

# Creativity, Learning, and the Specialized Brain In the Context of Education for Gifted and Talented Children\*

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I'd first like to explain that I do not work directly with children, so I translate from my experience with adults for my understanding of children's giftedness and talentedness. I actually work with big business; with corporations. But corporations, like children, have a range of potentials, so I've translated from corporate high potentials to gifted and talented children. Included in my data base are many thousands of human resource professionals, teachers, academics, school administrators, and also a group of about 4,000 high school students. But my data base is primarily corporate America. In terms of interests, I believe that all of us are kindred spirits. Our common interests are separated perhaps only by language. What I would now like to do is acquaint you with my specialized language, which is the new language of brain dominance technology.

My story starts with my own duality, which was the basis of my interest in creativity and the brain. As a young man, I excelled in science and math, but I also was a musical performer. I graduated from college with a double degree in nuclear physics and music. At the age of 45, I took up painting and sculpting and over the next fifteen years, created a body of work of some 600 paintings and 100 sculptures. As I contemplated my own behavior, I wondered where all that creativity came from. What was this duality between science and the arts in me? In my pursuit of the answer, I delved into the nature and source of creativity, and in the process, I "rediscovered" the brain. I learned that we all have dualities--not just

one, but perhaps multiple dualities. Think of the options your own interests have given you, both when you were young and now.

In pursuing the nature of creativity and discovering that its source was the brain, I really came to grips with what I think is a fundamental understanding. If the brain truly is the source of creativity (and it must be), then all human functioning is affected by the way we think.

People ask, "Ned, what is your definition of creativity?" But I really want to avoid defining it, because for each of us it has a different meaning. The following statement is as close as I would like to come: Among other things, creativity is the ability to challenge assumptions, recognize patterns, see in new ways, make connections, take risks, and seize upon a chance. Of course, all these aspects of creativity come from the brain. The human brain is something which we as a culture, we as a civilization, we as a people, we as individuals, have not done our homework on. We don't teach the brain. we should! Most of us don't understand it We need to. It's important for us to grasp the overall significance of the brain, because, in point of fact, every emotion, every thought, dream, act, bodily function of our waking and sleeping self is ruled by the brain--a vast network of neural activity. Most of us know more about our domestic plumbing or our automobiles than we know about the brain. I'm going to try to deal with that issue in this article.<sup>1</sup>

We are living in a time of explosive new knowledge about brain functioning. In fact,

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neuroscientists claim that we have learned more about the brain in the last decade than we learned throughout all the ages that went before. Much of what we have learned is expressed in two basic theories about brain specialization.

One of these theories is the left hemisphere/right hemisphere concept, which emerged in the early 1970s. Though the details of this form of specialization are still being discovered, generally the left hemisphere is specialized for linear, sequential processing, while the right hemisphere focuses on simultaneous, gestalt operations. Thus analysis, mathematics, and linguistic structure are all more efficiently processed in the left hemisphere while spatial relations, images, and abstract concepts are more effectively processed in the right hemisphere. The left brain is the step-by-step, disciplined, rule-oriented processor, while the right brain is more of a kaleidoscope of simultaneous processing.

The other major theory of brain specialization is the triune brain theory. Developed by Paul McLean of the National Institutes of Health, this theory proposes a form of specialization not in terms of two halves of the brain, but rather the successive evolutionary development of major structures of the brain starting with the brainstem. This is the reptilian part of us which is the more autonomic, the more primitive part. As we further developed in association with other early human beings, we needed an emotional processing capability so the limbic system capped that reptilian brain. In addition to emotions, the limbic system deals with form and structure, and very importantly deals with the transformation of information into memory. This associates emotion closely with information processing. Feelings now become a valid and very significant part of the processing of information and of learning itself. As we further developed in the evolutionary process and became

more civilized, a sophisticated cortex or "thinking cap," developed around the limbic system. It is in this cerebral cortex that abstract thought takes place. The notion of the triune brain is successive specialization from the brainstem up.

The Herrmann four quadrant brain dominance model can be thought of as a blending of left brain/right brain and triune brain concepts into a physiologically based metaphor of how the human brain works. It is a metaphor which permits us to move beyond the strict physiological location of specialized modes, and deal with the brain system as an abstract concept with, perhaps, more clearly defined boundaries than neurophysiology allows. We now have a whole brain model based upon the dichotomized and the triune brain notions. This model is made up of four separate quadrants, A, B, C, and D. We have the logical, analytic, quantitative, fact-based A quadrant, metaphorically representing the left hemisphere of the cerebral cortex and we have the planned, organized, detailed, sequential a quadrant representing the left half of the limbic system. These two together make up the left mode thinking processes. Additionally, we have the emotional, interpersonal, feeling-based, and kinesthetic aspects of the C quadrant metaphorically residing in the right half of the limbic system, and finally the holistic, intuitive, synthesizing, and integrating modes of the D quadrant, which is based upon the right cerebral brain. Taken together, C and D make up the right mode. Thus, we have left and right modes and cerebral and limbic modes—four different but equal parts of the brain system.

