Curriculum Units by Fellows of the Yale-New Haven Teachers Institute
2001 Volume VI: Human Intelligence: Theories and Developmental Origins

Multiple Intelligences: The Learning Process in Our Students

Curriculum Unit 01.06.10
by Yolanda U. Trapp

Dedicated to my beloved daughters Valeria and Patricia, and to Carlos Alberto Cornejo. This Curriculum Unit is designed for Kindergarten to 4th or 5th grade, and is easily adaptable to secondary levels.

My intention is to provide teachers and students of the New Haven Public Education a general description of how we could interact with children who have different styles of learning, to understand their emotions and to explore some aspects of their biological rhythm, memory, brain growth and development.

For these reasons I created several activities where all children will have a feeling of belonging and of being valued members of the classroom and the school's community. It may be necessary to modify the core curriculum to accommodate different styles of learning. Activities may be altered or replaced or the amount of work reduced to meet a student's individual needs.

Children need to explore and understand how they learn best. I suggest to use the theory of Multiple Intelligences (Howard Gardner) or Emotional Intelligence (theory of Daniel Goleman), and Sternberg's theory of "Successful Intelligence". The more that we can match youngsters to a congenial approach of teaching, learning, assessing, the more likely it is that those youngsters will achieve educational success.

Introduction

As a person concerned with public education, we shall consider in this project some of the conditions, factors and guides to promote a range of capacities and potentials, that both individually and in concert, can be put together to create a world in which a great variety people will want to live.

Traditionally, the function of our schools has been to train for the thinking aspects of living. And this obligation, more than at any other time in our history, must continue to be one of the basic responsibilities of the school. Our society has never been in greater need of citizens who can think clearly. But learning to think was, and unfortunately still is, regarded by many people as the training of a large isolated "mental muscle". By memorizing facts and acquiring certain mental skills the students is supposed to grow into a rational adult capable of dealing with all kinds of problems, including emotional and social problems. We know now that

such all around competency does not grow out of an educational program aimed exclusively at training the intellect.

A few decades ago some learning educators began to question the didactic, the 'telling them", the "precept" method of teaching children what they should do, how should they act. Instead they argued, if children and youth had more direct experiences with the materials, the processes, and the products of our world-both physical and social- they would, with help, arrive at sounder knowledge and would achieve greater readiness to do, act, in an "Intelligent Way" when confronted with new experiences, both real and vicarious.

However, in this doing or action programs, it was assumed that the intelligence and feeling aspects would become mature more or less automatically. We are finding that this does not happen quiet so automatically. Every child must have help in growing. My goal is to prepare the students into an emotionally mature adulthood. After long years we are recognizing our responsibilities for helping children to learn to feel and respond cognitively in certain ways. Most teachers and most teacher training institutions say, "yes, of course, we are interested in, and feel responsible for, the whole child, for the emotional, social, and cognitive growth". But most of us are not prepared to take on these responsibilities; we have not been trained to do so. With the constant evolution in theories ways of learning, and studies of human intellectual potentials, lead us to speculate and bear factors in mind when we try to help the child to become a good human being. I will discuss the factors of readiness for experiences, dealing, and integration of the feeling, doing, and thinking aspects of living.

Contemporary psychological thought has come to stress the importance of exploring and understanding these factors. 1The basic quality of our emotional maturity, we realize, is largely the result of the most important factors; the relationship between parent and child. Another relationship of great importance to the growth of the individual - and of even greater importance to the good of society - still cries out for study but remains generally neglected. Despite the fact that millions of children and thousands of adults are daily pressed into a student - teacher relationship, we know very little about their interactions and the influences they have on each other. Of course, there is a great deal of material available on learning theory and general educational practice. But none of this tell us what actually happens when a teacher asks a child a question in the classroom.

What does the child hear when he/she is called on? What does he/she feel? What does he/she think? What are his/her fantasies and wishes? What does he/she try to do? What kind of intellectual profiles is he/she assessing? What effect does he/she have on the teacher? What does the teacher think and feel and do as she awaits the answer? Does she understand the meaning of the child's answer or see it merely as right or wrong? Does her relationship with the child have the intimacy ideally necessary for intellectual growth or is it a dull, contractual one which fosters non - learning as much as it does learning?

Not every teacher is able or even willing to accept a relationship of such intimacy. Nor, for that matter, is every student. It would be reasonable, however, to expect the teacher to make a greater effort than the student does to promote interaction between them. But how? What can we do?

We cannot legislate sensitivity into existence. We can define curriculum and theorize about motivation, but we cannot promote perception by command. Only by specific, concrete examples can we encourage teachers to learn to see their pupils, not their subject matter. It is important to see all the aspects of the child. Only by showing again what the child in the classroom is doing can we come to understand how he/she learns and how he/she fails to learn.

Failure in a success - oriented culture is hard to take, we are failing and our children are failing in our schools at an alarming rate. 2Even children who achieve enviable grades are failing to learn much of what we hope to teach them: abstraction, curiosity, and most of all, appreciation. The subject matter of a course is frequently little more than merely a vehicle for the achievement of these educational goals-yet, all too often, the subject matter becomes an end in itself.

A teacher can perceive this only if she gets inside the Mind of the pupil.

In 1847 the first graded school was invented in America. The assumptions about the course of learning upon which the school was built were straightforward: students would be grouped by age, and each age level would be assigned to a grade. Age grading in our schools became the dominant organizational structure. It was further assumed that, since students were grouped by age, the content and aims for each grade should be the same for all children in that grade. Effective teaching was defined as the ability to enable all children in a grade to achieve the goals for that grade level. Like an army marching in tandem, at the end of an eight, or a 12 year period students would exit the school having mastered the content assigned to each of the previous grade levels.

