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# Long Island Education Review



**LONG ISLAND'S  
PEER-REVIEWED RESEARCH JOURNAL  
FOR EDUCATIONAL PROFESSIONALS**

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## About SCOPE

SCOPE Education Services is a not-for-profit, private, voluntary organization permanently chartered by the New York State Board of Regents to provide service to school districts. Founded in 1964 by school superintendents, it is a cooperative venture for sharing resources to deal with common concerns. It is governed by a Board of Directors of school superintendents and college representatives and serves as a regional School Study Council and School Board Institute.

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## **Future Themes for The Long Island Education Review:**

Leadership – Teachers and Others  
Ethics In Education  
CFE - Update, Perspectives  
No Child Left Behind

## Editor's Perspective

### **Organizational Alignment Generates Student Success**



When standards, focused teaching, staff training, school conditions/climate, and incentives are combined with effective school and district leadership, policy development will advance student achievement. Numerous studies over the past decade have illuminated the connections between leadership in education, a culture of continuous organizational improvement and increased student achievement.

To achieve excellence on a broad scale, as required by the national commitment to make every child a successful learner, requires high quality leadership in every school. School based solutions however, while critical, aren't enough. Central policy makers are uniquely positioned to increase the ability of schools to help all students achieve. Four strategic initiatives that have added focus and support for schools include; first creating a coherent organizational design in support school level implementation, second allocating resources in alignment with strategic planning, third providing real-time performance data systems and using results to guide decisions, and fourth developing and managing human capital in alignment with strategic directions. Policy initiatives developed with these priorities as guideposts have added a new level of support for school leadership teams that have established aggressive but realistic goals and hold themselves accountable for attaining them.

The Long Island Education Review has selected articles that advance an understanding of these strategic initiatives that influence coherent policy development. Research-based teacher **training and staff development** is the focus of R. Dunn and K. Burke's contribution - Teacher Education and Staff Development: Needed Changes in Both. **The conditions** for supporting achievement are highlighted in the articles by J. Grackin and C. Veloso, *Girl Power 21th Century: Encouraging K-7 Girls' Interest in Technology Education*; and *The Challenge of Diverse Learners in Nursing Education* by M. Hickey. A solution for expanding the quantity of **school leadership** candidates is offered by T. Rosati in *How to improve the Quantity of School Administrative Candidates Overnight and Save Millions in the Process*. M. Renner addresses **policy development** questions related to the sorting and ranking components of NCLB in *A Triage Experience*, and A. McCrink reviews **policy implementation** in *Critical Analysis Paper on Public Policy - "Nurse Reinvestment Act"*. T. Kelly's contributions highlight the importance of ethical **standards** in our curriculum and an understanding of the relationship between correlation and causality in *Infusing Ethics into K-12 Curriculum*, and *Correlation can imply Causality and often Does*, respectively. *Subject Matter DNA*, contributed by V. Maiorana, presents an alternative, learner-centered approach to teaching that may minimize the factors that separate people like social background or race.

*Kevin N. McGuire*, Editor

## *Infusing Ethics into K-12 Curriculum*

By Thomas F. Kelly, Ph. D.

### **Virtues and values: categorical confusion and cultural chaos**

The growing concern for student discipline problems in our schools has reached crisis stage. It is a reflection of the general state of moral ambiguity permeating western culture. Since religion is not allowed in public schools in America, any attempt to deal with ethics or morality must be done without reference to religion. Since western civilization has traditionally based its moral standards on religion, efforts to improve this problem have been problematic at best.

This article presents an approach to ethics that can be easily recognized and accepted by virtually all without reference to any religion. It can be used to create a climate for developing high ethical standards both in our education system and culture in general.

"Whose Values?" is the rapid response of the moral relativists who dominate our media whenever the question of character or morals is raised. This assertion, often loud, intending intimidation and generally condescending, stifles discussion of this vital topic. Meanwhile most would agree that we are living in deeply troubled times. Discipline problems plague our schools, respect is ever harder to find and the quality of life in American culture generally is in a state of decline.

At the root of this problem is a logical fallacy: CATEGORICAL CONFUSION. The categories we are confusing are virtues and values. Frequently used interchangeably, they are not the same.

Aristotle tells us that the first step in logic is definition of terms.

VALUES ARE THINGS I WANT.

VIRTUES ARE BEHAVIORS THAT MAKE ME GOOD.

Values are relative. \$10 dollars is a value. \$50 is better than \$10.

Virtues are absolute. Kindness is always good. Responsibility is always good. Justice is always good, etc.

The knee-jerk response from the moral relativists is "Whose Justice?" Honest People can disagree over what is just in a

particular case or under particular circumstances. People have been doing this at least since Plato wrote "The Republic." Affirmative action is a good current example. Is it just or unjust? We disagree. But we do not disagree on the larger concept: justice is good. If we possess the virtues of tolerance and respect, we will disagree quite civilly. Lacking these virtues, we escalate a disagreement to a conflict. (Tolerance and respect, of course, are always good.)

The categorical confusion between virtues and values is extremely destructive. For example, many believe that freedom and responsibility should be in balance, as though they are of equal importance. They are not. Freedom is a value, something I want. Responsibility is a virtue, a behavior that makes me good.

Our culture has placed freedom before responsibility. The impact has been disastrous. Values should never take precedence over virtues. In fact, responsibility is more important than freedom. Without responsibility I cannot be free. The freest people we know are the most responsible. The greater my responsibility, the greater my freedom. The more irresponsible I am, the less my freedom. Is a drug addict free? Irresponsible people forfeit their freedom to their irresponsibility. They are the slaves of their own vice.

Responsibility is to freedom as light is to reading. Just as light is a necessary condition for reading, so responsibility is a necessary condition for freedom. Without light I cannot read. Without responsibility I cannot be free. For an irresponsible person, freedom is a curse. It is the means to their own unhappiness and problems they cause others.

Abraham Maslow was the first of the great modern psychologists to recognize that psychology was being practiced backwards. Psychologists were looking for the sickest, unhappiest people they could find and studying them to see why they were like that. Maslow observed that what we should be doing is looking for the healthiest, happiest people we can find and studying them to see why they were like that. His insight begins modern psychology's escape from the determinism and pessimism of Freud and Skinner. He proposed a hierarchy of human needs with the happiest and healthiest people at the top. He called them self-actualizing people.

These people are not as rare as we might think. The existence of these people can easily be verified from your own experience. Think of someone who you know that you admire, hold in very high esteem, a happy successful person, an outstanding human being. Think for a few moments of how you would describe that person. Although I have never met the individual you are thinking of, I can describe that person to you.

THAT OUTSTANDING PERSON IS:

HUMBLE	COURAGEOUS
SELF-DISCIPLINED	FORGIVING
GENEROUS	HONEST
HOPEFUL	JUST/ FAIR
KIND	LOVING
LOYAL	MODERATE
PATIENT	PERSEVERANT
RESPECTFUL	RESPONSIBLE
SIMPLE	SPIRITUAL
TOLERANT	HARD WORKING

Amazing! I can accurately describe the outstanding person that you are thinking of although I have never met him or her. Indeed I have never met you! Is there anything on the list of virtues not characteristic of your outstanding human being? I've asked this question of thousands of people. They all agree that their "outstanding human being" can be described by these virtues. The reason is quite simple. Outstanding human beings are virtuous people.

St. Patrick's day came again last March. I thought, "how many times in my life have people told me (Kelly) or clearly implied that I'm good because I'm Irish?" Hundreds at least. It's not true. Irish doesn't make me good any more than it makes me bad. I'm fascinated by all the current interest and effort in the area of self-image and self esteem. I hear things like, "we've got to teach them their cultural heritage." This assumes membership in a group with some cultural identity will cause a positive self-image. Group identification is a value, not a virtue. It doesn't make me good any more than it makes me bad. You'll notice on my list of attributes of outstanding people that I do not include such categories as:

MALE	FEMALE
BLACK	WHITE
YOUNG	OLD
RICH	POOR
ATHLETIC	GOOD LOOKING
STYLISH	ETC.

The attributes listed do not make me good or bad and are randomly distributed among outstanding people as well as others.

William Glasser, in his landmark book "*Control Theory*," identifies five basic human needs: physical, power, freedom, belonging and fun. In fact, these outstanding, happy, successful people in Glasser's terms are "need satisfied". Virtue is the means to satisfy my basic human needs. There is no other means. If I want to be happy, I must develop my own virtue. To the extent I am virtuous, I will be happy, free, belong, etc.

Educators nationally are presently engaged in a quest for higher standards. The higher standards we need most are not academic. They are moral. Until we recognize this fundamental truth, we will continue our present precipitous educational and cultural decline. To the extent our culture is moral (i.e. virtuous) it will be a need satisfying culture. To the extent it is not moral, it will be a need frustrating culture. We must recognize that we cannot solve moral problems with political or economic solutions. Virtue is the only means to higher academic standards, improving discipline, personal growth and happiness, and social peace and justice.

We must understand the need to put virtues before values. When we put values before virtues, necessary consequences inevitably follow.

- 1) For individuals loss of self esteem (I'm a bad person).
- 2) For interpersonal relationships - loss of friendship, animosity, broken relationships (you are a bad person).
- 3) For international relations - wars, genocide, ethnic cleansing (you are a bad racial, religious or ethnic group, a bad country).

At the root of all of these unfortunate realities is an identifiable ethical flaw in at least one participant.

The challenge now is to bring ethics back into education. This is widely recognized among educators as desperately needed. Current attempts usually include some sort of curriculum development for teaching character education. While the above can easily be directly taught and should be, it does not require an entire curriculum. The concepts above can be taught in a few lessons.

What is needed is infusion into the entire curriculum, indeed into the entire school day. Ethics can be taught and discussed in literature (as Covey says used to be done), social studies, any academic area, the playground and the lunch room.

We must change the culture of our schools. I went into a teacher's class and saw a large sign on all four walls with one word printed on it; RESPECT. I asked her why it was up there and she replied, "it is our discipline code. If we have that we get everything else we need." Administrators can post the entire list of virtues in their offices. Teachers can post them in their classes and in the halls. Staff can brainstorm how to infuse them into school culture. Morality is not a course, it is a way of life.

Dr. Thomas Kelly is Associate Professor of Educational Administration, Leadership and Technology at Dowling College, on Long Island.

# How to Improve the Quality of School Administrative Candidates Overnight and Save Millions of Dollars in the Process

by Thomas Rosati

There exists a shortage of qualified candidates for administrative positions. The State has attempted to address this matter in a letter sent out to districts on June 30th by Johanna Duncan-Poitier. She discussed the shortage and a policy that would allow administrators with lapsed certification to reapply. While this may add some potential administrators to the pool, there is another way that this shortage could be addressed. This method would not only add more than enough qualified administrators throughout the state, but would save millions of dollars statewide over time. With New York State Education Department encouragement and local initiative, this process could virtually wipe out the shortage of available candidates for administrative positions overnight.

The publication, *Our Next Generation, School Leadership in New York State*, states that a large pool of potential leaders already exists in New York.

"There are more educators currently certified in school administration than there are projected openings. Indeed, the number of administrative certificates awarded since 1984 has exceeded the number of new principals hired by a substantial margin."

"Over 90 percent of respondents believe they are well prepared to assume leadership positions. They pursued administrative certification primarily due to a desire to serve as administrators."

"Only half of all individuals holding administrative certification and employed in New York public schools are actively searching for an administrative position. However, 85 percent would be willing to consider a position under the right circumstances."

"Even though they hold administrative certification, many educators are no longer actively pursuing administrative posts."

Why are all of these qualified administrators not administrators? The surveys pinpointed specific factors which affect their decision not to pursue administrative positions. Respondents recognized they would have a significant increase in their work day and responsibilities as an administrator over their current teacher schedule. 63% felt that an additional salary compensation of at least \$10,000 or more was needed to be considered equivalent. Yet in suburban upstate districts, a teacher with 25 years experience earned

12 percent more than a 5th year administrator. This gap can be even larger in downstate districts.

Experienced teachers usually have secure, tenured jobs. Many of them have reached a point in their lives where they have family members approaching or already attending college, which causes extensive financial burdens. Their responsibility as family breadwinners discourages them from taking the risk of leaving their current positions. They are close to retirement system benchmarks, and have the ability to supplement their income with after school and summer school teaching. Many have accumulated large terminal leave/sick day incentives that would not be transferable.

In order to be an administrator, they would earn far less, work more hours, work year round, and give up job security. Why would a district even consider a person who is willing to be so fiscally irresponsible? These factors combined make a foray into school administration a serious disincentive for many teachers to move from the teaching ranks to become administrators.

The study made a number of recommendations which included:

"Recognize and develop differential strategies to deal with the fact that each district type is unique and may require a somewhat different approach when recruiting and retaining high quality leaders."

"Identify and encourage prospective administrators early in their careers, when they may be most receptive and will still find financial incentive."

"Revisit the salary structure to ensure that senior teachers have financial incentives to seriously pursue school leadership positions if they so desire. While higher salaries alone will likely not be sufficient to encourage more educators to consider administrative positions, it appears clear that higher salaries are a minimally necessary condition for them to consider such a career change."

With a requirement of only three years of school experience, there has been an increase of administration candidates starting in administrative programs under the age of 30. This number decreases sharply until age 40 when the number of candidates increases. This has led to an increase, especially in areas like special education and school business positions, of hiring "kidadmins". It is not unusual today to

find these school administrators being 20 years younger than the majority of the staff and parents they are working with.

School districts looking for new administrators are being presented with a limited talent pool, primarily filled with candidates bereft of fundamental classroom experience. This does create an opportunity to hire new administrators of greater diversity, versed in ideology from the most current theorists. But these current administrative candidates are also more likely to move to other positions, having established little district loyalty. Many bring the additional burdens associated with child care and other significant constraints affecting them and their growing families.