One way of categorizing the four dimensions of the model is: A-know it; B-do it; C-sense it; and D-try it. These specialized modes lead immediately to different learning styles. The A quadrant learns by acquiring and quantifying facts, applying analysis and logic, thinking through, building cases, forming theories. This learning style is in contrast with the B quadrant which learns by organizing and structuring concepts, sequencing, evaluating,

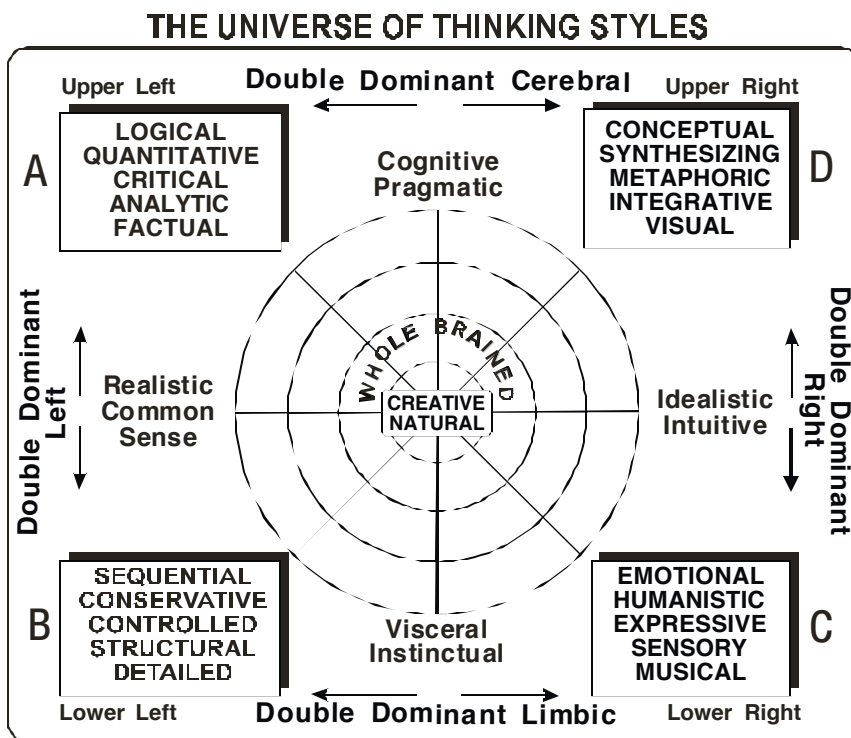
testing, acquiring skills through practice. This in turn is quite different from the C quadrant which listens and shares, integrates, experiences, moves and feels, harmonizes and has emotional involvement. The D quadrant takes initiative, explores different possibilities, relies on intuition, is interested in self-discovery, constructs concepts, and synthesizes.

Think about the subject that you did best in—one that you really excelled in, a subject that was easy and fun, one that you were turned on to. Hold that in your mind and then think about the subject you did the worst in. Now, contemplate trying to get a PhD in both. It isn't that you couldn't, but you would obviously achieve your doctorate in one of them sooner, more easily, and at a higher level of academic attainment.

The Herrmann Brain Dominance Instrument is based on the metaphoric model. In interpreting the resulting data, I

Though we may function in an area that is not preferred, our preferences can be like blinders on our eyes, altering our perception.

Imposing such blinders on our view of gifted and talented programs can have a devastating effect. Picture a person who is examining a child to determine the child's degree of talent, and this person is evaluating the child through the perceptions imposed by his own dominance pattern. In so doing it's very possible that he doesn't see the whole child. But it's on this limited basis that he makes a determination. A decision based on one's own dominance will not necessarily reflect the child. We end up with some children selected correctly, more who are selected incorrectly, and even more who are not selected at all. The consequences are devastating.



emphasize that I do not consider the Herrmann Brain Dominance Instrument to be a "test". That would imply right or wrong or good or bad. Rather, the instrument is simply a model showing a distribution of mental preferences in the form of a four-quadrant profile.

I want to differentiate between a preference for certain mental activities and the competence to perform those activities. These are two different things. However, they are strongly linked. Think back for a moment, to when you were in school.

Lest you think this just happens when adults evaluate young people in school, you should be aware that it occurs with older people in business as well. In one study involving one of the world's great corporations, I compared the profiles of five groups of "high potentials" (the corporate version of "gifted") with the profiles of their sponsoring managers. There was a strong correlation between the profile of these high potentials and the managers who designated them as such. Is it possible that we select people in our own image? Is it possible that others are overlooked because they are different?