These assumptions about human learning and these features of school organizations are alive and well in American schools today. Indeed perhaps more than in the past, the specification of grade-level standards is more than a tacit embrace of age grading. If we were to take President Clinton's advice, we would take grade-level standards, so seriously that no child would be promoted without having met grade level expectations, despite research indicating that retention is not general a good remedy. 3The roots of the problem are deeper. We have learned that human development does not proceed in a tidy manner. An eight-year old child is not an eight year old. Children differ not only in the rate of their development but also in the particular areas of work they are expected to perform. Some students have high-level aptitude in the arts; others, in the sciences. Some children are gifted in social skills; others, in the use of language. If some magic, teaching could be made optimal for every student in a class of 25, the variability of student performance in that class would increase in each subsequent grade. Optimal forms of teaching for those gifted in other areas would enable them to move farther and faster in artistic pursuits than those gifted in other areas; those gifted in mathematics would move farther and faster in quantitative areas than those not so gifted. Under optimal teaching, variability would surely increase.

Goals:

I describe here different styles of learning in general education, based on instructional methods allowing to develop instructional procedures and programming alternatives that emphasize the need to:

1. Provide a broad range of advanced-level enrichment experiences for all students and,
2. Use various student's responses to these experiences as stepping- stones for relevant follow-up.

This approach is not viewed as a new way to identify who is or not gifted. Rather, the process simply identifies how subsequent opportunities, resources, and encouragement can be provided to support the continuous escalation of student involvement in both, required and self-selected

activities. This approach seeks to develop high levels of multiples potentials in a broad range of students.

Brain Growth and Development

We are in the middle of an unprecedented revolution of knowledge about the human brain, including how it processes, interprets, and stores information. Never before have we known more about human learning. Thanks to a rapidly growing body of research in neuroscience. It is no longer just an art form - it is also a science. Never before have we had the potential for being successful with more students. Also the research is no magic bullet, what we are discovering about learning has the potential for making the greatest contribution to our practice in recent memory. Yet despite this incredible promise, many educators still question its significance.4

Despite all the rhetoric about reform, teaching and schools have changed little as old practices die hard. The Industrial Model and Agrarian calendar persists (although year-rounds schedules are on the increase). Lecturing continues to be the main method of instruction in secondary schools, and the overhead projector is often the most advanced technology used. Because students see little novelty and relevancy in what they are learning, they have a difficult time following for extended periods and are easily distracted. For many students, school is seen as a dull, non-engaging environment that is much less interesting than what is happening outside of school.

The valuable new information about the brain and learning can help us understand and deal more successfully with today's students. The advancements in neuroscience require that we now shift our focus to the learning process. The brain-based approach is not a packaged program or bandwagon. It is an acknowledgment that when teachers have a thorough understanding of how the brain develops, learns and organizes itself, they will make better decisions about teaching, and will use programs such as multiple intelligences, learning styles, and cooperative learning more effectively. It comes down to work smarter, not harder.5

Memory and Recall

We are learning more about memory and recall, and how strongly past experiences influence new learning . What we already know acts as a filter, helping us attend to those things that have meaning (that is relevancy), and discard those that don't. Thus, meaning has a great impact on whether information and skills will be learned and stored. If students have not found meaning by the end of a learning episode, there is little likelihood that much will be remembered. To help children find meaning, today's curriculum must contain

connections to their past experiences, not just ours. Paring down and integrating the secondary curriculum will also help students make relevant connections between and among the content areas, thereby improving learning.

Emotions in Learning

We are learning more about the power of emotions in learning. How students "feel" about a learning situation determines the amount of attention they devote to it. Their emotions interact with reason to support or inhibit learning. Students, for example, must feel physically safe and emotionally secure in their schools and classroom before they can focus on the curriculum. Consequently, society must ensure that schools are free of weapons and violence. Then teachers can promote emotional security by establishing a positive climate that encourages students to make appropriate risks while learning.

Until recently, emotions were not part of the mainstream of cognitive science. As a result most teachers have not had adequate preparation in how to use emotions productively in their classrooms. In addition, we should explore what, when, and how we teach students about their own emotions, so that they can be successful learners and productive citizens. Daniel Goleman, the author of *Emotional Intelligence* , suggests we teach about such topics as reducing stress, controlling impulses, delaying gratification, and expressing feelings.

Sensory Engagement

We are learning that the brain makes new neural connections when it gets actively involved in interesting and the challenging situations. Yet, in too many secondary schools, students sit passively for long stretches in rooms with little sensory stimulation, listening primarily to teachers talk. Classrooms should be busy, interactive environments where learners are teaching, and teachers are learning. By using a multisensory approach consistently, teachers keep students actively engaged in their learning. At appropriate intervals, students should be standing up, moving around, and discussing with each other what they are learning while learning it. Task-centered talking is critical to the memory process since it helps maintain focus while enhancing sense and meaning. This social interactions is also emotionally stimulating and supports the learning process.

Timing is Crucial

We are learning more about the importance of timing in lessons. Because today's students are accustomed to quick changes in their environmental stimuli, many find it difficult to concentrate on the same topic for long periods of time. This is particularly true if the teacher is doing most the work, like lecturing. Shorter learning episodes, therefore, are usually more effective than longer ones6. Twenty-minute lesson segments are likely to hold student interest, and result in more retention of learning. There is more remembering time in two 20-minute lessons than one 40-minute lesson. In block scheduling, and 80-minute lesson or period can be a

blessing or a disaster, depending on how the time is used. Many teachers believe that a block containing four 20-minute segments will be more productive than one continuous lesson.

Biological Rhythm

We are learning more about circadian rhythms and how they affect student performance both in and out of school. The biological rhythms responsible for overall intellectual performance start later in the day for an adolescent than for an adult7. This shift in rhythms means that most teenagers usually perform better in problem solving and memory tasks later in the day rather than earlier. Some districts are aligning high school opening times, as well as course and testing schedules more closely with the student's biological rhythms to increase their chances for achievement.8

Learning Disabilities

We are learning and gaining a deeper understanding of learning disabilities, such as autism and dyslexia. Scanning technology is revealing which parts of the brain are involved in these problems, giving hope that new therapies can help learners overcome their difficulties. It may be that some children who are called "learning disabled" are "schooling disabled" and the more we learn about the cerebral origins of their problems, the more successfully we can desing schools and teaching methods that will stimulate their brains and help them learn.

