential nature or real constitution of things (Capra, 1983, p. 6).

It is from this context that the philosophies of Socrates (470?-399 B.C.), Plato (428-348 B.C.), and Aristotle (384-322 B.C.) established the basis of the western view of the Universe for 2000 years. Little is known of Socrates except through the writings of Plato. Here his Socratic method of questioning, the use of discovery to abet investigation, and his quest for virtue were detailed (Schubert, 1986). These ideals heavily influenced later Greek thought.

Plato, a student of Socrates, widely influenced the nature of knowledge in western thought, and this has ultimately been expressed in our curricular practices. Plato believed in a rationalistic metaphysics and ontology where absolute forms or ideas, not content of things, were most real. He aspired to build a society not on materialism but through the "emulation of lofty abstractions such as justice, virtue and truth - entities (or ideas) that exist only in a realm of being that transcends sense [data]" (Zais, 1976, p. 131).

The real world for Plato is a nonmaterial world not the domain inhabited by our physical being. It exists first in

nonmaterial form, which encompasses the most perfect and absolute state of being, removed from this physical world; in material form, an imitation of the real, but found in this world; and in the form of an imitation of an imitation, such as a picture (Zais, 1976). These forms of being extend to all things. The absolutely real entity along with abstract knowledge exists in nonmaterial or idea form in the other-world of ideas, not in the world of our senses (Zais, 1976). Since this world of entities or ideas of the soul, fixed and unchanging, constitutes reality, the world of appearance or sense experience is considered a copy of reality and may be transcended through philosophical thought (Doll, 1983). Platonic philosophy embedded in such idealism tends to deal more with the subjective future away from facts toward theories and generalities about reality (Biggee, 1982). Consequently, a cultivated intellect, to some degree, reaches these truths of reality since the mind need only recall knowledge that it holds (Biggee, 1982).

To this end, Plato "saw education as essential to the development of the republic... and... a process by which the wisdom of preceding generations is passed along to succeeding generations (Schubert, 1986, p. 56). Using Socratic methods, and belief in mental discipline, Plato attempted to awaken in his students absolute knowledge that preexisted within the soul (Maritain, 1943). Furthermore, the ability to learn these truths was the responsibility of unaided reason through contemplation that ultimately

delivers a grasp of man's place in the universe.

This line of thought was not totally abandoned by Aristotle; however, unlike Plato who taught the physical universe was an imitation of reality, Aristotle believed this world to be the "genuine realm of existence" (Zais, 1976, p. 137). Aristotle held the physical universe to be made of matter and form. These two ingredients in various amounts and combinations comprised the entities that make up reality. Aristotle believed, however, that is was the "form that [brought] meaning and purpose to matter and constituted the principle upon which the nature of reality was based" (Zais, 1976, p. 137). Thus, Aristotle maintains that form is the universal attribute of each and every entity. Through form one finds knowledge of the real, and consequently, knowledge of the good. From this deductive state in Aristotelian logic, the search for knowledge becomes, Zais (1976) maintains, an inductive one. He asserts:

> [The search] begins with the senses and the observation of particulars, and proceeds by the use of reason to the discovery of generalizations. These generalizations... should not be construed as hypotheses or constructs invented by the intellect. Rather, they comprise the conscious intellectual appropriation of the very nature of reality-that is the conception of pure form. In culminating the discovery process, the intellect is said to have laid hold of

true and absolute knowledge. (p. 137)

From this a new science, logic, the art and method of correct thinking to deal with objective reality, was initiated. This became the dogma that formed the terminology of modern science (Durant, 1962).

While Greek philosophy influenced Western thought patterns in its idealistic and rational nature, the church prior to the Age of Reason also had great influence upon the nature of knowledge. Supernaturalism became the dominant principle. Absent from this era was any vestige of empirical or analytical thought. The knowledge most worth knowing during this time endured within the human soul. The singular function of knowledge was for the propagation of Christianity. All contemplation was directed toward aspirations of a religious nature; consequently, the church held tight control over every aspect of life. Thus, the models of human thinking from Greece, and the influence of the church were the major precursors to the scientific revolution.

The Scientific Revolution

The 16th and 17th centuries saw great changes in the way the world was perceived. These changes were derived from the revolutionary advancements made in physics and astronomy. Specifically, the scientific discoveries of Nicolas Copernicus (1473-1543) and Galileo Galilei (1562-1642), the revolutionary method of inquiry proposed by

Sir Francis Bacon (1561-1626), and the impact of Rene Descarte's (1596-1650) revelations set the stage for the emergence of the Newtonian world view that imposes upon reality the mechanistic deterministic framework within which we live.

The scientific revolution began with Nicolas Copernicus, an Italian, who rejected the accepted notions of man's position in the universe, formulating instead a new perspective. Specifically, he refuted the views of Ptolemy, hypothesizing, alternatively, a heliocentric theory of the universe. This theory was a departure from the belief in a finite world as it speculates on the infinite nature of the universe. The consequences of this hypothesis were grave. Not only did this displace man from his position as the center of the universe, but it removed humanity as the chief design of God's creation. This deeply offended the church and thrust a wedge in the scientific community; however, it opened the door for further advancements in science. Here was the first glimpse of explanations of events being presented "in terms of the mechanical and mathematically describable, motion of inert matter. Nature is seen as so much stuff to be grasped and shaped" (Berman, 1981, p. 54). Scientists no longer asked qualitative questions; rather, reason reflected instrumental purposes and there continued from this point an emphasis on production, prediction and control (Berman, 1981).

It was Francis Bacon, an Englishman, who proposed the

method through which the pursuit of science was to proceed. Bacon, also known as the father of the scientific method, believed "that knowledge, except that which fell under the jurisdiction of the church, should be subjected to critical analysis and empirical verification" (Schubert, 1986, p. 64). As a result of this assertion, Bacon formulated the theory of inductive reasoning. He believed we should "put nature to the rack" because of its inferiority to us, enabling us to push the parts around (Smith, 1984). His desire to control nature is further documented by Capra (1983) who cites Bacon's desire to "hound nature", "bind her into service" and "make her a slave" (p. 56). Through these methods of inquiry, Berman (1981) maintains, that Bacon opened the door to the mechanical arts where "[he] leaves no doubt that he regards technology as the source of [a] new epistemology" (p. 30).

The major Baconian legacy lies in the overall structure of the scientific method and the notion of the questioning and manipulation of nature under duress (Berman, 1981). This injects a new interpretation into the nature of our scientific inquiries. Rather than pursuing science as a religious question, the goal became one of dominance and control (Capra, 1983). According to Berman (1981), it is this empirical image of Bacon, the overemphasis on data collection, and the attack on speculative thought that translates the scientific method of Baconianism as synonymous with the identification of truth with utility.

Thus, the desire for manipulation in the "Baconian" spirit changes the very character and intent of science.

While Bacon set forth his scientific method, Galileo, an Italian, also known as the father of modern science, was the "first scientist to combine experimentation with the use of mathematical language to formulate the laws of nature" (Capra, 1983, p. 55). Credited with the formulation of the laws of planetary motion and the invention of the telescope, Galileo's inventions and discoveries supported the views of Copernicus and put the old world view of the Greeks to rest. The Age of Reason had arrived in all its glory.

Galileo's discoveries greatly influenced Western thought. According to Capra, (1983) Galileo believed that to understand philosophy we must first master the language (mathematics) and characters (geometry) in which it is written. To make this possible, Galileo maintained scientists should restrict themselves to that which could be measured and quantified. Psychiatrist R. D. Laing asserts that this method of directing attention only to the properties of objects that are observable and measurable discredits a myriad of other properties including all forms of emotional and ethical feelings and sensibilities that derive from the aesthetic domain (cited in Capra, 1983). This one-sided view of science has been perpetuated throughout history and Laing states, "hardly anything has changed our world more during the past four hundred years than the obsession of scientists with measurement and

quantification" (cited in Capra, 1983, p. 55). This desire to define empirically combined with rampant Baconianism, Capra (1983) maintains, have become the dominant positions of science in this century.

While the work of Copernicus, Bacon, and Galileo are pivotal in formulating the thought of the scientific revolution, it is Descarte, the founder of modern philosophy, to whom we ascribe the establishment of western thinking. Descarte's stance against the scholasticism of the Greeks, offers the first metaphysical theory in response to the new scientific view of the universe (Lavine, 1984). Descarte's vision was to devise an all encompassing system of thought. Lavine states:

> [It was a] plan for a single unified science in which philosophy and all the sciences would be interconnected in one systematic totality. All qualitative differences of things would be treated as quantifiable differences and mathematics would be the key to all the problems of the universe (Lavine, 1984, p. 87).

According to Lavine (1984), Descarte's science typified a rationalistic and mathematical unity where all change was explained mechanically according to rigid laws. What Descarte was determined to find according to Lavine (1984) "is self evident principles which will serve as first principles for his mathematical philosophy, and which will serve as the foundation from which an absolutely certain philosophy can be deduced" (p. 94).

The desire for certainty in scientific knowledge lies at the heart of the Cartesian philosophy. In order to ascertain this certainty, Descarte outlined the requirements for the formulation of a first principle. They are:

1. [The first principle's] certainty must be such that it is impossible to doubt, it is self-evident to reason, it is clear (in itself and distinct from every other belief).
2. [The first principle's] certainty must be ultimate and not dependent upon the certainty of any other belief.
3. [The first principle] must be about something which exists in order that from it beliefs about the existence of other things may be deduced. (Lavine, 1984, p. 95)

Thus, Descarte attempted to build a new system of thought that through the elimination of error would arrive at absolute certainty based on self evident truths.

His quest was to begin from the position of absolute doubt of everything except for his very existence. His postulate "cogito ergo sum -- I think therefore I exist" (cited in Lavine, 1984, p. 97) became the basis of his philosophy. Here, Descarte maintains that the three requirements put forth for his philosophy are met by the cogito. His rationale lies with the following argument for each postulate: (1) every time one doubts they affirm their existence; (2) the Cogito infers that the self evident truth

that I exist whenever I think is affirmed; (3) the Cogito refers to me, who exists as a thinking thing; therefore, I exist (Lavine, 1984). From this foundation of skepticism over everything but the mind, the Cartesian Cogito introduces subjectivism into modern philosophy.

The introduction of subjectivism into philosophy Lavine (1984) asserts is particularly important. He believes it conveys the implication that knowledge of other minds and of material objects can be proved, if at all, only through inference from the subjective consciousness or through its thoughts or ideas; therefore, the existence of anything other than one's mind is called into question. From this position, the existence of everything but mind must be verified, and this occurs in only one manner, through inference from consciousness because that is all that can be known with certainty. The consequence of this supreme subjectivity is a separation of mind, body, and physical world. The world, then, becomes a reality "out there" that must be viewed from a position of constant doubt.

There have been frequent attacks on Descarte's claims that the Cogito meets the requirements for a foundation of philosophy; however, even with the dissent, the consequences of these postulates, the separation of mind and body and the establishment of their duality in nature, has had serious implications for all of reality. When Descarte severs all relations in perception and behavior between mind and body, fragmentation in every aspect of life is the

result. Capra (1977) maintains that this inner fragmentation, so deeply entrenched in reality, now mirrors the external world where objects are separated. He states:

> The belief that all these fragments - in ourselves, in our environment, and in our society - are really separate can be seen as the essential reason for the present series of social, ecological and cultural crises. It has alienated us from nature and from our fellow human beings (p. 9).

Following this argument, one sees that even Descarte's method of reasoning, analytic in the extreme, separates thoughts into small particles and orders them in logical fashion (Capra, 1983). Werner Heisenberg recognized that it would take many years to undo the damage done by the fragmentation rooted in the human mind (cited in Capra, 1983). In this manner, the Cartesian duality becomes the dominant influence in the split between mind and matter, fact and value, object and observer, and ultimately man and nature; through this reductionistic view, the Universe became a giant machine governed by immutable laws.

Descarte's view of nature was based on these fundamental divisions between the realm of mind, res cogitans, and matter, res extensa. Both of these realms were the creation of God who enabled the human mind to recognize their order but plays no direct part in it, desiring to sit "outside" of reality (Capra, 1983). Thus, nature became a machine devoid of values that worked

according to mechanistic laws in clockwork fashion. The vision of God as the almighty clockmaker who set the Universe in motion became an apt metaphor. In addition, because the universe's functioning was explained only through its parts, it was considered to be no more than the sum of those parts. All reality could be explained in terms of arrangement and movement of its components. According to Berman (1981), this is Descarte's greatest legacy, the mechanical reductionistic view of nature which draws directly from his empirical methods and shows the logical linking of clear and distinct ideas that led to the belief in the mechanistic workings of the universe. This view has become the framework for science in succeeding generations. Capra (1983) asserts that it is this sanction of Cartesian reality that allows the manipulation and exploitation of nature in Western society.

The Cartesian reality, only a conceptual framework during Descarte's life, was finally realized through the science of Issac Newton (1642-1727). At the height of the scientific revolution Newton joined the rationalism of Descarte and the empiricism of Bacon to solidify a philosophy of nature based upon the scientific belief in absolute quantifiable and objective reality.

Newton's goal, the theme of the scientific revolution, was to determine how nature worked, not why (Berman, 1981). To this end, he devised a mathematical system to describe the motion of all bodies under the influence of the force of

gravity. The consequence of this system was the introduction of the Newtonian reality that, like Descarte's mechanistic universe, was believed to be a mechanical system operating according to mathematical laws (Capra, 1983).

This system was characterized by absolute time and space. Small particles made up matter and constituted the basic building blocks. The mutual attraction of these bodies set the universe in motion. Newton's God, like Descarte's, valued order in this predetermined universe of His creation. Thus, for every cause there is a resulting effect that injects a linearity in the workings of the world. According to Doll (1983), this constitutes the most important aspect of Newtonian physics. Here the assumption that what is observed may be broken down and measured in precise increments has resulted in the establishment "of a scientific methodology which looks to the quantification of observed relationships as the intrinsic understanding of the phenomena being studied for it is in mathematical relationships that essence resides" (p. 15). Indeed, Capra (1983) maintains that the significance of the foundational laws upon which the universe rests lie in their universal application. This mechanistic view of nature implies a deterministic quality that is the foundation for the predictable workings of the universe and ultimately influences not only what we know but how we know.

The Rise of Scientism

Thus, the scientific revolution of the 17th century brought about vast changes in the established view of reality. The quest for quality became one of quantity and the questions of "why" became those of "how". The organic universe was transformed into one of inert matter "hurrying around endlessly and meaninglessly" (Whitehead, in Berman, 1981, p. 45). Through the one sided empiric-analytic view of nature, science committed Wilbur's (1983) category error. Here, science was defined solely through rationalism and empiricism that restricts and limits our vision. Science moved beyond the reporting of actual findings, the true realm of science "to deny other approaches to know are valid and other truths true....[and to promote the fallacy of scientism] that which cannot be seen [thus cannot be quantified] ...does not exist" (Wilbur, 1983, p. 21). This is the state of affairs that Whitehead believes distorted nature and made her "a dull affair, soundless, scentless, colorless; merely the hurrying of material, endlessly meaninglessly" (Whitehead, cited in Wilbur, 1983, p. 25).

The 17th century ended with an empirical science that made the world view partial and closed. Quantification was the sole means through which knowledge was established, and thus, it served only utilitarian purposes. Questions of quality became nonexistent because ideas of a qualitative nature such as love, justice, and truth cannot be captured

and measured in an effort to produce a quantifiable score. Ultimately, all questions of value ceased. The legacy of the scientific revolution was preserved. This state of affairs is best described through a quote about the world view of Willard Quine, one of the foremost American philosophers of the 20th century:

> The best way to characterize Quine's world... is to say that...there is fundamentally only one kind of entity in the world, and that is the kind studied by natural scientists-physical objects; and second, that there is only one kind of knowledge in the world, and it is the kind that natural scientists have" (cited in Wilbur, 1983).

Science thus conceived became scientism. This philosophy distorts reality. It refuses to accept as valid sources of knowledge any wisdom from the nonrational domain that comprises contemplation or speculative thought. Only that which is quantifiable is real; all else becomes meaningless. Eisner (1985b) concurs with this assessment of scientism and defines this phenomenon as:

> [The] belief that everything that exists can be understood through the same methods, that there is only one legitimate way to verify knowledge of the world and that unless something can be quantified it cannot be truly understood or known. (p. 27)

Scientism extends the realm of science beyond acceptable bounds distorting reality and consequently limiting our

opportunities to see in the widest sense of the word; ultimately, this hinders our abilities to deal effectively in our world.

While scientism became the dowry of the 17th century, positivism, its first cousin, furthered its cause. The positivism of the 19th century embraced the rise of science and technology. It was dedicated to the application of the achievements of science and became the disciple of a technocratic rationale. In this manner, it advances scientific achievements to a revered position and at the same time attempts to discredit metaphysics or speculative thought that question the beliefs and practices of scientism.

Auguste Comte was the first to elevate science through positivism to this honored status. Comte (cited in Phillips, 1987) believed that "scientific method could be applied to human affairs including the study of morals" (p. 38). His argument lies in the assumption that all the sciences are related in a linear fashion from mathematics (the most advanced, hence most desired) to the human sciences, and their focus centers upon observing objectively determined phenomena (Phillips, 1987).

Phillips (1987) also discusses a closely related strand of positivism labeled consistent empiricism or logical empiricism that developed during the 1920's. The members of this group, known as the Vienna circle, were never unanimous in opinion except for their disdain toward metaphysics. To

speak to this issue, they adopted the verifiability principle whose point, Phillips (1987) asserts, is "to drive a wedge between science and metaphysics" (p. 39). The verifiability principle states "that something is meaningful only if it is verifiable empirically (i.e. directly, or indirectly, via sense experience), or if it is a truth of logic or mathematics" (p. 204). This is the central focus of positivism. Thus metaphysics, meaning "beyond physics" is discredited because by definition it is unverifiable through empirical means (Phillips, 1987).

In the behavioral and social sciences logical positivism becomes the foundation for behaviorism. Characterized by the work of Watson, Pavlov, and Skinner, behaviorism utilizes the verifiability principle through operational definitions and focuses on observable behavior. Furthermore, much of the pragmatism of John Dewey shows vestiges of logical positivism through his instrumentalism and in his belief that scientific thinking is effective thinking (Phillips, 1987, p. 81).

Using the tools of "testing, measurement, behavioral objectives, operational definitions, statistical inferences, and path analysis" (Phillips, 1987, p. 81) behaviorists attempt to apply the scientific method to the social sciences. They desire to explain, predict, and control behavior under certain conditions. Thus, in light of these doctrines, questions of "ought" become rhetorical or at best are reduced to instrumental means.

Technical Knowing

From the foundations of the scientific revolution of the 17th century, and the positivistic dogma embedded in the work of Auguste Comte, we find that an ideological commitment to these beliefs results in a desire for certainty, objectivity, and simplicity in practice (Sergiovanni, 1989). Knowledge becomes narrow in scope and reflects a technological-scientistic rationale that limits what and how we come to know. As a consequence, "much of curriculum and many of our instructional practices [have come to] suggest to students that the one who thinks is at least in principle completely separate from and independent of the reality we think about (Bohm, cited in Crowell, 1989, p. 61). This evokes what Palmer (1987) calls a bloodless abstraction of knowledge that directly influences the way we live.

Huston Smith, in his essay Beyond the Western Mind Set (1984), traces the sequence of events established through the epistemology that produced our current dependence upon knowledge gained through scientism. Beginning with our preoccupation with control, we embrace an empiricistic ideology based in the scientific method that limits what and how we know. From this yields naturalism, the view that an entity must be composed of material components to exist. This gives rise to a world of alienation where our intuitions, thoughts, and images are considered unacceptable

as a basis for knowledge. From this perspective, our belief system becomes mired in a technical rationality which renders certain phenomena more intelligible but does not allow for implications for action. This series of events produces what Whitehead asserts are "minds in a groove" (cited in Lodge, 1983, p. 50) where propositional knowledge becomes restricted through the phenomena of "tunnel vision".

This propositional knowledge, limited to linear functions, believes truth results from the products derived from direct experiences or the mind's operating on the form of the object. In this way, learning always moves toward a limit fixed in advance (Brubacker, 1950). Knowledge becomes confined to the discovery of an absolute truth, what is already "out there" and is checked through external reference. In this world, there is little room for creative thinking or invention. The proposition merely states something about the object and nothing about the perceiving subject; or, "the property says something about the object and something about the subject and that it is possible to separate the components" (Phenix, 1958, p. 302). Thus, rampant objectivity of this sort, concerned only with tangibles, transforms all of its concerns into an object or perceives them only in terms of their object aspects (Rogers, 1969b).

Objective knowledge found "out there" promotes a world view that is analytic in the extreme. This unidimensional perspective of nature denies the occasion of any mental

event that is not a product of a sequence of causal, physical events that can be empirically verified; furthermore, it acknowledges only knowledge gained through mental relations founded upon scientifically accepted facts; all other cognitive process is defined as subjective or intuitive and as such incapable of explanation and inappropriate for the construction of knowledge. From this an epistemology of control, precision, and causality emerges. Schon (1983) asserts this systematic knowledge has four essential properties. It is specialized, firmly bounded, scientific, and standardized. It is concerned with problem solving by picking choices from the available means based in technical knowledge to acquire an agreed upon or proven end. Ends are fixed and "have been converted to constraints and utility functions; means to command variables and laws to environmental parameters" (Schon, 1983, p. 47).

Technical knowing is explicitly useful; It makes our lives more predictable and efficient and encourages control to dominate. Technical knowing (Oliver, 1989) suggests a stockpiling approach in the construction of knowledge. Thomas Kuhn (1970) elaborates on the methodical character of the scientific method found in "doing" normal science where facts are added to the "ever growing stockpile" that constitutes the proven knowledge of science. Disciplines emulate the method of normal science because of the efficiency and control with which it is carried out. From

this, Kuhn (1970) argues, we gain a stagnant knowledge, concerned only with duplication and validation. It is here we attempt "to force nature into a relatively inflexible box" (Kuhn, 1970, p. 24).

Ernest Gneller (in Smith, 1984) proposes that a desire for control inherent in technical knowing produces what he calls effective knowledge. Effective knowledge, based in reductionism suggests the idea that the nature of reality can be understood by comprehending parts of the whole organism. The acceptance of this epistemology clearly stifles any attempt to generate alternative world views that would allow us to comprehend reality from a holistic relational perspective.

A reality based on technical knowing or effective knowledge and the fragmentation it encourages, attempts to mold, classify, and control all aspects of our lives. Technology limits our knowing to the peripheral aspects of reality. Within this framework, education pursues remedies that promise rapid results in our continuing quest for excellence. Content becomes a linear, functional recitation of inert facts which limits our knowing to the unidimensional form of reality. There is a preoccupation with quantification in all aspects of evaluation. We ignore visages of education that could direct us toward a more holistic vision, one that accepts multiplicity in the process of coming to know.

Similarly, Lodge (1983) maintains that the ideology of

a technological knowing based in scientism yields five theories that we use as a justification for our educational system. These reflect a positivistic-behavioristic stance that influences our curricular practice. These theories and their results include the following:

The first theory, specialization, results in the fragmentation of all curricular practices and narrows our vision to a singular path that offers efficiency in work.

The second theory, reductionism, occurring as a result of fragmentation, ensures the further breakdown of the system into small segments. From this, we come to believe that greater understanding lies within the parts, rather than emanating from the whole.

The third theory, the "payoff" from a scientistic methodology, is the self-proclaimed objectivity of perspective. We come to believe that we can "prove" through objective (quantifiable) means what we question.

The fourth theory, rationalism, dismisses from educational matters, with help from objective measures, all nonrational components such as intuitions, spirituality, or emotional responses. Thus, that which cannot be measured is assumed to not be worth knowing.

The fifth theory, materialism, results as a consequence of the above. Here, what becomes valuable are things; we lose touch with what constitutes the good, true and beautiful in life.

This series of events, culminating in materialism,

illustrates Habermas' concern (1971) for the ramifications of technical knowledge. He questions the decisions we make based on a one dimensional technological approach as a legitimate source of knowledge; we ask "can it be done" rather than "should it be done". He also expresses concerns for human interaction that are based on negative factors such as power and exploitation that ultimately impede true communication and emancipation, characteristics of alternative ways of knowing.