The panel suggested an option of providing financial incentives as a way to encourage senior teachers to switch into an administrative position. While this may have some impact, the study states that the incentives would need to be significant, and would not be the only aspect that would get certified administration candidates to leave their teaching positions.

lated incentives. A leave of absence process could also be established that has limits. The length of the leave might be limited to three years where the teacher/administrator would be eligible for administrative tenure, or tied to position when the leave is established. Limits to the number of administrators from a particular district could also be capped to minimize depletion of seasoned teachers.

The savings in this plan would come primarily from the replacement of the veteran teacher with a new or less experienced teacher. A teacher hired as an administrator in this scenario would be roughly equivalent in pay to what would be budgeted for a school administrative slot, but the replacement teacher would be hired at a significantly lower salary than the teacher they are replacing. Benefit packages would not be a major factor because the cost would be similar to adding a new administrator or a new teacher. Over time, there would be a significant financial savings for a non-city school district. Here is a projection for a five year period for filling 10 administrative slots.

Year	Filling vacancies with a new administrator (A)	Filling administrative openings with veteran teachers (B)	Hiring a replacement for the experienced teachers (C)	Experienced teacher continuing, hiring a new administrator D = (A + B)	Hiring the experienced teacher as the administrator and hiring a replacement E = (B+C)	Savings for a school system (D - E)
1	900,000.	950,000.	450,000.	1,850,000.	1,400,000.	450,000.
2	950,000.	1,000,000.	490,000.	1,950,000.	1,490,000.	460,000.
3	1,000,000.	1,005,000.	540,000.	2,005,000.	1,545,000.	460,000.
4	1,005,000.	1,010,000.	600,000.	2,015,000.	1,610,000.	405,000.
5	1,010,000.	1,015,000.	660,000.	2,025,000.	1,675,000.	350,000.
5 year totals	4,865,000.	4,980,000.	2,740,000.	9,845,000	7,720,000.	2,125,000

In addition, the number of school districts turning down their budgets in response to higher taxes is growing steadily. A significant increase to administrative salaries would not be met with a favorable response in most settings.

There is a solution that could be implemented by individual districts for their own candidates, and provide significant salary cost savings for districts. This would be through a leave of absence policy being made available.

The teacher would be assigned, or on leave from, their current teaching position, to assume the role of an administrator either in their current district or a regional district. The district and teacher would have the option at periodic intervals to revert the teacher back to their teaching and tenure area, which would be frozen at the point where they had left their classroom position. Additional salary for work days beyond the school year could be added as an additional incentive.

In order to replenish and improve the talent pool of administrators, a path should be established which allows veteran teachers to fill administrative slots. The current system creates situations that are not advantageous for candidates with school experience to consider school administration as a reasonable career path. They have a wide variety of educational experiences within school systems and with their own children. They are ideal administrative candidates, yet they are given little incentive to share this knowledge outside of their individual classrooms.

Use of this system will improve the quantity of administrative candidates, without impacting the quality of the teaching force, while providing significant savings to taxpayers.

**Reference**

Our Next Generation, School Leadership in New York State [http://emsc32.nysed.gov/csl/resources/Our\\_Next\\_Generation.pdf](http://emsc32.nysed.gov/csl/resources/Our_Next_Generation.pdf)

Thomas Rosati, A.T.P. is a doctoral candidate in the St. John's University School of Leadership.



# NCLB: A Triage Experience

by Margaret A. Renner, Ph.D.

## Abstract

This paper examines NCLB (No Child Left Behind) in terms of a triage experience. It focuses on the concept of sorting and classifying learners for instruction as required by the NCLB funding. The term *triage* is used to draw an analogy between the medical aspects of triage and its application to educational policy.

The document entitled NCLB will be revisited, and new questions will be asked such as: Were policy issues and politics the reason for initiating this document? If so, what benefits and/or ranking of priorities were designated for the recipients of the funding? Was this document just another means and method of sorting (when accountability was the real issue)? Is this just another attempt to pacify the "haves and havenots" in order to sustain a political agenda?

This paper attempts to answer the research questions posed in terms of the sorting and ranking components of NCLB. It intends to investigate the research used to determine if it was selective in nature. An alternative model will be suggested and described.

In conclusion, the possibility of fulfilling the promise of NCLB will be determined. The question of whether or not the NCLB initiative should be considered a triage experience will be addressed. The components (research, accountability, responsibility, policy and politics, and assessment) related to the promise will be summarized.

## Introduction

Is NCLB (No Child Left Behind) a triage experience? The purpose of this research is to answer this question. This researcher argues that NCLB is a triage experience that has failed. A triage situation exists for short term care. In an article from *Wikipedia* (<http://en.wikipedia.org/wiki/Triage>), triage is said to have originated from a French word, *trier*, which means *to sort*, much credit for modern triage is attributed to Dominique Jean Larrey, a French surgeon in Napoleon's army who devised a method of evaluation and treatment. Triage is defined as a noun; it is the process of sorting the injured or needy into groups based on their need for or likely benefit from immediate treatment. It is also defined as a process in which things/persons are ranked in terms of importance or priority. Reference will be made to past triage terminology such as: *haves/havenots* and the "Matthew Effect."

Sorting and ranking are not new concepts; they have been used in the past to designate those in need. Briefly stated, triage is crisis intervention that seeks to ensure the survival of the greatest number of people. It was not created to provide long term benefits.

The relationship between triage and NCLB cannot be understood unless NCLB is defined. NCLB (2001) is a government document that was created at the policy level to ensure that every child would achieve proficiency levels in basic skills (NCLB Desktop 2006). It is a document born of crisis. It is meant to address a grievance. The grievance clearly states that we are in crisis. There is a serious decline in the literacy rates among our children. Our children are in need of care, but triage is not the answer. Our children need time to grow and develop; they need long term care.

In order to present this argument clearly, a specific format will be used. The format will include models, issues, educational research/data, and a conclusion. The conclusion will be entitled: The Promise Realized.

## Application of Educational Policy

It is time to look at the medical aspects of triage and its application to educational policy (NCLB). Jennifer Booker-Jennings (2005), a doctoral candidate in the Department of Sociology at Columbia University, wrote a scathing article about educational triage in a Texas school and its effects on children and their teachers. She cites the sorting that was evident (the grouping of those who would score well if they received direct instruction) and interviewed the teachers regarding their feeling of helplessness regarding those who would be left behind. In essence, they felt paralyzed by the demands of high stakes testing. The teachers felt forced to sort in order to save. The educational triage required that they sort and rank the children so that they could receive care. The policy aspects of NCLB required that if they provided care, they must not only sort and rank but they must use research to provide the care. Finally, they must become accountable for the care provided. This rhetoric sounds reasonable, but is it? Consider the feelings of helplessness that the teachers experienced. Those who would not benefit from the care had to be left behind while those who showed promise of proficiency received treatment. NCLB is indeed a triage experience.

## Policy Issues and Politics: Triage/Declining Literacy Rates

A triage situation is often a catalyst for the formulation of policy. There appears to be a very definite relationship between the need to sort and rank and how we address grievances. When a grievance is addressed, it usually results in policy making. A policy is initiated when a condition or situation produces a need or dissatisfaction among people. A policy is created when relief or redress of governmental action is sought. A policy exists in order to address acknowledged public problems or grievances. Public problems are those that affect many or a substantial number of people and have an impact on/or consequences for people not directly involved (Anderson 2006).

In order for policy to be effective, policymakers must address questions such as:

- (1) What is the specific condition or situation that created the need and dissatisfaction?
- (2) What group or groups are petitioning for redress? And why?
- (3) How will the populace at large benefit from the creation of new policy?

If these questions are asked and answered, the possibility of a hidden agenda diminishes.

The populace has petitioned the government for relief or redress by the government regarding the declining literacy rate in this country. This relief and redress are based on the fact that after many years of public education many of our children are unable to meet basic proficiency levels in reading and math. To address this deficiency, the populace demanded that a policy be written that included a provision for accountability. This issue appears to be straightforward; the agency which holds the funds can and should legislate the conditions and/or stipulations related to accountability. However, the concept of accountability is rather deceptive. There is a disparity among the states regarding the implementation of educational policy and the distribution of public funding. Policy is related to legislation while funding is controlled by politicians.

As informed citizens who are interested in education, we need to understand the nature and roots of NCLB, particularly in terms of policy and politics. When politics is used to designate policy, the governed can assume that a political agenda will take precedence over or drive policy. An informed citizen must determine whether the politics of policymaking will benefit the populace. Another possibility is to unravel the hidden agenda. The hidden agenda can be evaluated in terms of the past. Consider some comments made during the course of the Nuremberg Trials. These paraphrased comments afford an opportunity to reflect about policy and governments. Reich-Marshall Hermann Goering commented to an army psychologist about the political philosophy of the times...it is the leaders of the country who determine the policy and it is a simple matter to drag the people

along whether it is a democracy or a dictatorship. Voice or no voice, the people can always be brought to the bidding of the leaders. It works the same in every country (NashuaPeace.org). Is this voice from the past accurately describing policy and policymaking?

Historically, the hidden agenda has been a political agenda. The Texas miracle, which was truly a mirage, is an excellent example. A sudden rise in proficiency scores deemed the miracle was nothing more than the manipulation of data (the mirage). The political agenda became apparent when a local educator received a federal appointment based on this education miracle (Trelease 2005). Although Dr. Paige was not retained as Secretary of Education for the second Bush term, his White House biography notes that under his tutelage the Department of Education received its second clean financial audit. The question remains: were the children left behind? Apparently, there was fiscal responsibility but at what cost.

### Triage: Past and Present

Consider the past triage terminology which Dickens recorded in *American Notes* (1842), in which he described the burden that poor families, *the havenots*, faced over the blessed with plenty, *the haves*. Of more recent vintage is the concept of the "Matthew Effect." The "Matthew Effect" restates the biblical connotation that those who already *have* shall gain more while those who *havenot* shall have what they have taken away (Stanovich 1986). These terms denote a sorting and ranking: the *haves* enjoy a hierarchical position of achievement and advantage, while the *havenots* have not achieved and are disadvantaged. The *haves* do not need to petition for relief; they have the means to insure their own accountability.

They also have the power to effect policy. Conversely, the *havenots* do not have the way nor the means to initiate their own policy. It is this group that needs to petition for relief and seek the advantages of accountability. The *havenots* need to achieve so that they have the ability to affect policy. Achieving will ultimately empower them!

Let us consider what achievement involves: to achieve one must have support and approval. Most politicians have already received support and have achieved so that the concept eludes them. However, the issues surrounding triage, the sorting and ranking of the *havenots*, is popular, even among the *haves*, because they see that the issues surrounding triage can benefit their political careers.

Perhaps the issue of triage is popular for a reason that has not been discussed. The recent rise in illiteracy among the *havenots* has created sufficient anxiety, discontent, and dissatisfaction among the *haves* because it relates directly to their stability and prosperity. The *haves* know how to move policymakers and politicians. The *haves* understand two concepts: (1) that it is in their best interest to maintain and support productive and accountable educational systems; (2) that it is possible to appeal to the populace regarding this issue because education is an entitlement.

The *haves* understand that their educational systems are superior to other systems. They are also aware that a need exists to sort and rank so that the *havenots* receive equitable distribution of the educational funding. Listen to the rhetoric: **It is in everyone's best interest that our children are well educated.** Is it possible that the No Child Left Behind legislation was supported and created for this reason? Does it exist today with modifications that will benefit all? Is there a covert and overt agenda? Consider these questions as we examine the accountability models.

## Accountability Models

Educational researchers' (Adams 1990; Barr and Kamil 1991; Hiebert and Raphael 1996; Hiebert and Taylor 1995; Juel and Roper-Schneider 1985; Pearson 1996; Slavin and Fashola 1998) work was used to construct a proficiency model that would ensure success. One of the most interesting components of the model is that it resembles a business structure. The model based on research included an accountability feature. The feature suggested was an annual assessment which would indicate academic achievement. The term academic achievement means tracking scores. Indeed, a product was sought! The accountability that drove the policy and the politicians produced a product. The product (scores) denoting progress could be tracked to establish accountability. States, districts, and schools that show progress would be rewarded and failure would be sanctioned. The accountability system (tracking scores) could be used to withhold or distribute funding. It also could be used to promote political ambition. Consider the Texas miracle previously cited (Trelease 2005). The manipulation of data was the catalyst for a very different educational agenda.

At first glance, the requirements stated appear to be quite reasonable; however, the *havenots* often take time (more than a year) to produce scores that indicate academic achievement. In the meantime, they lose their funding. The "Matthew Effect" looms again, the *havenots* have what they have taken from them (Stanovich 1986).

The funding also requires that each state develop plans with an annual measurable objective that will ensure that all teachers teaching in core academic subjects be highly qualified by the end of 2005-2006. The requirement stated again appears to be reasonable; however, the *havenots* don't attract the most qualified teachers. Additionally, their schools do not have the resources to improve their teachers' qualifications. Teachers graduating from education programs have enormous debt, and in many states they are required to complete a Masters' program within five years of initial certification. Their debt mounts! Schools with fewer resources cannot afford to offer incentives because they have limited funding or have lost their funding. The cycle of failure continues, and the children are left behind.

Parental choice is another aspect of the promise offered by NCLB that is misleading. Parents have been promised information about their children's achievement levels. They have been told that if they are dissatisfied with their children's

progress over a three year period, they have the right to choose an alternative school. Many of the parents who have children who have been sorted as low achieving, do not feel qualified to make such a choice. In the past, parents consulted the professionals for guidance regarding their children's needs. What choice do they really have regarding the provisions of NCLB? Do they ask the teachers in failing schools to help them choose an alternative school?

I argue that educators know the answer! They know that academic achievement cannot be measured by standardized tests alone. They know that authentic assessment is a better indicator of growth and development (academic achievement). They know that authentic assessment should be used to inform instruction. They know that skills are only the foundation of literacy, and that strategies must be taught so that learners can achieve higher levels of comprehension. They know that children need to critically think in order to succeed. They know that highly qualified teachers, and not scripted learning, are the answer to academic achievement (Darling-Hammond 1997). They also know that the government needs to fund teacher education.