In Search of Brain-Based Education

The Model

Brain-based educators tend to support progressive education reforms. They decry the "factory model of education" in which developing knowledge, teachers disseminate it, and students are graded on how much of it they can absorb and retain. Like many other educators, brain-based educators favor a constructive, active learning model. Students should be actively engaged in learning and in guiding their own instruction. Brain enthusiasts see neuroscience as perhaps the best weapon to destroy our outdated factory model. They argue that teachers should teach for meaning and understanding.

This model of learning is firmly in more than 30 years of psychological research. While we know a considerable amount from psychological research that is pertinent to teaching and learning we know much less about how the brain functions and learns. For nearly a century, the science of the mind (psychology) developed independently from the science of the brain (neuroscience). Psychologists were interested in our mental functions and capacities-how we learn, remember and think. Neuroscientists were interested in how the brain develops and functions.

It is only in the recent years that scientists called cognitive neuroscientists, began to study how brain structures support mental functions, how our neural circuits enable us to think and learn. This is an exciting and new scientific endeavor, but as result we know relatively little about learning, thinking, and remembering at the level of brain areas, neural circuits, or synapses; but we know more now about how the brain thinks, remembers, and learn.

Hemispheric Specialization

An apparently simple organ, the brain is in fact more sophisticated than the most complicated computer. The brain weighs about three pounds. It is composed of two hemispheres, left and right, which are connected by the corpus callosum. These fibers radiate in the walls of both hemispheres and form a direct connection between the convolutions of the right and the left side. The hemispheres must be the organs of long term of memory and in some way retain vestiges of former currents, by means of which mental considerations drawn from the past may be aroused before action takes place.

The brain is not totally symmetrical. Many specialized functions seem to be centered primarily in one hemisphere or the other. The speech and language centers are bilateral just above in front of the ear (Broca's area). Although language is primarly in the left hemisphere for the majority of people, it can develop in either hemisphere (Vitale, 1988).

To make this concept more practical, let us talk about hemispheric specialization as it is related to academic skills. Certain skills have been assigned to either the left or the right hemisphere. Although research is not complete in this area, it is clear that differences do exist. Table 1 (Vitale, 1988) lists the skills or curriculum area strengths generally attributed to left and right hemispheres.

(table available in print form)

Each hemisphere of the brain also specializes in a different mode of consciousness. Two separate and unique ways of processing stimuli exist within each person. Although both hemispheres receive and process sensory information from the surrounding environment, each hemisphere processes the information separately. They do not approach life in the same way, yet both use high-level cognitive modes. The left hemisphere approach to life is part-to-whole. It sequences and is logical. The right hemisphere does not sequence; it looks at things holistically, in an overall picture.

(table available in print form)

Enriched Environments and the Brain

The positive environment can be enriched and influenced by educators (psicologist F. Goodmin , Kotulak 1996). He says that the better the quality of the learning environment is, the better the brain will react to certain influences. But the first work is to eliminate the negative environment like embarrassment, finger pointing, unrealistic deadlines, humiliation, sarcasm, a lack of resources, or other threats that are not effective in the process of learning. On the contrary once threats are gone, we can certainly think that adding positives, the brain reacts amazingly in a process that permits to grow new connections when we enrich the environment. According to Marian Diamond, a neuroatonomist "the enriched environment produces thicker cortex in the brain" and this that the brain cells communicate better and increases neural stimulation.

We are learning more about how the young brain grows and the different stages of cognitive and skill development. A newborn's brain makes connections at an incredible pace as the child absorbs its environment. The richer the environment, the greater the number of interconnections that are made, and learning takes place faster and with greater meaning. As the child grows the brain selectively strengthens and prunes connections based on experience. Although this process continues throughout our lives, it seems to be most pronounced between the ages of two and eleven,9 as different areas emerge and taper off.

These so-called "windows of opportunity" represent critical periods when the brain demands certain types of input to create or consolidate neural networks, especially for acquiring language, emotional control, and learning to play music. Certainly, one can learn new information and skills at any age, but learning is easier during critical periods. What the child learned during that window period will strongly influence what is learned after the "window closes".

This research reminds us that the early years are important in helping children establish meaningful associations between learning, and to make emotional and sense of their world. By understanding the different times and areas of brain growth, teachers of the primary and intermediate grades can decide how best to approach the content and skills in their curriculum, and provide an enriched, brain friendly classroom environment.

Conclusion

Knowing more about how the brain learns will raise our level of experience that will lead us to use that new knowledge to improve student's success. The public has never before demanded so much of schools and teachers. Yet at the same time, we have a continuous stream of new knowledge about how the brain learns that will enhance our school and classroom practices. This is an excellent opportunity to create permanent liaisons among the neuroscientists, the cognitive psychologists, and the education field. By working together, we can improve our own teaching. We cannot forget none of these fields works separately. As the child grows, there results a more complex unity of the whole person, related to a broader world.

While libraries are full of technical books written about medical research, about how the brain works and also on the subject of hemispheric specialization, I feel that teachers and parents will benefit having the information restated in terms of the academic skills children must master in order to be successful in our educational system. I believe we ought to look at the research in terms of what it tells us about how children learn, rather than why they cannot learn. It is important to understand that children process information and learn in a variety of ways. I believe that by examining hemispheric specialization and dominance and by identifying individual thinking patterns, we can find teaching methods that will meet each child's needs.

Research into Learning Modalities Styles.

Modality refers to one of the main avenues of sensation such as vision and hearing. I am writing about modality-based reading styles because these are both the best researched and the most heavily promoted. The National Reading Styles Institute (NRSI) also "claims that it has worked with over 150,000 teachers", and its advertisement seem to be everywhere. Furthermore, the notions of "visual" and "auditory" learners, or "global" and "analytic" learners have been around for a long time and have found their way into a number of different programs, not just the NRSI programs.

There are others ways of looking at learning styles. People have proposed that children vary not only in perceptual styles, but on a host of different dimensions. To name a few, people have suggested that children are either two-dimensional/three-dimensional, simultaneous/sequential, connecting/compartmentalizing, inventing/reproducing, reflective/impulsive, field dependent/field independent, and so on.