When we view knowledge as always so, or as traditions set in stone, we concentrate on particulars that fragment our lives. This fragmentation causes each human being to see himself as separate and implies a commitment only to the individual. "This general self centeredness causes the incorrectness of such knowledge to be distorted, covered up, devalued, ignored to the point where it rarely enters the consciousness of the vast majority of mankind" (Bohm, 1984, p. 24).

Consequently, this attitude breeds an ethic of "competitive individualism in the midst of a world fragmented and made exploitable by that very mode of knowing" (Palmer, 1987, p. 16). This mindset misconstrues and stretches the Socratic axiom "know thyself" far beyond the limits of true self interest. It promotes commonsense habits of mind that raise epistemological issues that reflect our beliefs about reality. Thus, we must situate rationality and technology in a wider context, one that

helps us recognize the importance of fluid open movement and alternative ways of knowing in the exploration of ourselves and our world. To this end, we must explore the nonrational domain and its workings with the rational, to extend our knowledge base of the universe. This becomes impossible if we remain mired in a technocratic rationale that blinds us to the understanding that we are limited only by the way we choose to "see".

CHAPTER III

INTUITION AND KNOWLEDGE

Introduction

The empirical world view established in the 17th century evolved into the scientism of our era that accepts technical rationality as the only legitimate source of knowledge. The instrumental language of scientism structured around means- ends, cause-effect relations characterizes the scientific approach to the construction of knowledge (Mann, 1975). For education, from this perspective, meaning is discovered through the scientific process of observation, classification, hypothesis formation, and theory development in pursuit of an objective or purpose.

Apple (1975) asserts that this technological view is "primarily interested in efficiency and smoothness of operation" (p. 122). Furthermore, he suggests that this outlook, related to systems management, is best described through the belief that "for education to be effective one must explicitly determine [what] the learner is expected... to do, know and feel as an outcome of his learning experience" (p. 122). The obsession of positivistic

scientism for the recording of observable behaviors as irrefutable "proof" denies its inability to deal with ambiguity. It remains, through its limited means, mired in unsophisticated, artless answers to complex human questions.

This method dismisses the notion of the complex and dynamic nature of all reality. Huebner (1975) asserts that this procedure in education becomes a ritualistic form (instruction) offered in educational temples (schools) at sacramental gatherings (classrooms). Students at this altar are thought of as products to be "finished". He further writes of the student under these conditions:

> For centuries the poet has sung of [the student's] near infinitudes; the theologian has preached of his depravity and hinted of his participation in the divine; the philosopher has struggled to encompass him in his systems, only to have him repeatedly escape; the novelist and dramatist have captured his fleeting moments of pain and purity in never-to-be forgotten esthetic forms; and the man engaged in curriculum has the temerity to reduce this being to a single term - 'learner.' (p. 219)

With this limited perspective, education rejects all components of the aesthetic domain residing within humanity. These are the elements that offer the ability to deal with the infinite number of possibilities and the mysteries of nature. The aesthetic domain works not from the scientistic position of control or domination but looks to participation

and relational aspects in knowing as essential to knowledge construction. Thus, it is "forcing responses into preconceived conditioned patterns [that] inhibits ... participation in the world's creation. Limiting response-ability to existing forms of responsiveness denies others of their possibility of evolving new ways of existing" (Huebner, 1975, p. 230).

This new way of living, grounded in a world perceived as an intricate web of interdependent elements, promises the opportunity to transcend the technological mindset of scientism, to elude its shackles, and escape to the freedom of relational knowing. Here, "every concrete entity is experienced within a context of wider relationships and possibilities....[where] conscious life is always open to a never-ending web of entailments and unfoldings" (Phenix, 1975, p. 324). This form of experience in reality reflects the wholeness of nature and brings a qualitative dimension that includes not only rational but non-rational domains as allies in the construction of knowledge.

We have seen the results of a rationalistic world view. We now turn to the search for the aesthetic, the domain that harbors the intuitions and imaginative potentials that direct us to examine the qualities of life.

Personal Knowledge

John Dewey (1929) wrote that the sources of education are any part of knowledge that renders the educational

process more enlightened and humane. Education cannot afford to overlook any facet in the construction of knowledge that brings about this state. The acceptance of the aesthetic and rational domains becomes imperative. The relational process in the merging of these elements considers the construction of knowledge as more than external forces imposed upon the learner. Rather, knowledge is derived from a state of subjectiveness where the external world is a construction of human definitions and one in which propositions state something about the subject and object realizing that the components cannot be separated. This notion supports the belief in the relational nature of knowledge.

The relational process in coming to know considers that the construction of knowledge is more than external forces imposed upon the learner. Phillip Phenix (1958) believes that "education is a process involving personal becoming. This encompasses the real and inner most nature of the person and not those things which belong to him by association" (p. 11). The existentialist belief that humans exist first and then must define their world is salient. The distinguishing feature of becoming is the human's ability to think. "The powers of reason, reflection, memory, and imagination are the special glory of man whereby his prodigious cultural achievements are made possible" (Phenix, 1958, p. 297).

Schon (1983) and Rubin (1985) believe knowledge that is

an emanation of process develops as a result of the knower's actions in the world. This knowledge is dynamic and does not exist independently of the knower and its use in a specific situation (Mishler, 1979).

Similarly, Combs (1982), Yonemura (in Spodek, 1988), and Spodek (1988) have all written of the importance of personal knowledge in influencing our practices in our daily lives. Specifically, Combs (1982) believes that teacher's attitudes are crucial to the effectiveness of the acts of teaching because they influence the opportunities and learning experiences children have. Ultimately, "they determine how teachers behave and how successful they are likely to be in carrying out their professional tasks" (p. 3).

Spodek (1988) surmises that teachers process information as they work with children and that their actions and classroom decisions are driven by their perceptions and understandings and beliefs. He purports that teachers' implicit theories are rarely shared by all, and that theories that underlie professional practice are personal in nature. Teachers create conceptions of their professional world based upon their concept of reality.

Yonemura (cited in Spodek, 1988) found that a teacher's personal knowledge is as important to professional practice as teacher knowledge. Through an awareness of personal ideas, values, and beliefs, an understanding of the underlying basis of competent teaching comes about, and the

concepts known as personal constructs frame the technical world view and influence action.

Similarly, Schon (1986) discusses knowledge in action where the "know how is in the action". This immediate understanding, a sense of rightness, reflects an awareness of the uncertainty, complexity, instability, and uniqueness of experience in reality. This ultimately leads to a clearer understanding of the depth of any aspect of the process of coming to know. Consequently, the activity inherent in the action brings about knowledge that is a product of human existence (Simpson and Galbo, 1986).

From these examples, it follows that if we approach the world from beliefs other than a reductive view that encourages control, a new system founded upon an epistemology of shared occasions arises. A system such as this develops simultaneously and emerges through the ongoing processing of information received through the senses and information produced by thinking independent of sense data (Simpson and Galbo, 1986). Our knowledge is created from the workings of this assemblage. The process and result cannot be predetermined because they are functions of the combined energies and experiences of all participants. (Simpson & Galbo, 1986). Rational thought promotes consciousness; the non-rational, the raw material of our intellect, our perceptions, feelings, and intuitions, contributes an awareness of the nuance of the activity and fosters the intimate connection between knower and known.

First Order Thinking

Knowledge is basic to human development. As human's construct knowledge they assimilate and accommodate vast amounts of information into schemata (Piaget). Our knowledge of reality results from an interplay between the object and our subjective response to the activity. It is a relational process through which adaptive thinking promotes a personal reality whereby information is placed into a meaningful whole.

In this manner, knowledge is not passive; rather, it is an active process characterized by innovative responses to challenges that arise. It is an inner process through which one looks into the heart and soul of the problem. Toward this end, we must look beyond mere experiences in the construction of knowledge, into the subjective realm, to promote wholeness that is dynamic and emergent. Wholeness is naturally interrelated, and it offers to nature a more complete view of reality. A reality based upon an epistemology of constructed knowledge tends to be flexible, and thus, it becomes more important to know how and why than to know that (Zais, 1976).

The process incorporated into the how and why of knowing promotes the activity of thought Whitehead (1929) believes encompasses education. He states, "What education has to impart is an intimate sense of the power of ideas for the beauty of ideas" (p. 18). He opposed approaching

education as the imposition of scraps of information or what he called "inert ideas" (Hill, 1990). By looking at knowledge not as "inert facts" but as a means through which one gains insights through perceptions and intuitions, one gains the ability to grasp directly absolute non-empirical truth. Through this process Purpel (1989) maintains we are much more likely to become sensitive to human construction, "to the process and product of human imagination" and how these perceptions affect our experiences (p. 133).

Intuition functions as a catalyst in knowledge construction. Our intuitions are our cues for direction. They guide us through paths of our mind, help us to deviate from the familiar and seek alternative routes, circumvent dead ends, and explore new avenues. Through intuitive abilities imaginative thought is freed. This "flash" moves around the sameness and alwaysness that permeates our minds. It allows what Patricia Carrington (1977) calls "flow" to occur, to become an intimate participant in the occasion.

Oliver (1989) speaks of knowing in this sense as process knowledge. Coming to know in this way, based in grounded knowing or ontological knowing, includes the whole of the process, the past, present, and future from which events or occasions arise. "Ontological knowing is moving, dynamic and above all continually emergent" (Oliver, 1989, p. 14). It is becoming with the occasion, the feeling one gets when one is involved with the activity. It is the intuitive recognition of unity, rightness, and dynamic

movement that brings about a state of heightened awareness.

An example which illustrates "heightened awareness" is the difference between "playing music" and "reading music." A musical composition is nothing more than notation. One "reads music" when one plays notes. It is a replica of what is on the paper. "Playing music", however, occurs when one understands through an intuitive awareness into the whole, the nuance in the movement. The personal influence, the lilt and tone, the intonations, the interpretation of those notes is what makes the melody come alive. The heightened awareness or becoming one with the composition is an undivided knowing of the intuitive with the technical that brings it to full flower.

Polanyi (1966) also discusses a means of knowing which involves intuitive understandings. Tacit knowing, the ability to know more than we can tell, is central to an increased capacity for understanding that elicits a heightened awareness of our reality. "The act of tacit knowing implies the claim that its result is an aspect of reality which may yet reveal truth in an inexhaustible range of unknown and perhaps still unthinkable ways" (Polanyi, 1966, p. 141)

The process of tacit knowing is indwelling. Polanyi (1969) believes "indwelling... is a utilization of a framework for unfolding our understanding in accordance with the indications and standards imposed by the framework" (p. 134). Indwelling underlies all observations. Similar to

empathy, it is the interiorization or ability to identify ourselves with the entity. The frameworks, established by existential choice, leave us free to expand our horizons. They facilitate personal intuitive moments from which meaning arises. This allows flexibility and dynamic movement. This structure establishes an understanding through which we achieve an integration of the particulars to a coherent entity.

Particulars can be viewed in two different ways, as comprehensive entities or as particulars. While these are complementary parts of discerning the whole, and a theory of knowledge must encompass both ways of knowing, the meaning one derives from each of these ways is vastly different. Polanyi (1969) maintains that to "to focally gaze upon particulars uncomprehendingly is relatively meaningless compared to their significance when we notice them subsidiarily in terms of their participation in a whole" (p. 128).

The difference between the focal and subsidiary awareness is the meaning inherent in each. To know something focally is awareness; to be aware subsidiarily is not to be conscious of the entity in and of itself but to use this awareness as a clue pointing beyond. Polanyi (1966) believes that "no meaningful knowledge can be acquired except by an act of comprehension which merges our awareness of a set of particulars into our focal awareness of joint significance" (p. 44). This type of understanding

leads to a personal knowledge that through its connections with the whole allows man to acknowledge responsibilities inherent in action. (Polanyi, 1959).

Thus, Polanyi (1959) considers tacit knowing to be the dominant principle inherent in the construction of knowledge. Furthermore, Polanyi (1969) believes that any search that misses the intuitive quality in formulating a question or problem or excludes intuition "is irrelevant to the subject of scientific inquiry and of the holdings of scientific knowledge" (p. 118-119). Tacit knowing produces discoveries by steps which we cannot identify. It is an act of personal participation through which, in an unreflecting manner, we may become cognizant of our environment.

Graham Wallas's (cited in Arieti, 1976) explanation of the creative process also lends itself to intuitive ways of knowing. While intuition follows no logical steps or pattern, the stages of preparation, incubation, and illumination encompass much of the activity surrounding intuition (Arieti, 1976). Preparation, generally considered a rational process, helps organize data into useable forms. It is analysis and classification of information. Incubation requires a period of relaxation where the analytic thought processes may be quieted by the intuitive powers. History demonstrates that in this state of incubation, Wagner heard his music; Michelangelo created his art and Einstein conceived the theory of relativity (Pearce, 1971). This quietness of soul facilitates the "A-Ha"

experience of sudden discovery and inspiration which brings about the illumination that encompasses a new understanding of the query. Illumination also facilitates intrinsic appreciation for the experience (Souther, 1984). This total procedure is an aesthetic process that brings about a feeling of comfort and a sense of rightness about the solution typical of intuitive moments.

The notion of intuitive thought processes is also apparent in Joseph Chilton Pearce's explanation of autistic thinking. Similar to tacit knowledge, autistic thinking acts as a catalyst in suggesting and encouraging the birth of new possibilities. Pearce (1971) believes that the child's mind is autistic or capable of free synthesis. Autistic thinking is an unstructured, nonrational process. It is responsible for bringing forth unlimited ideas far beyond the abilities of logical thought; however, because of the desire to participate in the world, the child restricts or limits autistic thinking. Society's preoccupation with control and conformity further stifles this capacity. Thus, we lose the autistic ability to seek new possibilities and to intuitively understand.

From this discussion, it is apparent that intuition offers to individuals an enhanced perspective that allows one to see more profoundly into reality. This enables creative and original responses to arise to meet the challenges dealt us. Peter Elbow (1986) believes this to be "first order thinking." Based in tacit understandings, the

ability to know more than we can tell, this process generates rich data and encourages exploration. The intuitive functions allow us to gain insight into our world and to escape the boundaries that shackle us and make us reluctant to give up our commonsense notions of the world (Bohm, 1984).

Maxine Green calls the inward search the ability to possibilize, (in Purpel, 1989) to open the doors of our minds to embrace intellectual breakthroughs. From this perspective, we comprehend how we come to know and the implications inherent in this knowing. We may then understand and appreciate the connections, complexities and ramifications of the rational and nonrational basis of our knowledge. This enables one to create a vision of reality from which process becomes the end and the only constant the quest for knowledge. From this derives the ultimate goal of education, growth through greater insight into one's environment (Brubacker, 1950). It is this ability to change and grow that enriches lives, that allows us to expand our metaphors which bring meaning to our world, in order that they may become more inclusive in nature.

Historical Overview

Historically intuition has battled against the intellect in an effort to become a recognized source of knowledge. From the foundation laid by the early philosophers and scientists, knowledge was understood to be

a product of systematic endeavors, "a faithful reflection of an antecedent order of things" (Lucas, 1985, p. 166). Reason reached its zenith during the Age of Enlightenment. The fervor over dependence upon the intellect (reason) and an excessive confidence in its mechanical account of human nature brought about an appeal of protest. Philosophers turned to the nonrational domain because they realized that reason alone was not enough to bring about a wholeness in one's quest for truth. Rousseau (1712-1778) rejected reason and alternatively accepted a belief in the individuality of humanity. He asserted that "intuition shows us our own minds not as fabrics of ideas spun out on a loom of necessity, but as spontaneous and unitary agents of sentiment and will" (Hocking, 1959, p. 117). He advocated intuitive ways of knowing based upon the idea that our true feelings are smothered while we are young by rigorous instruction. If left alone, Rousseau felt, the child will find the important values inherent in their nature (Noddings & Shore, 1984).

Another philosopher of Rousseau's century, F. H. Jacobi (1743-1819), inspired by his abhorrence of pure rationalism, expressed his belief that unaided intellect leads to atheism and fatalism because it can only deal with finite and partial objects. He believed that metaphysical truth must be reached through immediate perceptions. Jacobi called this direct knowledge faith, and it is in essence what we know as the intuitive process (Hocking, 1959).

The philosophies of Immanuel Kant, Arthur Schopenhauer,

and Henri Bergson are also central in illustrating the concept of intuition. Their beliefs illustrate a progression of thought about the importance of intuition in the process of the construction of knowledge.

Kant defined intuition as "a nonrational recognition and awareness of individual entities" (Noddings & Shore, 1984, p. 14). Linked to sensual perceptions, he viewed intuition as a receptive capacity, an experience enabling function from which knowledge construction occurs and initiates affective understanding. The intuitive experience begins in response to the will. The emphasis is placed on intuition's contribution to the creation of the representation and understanding of the object. Kant's intuition takes place prior to experience and is developed in three stages. (1) Intuition presents the objects to reason (2) whereby the subject sees configuration to which verbal symbols have not been assigned and (3) then detects rightness and accuracy without using rules in conscious analysis (Noddings & Shore, 1984). Kant failed, however, to connect intuition to the engagement of intellectual activity. Intuitive thought, or the awareness of sense data, yields no knowledge. Only through the categories of thought are the intuitions organized into cognitions (Noddings & Shore, 1984).

Schopenhauer adds a creative component to the object giving function of the intuitive process that Kant disavows. For Schopenhauer, intuition guides action through an act of

will. "We have an immediate knowledge of reality in our minds and know this reality to be of the nature of will" (Hocking, 1959, p. 118). The will of the individual comes to light through intuition as feelings, insights, and sensibilities. The will, the dynamic center of self, cannot be acted on by intuition. It may only precipitate action and promote the go ahead for the individual's meaning. "Will as a whole is free, for there is no other will beside it that could limit it; but each part of the universal will, each species, each organism, each organ, is irrevocably determined by the whole" (Durant, 1962, p. 301).

In addition, while Schopenhauer accepts the Kantian position that the external world is known only to us through our sensations and ideas, he also believes that the discovery of reality relies upon our understanding of ourselves (Durant, 1960). He states:

> We can never arrive at the real nature of things from without. However much we may investigate, we can never reach anything but images and names ... Let us enter within. If we can ferret out the ultimate nature of our own minds we shall perhaps have the key to the external world. (Durant, 1960, p. 291)

For Schopenhauer, the internal intuitive process unites everything and has the ability to reveal a cosmic truth while the intellect based in the external world divides nature (Durant, 1960; Noddings & Shore, 1984).

Although Schopenhauer was one of the first of the

modern philosophers to acknowledge intuition as a viable force in the construction of knowledge, it was Henri Bergson who fully accepted intuition's place in this process. Bergson believed for a conscious being to exist change is necessary. To change is to mature, to go on creating oneself endlessly. Humans are not passively adaptive machines, rather they are a center of creativity; life, for Bergson, is a fluid and persistent creation (Durant, 1962). Bergson asserts:

> A true empiricism is one that sets itself the task of getting as close as possible to the original, of sounding the depths of life, of feeling the pulse of its spirit by a sort of intellectual auscultation; We see life in flow, we listen in on the current of life. By direct perception we feel the presence of mind; by intellectual circumlocution we arrive at the notion that thought is a dance of molecules in the brain. Is there any doubt that intuition here beholds more truly the heart of life? (Durant, 1962, p. 424)

Intuition, then, is the direct feeling of life and mind, not their external representations but their inner existence (Durant, 1961). With intuition we do not move around objects touching only their properties but enter into them in a unity of feeling.

Bergson holds that when we leave the life of logic to enter that of consciousness, we must make our appeal to a sense of life which has its origin in intuition. Bergson

compares life to a motion picture. The film freezes and divides reality into static poses; the intellect catches the state but loses the continuity that weaves the frames into a whole. Only moments of reflection, a steady consideration of the events yields knowledge, and this process depends on intuition (Durant, 1962). In this manner intuition is essential to life in that it reveals all genuine insight into mind and the living character of reality (Hill, 1961).

Definition of Intuition

Capturing the essence of intuition through language is a difficult task due to the subjective nature of the intuitive state. Phrases that are most often associated with intuition include "an immediate awareness", "an inner feeling", and "a priori knowledge".

The American Heritage Dictionary defines intuition as the act or faculty of knowing without the use of rational processes, knowledge so gained, and sharp insight.

Rudolf Arnheim's (1985) definition illustrates additional beliefs about intuition. He defines intuition as a "particular property of perception, namely, the ability to apprehend directly the effect of interaction taking place within a gestalt situation" (p 78).

Phenix (1958) documents positions individuals most often hold regarding intuition. These include the presence of intuition in one's life and one's knowledge about oneself; additionally, it appears in the axioms of

mathematics, connections between propositions, and the recognition of what is good, true and beautiful. Further positions include intuition as the expression of the outcome of subconscious induction or deduction. Examples of intuition in inductive or deductive thinking include scientific or poetic insight or musical inspiration. Finally, the assertion that intuition enables us to explore the nature of reality and create a vision that encourages unity with one's God, must be included. These positions do not reflect conscious reasoning or direct apprehension of sense data. Instead, they are a process of direct apprehension of knowledge, a receptive quality that Noddings and Shore (1984) believe "establishes a direction in the intuitive mode, but this direction is at once both sure and clear and continually open to change" (p. 81).

These definitions and beliefs suggest that intuition is that function which apprehends directly objects within one's world. This process unaided by sense perception or conscious reflection occurs without mediation, directly and inwardly. "The immediate character of intuition does not imply accuracy or rightness. It does imply commitment and clarity" (Noddings & Shore, 1984, p. 57). From this immediate awareness, intuition guides reason in an effort to yield knowledge. Consequently, intuition has the ability to clarify meaning, provide direction and act as a guide for moral action. It allows the person's "I see" to occur, which is an affective representation of the self and world

in a transformational process of coming to know.

The Emergence of Intuition

The will is that part of human nature from which anticipation emerges. Inherent in this dynamic quality is "the voice from within" that initiates the quest for meaning from which springs intuition. "Its appearance as force directed toward understanding, expressing, reacting, sustains and promotes intuitive activity" (Noddings & Shore, 1984, p. 59). The will has the ability to turn sight inward, to gaze upon itself, realize its roots in the past and acknowledge potential for the future. This purposive process allows the individual to make leaps through time and space into the future (Phenix, 1958). This evolutionary nature of will encourages the dynamic process that when allowed to function creates wholeness of thought. Thus, will works in conjunction with the processes of intellect, experience based on sense data and reason, and intuitive understanding to bring clarity to our world.

Intuition is not separate from thinking. Titus (1946) asserts "the art of living demands that intuition, intellect (reason) and sense experience be kept together" (p. 178). These are all vital parts of cognitive activity. Lemkow (1990) maintains when thinking is directed outward, nature is examined and practical tasks completed; when directed inward it ponders ontological questions such as truth, goodness, and beauty. It is within these functions that

knowing becomes complete, that reason, logic, and intuition melds that which is within, to that which is without, and becomes a dynamic unity.

Sense data bring us experiences directly. The organs of sense are the primary guide to reality (Phenix, 1958). Our senses are transmitted to our brain and we see, hear, taste, touch, or smell our world. We see a dog or cat and from visual, tactile, and auditory senses "know" them as such. Bertrand Russell believes this to be knowledge by acquaintance, or direct awareness which implies the absence of any intermediary process such as inference or analysis (Agyakwa, 1988). "Knowledge by acquaintance does not rest upon intuition" (Agyakwa, 1988, p. 162).

The second source of knowledge, reason, is the process of reflection or reasoning (Phenix, 1958). Often called "a posteriori" or mediated knowledge, the products derived from this cognitive activity take place from or after the experience and direct our actions through questioning, guiding, and reflecting on incoming data (Phenix, 1958).

Sense data in conjunction with "a posteriori" reason extrapolate representations and insights. Concrete perceptions from sense data yield abstract concepts. We understand dog or cat from experience with particular dogs or cats. Conversely, the dog or cat we sense is conditioned through our ability to reason (Phenix, 1958). Consequently, as W. P. Montague (1925) states:

The function of reason is, in other words, not so much

> to originate but to prove. Reason is the censor of fancy, selecting from the wealth of new ideas those that can successfully stand comparison with the old and be made harmonious with them. (p. 65)

From this rational perspective reason remains mechanical in nature.