In the brain dominance model, we are talking about a group of specialized languages that deal differently with facts, forms, feelings, and futures. A famous Abraham Maslow quote says, "If your only tool is a hammer, isn't it amazing how many things begin to look like a nail." I think we should be alert to the fact that ignoring language differences can be counter-productive.

It is essential for us to understand that the brain dominance concept deals with personal differences and uniquenesses and not with good or bad, or right or wrong. As with handedness, mental dominances just are! We all tend to have these preferences and we should think of them more as potential sources of competencies than as problem issues. Our preferences for one mode or another inevitably lead to preferred thinking styles. For example, the thinking style of the upper left A quadrant is that of analyst, and of the upper right D quadrant, that of synthesist. The lower left B quadrant is conservatist. Finally, the humanistic feelings of the C quadrant represent thinking just as much as the fact-based modes. They are just different approaches. (I hope that we as a people--as a culture--can begin to understand and accept this feeling mode of thinking as equal to the more cognitive modes.) The combination of analyst and synthesist is pragmatist. The combination of conservatist and humanist is visceralist.

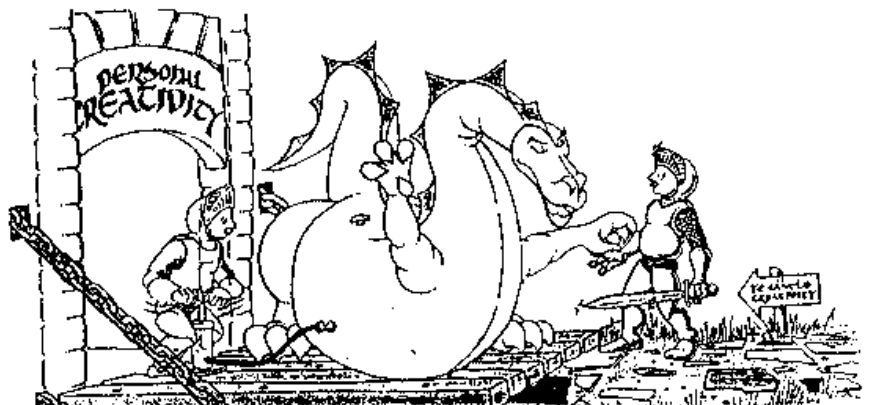
In building a more comprehensive universe of thinking styles we can identify some key concepts as belonging to particular modes: Common sense is in the left mode. Kinesthetic is right mode. Instinctual is visceral. Cognitive is pragmatic. Creative and natural are whole brain terms.

Using a different language now and thinking in terms of "smartness,"

it is possible to identify a whole array of concepts, including factual smartness and visual smartness. Some people have one or the other. Some have both. There is procedural smartness and emotional smartness. There is, of course, intellectual smartness, a gift for which frequently draws people to academic positions. There is also street smartness, a common trait of entrepreneurs. There is organizational smartness and social smartness; academic, artistic, administrative, and musical smartness, to name a few. These different types of smartness have a bearing on our role as educators and as persons who deal with gifted and talented people and those classified as high potentials.

Mintzberg, in his article, "Planning on the Left, Managing on the Right" (*Harvard Business Review*, July/August, 1976), raised the question, "Why is it that some of us are so smart and dull at the same time; so incredibly capable of certain mental activities and so curiously incapable of other activity or smart people." We all seem to have this array of "smartness" and "dullness." Upon reflection, that includes me, my staff, my associates, my wife, my children, and my friends. It's quite normal that we would not be equally smart across all of the mental functions available to us. My view is that half of being smart is knowing what you're dumb at. This can be an important clue to the direction and method of our own development as well as the development of other people.

One of the things I have learned myself is that many of us have our own ogres that prevent us from being as creative as we would



like to be. For me it was a fearsome dragon guarding the entrance to my creative castle. But this ogre proved to be just a toy rubber dragon—one that I, myself, was inflating to monstrous proportions. So at the same time we attempt to reach our castle of creativity, we block the way with our own internal issues. One of those issues is simply the difficulty of dealing with being creative in the first place. Often there is resistance every time we attempt to be creative. Sometimes we are scared by the power of our own imagination. Then we say, "Oh no, not me. I can't be creative!"

Because of their fundamental uniqueness, people have very different views of creativity. One of the things I do in my research is to ask people about the most creative person they have met and by diagnosing their answers, I learn something about their own mental preferences. If you were to create a logo of yourself, the materials you chose and how you assembled these materials to represent yourself would reflect your mental preferences. Our behavior in such tasks represents our own creative process in action, and what happens is indeed a process, not just a single event.