Some of these are learning preferences, or how an individual chooses to work. This might include whether a person prefers to work in silence or with music playing, in bright light or dim light, with a partner or alone, in a warm room, or a cool room, etc.

Some of these are cognitive skills, such as whether a person tends to reflect before making a choice or makes it impulsively, or whether, a person tends to focus on details or sees the big picture.

Some of these are personality types, such as whether a person is introverted or extroverted.

Some of these are aptitudes, like many of Howard Gardner's Multiple Intelligences. Gardner suggests that people vary along at least seven different dimensions-linguistic or the ability to use language, logic-mathematical or the ability to use reasoning specially in mathematics, spatial or the ability to use images or pictures, bodily-kinesthetic or the ability to control movement, musical, people who are skilled or dance, interpersonal or the ability to work with people, and intrapersonal, or the thinking done inside oneself. The last two are more like personality types, rather than aptitudes or even learning styles. The others are Gardner's attempt to expand the notion of what we think is intelligent behavior to people who are talented in music or dance, or even in interpersonal relations. In contrast to the traditional vision of learning styles as either/or categories (either a person is visual or he or she is auditory), Multiple Intelligences are put forth by Gardner as separate abilities. A child may be strong in a few of these areas, or none of these areas.

Gardner also says that children are different, they come to us with different personalities, preferences, ways of doing things. However, the research so far shows that has little to do with how successful they will be as readers and writers. Children also come to us with different amounts of exposure to written text, with different skills and abilities, with different exposure to oral language. The research shows that these differences are important. We have to find different methods appropriate for children at different stages in their development.

The Act of Learning

School improvement must begin by placing the act of learning at the center of the change process. Such organizational and administrative structures as vouchers, site-based management, school choice, multi-age classes, parent involvement, and extended school days may be important considerations, but they do not address directly the crucial question of how we can improve what happens in classrooms, where teachers, and curriculum interact with one another. We must take account of the important components that students bring to the act of learning. Thus, when examining the learner, we must take into consideration: 1) present achievement levels in each area of study, 2) the learner's interest in particular topics and the ways in which we can enhance present interest or develop new interests, and 3) the preferred styles of learning that will improve the learner's motivation. Likewise, the teacher and learner dimensions have subcomponents that must be considered when we place the act of learning at the center of the school improvement process (Sternberg, 1997).

Intelligence

Intelligence is a mystery. We hear it said that most people never develop more than a very small part of their latent intellectual capacity. Probably not; but why not? How do some people manage to keep review up to twenty percent or thirty percent of their full power - or even more? What turns the power off, keeps it from ever being turned on?

When I started teaching, I thought that some people were just born smarter than others and that not much could be done about it. This seems to be the official line of most of the psychologists. It is not hard to believe, if all your contacts with students are in the classroom or the psychological testing room. But if you live at a small school, seeing students in class, in their private lives, at their recreations, sports, and manual work, you cannot escape the conclusion that some people are much smarter part of the time. Why? Why should a boy or a girl, who under some circumstances is witty, imaginative, analytical, in a word, intelligent, come into a classroom and, as if by magic, turn to a complete dolt?

We can to some extent, and over a long period of time, create situations in which some of them may be willing to use their minds in better ways. Some of these, in turn, may even carry these new ways of thinking into a new situation; but we can not expect that they all will. Most of them will probably drop back into the strategies with which they are most familiar and comfortable. Not many children, in one school year, are going to remake their whole way of dealing with life. With luck, we can give some of them a feeling of what it is like to turn one's full intelligence on a problem, to think creatively, originally, and constructively instead of defensively and evasively. We can hope that they will enjoy the experience enough to want to try it again, but it is only a hope. To put it in another way, we can try to give them a glimpse of an intellectual foreign country, and even persuade them to visit it for a while; but it would take more time than we have to make them citizens of that country.

There's no telling what might be done with children if, from their very first day in school, we concentrated on creating the conditions in which intelligence was most likely to grow, but setting up the conditions under

which good thinking can be done does not always mean it will be done. A child who has really learned something, can use it and does use it. It is connected with reality in his mind, therefore he can make other connections between it and reality when the chance comes. A piece of unreal learning has no hooks on it; it can not be attached to anything, it is of no use to the learner.

A child is most intelligent when the reality before him arouses in him/her a high degree of attention, interest, concentration, involvement-in short, when she/he cares most about what she/he is doing. This is why we should make schoolrooms and schoolwork as interesting and exciting as possible, not just so that school will be a pleasant place, but so that children in school will act intelligently and get into the habit of acting intelligently (Sternberg, 1997).

Some Theories of Intelligence

For well over two thousand years, at least since the rise of the Greek city state a certain set of ideas has dominated discussions of the human knowledge, and those capacities that figure in knowing have been specially valued.

a. Psychologists say that it is "the capacity to acquire and use knowledge" .

Theoretical Underpinnings

b. Piaget's theory of developmental psychology:

"Intelligence is developmentally constructed in the mind of the learner and moves from concrete to abstract stages of understanding".

c. Vygotsky's theory of social mediation. "Intelligence is a function of activity mediated through material tools, and other human beings."

d. Feuerstein's theory of structural cognitive modifiability. "Intelligence is a function of experience and can be changed through guided mediation."

e. Gardner's theory of Multiple Intelligence.

"Intelligence is made up of eight realms of knowing (verbal, visual, mathematical, musical, bodily, interpersonal, intrapersonal, naturalistic) for solving problems and creating values in a culture".

f. Sternberg's successful Intelligence. "Intelligence is triarchic, with creative, analytic, creative, and practical components that need to be balanced."

g. Perkin's theory of learnable Intelligence. "Intelligence is made up of neural, experiental, and reflective components that helps us know our way around the good use of our minds".

h. *Costa's theory of Intelligence behaviors* . "Intelligence is composed of acquired habits or states of mind that are evident in such behaviors such as persistence, flexibility, decreased impulsiveness, enjoyment of thinking and reflectiveness."

i. Golemans' theory of emotional intelligences "Intelligence is both cognitive and emotional, with the emotional (self-awareness, self regulation, motivation, empathy and social skill) ruling over the cognitive" j. Cole's theory of moral intelligence. "Intelligence is composed of cognitive, psychological, or emotional and moral realms."