Hocking (1959) believes defects of the intellect derive from its unidimensional perspective. He lists the limitations of intellect as the external nature of intellectual knowledge, its abstract and partial construction, and its relative and static nature. "In essence the intellect analyzes and reduces an organism to its simplest components but cannot by itself reassemble the whole" (p. 120-121). The limited nature of the intellect restricts one's world in that the order and direction inherent in rational processes of "a posteriori" knowledge obscures or stifles the third alternative to knowledge acquisition, intuition.

The third source of knowledge, intuition, is neither a sense perception nor a function of the cognitive process in the traditional sense, but is an essential component in the process of coming to know (Phenix, 1958). Intuitive processes are a fundamental source of knowledge and a means to truth (Agyakwa, 1988). As a means to truth intuition takes the form of "seeing" through "a priori" knowledge or self evident truth. "A priori" knowledge is the nonrational side of reason. Capra (1977) writes:

> When the rational mind is silenced the intuitive mode produces an extraordinary awareness ... the environment is experienced in a direct way with out the filter of conceptual thinking .... The experience of oneness with the surrounding environment is the main characteristic of this meditative state. It is a state of consciousness where every form of fragmentation has ceased, fading away into undifferentiated unity. (p. 26)

This receptive quality and quest for further clarification of our ideas and beliefs establishes direction for the intuitive mode. While many philosophers have attempted to discredit "a priori" knowledge as unfounded, it is from this domain that our nonrational insights arise which bring to knowledge construction its dynamic structure. Rather than being mediated by sense data, it is immediate. Noddings and Shore (1984) define this state as "a developing intuitive pattern that makes increasingly sophisticated experience possible and comprehensible.... [and] it results from a complementarity in the quest for meaning and subsequent experience" (p. 50).

The immediacy found in "a priori" knowledge enhances our ability to see and create patterns, to have an immediate awareness of new forms or new perspectives of entities.

> The formation of hypothesis in science, the elaboration of conceptual frameworks in philosophy and the formation of symbolic systems in the arts are examples

> of human activities which illustrate how reason is one primary source of immediate rather than mediated knowledge. (Phenix, 1958, p. 306)

This capacity implies the act of grasping the meaning, or significance, or structure of a problem with out explicit reliance on the analytic apparatus of mind (Bruner, 1962). Knowledge acquisition in this manner is not static or product oriented but an effort founded upon process. As a source of knowledge it is an instantaneous understanding of the rightness of action. Intuition characterized by immediate awareness and an absence of cognition allows us to transcend our habits of mind and offers the opportunity to explore our creative capacities.

The two faces of cognition, the rational and nonrational, become the means through which we construct knowledge. Eisner's discussion (1985a) of cognition relates directly to the understanding that intuition and intellect operate as a whole and merge into a partnership. Eisner believes cognition to be a process through which organisms achieve awareness. To engage in cognitive awareness is not simply to think of the world in terms of products; instead, it is to also be aware of the qualities of which it is constituted. Eisner argues that thinking requires content and that the base of this is our senses:

> The world is made up of qualities and the extent to which those qualities can be experienced depends upon the acuteness with which each of the sensory systems

> can function. Thus, with vision we are about to see those aspects of the environment that are unusual, but we cannot with our eyes hear the sounds of the world. Through audition we are able to hear, but we cannot see. Through our ability to taste, the gustatory qualities of the world can be experienced but not heard. And so it goes. We are biological creatures designed to be able to pick up information about the features of the world in which we live. What we know about those features depends initially on what our sensory system picks up. (p. 231-232)

Thus, Eisner (1985a) believes from the basis of the senses the human being's ability to perceive "allows us to create experiences, to achieve modes of consciousness that are built upon the information the senses provide in the first place" (p. 233). The senses provide the stuff from which concepts are born; however, once these sense data are recognized our ability to intuit provides us contact with qualities of the world based not on "objective" knowledge but knowledge dependent on information provided by intuitions. Through this process, a world view of depth, clarity and dimension emerges.

Lemkow (1990) also considers that the process of reason and intuition are not mutually exclusive but promote a wholeness of perspective. She states:

> Reason and intuition are mutually supportive and work hand in hand. Reason can help activate intuition.

> Intuition completes, perfects and fulfills reason. Moreover intuition comprehends reason but is not reducible to it: intuition transcends reason. (p. 50)

Thus, the sources of knowledge, sense data, reason and intuition are inextricably intertwined. All three types of mental activity are necessary for personal creation, discovery or inventiveness.

To conceive of intuition as a process in and of itself, or to disavow intuition in favor of empirical knowledge as the only legitimate source of knowledge, is to commit oneself to a fragmented world view. It is in this way that we commit Wilbur's (1983) category error. As an alternative to this lop-sided aspect of the construction of knowledge, Bahm (1960) presents an organic conception of intuition whereby the construction of knowledge involves the subjective and objective representations of intuition in the process of mediacy, immediacy, aesthetic perfection, and dynamic incompleteness. Through a heuristic process, these notions connect in sudden insight what we know with what we intuitively understand to produce a product founded upon personal meaning.

The Intuitive Process as Heuristic Inquiry

The search for personal meaning through the phenomenological process of heuristics is a natural practice. The personal nature of the heuristic inquiry, guided by spontaneity and a desire for clarity, deals with

much of the intuitive thought process.

Douglass and Moustakas (1984) believe heuristics, drawn from existentialism and phenomenology, with its course embedded in the tacit dimension, intuition, and complexities of the inner search, provides a philosophical and conceptual orientation for intuitive knowledge. The basis of the process involves intuitive scanning of the inquirer's consciousness. While phenomenological research extrapolates from this metaphors of human experience that may be expressed through hermeneutical interpretation (Willis, 1991), heuristic inquiry retains the essence of the person in the experience. (Douglass and Moustakas, 1985). Consequently, heuristics, the internal search to know, encourages individuals "to pursue an original path that has its origins within the self and that discovers its direction and meaning within the self" (Douglass and Moustakas, 1985, p. 53). Its emphasis lies in the interpersonal nature of the study and it contributes to the belief in dynamic wholeness inherent in our world and the faith in the innerconnectedness and fundamental unity of reality.

Rogers (1969b) maintains that all knowing, even that of the most demanding scientific process, emanates from the subjective and phenomenological. He maintains that through the interpersonal or phenomenological aspects of knowing we gain a deeply felt, holistic sense from which we organize our thought. To substantiate belief in knowledge gained through phenomenological processes he quotes Einstein:

> During all those years there was a feeling of direction, of going straight toward something concrete. It is, of course, very hard to express that feeling in words, but it was decidedly the case and clearly to be distinguished from later considerations about the rational form of solution. (p. 25)

The heuristic inquiry begins with immersion, a form of indwelling, the personal search for meaning. From this yields acquisition of data through the special resources of tacit knowing, intuition, and self disclosure. Finally, realization or synthesis of knowledge occurs bringing new discoveries that establish meaning beyond that of summary. In this manner, heuristics attempts to affirm the inner processes as a viable means through which one may search for, gain, and process knowledge (Douglass and Moustakas, 1984).

Models of Intuition

The belief in intuition, through heuristic discovery, as a viable means through which one becomes aware of new possibilities within reality is central to this dissertation. Quoting Thomas Carlyle's Characteristics, Noddings and Shore (1984) state that "the healthy understanding, we should say, is not the logical, argumentative, but the intuitive; for the end of understanding is not to prove and find reasons, but to know and believe" (p. 91).

The intuitive thought process is, thus, a quest for further clarification and understanding. Individuals able to respond positively within such a system accept the notion of David Bohm's natural law that there are no limits to the number of new transformations made in the evolving construction process of knowledge (Pearce, 1971). Comments of students and teachers on their intuitive processes bear this out (Forester, 1990). This information derives from informal conversations occured with colleagues and students during the Fall of 1990. Some excerpts from these discussions related to Agyakwa's (1989) models of intuition follow and illustrate the process of intuition as a receptive capacity, a guide to understanding, and finally the link that connects our inner being with our logical self. Agyakwa (1988) suggests that these four modes are representative of intuition as a source of knowledge and intuition as a means to truth. The clarification of intuition in these capacities serve to underscore the importance of the acceptance of the process of intuition in education and curriculum thought and the realization of its natural place in the whole of coming to know. The models are: (1) not seeing but "seeing" (2) seeing and perceiving (3) seeing and "seeing" and (4) "seeing".

Model One

Not seeing but "seeing" is a model for general intuitions or psychological intuitions. It is characterized

by such cases as precognition, telepathy and clairvoyance. Agyakwa maintains the first seeing to be literal while the second "seeing" is metaphorical. One student intuitively understood the concept of intuition in this sense when he offered, "Intuition can help you see in your mind." Agyakwa (1988) believes convictions such as these are nonsensory in nature and do not rely on perceptual metaphors.

When we deal with general intuitions of this sort we deal with "knowing that" (Agyakwa, 1988). Knowing that remains closely linked to sense data due to its ability to perceive more profoundly and deeply into situations. The knowing is private, but may be validated through one's willingness to act on the intuitive insight or the ability to make reference to a specific event as evidence. It brings to mind the "feeling" of rightness or wrongness, about an occurrence. This type of knowledge requires close contact, an intimate understanding of the occasion. The intensity with which children play games encourages this type of intuitive response.

> "One time at my old school I was playing a game and my thoughts said duck, duck, so I ducked and the ball went right over me. I always follow my thoughts now."

Another example of knowledge in this sense is the explanation of an intuitive experience offered by one student. In this instance a fifth grader had been informed of his mother's impending operation. After the operation his teacher relayed to him all was well; however, he stated:

"I had a feeling that something was wrong with her.... I knew I had to talk to her so I asked my teacher if I could call...my mom had dislocated her hip after she was back in her room."

This type of intuition rests upon faith. Faith regarded as a virtue implies an act of will. One has the resolve to accept truth and act upon it. "Its discoveries can never be contrary to reason, however, they may well be beyond reason" (Hocking, 1959, p. 117).

To validate knowledge based on faith, A. J. Ayer's three conditions for knowing are utilized. Ayer believes these conditions include that what one is said to know be true, that one be sure of it and that one should have the right to be sure (in Agyakwa, 1988). Furthermore, Ayer (1955) states that the man who knows, as contrasted with the man who merely has true opinion, is the man who has the "right to be sure" (p. 31-35).

In following Agyakwa's rationale (1988) for justification, through Ayer's conditions for knowing, the following may also be said for this student's comments. The truth condition is fulfilled because the boy's mother was in the hospital. The second condition is met through his willingness to act on his convictions to call to find out about his mother. Finally, the right to be sure in this instance may be interpreted as the willingness to accept the notion of a state of feeling as evidence.

Moods or feelings such as "I'm happy or "I'm in pain"

are accepted as personal truth and are generally not questioned. To illustrate this point, Agyakwa (1988) quotes Scheffler:

> There are important limits to the concept of evidence when we are dealing with phenomenalistic knowledge such as feelings and moods. In such cases we should be prepared to concede that the individual knows that he is in pain if the belief condition and the truth condition are met. (p. 171)

W. E. Hocking (1959) also believes that self knowledge is the best example of intuitive knowledge. He states "...the final authority on one's own likes and dislikes, pleasures and pains is oneself" (p. 124). Thus, the child that related this story had a feeling of verstehen or intuitive understanding that led him to contact his mother and learn for himself her condition.

Teachers also recognized the ability to "see in the mind" as an important part of the learning process. Pertinent responses included the following:

> "Intuition is the spontaneous, involuntary recognition of the need for a certain action or a sense of a future event which is not derived from reason."

> "Children unable to use their intuition usually want cut and dry answers, want to be told exactly what to do...they do not like thinking questions, where they have to draw from their inner feelings. I feel

children who grow up unable to make use of intuitions become the adults that we say lack common sense."

These responses are in direct opposition to today's educational posture that demands "reasons" for every response which dampens the individual's ability to "see" to search for an inner truth that conveys meaning. These teachers recognize that education should not overlook any aspect of human nature that offers to humanity a better understanding of our world, and solutions to our problems.

Model Two

Agyakwa (1984) asserts that in the second model "Seeing and Perceiving", "Seeing" is a literal and a vital presence, a rational intuitiveness that covers self evident truths involving abstract logic and arithmetical or geometric principles. The underlying idea is that certain types of knowledge or truths are unobtainable without the aid of intuition. Intuitions of this sort come about not through the analytic mode; rather, they arise from "a purposive quest for meaning and understanding" (Noddings & Shore, 1984, p. 84). In these instances, correctness of performance and sensible results are used as the criteria for knowledge claims (Agyakwa, 1988).

One child summed his beliefs about intuition by remarking:

"Intuition is something like an idea that you have for

> something that you can't figure out. You look at different ways and you get the problem right, or you have an idea of it and you figure it out."

This is a type of intuitive induction which gives rise to new ideas and becomes a means to truth. While we discover them "a posteriori" we recognize them as "a priori". Our intuitive understanding in this sense is independent of the space-time position and would hold true for any possible position in which we might experience it in the future (Montague, 1925).

Typically students use this type of intuitiveness in mathematics and on perceptual problems. Three children's responses illustrate these processes:

> "When I was working on a math problem and the teacher didn't tell us what to do - I just knew to subtract and I got it right."

> "Yesterday when I was making a paper airplane I forgot which step went before the other. My intuition told me which step went first, and which came next."

> "Intuition is when your mind tells you what to do. If you had trouble on a math problem your intuition would help you find the answer. It also helps you learn and understand things."

Intuitive insight may also be a frustrating experience. Children understand that the intuition is a basis for new

knowledge, but in some cases this process may not yet be part of their capabilities or they have been encouraged to distrust this knowledge through an emphasis on step-by-step processes or acquisition of the correct answer.

> "Intuition is that thing that happens when you are studying a problem-it pulls you through."
>
> "I use intuition when I am drawing. If I mess up I get all mad because I don't have a lot of patience. I don't really want to get mad, but I have to get mad. I can't stop it. I think my intuition is for the blame. It is trying to get me to do something that I can't do."

Although in all of these instances the children's experience is significant, it is their ability to "see" the essence of the problem that gives rise to solutions. "The intuition takes over at the point where the perceptual experience ends" (Agyakwa, 1988).

Model Three

"Seeing" and "Seeing" represent both literal and figurative interpretations of the moral and aesthetic domains. Because these intuitions often come in what is described "as a flash of insight", they are not open to rational analysis and are often incapable of being articulated. Here again, beliefs based in an intuitive self awareness or intuitive understanding or verstehen are a fruitful source of knowledge (Chisholm, 1966).

W.P. Montague (1925) believes this type of insight plays a major role in the intuition in the sense of immediate feeling. He discusses this in terms of love, friendship, and aesthetic feelings for art. Montague asserts we do not select lovers, friends, or determine our likes and dislikes through authority of others, or through deductive reasoning or calculation. Instead, in these regions he believes intuition is the most appropriate faculty for affording information (Montague, 1925).

Agyakwa (1988) maintains this model deals with dispositions or propensities of varying degree. Quoting Gilbert Ryle, (in Agyakwa, 1988) who distinguishes between simple, single-track dispositions and higher-grade dispositions, he details two types of intuitive awareness based in "knowing how" and "knowing why". These are justified through the results of the action completed through the impetus of the intuition. An example of a single-track disposition is "knowing" punctuality. Agyakwa (1988) elaborates this point by suggesting that when one learns to tell time the extension is an intuitive "feel" for time and punctuality. Children interpreted these single track dispositions as sure and fast feelings.

> "I think intuition is feelings, instincts, ideas and the power to know something."

> "Intuition is knowing you are not wrong... it is feeling instantly."

"Intuition [is like] a feeling that comes like an idea or a right or wrong."

These lower grade intuitions are often moral in character and are intertwined with the ethical sphere which comprise the group of higher grade dispositions. Agyakwa (1988) considers the ethical or moral belief to be subjective in nature. The intuiter "sees" what is "good" or "right" or "duty" and understands intuitively the implications of the action. This process brings to consciousness the ability to question why we do what we do. It enables our mind not only to think but feel.

Children appear to have an intuitive understanding of the ethical or moral implications in action. They are able to express instances of this type more freely than others. In one instance one girl's intuitive feelings were so vivid she personified them, making them even more a part of her reality.

"My intuition is when my mom said, "Stop Reading" and I had a little person inside me saying 'Don't turn out the light because your book report is due in three days.' But then I have another person inside telling me you have to turn out the light. Now I don't know what to do. It's like in the cartoons where you have a devil and angel on each shoulder telling you what to do-they are my intuition."

Another boy intuitively knew the ethics of a situation

and despite his desire for the candy in question, listened to his inner voice.

> "One day I was in the grocery store and I saw a lot of Blow Pops. Blow Pops are my favorite candy. So, I asked my mom if I could get some. She said no. I threw a fit because I love Blow Pops. So I just left my mom alone and went and stared at those Blow Pops. I wanted to steal them but something inside of me just said no I would get into big trouble. So I didn't take any but next time I went and I brought my own money."

Intuition in this respect reflects the moral character of our nature. When it is stifled or discouraged our actions become disjointed and meaningless. It is within this realm that "knowing that" leads to fragmentation, rigidity, isolationism, and nihilism. As an outgrowth, we lose the ability to consider consequences that result from behavior. The inclusion of intuitive knowledge in our conceptualizations, however, contributes to a consciousness that focuses on human relationships in terms of how we deal with each other and the world responsibly. When "knowing why" is allowed to flourish, we scrutinize actions and this encourages axiological considerations to become concerns in the workings of our daily lives.

Model Four

"Seeing" involves previous experiences and exposures that bring about intuitions of which the lay-person is not

conscious. When a professional nods his head in agreement or says "I see" to a complaint or problem, he or she is able to attend immediately, intuitively, to the crux of the matter. It is an intuitive grasp of object that brings about knowledge that is available only to the experienced observer (Agyakwa, 1988). Here again, the achievement or accomplishment of task legitimizes this knowledge claim.

Teachers work from these intuitions daily and are aware of their effect upon the decision making process.

> "As teachers, there are situations that you react to intuitively. You have a sense as to whether a child is telling the truth or you sense that something is bothering him or her."
>
> "Intuition plays a large part in the work relationships between teacher and students."
>
> "Teachers make split second decisions of an intuitive nature every day."
>
> "You don't have to be intuitive to be successful, but more often than not the great teachers I have known are highly intuitive. Teaching requires thinking on your feet and having the ability to have several things going on at once while maintaining an inner sense of control and progress toward completing the task or tasks. Intuition helps you to shift gears easily and to foresee possibilities of problems, questions, etc. It

is the process of sizing up the big picture."

"Anyone who is successful over the years in dealing with people has to have a sixth sense (call it intuition) about human behavior. Intuition involves being empathetic and being on the same wave length."

The intuitive grasp of these situations allows the practitioner to circumvent the process of analysis. Scientific insight, poetic and musical inspiration are a few of the achievements that are born of this intuitive mode (Titus, 1925). Agyakwa (1988) points to intuition in this sense as a higher kind of knowledge, different from that disclosed by the senses or by the intellect through which we discover Bergson's "elan vital", the vital impulse of the world.

Wholeness of Thought

All knowledge derives from thought. Thought includes intellectual, emotional, sensual and physical aspects of our being (Bohm, 1983). When we treat these processes as separate and independent entities, we sentence ourselves to a distortion of perception from which only parts of the whole are visible. From this perspective, we may amass facts and figures to quantify, but the ability to qualify, to see the relational aspect of the whole, remains unobtainable. Knowledge in this manner, fragmented from the rest of reality, blinds us to the natural process and rhythm

that is inherent in the construction of knowledge.

Totality of thought is process thought. It includes accepting reason and intuition as relational aspects of coming to know. Intuitionists believe that a "total response to the total situation may supplement the particular senses and the efforts of the intellect" (Titus, 1946, p. 177). Salk (1983) contends that when we accept the convergence of reason and intuition we will no longer need to concern ourselves with which is of most importance, for their interdependence offers us the opportunity to add a perceptive capacity that overcomes the dichotomy between the knower and the known. This convergence of reason and intuition offers a multiple perspective of reality from which we may draw. Bohm (1983) states:

> Thought with "totality" as its content has to be considered as an art form, like poetry, whose function is primarily to give rise to a new perception, and to action that is implicit in this perception rather than to communicate reflective knowledge of how everything is. (p. 63)

This grounds our knowing not on isolated facts whose validity is checked through externally observable behavior and operations, but rather connects knowledge to our inner consciousness, a personal frame of reference based upon values, attitudes, customs, and beliefs. This subjective knowledge is validated through the flow of feeling, perceiving, and experiencing between inner and outer events.

Consequently, our world emerges in relationships and patterns instead of inert facts and descriptions. We understand that facts are not enough and that correct responses or accuracy are not the same as truth.

The addition of the aesthetic dimension to thought gives rise to new forms, and enables us to recognize our successes and failures and heightens the awesomeness of the challenges and responsibilities inherent in the tasks we face (Purpel, 1989). At first, knowledge may be imprecise, but gradually patterns emerge that yield a sense of insight and purpose. Extending from this conceptual base, meaning may be clarified and heightened, new directions discovered and action becomes process oriented promoting an environment in which our creative consciousness may flourish. In this manner, knowledge is not reified; rather, it is constructed from an intrinsic foundation that enables us to become aware of our relational acquaintance with knowledge, how we create it, how it shapes us, and finally allows us to recognize the implications for what we ultimately accept as truth.

From this perspective within the phenomenological realm, individuals no longer blindly react to their environment; instead, they are in the process of creating themselves and personal meaning which exemplifies their subjective freedom. Whitehead believes that when we expand our foundations to include ranges of feelings as well as the clear and distinct data of science, we render knowledge more empirical rather than less so. Extrapolating from this

understanding, we gain a deeper comprehension of ourselves and our universe that allows our visions of possibilities to become reality. This occurs through the natural rhythm that permeates thought.

Pagels (1983) maintains that problems arise when those who give priority to intuition and feeling and those who give priority to knowledge and reason clash. "Both impulses live inside each of us, but a fruitful coexistence sometimes breaks down and the result is an incomplete person" (p. 311). "When people listen to only that which they understand or proceed according to explicit direction or plan, they cut themselves off from half their intelligence" (Elbow, 1986, p. 135). Similarly, Agyakwa (1988) believes "that any claim to knowledge, from whatever source, ought to be of concern to philosophers unless the testimony of human experience is to be flouted" (p. 173). Consequently, we must learn that there is a limit to how far one may go in demanding reasons for every response, for this demand when pressed to its limits leads to infinite regress (Agyakwa, 1988). This fragmentation distorts and limits our reality. From this perspective, the Cartesian duality, the "in here-out there" mindset that characterizes the predominant philosophy of education overlooks the natural wholeness of the child, an intimate connection between the innerself and the world. This unity of individual and environment is based on the beliefs of the interconnectedness of one's reality, the fundamental totality and relational aspects of

nature, and their reliance on intuition as the link between these relationships.

Process knowledge, based in the ability to see patterns and to understand relationally, offers a fifth dimension (Chapman, 1982; Salk, 1983) to reality. The dynamics of process presents itself as a state in flux, utilizing sense data, reason, and intuition, intermingling, forming, and reforming our world. In this manner, we gain the understanding that "from any beginning we can then move and change our point of view by exploring the mind or exploring the cosmos. We can look at the past, the present or anticipate the future" (Salk, 1983, p. 25).

This encourages movement of thought in creation and presents a broadened perspective that renders our understandings more enlightened. From the ability to know reason and intuition separately and together, one gains deeper insight into the important relationship between what we know and think, do and say.

Patterning and relational thought, both key characteristics of process, bring together the three dimensions of space and the dimension of time to form a whole that provides the ability to see in the deepest sense. This ability offers a multiple perspective of the world that brings back into focus human knowing and the moral and spiritual aspects that embody this process. These encompass empathy, faith, humility, and commitment in action. It requires an understanding of the necessity for autonomous

individuals, those capable of looking at problems from multiple perspectives and choosing the path for the common good.