The creative process involves the whole brain and certain discrete phases or steps: interest, preparation, incubation, illumination, and application. That these five classic steps are the principal characteristics of the creative process has been confirmed in my research of history, from noting creative events during my own long associations with the General Electric Company and the Stamford (Connecticut) Art Association, and from observing the way I myself work. Based on this process, I've developed a model of creativity involving the whole brain. Applying the model to a creative task could be described in this way: Our preparation would start with an accumulation of the facts. We'd analyze the facts, do some

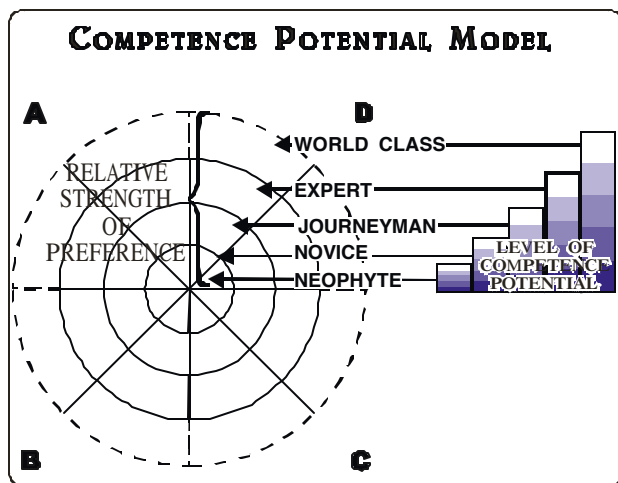
preliminary organization and planning, and some logical processing. We'd further categorize and organize the materials as they unfolded, we'd process the numbers, and as we processed them, we might see a concept or a pattern emerge which in turn might stimulate a sensory response confirming that we were on the right track. We would then verify that response. As we continued to process in this manner, we would go back and forth in preparing and verifying, contemplating and sensing, and along the way, perhaps we may have drifted off into a daydream around some visualization which occurred. This would lead in turn, to an Aha! of illumination. The gut reaction in response, again, would be very positive.

In this simple example of the creative process, I've used the brain iteratively, situationally, and, over time, I've involved the whole brain. To help describe the process, I've cleaned it up. I have over-organized it to communicate the idea, but of course it isn't that cut-and-dried; the actual process is quite complicated and very messy. A good metaphor is "zigzag lightning" in the brain. If we try to straighten up the process, then we will likely shut it down. If we avoid a part of the process, we tend to disable it. When we actively avoid any aspect of the integrated whole, we turn off our creative process. Because creativity is whole-brained, we must assume that giftedness encompasses the whole brain. If we are to serve the interests of the students, teachers, parents, and administrators, we really have to change our way of thinking about the mental aspects of giftedness.

I am constantly re-impressed by the creative capability of people who never thought of themselves as creative, but who, when facilitated into accessing their creativity, clearly are. Importantly, there appear to be no real time constraints to limit our ability to do this. It is as if our creativity is ever-present, awaiting our recognition of its availability, no matter how old we are.

We must assume that everyone is capable of being uniquely and personally creative. Creativity is not a privileged domain for the select few but rather a part of life available to all of us. When we assume that a person is not creative, and worse, when we teach a person that he or she is not creative, we stifle an important part of that person's life. When we assume that a child is not gifted or talented, without first seeking to discover the child's gifts and talents, we stifle that child's potential.

In order to better understand the relationship between competence and preference, I need to differentiate between



what I call a "primary" or the strongest preference, a "secondary" which denotes our intermediate preferences, and a "tertiary" which indicates our least preference. The tertiary preference is where we experience the most difficulty, and in some cases even avoid learning.

We stay away from it as opposed to preferring it. Our strongest preferences lead to our greatest competencies and our avoidances lead to our least competencies. In terms of learning strategy, we should affirm or extend our preferences. We should reinforce and develop our secondaries and be stimulated and challenged in our areas of avoidance. I do not feel that we should let students off the hook (or ourselves for that matter) in

areas that we have not yet accessed or developed. Many of us do not even know they exist, and so we need to find ways to stimulate and challenge them. Competency potential then ranges from world-class to hopeless. As educators we must understand that as we move individuals into situations out of their area of competence, we should have different expectations of their ability to learn and perform.

In big business, we risk this all the time as we move people from job to job, often ignoring the fact that they might have different preferences that result in a set of competencies more appropriate to other areas of work. That situation can be very counter-productive to all concerned. I believe that we can be experts situationally across a rather wide area of primary and secondary preferences. As a matter of fact, I believe that our degree of wholeness is the degree to which we can utilize different modes and quadrants as the situation requires.