## The Real Issue

There are major flaws in the reasoning presented in the accountability model. Simply stated: children are not products and learning is not linear. Growth and development appear over time and not at a predictable moment in time. The titles given to recent educational publications are interesting because they denote packaging. *Learning First Alliance*, and *Every Child Reading: An Action Plan* are some of the more interesting titles that illustrate that packaging and score distribution are driving policy and the politicians. The initiatives are well publicized and the verbiage appears to address the grievance and redress sought, but the reality is that there is a crisis, but NCLB is not the remedy. NCLB is a triage experience that has failed. Those who were sorted for priority treatment will not receive it. The treatment will be withheld because they failed to achieve performance levels required for treatment (funding). NCLB has created casualties instead of treating them.

## The Data

It is time to get honest about our casualties. The number of children who are poor readers is uncertain; however, the accepted indicator is that 40% of all U.S. nine-year olds score below the "basic" level on the NAEP (National Assessment of Educational Progress). The number of poor readers is too high. Additionally, the gap between white students and African-American / Hispanic students continues to grow. In 1994, 31% of white fourth-graders scored below "basic" while 69% of African-American and 64% of Hispanic learners did.

A recent update from NAEP (2006) indicates that nine-year olds in the 10th percentile made slight gains in 1996, then lost the gains in 1999, only to regain the gains in 2004. Current findings are not available. One must question the trends after having digested the Texas miracle which was a

mirage. The question must be asked: are these trends being manipulated? These are the differences that the *haves* are concerned about because the declining literacy rates have major consequences for society such as: unemployment, social instability, and social unrest.

## The Research

There is no one method that will solve the reading crisis. What we do know is that teachers make the difference. The difference is a decision made by a teacher who knows the research and how to apply it. The difference is the learning environment created by a teacher so that all children can learn. The difference is an instructional judgment made by a teacher at the right moment when learning is taking place (Garrison 1997; Darling-Hammond 1997). It is a decision made by a teacher who understands growth and development and uses authentic assessment to document it. It is not scripted learning which often requires only literal levels of comprehension.

Most researchers would agree with the statements articulated. A research-based approach is essential because best practices are grounded in research. Interdisciplinary fields such as cognition, neurological science, and the psychology of reading must be tapped as resources.

Selecting research can be difficult but guidelines are available. First, the research selected must be suited to the needs of a particular or group of children. Second, research develops over time and must be the subject of inquiry. *Every Child Reading: An Action Plan* carefully spells out a step-by-step procedure to follow but this also needs to be revisited as new data become available. This procedure should not be used for all populations. No one method fits every child. The illusion created is that once we find the right model, it can be applied for all children.

## Educational Models

Reading is a constructive process. Literacy strategies are the raw materials and guided practice is the blueprint for construction. Most literacy researchers agree that literacy strategies need to be explicitly taught through guided practice. Educating teachers about how to use strategic instruction and active research will produce data that will inform instruction and result in best practices.

In the past, reading was approached as a linear experience. Each plateau had to be reached before a new skill could be encountered. This approach produced very few engaged readers. The new basals which in the past were only skill based now acknowledge reading as a constructive process and encourage the use of literature based supplements. Children learn to read when they interact with the text. Rumelhart (1984) views the reading process as an interaction between the reader and the text. This view is referred to as the interactive model.

acquire and use knowledge in the form of schema to categorically order their mind. This theoretical model allows for both the bottom-up and top-down process and is reflected in the teaching approaches that emphasize direct reading instruction as meaning construction. Construction involves word identification skills, vocabulary, word meaning and comprehension. The strategies needed to acquire basic skills include establishing prior knowledge, developing concepts, self-questioning, summarizing, a graphic ability to represent ideas, awareness of patterns and the ability to predict and verify the predictions. Understanding how learners acquire and use knowledge enables teachers to design strategic instruction. Strategic instruction enables learners to become independent readers and thinkers.

The ultimate goal of literacy is to provide learners with strategies that will allow them to monitor their own thinking while reading and link their prior knowledge with text as they read. As children begin to learn language they need to engage in hypothesis testing (Goodman 1976). Readers need to simultaneously test, accept or reject hypothesis as they construct meaning.

## Necessity of Triage

Triage is a necessity when a crisis exists. A literacy crisis exists! Therefore, a triage experience may be appropriate providing it saves and does not injure. Those who have already been sorted and ranked need treatment; they need explicit strategic instruction so that they can think and not just regurgitate information. They need research based instruction so that the treatment will be beneficial. They need to be moved from triage to long term care or after care if needed.

Accountability needs to be redefined in terms of the triage experience. Who is being held accountable, the treated or the one providing care? Or are both being held accountable? It sounds like the perfect setting for the blame game. If the scores alone are used to determine accountability, then there is a problem. Scores alone do not lend themselves to writing a treatment plan; teachers are asked to construct treatment plans so they must have input.

Teachers who are researchers are accountable. Active researchers (Bennett 1994) know that they need to collect, analyze, and evaluate their data. They know that the data must inform curriculum. They know that change is a constant. They know that accountability like research should never result in punitive action. Teachers know that accountability involves differentiated instruction and the inclusion of learning styles strategies. They know that interdisciplinary practices result in integrated knowledge.

## Conclusion

NCLB should have been implemented as action research. Action research is a component of most graduate education programs, so a model already exists (Calhoun 1994). The literacy crisis has already identified the population as well

as the need. The government should have funded an in-service program for those teachers who needed to sharpen their research skills. The graduate education schools would have accepted the challenge. Action research produces data which is used to inform instruction. An accountability system is inherent in the model. We need to urge the policy makers to reconsider the **promise**.

The **promise** of No Child Left Behind can be realized:

- if educators write the policy, implement the model/s, and determine the levels of accountability;
- if the political agenda can be deleted from policymaking;
- if the *haves* view their responsibility in terms of preserving a generation;
- if action research drives policy and informs instruction;
- if children believe that education is about growth and development (a process) and not just scores (a product).

The promise of NCLB is eloquently depicted in a poster I recently received from ACEI. A child is walking down a path among the trees observing how they grow. Listen to the poetry that describes the growth.

Time to Grow  
 You cannot hurry human growth  
 It is slow and quiet  
 Quiet and slow  
 As the growth of the tree.

Pace and pattern of human growth  
 Are nurtured  
 In the earth  
 In the soil  
 The warm earth  
 The rich soil  
 And gather strength  
 As the roots go ever deeper  
 To the source  
 Of its own life  
 In its own earth  
 Its own soul.

Agnes Snyder  
 Published in ***Childhood Education***,  
 December 1945

Sixty-two years later, we still need to be reminded that growth and development take time. We still need to be reminded that No Child *Will* Be Left Behind, if he/she is given time to grow and develop.

**I challenge you to stand-up to NCLB and let our children grow**, so that they **can develop!** We have a model for growth and development; it is called action research.

Action research holds educators accountable, and it informs their instruction. NCLB is a poorly constructed and implemented triage experience. Children should not be involved in an **on-going triage experiment** (*on-going* violates the term triage). Educators should not be forced to choose which child to save in order to maintain the funding requirements. All children should be saved. It is our responsibility to educate a generation which can contribute to society.

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## Project SAVE - Fingerprinting

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# Teacher Education and Staff Development: Needed Changes in Both

by Rita Dunn, Ed. D. and Karen Burke

Teacher Education and staff development have been going through formal and informal experiences for decades. These programs are periodically evaluated and revised, but their additions and deletions invariably reflect the expertise of senior or retired persons and generally incorporate bits of the most recent fads rather than the results of experimental research.

Quality Teacher Education or staff development cannot be identified by either the content they emphasize or the amount of time they require in attendance. Rather, their quality is recognizable only by the academic gains of its graduates' pupils--measures evaluators rarely employ. Indeed, classroom teachers often complain that their students do not perform well academically because they, their family, their neighborhood, their culture, their upbringing, or the building in, and resources with which they are taught, are inadequate.

Educators are loathe to acknowledge that many students fail because their teachers do not know how to teach those who vary from the norm. That teachers do not teach nontraditional students effectively is a direct outcome of being graduated from programs that have not prepared them for globally-processing, low-auditory-but-high-tactual and high-kinesthetic, unmotivated, and non-conforming students in need of mobility and variety. Even Special Education supervisors rarely teach effectively to children with these traits.

## How Do Traditional Learners Learn?

Teachers acknowledge that children learn differently from each other and that many find traditional schooling difficult, if not intolerable. However, they often attribute their students' inability to achieve in school to the items listed above and to learners' lack of ability, discipline, parental support, and/or motivation. Teachers do not understand that to perform well with conventional teaching, students need to:

- \* Remember at least 75 percent of what they hear by listening or reading;
- \* Internalize what they hear so that they can take clear notes for later review;
- \* Be receptive to ever-present rules and regulations;

- \* Sit quietly on a wooden, metal, or plastic seat for hours;

- \* Concentrate in bright light, without snacks and without benefit of much peer interaction; and

- \* Remain mentally focused all day, each day, despite the topic and their personal environmental requirements.

Because these required behaviors do not come naturally to many children, the National Research Council (1996) established standards requiring that science be taught as an active process based on student engagement rather than on textbooks or lectures and discussions. To create engaging instruction, teachers design strategies based on their perceptions of how to involve students in other-than-conventional approaches. Based on personal observations, they then use those approaches for most of the class at the same time and call it differentiated instruction.

## How Do Non-traditional Learners Learn?

Students who learn differently from their peers and from how most teachers teach, are labeled non-traditional. Although all non-traditional learners do not learn similarly, many of them require:

- \* Movement while concentrating; interactive discussions; individual, paired, small-group, and/or teacher-directed experiences; active participation; hands-on learning; and varied self-selected approaches responsive to their individual learning styles;

- \* Tactual and kinesthetic resources, because learning-by-listening is the most difficult way for at least 85 percent of students to master new and challenging academic material;

- \* Strong interest in what they are learning; insight into how each lesson pertains to them; some emotional involvement; drama or humor; and alternatives for how to master and retain new and difficult academic information or skills;

\* Clearly printed and illustrated objectives, so they know exactly what they are required to learn, but have choices of how to master them;

\* In a variety of social patterns, so that individuals may learn independently, in a pair, in a small group, or with their teacher. To further complicate the decision-making, some students need a collegial teacher whereas others need an authoritative teacher;

\* Soft light, music or background conversation, comfortable seating, and snacks while concentrating; and

\* Periodic breaks from their academic tasks (Dunn & Dunn, 1992, 1993; Dunn & Griggs, 1995, 2004).

### **How Can Teacher Education and Staff Development Address Individual Differences?**

Teaching to students with non-traditional styles is not difficult, but it is different from how most teachers teach. The necessary knowledge and skills can be provided for prospective teachers in four, three-credit courses, one describing the theory, research, and learning-style identification instruments, another demonstrating the development of learning-style instructional resources responsive to individuals' different styles, the third including supervised implementation experiences and periodic evaluations, and the fourth requiring experimental research with and evaluation of the practices. Teachers need to know how to:

\* Identify individual learning styles and their implications for instruction ([www.learningstyles.net](http://www.learningstyles.net));

\* Explain individual learning styles clearly to students and their parents;

\* Provide students with individual prescriptions for studying and doing their homework through their learning-style strengths ([www.learningstyles.net](http://www.learningstyles.net));

\* Develop a variety of learning-style responsive instructional materials, teach students how to use them, and then teach students how to create their own (Dunn & Dunn, 1992, 1993; Favre, 2004; Schiering & Dunn, 2001; O'Connell, Dunn, & Denig, 2003);

\* Introduce lessons globally for global students and then continue analytically for all, having shown each group how to record beneficial information by capitalizing on its strengths (Favre, 2004; Fine, 2003);

\* Administer, evaluate, and monitor the process; and

\* Conduct experimental research to determine the extent to which each treatment is effective for students with different learning styles (Dunn & Griggs, 2004).

### **Does Teaching-to-Learning-Style Make a Measurable Difference?**

Consider the outcomes of teaching to students' individual styles rather than to an entire class.

1. A meta-analysis of 42 experimental studies conducted at 13 different universities with the Dunn and Dunn Learning-Style Model between 1980 and 1990, revealed that eight variables coded for each study produced 65 individual effect sizes (Dunn, Griggs, Olson, Gorman, & Beasley, 1995). The overall, un-weighted group effect size value ( $r$ ) was .384 and the weighted effect size value was .353 with a mean difference ( $d$ ) of .755. Referring to the standard normal curve, this indicated that students whose learning styles were accommodated, could be expected to achieve 75% of a standard deviation higher than students who had not had their learning styles accommodated. Clearly, complementing students' learning-styles with compatible interventions was beneficial to their academic achievement.

2. A second meta-analysis of 76 experimental studies was conducted at multiple universities with the Dunn and Dunn Learning-Style Model between 1980 and 2000 (Lovelace, 2005). The total sample size was 7,196 and the total number of individual effect sizes was 168. Twenty-one dissertations came from 17 universities other than the one at which this meta-analysis was conducted; only four dissertations came from the same university. The overall data reported statistically higher test scores when the Dunns' learning-style strategies were employed and compared with traditional teaching, regardless of the university at which the study was conducted. Most effect sizes were medium to large dependent on the elements tested. Very few effect sizes were small.

3. According to the United States' government's Center for Research in Education (CRE), the 20-year period of extensive federal funding (1970-1990) produced few programs that resulted in statistically higher standardized achievement-test scores for Special Education (SPED) students (Alberg, Cook, Fiore, Friend, Sano, et al. 1992; Braio, Dunn, Beasley, et al., 1997). Prominent among the very few programs that consistently did increase standardized achievement-test scores for SPED students was the Dunn and Dunn Learning-Style Model.