Ultimately, process encourages an understanding of the existentialist belief in the "authentic individual". It takes us past viewing self-actualization as a final cause and moves us beyond where final causation becomes not a fixed entity but instead encourages creativity, understanding, and transcendence. Salk (1983) professes a belief in our moral obligation to strive beyond the norm, to search for what appears to be beyond reach. Similarly, Wilbur (1983) proposes that the only constant is the search, that being is dynamic becoming. It follows that the metaphor of humanity as puppet dancing to another's tune is no longer salient; instead, the individual is aware of and understands the concept of becoming and the personal freedom inherent in this state. The burden of responsibility for the choices made possible by this freedom is also of grave concern.

The individual capable of creating meaning, of comprehending the process of becoming, understands intuitively the fifth dimension of sensing patterns and relationships, and recognizes that what happens outside oneself is a reflection of one's inner world. Thus, the solution for the ills found in the human condition lie in the joining of the intuitive and reasoning powers of the human being because it brings to consciousness a wholeness

of spirit that a preoccupation with abstract scientific knowledge lacks.

This encourages and restores, Whitehead asserts, a wholeness and speculative coherence to reason, for the interpretation of our apprehension of reality (Hill, 1961). Reason's function, Whitehead (1958) believes, is to "promote the art of life" (p. 4). It is within the realm of speculative reason to accept and then transcend the analysis of existing fact, to build a "cosmology expressing the general nature of the world as disclosed in human interests" (Whitehead, 1958, p 85). Following this assertion, the next section explores the philosophy of Alfred North Whitehead and its implications for process knowledge and curriculum thought.

CHAPTER IV

AN INQUIRY INTO THE WORK OF ALFRED NORTH WHITEHEAD

Introduction

Alfred North Whitehead has contributed much to the philosophical world. Born in England in 1861, his formative years exerted a powerful influence on his future. His father was director of a private school and later a clergyman. The senior Whitehead was involved in local and state affairs, and consequently, Whitehead was exposed at an early age to national and local politics. He developed an early interest in history which sparked an awareness of the past. At school, in Sherborne, he was a leader involved in sports and supervised discipline outside the classroom. He studied Greek and Roman, French and English literature, history, mathematics, and science. (Johnson, 1947). In an article in The Atlantic Monthly he described the purpose of his early education. "We did not want to explain the origin of anything. We wanted to read about people like ourselves, and to imbibe their ideals" (Whitehead, cited in Johnson, 1947, p. 4).

Later, at Cambridge University Whitehead studied

mathematics. In addition, he also took part in informal discussions over diverse areas such as politics, religion, philosophy and literature. A voracious reader, Whitehead also was interested in the poetry of Wordsworth and Shelley and in historical materials (Johnson, 1947).

From this eclectic background, the philosophy of Alfred North Whitehead evolved. His books fall into three distinct periods (Hill, 1961). His first works, concerned with logic and math, date from 1888 to 1914. These were primarily written during his time at Cambridge University. One of Whitehead's best known works from this time, Principia Mathematica, co-authored with Bertrand Russell, questions the practice of employing indefinable mathematical concepts and also disagrees with the traditional conception that mathematics is the science of magnitude (Johnson, 1947). "According to Principia, mathematics is the science concerned with the logical deduction of consequences from the general premises of all reasoning" (Johnson, 1947, p. 10).

The second period, extending from 1915 to 1924, was conducted at the University of London. Here, Whitehead formed his philosophy of scientific knowledge. In his works Principles of Natural Knowledge, The Concept of Nature and The Principle of Relativity, Whitehead endeavors to present a unified concept of nature that did not become embroiled in metaphysics. Whitehead believes that the values of nature are the key to the metaphysical synthesis of existence;

however, he states, "but such a synthesis is exactly what I am not attempting. I am concerned exclusively with the generalizations of widest scope which can be...known to us as the direct deliverance of sense-awareness" (Whitehead, 1957, p. 5). Continuing in Concepts of Nature (1957) he relates:

> Any metaphysical interpretation is an illegitimate importation into the philosophy of science. By a metaphysical interpretation I mean any discussion of the how and of the why of thought and sense awareness. In the philosophy of science we seek the general notions which apply to nature, namely to what we are aware of in perception. It is the philosophy of the thing perceived and it should not be confused with the metaphysics of reality of which the scope embraces both perceiver and perceived. No perplexity concerning the object of knowledge can be solved by saying there is a mind knowing it. (p. 28)

His principle attack during this period surrounds the bifurcation of nature and opposition to traditional beliefs about space, time and matter (Hill, 1961). In the Concept of Nature (1957) Whitehead proposes to extricate philosophic thought from the doctrine of a "valueless vacuous actuality" characteristic of abstract thought begun by Aristotelian logic, perpetuated by the science of Galileo and Descarte, and projected into philosophy by Locke. In addition, time and space, viewed as absolutes brought about the rapid

advance of mechanics, which Whitehead believes has ultimately led to a "scientific impasse." This static view of the universe impedes progress (Hill, 1961). Instead of looking at space and time as external conditions, absolute and independent, in which reality "exists", Whitehead views space and time as relations between moments or events. Their mutual relations, expressed from a purely experiential point of view, leaves open the possibility of the occurrence of diverse modes of conceiving the universe.

The principle of relativity heavily influences Whitehead's interpretation of reality (Spraggins, 1984). Through his interpretation of space and time, Whitehead suggests that nature discloses the underlying character of the nature of knowledge. The disposition and spirit of knowledge are specifically derived through the relationships of space and time in their forms of extension, cogredience and ingression (Hill, 1961).

Extension is made up of segments called durations. These are defined as "our observational present" or as "the whole of nature appreciated in immediate experience" (Hill, 1961, p. 267). Durations are infinite in their spatial aspects and overlapping temporally so as to give continuity to time. Thus, durations are made up of events that involve wholes and parts and there is no single way they may be divided (Hill, 1961).

> By reason of its extension each bit of matter is divisible into parts, and each part is a numerically

> distinct entity from every other such part. Accordingly it would seem that every material entity is not really one entity. It is an essential multiplicity of entities. (Whitehead, 1957, p. 22)

The second relation, cogredience, is the event included in our observational present that signifies our standpoint of perception. Cogredience is that quality within the differing time systems nature provides that offers meaning to the "here" in its relation to the event. The notions of motion and rest arise through comparisons of positions (Hill, 1961).

Finally, ingression concerns "the way a character or event shapes itself in virtue of the being of the object or universal" (Whitehead, cited in Hill, 1961, p. 268). Between object and events lies a mutual dependence. Objects are situated within events. Events are not recognized in isolation; rather, they are seen in terms of the object having ingression in them.

> Objects are situated in the events into which they have ingression...This means that with respect to events the object is a whole systematic assemblage of modifications involving an unresolvable multiple relation and that each object is in some sense ingredient throughout nature. (Whitehead cited in Hill, 1961, p. 269)

Thus, it is through the features of cogredience, ingression, and extension found in duration of events that

the notion of subject and object and their relationship in time, space, of being in motion and at rest, are inseparably intertwined. Furthermore, the mutual interdependence of these forms the foundation of the creative advance of nature. This shared relationship between objects and events became the foundation for Whitehead's later writings.

Whitehead's third period of writing from 1925 to 1937 began at Harvard where he became Professor of Philosophy. In this period he rejects the modern doctrine of science. Whitehead no longer adheres to the belief that science is merely the description of things observed thus needs no metaphysics for explanation (Whitehead, 1958). Instead, during this period he undertook the task of formulating a philosophy of life which touched upon the aesthetic, moral, and religious, integrating these with the data of the natural and social sciences. During this period, Whitehead's diverse background coalesced into his organismic philosophy. In the works of Process and Reality, Modes of Thought, Adventures of Ideas, Religion in the Making, and the Function of Reason it becomes Whitehead's contention "that the key to understanding of ultimate reality is the careful examination of the nature and experience of human beings" (Johnson, 1947, p. 12). From this belief arises a system of general ideas with which Whitehead attempts to interpret every element in experience. Thus, Whitehead's inquiry moves from that of his second period of writing in that his philosophy no longer looks simply at scientific

inquiry into the nature of reality; rather, every source of insight is promoted to achieve an organismic wholeness for the interpretation of knowledge which a scientific outlook rejects.

The Philosophy of Organism

Whitehead's view of philosophy is the antithesis of the traditional positivistic-scientistic belief system. He draws from all areas of human interest in an effort to bring together and resolve conflicts between epistemologies. In essence, the philosophy of organism is an attempt to present a cosmology in which each organism called an actual entity or actual occasion grows, matures, and perishes (Sherburne, 1966).

In Modes of Thought (1938), Whitehead defines philosophy as an attempt to make clearly apparent the fundamental data inherent in the nature of things. Within this philosophy lies the belief that no entity may be perceived in complete abstraction from the system of the universe (Whitehead, 1978). Whitehead asserts that the errors concerning fragmentation and abstraction of fact, made by early science, led to a conceptual framework in which philosophy, guided by the notion that its method is to erect a deductive system of thought, formulates a system in which the premises are clear, distinct, and certain (Whitehead, 1958; 1978). He states: "My quarrel with modern epistemology concerns its exclusive stress upon sense

perception for the provision of data respecting nature. Sense perception does not provide the data in terms of which we interpret it" (Whitehead, 1934, p. 7). "The truth is that our sense perceptions are extraordinarily vague and confused modes of experience" (Whitehead, 1934, p. 29). Whitehead further contends that this mechanistic view of nature omits our intuitive modes of understanding; knowledge in this way becomes superficial, based upon broad generalizations of sense perceptions.

Whitehead (1938) asserts that the weakness found from a positivistic belief is the manner in which scientists welcome detached fragments of explanation. From this perspective, he maintains that science is bankrupt. He believes that when scientific notions rest upon sense data we can find no joy, aim, or creativity in nature. We are working with only one half the evidence human experience provides (Whitehead, 1934). Knowledge in this manner is an abstraction and "is nothing else than the omission of part of the truth" (Whitehead, 1934, p. 13).

Central to this positivistic philosophy is the notion of causation. Whitehead, in Modes of Thought (1938), questions the belief that one event may be the cause of another. He holds the whole antecedent world brings about a new occasion in the manner of its relations. He contends that "neither physical nature nor life can be understood unless we find them together as essential factors in composition of reality, ... whose interconnection and

individual characteristics constitute the unity" (p. 205).

Reason is the factor in experience which directs and criticizes the urge toward attainment of unity in which past, present, and future produce a dynamic system where all interactions involve transitions in their essence. The main evidence that a methodology is worn thin comes when progress within a system no longer deals with main issues. When we live in a stabilized life, there exists no need for reason because reason seeks the novelty of creative advance (Whitehead, 1958).

Whitehead (1958) discusses the function of reason as a two fold process. First, reason operates as a method for seeking complete understanding. From this perspective reason becomes speculative and enables transition toward new methods; however, reason from a practical perspective seeks an immediate method for acting. Without the speculative realm, practical reason suffers from "obscurantism" or the refusal to speculate on the limits of traditional methods.

Whitehead (1958) maintains we all begin as empiricists, but our scientific endeavors become mired in immediate interest. Furthermore, the more we search and understand about these interests, the more we reject the inclusion of evidence which refuses to be immediately harmonized with our study. Thus, "the conduct of human affairs is entirely dominated by our recognition of foresight determining purpose and purpose issuing control (Whitehead, 1958, p. 13). It is then that practical reason succumbs to the

dogmatic fallacy that permeates science with its refusal to accept or entertain ideas that do not immediately conform to the present system.

To alleviate this finite condition, Whitehead believes that "the power of going for the penetrating idea, even if it has not yet been worked into any methodology is what constitutes the progressive force of reason" (Whitehead, 1958, p. 45). Only through the acceptance of an interplay of speculative and practical reason do ideas of clarity arise which promotes the creative advance of civilization. Final causality no longer holds a prominent place in scientific endeavors. It is on this belief that the philosophy of organism turns.

Parsons (1981) points out three additional ideas central to Whitehead's philosophy of organism. Most importantly, the organismic philosophy, rejects reductionistic philosophies that fragment and distort knowledge leaving it static. Instead, Whitehead encourages creativity of feeling, based upon dynamic interaction which recognizes all concrete experiences as valuational. Experience derives values from its subjective content. The subjective centers directly upon intuitive insights. Whitehead asserts (1978) that the problem of philosophy is to come as near as possible to the complete concreteness of our intuitive experience so that we may begin with the immediate quality and depths of our own physical experience. To reject this centrality of feeling is to follow Newton and

Hume in omitting from our consciousness "aspects of the Universe as experience and of our modes of experiences, which jointly lead to the more penetrating ways of understanding...in such ways the Newton-Hume interpretation omits our intuitive modes of understanding" (Whitehead, cited in Northrop and Gross, 1953, p. 896-897). Thus, centrality of feeling contributes to process input from the subjective that brings emotional, purposive, and appreciative elements to alien facts that offers enlightenment.

The second important aspect of Whitehead's philosophy is Societism, the principle that encompasses the belief in a multi-faceted interconnected world (Parsons, 1961). In Modes of Thought (1938) Whitehead reminds us that not only are we in the world but conversely the world is within us. The order of the universe hinges upon the belief that no actual occasion can exist or be defined apart from its predecessors. The doctrine of internal relations to which Whitehead subscribes illustrates this point. It purports that an entity is made up of relations with other entities and not by its substance which first exists and then is externally related (Dunkel, 1961). Subsequently, each actual occasion affects the nature of all others. Occasions emerge from the universe of the past each in a unique way so that no two are exactly alike. These are the elements that give rise to time and space. These internal events are ignored or reflected by science. Thus, science never fully

understands events occurring within the universe (Hill, 1961). Whitehead (1938) contends that the old method of abstracting nature at an instant in isolation is no longer relevant to our reality. Instead, we must accept that there is no nature removed from the elements inherent in the process that makes up nature.

Nature, formulated from process, or the doctrine of becoming, is the final aspect that is central to Whitehead's philosophy (Parsons, 1961). Whitehead's belief that subject and object are inseparably linked both with one another and the universe in organic unity exemplifies process (Hill, 1961). This type of relation produces a natural rhythm in which the potentiality of occasions arises which is fundamental for the understanding of existence. When the universe is viewed as static, potentiality vanishes. Whitehead states:

> If we start with process as fundamental, then the actualities of the present derive their character from process and bestow their character upon the future. Immediacy is the reality of the potentiality of the past and is the storehouse of the potentiality of the future. Hope and fear, joy and disillusionment obtain their meaning from the potential essence in the nature of things. (Whitehead, cited in Northrop and Gross, 1953, p. 871)

The potential in immediate fact constitutes the driving force of process. In this manner potentialities become

actuality and introduce the concept of novelty through creative activity (Whitehead, 1934).

Speculative Philosophy

Process encourages the introduction of novelty as an integral part of reality. No entity is perceived in complete abstraction from the system of the universe. Salient to this point is Whitehead's belief in the part speculative philosophy plays in the creation of new ideas. In Process and Reality (1978) Whitehead states "speculative philosophy is the endeavor to frame a coherent, logical necessary system of general ideas in terms of which every element of our experience can be interpreted" (p. 3). Thus, the aim of Whitehead's philosophy of organism is speculative.

Within this process, Whitehead appeals to direct insight of speculation to indicate meaning and suggests the best method for understanding reality to be careful self observation. Here, an individual selects, from environmental factors specific data required for human experience. This selectivity, combined with a process of autonomous self development, guided by an appreciation of certain ideal goals, constitutes every action in human experience (Johnson, 1947). Consequently, Whitehead believes that reality is composed of persons who have varying degrees of width and depth of experiences and each of these persons emerges as a result of creative interaction

with other persons (Johnson, 1947). Thus, Whitehead contends that it is the speculative idea and the evolutionary process of continual change that guides human experience (Johnson, 1947). Here, the ultimate function of reason "to promote the art of life" is carried out (Whitehead, 1958, p. 4). This encompasses the urge "to live, to live well and to live better" (Whitehead, 1958, p. 18).

Whitehead believes that speculative understanding brings to life elements that promote going beyond limited reasons toward a flight to the unattainable. Historically the Greek thinkers made speculation effective. Whitehead (1958) lists the important characteristics of the speculative thought of the Greeks. These include: (1) curiosity; (2) systematic methods in thought; (3) multiple interests and a desire to illuminate the interplay between these interests; (4) the search for truths of the highest generality; (5) maintaining active practical interests.

The business of speculative reason as set forth by the Greeks in these five characteristics is to make thought creative for the future; however, the need for discipline arises. While Whitehead believes that to set limits to speculation is treason to the future, the use of such speculation must be kept in perspective of the known facts of the era (Whitehead, 1958). Thus, speculative reason works in an interplay of two ways utilizing a system of checks and balances. It accepts limits of a topic or method

while seeking the means to enlarge its scope; "it [also] seeks to build a cosmology expressing the general nature of the world as disclosed in human interest" (Whitehead, 1958, p. 85). "The supreme verification of the speculative flight is that it issues in the establishment of a practical technique for well-attested ends, and that the speculative system maintains itself as the elucidation of that technique (Whitehead, 1958, p. 80-81). Whitehead maintains that this interplay is the mechanism through which speculative philosophy is restrained.

Whitehead (1958) asserts that the secret of progress is speculative interests in the development of abstract schemes which precede understanding of fact; however, these schemes may not be pressed past their proper scope. The art of speculative reason lies in the transcendence of schemes as well as their utilization. Such speculation creates systems and then transcends them, bringing to the world a process which encourages dynamic movement toward the future. This freedom of thought promotes the art of life.

Finally, through speculative philosophy, Whitehead's Philosophy of Organism does not confine itself to rules of one science and attempt, as modern science often does, to explain away data that does not quite fit the mold. Instead, this system of thought, utilizing practical and speculative processes, provides an interpretive system which expresses the interconnection of the systems found in the universe (Whitehead, 1958).

Characteristics and Components of Whitehead's Cosmology

Whitehead's Theory of organism encompasses not only knowledge of nature but knowledge of all reality. Whitehead's (1938) concern over modern epistemology's preoccupation with the exclusive use of clear and distinct data as the true harbinger of reality reflects his belief that "the scope of the concept of experience must be widened to include neglected ranges of feeling, and this widening process renders knowledge more empirical rather than less so" (Hill, 1961, p. 271).

The connections Whitehead makes between conceptual knowledge and experience lie in the relationships between entities that figure in his philosophy. This process "is constituted by the reception of entities whose being is antecedent to that process into the complex fact which is that process itself (Whitehead, 1933, p. 228). This interdependent practice includes imagining, selection and ordering; reality consequently becomes more than decision making and consequence of action because it includes the potential for variety in action (Oliver, 1989).

Following this belief, Whitehead includes the importance of rational mind and speculative thought as necessary components to the concept of reality and the construction of knowledge. The essence of his philosophy flows around the understanding that reality is more than

action; rather, it is the progressive grasping into a unity where "neither physical nature nor life can be understood unless we fuse them together as essential factors in composition of really real things whose interconnections and individual characteristics constitute the unity" (Whitehead, 1938, p. 205).

Whitehead speaks of this type of unity as a "vibratory existence" of the process of organism. Wilbur (1979) uses the metaphor of a wave to interpret Whitehead. He states:

> All events and things that we consider as irreconcilable such as cause and effect, past and future, subject and object are actually like the crest and trough of a single wave, a single vibration. Reality is not found in the crest or trough alone but in their unity. (p. 23- 24)

The basis for Whitehead's theory of knowledge rests upon the ontological principle, the reformed subjectivist principle and the principle of relativity. These principles are unique as they are used in Whitehead's work and serve to illustrate how experience differs in process from experience in traditional philosophical systems. In traditional systems experience becomes static; subjects are fixed and ordered, a symbol of the mechanical universe of Decarte and Hume at its finest. Whitehead, alternatively, views experience as the concrescence of what and how the entity is. According to the ontological principle:

> Every condition to which the process of becoming

> conforms in any particular instance has its reason either in the character of some actual entity in the actual world of that concrescence, or in the character of the subject which is in process of concrescence.... there is nothing which floats into the world from no where. (Whitehead, cited in Sherburne, 1966, p. 233)

The ontological principle is closely related and entertwined with the reformed subjectivist principle because they both point to the inherent fact of nature that every entity is a potential for every becoming. All things are potential qualifications of occasions. How an actual entity becomes determines what that actual entity is (Whitehead, 1978).

Whitehead combines two documents, the sensationalist principle and the subjectivist principle, to form the reformed subjectivist principle. Sherburne (1966) explores the essential notions of these two principles. The subjectivist principle asserts that any act of experience is analyzable in terms of pure universals. Alternatively, the sensationalist principle proposes that the fundamental activity in experience is the "entertainment of the datum devoid of any subjective form of reception" (p. 127). This is the doctrine of sensation where the perceiver passively receives information from the external world.

The reformed subjectivist principle, to which Whitehead subscribes, suggests that all entities are to be viewed as potentials and qualities for all occasions. The "object" of

experience is an essential ingredient of the experiencing subject. The object is not an external thing but immanent in the subject. Thus, the reformed subjectivist principle is a doctrine of experiencing, where the activity in experience is a receiving of entities (Leclerc, 1965). Experience from this perspective is not negotiation between subject and object; rather, it is relational in that entities meld together into new subjectivity (Parsons, 1961). Consequently, the subjectivist principle balances the duality found in the natural sciences by blending subjectivism with objectification of experience to create novelty. From this perspective, the duality of outside and inside becomes meaningless and the boundary between the two unites into the understanding that while each entity is autonomous in its creativity, it is also an inherent part of the whole.

In terms of the principle of relativity, in his essay Space, Time and Relativity (1929) Whitehead suggests:

> In the act of experience we perceive a whole formed of related differentiated parts. The relations between these parts possess certain characteristics, and time and space are the expressions of some of the characteristics of these relations....the generality and uniformity which are ascribed to time and space express what may be termed the uniformity of the texture of experience. (cited in Whitehead, 1974, p. 244)

Whitehead believes while time and space are necessary to experience in that they are characteristics of our experience, it is the relations between relations from which the character of experience is truly derived. Thus, in his ontology actual entities are made divisible and indivisible from different points of view. In addition, an actual entity must be related to all other entities. Actual entities give rise to time and space; they do not reside in an external spatio-temporal continuum.

While these three principles help define the relationship between the components in Whitehead's ontology, to fully understand the cosmology of Whitehead and its implications, an explanation of the essential entities becomes necessary. Northrop and Gross (1953) assert Whitehead introduces new terminology in his philosophy of organism to avoid the conceptual shortcomings inherent in other philosophies. They suggest each new concept is relationally defined in terms of the preceding term until a formal system is constructed. Since the system is based on the interconnection of its elements no appeal to outside sources for interpretation becomes necessary. Thus, it is possible to deal only with the system as a whole.

The actual entity or occasion is the basic, most fundamental ingredient by which Whitehead explains all reality. Whitehead, in Process and Reality (1978), states that God is an actual entity and so is the most trivial puff of existence in far off empty space. Actual entities or

actual occasions are pure potential, universals, that lose their value apart from the world. The ontological principle, to which Whitehead subscribes, states "No actual entity, then no reason" (Whitehead, 1978, p. 17).

A related set of actual entities is a nexus. These make up the units of everyday existence. When entities meld together through prehension they give rise to recognizable persons or things in reality. When actual entities come together and are objectified in each other in an occasion, the real, individual, and particular facts intertwine; this togetherness constitutes the nexus.

Hill (1961) points to another component of cognition in Whitehead's philosophy, the eternal object. Eternal objects are "pure potentialities for specific determination of fact and function as forms of definiteness" (p. 273). They are the only entities which do not require other entities to exist; they develop when prehended by an actual entity or occasion, as they are unified with its being. Examples of eternal objects are color and shape. Because they are universal, they can and do recur, but how they recur depends upon the object's subjective aim or intent (Oliver, 1989). Blyth (1941) asserts that Whitehead's ontology may be seen as a pluralism of actual entities and eternal objects related through their experiences.

From the relationship between actual entities, eternal objects, and nexus the importance of the theory of relativity upon Whitehead's philosophy emerges. Science,

Whitehead believes, looks at events only from a spatio-temporal aspect. Instead he advocates that actual entities and eternal objects are not situated in time and space; rather, they give rise to time and space. In addition, actual entities and eternal objects do not endure through time; rather, in their passing each occasion emerges differently so no two are precisely alike defining their time and space in the Universe. They form first as subject and then as object in the growth of the new subject.