There's a danger in being different not only in school and business but also with our own family. On one occasion a father said to me, "Let me tell you about my kid, John. I mean we're talking weird. We don't understand this kid. My wife and I even joke about the possibility of a mistake being made at the hospital. We don't like the way he looks. We don't like the music he listens to and we can't stand the occupation that he has chosen. We are frightened by his future. Would you please do a brain dominance profile of John and the rest of the family?" Of course I agreed and the resulting profiles reveal John's extremely strong D quadrant preference and the rest of the family's contrasting A quadrant preference. This situation became the Weird John Syndrome. John is weird because John is different, and John is different in an area where difference is visible-it's visible in hair, dress, friends, and in speech. It's visible in educational direction, it's visible in occupational choice and it's visible in everyday behavior. To better understand the differences between John and his family, I invite you to fantasize

about John talking to his friends about his "weird family." John's family is a homogeneous tribe, and as a tribe spent, as the father said, 26 years digging a moat, building a wall, and inventing weapons to keep John out, all because he was different from the family tribe. I like to ask audiences, "Do you know a Weird John?" "Are you a weird John?" The Weird Johns of this world know about the power of this model and the impact of being estranged by simply being different. But the world needs Weird Johns because they frequently have the answer--they just often don't have the best way to convey that answer.

I have a very strong feeling that most of us have some Weird John in us and should honor those characteristics because that's where much of our creativity comes from and where much of our ability to deal with innovation and change can come from. We joke about it in others and suppress it in ourselves. Paul McCartney said, "I used to think that anyone doing anything weird was weird. But I suddenly realized that anyone doing anything weird wasn't weird at all. It was the people saying they were weird that were weird."

In my past corporate culture, and perhaps yours also, we used to say, "you're flying out of formation again, Cunningham, "because Cunningham looks different and behaves differently. A few years ago I did a study of 50 people who were described by their friends as "the most unique person in my life." The average profile for this group of 50 successful but unique people looks very much like Weird John. We must begin to honor differences. Let's not always cater to our natural inclination to be homogeneous. That can be very comfortable, but can frequently lead to mediocre solutions and decisions.

Our preference for different modes leads to the use of brain dialects that are equivalent to different languages. To illustrate, I will relate a story about the building of our home in North Carolina. Our architect flew in from Portland, Oregon to help us design the house. The building site was on a mountain ridge overlooking a sparkling lake and surrounded by a ring of mountains. It's really quite spectacular. On a clear September day, the architect walked out onto the partially cleared site with sketchbook in hand and looked out at the lovely scene. He stood there without saying anything for what seemed like too long, because I was really curious about his reaction. Finally I said, "Well Lou, what do you think?" And Lou said, "Wow! What a place to build a home. I could build a cathedral here. This is a place where you could live forever. Thank you for the opportunity to help you design this special place." He then began to sketch the first few lines. One year later, the builder I had selected stood in the same place. It was another beautiful day in September. I just couldn't resist asking the builder the same question. "Well Grover, what do you think?" Grover looked out at the same spectacular scene and said, "Oh, I've seen a lot worse than this!"

The builder and the architect were simply coming from two different sets of preferences that led to two different perceptions, expressed in two different ways, even though they were looking at the same scene. For many of us, one thing goes in and quite another comes out Noise goes in and music comes out, or music goes in and noise comes out. We are simply on different wave lengths from each other. The variations in our ability to communicate effectively are based upon either our mental similarities or our differences. Every once in a while we have this exquisite understanding that comes between best friends or spouses where it's like magic and they understand. Then we have other experiences that are very different. For example, we use the word "measure" with the thought that everyone understands immediately what we mean, but of course they

don't. Some have a highly precise understanding of it in the A quadrant and some are perfectly content to approximate it. Others are wanting to sense it, others are wanting to evaluate it. We say "plan," and we never specify what we mean. Do we mean tactical, human, strategic, or financial? Other people hear it in terms of their own preferences. We say "money," and we might mean we've got ways to count, ways to save, ways to help, or ways to spend, all of which are very different ways to think about money. There is the high tech aspect of quadrant A and the high touch aspect of quadrant C. Mega Trends

says we better begin to get those together if we're going to survive in the future. There are also the high teach aspects of quadrant D and the high time focus of quadrant B. Out of these brain dominance concepts developed a model of what I call whole brain teaching and learning. In the A quadrant, we deal with rational, cognitive, and quantitative modes. All are important and are basically fact-based. In the B quadrant are the organized, sequential, procedural aspects of learning which, taken together with A, are the most structured and verbal part of our processing. In the C quadrant are the feeling oriented emotional, expressive, and interpersonal modes which contrast with the controlled A and B. The D quadrant contains the visual, conceptual, simultaneous aspects. C and D taken together are experiential and non-verbal.