4. Practitioners throughout the United States reported statistically higher standardized achievement-and attitude-test scores within one year of implementing the Dunn and Dunn model for reading, math, and science with poorly-achieving, average, and SPED students in urban, suburban, and rural schools (Dunn & DeBello, 1999; Dunn & Griggs, 2004; Favre, 2004; Fine, 2003; Levine, 2007).



## How Should Teacher Education and Staff Development Be Changed?

Professors and staff developers need to directly address the following items:

1. Males, particularly African-American and Hispanic males, dominate our Special Education (SPED) and remedial reading classes.
2. We need to teach future and current teachers through their learning styles so that they experience how to implement individualized practices.
3. We need to identify the skills and abilities required of teachers who work with non-traditional learners and see whether enough of us are willing to change those practices that have been shown to be ineffective with currently struggling or failing learners.

Policy makers in states across the country are taking a hard look at prospective teachers, the colleges that train them, and the districts that provide subsequent training. In some instances, they're threatening to crack down on programs that don't make the grade. New York's Board of Regents voted to consider closing teacher-training programs if 80% of their graduates could not pass certification exams. To do less would be unethical and immoral, and should be illegal.

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# The Challenge of Diverse Learners in Nursing Education

By Mary Hickey, Ed.D., NP

## Abstract

The nursing profession and its student body has changed dramatically over the past decade. As nursing schools are seeing more culturally and linguistically diverse students, it is important for educators to recognize the unique needs of this new population. Typically, nursing has focused efforts on providing culturally competent care to patients; however, little attention has been given to providing a culturally competent education to our students. This article addresses some of the needs of diverse learners, and offers examples of how nursing faculty can promote optimal learning opportunities for students.

In the United States, the profession of nursing has changed dramatically between 1995 and 2005. There has been an influx of foreign educated nurses entering the workforce, increased numbers of male students, and a more culturally diverse student body in nursing programs (Xu and Davidhizar, 2003; Carty, 2002; American Association of Colleges of Nursing, 1998). Today's nursing students are from various countries and cultures, speak multiple languages, and may have limited English language proficiency. The most recent statistics indicate that the percentage of minority nurses in the workforce has increased to 12.3 percent while minority students in nursing baccalaureate programs grew to approximately 26.5 percent. In the same period, there has been an increase in the numbers of males entering the profession (AACN, 2001). These changes present a challenge for nurse educators especially in the academic arena. This article focuses on the needs of culturally diverse learners in the field of nursing.

The research on diverse learners in nursing is limited, particularly those from different ethnic and cultural backgrounds; especially lacking is information that addresses specific teaching strategies and their applications in nursing education programs with culturally diverse learners. Researchers have highlighted some specific examples of teaching strategies that have been used in classrooms with a non-nursing diverse student population: gaming activities, role-playing, student presentations, small group projects, self-learning projects, computer-assisted teaching and the traditional lecture format (Bangert, 2005; Bagnardi and Perkel, 2005; Halstead and Billings, 2005; Xu and Davidhizar, 2005; Kleiman, Frederickson and Lundy, 2004; Flinn, 2004; DeYoung, 2003; Gaffney, 2000). All educators, regardless of

discipline, must be prepared to utilize multiple modalities to adequately meet the needs of all students. Nursing education faces challenges not typically encountered in other disciplines. A nursing education program must incorporate theory-based lecture courses with laboratory and clinical skills. The language of nursing includes medical and nursing terminology, as well as anatomic and scientific terms. All students, primary English speaking or not, are required to learn this new, unfamiliar language. In addition, nursing students from other cultural groups often have not mastered common English terms well enough before they are placed in nursing courses where this "new language" or nursing terminology represents the dominant vocabulary for success in the class or clinical setting. The new language raises student anxiety and may interfere with their learning process even more than the constructs within the nursing curriculum.

In a study comparing non-English as a second language and English as a second language (ESL) students' reported difficulty with nursing curricula, Jalil-Grenier and Chase (1997) found that ESL respondents indicated greater difficulty in courses with a laboratory or clinical component. Those students also reported more difficulty approaching faculty or asking questions. In another study, students reported feeling that clinical instructors were less tolerant of students with strong foreign accents, and therefore, they were less comfortable asking questions (Hickey, 2005). In light of the reluctance of culturally diverse students to propose questions to faculty, faculty must make every effort to ensure that communication is open, supportive, exploratory and effective.

Effective communication and some specific teaching strategies can promote diverse students' learning. Communication is foundational for any teaching-learning experience and is an essential component of successful teaching. Of the factors influencing academic success, language proficiency has been found to be a primary determinant (Xu and Davidhizar, 2005). Cultural differences in communication style and language barriers may negatively impact student performance.

Effective communication includes clearly stating course expectations, ensuring the course instructions are

understood, and providing an overall respectful approach to students. Unclear expectations can lead to erroneous assumptions, increased student anxiety, and may adversely affect student achievement. There are several strategies to both communicate expectations, and ensure that the students are aware: the syllabus for the course typically lists content outline, exam dates, and other course requirements. It would be helpful to all students, but particularly to students from different cultural backgrounds, to clearly have a section for "student responsibilities" as well as "professor responsibilities" on the course documents. For example, "student responsibilities" would include arriving to class on time, being prepared for class, completing reading assignments in advance, completing and handing in assignments on the specified date, participation in group discussions and working in cooperative teams. "Professor responsibilities" might include the professor being prepared for class, promoting and maintaining a classroom culture of mutual respect, and working toward imparting essential knowledge to students. Reviewing the course syllabus, and its contents, on the first day of the course may seem time consuming initially, but it ensures that the students have the information in print, and that they have been directed toward the key points which will promote their academic success.

Bangert (2005) lists some principles of effective teaching, including student-faculty interaction, cooperation, high expectations and respect. The teaching learning process "is a personal interactive relationship that extends beyond the subject matter.....faculty relate to students with dignity and respect....." (Hyman, in Vandever and Norton, 2005, p. 233). Maintaining a climate of mutual respect in the classroom is essential for all students. Nursing education should encourage active and respectful dialogue, when appropriate, and allow students to learn from each other's experiences and perspectives.

Implementing some simple teaching strategies can also facilitate the learning process for students from diverse backgrounds. In traditional, large group, lecture format courses, the use of hand-outs, or outlines, is helpful for all students. Many instructors utilize the technology available to post outlines, or slide presentations of the content to be covered in lectures. Students are encouraged to review the material prior to a lecture.

Providing preprinted lecture content, in outline or power point format, serves many purposes. Providing or posting hand-outs which list the commonly used medical and nursing terms in the course gives the student an opportunity to look up and review those terms prior to (or after) class. Students are able to focus more on the lecture and discussion, rather than on extensive note-taking when they have received outlines and lecture notes in advance. When limited English-speaking students have access to new terms and vocabulary prior to the lecture, the auditory learner has a reference for later, and the student who may struggle with note-taking does not have to take extensive notes during the lecture. By providing the lecture outline in advance, teachers prepare students for the vocabulary and definitions of terms that

they will have to understand to comprehend the lecture and any discussion that accompanies the lecture.

In addition, course syllabi and course outlines provide students with written or printed materials on subject matter or lecture content that allow students to refer back to the material at a later time. If a student was unclear on any of the content covered, the student has the outline from the lecture to assist in reviewing the material, to compare to the textbook or other resources, and to use in a conference with the professor through a phone call, email exchange, or person-to-person Internet exchange.

In addition to the use of pre-printed handouts, other strategies have been effective in meeting the learning needs of diverse students. Teaching and learning plans that incorporate multiple strategies and encourage active student participation engage diverse learning styles that may be the dominant instructional activities in non-western cultures, such as story-telling to illustrate content, and simulations. Some students prefer cooperative learning assignments, and will prefer group projects or group presentations to review course content. Active questioning, game playing, or role playing are other methods to cover and reinforce course content. Public questioning may be discordant with some cultural norms. Some students may feel anxious about being openly questioned during class discussion, for fear of "losing face" if they do not know the answer, which may be culturally unacceptable (Xu and Davidhizar, 2005; Bastable, 2003; DeYoung, 2003).

Case studies provide an opportunity to promote multiculturalism, in areas of content integration, knowledge construction, and prejudice reduction. Case studies are an effective method to review and reinforce course content, as well as promote critical thinking and problem-solving skills (Baumberger-Henry, M., 2005; Goldenberg, D., Andrusyszyn, M., and Iwasiw, C. 2005). Using case studies to augment lecture content may improve subject mastery for students. Patient scenario case studies allow the student to apply classroom principles to a fictitious patient. Students can expand their knowledge base by applying classroom principles without fear of harming the "patient." Working through the nursing process using case studies also helps to improve student self-esteem, and build confidence for caring for patients in a real-life setting. Case studies also lend themselves to multiple formats: cases can be presented in the lecture course, and students can work in groups to answer questions, or case studies can be used outside of the classroom setting, as individual or group assignments. Written assessments of a case study can be important individual assessments of student knowledge and judgment. They offer an opportunity for the teacher to inquire about an individual student's thinking process and offer advice, counseling and judgment.

As educators, we have a responsibility to assess and meet the learning needs of all students and this can be challenging for us when our learners are from diverse cultural, ethnic, and language backgrounds. Effective commu-

nication and creative teaching strategies combined with collaborative and individual assessments are practices that meet the diverse needs of nursing students. Nursing educators who employ these techniques learn from these experiences, and by listening to their students they can avoid the trap of unconsciously attempting to "Westernize" or "Americanize" diverse learners.

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# Girl Power 21st Century: Encouraging K-7 Girls' Interest in Technology Education

By Janice A. Grackin, Ph.D. and Christine M. Veloso, Ph.D.



The technology and engineering industries in the United States are scrambling to head off an imminent personnel crisis which threatens to have far-reaching national economic consequences. Already struggling to cope with longstanding shortages within the technical and engineering applicant pools, over the next ten years these industries will face their greatest human resource challenge yet-replacing the more than forty percent of the industry workforce represented by retiring baby boomers (Jackson, 2004).

Leaders in industry and academia have been aware of the looming crisis for some time. Discussions over the last twenty years have centered around three related problems:

- (1) a general lack of diversity, including diversity of race and gender within the technology and engineering workforce (Women in Engineering and Program Advocates Network, 2005; 2006);
- (2) relatively small numbers of individuals entering the engineering education "pipeline" overall and the resulting virtual trickle of candidates successfully emerging from that pipeline at the hiring end (Kennelly, Misra, & Karides, 1999); and
- (3) the early diversion of a significant number of entrants out of technology and engineering and onto other career paths due to the negative effects of certain industry factors only imperfectly identified (Pantelli, Stack, & Ramsay, 2001; Women Yield High-Tech Field, 1998).

Higher education and industry have long focused on the second issue, increasing the number of pipeline entrants, but these efforts have not resolved the shortage. In recent years there has been much more attention paid to the first and last issues, with efforts made toward increasing diversity and decreasing early career attrition, both of which offer potential long term, systemic solutions to increasing the pool of qualified applicants for the technology workforce.

The lack of diversity among those entering the engineering education pipeline is an important factor in the shortages among candidates at other points along the way. Engineering as a field has historically been overwhelmingly white and male, with the result that large portions of the

potential entry pool, that is, men of color and women, may not perceive the field as a good fit as an education or career option. If we assume for argument's sake that approximately 51% of the U.S. population is female, and that perhaps 15% of U.S. men are African American or Latino (U.S. Census Bureau, 2005), we arrive at the staggering conclusion that engineering may not be perceived as a career option by perhaps two-thirds of the U.S. population. These simple calculations represent a sobering fact - in the highly unlikely event that every white male in the U.S. chose a career in engineering or information technology, the industry's needs would still be largely unmet.

The urgency to diversify and expand the flow of engineering and technology pipeline entrants is clear, and nowhere is it more clear than in the statistics describing women in computer science (CS) and information technology (IT). Although the proportion of CS and IT graduates who are women had increased steadily from 14% in 1972 to 37% in 1984, from 1984 to 2000 those numbers began to steadily decline again and are currently at less than 28% (Borrego, 2002).

Although educational interventions to expand and diversify the technology and engineering workforce have focused mainly on secondary and post-secondary settings (National Science Foundation, 2003; 2004), K-6 education may be a better starting point for addressing the problem. This paper outlines the psychosocial rationale for this suggestion and describes an experimental K-7 technology project, the goal of which was to increase gender diversity in the engineering and technology workforce by using early intervention to increase the number of young women entering CS and IT pathways.

## *Gender Diversity in CS and IT Pathways: Role of Biological and Psychosocial Factors*

Researchers in industry and academia have struggled to identify the factors that contribute to the much smaller numbers of women than men entering and successfully navigating the CS and IT pathways. In addition, there is a need to identify the factors that contribute to the not inconsequential proportion of trained female CS and IT employees exiting from these fields early in their careers. Over the years, we seem to have settled on two broad categories

of factors - biological and social - to define the problem(s). Both sets of factors have (sometimes) been imbedded within the context of a diverse population, but only recently have these intellectual exercises been applied to identifying strategies for solutions.

Biological factors have been the most contentious, and we have at this point accumulated enough empirical evidence to label them irrelevant or at best trivial in predicting abilities in math and science that might result in greater "natural" selection of white males to engineering paths. First, in nearly all cases of empirically-based group comparisons it has been demonstrated that within-group variance will be greater than between-group variance, and that there is a great deal of overlap in the performance of males and females on science and math tasks (Barnett & Rivers, 2004). In the specific case of individuals grouped by sex, recent meta-analyses have clearly demonstrated that group differences between males and females on most math/science performance variables are generally non-existent, but the differences are very small and related to specific cognitive tasks (Hyde, 2005; Spelke, 2005). Where they are evident, these sex differences in cognitive processing are not interpreted by brain researchers as representing value differences in global abilities since the differences are related to very specific cognitive tasks and the effect sizes are vanishingly small (Hyde, 2005). Such differences have little, if any, impact on task completion rates, but rather reflect differences in brain structure that support differential processing modes. In fact, those domains for which small effect sizes for sex have been found are sometimes in a different direction than generally believed. For example, girls consistently outperform boys in math throughout K-12, with the gap narrowing only a bit in high school (Hyde, 2005).