Within the process of knowing, and influenced by the theory of relativity, the relationship between subject and object which Whitehead defines as the subjectivist principle is of primary importance. In his revised form of the subjectivist principle, Whitehead asserts that when a subject feels an object it feels in a definite way - the how of this feeling is called by Whitehead the subjective form of the feeling (Blyth, 1941). This subjective existence is an integral part in experience between subject and object.

Hill (1961) describes Whitehead's idea of subject as "a dynamic, emotional, creative and created, unifying and unified aspect of an actual occasion or entity...both activity and resultant, forming and formed" (p. 278). The subject and its subjective aim, the ideal of what the subject can become, emerges through process. From the vehicles of concrescence and prehension to conscious apprehension evolves the subjective forms of emotion, valuation, purpose opposition, and consciousness (Whitehead,

1978, p. 24). These subjective forms do not arise independently. Instead, they define and influence one another. Their essence encompasses an evolutionary process bound inextricably with the space and time of the events from which they evolved. From them, a unity in the subject emerges.

"The object is the data from which the occasion originates, the catalyst, an entity which is potentiality for being a component of feeling" (Whitehead in Hill, 1961, p. 279). Whitehead asserts that an object consists of one of two types of entities, or a combination of them. They are actual occasions of the existing order or eternal objects that make up the realm of possibility, or, the object may be part of a nexus. Objects that are physical facts are composed of dynamic patterns of occasions. "Every occasion may become at some time an object" (Hill, 1961, p. 279).

Whitehead (1933) holds that the structure of experience has suffered from the tendency of philosophy to discriminate between the elements of subject and object. He states "this structure has been identified with the bare relations of knower to known. The subject is the knower and the object is the known. Thus, with this interpretation, the object-subject relationship is the knower-known relation (p 225). Whitehead asserts instead, that the subject-object relation induces an understanding of past that interjects into present and implies a relationship to future. The events

that lie between object and subject are merged together in the process of creation. Whitehead argues "that subject and object are inseparably linked both with one another and with the whole universe in organic unity" (Hill, 1961, p. 281). The subject and object maintain an interconnected, interdependent relationship. Depending upon the circumstance and the elements involved, an entity may become either a subject or an object.

The Process of Becoming

The development of an actual entity begins with prehension. Whitehead (1978) calls prehensions vectors for they "feel what is there and transform it into what is here" (p. 87). The process of prehension is understanding or apprehension devoid of consciousness or representative perception. A prehension reproduces in itself the characteristics of an actual entity. It is a referent to the external world.

Oliver (1989) states prehensions apply to all aspects of universal process. They are the mode through which one occasion responds to another. Thus, no occasion or entity stands alone isolated; instead, Whitehead holds that prehensions give rise to occasions which are characterized by the patterns and interconnections that include the observer and the observed. "The prehension is the vehicle through which one actual entity becomes objectified in another, or eternal objects obtain ingression into actual

entities" (Sherburne, 1966, p. 235). The prehension carries the object into the form of the subject. The subject is the actual entity in the process of creation. The actual entity grasps, or has feeling (a positive or negative prehension) for the new form (Oliver 1989).

Not all prehensions, however, can be included. When a prehension of an eternal object is excluded from being an element in the makeup of the actual entity, a negative prehension evolves. Negative prehensions and positive prehensions (feelings) constitute the actual entities. Thus, through prehension one actual entity becomes unified with another, becoming relationally either cause or effect. An occasion is a subject by virtue of its relations with the object, or an occasion may be an object by virtue of its relations with the subject (Whitehead, in Oliver, 1989).

While the relational, interdependent character of each actual entity (occasion) is important, of equal importance are the intrinsic properties of each event. Through the process of interaction, each event displays not only its external qualities from which space and time arise but also its inner feelings (Hill, 1961). As a result, the internal character of the event is disclosed. Thus, the act of prehending on the part of actual entities involves "emotion and purpose, and valuation and causation" (Whitehead, 1978, p. 19). With the acceptance of the internal and external characteristics as essential ingredients in the actual entity, actual events become a unity in process.

The act of becoming, concrescence, is the result of occasions prehending one another. Whitehead (1933) states: "The word concrescence is a derivative from the familiar Latin verb meaning grow together....concrescence is useful to convey the notion of many things acquiring complete complex unity" (p. 303). This unity formed through five stages occurs and operates throughout reality.

In the first phase of conformal feeling, the primary stage of concrescence, the antecedent universe enters into the entity. It is a phase of pure reception and initiates the process of becoming. This initial phase sets forth the principle of final causation in Whitehead's philosophy. The actual entity selects from possibilities and self determines their becoming. The uniquenesses of an actual entity is inherent in its character and condition and its transcendence to novelty (Sherburne, 1966).

The second stage of concrescence, conceptual feelings, constitutes the physical and mental pole of an actual entity. Whitehead believes one's reality cannot be understood without the examination of the unity of the poles within the actual entity. With the emergence of the conceptual phase, valuation, the subjective form of a conceptual feeling, emerges. At this level creativity is operating and the subject acts as the causal agent in its own concrescence (Sherburne, 1961). Thus, the initial data, a multiplicity of feelings, is transformed through subjective aim into a potentiality.

"The third phase, simple comparative feeling, compares or holds in the unity of contrast a simple physical feeling from phase one and a conceptual feeling from phase two" (Sherburne, 1961, p. 54). Whitehead sometimes refers to this as the integral comparative feeling (Sherburne, 1961). From the physical feeling and the conceptual feeling an object develops a richness of character from which arises the propositional feeling. The primary function of a proposition is that it act as a lure for feeling, which is the foundation necessary to ascertain purpose.

The fourth phase, characterized by complex comparative feelings, gives rise to consciousness. This consciousness is a product of the previous stages. Whitehead asserts that "consciousness presupposes experience and not experience consciousness" (Whitehead, in Sherburne, 1961, p. 214). Consciousness is a subjective form in which the elements are derived from the process of concrescence and yield the final phase termed satisfaction.

The character of satisfaction is such that it gives rise to value of the creation. Satisfaction is the outcome in which the actual entity terminates its becoming in one complex feeling either positive or negative. Thus, when several actual entities prehend one another a new occasion arises. The act is driven by an inner process, a subjective aim, based upon the categories of feeling. "The subjective aim of an actual entity is to integrate its feeling of past actual entities into one complex harmonious feeling of

satisfaction" (Blyth, 1941, p. 13).

The process of concrescence of the actual entity is an act of becoming which terminates in the unity of feeling. Oliver (1989) discusses the process of feeling and identifies five factors in its makeup:

> (1) the subject that feels, ie., the actual entity; (2) the initial data to be felt; (3) the elements of other data by virtue of negative prehensions (what the entity decides not to use or be); (4) the objective data that is felt; and (5) the subjective form, which is how that subject feels that objective data. (p. 116-117)

Following this process in feeling, our ideas become not merely representations but modes through which subjects incorporate other entities as components of themselves. Each actual entity, conceived as an encounter, forms from objective and subjective data and melds into the unity resulting in subjective satisfaction. Feeling is the term used for this process of "passing from the objectivity of the data to the subject of the actual entity in question" (Sherburne, 1966, p. 225).

The unifying process in concrescence excludes the possibility of cause and effect. Whitehead (1934) rails against this mechanistic interpretation of nature so prevalent in the modern sciences:

> I will recur to the main principles of the old common-sense doctrine which even today is the common doctrine of ordinary life ....There are bits of matter, enduring

> self-identically in space which is otherwise empty. Each bit of matter occupies a definite limited region. Each such particle of matter has its own private qualifications....The essential relationship between bits of matter is purely spatial. Space itself is eternally unchanging, always including in itself this capacity for the relationship of bits of matter .... Locomotion of matter involves change in spatial relationship. It involves nothing more than that. Matter involves nothing more than spatiality....This is the grand doctrine of Nature as a self-sufficient, meaningless complex of facts. It is the doctrine of the autonomy of physical science. It is the doctrine ... which I am denying. (p. 5-6)

For Whitehead, the coming together of prehensions in concrescence brings variety where mind and matter influence one another and give rise to some new event or occasion. From this perspective, one effect does not point directly to one cause; rather, an entity is a multiplicity of causes. An effect relates to cause, to the subject's emotions and feelings in the occasion. Thus, it is impossible to consider the object without the context from which it emerges. From this, the notion of cause and effect becomes nonsensical.

Nature of Consciousness

Initially in his Theory of Organism Whitehead rejects

the account of the nature of experience as merely the identification of apprehension with sense perception. Instead, he believes perception must have a wider scope, a feeling of sympathy which involves feeling "in" and "with" the object (Blyth, 1941). Whitehead asserts that it is the emotional element not found in clear consciousness that constitutes an integral part of reality. Whitehead bases his theory of perception and metaphysics upon this type of experience (Blyth, 1941).

When prehensions become sufficiently complex, they become part of our consciousness and qualify as perceptions. Perception constitutes knowing. The essential characteristics retain the qualities found in the more elementary form of prehension but become more abstract in nature (Hill, 1961). Perception involves three distinct modes: causal efficacy, presentational immediacy, and symbolic reference. These forms integrate to become what the actual world is, "a unity of data in our experience productive of feelings, emotional satisfaction, actions, and finally as the topic for conscious recognition when our mentality intervenes with its conceptual analysis" (Whitehead, in Blyth, 1941, p. 65).

Presentational immediacy constitutes the most complex mode of perception. It is the perceptive mode in which clear and distinct consciousness of the extensive relations of the world derive (Whitehead, 1978). Presentational immediacy alone transmits data that are clear and distinct,

but self contained and thus cut off from time. It is the instantaneous perception of our external world (Blyth, 1941). In the mode of presentational immediacy there is no sense of continuity in terms of past, present, or future. Unfortunately, presentational immediacy has been for science taken as the whole perception; this narrow view negates the possibility of interpretation because it rejects the relational connection with the past that is necessary for the examination of reality.

"Perception in the mode of presentational immediacy is described by Whitehead as the perceptive mode in which there is clear, distinct consciousness of the extensive relations of the world, relations which include the extensiveness of space and the extensiveness of time" (Blyth, 1941, p. 29). "In this mode the contemporary world is consciously prehended as a continuum of extensive relations .... appearing as an element constitutive of our own experience" (Blyth, 1941, p. 42). This expands the understanding of presentational immediacy to include the manner in which the present world is consciously prehended as a continuum of extensive relations. Whitehead decries the belief that the act of becoming is divisible. Instead, he constructs a continuum on which the occasions may be expressed as relational, overlapping wholes and parts. "The extensive continuum is a potential scheme of relationships which is actualized by each set of relations constituting an actual entity" (Whitehead in Blyth, 1941 p. 32). The relational

nature of presentational immediacy placed in the extensive continuum explains why an event can be found where and how it is; without this understanding the event does not exist. In this manner, each actual entity acquires its own world and views the world from that vantage.

The concept underlying presentational immediacy and the extensive continuum is that of causal efficacy. Causal efficacy brings together past, present, and future. It constitutes the subjective forms of the actual entity which are derivative of the past passing into oneself in the present and suggesting a passage into the future (Blyth, 1941). Vague and inarticulate sensations constitute causal efficacy. It is accepted as being an emotional feeling that orders our general sense of existence within a dynamic system (Whitehead, 1978).

Causal efficacy and presentational immediacy almost never occur in pure isolation from one another (Hill, 1961 & Blyth, 1941). In Process and Reality (1978) Whitehead states the nearest one ever comes to pure presentational immediacy is in illusion and double vision or the sensation after amputation that the limb is still attached. "The nearest one comes to pure causal efficacy is in instances of memory and visceral changes" (Hill, 1961, p 276). Whitehead believes that perception, instead, occurs in a compound mode that combines presentational immediacy and causal efficacy. This mixed mode labeled symbolic reference combines the qualities of the two pure modes. The result is that data in

experience produce feelings, emotions, satisfactions, actions and conscious recognition (Blyth, 1941). Whitehead states in Symbolism:

> We are subject to our percepta in the mode of efficacy, we adjust our percepta in the mode of immediacy. But, in fact, our process of self-construction for the achievement of unified experience produces a new product, in which percepta in one mode, and percepta in the other mode, are synthesized into one subjective feeling. For example, we are perceiving before our eyes a grey stone. The two modes are unified by a blind symbolic reference by which supplemental feelings derived from the intensive, but vague, mode of efficacy are precipitated upon the distinct regions illustrated in the mode of immediacy. The integration of the two modes in supplemental feelings makes what would have been shallow to be intense. This is the perception of the grey stone, in the mixed mode of symbolic reference. (Whitehead, in Blyth, 1941, p. 65)

When mentality intervenes symbolic reference produces conscious recognition or experience. Conscious experience involves what Whitehead labels propositional feeling.

Propositional feeling consist of data that await a subject to feel them (Sherburne, 1966). "It relates to the world through its truth or falsity" (p. 276); however, Whitehead insists that to dwell upon truth or falsity is to miss the point about propositions. Propositions are a means

of introducing novelty into the universe through the acceptance of nonconformal propositions (Hill, 1961). Whitehead asserts that "this novelty may tend to produce more or less of order and is potential for good or evil....the risk of evil [however] is requisite for good and error is the price which we pay for progress." (Whitehead in Hill, p. 277).

The subject of a proposition is a set of actual entities and the predicate is a set of eternal objects. The later defines the potential of relations for the former (Hill, 1961). "The locus is constituted by all the actual entities whose worlds include the subject of the proposition, although not all of these will prehend the propositions positively" (Sherburne, 1966, p. 240). It is interesting to note that Whitehead cautioned that language is often times inadequate or misinterpreted in terms of relaying the purpose of propositions. Thus, in essence, the role of propositional feelings is the formulation of potential, a lure for feeling and this gives rise to judgment (Hill, 1961).

Judgment in perception builds upon propositional feelings. It offers more complex and abstract perception. Like the proposition a judgment is a feeling created and held by the subject. Its truth or falsity also depends upon that subject. "It concerns the Universe in process of prehension by the judging subject. At the moment at which it takes place it is invulnerable and it can only be

criticized by the judgment of the actual entity in the future" (Whitehead, cited in Hill, p. 278).

Judgment makes it possible for the conceptualized fact to be examined within a larger context. This process involves Whitehead's (1978) advance from disjunction to conjunction. Here the cycle of creativity, which begins and ends with the new and novel fact, spends its subjective life in judgment through prehensions including and excluding other entities in the rhythmic flow of creative advance.

The concept of creativity in the universe brought about through creative advance, is central to Whitehead's ontology. To account for the creation of the universe Whitehead does not depend upon an external creator; rather, he sees as the very nature of things a drive toward creation, an instinctive creativity from which the urge toward novelty springs (Dunkel, 1961).

In Process and Reality (1978) Whitehead delineates the meaning of creativity:

> Creativity is the universal of universals characterizing ultimate matter of fact. It is that ultimate principle by which the many, which are the universe disjunctively become the one actual occasion, which is the universe conjunctively. (p. 21)

In this manner, creativity is all pervasive and at no point in the universe or in any occasion can we find an instance where creativity is not operative. Thus, Whitehead (1978) believes that "creativity is the universal of universals"

(p. 21) and only through its offspring, God, the actual entities, and nexus, do we know it. For Whitehead there is no creativity apart from these. It is inherent in the nature of things. From this perspective, creativity becomes the motivating power of process.

The drive toward creativity is an urge for novelty. An actual occasion's novelty arises in the unification of the many in creative advance. The prehensions and concrescence of the entities bring together new patterns from which new relationships arise. The principle of creative advance enhances the relationships between the many and one in that at any moment the universe may be represented by the separateness of the many and at the same time these many may enter into a complex unity. The one that results is unique or as Whitehead terms novel because it is different from that which it was created. Each actual entity, in this manner creates a novel self from the relational patterns found in process. This advance, or creation of the novel, comprises Whitehead's ultimate metaphysical principle. This act of creation is the repatterning of one's reality focusing upon the possible rather than the known, dynamic interaction as opposed to singularity and a rhythmic pulse rather than static universe. This bent encourages adventure and the examination of new possibilities in one's world.

From the urge toward novelty in the universe, a summary of the components in Whitehead's process philosophy is possible. In process, Whitehead offers the opportunity to

interpret all experience. His organismic universe establishes an environment in which fragments of experience come together as parts of the universal whole. The fundamental elements, or actual entities, which Whitehead defines as vital transient "drops of experience complex and interdependent" comprise the final things from which the world is composed (Whitehead, in Sherburne, 1966, p. 205). These entities prehend or select, disregard, and order the prehensions of other entities merging with the eternal object in concrescence to create a nexus or form in perception.

The internal structure of the actual entity and the eternal object extends perception from merely being representational to relational. These relationships, patterns, sharply focused sense data, and the underlying emotions, create conscious experience. In this way, conscious perception becomes multidimensional and is expressed in propositions and judgments which reflect the potential for actuality.

Whitehead believes that when we examine the final form as complete we are already analyzing the potential for new creation. Whitehead rejects the notion of unchanging factual absolutes. Additionally, "his system also eschews the concept of simple linear progression, uncyclical immanently predictable and most important not reflective of experience" (Spraggins, 1961, p. 374). Always in a state of production, the theory of organism is a process interjecting

toward the future with each step being the basis for its successor. This passage is the creative effort to bring into existence the one from many, to produce a novel entity that is more than the sum of its parts. In turn, this entity again becomes a one of many to create yet another entity. Orderly growth and change consequently occurs from the natural rhythmic process inherent in the universe.

The substances in Whitehead's universe are accepted in their diversity through his view of empiricism. Empiricism in process, based upon a wide view of experience, exhibits through feeling, a progressive grasping from the parts into a unity (Parsons, 1961). This unity is inherent in "the doctrine of atomism" which may be interpreted as "individuals, separated and pluralized. There is nothing... apart from individual actual entities and their relationships .... Ultimate reality is comprised by these individual atomic concrescences (Parsons, 1961, p. 232). Whitehead (1978) believes there is no creativity apart from these entities. This flow of creation between the concrescence of the many and one is process as it encourages the rhythmic quality of the universe toward creative advance.

Through the rhythmic quality of concresence, Whitehead attempts to show us how we might construct a future and not control it in the old deterministic manner. In Process and Reality (1978) Whitehead states "man never quite knows what it is after...the proper test not of finality but of

progress" (p. 14). In Whitehead's conception of the universe, it is this progress that is essential.

Inherent within this progress is process, where actuality is constituted by creative activity and the interrelations of potentiality and actuality. "The creative process is thus to be discerned in that transition by which one occasion, already actual, enters into the birth of another instance of experienced value (Whitehead, in Leclerc p. 209). Process involves the exploration of past realities which are at the same time energizing as the origin of a new occasion. The process is the absorption of the past into a new unity emitting fresh and original ideals and anticipations that encourage the unification of values or intrinsic reality of an event. Involved in the conception of unification are the eternal constituents and defining components of the universe, adventure, art, truth, beauty, and peace (Whitehead, 1933).

These six elements are the aesthetic components of Whitehead's metaphysical system. Found within experience, they are the unifying concepts that underlie all activity. Each of these factors brings to the occasion certain qualities that together culminate in a harmonious satisfaction. For instance, from adventure, civilization maintains a freshness of experience that leads to the sudden illumination of intuitive understanding. Art, inherent in adventure, refers to aesthetic appreciation in the widest sense which heightens appreciation for all adventures.

Truth functions as a lure for feeling and leads humanity toward the realization of potential. Beauty thrives in potentiality of experience and in this manner introduces novelty into occasions. Finally peace denotes the sympathetic understanding and depth of feeling that brings richness to the quality of our lives. These elements work in interdependent fashion to create a universe rich in spirit and devoid of the listlessness which nature inherits from the excessive importance placed upon an exact science. From these, all aspects of experience become living agents in process.

Religion and God are also central to Whitehead's metaphysics. The ideals held in each reflect the nature of process. On religion Whitehead asserts:

> Religion is the vision of something which stands beyond, behind and within the passing flux of immediate things; something which is real, and yet waiting to be realized; something which is a remote possibility, and yet the greatest of present facts; something that gives meaning to all that passes and yet eludes apprehension; something whose possessions is the final good and yet is beyond all reach; something which is the ultimate ideal and the hopeless quest. (Whitehead, cited in Johnson, 1947, p. 75)

Since the ideals of religion and God are found within process, they may, like all that we experience, be interpreted in patterns and relationships. In Process and

Reality (1978) Whitehead maintains that "God is not to be treated as an exception to all metaphysical principles invoked to save their collapse. He is their chief exemplification" (p. 343). Whitehead places the Divine Creator inside not outside the universe as are all entities in his philosophy.

For Whitehead, God may be viewed from two perspectives. His primordial nature exemplifies the infinite potentiality in creativity of the universe in process. God is the "ultimate source of both novelty and order in the world" (Parsons, 1961, p. 237). In his consequent nature, He expresses the reactions of the world in Himself. In this manner, the physical feelings of the actual world become objectified in God. Johnson (1961) asserts that "the term 'God' is used because one's experience of this entity gives rise to a feeling of refreshment and companionship" (p. 14). He offers order to the universe but affords the inhabitants the opportunity "to make up their own minds and shape their own desires" (Parsons, 1961, p. 241).

> Because each creature is free to choose and compose the course of his own career, he is also in like degree responsible for it. 'Responsible' means capable of responding to the best - as it appears in the ideal vision of God. Responsibility also means accountability for consequences. (Parsons, 1961, p. 239)

Thus, through God individuals become empowered to take

charge of their lives; consequently, through this a reciprocal relationship between God and the world arises. "The events in the world are transformed through God's love and wisdom and His love and wisdom then pass back into the world....A final definition becomes God as a fellow sufferer who understands" (Magill, 1990, p. 561).

Whitehead does not attempt to offer proof of the existence of God; rather, the focal point is not God, Himself, but the love that emerges from His presence. Within human experience God stands as the organizer, an ever present entity in reality whose function is to save what is worth saving in experience and would otherwise be lost (Johnson, 1949). This God is not thought of as all powerful; rather, "He is the poet of the world" leading it through his vision of the unifying components of the universe (Johnson, 1961).

The Aims of Education

It is within the aesthetic elements of the Universe in process that Whitehead's beliefs about education unfold. Education, for Whitehead, is growth. He emphasizes the significance in the ability to look beyond the obvious for relationships and patterns that bring meaning to experience. He believes that "the intellect does not work best in a vacuum" (Whitehead, 1929, p. 6). Furthermore, he states in the preface to Aims of Education (1929) that "students are alive, and the purpose of education is to stimulate and

guide their self-development." He maintains that for the individual, within the educational process, where meaning and understanding are brought to experience, there arises the intrinsic desire to develop although there is no self-regulating direction or organization to this urge. Within this process, one achieves what Whitehead (1929) believes to be the ultimate aim of education, participation in the art of life. He interprets the art of life as "the most complete achievement of varied activity expressing the potentialities of that living creature in the place of actual environments" (Whitehead, 1929, p. 61). Thus, to education is left a sense of responsibility for the care, advancement and survival for humanity.

Whitehead (1929) defines education as "the acquisition of the art of the utilization of knowledge" (p. 6). If conducted properly, schooling allows children to proceed in their pursuit of knowledge according to intrinsic desires. This prevents curriculum from becoming lost in the vast array of inert ideas that proliferates in each discipline. Because a student works from an individual sense of value, the relevance and power of what is taught becomes more clearly focused. "Education with inert ideas is not only useless: it is above all things harmful" (Whitehead, 1929, p. 2). To educate with inert ideas is to fill a child's mind with ideas that are merely received, not utilized, tested or thrown into fresh combinations. To do this is to condemn a child to "mental dry rot" (Whitehead, 1974).

Whitehead (1929, 1974) asserts that within the educational process the child should experience the joy of discovery. He states in Aims of Education (1929) "what education has to impart is an intimate sense for the power of ideas, together with a particular body of knowledge which has peculiar reference to the life of the being possessing it" (p. 18). Within this framework, theory is appropriate when presented in a clear cut, systematic, concise fashion which most expediently presents the great fundamental ideas of the discipline. It is never presented in isolation. The students then apply this knowledge in an active search for meaning until they reach an understanding or grasp of the patterns and relationships in the subject. "The pupils have got to be made to feel that they are studying something, and are not merely exercising intellectual minuets" (Whitehead, 1929, p. 15). Education in this manner eradicates the fatal disconnection of subjects and their foreign character to the pupil.