Theory of Successful Intelligence

Successful intelligence involves using one's intelligence to achieve the goals one sets for oneself in life, within a specific socio-cultural context10. Why should teaching for successful intelligence - which involves kinds of analytical, creative, and practical abilities that go beyond those typically emphasized in the schools - raise performance even on tests of memory for learned material? There are two reasons:

First, when material is taught in a variety of pedagogically sound ways - in this case, for memory as well as analytically, creatively, and practically - students have more opportunities to learn and understand the material being taught. If they do not comprehend the material when it is taught in one way, they might comprehend it when it is taught in another. Thus their achievement is likely to improve.

Second, teaching material in a variety of ways enables students to make the most of their intellectual strengths and even to work toward correcting or at least compensating for their weaknesses. Students can learn the material in a way that fits their individual profile of abilities while simultaneously seeing how the material can be learned in a way that is not ideally suited to them. It is important to teach in a way that helps students both to capitalize on strengths and correct their weaknesses.

The Theory in Practice

The theory of successful intelligence can easily be applied in classroom settings, both in instruction and in assessment11. Sternberg and Grigorenko conducted two studies to test the theory in practice, applying it in two subject-matter areas; social studies (a unit on communities) and psychology (a natural and social science). Their studies accomplished our main goals. They showed that an educational intervention based on the theory of successful intelligence improved school achievement, both on performance assessments measuring analytical, creative, and practical achievement and on conventional multiple-choice memory assessments. The studies suggested that teaching for triarchic does not impede - and actually facilitates - factual recall, presumably because students learn the material they are taught in multiple ways and can better capitalize on their strengths and compensate for their weaknesses12.

Theory of Multiple Intelligences

Introduction

Western society has always put great stress on intelligences and intellectual development. But what is intelligence? Since the early 1900s. the I. Q. test has been regarded as the best measurement of an individual's potential and possible role in society. Howard Gardner in his book "Frame of Mind", The Theory of Multiple Intelligences" (1983), puts forth a new and different view of human intellectual competencies. He argues boldly and cogently that we are all born with potential to develop a multiplicity of Intelligences, most of which have been overlooked in our testing society, and all of which can be drawn upon to make us component individuals. The potential for musical accomplishments, bodily mastery, and spatial reasoning, and the capacities to understand ourselves as well as others, are, Gardner argues, "the multiple forms of intelligence that we must add to the conventional - and typical tested - logical and linguistic skills long called I.Q."

Drawing on many years of research in cognitive psychology and neuro-psychology, and pulling together information from the widest range of sources, Gardner suggests that the multiple forms of intelligences can be mobilized by society to achieve a greater diversity of ends and to fulfill a wider range of social goals.

The Theory

The theory of Multiple Intelligences presents the idea that there are many ways in which students use symbol systems in composition. Those who are non-verbal are allowed to approach composition different from those who are verbally inclined. The multiple intelligence theory is that children possess seven types of intelligences; linguistic, logical, spatial, musical, motor ability, interpersonal, and intrapersonal. Traditionally, schools only reward linguistic and logical skills, but they should reward "all intelligences".

Teachers can develop their student's intelligences by applying Harvard psychologist Howard Gardner's Multiple Intelligences Theory, which suggest that approaches other than classroom based education can develop or enhance children's multiple intelligence's.

Linguistic Intelligence: According to Gardner means the ability to retain information like lengthy verbal lists. The recollection of large amounts of information is a tremendously important gift in preliterate cultures.

Musical intelligence: This gift nobody knows why it emerges so early, and what the nature of this gift might be. It remains uncertain. The aural imagination is simply the working of the composer's ear, fully reliable and sure of its direction as it must be, in the service of a clearly envisaged conception.

The musical mind has a creative portion, operates selectively, and works with the mechanisms of tonal memory. This tonal memory has been compounded with remembered emotional experiences.

Logical mathematical Intelligence: In contrast to linguistic and musical capacities, "logical-mathematical intelligence" does not have its origins in the auditory-oral sphere. Instead, this form of thought can be traced to a confirmation with the world of objects. For it is in confrontation with the world of objects, in ordering and

reordering them, and in assessing their quantity, that the young child gains his or her initial and most fundamental knowledge about the logical-mathematical realm. (Gardner)

In Piaget's view all knowledge - and in particular, the logical -mathematical understanding which constituted his primary focus - derives in the first instance from one's actions upon the world.

What characterizes the individual as a mathematician is a love of dealing with abstractions. It is undeniable that a gift for mathematics is one of the most specialized talents and that mathematicians as a class are not particularly distinguished for general ability or versatility. Piaget noted long time ago that the evolution of science displays certain intriguing parallels with the development in children of logical-mathematical thought.

Spatial intelligence: As a definition it is the capacity to perceive the visual world accurately, to perform transformation and modifications upon one's initial perceptions, and to be able to re-create aspects of one's visual experience. Even in the absence of relevant stimuli. Spatial intelligence merges as an amalgam of abilities.

Bodily-Kinesthetic Intelligence: there are languages other than words, language of symbols, and languages of nature. There are languages of the body. A description of use of the body as a form of intelligence may at first jar.

> Skilled use of one's body has been important in the history of the species for thousands of years. The Greeks revered the beauty of the human form. They sought a harmony between mind and body , with the mind trained to use the body properly, and the body trained to respond to the expressive powers of the mind.

Bodily use can itself be differentiated into a variety of forms. Fine motor movements of grosser moor actions. The ability to use one's hands and fingers, or carrying out delicate movements involving precise control.

The Personal Intelligences: There are two sides of development in human nature. One is the development of the internal aspect of a person or intrapersonal intelligence. This form allows us to detect and to symbolize complex and highly differentiated sets of feelings. The other form turns outward and the core capacity here is the ability to make distinctions among other individuals, and in particular, among their moods, temperaments, motivations, and intentions. These forms of intelligence, according to Howard Gardner are of tremendous importance in all societies in the world, - forms that have been tented to be ignored or minimized. The evidence, now, is that will eventually understand a great deal about the phylogenic origin of these intelligences. The capacity to know oneself and to know others is part of the human intellectual repertoire.