But if we have now demonstrated empirically that biological factors cannot explain sex differences in educational and career choices, what other factors might explain the very real disparities in female-male entry and persistence in CS and IT pathways? Psychosocial factors offer an alternative explanation for this phenomenon.

Social and psychological factors have the greatest impact on individuals' education and career choices. As children develop, self-concept is increasingly influenced by continuing and ever more gender-constrained social expectations from adults, peers and media. Culture and media reinforce gender segregation in various careers (Coltrane & Adams, 1997; Massoni, 2004), and social expectations increasingly define the education and career options which are accepted as "gender-appropriate" for girls and boys. This socialization process often effectively limits the range of careers that individuals consider (Cooper, & Weaver, 2003).

Such gender segregation in employment is a stable cultural phenomenon that may reinforce the very attitudes that created it (Kennelly, 2002). In the case of CS and IT fields the default model employee, at least in the United States, has been a white male (AAUW, 2002; Colley, Gale, & Harris, 1994; Pantelli, Stack, & Ramsay, 2001). Social ex-

pectations have shaped not only the formation of this perception but contributed to its cultural perpetuation and the current composition of the workforce. The generally homogeneous technology workforce is filled with role models who are overwhelmingly white and male, making it very unlikely that girls (or boys of color) will perceive technology as a viable or appropriate educational or career aspiration. For young women who, despite gendered expectations, choose to pursue technology or engineering, the stress of intensely rigorous curricula is compounded by the stress of being a visible minority within classes and programs (Steele, 1995, 1997). This may contribute to lower rates of educational completion for women in these areas, as they may respond to the added stress by changing education and career direction.

In fact, women may have dissociated from technology long before they choose a college major. Social expectations regarding various groups can rise to the level of *stereotypes*, setting the stage for individual members of that group to experience what is known as *stereotype threat* (Steele, 1995, 1997). In performance situations where individuals are aware that a negative group stereotype exists, the anxiety produced can adversely impact performance for a variety of reasons unrelated to ability (Steele, 1995, 1997; "Threats Within," 2004). Girls and young women find themselves in a stereotype threat situation any time they are performing with technology in general and computers in particular (Cooper & Weaver, 2003), especially when males are present. The anxiety produced may adversely impact cognition and performance, resulting in performance that does not truly reflect abilities. Girls and young women may come to doubt their own abilities and out of a need to preserve self esteem they may psychologically dissociate from technology, de-emphasizing its importance in their self-concept and embracing the prevailing gender schemas that inform us that this is a male domain (Smith, Jussim, & Eccles, 1999).

Given the social obstacles, increasing the likelihood that young women will choose engineering or technology education is no small task. However, since gender roles are not completely internalized by individuals until later in development (Kohlberg, 1966) we may achieve success through early interventions that use single-sex learning environments to counter pervasive gendered expectations. In other words, we may be able to influence the formation and internalization of gendered education and career expectations before these are firmly set by intervening with girls earlier in their psychosocial development.

## **METHOD**

### *Girl Power 21st Century History*

*Girl Power 21st Century* was a collaborative project that included Stony Brook University, Riverhead Central School District, Girl Scouts of Suffolk County and two corporate partners, CA International, Inc. and Symbol Technologies, Inc. The missions of each of these partners includes strong commitment to the broad goals of enhancing diversity across academic disciplines and establishing educational equity, with a specific interest in increasing the number of women

entering the information technology and engineering workforce. These five organizations recognized that growing strong in technology would not only enrich girls academically and personally, but would also enhance their future earning power, placing them individually and as a group in a strong position to compete for the many well-paid technical jobs that will be available to them in the future.

Begun in 1999, the original *Girl Power* project was funded for four years by small grants from the Long Island Fund for Women and Girls, a local non-profit women's fund dedicated to helping women and girls on Long Island build a world of compassion, equality, safety and justice. Based on the success of the four-year-old original project, in 2003 the National Science Foundation awarded the project a major three-year grant which enabled the implementation of an expanded and enhanced program.

#### *Program Structure*

*Girl Power 21st Century* comprised three modules within a continuum program. The program had a single entry point, and girls returned in successive years as they moved through the various modules. **Module One**, the program entry point, was a two-year experience which included Beginner and Advanced classes for girls in grades two and three. **Module Two**, an annual one-week Technology Summer Camp, was attended by girls in grades four through seven. For rising fourth graders who had completed Module One, the camp was a bridge to **Module Three**, named Project Options, for girls in grades four through seven. The focus of Project Options was an evolving website designed to showcase the project and participants' growing knowledge and skills, as well as to provide information about career options, particularly those associated with science, technology, engineering and math. The site was designed and maintained by participating girls with the assistance of the Project Director, Project Coordinator and project staff (graduate and undergraduate students enrolled at the university), all of whom served as instructors and mentors. In successive years, older girls continuing in Module Three acted as peer mentors to incoming younger girls.

#### *Sample*

*Girl Power 21st Century* served a target population residing in the Riverhead Central School District, a large suburban district on eastern Long Island which is racially, ethnically and socioeconomically diverse. Approximately twenty new second-graders entered the program each spring. Returning girls advancing through the program brought the total number of annual program participants to about sixty. Of these, approximately forty percent could be identified as members of underrepresented racial, ethnic and socioeconomic groups.

#### *Project Goals and Outcomes*

The stated broad goal of the project was to encourage positive changes in how girls relate to technology, increasing the probability that they would participate in technology courses in high school, and thereby increasing the likelihood that they would consider technology-related fields when choosing college majors and careers. A secondary

goal was to disseminate *Girl Power 21st Century* as a regional and national model for successful community and higher education partnerships to increase the participation of women in the CS and IT workforce.

The modular program itself was designed around three related goals:

1. To challenge girls' perceptions of technology as "geeky" while encouraging positive changes in how girls relate to technology;
2. To encourage girls' perceptions of technology as a gender-appropriate education and career option;
3. To increase the probability that minority and low income girls would consider technology-related education and career pathways.

The primary measurable outcomes that extended across all program modules were:

- \* Increased basic and advanced technology skills;
- \* Increased perceptions of technology-centered activities as social, not solitary;
- \* Enhanced technical self-confidence (tech-savvy);
- \* Increased perceptions of technology-based activities as gender-normative for girls.

#### *Assessment Instruments*

Program assessment focused on the aforementioned goals and outcomes. Each year participating girls completed surveys, interviews and skills tests (disguised as games to eliminate performance anxiety) to ascertain whether and to what extent girls increased their basic technology skills, perceived technology-centered activities as social, experienced enhanced technical self-confidence, and perceived technology-based activities as gender-normative. Self-report data collection from children is problematic since their responses are often susceptible to situational factors (e.g., their desire to please the interviewer or instructor). Therefore, collecting corroborating data, in this case through annual parent surveys, was a means to increase the reliability of our data. (Henerson, Morris, & Fitz-Gibbon, 1987).

#### *Basic technology skills and confidence*

In order to eliminate performance anxiety, a group game format was developed to assess basic skills, as well as technical self-confidence. To further allay anxiety in younger participants, these girls were sometimes assigned to teams, although they responded individually when answering questions and performing assigned tasks. Girls participated in the skills assessments as teams in the Module One Beginner class and individually in the Module One Advanced class, in Module Two (Technology Camp) and in Module Three (Project Options). Questions and tasks were specific to les-

sons contained within each module. Questions were divided into three sections: simple fill-ins, more difficult "challenge" questions, and problem-solving or skills challenges that required demonstration.

#### *Behaviors, attitudes and beliefs*

Girls in Module Three completed baseline interviews at the beginning of each year and follow-up interviews at the end of each year. Each year, interviews were administered to all girls in Module One (Beginner and Advanced) and Module Two at the last meeting of each module. Interviews comprised a set of seven basic questions, including questions about technology-related behaviors and attitudes. The Module Three interview included additional questions designed to assess the older girls' computer usage as well as their opinions about and interest in technology-related careers.

#### *Parent surveys*

Parent surveys were distributed and completed at the project "graduation ceremony" each year. These were designed to assess the perceptions of parents and guardians regarding the program's impact and their girls' technology knowledge and skills, as well as parent/guardian attitudes relating to girls and technology.

### **RESULTS**

Program assessment for each of the project's three years, including baseline and follow-up interviews, games-format skills assessment, and parent surveys, resulted in the following general findings:

- (1) The overwhelming majority of girls in all modules demonstrated high retention of technology knowledge and skills between modules;
- (2) Most girls exhibited increasingly high comfort with problem-solving through experimentation, indicating a positive shift in relationship with technology;
- (3) More than 90% of girls agreed that a computer lab is a place where: they feel comfortable, people work together, one can get work done and still interact with others, and it is okay to make mistakes or do things differently;
- (4) Girls in Module Three expressed awareness of opportunities in technology for women, and indicated that they were at least a little interested in pursuing such careers;
- (5) At home, girls in the program frequently talked about and demonstrated what they were learning.

Toward the end of the project, we were able to gain access to school data on participants' math, science and ELA test performance. *Girl Power 21st Century* was not designed as a program for gifted and talented students. To participate, girls needed only to demonstrate (as certified by classroom teachers and the building principal) that they could maintain their classroom performance while in the program, since participation required some lost in-class time. Based on this

criterion, it is not surprising that while the school math, science and ELA performance data illustrate that program participants presented a range of performance levels in the three test areas, most participating girls tested in the mid- to high-performance range in all areas. Anecdotal reports from some classroom teachers suggested that participation in *Girl Power 21st Century* had a positive effect on overall academic performance. However, the very small sample and narrow variance in testing scores made it impossible to meaningfully evaluate whether or not program participation was positively related to overall academic performance.

### **DISCUSSION**

One of the most challenging aspects of programmatic studies with very young children can be the assessment of outcomes. In education, standardized tests often stand in as assessment instruments where knowledge is the desired outcome. However, it is notoriously difficult to measure less concrete variables such as attitudes and beliefs, especially for children as young as our *Girl Power 21st Century* participants.

Age-appropriate instruments are hard to find, and young children's reading skills vary tremendously. Even if children are highly skilled readers for their age group, their reading skills may not be sufficient for the valid and reliable psychosocial measures of attitudes we might like to use. Therefore, researchers studying young children are often forced to develop project-specific measures that by their status as new instruments do not have established validity and reliability. Often, assessments of program interventions for young children are necessarily focused on more qualitative outcomes than on results that can be directly expressed in quantitative terms. Such was the case with the *Girl Power 21st Century* program assessment, and the results above are described in largely qualitative, descriptive terms.

In a longitudinal programmatic study framed by developmental questions, long term data and follow-up are essential to adequately measure posited outcomes. *Girl Power 21st Century* was planned as a much longer project, with expectations of collecting longitudinal data at least through the participants' high school graduation. It was hoped that the initial funding period would be extended, but changes in the focus of the National Science Foundation educational funding programs necessitated the end of the project after three years. At the point at which funding was no longer available, girls who had participated in *Girl Power* for five and, in some cases, six years were just entering junior high school. This was the point at which we had planned to begin gathering data regarding high school course choices and performance as well as college and career plans. This opportunity to begin evaluating long term effects of program participation was lost to us.

Part of the project assessment had also been a planned comparison of high school academic choices and college plans between our group of project participants and the group of girls (and boys) in the school district who did not



participate in *Girl Power 21st Century*. This opportunity to comparatively evaluate long term effects of program participation was also lost to us, as was an opportunity to implement a planned adaptation in another school district. There is, therefore, a great regional and national opportunity for others to build on this research through replication and adaptation of the program in other communities.

### **Future Research**

Through our work with *Girl Power 21st Century* we discovered a second, unexpected research strand which focuses on the program's impact on graduate and undergraduate students acting as instructors. The program created a unique community of women around technology, which not only provided our young participants with a safe place to explore their technical interests, but may also have positively affected the college careers and academic performance of our student staff. We collected no formal data, but our anecdotal experiences offer a very tantalizing future direction for research in this area.

The staff of *Girl Power 21st Century* included undergraduate and graduate university students studying disciplines ranging from chemistry to mechanical engineering to computer science to music. Our instructors interacted professionally and personally with one another, with the participating girls, and with the project's professional staff, sharing a wide range of knowledge and experiences. Through these interactions, the *Girl Power 21st Century* project became not only a reliable source of academic and professional mentoring from peers and women professionals, but provided a ready social support network for student staff as well. Student instructors expressed to us their belief that they had benefited personally from working on this project because of the female-centered work environment. This environment facilitated the acquisition of technical and professional teaching skills necessary to successfully teach and inspire our students, skills our student staff will be able to apply in their professional lives.

However, the student staff believed that they also benefited through this relationship-rich environment in more personal ways as well. Project staff told us that working closely with us and with one another provided them with access to knowledge and skills that facilitated the successful completion of their coursework. They also reported that the supportive environment provided access to emotional and instrumental support which helped to ease the stress of learning and competing academically, especially for those student staff that were majoring in male-dominated disciplines such as computer science. Based on the anecdotal reports of our staff, the impact on university students of working in diversity-focused programs like *Girl Power 21st Century* is an extremely promising area for future research.

Although the trailblazing project has come to an end, a *Girl Power 21st Century* project manual, including lesson plans, is available for download at the project's website [www.celt.sunysb.edu/GP21](http://www.celt.sunysb.edu/GP21). The project manual

may also be obtained by contacting the first author via email at [Janice.Grackin@stonybrook.edu](mailto:Janice.Grackin@stonybrook.edu). We encourage K-12 educators across the region to use this manual to develop and adapt early intervention technology programs in their own schools.