Whitehead (1929) outlines his views on educational development in The Aims of Education. He maintains that the rhythmic quality of educational development is characterized by three phases. These are: the stage of romance, precision and generalization. These phases describe the process of learning both in a narrow and broad sense. Each lesson or unit provides both closure and fresh cycles. From this, Whitehead believes, education entwines in the learner's mind a harmony of patterns, each a unique element of intrinsic

worth from which the student gains a richer understanding of the larger scheme. (Whitehead, 1929).

The phases in the rhythmic process of education produce patterns from which arise a synthesis that becomes the initiating factor in yet another occasion. Initially, in the stage of romance, the subject matter has the vividness of novelty. From this springs an erratic unsystematic emotion that realizes the connections, transitions, and relations between facts. In the second stage, precision, analysis of knowledge and placement of facts into relationships occurs. Whitehead (1929) states:

> The facts of romance have disclosed ideas with possibilities of wide significance, and in the stage of precise progress we acquire other facts in systematic order which thereby form both a disclosure and an analysis of the general subject matter of the romance. (p. 30)

Finally, the stage of generalization is a return to the romantic stage with the advantage of classified ideas and relevant technique. It is the final success.

Within the rhythmic quality of Whitehead's educational process found in the stages, creativity becomes a central notion in education. The opportunity to create promotes the natural impulse to acquire the ability to use knowledge in the production of a form. Whitehead's inclusion of the idea of concrescence of self creation where one creates and recognizes patterns and relationships is essential to the

educative process. Whitehead believes that it is inherent in the process of concrescence "that the principle of progress evolve from within: discovery is made by ourselves, the discovery is self discovery and the fruition is the outcome of our own initiative" (Millard, 1961, p. 214). In this process the teacher functions as a facilitator and elicits enthusiasm which provokes imagination that is the catalyst for creativity. Whitehead (1929) believes that without imagination learning becomes stale "like yesterday's fish". Thus, the rhythmic surge of creativity is the motivating power of the universe and is the ultimate source of educational growth. It is creativity in the dynamic interplay of the rhythmic process of education through which the creative advance into novelty is rendered more fruitful.

The rhythmic patterns in education necessitate advancement into novelty which fosters a freshness of spirit in the educational process. Whitehead (1929) believes that the presentation of key ideas in a restricted set of subjects and emphasis on thoroughness with provisions made for recreational, vocational, and aesthetic pursuits give the educational process an integrated approach from which the application of knowledge remains fresh. To retain the quality of freshness, the teacher makes as vivid as possible the knowledge from the past and uses that as a base from which concerns of the present and future may be addressed. From this perspective, education becomes process rather than product oriented.

Additionally, in Whitehead's concept of education are the holistic implications for schooling. Within the stages of romance, precision, and generalization Whitehead provides the impetus from which the integrated vision emerges. Here, the student obtains a basic preparation and skills for acquiring values while attaining an understanding of the wider quest. Style, the sense of goodness, a disdain for waste, and a love of a subject in and of itself arises. This promotes the power to understand the strength and value of gaining a broader and deeper view of the universe in its relational patterns (Whitehead, 1929). As stated earlier, Whitehead believes, to educate is to guide toward the art of life; this implies the organic relatedness of the student, teacher, curriculum, and environment that yields an integrated comprehensive set of values from which the organismic whole operates.

Schools within the holistic vision should also speak to an individual's development in terms of his or her place in and contribution to society. Whitehead believes that like the inert curriculum, the student may not be treated in isolation, but must be concerned with the relational patterns within which s/he lives. Whitehead's social philosophy suggests that we must conserve that which is best in our cultural heritage while exploring solutions that speak to the emergent problems of an ever changing society (Wegener, 1961). Education from this relational perspective, using creative advance as its catalyst,

promotes the advance of society. "Education in this sense takes on all the comprehensiveness and vitality of life itself, for it is then rightly concerned with the problems of purpose, direction and value both individually and collectively" (Wegener, 1961, p. 205). Education in this sense utilizes the contributing factors in the universe, art, adventure, beauty, truth, and peace to forge ahead in a process dedicated to the art of life.

It is apparent that an educational philosophy based upon Whitehead's cosmology calls for reform in schools. The current notion of education based upon scientism renders the essence of our curricular practices unintelligible. From this one sided perspective, we are unable to attend to the myriad challenges that face humanity. The fate of humankind hinges upon our ability to develop our capacities toward a wholeness of spirit that promotes the relational aspect in life. This capacity rests in the acceptance of practical or rational and speculative or nonrational domains as essential defining components of reality. Here, logical and intuitive knowledge complement and enrich our reality.

Whitehead's "art of life" employs this belief by proposing a philosophy that accepts process as the fundamental element in nature. In Nature and Life (1934) Whitehead embraces this belief:

> Philosophy begins in wonder. And, at the end, when philosophic thought has done its best, the wonder remains. There have been added, however, some grasp of

> the immensity of things, some purification of emotion by understanding. Yet there is a danger in such reflections. An immediate good is apt to be thought of in the degenerate form of a passive enjoyment. Existence is activity ever merging into future. The aim at philosophic understanding is the aim at piercing the blindness of activity in respect to its transcendent functions. (p. 46)

Within this quotation lies the foundation for curricular practices that promote the "art of life". The final chapter of this study explores a curriculum dedicated to process, and the art of life and the implications this holds for our future.

CHAPTER V

NEW VISIONS IN CURRICULUM THEORIZING

Introduction

Philosophy is the study of realities. Phenix (1958) believes it involves the organization, interpretation, clarification, and criticism of what is already within the realm of the known and experienced. While this view of philosophic inquiry is sufficient for the world of knowledge found "out there", it is insufficient to carry us into a realm of transcendent interactions characterized by an ecological character and spirit. It is within this holistic world where nature becomes more than mere activity, and where we may add qualitative dimensions following the art of life.

The art of life, promoted through speculative philosophy, formulates working hypotheses or questions which coordinate all the modes of human expression eliciting harmony and exposing discrepancies in reality (Whitehead, 1933). Whitehead states:

> [In this manner] we are in the world and the world is within us. Our immediate occasion is in the society of occasions forming the soul, and our soul is in our

> present occasioning. The body is ours, and we are activity within our body. (Whitehead, 1934, p. 42)

At the moment of nexus for these occasions, the point of choice, the merging of rational and non-rational occurs, the intertwining of environment, body, and soul to offer a wider definition of what we view as reality. Here, reality becomes "a unity of emotions, enjoyment, hopes, fears, regrets, valuation of alternatives, decisions, all of them subjective reactions to the environment as activity in nature" (Whitehead, 1934, p. 43).

The individual that emerges from this view of reality organizes these feelings into a pattern which allows a continuation of the antecedent world into the present where the emergent occasion becomes the moment of choice into the future. This pattern is the way of self creation where "each occasion although engaged in its own immediate self-realization is concerned with the universe" (Whitehead, 1934, p. 44). This interplay in occasions is the foundation of the connecting fabric, the seamless whole or the unbroken wholeness or flowing wholeness of which Bohm (1988) speaks. From this, life becomes concerned with more than experience. It reflects instead "enjoyment derived from the past and aimed at the future" (Whitehead, 1934, p. 44). It is an awareness of the numberless patterns and possibilities inherent in the universe. Here, knowledge becomes qualitatively different than knowledge gained from mere sense data. Therefore, the use of speculative

philosophy offers insights, allows us to penetrate to the inner soul from which emerges the creative potential of individuals and the awareness of alternative ways of knowing. This imparts a wholeness of spirit into life that allows the educational endeavor to explore in the fullest sense the essential characteristics of curriculum.

Foundational Aspects of Curriculum Theorizing

There are many visions of curriculum from which one may sift and sort to construct a coherent picture of what comprises "doing" school. Schubert (1986) identifies eight images that characterize the field. These include: curriculum as content or subject matter, curriculum as a program of planned activities, curriculum as intended learner outcomes, curriculum as cultural reproduction, curriculum as experience, curriculum as discrete tasks and concepts, curriculum as social reconstruction, and curriculum as currere or the individual's ability to make meaning of his world. In addition, Dobson, Dobson, and Koetting (1985) cite the military, industrial, and disease images which have evolved when talking of children and the curriculum. Further, Huebner (1966) suggests the technical, scientific, political, moral and aesthetic value structures as potentials for discourse about curriculum. Kliebard (in Schubert, 1986) emphasizes the metaphors of production, growth, and journey as examples of the way in which we deal

with curriculum. While it would be impossible to relate an exhaustive list of current visions for educational practices, the above detail the fundamental views of curriculum.

Each of these notions poses a world view that presents a unique approach for curriculum practices that necessarily influences action. Difficulty arises when we attempt to question and probe and to communicate our visions. Kliebard (1982) believes that for this reason metaphor is the appropriate vehicle for clearly expressing human thought and visions because metaphor has the ability to transcend the concrete, drawing comparison through mental images that bring a greater understanding to concepts. Furthermore, Kliebard (1982) asserts, it is through the conveyance of this meaning in metaphorical interpretation that human constructs become the organizing influence in our world.

In similar manner, Swimme (1988) discusses the way in which we organize our reality. He speaks of the necessity of cosmic storytelling in which the story provides "the central cohesion for each society....a world interpretation - a likely account of the development and nature and value of things in this world" (p. 48). Inherent in cosmic storytelling is the use of metaphor. Through metaphor, cosmic stories go beyond merely relating accounts of human life by bringing to the text depth, clarity, and contextual parameters.

Thus, metaphors are conceptual organizers that assist

in making the complex familiar. Metaphors offer a richness of quality to our lives that transcends the rational realm. Eisner (1985b) holds "metaphor breaks the bonds of conventional usage....it capitalizes on surprise by putting meanings into new combinations and through such combinations awakens our senses" (p. 226). This brings about the feelings and impulses that encourage the intuitive spirit of thought which allows us to search for deeper understanding.

> "A curriculum theory [or story, therefore,] begins in the transference of meaning metaphorically from the familiar and the comprehensible to the abstract and persistently perplexing problems that arise when we address the question of what, [how and why] we should teach" (Kliebard, 1982, p. 13).

Metaphor, formed from mores, customs, and beliefs communicates a particular reality. When we consider a metaphor of curriculum to be true or false, of the mundane, trivial, or significant we are making choices based upon a particular world view and this reflects the way in which we view the nature of the learner, the nature of learning, the nature of society, and the nature of knowledge. Our beliefs about the natures are so deeply ingrained in our cultural myths they harbor habits of thought which necessarily influence our actions and methods of inquiry. Ponder (1986) asserts "the questions we ask determine finally the answers we get" (p. 34). From this, our explanations determine the reality seen and evolve into conceptual constructs that

related through metaphor influences what we teach, when we teach, and how we teach. This, then, becomes the knowledge base of curriculum.

Dobson, Dobson and Welch (1989) cite two dominant modes of curriculum theorizing, model building and the paradigm shift, in which metaphor becomes actualized into theory. Building models for curriculum implies rigid structure, replication of reality, and rules which attempt to define and categorize curriculum into fragmented parts. "An assertion can be made that curriculum models generally follow a linear sequential format of steps or stages to fulfill their mission" (Dobson et al., 1989, p. 8). Quoting Brown (1989), Dobson et al. (1989) continues, "Each successively builds upon the previous one and, when completed, the cycle begins again in a deterministically closed process" (p. 8). Models reflect the current state in curriculum design, where product rather than process is the major concern.

Alternatively, defined through parameters rather than inflexible guidelines, paradigms offer options for the curriculum. Less rigid than a model, a paradigm provides a framework from which one may articulate reality. Schubert (1986) contends that paradigms are conceptual lenses while Capra (1983) maintains paradigms are the "thoughts, perceptions, and values that form a particular vision of reality" (Dobson et al., 1989, p. 9). Kuhn (1970) suggests that through paradigms, or a set of theories that subscribes

to a particular world view, one becomes indoctrinated to that particular perspective and devotes time to solving the problems pertinent to the paradigm. Thus, a paradigm's loose structure holds promise for curriculum theorizing in that it promotes a process rather than a product orientation.

Whether organized in a model or paradigm, our conceptual constructs characterized in metaphor, become articulated through language (Fry, 1989). "Language provides us with the conceptual categories by which thought and understanding are ordered" (Kliebard, 1982, p. 13). Depending upon the world view that frames one's belief system, the language of metaphor may be limiting and confining or may encourage an ecological spirit that accepts multiple ways of knowing. Huebner (1966) states that often, "...the curriculum worker is locked into a language system which determines his questions as well as his answers" (p. 12); however, Sawanda (1985) believes metaphor essential to the process of reconceptualization of curricular practices. He conceives metaphor as expressing levels of connectedness that begin with the interpersonal comprehension between entities, move to the intrapersonal connectedness of deep comprehension of the subjective realm, and finally expresses the unity of all things where "becoming lies in connectedness" (p. 13). Consequently, we must be aware that metaphor as a tool of language may offer both an expanded view of reality or become a limiting factor; nevertheless,

it is the metaphor, Kliebard (1982) asserts, that connects the practical world to the realm of theory, and transforms the world view into reality. Thus, metaphors are the vehicles through which we make meaning in curriculum theorizing.

It has been stated but bears repeating that the language that structures particular models or paradigms relates specifically to that perspective. Each paradigm or model constructs its own meaning. Translation of language from one to the other is problematic making communication between philosophies difficult. This is what Kuhn (1970) labels incommensurability.

Incommensurability poses serious difficulties in curriculum theorizing for those who wish to borrow language in relative fashion. Theorizers, working from this perspective utilize, with little regard given to consequences, what works. The random selection of metaphors based upon relative need promotes an eclecticism that is inappropriate for curriculum theorizing. Eclectic borrowing merely partakes from a smorgasbord of ideas bringing only confusion to curricular practices. Our philosophical base, then, reflects a hodge-podge of various postures, that are conflicting in nature and act as competitors in reality. These contrary views confuse and distort meaning (Forester & Powell, 1992).

In addition, this mixing of metaphors encourages value neutrality. Rejecting absence of values in curricular

theorizing, Dobson and Dobson (1987b) assert that "curriculum theorizing is value based and there is no such thing as value neutral action. Curricular practices...are an expression of beliefs held by theorists (p. 277). Congruence in action, then, becomes central to the process of curriculum theorizing as it offers a value base from which to guide action.

Because each metaphor deals with reality in a unique fashion, what emerges is variety in expression of philosophical belief. Dobson and Dobson (1987b) believe this diversity has led to a philosophical split which has resulted in a myriad of trends in theory construction. They hold that the various definitions are neither positive nor negative, but the translation into action becomes an act of valuing. It is here that our definitions begin to reflect our belief about the "natures" that are the foundation for the way we "do" school. According to Greene (1973), educators need, in order to understand what they are doing, to scrutinize "not only the object studied, including its context, but also the horizon, the forestructure of understanding and the prejudices she or he brings to the task" (Dobson & Dobson, 1987a, p. 12). Thus, when one chooses an ideology, one is making choices about the language, practices, and beliefs one will follow. In order to avoid commonsense notions, it is important for curriculum theorists to reflect upon their motivation for action, the act itself, and the consequence of action to bring

congruence to the educational mission (Dobson and Dobson, 1987b). Unfortunately due to the emphasis of bringing to education a scientific orientation, little importance is placed upon metaphor, paradigms, or congruence in action in current curriculum theorizing.

Current Trends in Curriculum Theorizing

There is much evidence (Brown, 1989; Dobson et. al., 1989; Doll, 1989; Ferguson, 1980; Lodge, 1983) to support the contention that the linear mechanistic vision of reality held by Newton and Descarte is projected into curriculum thought through the work of early educators. Hayes (1990) determined the work of curriculum theorists Franklin Bobbit, Ralph Tyler, Hilda Taba, and John Dewey to be the most influential in educational practices today. Eisner (1985a) also asserts that reliance upon scientifically based technique in educational practices was established from the very beginning with E. L. Thorndike and John Dewey.
It is not surprising that these philosophies are firmly entrenched in the dominant scientific model of curriculum theorizing.

Purpel (1989) maintains that the systematic structure that characterizes curriculum design is a legacy of Ralph Tyler and leaves to curriculum thinkers a highly structured, content centered predetermined curriculum that is logical and linear in its makeup. Furthermore, he asserts that it is the Tyler rationale that structures our traditions of

pragmatism, engineering, reductionism, and control. He believes the influence of Tyler's rationale to be so universal in the thinking of the educational profession that it seems "inconceivable to most educators to conceptualize education in any other way" (p. 45). Similarly, Shane (1981) reports Tyler's syllabus, Basic Principles of Curriculum and Instruction (1950), as one of the most influential publications in the field of curriculum (cited in Klein, 1986). Thus, the function of education from a scientific perspective based upon the Tyler model "becomes one of diagnosis, prescription, and treatment....There is a high level of accountability [for both students and teachers] for getting desired results (Dobson and Dobson, 1981, p. 25).

The Tyler model is philosophically based in rationalism. Zais (1976) defines rational as "means justifying belief or behavior with good reasons instead of real reasons" (p. 226). In education "to know has come to mean to be able to state some form of the proposition and to be able to verify the truth of that proposition through scientific criteria (Eisner, 1985b, p. 357). Here, academic rationalism considers the chief function of curriculum to be the mastery of knowledge gained through intellectual traditions and its transmission to succeeding generations. In addition, rationality in schools also reflects a preoccupation with the subject matters that are emphasized, in the forms of human performance rewarded, and in a

preoccupation with testing (Eisner, 1985b). In the construction of this rational curriculum, MacDonald (1981) asserts that implicit in this form of rationality is the understanding that "almost all of our curriculum theory efforts are attempts to explain, (flatten out) which are usually intended to lead to prediction and control" (p. 103). This perspective limits the way we come to know to that which is observable and measurable. Undeniably, it influences every aspect of the educational process.

Academic rationalism based on a storehouse of knowledge, belief in behavioristic models for control, and evaluation through test scores characterizes the measured curriculum that has become hyperrationalized. This phenomenon, described by Wise, is "the effort to rationalize beyond the bounds of knowledge" (cited in Frymier, 1986, p. 60) He continues:

> This involves imposing means which do not result in the attainment of ends, or the setting of ends which cannot be attained, given the ...means...[or] imposing unproven technique on the one hand and setting unrealistic expectations on the other. (p. 60)

From this hyperrationalization, the perpetuation of programs characterized solely by rational thinking promotes the static efficiency that is so prevalent in schools.

If rationalism represents the means, our preoccupation with evaluation becomes the ends for educational practices based upon a rationalistic structure. Evaluation methods in

the form of testing are firmly entrenched in schools today. The belief in quantifiable data that is identified, measured, and analyzed statistically to determine educational quality is a widely accepted practice. Eisner (1985b) believes that the consequences of such testing found in scientifically based approaches extend to what is taught, how curriculum is organized, and the type of teaching that occurs. Eisner compares the curriculum to an assembly line that produces at predictable intervals a set of predetermined behaviors. From this, he believes it becomes a natural process to specify those behaviors as a standard and set up methods and procedures through which they can be measured (Eisner, 1985b). This preoccupation with measurement, Eisner (1985b) maintains, fragments every facet of the educational field.

Goodlad (1984) also reports fragmentation to be inherent in curriculum, teaching methods, and the administrative divisions between those that create policy and those who comply with policy. Similarly, Lodge (1983) contends that "schools too often are disconnected from society teaching separate packages of knowledge which students firmly believe will make no difference whatsoever in their relations to what they find around them" (p. 51). The result of this fragmentation is further separation between knowledge, knower, and the world.

Fragmentation also stresses the concept of reductionism or atomism, the separation of curriculum into small separate

units (Miller, 1986). Franklin Bobbitt's (1918) curriculum of skills and objectives is atomistic to its core. This compartmentalization of education clearly relates to competency and outcome based education, effective teaching strategies, and mastery learning so popular in today's curricular practices. In all of these, the essential component is the linear sequential manner in which the teacher/learner proceeds through the steps (parts) to reach the predetermined end; however, mastery of the parts remains the goal, not the understanding of their unity as a whole. The whole in atomistic thinking becomes merely the sum of its parts.

Finally, curriculum experienced from the scientific framework is also considered to be value neutral. Knowledge constructed from a scientific base tends to promote a freezing function for curriculum in that it defines only the observable. Curriculum, then, deals only with surface phenomena that reify the educational process (Dobson & Dobson, 1987b). From this perspective, education following the technical model concerns itself with power and control that is imposed upon the learner. Thus, "knowledge is removed from the self-formative process of generating one's own set of meanings, a process that involves an interpretive relationship between the knower and known" (Giroux, 1988, p. 14).

The faith that the Cartesian scientists and early educators placed in the scientific method frames much of

current curriculum theorizing. Precise, efficient, and quantifiable methods concerned with product rather than process promotes a field of thought that is rigorously deterministic. Rigid frameworks in curricular design, behavioral objectives specifying predetermined ends for subject matter, and sequential lockstep procedures in instruction characterize curricular practices. This generates a means-ends orientation for education in which teaching becomes more akin to instruction (Eisner, 1985a).

The ramifications of the scientific traditions have far reaching effects (Eisner, 1985b). Probably the most significant is the denial of the scientific epistemology to include any other view of education. The mechanistic nature defines the limits and "problems that do not lend themselves to measurement or to scientific solutions have been considered intellectually ill conceived" (Eisner, 1985b, p. 17). As a result of this attitude, educational practices have been reduced to a technology where teacher proof materials become the norm for a diagnostic-prescriptive model. From this model derives a preoccupation with measured outcomes. Eisner (1985b) relates that ironically what we gain in this environment is "statistical criteria superseding educational criteria" (p. 19). This emphasis on measurement encourages the breakup or fragmentation of the curriculum into discrete units, where an assembly line mentality thrives. This renders the curriculum into inert pieces of knowledge that must be "given" to students for

education to take place. Under these assumptions, pupil participation becomes nonexistent because "the provision for such opportunities would make the system difficult to control, hard for educators to manage, and complex to evaluate" (Eisner, 1985b, p. 20). These conditions operate out of a field that, due to its dependence upon a reified science, leads to "an emotionally eviscerated form of expression" that believes in "cool dispassionate objectivity" which has resulted in "sterile, mechanistic language" that purports to be based in value neutrality (Eisner, 1985b, p. 20).

From this rationalistic perspective, educational endeavors fall victim to an unconscious bias induced through unidimensional linearity. This adherence to a single cluster of ideas or beliefs that remains unexamined contributes to shape a view of reality that becomes a self-fulfilling prophecy. The process involved is encapsulation, "an endemic human condition in which individuals believe they have a reasonably accurate perception of reality when in fact, because of various limitations, they have only a partial and quite distorted image of what is really "out there" (Zais, 1986, p. 219).

Encapsulation, resulting from a curriculum based philosophically on rationality and couched in behaviorism, allows us to justify our actions instead of engaging in reflection and critique to determine real reasons (Zais, 1986). What counts as objective knowledge in a system such

as this is in fact a one-sided and distorted view of reality. Not only is the selection, organization, and distribution of knowledge unquestioned, but the manner in which it is selected and organized represents assumptions by the educators about its value (Giroux, 1988). This allows educational practices to continue that reproduce the cultural and economic interests of society and block change in the educational setting. The school then functions as an agent of socialization that defines the very essence of our lives.

Louis Wirth states that "the most important things...we can know about a man is what he takes for granted and the most elemental and important facts about a society are those that are seldom debated and generally regarded as settled (cited in Apple, 1990, p. 13). Apple (1990) believes that to gain insight into the activity of men and women one must question these habits of thought and commonsense notions, those that are generally considered unquestionable.

These beliefs, values, and ideals that underlie habits of thought are never questioned if we are guided merely through a mindset that through a desire for amelioration induces encapsulation. This state of affairs perpetuates the status quo and promotes the belief that the major interest of education is finding the one perfect set of means to reach our prechosen educational ends (Apple and King, 1990); however, those that confront encapsulation become dissatisfied with the status quo and begin to

question and probe to move beyond, to effect a transformation where knowledge derives from multiple sources. Those that question the status quo and probe into the shadowed recesses of commonsense notions are much like the unfettered prisoner in Plato's parable on education; they, once having passed into the light, would "rather accept anything than live like that again" (Warmington and Rouse, 1956, p. 315).

