

The Cognition Gap:  
Sufficient Skills for High School but not Sufficient for College

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Information is not knowledge.

Einstein

On most college campuses faculty frequently express concerns about the lack of student academic preparedness. There are complaints that new students are increasingly less well prepared for the rigors of college level work. They seem to have more difficulty solving problems in math, writing literate college compositions, and even studying effectively. Of equal concern is their inexperience with critical thinking, independent decision making, and application of what was learned. Too many students begin college underprepared but there is a combination of reasons for their lack of prerequisite learning skills. “Underprepared” describes a diverse group that varies with ability, educational background, income, culture, and life experience. It is risky to make broad generalizations about these students even though they share similar academic characteristics. We need to ask relevant questions that allow us to understand the reasons why so many new students are not adequately prepared for college level work, and especially the need to demonstrate independent and effective critical thinking skills. Once we better understand the etiology of underpreparedness, we will be able to address the most significant aspect of the issue: a gap between the cognitive skills needed in high school and those expected at college.

We will begin by first identifying the specific characteristics that distinguish underprepared students from more successful first semester students. Second, we need to understand whether underpreparedness is a reflection of lack of ability, lowered high school standards, cultural influences, an increased focus on standardized testing, or some other yet unrecognized factors. Third, we will identify what measures can be taken to address the problems faced by these students in the college classroom. It is necessary to minimize the initial impact of underpreparedness on their learning and their ability to be academically successful while providing them with the opportunity to acquire the needed skills. This chapter will address the significant changes in academic standards during the last decade as well as the role that socioeconomic status plays in contributing to the problem of underprepared students. The *cognitive gap* is a gap in thinking skills that many students experience as they begin their college work even though they might have been very successful while in high school. There are multiple causes for this problem. The solutions to the problem will require multiple strategies.

## Identifying the Underprepared

Dotzler (2003) noted that although the 1960's saw the beginning of widespread experimentation and study in developmental education and pedagogy, classroom practices have not changed significantly since then, except for the increased use of technology. College curriculum is typically based on the premise that students have completed college prep courses while in high school, yet many students arrive on campus not having completed those courses and are underprepared to succeed. This situation was also noted by Weiner (2002) who described high school graduates who arrive confidently on a college campus, only to find that they are academically underprepared for course work in their first semester. How are we to teach confident first semester students who are not realistically prepared for the rigors ahead? Levine (2005) noted that "our colleges open their doors to kids who have grown up in an era that infiltrates them with unfettered pleasure and heaps of questionably justified positive feedback. Higher education has to avoid hitching itself to that pleasure-packed bandwagon" (p. B12). Introducing the realities of college level work and expectations can be a difficult and frustrating academic transition for many of these students.

The issue of underpreparedness and the gap in thinking skills is not about intelligence. Students are at least as bright as they were in the past. This assertion is based on current SAT and college placement test scores as well as the often exemplary performance of some students in traditionally challenging first semester courses. Despite the number of underprepared students who are admitted to college, there is still a majority of students with very strong intellect and a high level of college readiness skills. The core issue is not about intellect or admissions standards. The point being made is that although underprepared students are found on most campuses, as a group they have the ability to pursue higher education if their academic skill level is raised to the standard needed to be successful. *Academic skill level* generally refers to reading, writing, and math but certainly, more than ever, it also includes critical thinking and application of knowledge. Current students readily acknowledge that they have mastered memorization skills while in high school but they are often inexperienced with what it means to think critically, independently, and apply what they know. The issue is not that they cannot learn these skills. The issue is that too many have never had the opportunity to learn and to demonstrate the skills. A question to be answered is *why* they have not had to learn and apply these skills during their high school careers.

An *underprepared* student is any student who demonstrates academic skills that fall below those determined to be necessary for college success and/or any student whose college readiness skills do not adequately prepare them for the rigors of college study and learning. *Academic skills*, as used here, refer specifically to reading, writing, and math. *Readiness skills* include the use of strategies that lead to effective study, problem solving, and thinking critically in order to progress satisfactorily through college level work. The "*thinking gap*" refers specifically to students who begin college having satisfactorily completed all the requirements for high school graduation but who demonstrate specific weaknesses in critical thinking and problem solving skills. These deficits can be predicted to negatively impact student ability to

*apply* the knowledge they acquired in high school. Beginning with their first semester in college, they will be expected to think at a more complex level, which leaves them little time to acquire missing skills or to strengthen weak ones.