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# ***CORRELATION CAN IMPLY CAUSALITY AND OFTEN DOES***

*by Thomas F. Kelly, Ph. D.*

While working in the area of effective schools research, I frequently puzzled over the consistent and high correlations that I have found between the correlates of effective schools and student achievement. According to the standard statistical view of correlation, we cannot assume that improving such things (i.e. correlates of student achievement) as discipline, expectations, leadership, curriculum, morale, etc. will cause higher student achievement. This always seemed counter intuitive and upon reflection, as will be demonstrated here, is also illogical.

Causality is a question of logic, not research or statistics. By recognizing the causal nature of correlation, we can significantly increase the effective application and impact of knowledge gained through correlational research done in any area.

A standard tenet of correlational statistics is that we cannot assume "correlation implies causality. In fact, we can if the specific nature or kind of cause can be identified.

In general, it should be remembered that while correlation does not imply causality, it also does not imply noncausality. Correlation implies degree of relationship, without speculating on the nature of that relationship (i.e. sequential, chronological, contradictory, supporting, causal, etc.).

The case can be made for correlations as causes. A logical model for determining the causal nature of correlates is demonstrated later in this writing. This logical model can be generalized for use to any other correlational research.

We can have correlations that in fact do not imply causality. For example, if research indicated that red hair is correlated with blue eyes, we could not assume that red hair causes blue eyes or vice versa. Both red hair and blue eyes might both be caused by some other cause or causes.

On the other hand, we have not recognized that there can be correlations between variables that do in fact have an identifiable causal relationship. We shall see below that we must look at each correlational relationship as a separate issue and view it in specific logical terms before we determine whether it is causal or not.

If indeed, the correlates of effective schools do not cause student achievement, they are at best of doubtful importance for school improvement. The case can be made for the

causal nature of the correlates. They do in fact cause student achievement.

Let us look at the correlates listed here.

1. Positive School Climate
2. Planning Process
3. Academic Goals/High Expectations
4. Clearly Defined Curricula
5. Monitoring of Student Progress
6. Teacher/Staff Effectiveness
7. Administrative Leadership
8. Parent and Community Involvement
9. Opportunities for Student Responsibility and Participation
10. Rewards and Incentives
11. Order and Discipline

The causal nature of each of these correlates can be seen below.

Causality has specific and identifiable different dimensions.

THERE ARE FOUR DIFFERENT KINDS OF CAUSES:

1. FINAL CAUSES
2. INSTRUMENTAL CAUSES
3. CONDITIONAL CAUSES
4. IMMEDIATE CAUSES

Consider the following "caused" behavior. A man wants to take a restful vacation in the Florida Keys. He sends to the chamber of commerce for literature including restaurants, hotels, maps, etc. He also calls the airline for flight schedules and costs. When he receives these materials in the mail he sits down, turns on the light and reads them. The caused act to be considered here is reading. All four causes are necessary for any effect, but none by itself is sufficient.

Causality in this case (as in all cases) is multiple and diverse. The man is reading because he wants to take a restful vacation. This restful vacation is his goal or FINAL CAUSE. It is the motive or reason for reading.

The light is a different kind of cause. It is a CONDITIONAL CAUSE. A conditional cause is necessary but not sufficient to cause the effect (i.e. reading). A conditional cause makes the effect possible. Without this cause, the effect is not possible. Without light, one cannot read.

The material, maps, restaurant and hotel guides are INSTRUMENTAL CAUSES. They also are necessary but not sufficient to cause an effect. One cannot read without something to read. A baseball player cannot hit without a bat, a surgeon cannot operate without a scalpel.

The arrival of the materials in the mail is the IMMEDIATE CAUSE. It causes the reading to happen now.

The relationship of the four types of causes can be seen in the chart below.

all of the correlates identified above. We can apply the causal model to the correlates.

Psychologists have long recognized that human behavior has multiple causality. These include:

1. Final causes: motives, reasons (needs)
2. Instrumental causes: means
3. Conditional causes: necessary conditions
4. Immediate causes: triggers or stimuli to direct actions.

<b>EFFECT: Reading</b>			
<b>TYPES OF CAUSES</b>			
FINAL CAUSE (motive)	INSTRUMENTAL CAUSE(S) (means)	CONDITIONAL CAUSE(S) (necessary conditions)	IMMEDIATE CAUSE (trigger, when)
<b>ACTUAL CAUSES</b>			
Needs restful vacation	Maps Restaurant guides Hotel guides Flight schedules	Light	Mail received

All of the above causes are necessary to produce the effect of reading. Only in combination are they sufficient.

The final cause is the motive or initial stimulus to act. We want to reach some end, some goal, some desired

When behavior or effects of any kind are viewed as the result of a complex of interactive and interrelated causes, we can see the "causes" of learning to be multiple in number and varied in nature or kind.

<b>MOTIVE OR DESIRED EFFECT: Learning (or Achievement)</b>			
<b>TYPES OF CAUSES</b>			
FINAL CAUSE (motive)	INSTRUMENTAL CAUSE(S) (means)	CONDITIONAL CAUSE(S) (Nec. Conditions)	IMMEDIATE CAUSE (When)
Learning	Planning Process	Positive Climate	Effective Teaching
	Clear Curriculum	Hi Expectations	
	Monitor Progress	Admin. Leadership	
	Planning Process	Student Response	
		Order & Discipline	
		Parent Involvement	
		Rewards & incentives	

result or effect. In order to reach our goal we must identify and acquire the means to reach it, i.e. the instrumental cause(s). In order to use the means to reach our goal, we must have the necessary conditions, i.e. conditional causes.

The direct stimulus or trigger for action at a specific time is the immediate cause. For any effect to occur (be caused) some combination of all four of these causes is absolutely necessary. Learning is the ultimate human act. When we look at the correlates of effective schools, we can categorize

The complexity of multiple causality is compounded by the degree to which they exist and interact. For educators, the critical idea is recognition that the greater the existence of all the correlates, the higher the level of student achievement. We can now see why this is so: the correlates are causes.

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# Critical Analysis Paper on Public Policy - "Nurse Reinvestment Act"

by Andrea McCrink

In 2002, the 107th United States Congress responded to a growing healthcare crisis, one of the worst nursing shortages in the United States, by passing the Nurse Reinvestment Act, P.L. 107-205. Signed by President Bush in August 2002, this bill was anticipated by many to help solve the growing crisis of nursing shortages by addressing current and future nursing workforce issues. The goal was to make the profession more attractive and create an administrative structure to support training, scholarships, grants and loans for various nursing education activities. Unfortunately, this has not happened to the anticipated degree of expectation and the shortage continues.

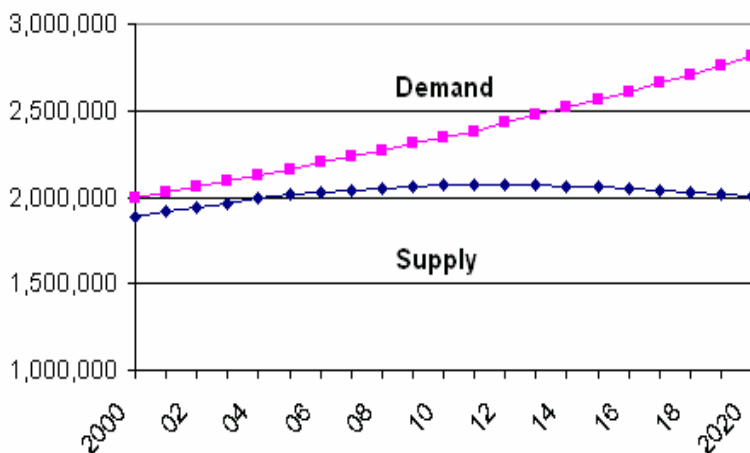
The U.S. Department of Health and Human Services, using data on supply trends drawn from the 2000 National Sample Survey of Registered Nurses, reported in 2002 that a shortage of full time employed registered nurses, previously projected to begin around 2007, was already evident in the year 2000 (Chart 1).

According to the American Association of Colleges of Nursing (2005), the critical nursing shortage is "expected to intensify as baby boomers age and the need for healthcare grows" (p. 1). To meet the ever-growing healthcare demands of the U.S., more than one million new and replacement nurses will be needed by 2012 according to the latest projections by the U.S. Bureau of Labor Statistics (2004). For the first time ever, the US Department of Labor (2004) has identified registered nursing as the top occupation in terms of job growth through the year 2012.

Compounding the problem, many nursing programs across the United States are struggling to increase enrollment numbers and retain student populations. The American Association of Colleges of Nursing (2005) reported that nursing schools in the U.S. turned away more than 32,000 qualified applicants in 2004 due to "insufficient number of faculty, clinical sites, classroom space, clinical preceptors and budget constraints" (p. 2). The average age of nursing professors is 52 and aging; fewer than 20,000 full-time nursing faculty are in the nursing educational system and nearly 1,800 full-time nursing faculty members leave their positions annually.

Also, many experts note the lack of ethnically diverse nurses to meet the healthcare needs of an increasingly culturally diverse U.S. population (Guhde, 2003; Abriam-Yago, Yoder, & Kataoka-Yahiro, 1999; Dowell, 1996). Guhde (2003) asserts that increasing the number of ethnically diverse nurses, who will share their knowledge of different cultural backgrounds with peers, will result in serving the healthcare needs of diverse U.S. populations. Abriam-Yago et al, (1999) suggests the need for a healthcare system that requires nurses with "the language ability and the cultural

Chart 1: National Supply and Demand Projections for FTE Registered Nurses: 2000 to 2020



Source: Bureau of Health Professions, RN Supply and Demand Projections

knowledge to meet the health care needs of ethnic minority immigrants" (p. 143). Dowell (1996) states "recruitment and retention of minority students are critical issues in contemporary nursing education" to provide culturally sensitive healthcare (p. 293). The U.S. Census Bureau (2001) reported an increase in the Hispanic/Latino population by 57.9% and the Asian population by 48.3% since 1990. While the representation of racial/ethnic minority groups in nursing programs has increased to 23.9% (American Association of Colleges of Nursing, 2004) compared to 2001, the number of ethnically diverse nursing students actually completing a program is "less impressive" according to Sanner (2004).

Additional factors contributing to the nursing shortage include changing demographics that will only increase the need for more nurses, reports of job burnout and dissatisfaction resulting in nurses leaving the profession, high nurse turnover and vacancy rates in healthcare facilities and negative media images of nurses. Nurses are portrayed as overworked, underpaid and underappreciated and sexual stereotyping of nurses by the media and film industry has diminished positive perceptions of nurses (Donley, R., Flaherty, M.J., Sarsfield, E., Taylor L., Maloni, H., & Flanagan, E., 2002, p. 5). During the Medicare reimbursement and managed care initiatives of the 1980's and 1990's, hospitals downsized their nursing staffs; nurses were assigned more patients and increased responsibilities with fewer support staff to help them. Mandatory overtime became the norm as the media reported the impact of poor nurse staffing on patient care: poor patient outcomes. Overall, the image of nursing suffered.

The Nurse Reinvestment Act, which includes two titles and seven sections, specifically addresses two facets of the nursing shortage: recruitment and retention. Title 1, Nurse Recruitment, established definitions, specifically with regard to nurses' work sites, endorsed the development of public health service announcements and the use of the media to promote positive images of the nursing profession, and established the National Nurse Service Corps to create scholarship and loan repayment funds by providing nurses to shortage areas. The concept of the National Nurse Service Corps was done to support the belief "that nurses are a national resource and acknowledges the shortage of nurses as a real, national crisis" (Donley, Flaherty, Sarsfield, Taylor, Maloni & Flanagan, 2002, page 6). Title 2, Nurse Retention, recommended the establishment of career ladders in the healthcare facilities to encourage retainment of quality nurses, promoted the availability of grants or contracts to improve nursing access to underserved and high-risk primary healthcare populations and encouraged funding to expand enrollment in baccalaureate nursing programs and new educational technologies. Additionally, the development of comprehensive geriatric education to serve the ever growing aging population in the United States was recommended. Finally, under Title 2, a Nurse Faculty Loan forgiveness program was created and reports by the General Accounting Office were mandated.

It is important to understand that the Nurse Reinvestment Act is an "authorization" measure, which authorizes certain programs and initiatives to be created and supported by the government. The Nurse Reinvestment Act itself does not provide funding for the programs and initiatives. Additionally, the act itself did not specify the amount of money to be allocated for the authorized programs and initiatives but states "such sums as may be necessary for each of fiscal years 2003 through 2007" (Nurse Reinvestment Act, Public Law, p. 5) may be allocated thus leaving it up to Congress each year to set funding levels.

Each year the budget and appropriations process begins with the release of the President's budget. The wrangling over government monies begins and the House and Senate Budget Committees develop respective budget resolutions to enact funding for all appropriation bills. As an appropriation bill is needed to dispense or spend US funds, each year, by September 30th, Congress must enact 13 separate appropriations measures to fund all aspects of the federal government. The Labor, Health and Human Services and Education (LHHS) appropriations bill contains funding for the Nurse Reinvestment Act. Vying for funding each year with the Nurse Reinvestment Act are numerous health and cancer-related services, included the activities of the National Institute of Health.

The 107th Congress adjourned in November 2002 without acting on the appropriation/funding bill that would have made the nurse reinvestment act a reality. The following year (2003) both chambers of Congress passed the \$397.4 billion Fiscal Year Omnibus Appropriations bill and consequently, the Nurse Reinvestment Act (PL 107-205) was enacted and funded with \$113.5 million.

Implemented and overseen by the Health Resources and Services Administration (HRSA) at the U.S. Department of Health and Human Services (HHS), funding of the act continues to be a major concern every year. To date, Congress has failed to fully fund all of the initiatives created in the act and has failed to fully grant all the funds requested by nursing experts and nursing organizations. Each year, nursing organizations are faced with an uphill battle to secure adequate funding for the bill. In 2004, \$141.8 million was funded. In fiscal year 2005, President Bush requested \$147,350 million for the Nurse Reinvestment Act and other nursing workforce programs at HRSA; the final amount funded by Congress was \$150,674 million. For fiscal year 2006, President Bush has requested \$150 million; the house has passed a budget of \$149.9 million and the senate committee is contemplating a budget of \$155.6 million. Experts estimate that a minimum of \$250 million a year is needed to fund all components of the Nurse Reinvestment Act. According to Kathi Ream, Director of Government Affairs at the National League of Nursing (2005), federal investment in nursing education is less than one-tenth of 1% of the total federal budget.