Zais (1986) believes "the main goal of a curriculum based on reduction of encapsulation cannot so much be unencapsulation ...but rather a healthy propensity for habitual self and social-critical inquiry" (p. 18). This reflection promises to move the curriculum past blame toward liberation where curriculum may reflect process rather than product and human understanding becomes a function of the relations between thought and action. When this occurs, curriculum theory becomes a search for understanding, a subjective heuristic process that deals with unity rather than bits and pieces. It is a participatory experience where the individual "engages in dialogue with the theory bringing each person's biography and values to the interpretation" (MacDonald, 1981, p. 6). The focus of this interpretation is not to control but to integrate theory, and practice through thought, reflection, and action toward the development of understanding that lies at the basis of transformational theory.

Theory into Practice

Theories are the framework around which one constructs reality. They are personal in nature and offer to individuals the capacity to deal with tasks encountered in the acts of everyday life. While theories are constructs, imaginary entities not directly observable, their influence is widely apparent in the manner in which we conduct our business.

To illustrate this point, MacDonald (1982) relates a story in which Alfred North Whitehead reportedly remarked to Bertrand Russell that the world was made up of two types of people; the muddle headed like himself, with his organismic theory, and the simple minded like Russell, a believer in the benefits of a logical mathematical approach to reality.

Meaning extrapolated from these comments brings to curriculum theorizing two divergent connotations (MacDonald, 1982). The mathematical methodology steeped in the scientific method leads to a highly rational structure of reality that compartmentalizes and categorizes. Slater refers to this as a tinker-toy style of theorizing that projects a literal picture of the phenomena they wish to explain (cited in MacDonald, 1982); however, curriculum theorizing from the muddleheaded becomes a metaphorical search for meaning and understanding. A heuristic inquiry of this sort attempts to deal with the whole rather than small segments. These differing positions portray the

contradictory nature of curricular theories that often cause conflict in reality.

There is, in education, no precise definition of theory. Indeed, the field is awash with numerous beliefs about the nature and function of theory, the relationship between theory and practice and definition of theory (Zais, 1976); however O'Conner (cited in Zais, 1976) states that the word "theory...is most often used to refer to a hypothesis that has been verified by observation and more commonly to a logically interconnected set of such confirmed hypotheses" (p. 78). The work of normal science (Kuhn, 1970) provides these hypotheses; consequently, it is to the natural sciences and the scientific method that we currently look for our model for theory. The appeal in this method lies in the logically unified framework, generally accepted axioms, and empirical base that characterizes the method (Zais, 1976). These offer a standard from which we may assess our knowledge.

Conant (in Zais, 1976) asserts that theories derived from the scientific are those of "is-ness". They explain phenomenon in a universe removed from the knower. These theories are accumulated in an effort to discover the nature of ultimate reality. Thus, within this framework, scientific theories amass explanations in an effort to establish absolute knowledge. Theories offer from this vantage what many consider to be an objective perspective that provides control. Practice implied from this method of

theorizing becomes a paint-by-number endeavor; theorists become technicians.

Descriptive theory is similar to the "isness" of theory construction in that it purportedly provides an objective view of reality (Eisner, 1985b). Related through discursive language, descriptive theory becomes a powerful tool for classification (Eisner, 1985b). The reality described by the descriptive theory is determined by the "Whats" and "Hows" found in the process of imparting knowledge. This provides the parameters within which one makes choices about what and how work is carried out. Descriptive theory in this manner becomes useful in that it provides primarily concepts that enable us to make more subtle and potent distinctions about our curricular practices (Eisner, 1985b). This point is particularly pertinent for those that value objectivity and wish to constrain and prescribe what is considered acceptable knowledge for education; however, these individuals overlook the fact that these distinctions are influenced by normative theory which makes explicit the value base from which our theories arise (Eisner, 1985b).

Normative theory brings to theorizing values and beliefs that derive from the subjective realm. This process, Zais (1976) believes, represents the perspective of "oughtness" in curriculum theorizing. Theory from the "Ought" perspective provides the powerful forces of intuitions, insights, imagination and the like for use in making judgments (Zais, 1976). Acquired through the

heuristic process of deep reflection, normative theory offers to theorizing a guiding function that "tells us which facts are relevant and gives meaning to the facts by illuminating the relationship among them" (Zais, 1976, p. 81). Whitehead (1978) believes the power of theory lies in this normative capacity in that it serves as a lure for feeling that provides immediate enjoyment and purpose.

Normative theory and descriptive theory penetrate each other. Descriptive theory serves a useful function as it describes our world while normative theory reflects our beliefs which influences our actions and reflects the values inherent in our epistemological commitments (Eisner, 1985b). From a descriptive and normative perspective, curriculum asks not only "what" and "how" but adds another "what" in terms of whose knowledge and "why". This information expands our knowledge not quantitatively, but qualitatively.

Theories grounded in our knowledge base are ideational. They do not exist in a vacuum but rely on action or practice for their being; alternatively, practice relies on theory for meaning and purpose. Theory alone is mere formula while practice does not get to the heart of things. Thus, theories evolve from what Whitehead refers to as the goal of education, the marriage of thought (reflection on theory) and action (practice).

Related to the idea of the association between theory and practice, Schubert (1986) asserts the strength of theorizing lies in its verb form, the doing, which "denotes

a continuous process of questioning and interpretation that gives the person who theorizes the increased capacity to deal with problems and dilemmas of life" (p. 420). Theory without practice becomes idle speculation while practice without theory is blind groping (Zais, 1976).

Theory and practice working together contribute to deeper understanding that derives from action with reflection. This knowing-in-action and reflection-in-action (Schon, 1983) are apparent in the activity of our everyday lives. We know how to proceed at our task, but we often cannot articulate how we know or what we know; we just know and "go with the flow". Alternatively, we often reflect upon what we know and our actions to bring understanding and insight to further action; we can think on our feet, improvise or deviate from the routine much like the design engineer who has an intuitive feel for what will work. This entire process is central to the art of reflection-in-action and enables us to deal with skepticism, disequilibration, peculiarities, meaning, and purpose. Schon (1983) states:

> Once we put aside the model of technical rationality, which leads us to think of intelligent practice as an application of knowledge to instrumental decisions, there is nothing strange about the idea that a kind of knowing is inherent in intelligent action. Common sense admits the category of know-how, and it does not stretch common sense very much to say that the know-how is in the action- that a tight-rope walker's know-how,

> for example, lies in, and is revealed by, the way he takes his trip across the wire....There is nothing in common sense to make us say that know-how consists in rules or plans which we entertain in the mind prior to action. (p. 50-51)

Reflection serves as a critique to action and from this analysis adjustments are made. This encourages an emergent participatory theory that is responsive to situational insight. This reflection may take place during the action over days or years. The object of the reflection may vary. The intuitions, norms, behaviors, judgments, strategies, or theories may all fall under the watchful eye of reflection (Schon, 1983).

> When someone reflects-in-action he becomes a researcher in the practice context. He is not dependent on the categories of established theory and technique, but constructs a new theory of the unique case. His inquiry is not limited to a deliberation about means which depends on a prior agreement about ends. He does not keep means and ends separate, but defines them interactively as he frames a problematic situation. (Schon, 1983, p. 68)

In education, the interdependence of theory and practice is evident in the process of practical inquiry. Schubert (1986) holds that the roots of practical inquiry lie in phenomenological, pragmatic, and existential philosophies that stem from interest in the interaction of

humans with their environment (Schubert, 1986). Based on the assumption that situations are unique, "practical inquiry centers on the human search for meaning and understanding that enriches groups and institutions as they continuously refine their sense of value and direction and the means to move toward it (Schubert, 1986, p. 288). The four underlying assumptions that guide practical curriculum inquiry include:

> (1) the source of a problem is found in a state of affairs....; (2) the method of practical curriculum inquiry is interaction....; (3) the subject matter sought in the process of practical curriculum inquiry is situational insight and understanding....; (4) the end of practical inquiry is increased capacity to act morally and effectively. (Schubert, 1986, p. 289)

Practical inquiry moves beyond reflection and engages those who live within the educational setting to seek insights and meaning that lie behind the observable. Schubert (1986) believes this objective is best met by continuously scrutinizing intersubjective meaning and making adjustments accordingly. The process requires indwelling, immersion into the unknown taking information from intuitions and insights from the subjective realm, merging with the rational data in acquisition to form a theory that has the ability to synthesize and create new theories through its own becoming.

This process becomes an act of creation that presents

an emergent participatory picture of reality that MacDonald (1982) believes is an attempt "to disclose something not yet clearly perceived or conceived .... there is a mystery to be probed, curiosity to be satisfied, confusion and ambiguity to be faced and lived with" (p. 58). Similarly, creativity of this nature, Whitehead (1978) holds, enables the process of ongoingness or becoming, and makes it intelligible through the understanding that relationships derive from the many and one in concrescence. The creation of novelty offers new possibilities and opens the door to alternative ways of knowing. Thus, while there is a sense of completion, a new sense of urgency arises; consequently, theory becomes less an instrument of control and more a form of event where to theorize is not merely to define but to search for meaning to which we bring ourselves, our consciousness, our inner souls, and our reality. This view forms a participatory bond that through an ongoing process creates meaning for action and action embedded in meaning.

Thus, to develop an epistemology of practice, we must place theory and practice together within the arena of reflective inquiry. Here, implicit in the knowing is the belief in the artistic intuitive processes that theorists bring to the curriculum setting. The theorizer comes to the task as a committed participant, a thinker and doer. These characteristics infuse the act of theorizing with values (MacDonald, 1982). MacDonald states:

The act of theorizing is an act of faith, a religious

> act. It is the expression of belief...and belief necessitates an act of the moral will based on faith. Curriculum theorizing is a prayerful act. It is an expression of the humanistic vision in life. (MacDonald, 1982, p. 60)

Consequently, theories derived through this process clarify meaning, provide direction and ultimately act as a guide to moral action in our practice (Dobson & Dobson, 1987b).

Curriculum theory defined in this manner makes the adage "something may work in theory but not in practice" nonsensical as both theory and practice are integral parts of the theorizing process and work in a unity. Whitehead (1978) considers this to be objectification, the process through which each occasion (theory) once it has reached its satisfaction, loses its subjectivity, its own immediacy of becoming and serves as the ground for succeeding generations of occasions (theories). Thus, the organismic notion of the process of becoming emerges as the metaphysical base from which theorizing occurs.

Transcendence Through Quantum Reality

Houston Smith (1984) in his essay Beyond the Modern Western Mindset believes that an epistemology that aims solely at control eliminates the possibility of transcendence. He believes that in this quest for causal interpretations we organize our reality into hierarchical stages that are linear, predictable, and deterministic in

the extreme. This reflects, Griffin (1988) argues, not only a disenchantment of science but a disenchantment of nature as well; consequently, this mindset leads to the denial of all subjectivity, all experience and feeling. From this we suffer from what Solzhenitsyn calls a spiritual exhaustion (Solzhenitsyn in Smith, 1984). This debilitation, he believes, derives from the foundations of thought in modern times "which was born in the Renaissance and has found political expression since the age of Enlightenment" (p. 68).

Similarly, Whitehead (1978) asserts that by denying the subjective aim for satisfaction, the lure for transformation, we exclude the possibility for norms and values to play a significant part in our existence. Thus, without subjective aim no purpose or creativity exist. Using Weber's (cited in, Smith, 1984) term for disenchantment "Entzauberung", we are quite literally in this instance "taking the magic out" of our lives. As a result, nature becomes devoid of all qualities with which the human spirit may feel a sense of attachment.

Disenchantment has continued throughout most of the 20th century. There is, however, a growing disquiet with our continued dependence upon a mechanistic view that "takes the magic" from our reality. This dissatisfaction stems from an alternative view of nature that developed within science itself and has spread to other disciplines. Thus, an understanding of the dramatic changes in the way science

views the nature and function of scientific theory depends upon an understanding of the revolution in science itself.

There is ample evidence in the literature (Capra, 1976; Dobson et al, 1991; Lucas, 1985; Pagels, 1983; Schopen, 1989) that the dominant vision of reality, that of the mechanistic world view, is in decline. In its place resides a new world view offering greater explanatory powers and a more comprehensive picture of reality. Based on the new physics of quantum mechanics, the clockwork mechanism of the old paradigm is brought into question. The work carried out by Einstein, Bohr, Heisenburg and other eminent scientists projected into the 20th century new ideas on space, time, cause and effect and challenges the ideal of an objective description of nature and the belief in fundamental building blocks of the universe (Lucas, 1985).

The initial blow to Newtonian mechanics came with the recognition that the physical world could not be reduced to separate and independent elements or isolated entities (Lucas, 1985). This discovery forms the basis of quantum theory. Instead of discrete entities, scientists found that an element may have the properties of a wave or of a particle. Wave-particle duality reveals a complicated pattern of relationships that disavows the belief in the existence of fundamental building blocks of the universe. Furthermore, the manner in which the scientist inquires determines what is seen. "This means that the classical ideal of an objective description of nature is no longer

valid .... we can never speak about nature with out ... speaking of ourselves" (Capra, 1977, p. 57). This new actuality recognizes observer bias and the influence this has on the emergence and indeterminacy of particles in the universe. From this perspective, the universe is composed of dynamic particles in the process of becoming rather than unique particulars in a static reality. Quantum theory in this manner reveals a basic oneness of the universe.

In addition, Einstein's Theory of Special Relativity, while still embedded in classical physics, brought changes to the traditional concepts of space and time that undermined the Newtonian world view. According to relativity theory, space and time are connected into a four dimensional space - time continuum. One may not speak of space without time or vice versa. Further, there is no universal flow of time; rather, different observers order events differently relative to their position and momentum or lack thereof. Measures in this manner lose their absolute significance (Capra, 1977). In bringing these two valuable principles together Bohm (1983) states:

> Relativity and quantum physics agree in that they both imply the need to look on the world as an undivided whole in which all parts of the universe including the observer and his instruments merge and unite in one totality. In this totality the atomistic form of insight is a simplification and an abstraction valid only in some limited context. (p. 11)

More problematical for the mechanistic world view was Werner Heisenburg's principle of uncertainty. This discovery challenged determinism, the stalwart principle of the Newtonian world. The principle of uncertainty asserts that the qualities of position and momentum can never be measured with precision simultaneously. Capra (1977) believes, however, that this limitation has nothing to do with imperfections or inadequacy in measuring technique, rather, it is our position and involvement in the observation that ultimately influences what is observed. To illustrate this point, Pagels (1983) states:

> I have always thought that wet seeds from a fresh tomato illustrate the Heisenberg relation. If you look at a tomato seed on your plate you may think that you have established both its position and the fact that it is at rest. But if you try to measure the location of the seed by pressing your finger or a spoon on it the seed will slip away. As soon as you measure its position it begins to move. A similar kind of slipperiness for real quantum particles is expressed mathematically by the Heisenberg uncertainty relations. (p. 71)

Thus, the fundamental importance of the Uncertainty Principle is that it expresses the limitations of our notions about observer-observed relationships. The very act of observation distorts the observed and due to this phenomenon there exists the need for awareness of

observational bias in the determinations we make.

Niels Bohr also undertook to probe the new ideas of relationships in the subatomic world. Bohr considered the particle and wave "two complementary descriptions of the same reality, each of them only partly correct and having limited range of application" (Capra, 1977, p. 145). Knowledge of one excludes knowledge of the other. Therefore, in choosing a description we exclude other possibilities. Furthermore, which description one chooses is a matter of human choice (Capra, 1977).

Thus, in applying the lessons of the theory of relativity, quantum theory and Bohr's and Heisenberg's findings, related in the Copenhagen Interpretation, we see the rejection of the Newtonian world view based upon determinism and objectivity. Instead, a reality based in process emerges where space and time represent an abstract scheme of relations.

Whitehead (1978) calls this potential scheme of relations the extensive continuum where the defining characteristics of our environment arise. Here, space and time lose their absolute measures and take on an indeterminate quality that eschews cause and effect relations. From this, we may ask Whitehead's (1934) question "How can one event be the cause of another?" (p. 42). Whitehead (1978) maintains, as quantum theory indicates, that particles or (events) cannot be separated from the space surrounding them. Their unity contains the

potential for their creation and destruction. This involves a dynamic interplay of endless motion in what Capra (1977) describes as "a continual cosmic dance of energy" (p. 211). This reflects Whitehead's (1978) final causation, the rhythm of creation in the inseparable whole where "each occasion presupposes the antecedent world as active in its own nature" (Whitehead, 1934, p. 42). Each actual entity defines its environment and, thus, views the universe from that perspective.

When we shift from the serial view of time to a relational perspective, pursuit of meaning becomes a personal endeavor. We cannot explain in terms of universals specific defining factors of an entity; rather, the status of an entity in the world depends upon its internal relatedness. Thus, space/time relations are internal, not external. When each set of relations enters into an event they comprise the essence of the event. Without these defining points in the relation, the event would not be itself. Consequently, when we choose one method or one philosophy over another, we exclude alternative ways of coming to know. We are also mindful that the observer is not detached but plays an integral part in what is observed; furthermore, through our participation and inquiry we determine the reality seen. From this perspective, our knowledge in a transformed reality remains incomplete and limited (Dobson, Dobson, & Smiley, 1991); however, it retains the potential for creative advance.

The new world view envisioned through these metaphors reflect what Bohm (1983) describes as the implicate order. Here in the unbroken wholeness the universe enfolds and all parts relate in intimate fashion. Bohm (1983) asserts, "the relationships found in this order are between the enfolded structures that interweave and interpenetrate with each other, throughout the whole of space, rather than between the abstracted and separated forms that are manifested to the senses" (p. 185). From this arises a new notion of structure that we must consider from the perspective of patterns and relationships, rather than the ordered arrangements of things joined to construct a whole. This structure, the hologram, carries an implicate order within its being which merges and becomes inseparable, where "its wholeness, the holomovement, is not required to conform to any particular order or to be bounded by any measure. It is indefinable and immeasurable" (p. 151). Ultimately, Bohm (1983) believes the universe must be seen as an undivided wholeness of relations and patterns in which division into individual elements offers no meaning.

This new vision becomes the foundations for a new consciousness that allows us to participate with the world rather than control it. Smith (1984) proposes that by beginning with participation as a base we gain a wider vision of reality. He believes as Capra (1977) does that when the rational mind quiets the intuitive mode is capable of extraordinary powers. Thus, Smith (1984) acknowledges

that by accepting intuitive processes as the fundamental epistemological base from which we may loose the chains of control, we embrace an ontology that accepts transcendence of the individual. Here individuals remain not at the center of reality but create a sense of self that recognizes connections and becoming as integral parts of process in wholeness. Transcendence of the individual leads to the final step which Smith (1984) believes is a sense of fulfillment. In taking this step we move away from living the confining and limiting position of our present world to experiencing a posture that encompasses art, adventure, beauty, truth, and peace, all part of a process reality (Whitehead, 1935).

Defining Elements of Process

As was previously discussed, the aim of the philosophy of organism is to promote a coherent cosmology based upon the notions of process. Often called a process philosophy, organism, as proposed by Whitehead, offers a metaphysics characterized by change, emergent realities, and dynamic relationships. Capra (1983) sees this as the new vision of reality, an ecological perspective which departs from the immediate concerns of environment. Here perception moves from dependence upon a scientific framework to include "an intuitive awareness of the oneness of all life, the interdependence of its multiple manifestations, and its cycles of change and transformation" (p. 412). These

characteristics of process convey the notion of an existence distinguished by the essential elements of the universe, art, adventure, beauty, peace and truth that Whitehead (1935) believed enabled one to live life to its fullest.

Art, adventure, beauty, peace and truth are the corner stones of process. These essentials of the universe promote the activity of life that is exemplified through unity. It is within this association that Whitehead believes the interplay of the subject and object make up the actions of experience. These experiences through creative advance urge us beyond self toward a transformative change that alters our perspective, our very relation to nature. To understand fully the implications of process and transformative change, a close inspection of the foundational characteristics of the universe as they relate to process is essential.

Adventure

Whitehead (1935) believes that the very essence of reality is process (p. 354). He defines process as "the absorption into a new unity with ideals and with anticipation by the operation of the creative eros" [p. 354] ...thus each actual thing is only to be understood in terms of its becoming and perishing" (p. 356). The driving force behind process is adventure and without adventure Whitehead (1935) believes civilization is in decay.

Inherent in adventure is an insistent discontent that leads to a creativity of spirit. Creativity is a growth

process that involves emotions, moral insights, intuitions and rational thought processes in the act of creation; consequently, creativity in process is not characterized by determinism in that one creates a "thing"; rather, the impetus of creativity, novelty, is a thrust toward adventure to explore the possibilities found in nature. Here, adventure is an act of becoming that opens up new perspectives. These perspectives, Whitehead believes, are the fruit of wisdom (cited in Millard, 1961).

Wisdom in the process of creativity in adventure is the "persistent pursuit of deeper understanding" (Whitehead, cited in Millard, 1961). This process is found in the birth and passing of occasions. It is the present reflecting the past and injecting into the future. This rhythmic quality is the dance of creation that is an essential aspect of life. Without this quality, life becomes static. A dynamic system requires that creativity become an inherent part of its being. Whitehead (1935) believes that without the novelty inherent in creativity life lacks adventure that is exhibited through beauty.

Beauty

Beauty rests in the creation of novelty from which our lives gain their dynamic quality. Whitehead (1935) states:

> Beauty is the mutual adaptation of the several factors in an occasion of experience. Thus, in its primary sense beauty is a quality which finds its

> exemplification in actual occasions: or put conversely it is a quality in which such occasions can severally participate....thus the parts contribute to the massive feeling of the whole and the whole contributes to the intensity of feeling of the parts " (p. 324).

Reality from this perspective constitutes an integration of systems in an organismic wholeness that expresses beauty. The unity of this system situates us as an integral part of a larger whole. Through their harmony operating in process, beauty becomes the relationship between the subject and object incorporating the elements of both realms in a system that operates through a union of understanding. Consequently, we are the inside, looking inside, not on the outside looking in. There are no boundaries that create separation (Wilbur, 1979).

Capra (1983) further illuminates this point. He maintains that a systems view organizes the world in terms of relationships and integration. He asserts systems become unified wholes whose elemental parts cannot be reduced to fragmentary bits. "Instead of concentrating on basic building blocks or basic substances, the systems approach emphasizes basic principles of organization" (p. 266). Actions between the parts of the system arise from transactions or the "simultaneous and mutually interdependent interaction between multiple components" (Capra, 1983, p. 277). Here again, the interdependence and organic unity of the system exhibits a harmony in its

working that, as in musical composition when the different qualities are blended, produces beauty.

Whitehead (1935) contends that the perfection of harmony is the perfection of beauty; however, beauty, as the adage states, is in the eyes of the beholder. The system, therefore, offers the opportunity for the emergence of the analysis of value or judgement as it relates to the whole. Here, what is "good" and "beautiful" becomes a relational determination, that is ascertained through the pursuance of truth.

Truth

Truth has many meanings. The American Heritage dictionary defines it as (1) conformity to knowledge, fact, actuality or logic, (2) fidelity to an original or standard, (3) reality, (4) a statement proven or accepted to be true, (6) sincerity or integrity. Whitehead (1935) defines it as the conformance of appearance to reality. The variety in these definitions indicates the diverse views one finds on the subject. Nevertheless, these definitions may be categorized into either a definition from the rational domain that derives from sense experience, logic, and reason or from the nonrational realm acquired through intuition, revelations, and enlightenment.

Traditionally we have defined truth almost exclusively from the rational view. Truth in this manner serves a useful function in that it determines truth or falsity.

With rational truth one is in concert with science. When we look, however, at truth from the nonrational standpoint, it becomes relational. Truth from this perspective encourages the individual to become actively intimate with nature. Truth in this mode becomes spontaneous and unfettered. Here, Whitehead believes (1935), the "intrinsic value of truth...derives in the enjoyment of stability in the sense of real accomplishment, elemental harmony, directness, "cleanliness" and efficaciousness which truth gives" (p. 342-343). From this relational position, truth extends far beyond the limited domain of that which works; consequently, it is no longer tied to a particular context. Truth from this perspective becomes process oriented.