These are four very different modes and if we as designers and teachers ignore those differences, the student will simply not understand. The person who is strongly oriented to one particular learning mode will tend to fight and reject or not process effectively the other modes. Again, the world as a whole is a composite whole brain, and so we must now begin to change our assumptions about the learning styles of our students to ac-

commodate those who think in ways different from ourselves and our schools.

We can describe training elements in terms of this four quadrant model. Activities in the A quadrant include analyzing, objectifying, articulating, and finance training programs. In the B quadrant are planning, organizing, administrative, and evaluative activities. C quadrant includes interpersonal, team oriented, and emotive activities. In the D quadrant we conceptualize, strategize, design, and integrate. The four quadrants can also be thought of as A-technical; B-traditional; C-humanistic; and D-experimental. So if you have a system that is heavily oriented towards B, it's going to be traditional in all its modes. If you try to place experimental activities into a traditional school mentality, it won't work. There will be immediate resistance and it simply will not work.

In identifying gifted and talented children, I believe that we've been over-selective and have used the wrong criteria for that selection. My experience over the past decade of using whole brain teaching and learning methods provides overwhelming evidence that we all have latent creative potential that can be accessed and made visible. "Creativity is the breaking down of walls rather than the building of skills," realized a young man after attempting a sculpture for the first time. "I finally was able to slay the self-created dragon that prevented me from doing what I had wanted to do all of my life." We must summon the courage to attack the inflated dragon that blocks our personal creativity.

I'm constantly doing research as I explore my own understanding and try to push toward new frontiers. My most recent research involved asking 51 human resource experts to describe the master teachers in their pasts. From the data they gave me, I created a representative brain profile. I then asked them to describe the master learners in their experience. I profiled the learners as I had done the teachers. The combined results

reveal an interesting overlap--both of them have the same D quadrant orientation. The master teacher is more A and C oriented and the master learner is more B quadrant oriented, but the common characteristic of both master teacher and learner was a preference for the mental modes of the D quadrant. In contrast, the profiles of the typical school superintendents are opposite to the master teacher's and master learner's profiles. School systems could benefit from a leadership mentality that understands the mental preferences of teachers and learners.

When teachers say to me, "Ned, I don't understand whole brain teaching. What does it mean?" My answer is, "Most likely, it's what you are now doing that works. Take those things that you are now doing that really seem to work and diagnose them using these concepts, and you will discover that you are using many of these whole brain ideas."

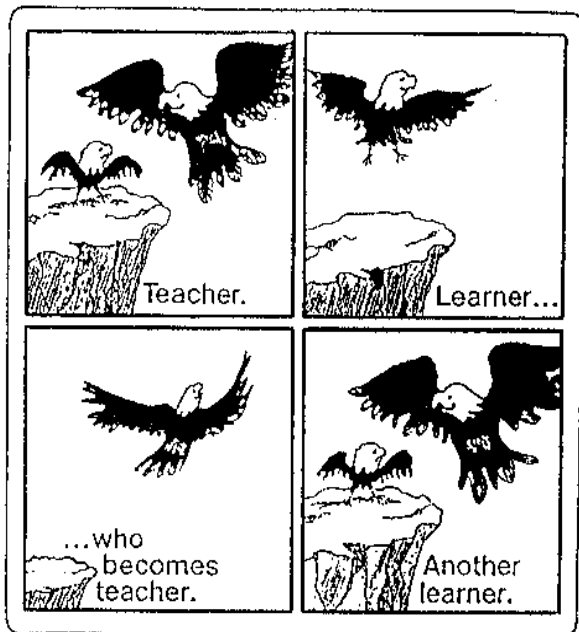
From a pitcher's point of view, every batter represents a unique hitter. This being the case, those involved in the design and delivery of learning need to understand and apply the specialized approaches that represent the ingredients of the whole brain model. The A quadrant responds to formalized, data based content, business oriented cases, textbooks, program learning, and behavior modification approaches. The B quadrant responds to thorough planning, sequential order, structure, lectures, organizational and administrative case discussions. The C quadrant is very different because we are getting into experiential opportunities, sensory movement, music, people oriented case discussion, and group interaction. The D quadrant again very different, responds to spontaneity, free flow, experiential activities, experimentation, playfulness, future oriented case discussions, visual displays, aesthetics, individuality, and being involved. As educators, we have to reconsider how we

are designing and delivering learning if we are going to serve the needs of learners who are potentially whole-brained, and who are all potentially gifted or talented.