Conclusion and Extension to our Teaching

Thanks to Howard Gardner's theory we learned that each of us possess at least seven entirely different ways to understand the world and to express ourselves: linguistic, spatial, musical, logical-mathematical, body-kinesthetic, and to find two kinds of social intelligence, intrapersonal (knowledge of self) and interpersonal (knowledge of others). Each intelligence has its own means and models for expression. Each represents an area of expertise with a specific body of knowledge, as well as a way of approaching learning in any domain. As teachers we can use this theory stimulating students in all their domains, not typically part of traditional western education.

Students may experience new ways of expression, helping their individually, understanding multiple perspectives. No two educators are alike but in one way we are the same: we are all trying to give children quality teaching. With these new approaches to the mind of the students in which we want to do things in ways that fall outside the normal practices of the society, this is the way that can open us to diverse intelligences and sets of intelligences with which each of us is equipped.

Emotional Intelligence

One of the best selling books of 1995 was Daniel Goleman's Emotional Intelligence. This book, which galvanized popular sentiments that some form of intelligence beyond academic knowledge and cognitive problem-solving capacity is essential to success in life, represents a broader trend toward examining the personal attributes and skills that link academic intelligence and success in school, work, and interpersonal relationships.

Goleman defines personal talents as aptitudes that are primarily intrapersonal and enable one to take constructive action with respect to both people and task. Personal talents include affective processes and aptitudes and connative processes and aptitudes, such as volition and self-regulation. These two correlated sets of abilities help an individual develop self-awareness, capitalize on personal strengths, minimize personal weaknesses, make effective life decisions and set and achieve goals.

Individuals have different levels of these personal abilities, just as they have different levels of intellectual, artistic, or musical abilities. Individuals with high levels of personal talent are often found among the ranks of the eminent. A key finding of Benjamin Bloom's study of world-class experts in several talent fields was that, as children and adolescents, these individuals set goals for themselves and practiced long hours to achieve those goals.13 Talented adolescents are also distinguished by their capacity for consistent and intense concentration on academic tasks, athletic events, and musical performance. Bloom also describes eminent achievers as combining great emotional acuity and technical excellent in their activities, which suggests that "emotional intelligence" was integral to their success. Many distinguished writers have the emotional intelligence necessary to rebound from early losses and to express their personal pain and conflict through the creation of great literature. Achievement appear to be extraordinary in their ability to focus their attention, sustain their works efforts, and use their creative efforts as a vehicle for emotional expression.

According to Goleman, emotional and connative components or personal talent are closely related. For example, emotional information is key to decision making, which is essential for self-regulation and goal attainment. Similarly, connative processes are crucial to the development of skills in affect regulation.

John Mayer and Peter Salovey define emotional intelligence as the "ability to monitor one's own others' emotions, to discriminate among them, and to use the information to guide one's thinking and actions".14 They have developed a hierarchical, cognitive model of emotional intelligence that includes four components, listed from the simplest to the most complex:

1. Perception, appraisal, and expression of emotion;
2. Emotional support for thinking;
3. Understanding and analyzing emotions and applying emotional knowledge; and

4. Reflecting regulation of emotions to promote emotional and intellectual growth.

Occupations that require emotional intelligence include psychotherapy, social work, teaching, creative writing, and organizational leadership. Emotional intelligence also predicts positive relationships and work histories. However, research on emotional intelligence is still in its infancy, and work is under way to develop a scale to measure the four levels of Mayer and Salovey's Model of Emotional Intelligence.

Even less attention has been given to emotional processes in education, although that may be changing. For example, for a couple of years there have been created several projects like "Project Charlie" that provides direct training for social and emotional learning. This program was designed to build basic skills in personal and social talents in the general New Haven school population.

Application in my classroom - Emotional Intelligence15

It's time to replace the current model of intelligence. When we give an achievement test, we accept the idea that we are testing a form of expertise, but this is also when we administer an I.Q. test. What differs is the level of experiences we measure, and, probably more important, the way we perceive what are measuring.

As a teachers and all who use ability and achievement tests should stop distinguishing between what the two kinds of tests assess. I will pay attention to the differences among kids and try to use that knowledge to personalize instruction and assessment. It will allow me to plan educational programs that will enable children to realize desired end states (for example, the musician, the scientists, and the civic -minded person).

Curriculum Unit

Goals

What do I intend to do for my project?

I will explore the critical ingredients and different views of human intellectual competencies that can be

mobilized by society to achieve a greater diversity of ends and to fulfill a wider range of social goals.

The focus of my project is to develop a curriculum based in a different approach to the mind of the students, stimulating them in all their domains using the multiple forms of intelligence that Howard Gardner describes in his book "Frames of Mind, The Theory of Multiple Intelligences" (1983), also Goleman's Theory of "Emotional Intelligence" , and Sternberg's "Successful Intelligence"

Why do I want to do this specific project?

Teachers can develop their intelligence by applying all these Theories, which suggest that approaches other than classroom- based education can develop or enhance children's intelligence

Why do I want/hope to accomplish?

I want and hope to accomplish a new approach to the mind of the students, in which we want to do things in ways that fall outside of the normal practices of the society. As educators we are all the same: we are all trying to give children the quality of teaching.

What do I think I will learn or gain from this project?

This project will give me a challenging and wonderful experience that surely will improve my classroom preparation and will also enhance student performance. It will also make me more sensitive to the needs of the children. Listening and learning as a Special Educator has many consequences. It makes me conscious of the different ways a child is able to learn - aware not merely of whom and where I am teaching but of the social structure in which we are involved.

There is a list of factors calling for a change. These factors are based on the assumption that we learn about the world through everyday interaction with our environment and with others. We need to use a wide variety of tools, new approaches to develop problem - solving strategies. To help children learn we must be aware of how the children learn.

How will I present my project?