Nursing has not been seen as a major political force due to lack of public policy consensus within the nursing community. Multiple nursing organizations are working to change this concept. Current legislative agendas include the ANSR Alliance (Americans for Nursing Shortage Relief) and the development of a "Consensus Document". Endorsed by 50 nursing organizations, the document outlines a comprehensive approach to address the multiple complex factors contributing to today's nurse and nursing faculty shortages and includes guiding principles, suggestions for improvement of existing programs and creation and funding for new initiatives. The overall objective of the alliance is to obtain additional funding for the Nurse Reinvestment Act; \$210 million for fiscal year 2006 was requested.

### **Conclusions**

The Nurse Reinvestment Act was a start but it certainly has not significantly accomplished its purpose, and competition for federal monies will continue. Military and national security issues and the recent devastation of regions from Hurricane Katrina will certainly impact the amount designated to fund the Nurse Reinvestment Act.

More nurses are needed to meet growing healthcare needs and interest in the profession should start in local educational settings. High school counselors must advocate nursing as a viable career option to both female and male students. Nurses should routinely be invited to career development days so they can speak first-hand about the multiple rewards of nursing. Liaisons between high schools and schools of nursing would foster the growth of interested and qualified applicants to nursing programs.

As the largest provider of healthcare in the U.S., nurses and specifically, nurse educators must become more actively involved in public policy by writing letters to legislators at all levels informing them about the many roles of nursing. Public education promoting nursing as a profession started with the Johnson & Johnson campaign on television and it needs to continue. The curriculum of nursing education programs must include topics on public healthcare policy and the role nurses should have in the political arena. National nursing organizations involved in political activism must continue to be supported. The National League of Nurses, considered by Registered Nurses to be "one-stop" shopping for federal legislative and regulatory information, utilizes E-mail alerts, template letters, voter scorecards, and "tell-a-friend" E-mails to inform its members about important political issues. Failure to change the political mindset of nurses and increase the number of qualified nurses and nursing faculty will only result in inadequate healthcare options which will lead to poor patient outcomes.

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# ***SUBJECT MATTER DNA***

**By Victor P. Maiorana, Ph.D.**

## **ABSTRACT**

Cognitive Sequentialism [CS] is the conventional cognitive basis for the treatment of subject matter in classrooms at all levels. In the manner of the textbook, CS treats subject matter serially one topic after another. This reverses and actively works against the learner's inborn need to make connected and integrated sense of the world. CS promotes rote learning and severely limits literacy development in all learners. The purpose of this essay is to discuss an alternative cognitive approach for thinking, reading, and writing with subject matter; one that overcomes the severe limitations of CS. It is called Cognitive Defined Natural Attributes Analysis [CDNAA]. CDNAA is used to reveal critically the "DNA" shared by all subject matter.

*Genetic* DNA [deoxyribonucleic acid] represents an innate and universal *biological* attribute of humans. Genetic DNA provides a basic structure for investigating and understanding how the body works. *Subject Matter* DNA represents the DNA-like *cognitive* attributes of humans. Subject Matter DNA represents an innate and universal cognitive structure for investigating and developing critical understanding of all subject matter. CDNAA provides the basis for contextually developing life-long and learner-centered critical thinking, reading/listening and writing/speaking abilities in all learners at all grade levels. Applications for teacher preparation and student achievement are discussed.

## **INTRODUCTION**

Genetic DNA is a nucleic acid that carries the structural genetic information in the human cell. Genetic DNA provides a system, a grammar, for investigating medical and associated phenomena. Subject Matter DNA carries the structural basis for thinking and therefore reading/listening, and writing/speaking about subject matter. The "DNA" in Subject Matter DNA stands for Defined Natural Attributes. These attributes are discovered in subject matter through use of a methodology called Cognitive Defined Natural Attributes Analysis. The four defined natural attributes are intent, activities, consequences, and resources. They are presented in Figure 1.

Conventional grammar puts *words* together to form a single complete thought. Cognitive DNA, a grammar of cognition, puts *thoughts* together to form a critically analytic and integrated understanding of subject matter (Maiorana, 1998).

Just as genetic DNA applies to all living things, cognitive DNA transcends national languages and applies to all subject matter. Here is another way of thinking about this idea. The grammar of spoken and written language is a natural evolution of humankind that provides structure and supports analysis. It follows that the world's subject matter - the object of language as viewed through grammar - should contain similar characteristics. In other words, if the grammar you use to express yourself contains structure, then it follows that the subject matter you think, speak, read, or write about will reflect that structure. If grammar carries genetic information that self-replicates itself throughout all of language, then is there a similar "DNA" of subject matter? Is there something natural, structural, and constructive about subject matter that makes it susceptible to a universal grammar of analytic thought? Such a universal cognitive grammar represents what I call Cognitive Defined Natural Attributes.

Cognitive DNA reveals how the conscious mind works when it engages subject matter in an analytic way. Any written, spoken, or rendered material can be decoded and therefore, understood. This means that the component parts of a given subject matter topic can be identified, related, and integrated. Such an analysis provides a common analytic foundation for understanding and investigating subject matter.

## **Principles of Subject Matter DNA**

- Humans seek understanding naturally by virtue of their innate analytic and language intelligence.
- Humans naturally and continually, consciously and subconsciously, have, seek, express, reflect, and inquire as to the purpose, ends-in-view, effect, importance, function, and meaning of their endeavors, in the natural world, and in the human-made world.
- All the world's subject matter serves some purpose, end-in-view, effect, meaning, function, or is otherwise important in some way.
- The structure of language can be framed analytically/critically not merely sequentially, as is the convention in elementary through graduate textbooks and classrooms.

According to Bailey (1996, p.9):

When the world is presented to us in books, it is perforce presented sequentially, so we see only one set of realities at a time. We see, for example, more isolated facts and fewer relationships ... Once the ways of sequential [thought] have played [their] role, the results are beyond the reach [of change]....[Cognitive] Sequentialism is forever. Once our teachers have shaped our young minds to think in train, it takes enormous effort to accept [change].

Cognitive Sequentialism [CS] is forever and beyond the reach of change only if no alternative approach to organizing subject matter is available. Cognitive DNA provides a powerful cognitive alternative to CS that is shared by both teachers and students.

Cognitive Sequentialism is the unchallenged cognitive basis of teacher education, professional development, and therefore classroom delivery of subject matter. CS is standard in classrooms, in textbooks and education technology. It is the unchallenged basis of curriculum and program designs at all levels of education. In the manner of the textbook, CS treats subject matter serially one topic after another without making analytic/critical/integrated connections *within* and *among* subject matter topics. CS is teacher centered.

By its very cognitive nature CS inherently inhibits analytic, integrated, and critical thinking. It defeats the contextual development of thinking, reading, and writing abilities in all learners, teachers and students. CS is a major factor in the following:

- A study authored by faculty at Columbia, Dartmouth, and Harvard found that "Uncertified teachers end up performing just as well in the classroom as certified teachers" (Garland, 2006). This suggests that schools of education do not equip teachers with cognitively-based teaching strategies that are unique to their training and profession.

- Of U.S. 17-year olds, only about 10% can draw conclusions using scientific knowledge, only 7% can solve math problems of more than one step, only 7% can read and understand textbooks, and only 2% can write well-formed essays. (*What Matters Most: Teaching for America's Future*, 1996, p.5).

- "Performance of the nation's 12th-graders in reading has declined in comparison to 1992; (showing) no significant change from the last assessment in 2002. This was seen in overall scores and in scores for literacy, informational, and functional reading contexts. In 2005, scores for both White Students and Black students were lower than in 1992." The percentage of students performing at or above the *Basic I* and *Proficient* levels decreased. In mathematics, "Sixty-one percent of high school seniors performed at or above the Basic level, and 23 percent performed at or above Proficient." Mathematics results could not be directly compared to previous years. (*The Nation's Report Card*, February 2007, p.4).

- More than 75% percent of the 1.2 million students who took

the ACT college-entrance examinations in 2004 were not ready for college-level work in the core subjects of mathematics, English, and science (*A Test of Leadership: Charting the Future of U.S. Higher Education*, September 2006, p.9). This same report warns that many college graduates have not mastered the thinking, reading, and writing skills expected of those who earn degrees. "The percentage of college graduates deemed proficient in prose literacy has actually declined from 40 to 31 percent in the last decade. ... Employers report repeatedly that many new graduates they hire are not prepared to work, lacking critical thinking, writing, and problem-solving skills needed in today's workplaces." (p.3)

- "The share of students in New York State who are reading and writing at grade level drops sharply between the fifth and sixth grades and keeps declining through middle school, according to the first results of a new state testing system ... for tracking year-to-year progress. The scores for the 2005-6 school year ... showed an increase in the proportion of students in the state performing at the lowest level." (Herszenhorn, D. and Fessenden, F., 2006). New York State education commissioner Mills is reported as saying "literacy is the problem" but does not question the cognitive foundation upon which literacy is based and classroom practice now proceeds.

Such unquestioning acceptance of cognitive sequentialism is not unusual among those charged with operating, reforming, and setting policy for education. An example is the report, *A Test of Leadership: Charting the Future of U.S. Higher Education*, referred to above. The report, issued by the U.S. Secretary of Education, was developed by 34 high-level commission members from across the country. They had the support of 15 issue papers prepared by 20 authors, 143 private and public organizations, and 22 more participants at meetings hearings, and testimony. The report contains 41 recommendations. None of the recommendations address the cognitive basis upon which teachers, students, and subject matter are brought together in the classroom.

So the performance disconnects between 4th/5th grade and 11th/12th grade / college graduate achievement continues to exist. With respect to how subject matter is engaged cognitively, it is of little consequence whether a classroom is in a public school, private school, charter school, or college; whether in a theme, magnet, model, or contract-managed school; or how small or well financed it may be. Once a classroom door closes, CS reverses and actively works against the learner's inborn need to make connected and integrated sense of the world. CS defeats the contextual development of thinking, reading, and writing abilities in all learners, teachers and students.

Reform efforts do not address CS. Therefore, the systemic, reproducible, and transferable reform of teacher preparation programs and school and college classroom practice does not take place. The following discusses how teacher effectiveness and student achievement can be significantly improved by addressing Subject Matter DNA.

## DISCUSSION

### Foundations of Subject Matter DNA

Figure 1 relates the four main structural elements -- the defined natural attributes -- of Subject Matter DNA (Maiorana, 1992).

intent is called a cognitive learning objective. It is written as a complete sentence.

The term "intent" is associated with a conscious being. Obviously, subject matter as such is not conscious. However, this does not prevent teachers and students from thinking and speaking for the subject matter. In other words, if the

#### Figure 1

Title: The Four Defined Natural Attributes of Subject Matter

- 1) Subject Matter Intent
  - The purpose *or* end-in-view *or* effect *or* meaning *or* function *or* importance of the subject matter topic at hand.
- 2) Subject Matter Activities, Means, Causes, or Events
  - The processes used to achieve the purpose, end-in-view, effect, meaning, function, or importance of the subject matter topic. Processes can fall into one or more of the following categories:
    - Natural
    - Mental
    - Physical
    - Technological
- 3) Subject Matter Consequences
  - The aftereffects if the purpose, end-in-view, effect, meaning, function, or importance of the subject matter topic is achieved [realized] and/or not achieved [not realized].
    - Consequences can be positive
    - Consequences can be negative
- 4) Subject Matter Resources
  - The persons, places, things, and ideas needed to accomplish the necessary activities, means, causes, or events. Resources can fall into any one or more of these categories:
    - Human
    - Social
    - Institutional
    - Economic
    - Elemental

Here is how one analyzes the DNA of subject matter. The first step is to identify a subject matter topic of interest. The topic can be anything in the universe that exists or that can be imagined.

Next, a cognitive objective for that subject matter topic is developed. Whether sounded, written, or demonstrated and although sometimes obscure, every human communication is about some subject matter topic. That topic serves some purpose *or* has an end-in-view *or* has some effect *or* carries some meaning *or* serves some function, *or* is in some way important. Accordingly, everything that occurs or exists in life and in the world can be analyzed objectively *or* analyzed for the meaning humans can impute. Identifying intent [the cognitive objective] allows one to start to construct analytically a critical view of subject matter. The statement of

subject matter itself could think and talk, how would it describe its intent [that is, how would it describe its purpose, end-in-view, effect, meaning, function, or importance]? A useful tool in this regard is for the teacher and student to "become [be] the subject matter" topic at hand.

A cognitive objective is concerned directly with, and is drawn from, the subject matter itself. It is not a teaching aim or a behavioral learning objective or a performance objective. A cognitive objective is concerned with the purpose *or* end-in-view *or* effect *or* meaning *or* function *or* importance of the subject matter topic at hand. Here are examples of how behavioral and cognitive objectives differ: The student shall understand the human digestive system [Behavioral Objective]. A function of the human digestive system is to extract nutrients from food [Cognitive Objective]. Here is another

example. The student shall understand proper fractions [Behavioral Objective]. The purpose of a proper fraction is to represent a numeric value that is less than one [Cognitive Objective].

The cognitive objective establishes the beginning of a dynamic cognitive path that teachers and students share, develop, and follow analytically and critically. Next, the activities needed to achieve the intent of the subject matter are identified along with the resources associated with those activities. The last step is to develop consequences. Consequences are the results, outcomes, or aftereffects of achieving and/or not achieving the cognitive objective. Consequences can be positive and negative.