Whole brain teaching and learning refers to the brain's ability to iterate, that is, to move back and forth in order to take advantage of the situational applications of the brain's specialized modes. For example, if I asked you to multiply nine times twelve in your mind, you would automatically access the quadrant specialized to do calculations. If I asked you then to talk about it, you would switch to the quadrant that is specialized to do that. If I then asked you to visualize this multiplication process, you would use the quadrant that is specialized to do that. In everyday mental processing, we move back and forth situationally as the occasion demands. As I deal with key learning points in a teaching situation, I treat each learning point in as many modes as possible--frequently all four. During the course of a few days or a week or even a few hours, I design the delivery so that every key learning point is addressed in ways appropriate for all four quadrants. The learners must be thought of as a composite whole brain. I have enough data from enough sources to make that overall diagnosis. Taken as a whole, the world thinks equally in all four of these modes.

I have discovered that when working with groups, the creative capability is significantly higher when the group is heterogeneous rather than homogeneous. Homogeneous groups are mental tribes that quickly settle for a convenient, easy answer. Heterogeneous groups have to struggle together to get a better answer. There are lots of sparks. Sometimes there is pain, but the output of this mixed group can be significantly higher. I would like to suggest the possibility that each of us is, in fact, a heterogeneous person within ourself. Multiple dominances are not only possible, but the likelihood is that each of us possesses some degree of whole-brainedness. The individual four quadrants of one's brain can be likened to a

heterogeneous team. We have a four way team of mental preferences residing in us. That array of preferences then needs to be understood as the basis of our learning styles. The Three Person Problem is my metaphor for the truly effective learning



process: The teacher teaches the learner at such a level of independent understanding that the learner is then able to teach another learner. That learner then gives evidence that full understanding has been transferred.

I firmly believe that composite whole brain learning groups represent the ultimate teaching configuration. I realize this imposes an enormous administrative difficulty on people, to assemble such a rare group, but I attempt to change the organizational culture of the businesses and schools I work with in order to make that possible. I solve that problem by gathering together people who are different and unique. In effect, I create a participant pool of interested learners that as a group represent a composite whole brain. This allows me to pick people in pairs, triads, and communities so that their similarities and differences provide an opportunity for them to learn from each other.

I continue to be impressed by the fact that out of the hundreds of people that I have trained in this whole brain teaching and learning concept, not a single one has elected to go back to the traditional modes. This approach is simply more successful and more fulfilling for them.

Keep in mind as you contemplate and interpret these ideas that the right brain invented the left brain. Think about the truth of that. Way back when, we didn't have a need for our modern, sophisticated brain. We did not have the need for organization and language and rational thinking, and then we became "civilized" and things began to change. As we assess the value of the left brain, my advice is: Don't leave home without it!" That's the part of us from which we derive most of our success in dealing effectively with life in this left mode culture in which most of us live.

A little left goes a long way. I say that because that part of our mental process is so powerful. Our left mode deals with facts and with verbal expression. Words and facts can not only overwhelm others, they can engulf us as well. we need to deal equally with other modes--modes that are non-verbal, very soft, and very different.

Language can build a logical brain, but language logic can disable an artistic brain. Jerome Bruner has described language acquisition as the most significant of all life's learning experiences. It is so significant that it can block other modes of thinking. When I teach people how to draw and sculpt, my approach is to disable their language logic. By disabling their language logic and using only the simplest of art techniques, a way is provided for the learner to suddenly be able to "see." The dominance of language over nonverbal modes suggests that we reward children lopsidedly for vocabulary development, paying insufficient attention to other, nonverbal skills. For example, one of the accepted hallmarks of giftedness is a precocious vocabulary, so as we look around for clues of giftedness, a person with an

enormous language capability, is considered before another person with lesser verbal skills.

IQ tests are not a true measure of intelligence. My personal feeling is that IQ tests are an abomination. They give wrong information--either high or low. It's wrong because it gives you misleading clues as to what true intelligence is. High IQ scores do not insure success. My experience with business people--with adults with whom I work--shows that there is no strong correlation between IQ and success. As a matter of fact, over specialization can get in the way. A recent study by Forbes magazine dealing with the 800 most powerful people in the United States, shows that of the top 100, 22 percent had no college degree at all, 50 percent were at the bachelor level, and only 17 percent were MBAs. Specialization in advanced business subjects was not common among the top 100 business people. Intelligence is more than lots of knowledge. It's also intuition, insight, and inspiration.

Thomas Mann, in The Magic Mountain summed up our culture's view of language: "Speech is civilization itself. The word, even the most contradictory word, preserves contact. It is silence which isolates." A contrasting view is the sufi proverb that "words have to die if humans are to live." That may be an overstatement, but I want us to begin to understand the power of language as it compares with the power of ideas and we have to treat this at a different level than we have in the past.