As a Curriculum Unit with Goals, Objectives and Activities according to the different student's learning styles.

Lesson Plans

Sample Lesson: Bodily/Kinesthetic (grade k to 2nd)

Rain Forest Gallimauphry

Targeted Intelligence: Bodily/Kinnesthetic

Supporting Intelligences: Verbal/Linguistic, Musical/Rhythmic, Naturalist

Thinking Skill: Analysis

Social Skill: Accepting responsibility, taking turns

Goal: To learn about the environment of the rain forest

Materials: chart paper and markers.

Task Focus: class crated the happening of the rain forest through the performance.

Product: Production of the role play

Time: Every days - 45 min. period.

Objective: How to know the uniqueness of the rain forest.

Activity:

1. The teacher reads a story or shows a video about the rain forest.
2. The total class brainstorms all the things found in the rain forest.
3. Small groups are assigned a word to act out a part (e.g., Birds - the students decides the motion and the sound as they become a bird).
4. Give time for a quick rehearsal. Count 1-2-3 everyone makes their noise and motion.
5. now for the performance:
    a. The lull before the storm, the teacher holds up fingers 1-2 and as soon as the students see 3 the role play begins.
    b. After a period of 3-2 and when the students see 1 the gallimauphry ends.
    c. Now the teacher starts on one side of the room. He or she walks across the room and passes in front of sections of the students. While the teachers is in front of a particular group, they make their noise and motion. As he or she passes by they get still quiet - this continues all the way across the room.

Reflection

In cooperative groups of 3 or 4, complete and share this chart.

(chart available in print form)

Sample lesson: Bodily/Kinesthetic (grades 1-2 integrated)

Act the word (adapted from Chapman, 1993, p. 143):

Targeted Intelligence: Verbal/Linguistic, Intrapersonal, Interpersonal

Supporting Intelligences: Synthesis

Social Skills: Accountability, communication

Goal: to develop Vocabulary

Materials: Words whose meaning can be acted out

Task Focus: This activity allows teachers to review vocabulary words by using body motions and movements while saying the words and the meaning.

Time: one week - 45 min. period

Product: definition of new words

Objective: To learn vocabulary words through movement

Activity:

1. Assign cooperative groups of three.
2. Assign the roles.
    Actors: Each member of the group.
    Coach: makes sure that all group members know the words

Director: Distributes the words assigned and decides the orders of the words to be introduced.

3. Begin the activity by having the director distribute the words.
4. Each member learn the words assigned and decides on the best action to teach the word to the group.
5. Each team member teaches his or her words. As a word is taught, all members should do the motion while saying the word and the meaning over and over.
6. The coach has each member review all of the words for a final check.
7. Have the class stand in a circle. The teacher calls out a word and the students do the learned action while saying the word and the meaning.

Reflections

1. which words did you learn most easily?
2. How did this strategy help you learn the words?
3. How else might you use this strategy?

The Rubric

The Standard Mastery of vocabulary The Criteria High performance: 93% average on vocabulary test Sound performance: 85% average on vocabulary tests Adequate performance: 78% average on vocabulary tests Not Yet: Less than 70 average on vocabulary tests

Sample Lesson: Intrapersonal (grade 3 to 4)

Me-Hat

Targeted Intelligence: Intrapersonal

Supporting Intelligences: Visual/Spatial, Verbal/Linguistic

Thinking Skill: Inventing

Social Skills: Giving and getting positive feedback

Goal: To develop self-awareness

Materials: large piece of newsprint, markers or crayons

Task Focus: Each student designs a hat reflecting his or her likes, favorite book characters, goals, or strengths.

Time: 2 periods or 45 min. each.

Product: A hat to wear

Objectives: How to accept positive feedback

Activity:

1. Have each student cut or tear the shape of a large out of newsprint.
2. Give the followings directions:
    a. Put your name on the front of the hat in graffiti style.
    b. On one side, draw two things you like to do in your spare time. (If they wish, students may label them.)
    c. On the other side, draw ways that learn the best.
    d. In one of the back corners, draw what or who you want to be ten years from now.
    e. In the bottom of the other corner, draw and write about a goal you set for yourself for next year.
    f. Under your name, write an adjective that describes the way you want others to describe you.
    g. Include a symbol of your favorite character from a book.
    h. Design the rest of your hat with your favorite sketches, and colors.
    i. During the next three minutes, go around the room and ask to give you a word that describes you. Write them around your hat. Only positive words!
    j. When a friend gives you a word, you give him or her a word in return.
    k. Display the hats.

The Rubric

The Standard: Quality product

The Criteria

High Performance: Creates a hat that shows originality and insight.

Indicators: Novelty of hat design

Arrangement of parts to fit whole

All pieces included

Pieces reflect characteristics clearly

Sound Performance: Creates a hat that communicates insight clearly.

Indicators: Characters represented are clearly shown

Arrangement of parts is orderly

Most pieces included

Adequate Performance: Creates a hat that follows instruction.

Indicators: Characteristics shown as instructed

At least 70% of pieces used

Not Yet: Does not follow instructions.

Indicators: Characteristics not clear

Symbols not connected to characteristic

Sample Lesson: Interpersonal (grade 4 to 5)

Generational Interviews

Targeted Intelligences: Interpersonal

Supporting Intelligences: Verbal/Linguistic, Visual/Spatial

Thinking Skills: Inquire, analysis

Social Skills: Respect for elders, active listening

Goal: To learn respect for elders

Materials: Note pads, newsprint, markers

Time: 45 min. period

Product: Class Venn comparing intergenerational views

Objective: How to understand and to respect elder's views

Activity:

1. Use a KWL chart (What we think we know what we want to know, what we learned) with the whole class to identify what they think they know about their grandparent's lives, and they want to learn.
2. Let the class know that they are going to be team reporters interviewing senior citizens about their generation's growing up.
3. Using the want to know list, make a questionnaire and distribute it to teams of two.
4. Practice with the teams how to ask the questions with respect and caring.
5. Arrange for the class to go on a field trip to a senior home. Let the seniors know what will be happening.
6. If you have a video camera, video tape some of the interviews. Be sure the students use their interview notebook to record their answers.
7. When the students return to, the classroom, use the L or the KWL chart to guide the discussion. "What did you learn through the interviews".
8. Makes an all-class Venn on the blackboard to compare and contrast the generation views.