Cognitive learning objectives and the Cognitive DNA analyses they give rise to make operational in the classroom Dewey's observation that "Any subject from Greek to cooking is intellectual in its power to start and direct significant inquiry and reflection." [Dewey, 1933, p.46]. Although one can begin an analysis anywhere in the process and reason to all its parts, it is usually best to carry out an analysis in the order just given, that is: topic, cognitive objective, activities, resources, and consequences.

## Application of Subject Matter DNA in the Classroom

Any topic in any subject matter area can be analyzed by teachers and students to reveal its DNA. The following is an initial [but faulty] DNA frame produced by a high school history teacher during an across-the-curriculum professional development program. It reflects how teachers [and therefore students] are trained to adopt behavioral and sequential views of subject matter at the sacrifice of cognitive and analytic views. Study the display closely, and then read the comments that follow.

## Comments for Figure 2

In figure 2 the teacher has attempted to develop a lesson plan. However, that was not the assignment. The assignment was to think analytically about the battle itself. As you can see, the *Battle* of Gettysburg itself, the actual topic of the analysis, is nowhere directly addressed. This is because the teacher is confined intellectually, traditionally, and by training to the behavioral/sequential view of subject matter.

The purpose of the battle itself is not addressed. Instead, the teacher has substituted his purposes as a teacher and his students' purposes as learners. Such behavioral/learn-

### Figure 2

#### Title: A Subject Matter Display of The Battle of Gettysburg Version 1 - Conventional Treatment

- (1) Purpose (Why?)
  - to understand the reasons that brought both Northern and Southern forces to fight this crucial battle of the Civil War
  - to understand the various aspects of the battle
  - to understand how it changed the course of US history
- (2) Activities (What took place?)
  - read diaries, historical documents, historical texts, newspaper reports
  - study maps (understand troop movements in the flow of battle)
  - draw maps as a way to understand the flow of battle
  - study pictures from that era
  - tour the battlefield
  - study paintings of the action as a way to understand the battle
- (3) Consequences (If purpose was /was not achieved?):
  - Positive (if purpose is achieved): A clear understanding of why the North won the battle. An understanding of why this battle was a turning point of the Civil War.
  - Negative (if purpose is not achieved): One who studies the Civil war will not understand why the South lost this war and why the Civil War ended the way it did.

#### Resource Bank:

- diaries
- newspaper reports from that time
- maps
- pictures
- battlefield
- historical paintings
- historical documents

ing objectives are useful for instructional planning and management. However, they do not promote *cognitive* understanding (logical or critical) *of the battle itself*.

A CDNA analysis calls for the activities that took place *in the battle itself*. But these battle activities are not described in Figure 2. Instead, lesson plan activities associated with teaching and learning are described. These are all good activities that can eventually be made part of a lesson plan. However, when constructing a CDNA profile we are not developing a lesson plan. Rather, we are first trying to construct our own analytic understanding of the topic at hand. What we are trying to do here is to develop the cognitive foundation upon which a lesson plan can later be developed.

The consequences given are simply restatements of the (misdirected) purposes. As such, they are not consequences. The consequences should address the results, outcomes, or aftereffects *of the battle itself*.

The resources used in the battle itself are not described. Instead, the resources associated with teaching and learning are described. Note that the resource, battlefield, is in-

cluded as a place for teacher and students to visit, not for the part in played in the battle itself.

*Summary:* Figure 2 reveals what happens cognitively when conventional behavioral / learning objectives are substituted for the purposes served by subject matter. In summary, this is a rote-inducing one-dimensional display *about* the subject matter, not a multi-dimensional analytic view *drawn from within or of* the subject matter.

Figure 3 was developed after the same history teacher received training in how to reveal the cognitive DNA of subject matter. Study the display closely, and then read the comments that follow.

### Comments for Figure 3

The DNA frame in Figure 3 directly, analytically, and critically addresses The Battle of Gettysburg. Figure 3 is referred to as a DNA frame, display, or profile. It was developed after the history teacher gained an understanding of the difference between teaching about subject matter and teaching from within or of subject matter using Cognitive DNA.

### Figure 3

#### Title: A Subject Matter DNA Display of The Battle of Gettysburg from the North's Point of View Version 2 - Cognitive DNA [Analytic/Critical] Treatment

(1) **Purpose of the battle** (Why?)

- The purpose of the battle of Gettysburg was to stop the Confederate army from continuing its invasion of the North in 1863.

(2) **Activities Associated With the Battle** (What took place?)

- Southern forces move into Pennsylvania
- Southern forces move towards Harrisburg, PA.
- Northern forces follow Southern forces
- Southerners look for shoes in Gettysburg
- soldiers from both sides meet on the outskirts of town
- the battle is joined
- fighting continues for three days
- Northern forces win the battle

(3) **Consequences of the Battle** (If purpose was/was not achieved?):

Positive (if purpose achieved): (1) Union forces (the North) stopped the Confederate forces (the South, the rebels) from continuing the invasion. (2) Union forces stopped the Confederate forces from being in a position to attack Washington, DC. (3) Union forces inflicted casualties on the rebels from which they would never recover.

Negative (if purpose not achieved): (1) The Confederate invasion would continue. (2) Northern armies could have been destroyed. (3) Possible capture of Washington, DC.

**Resource Bank:** What resources were used to fight the battle?

- battlefield
- officers
- maps
- supplies
- soldiers
- horses
- weapons

The teacher has traveled intellectually inside the subject matter and has identified the purpose of the Gettysburg battle itself. Everything else in the display is directly based on this cognitive objective. This allowed the teacher to assemble / construct / reveal the subject matter DNA of the Battle. This was followed by the development of the remaining DNA elements of process, consequences, and resources. The frame itself then became the *cognitive foundation* for developing classroom assignments. How such frames are used to develop classroom assignments is discussed next.

Note: When writing a cognitive objective one selects the intentional term that best fits the topic at hand. For example, and without meaning to be restrictive, the term end-in-view lends itself to topics in the humanities, the term effect lends itself to science topics, the term function lends itself to math topics, the term purpose lends itself to technology topics.

### Classroom Methods and Subject Matter DNA

The key to developing critical understanding of a subject matter topic -- from the Arts through Zoology and including math and science -- is to develop a view of that topic that is based on an analytic reasoning process. CDNAA is such a process. The DNA frame shown in Figure 3 represents the results of a CDNA analysis. The process is known and

shared by both teacher and student and it is applied jointly to the subject matter topic at hand.

According to national learning standards issued by the University of Pittsburgh including those issued by New York State, 75% of the performance indicators within the raised learning standards call for analytic/critical engagement of subject matter. CS inherently defeats such engagement whereas the treatment of a topic within an analytic/critical DNA framework addresses directly the learning standards. CDNAA sets the stage for teachers to develop integrated and dynamic critical thinking, reading, writing, and problem-solving abilities in all students. This is accomplished by using a variety of classroom instructional methods. Example methods are described in Table 1.

Table 1 contains sample methods used in elementary through college classrooms to develop CDNAA-based classroom assignments. Methods 1, 2, and 3 can be used to introduce CDNAA to students. Methods 4 and 5 can be used to set students on their own once they gain an understanding of the analytic process.

Notice that all of the methods are learner-centered. This means students are actively thinking, reading, and writing as they construct subject matter understanding for them-

**Table 1**  
**Subject Matter DNA in the Classroom**

Sample Instructional Methods for Developing Learner-Centered Classroom Assignments

Having constructed a DNA frame, teachers now have the basis for developing the classroom assignments portion of a lesson plan. The assignments require that students engage in a variety of analytic thinking, reading/listening, and writing/speaking classroom activities. Here are some example methods that can be used to develop learner-centered analytic classroom assignments.

- (1) Provide students with a DNA frame with missing elements, along with a scrambled list of the missing elements. Students then complete the frame using the list supplied.
- (2) Provide students with the whole frame in scrambled list form. Students then decode each element in the list [Is it a cognitive objective? Is it an activity? Is it a resource? Is it a positive or negative consequence?]. Once the list is decoded, a DNA frame is constructed.
- (3) Provide students with a DNA frame where the elements have been purposely misplaced. For example, a resource is identified as an activity; a consequence is identified as a cognitive objective; an activity is identified as a consequence. Students then find the errors and construct a correct display.
- (4) Assign a reading passage and have students translate the conventional sequential textbook discussion into an analytic DNA frame.
- (5) Have students select a topic, develop a frame, and then use the frame as a guide for writing a narrative.
- (6) Differentiation is achieved by having students develop 2, 3, or 4 stage frames. A 2-stage frame contains a cognitive objective and associated activities. A 3-stage frame contains a cognitive objective, activities, and resources or consequences. A 4-stage frame contains all the elements shown in Figure 1. Students with varying degrees of understanding regarding how to assemble a DNA frame can be placed in groups and given an assignment. This is an excellent way to bring all students along.

selves. Because they share an analytic cognitive foundation, teachers and students can move forward together to develop subject matter understanding while simultaneously developing literacy skills.

### An Example of How Students Respond When Taught the Basics of Subject Matter DNA

Figure 3 shows how teachers respond to CDNAA. Figure 4 (on page 40) is an example of how students respond when taught to use CDNAA within the context of engaging regular course content. In a pre and post test, middle school students [n=344] were given two different social studies textbook passages to read. As in method #4 in Table 1, students were asked to analyze what they read. In Figure 4, note that in the pretest a student - having yet to be taught how to critically analyze textual material - leaves the planning page blank. Note that in the posttest the same student - having in the interim been taught contextually by the teacher to think analytically using Cognitive DNA -- is able to construct a critical view of the textbook material.

### CONCLUSION

Over time, engineering practice has evolved from trial-and-error to rule-of-thumb to scientific formulations. Law practice has gone from the mystical to oral to written law. Medical practice has progressed from incantation to blood-letting to modern surgery. However, teaching practice has not evolved cognitively. It remains bound by a centuries-old, rote-inducing, sequential view of subject matter. The profession responsible for transmitting the world's subject matter continues to operate without a cognitive theory of subject matter; one that would reform and inform its practice and make measurable its contribution. It is past time to change the cognitive basis for organizing subject matter and with it the acts of classroom teaching and learning.

By providing *cognitive learning objectives* and *analytic patterns* that are purposeful/meaningful and consequential, Cognitive Defined Natural Attributes Analysis reveals the whole, dynamic meaning (the DNA) within all content. Such meaning promotes critical understanding and application of subject matter. It makes knowing an issue of active construction of content within the context of developing life-long essential and critical abilities in all learners - teachers and students.

CDNAA provides the basis for developing a series of teacher education and professional development courses under the general heading of Theories and Applications of Subject Matter. Such courses would address these two objectives: (1) Every teacher -- Elementary through Graduate and within the context of their discipline --should also be an overt literacy teacher; a teacher of thinking, reading, writing, speaking, and listening, and (2) All subject matter be discussed critically by teachers and students the first time it is engaged in class.

Promoting analytic/critical understanding of subject matter through use of Cognitive Defined Natural Attributes Analysis -- in classrooms, in textbooks, in computer courseware, and through other delivery systems -- minimizes the factors that we believe separate students. This is because CDNAA provides a grammar for literacy. It emphasizes the common human thought and learning gifts and abilities that all students possess regardless of race, color, creed, national origin, or social background.

Within the engineering, legal, and medical professions there are shared cognitive foundational theories and applications that inform their practice and make their contributions more effective, reproducible, and systemic. Discovering the DNA shared by all subject matter provides a way to integrate the teaching profession intellectually and operationally. It provides a learner-centered way for teachers to help all students -- the prepared, the under-prepared, English language learners, and special education students -- to fulfill their human learning potential.

### End Notes

**Note 1.** Cognitive DNA was developed in an academic environment. The theory and methodology of CDNAA is the result of the writer's original research on critical thinking performed for a PhD doctorate; and research, development, and practice during the last thirty years. The research won two awards: - the 1985 Paul S. Lomax Scholarship and Leadership Award and the 1985 NYU Delta Pi Epsilon Research Award. Cognitive DNA has application in any environment that requires one to understand, which is "... to perceive and comprehend the nature and significance..." of subject matter. (*The American Heritage® Dictionary of the English Language, 4th Edition*).

The classroom is obviously such an environment. However, CDNAA is also finding application in the legal world where it is referred to as Forensic Document Content Integrity Analysis. FDCIA is currently being used in legal proceedings to establish the content integrity of written material (documents). This means that a document is read and analyzed and a CDNA profile is developed. The resultant profile is used to establish the document's integrity, that is, the degree to which the document is valid, complete, and fair-minded.

**Note 2.** Here are excerpts from a book review of *Critical Thinking across the Curriculum: Building the Analytical Classroom*, by Victor P. Maiorana. This work provides the basis for discovering subject matter DNA. "He [offers] a new methodology to counteract the negative effects of older methods. ... The clarity of Maiorana's concept is apparent as the chapters unfold. ... offers a valuable method to push critical thinking behaviors into all classrooms for all learners. ... All information, whether new or not, would critically engage the learner - no need to lecture to provide background information first." (Joan Ruddiman, *Journal of Reading*, April, 1992. pp. 395, 396).

Figure 4

Student 1 – Thinking Pretest

**Part B: Use the space on this page to analyze the paragraphs.**

Student left this pretest planning page blank

Student 1 – Thinking Posttest

**Part B: Use the space on this page to analyze the paragraphs.**

Title: British tax acts

Purpose: To try and get money from tax payers to get out of debt

Activities

- The British Parliament passed the stamp act
- Items such as newspapers and cards were taxed
- The British officials tried to enforce the stamp tax in America
- There were riots across America
- People were violent toward tax collectors
- The stamp act was cancelled

Consequences

Good: The protests and riots got the stamp act cancelled

Bad: A lot of innocent people died in the riots and tax collectors were killed



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Dr. Maiorana is an educational consultant, researcher, and writer focusing on the construction of subject matter understanding while simultaneously developing critical thinking, reading, and writing skills.

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