Albert Einstein who was certainly one of the most gifted people in recent history, was not a strongly language oriented person. He said that when he examined his own methods of thought, "I came to the conclusion that the gift of fantasy has meant more to me than any kind of abstract thinking." He was talking about his preference for the D quadrant, not the A quadrant. As a matter of fact,

those of you who have researched Einstein know that he didn't do well in school. He was basically a poor student. If he had been rigorously measured on this, he would never have been judged gifted as a child. Through visualization he dreamed the theory of relativity. Some of us would scoff at this and say it's not thinking. Of course, it's thinking. It's just a different kind of thinking, and we need to validate it as appropriate in our education process. Today, we still punish students for daydreaming, when in fact, we dream every night every 90 minutes and we daydream every 90 minutes during our waking hours, but our culture considers this inappropriate behavior and frequently says that daydreaming is a waste of time.

We have probably not even begun to discover the capabilities of our brains. As Michael Hutchinson put it, "It's as if we've all been given superbly engineered sports cars, in which we've been putt-putting about without ever shifting out of first gear, never realizing that there were higher gears." Many of you are familiar with Howard Gardner's book, Frames of Mind, in which he develops the notion of multiple intelligences. He argues that a whole array of intelligences are coequal, including linguistic, musical, spatial, logical, - mathematical and body-kinesthetic. I'm going to add a few more to that list: the academic and the non-academic, the tacit and the practical.

An important idea in the area of gifted and talented programs is the notion of "islands of brilliance." Islands of brilliance can take on a number of different modes. They can be language based, musical or artistic. They can be mathematically or scientifically oriented. They can relate to any of our many intelligences. I believe that all human beings have an island of brilliance. Some of us have more, but all of us have at least one. Since many of us don't know what our islands of brilliancies are, one of the things I do as I try to deal with the issue of personal creativity is to help disclose to people, and access for them,

their islands of brilliance, some of which they didn't realize they had.

Among the techniques I use are biofeedback, visualization, and drawing. That moment of learning which all of us as teachers have witnessed with our students, can inspire a lifetime of achievement. A young man who sculpted the hand in one of my workshops four years ago wrote me just few weeks ago about how the experience changed his life. What I really taught him was how to see, and seeing is a transferable skill. He is now doing different work at a different level in a different way as a result of that experience of sculpting. In the application of whole brain approaches to education, we don't teach people how to draw or sculpt as much as we remove the barriers to their ability to see. When this happens it is as wonderful as Ashley Brilliant said: "Inside every little beam of light a rainbow is sleeping." To the individual, that frequently can represent a personal affirmation, which, to me, is a key to learning. That's where my work leads me--affirming people.

No matter what your brain dominance is, the degree of wholeness of your mental process is the degree to which you are situational. I have discovered that even in our secondary areas of mental preference, we can be very expert if we use these modes situationally. So we do not have to have a perfectly balanced profile in order to be whole. That to me is a message of hope.

As I reflect on the many uniquely different people I know and work with, I feel a strong personal need to redefine "normal." I think many haven't felt normal, don't feel normal now, but should feel normal. No matter how different we are, there are normal people like us somewhere in the world. The world is a composite whole brain. There are kindred spirits out there who have mental preferences very similar to ours. As a group, we would be normal to each other.

In dealing with the issue of normalcy, we have to be much more inclusive than exclusive. You see, I think creativity is normal. I think being gifted or talented is normal. It's normal for us to have these capabilities. The challenge is for us to find better ways to release them.

As I summarize the brain and learning, I see these kinds of major issues:

1. The brain is specialized.
2. The individual brain is unique.
3. The brain is situational.
4. Learning is mental.

That seems so obvious, but we don't behave that way. We do not behave, please understand me, fellow teachers and educators, as if learning is mental!

5. Each individual has different learning styles.
6. Learning designs can accommodate individual differences.
7. Delivery of learning can respond to personal uniqueness.
8. Unique people can be made an integral part of the learning design. As a matter of fact, these unique learners become part of the learning resource because those differences now become part of the way people learn and teach, they teach each other through their differences:
9. Learners can be grouped to make learning more effective.
10. Learning through affirmation and discovery can be more effective, more fulfilling, and last longer.
11. Learning programs that are based on the specialized brains of the unique participants work to the advantage of everyone, including the teacher or trainer.

Response to learning is independent of age in a whole brain learning design. This is a message of hope. As we grow older, we can look forward to continued learning capability, in essence until our brain becomes dysfunctional. My experiments with this are very conclusive. In working with individuals ranging in age from eighteen to seventy, I found the learning response absolutely similar. You cannot

discern the difference. Issues of age simply drop away when you have the excitement of experiencing a whole brain learning design. After participating in whole brain learning experiences, hundreds of gifted and talented adults (high potentials) have revealed that they now feel normal--no less unique and special, but finally normal and okay about themselves. For some of these people, it is the first time they have felt this way in their adult lives. The understanding of self—the discovering of self—can be greatly facilitated through whole brain approaches to learning. It's never too late for gifts and talents to emerge. Never too late!