(figure available in print form)

Reflections: Use student journals. Here are possible lead-ins:

• What surprised me about the ideas shared?

• What did I learn about respecting elder's view's?

• How will I be a better person for what I learned?

The Rubric

The Standard: respect for elders

The Criteria

High Performance: Explanation "why it is important to respect elders.

Indicators: Three to five valid reasons in classroom discussion

Can give reasons for using three to five behaviors that show respect
Story example in reflection with detail
Observed three to five respectful behaviors during interview

Sound Performance: Demonstrates respect during interviews

Indicators: Showed two to four respectful behaviors during interview

Gives one or two reasons in classroom discussion

Adequate Performance: Acknowledges importance of showing respect for elders

Indicators: Used two respectful behaviors in interviews
States publicly the value of respect for elders

Not Yet: Shows no understanding of the need for respect

Indicators: Inappropriate behavior during interviews
Cannot list reasons for respectful behavior to elders

Conclusion

It will help me (or us) to teach more children who are trying to understand important theories and concepts in the disciplines. The more that we can match youngsters in approaching teaching, learning and assessing, the more likely it is that those youngster will achieve educational success. We as teachers must diversify our approaches to education if we want successfully reach the many personalities in the classroom. Each lesson we teach needs to move from doing and talking. This progression will encourage me and my students to learn first through exploration, then to anchor all multiple intelligences in a personal land social approach through lessons that will immerse students in creative experiences while encouraging me toward greater creative participation as each lesson progresses.

Notes

1. David A. Sousa " *Is the Fuss About Brain Research Justified?*" *(How the Brain Learns)* Corwing Press, Article 1998 (p.3-4)

2. Carol S. Dweck "*Caution-Praise Can Be Dangerous*" *American Educator* , Spring 1999. (p.4-6)

3. Shannon Brownlee, "Inside the Teen Brain", article, *U.S. News and World, Report* , August 9, 1999 Magazine, (p. 44-50-52-)

4. David A. Sousa. "*The Learning Manual for How the Brain learns*" Corwing Press, 1998 (p.3-4)

5. 6. 7. 8. David A. Souza " *Biological Rhythm*" , Article Corwing Press, Plainfield, N,J, (p. 3-4).

9. Robert Sternberg, "*Successful Intelligence*" , New York 1997, (p. 10-12)

10. Robert Sternberg, "Ability and Expertise", Article appeared in "*Educational Researcher*" , April 1998.

11. 12. Robert Sternberg, Professor of Psychology in the Dep. Of Psychology at Yale University. *American Educator Magazine* , Spring 1999. (p. 10-12-13-50)

13. Benjamin S. Bloom, "*Developing Talent in Young People*" , New York, Ballantine, 1985.

14. Peter Salovey and D. Stuyter (EDS) "*Emotional Development and Emotional Intelligence* New York, currently in Press (as of Nov.

99) a pre publication. Copy is available from the authors. (p. 1-3) eqi.org/ei-ahs1.htm# Models of emotional intelligences.

15. Goleman Daniel, "*The Meditative Mind*" "*The Variety of Meditative Experience.*" Jeremy P. Tarcher, Inc. Los Angeles, Distrib. By St. Martin's Press, New York, 1995.

References

Gardner Howard, "*Intelligence Reframed*" (1999) Basic Books.

Gardner Howard "*Frames of Mind*" , (1983) Library of Congress.

Goleman Daniel. "*Emotional Intelligence.*" "*Why it can Matter More Than IQ*" . New York: Bantan Books, 1995.

Goleman Daniel, "*The Meditative Mind* " *The Variety of Meditative Experience.*" Jeremy P. Tarcher, Inc. Los Angeles, Distrib. By St. Martin's Press, New York, 1995.

Piaget Jean, "The origin of Intelligence in Children" (1954) and "The Early Growth of Logic in the Child". (1964).

Souza A. David, "*How the Brain learns*" , Corwing Press, 1988.

Sternberg Robert. "*Successful Intelligence*" , New York. Plume. (1997).

Vitale M. Barbara. "Unicorns Are Real" "A Right-Brained Approach to Learning". Jalmar Press, Rolling Hills, Estates, CA 90274 (1988)

Vygotsky, L.S. "*Mind in Society*". "*The development of higher Psychological Process.*" Cambridge, MA. Harvard University Press. (1978).

Bibliography

Armstrong, Thomas. *Multiple Intelligence in the Classroom* . Alexandria, Virginia: ASCD Press, 1994.

Covey, Stephen R. *Seven Habits of Highly Successful People* . New York: Simon and Shuster, A Fireside Publication, 1989.

Gardner, Howard. *Frames of Mind, The Theory of Multiple Intelligence* . New York: Basic Books, 1983.

Gardner, Howard. *Multiple Intelligences, The Theory in Practice* . New York: Basic Books, 1993.

Gardner, Howard. *The disciplined Mind , What all Students Should Understand* . New York: Simon and Schuster, 1999.

Lynch, Jerome and Ann E. Lynch. "Multiple Intelligences Theory and Student Centered Education". *Journal of The New England League of Middle Schools* (Fall, 1995): (1-6)

McKenzie Walter "Gardner's Eight Criteria: For Identifying an Intelligence". Arlington Public schools Web Page.

http://www.surfaquarium.com/im.htm

Nelson-Nicholson, Kristin. *Developing Student's Multiple Intelligences* . New York: Scholastic Professional Books, 1998.

Wibel, William H. "Multiple Intelligences, The Principal and the future". *Journal of the New England League of Middle Schools* (Fall, 1995): (12-14)

Acknowledgments

I am indebdet, to my Professors: Mr. Robert Schultz and Mr. Walter Gillian who have encouraged and given me the opportunity to advance in my profession. I express my heartfeld gratitude; also to Angela Pérez for her technical support, and finally to the Yale Institute for giving me the opportunity to grow as a human being.