Truth based in the nonrational realm, not tied to a fixed standard, opens new possibilities. It encourages individuals to recognize that there are multiple ways of knowing. Instead of creating objective data, the nonrational domain encourages individuals to seek and create pattern. This is a playfulness of mind that allows the intuitive thought processes the opportunity to present potential and possibility. Patterning offers the ability to see relationally, to recognize the interconnections between elements in a system in order that we may organize events, situations, and ideas. This ability offers new directions and brings to light new discoveries. It encourages the perceptual ability that allows one to "see" rather than "look" to determine detail and nuance. Eisner (1985a) calls

this process connoisseurship.

Truth from this relational perspective does not mean, however, that individuals "have relinquished their capacity to choose...and succumbed to the bottomless pit of relativism" (Eisner, 1983, p. 13). Rather, the relational process that gives rise to plurality of perspective affords humanity the opportunity to assess the knowledge gained from the union of the rational and nonrational, drawing conclusions, making judgements and determinations on coherence and value of beliefs, and looking for alternatives that better meet our needs (Eisner, 1983). Truth conceived in this manner will be explored not through the strictly empirical grounds of positivistic science but offers a wider perspective in which to gain knowledge about the world. Consequently, truth is no longer tied to a particular context that offers sanctions for the reprehensible deeds of man or to the limited domain of "that which works". Instead, relational perspectives of truth extend far beyond to the realm of unlimited potential where it promises to bring greater understanding, congruence, and symmetry to our construction of knowledge.

Peace

The opportunity to pursue knowledge and truth as a process, to live life in congruence with nature, elicits a system grounded and supported by peace. Whitehead (1935) states:

> The peace that is meant here....is a positive feeling which crowns the life and motion of the soul. It is not hope for the future, nor is it an interest in present details. It is a broadening of feeling due to the emergence of some deep metaphorical insight unverbalized and yet momentous in its coordination of values. Its first effort is the removal of the stress of acquisitive feeling arising from the soul's preoccupation with itself. Thus, peace carries with it a surpassing of personality. (p. 367)

Peace brings a sense of wholeness that expresses the inward journey in an outward manner. This definition of peace offers a broadened perspective of the individual that encourages communication and sharing. This directly confronts the fragmentation found in all aspects of our society and promotes instead a positive interdependence and responsibility for others that brings shared meaning and understanding. Peace exemplified through this commitment based in an ethic of caring is the essence of fidelity. Here, the self is surpassed in the realization of the interdependence of our relationships with others and our presence as an essential part in those relationships (Noddings, 1986).

Peace founded in the ethic of caring is love. Noddings and Shore borrow (1984) from the Greek translations of "love" and characterize this quality as love of life, Christian charity, brotherhood, and the joining of

incompatible substances to create a new entity. Love arises from the subjective realm. We know we truly love not through our senses or rational thought processes but through an intuitive feeling of rightness. These visions of love are the heart and soul of process. Here, love is the powerful force that unifies the system; it brings a sense of harmony and reciprocity that looks to the nonrational realm to seek a sense of peace. Peace, based in love, then, is foundational as it is the unifying factor in nature that encourages art as the optimal form of expression.

Art

Art, Whitehead (1935) believes, is the education of nature. On the one hand it enriches our lives through its embodiment of ideality or pattern of perfection through its creativity of spirit; on the other, in a broader sense, art becomes a quality of society and civilization where its purpose is the harmonization of all types of value which are found within civilization (Whitehead, 1935).

Whitehead (1935) maintains that art objectifies the subjective core of life. It conveys the living sense of humanity that positivistic science denies. He states:

> The work of art is a fragment of nature with the mark on it of a finite creative effort....thus, art heightens the sense of humanity. It gives an elation of feeling which is supernatural....[that] requires art to evoke into consciousness the finite perfections

> which lie ready for human achievement. (Whitehead, 1935, p. 348)

This spiritual process enables us to participate in a cosmic dance that incorporates the universe in activity that exemplifies the art form in its highest expression. Here, art ranges from great literary works, musical composition, paintings, sculpture, to the pythagorean theorem or theory of relativity; these items pleasing to the eye or intellect exhibit for consciousness a finite fragment of human effort which are the merit of art in achieving its own perfection within limits. Art in this manner heightens the sense of humanity (Whitehead, 1935). Art may also, however, represent more complex wholes such as symmetric patterns in the particle world or the universal web of interrelationships and their interconnections in nature which are integral parts of a patterned order. The emergent patterns of nature formed through the dynamic network of events that characterizes an indeterminate process are artistic in their very becoming. Art, thus conceived, defines the world through its harmonious interactions that blend our interrelationships.

The need for expression through art, and its ability to crystalize and create, bring forth a range of human experience that exemplifies the emotional roots as well as its aesthetic formative function. Based in value, these emotions reflect a preference which expresses depths of felt meaning which cannot be envisioned in any other way

(Millard, 1961). Valuing enables individuals to probe their value base, to analyze, synthesize, and create responses or determine a course of action. Values, then, find their promise in the process of valuing in that they no longer reflect fixed laws. Valuing becomes an artistic endeavor. It promises the ability to change, to seek greater congruence and symmetry in our daily existence. Thus, art in process offers from the aesthetic domain, a qualitative dimension that enriches our lives.

These five attributes work together in a multifaceted system to bring about process. Each element works in a relational manner; indeed, one can often not be considered without inquiry into the character of the other. This provides the basis for a process cosmology that sees all creation as flow where involvement, balance, harmony, and a moral intensity flourishes (Oliver, 1989).

Curriculum in Process

The relationship between cosmology and metaphysics provides a framework from which new aspects in curriculum theorizing emerge. The new image allows us to view curriculum not as fixed and determinant but as a dynamic enterprise from which one may envision a curriculum of interconnected relations and broadened perspectives grounded in personal relevance. This view of a process orientation to curriculum addresses Bateson's (1980) concern that thinking should be congruent with nature. He believes that

our conceptual maps should not prescribe direction, rather, they should support the dynamic system in which we live. He proposes that we should focus on the natural relational nature of systems as the basic building blocks. "Preoccupation with objective matter ignores or masks the fact that an observer is in relation with what is being observed" (p. 67-68). Hence, curriculum emerges from multiple perspectives.

Additionally, when considering process as potential for curriculum theorizing, theology offers insight. Barbour (cited in MacDonald & Purpel, 1987) proposes types of experience that are addressed in a religious framework. These include:

> (1) awe and reverence...; (2) mystical union as expression of the unity of all things; (3) moral obligation in the form of ethical decisions and assumption of responsibility, reorientation and reconciliation...; (5) interpersonal relationships as experience of dialogue between persons characterized by directness, immediacy, and mutuality; (6) ...events of the community, which helps us understand ourselves and what has happened to us; and (7) order and creativity in the world, the intricate complexity and interdependence of forms. (p. 185-186)

This model may be extended to curriculum as each point is salient to the process curriculum. In an open system, these spiritual experiences enable the articulation of viewpoint,

communicate reality, and lead to harmonization of occurrences. This invites extended meaning and connections that reflects aesthetic awareness of the uniqueness found within the system and the efforts engendered to become a unity.

Unity in this sense reveals the ecological spirit with which the system is invested. These components in a process curriculum bring to education what Oliver (1989) considers a grounded or ontological consciousness that embraces both primary perception which conjoins us to the process of being in the broader pattern of events and our sense of immediacy in our lives. This encourages a curriculum capable of enabling individuals to create vision that stirs their consciousness to new heights.

Inherent in this curriculum is the ability to increase the capacity for moral action, contribute to growth, enhance personal and public meaning, and renew a sense of direction (Schubert, 1986). Here humanity participates "in the development of a world in which justice, love, dignity, freedom, joy and community flourish....and where [they] are meant to pursue a path of truth, beauty and goodness (MacDonald & Purpel, 1987, p. 187). When curriculum reflects these characteristics it becomes authentic. Thus, an authentic curriculum is one that enables us to connect the metaphorical language of the metaphysical concepts to the being of our lives in order that being merges with becoming. This offers a broadened perspective from which

meaning and understanding may speak to basic individual, cultural, and spiritual values.

Zais (1986) believes that a curriculum that invites authenticity is one of lived experiences. It encompasses all things for which schools assume responsibility. Similar to schools as lived experiences is the metaphor of curriculum as event (King, 1986). These notions may initially have a limiting perspective when viewed from a mechanistic vantage in that experiences and events have a beginning and an end; however, Gadamer (cited in MacDonald and Purpel, 1987) augments the metaphor with the concept of horizon. A horizon is an essential part of each situation or event which allows individuals to see beyond what is nearest to them. This expands the immediate sense of finality and stretches our imagining to what could be. In addition, Whitehead's (1978) perception of event is congruent with this notion. For Whitehead an event is the coming together of actual occasions in the act of concrescence. This continual becoming, like the metaphor of horizon denies a means-ends orientation and promotes process in curriculum.

By using the metaphor of event in curriculum theorizing, we remove limiting visions of traditional curricular practices and move to a transformative perspective. Here, an event implies a relational nature. Curriculum becomes more than a noun, a person, place, or thing. Curriculum theorizing in its transcendent form

becomes a complex organization made up of systems that interact as a whole. Each brings to the other complementary characteristics that make functioning an emergent process. Much like a holographic image responds, the nature of the teacher, nature of the learner, nature of society, and nature of knowledge interact and reflect mutual causality and an ecological spirit that reflects this interactive character. Within the alliance of these elements, the essence of a process curriculum emerges.

Nature of Knowledge

Epistemology is the branch of philosophy that deals with the nature of knowledge and the processes involved in coming to know. Herbert Spencer's question "What knowledge is of most worth?" is the fundamental question underlying educational practices. Dobson et al., (1985) assert the answer to this question from the predominant view is that there is a pivotal body of knowledge which must be transmitted to all. A belief in absolute knowledge Bohm (1983) maintains prevents the free movement of the mind needed for clarity and perception. Thus, when we try to define the idea of knowledge, we limit it to an arbitrary standard that becomes independent of thought. Knowledge at this point becomes objectified and severed from reality. In this form, it exists apart from the knower and must be discovered or granted.

The antithesis of this is knowledge as the nature of

process. Bohm (1983) holds that in process, knowledge must be viewed as part of the total flux. He argues that this leads to a congruence in life that is more in tune with nature. Here, knowledge from a process perspective is created, manifested, communicated, transformed, and applied in thought. "Thought considered in its movement of becoming is the process in which knowledge has its actual and concrete existence (Bohm, 1983, p. 50).

This quality of thought is an art form that disposes us toward order and harmony in the overall dance of the mind (Bohm, 1983). The art of thinking holistically is the capacity to comprehend ever changing and flowing reality. Its function is primarily to seek deeper understanding and to recognize and create patterns that reflect personal order rather than to communicate reflective knowledge of how everything is (Bohm, 1983). Ultimately, the actual movement of thought incorporating any assumption of wholeness has to be seen as a process with ever changing form and content (Bohm, 1983).

Process thought is congruent with Whitehead's assertions about knowledge. He defines knowledge from a process perspective as conscious discrimination of objects experienced.

> [This] discrimination, which is knowledge, is nothing more than an additional factor in the subjective form of the interplay of subject with object. This interplay is the stuff constituting those individual

> things which make up the sole reality of the universe. (Whitehead, 1933, p. 228)

Thus, knowledge, the process of thought, lies in experience not outside experience. Bohm (1983) calls this non-thought and Siu (1957) no-knowledge. Here knowledge transcends events. It has no properties and no time. It is, however, the kindred spirit that allows one to inject empathy and understanding into thought encouraging participation in nature (Siu, 1957). The purpose of knowing from this perspective is to live life more compassionately (Berman, 1986).

The applicability of process knowledge to curricular practices promotes an emergent reality based in personal truth. Dobson and Dobson (1981) believe "how children feel about what they know is equally as important as what they know" (p. 53). Process knowledge created from the workings of the subjective realm acknowledges the expression of emotional feeling. It nourishes intuition as a driving force in cognition. These intuitive abilities allow students to maintain a playfulness of mind that frees the spirit from habits and prejudices and encourages reflection, recognition of nuance, expression of emotions and value in action. In this manner, process knowledge revitalizes expression of vision. Its ultimate configuration, however, promotes the pursuance of novelty in adventure. These qualities widen awareness which is essential for dealing with the rapid change that characterizes our world. It

releases students from the mechanistic routine that stifles potential and offers the occasion to go beyond mere action; it allows students to incorporate a deeper and broader thinking and feeling into their educational experience that offers a sense of the beauty and harmony found in human expression.

Nature of Learning

When we consider our knowledge to be a process not a thing, the nature of learning also is transformed and becomes actualized in our actions. Whitehead's (1929) rhythmic process and the idea of education as event dispel the "wooden futility" with which education is invested. Learning from a process perspective becomes an active endeavor, where the very experience is one of "romance, precision, and generalization" (Whitehead, 1929). In romance, one experiences the first stirrings of connections and relationships. Ideas disclose themselves in emergent patterns and precision fleshes out the ideas born in romance. Precision and romance working together in interdependence usher into consciousness a transformative state that yields the fruition of the initial processes. The stage of generalization is a synthesis of ideas that brings back to thought the romance in the educational process.

It is important to note that, in keeping with his organismic philosophy, Whitehead (1978) asserts this process

like all processes into novelty does not reflect uniquely serial advance. He states "there is a becoming of continuity but no continuity of becoming (p. 35). Instead, each atom is a system of all things (p. 36) and as such the nature of learning encompasses "completeness of realization". Thus, experience from a holistic perspective is composed out of relations and formation of relations to come. Here the present receives the past and builds the future (Whitehead, 1938).

This process view of learning in the sense of an emergent reality emphasizes the importance of disequilibration in coming to know. Glieck (1987) asserts that in the formation of patterns in nature there arises periods of equilibration and disequilibration. Change emerges within this process. Disequilibration, a self-regulatory process, is the "spontaneous reorganization when a critical point has been reached (Prigogine & Stengers, p. 165). Similar to the subjective aim of Whitehead's philosophy (1978) in the process of concrescence, the critical point holds the myriad choices a student may make and decision becomes internally driven dependent upon the environmental stresses. This delicate balance between stability and instability maintains what Kuhn calls the "essential tension" (1977) that serves not to destroy but to create. Here a simple event, touched by the conditions of its being, opens paths of complexity to reflect new vistas that evolve into adaptive patterns that reflect the

circumstances through which they pass.

The consequences of a transformative vision of the nature of learning demands educational settings that deal with the complexities of reality. The curriculum focus becomes wider encouraging reflection and inquiry rather than uniformity. The objective of learning becomes growth oriented and invites diversity and creativity. The student works from a subjective perspective buoyed by an internal locus of control. When learning follows this pattern, disequilibration becomes a positive concept. This enables the nature of learning to be a participatory process that encourages learning in action and interaction and finds harmony in the adventure of emergent realities.

Many of today's "grass roots" efforts in education attempt to implement facets of a process approach. The National Council of Teacher's of Mathematics Standards and the holistic education movement reflect the spirit of process; however, because of the mechanistic structure of schools these fall far short of the mark. These philosophies do not fare well in a tightly structured environment. Their spirit becomes tangled in a web of prescription, remediation, and control that snuffs out the essence of their very being. In this atmosphere, they become little more than another method or "gimmick". This posture denies the dynamic relational nature of the school house that encourages the freedom for students and teachers to explore their world and bring personal meaning to it.

Nature of The Learner

Transpersonal psychology offers a description of the nature of the learner that is congruent with process. Based in the humanistic psychology of Maslow (1968) and Rogers, (1969) the self is seen as a kind of intrinsic nature for which one must probe and guide toward self actualization, the realization of potential. Transpersonal psychology, however, encourages the individual to move beyond actualization toward a systems view of self that is based on the establishment of a healthy identity (Erickson, 1963) and reflects an integration of the mind and body, a total system, where the individual celebrates all that he or she is.

A systems view of the self acknowledges the web of relationships that make up our existence. Whitehead (1934) asserts "that there is a unity of the body with the environment, as well as a unity of body and soul into one person" (p. 38). This is manifest in the individual who constitutes the immediate stage of experiencing "which is myself now" (Whitehead, 1934, p. 160). Actuality, then, becomes experiencing within oneself the self enjoyment of importance that has the character of the self-enjoyment of others. This is an instance of the unity of the universe in each individual actuality (Whitehead, 1934).

When an individual transcends the idea of the self as independent and separate, the authentic individual emerges

and defines being not through social roles but through their relations with others. Here, the self is characterized by self-actualization and "peak experiences" but not limited to it. Rather, it is the inner directedness that facilitates the enjoyment found in the harmony of life that promotes an understanding of the self and the environment that is an integral part of its existence. Based in self-regulation, an authentic individual exhibits an autonomy, not of the rugged individual, but in the capacity for intimacy with all of one's experiences (Vaughn, 1985). From this, one gains a sense of self in which the awareness of the freedom to make choices and accept responsibility for them emerges. There exists an inherent consistency between thoughts, words, and actions. Here, "the real self is ... a coherent whole. Behavior is congruent with inner experience, and self-expression is characteristically spontaneous and unique (Vaughn, 1985, p. 17). Thus, the transpersonal self participates in the art of life through its celebration of wholeness.

When we look at the nature of the learner from this holistic perspective, we improve the quality of life and increase opportunities for students and teachers to experience themselves as participating agents "engaged together in creating, critiquing, and transcending their present realities" (Zaret, 1986). The transformation offers to individuals the authority, freedom and responsibility to take control of their lives to unleash talents and effect

change. This process concerns heuristic inquiry into the very core of existence where students find they are the curriculum (Bowman & Haggerson, 1990). The objective and subjective realms merge and produce a curriculum rich in significant occasions for the participants to take an active part in their learning "event". This self-empowerment supports students and teachers offering opportunities to take risks and enfold themselves into material that submits meaningful substance to their lives.

Nature of Society

Society from a process perspective widens the beliefs about the nature of the learner to infuse those characteristics into that of society as a whole. When this occurs every action of the individual is at once private and public affecting all aspects of the system. Related to this perspective, Whitehead's (1978) beliefs about society are salient. He asserts society contains common defining elements of form arising through interactions conditioned by influences of the system. Within this order, or relations between the entities, the society emerges, a reflection of the individuals that make up the society and nature. It is here values, beliefs, similarities, and differences merge to create a reality that is not a passive entity separate from the individuals waiting to be encountered; rather, it is a reality of lived experiences in process, a creation derived from the interdependence of the totality. Here a sense of

being connected to everyone and everything as an integral part of the whole resides (Vaughn, 1985).

Societies characterized by process accept the transformations inherent in their becoming. Facilitated through democratic participation, communication, reflection, and recognition of personal relevance these relations reflect the active participation in the becoming of each lived experience. These actions offer the members of the society the opportunity to effect the qualitative change in reality that occurs when teachers and students as members of the society are involved with the planning, decision making, and evaluation of curricular matters. Participation breeds ownership. In this way they are motivated intrinsically and this inner drive elicits a high level of autonomy that unleashes enthusiasm for the business at hand.

Enthusiasm fostered by participation builds a spirit of "community". Process supports open lines of communication and invites feedback. Open lines of communication advance a climate based on honesty, trust, and mutual respect. Through this new found openness, constructive conflict and criticism are encouraged. Teachers and students are challenged to make personal commitments, reflect and study their work, and to communicate these ideas to one another. Work is focused on educational connoisseurship, (Eisner, 1985b) the ability to see, to perceive what is subtle, complex and important in order that they may evaluate their culture effectively. This affords the opportunity to bring

together the diversity, yet maintain uniqueness and to promote a collaborative atmosphere. This disequilibration in community effort induces the potential for change and greater understanding.

Conclusions

It has been the intent of this dissertation to redefine the concept of excellence in education and specifically to explore the implications for curriculum that emanate from this new perspective. To recapitulate from the information found in Chapter II, the present conservative technical notion of excellence based in a scientistic rationale tends to fragment, distort, reduce, and control reality. Knowledge from this perspective is exclusively rational and empirical and refuses to accept all nonrational elements as legitimate sources of knowledge. Thus, a product or score that is verifiable defines excellence.

Alternatively, Chapters III and IV of this dissertation explore intuitive processes to pursue a wider and deeper notion of excellence. In the text, it is suggested that the acceptance of intuition as an equal partner in the construction of knowledge generates rich data and encourages Whitehead's speculative exploration into the art of life. This added dimension from the subjective realm expands awareness and brings to curricular practices a unity of spirit that embraces the wholeness and interdependence of process. It is one thing to "know about" something, it is

another to "know". There are two parts to the learning equation: information and personal meaning. Clearly, the former is limited to the rational and the latter the nonrational or intuition. Thus, it is my contention that excellence in education requires that curriculum thought move beyond the scientistic methodologies of present practices, and through the acceptance of intuition as an integral part in the construction of knowledge, move toward process as the unifying element of all reality and in particular curriculum theorizing.

In curriculum theorizing, from a process perspective, when we incorporate the nature of learning, the nature of the learner, the nature of society, and the nature of knowledge as essential, interdependent elements, we forever change the character of curriculum. Dominant curriculum theories incorporate the first three natures but for the most part epistemology has been neglected. When all four functions or "natures" have parity, schools accordingly emanate with life rather than copy life. In this manner, as MacDonald and Purpel maintain (1987) "curriculum [becomes] ... an index, a reflection, an aspect, an activity that emerges from an orientation and vision of who and what we are, where we come from, and where we are going" (p. 192).

From a redefinition of excellence and the acceptance of intuition as a legitimate source of knowledge, we establish process as the mode through which we approach curricular practices. This ecological spirit directly confronts the

fragmentary views that plague the educational process, inhibit freedom of choice, and promote alienation of students and teachers. When we accept intuitive knowing, schools emerge as places that breathe with vitality rather than remain the lifeless forms that have had the very breath squeezed from their existence. From the speculative, intuitive information, we gain the opportunity to shift directions and alter our course of learning. This increases the capacity to "see" with greater depth and clarity. This sanctions the creation of vision for what could be rather than remain forever chained to what is. Additionally, when we perceive curriculum as a vital, active force, an interdependent system of parts, the metaphor of event allows learning to be dynamic and fresh not stale "like yesterday's fish" (Whitehead, 1929).

Curriculum in this manner is emergent and learning is encountering. The event provides for rich experiences in many contexts and through its horizon is future oriented. Paradox, ambiguity, disequilibration, and complexity become liberating qualities in a transformative occasion. Knowledge, no longer absolute, finds expression through the process of thought. Truth in process is not absolute but relational, and defined by one's values, beliefs, and attitudes. Its subjective nature allows us the opportunity to question truth, assess view points and to make judgments and determinations from a nonrational and rational ground. Consequently, individuals make connections between linear

notions and intuitive understandings. They accept multiple ways of coming to know that encourages a playfulness of mind. From this intuition, creativity, innovation, and imagination become essential ingredients for learning. These constitute the true methods of excellence.

Ultimately, this emergent reality inherent in process centers on reflection and the search for meaning and understanding rather than determinate answers. The focus of curricular matters, consequently, shifts from quantity to quality (Zaret, 1986). "Through this process we have the capacity to transcend our present situations; we move beyond what we now know, imagine, believe ourselves to be, to create new meanings and new understandings and even new worlds" (Zaret, 1986, p. 47). We pursue excellence through this transformative process.

Finally, the purpose of curricular practices formed through process becomes more than the actualization or realization of potential. It is the source of stimulus for participation in the creative process. In process, curriculum evolves into the active experiencing of reality, the awareness of choice and recognition of the responsibilities inherent in those decisions. One understands and accepts the challenge of life realizing there is no separation between self and nature, subject and object; we are one. Ultimately, this realization of the interactive nature of our existence focuses the curricular vision on mental, emotional, and spiritual nourishment that

promises to provide fertile ground for the cultivation of the art of life. Here, rational and nonrational become interdependent entities, capable of searching and questioning, of gleaning information from all realms and applying them to the myriad aspects that are inherent in reality. From this ability, excellence is achieved.

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