When college admissions offices review SAT scores and high school grade point averages, they certainly recognize that a student's skills are reflective of his specific economic, familial, social, and cultural influences. However, focusing on recruiting students with high SAT scores leads too many campuses to under serve those with lower scores but who are in need of support services. Students with high SATs and high class rank can be predicted to do well. Those with lower SATs and lower class rank, combined with disadvantageous environmental circumstances, generally require considerably more support. In addition to the socio-cultural variables that negatively impact education, especially those related to low socioeconomic status, we can question the increased class time that is being taken away from teaching and learning and instead spent on activities related to standardized testing. Not only is this practice having a negative impact on student learning, it also directly impacts preparation for college or the work force. A recent news article contained the following quote about the state of literacy in Pennsylvania: "More than half of working age adults in Philadelphia lack basic reading and arithmetic skills. The study by labor economist Paul Harrington for the Philadelphia Workforce Investment Board (WIB) reported that the average Philadelphia score for Reading is 260 out of a possible 500 points. Most jobs in the city – such as health care technicians, secretaries, and security guards – require higher scores" (York Daily Record, June 29, 2009). Consider that more than half of working age adults in Philadelphia lack basic reading and math skills. How can we explain, or worse yet, accept that finding? The data reflect a shameful literacy rate that no doubt is reflective of many adults working in labor positions in our cities.

It is now estimated that 90% of good paying jobs require some amount of post-secondary training or education (U.S. Dept. of Labor, 2006). The labor market is constantly changing, requiring students and employees to acquire, maintain, and update transferable skills that allow them to adapt to changing market needs. High school dropouts, and even those who do graduate, are being pushed to the side and too often find themselves in dead end jobs with little or no room to improve. If the necessary work related skills are not being acquired in high school, then post-secondary education or training is certainly needed. Unfortunately, rather than preparing students for post high school endeavors, too much class time is being devoted to standardized testing and rote memorization, neither of which adequately prepare students for the skills they will need.

There are multiple reasons for the lack of academic preparedness observed in college students and multiple areas that are impacted by it. One of the primary causes of underprepared students was noted previously: the gap between the skills and requirements needed for graduation from high school and the skills needed for college admission and academic success. Whether or not there has been a lowering of standards for high school graduation remains a debatable issue, and if this issue is justified, an approach to addressing it has seldom been thoroughly discussed on a national level. If lack of student preparation is due

to lowered high school standards, then perhaps reliable and valid state exit exams are one method by which mastery of skills can be accurately measured. Steps must be taken to better prepare students to acquire the necessary academic skills throughout their high school careers and to guarantee that they are prepared for graduation. This requires a rigorous curriculum and frequent monitoring of student progress by qualified teachers.

Underprepared students are a product of multiple and inter-related variables that impact learning. These include 1) societal and cultural changes that have had a dramatic impact on family demographics and, therefore, on education, 2) the fast pace and desire for instant gratification characteristic of life in this country but counter to the environment present in a college classroom 3) cultural and ethnic variables that impact how students think, read, write, study and learn, and 4) an increasing focus on the techniques used in rote memorization as more and more time is spent on standardized testing, leaving less time for teaching, critical thinking, and situations allowing for application and creativity.

A number of reasons for the increase in underprepared students fall under the broad heading of demographic and societal changes that are known to be negatively associated with educational achievement. These demographics and trends include:

1. Low income, which is known to be a primary cause of underachievement.
2. An increase in the number of first generation students who are attending college.
3. Children from two parent homes who spend less time with their families now than in the past and have less emphasis on academic achievement.
4. Educational standards in high school that have been gradually lowered, especially in the areas of writing and critical thinking.
5. Grade inflation in high schools and the question of whether a high grade point average accurately reflects mastery of skills.
6. A societal trend in which parents are less supportive of public education and school personnel.
7. An increased awareness that since the implementation of No Child Left Behind in 2002 there has been an increase in time and money spent on standardized testing. That reality takes time and money away from effective teaching and from student learning.

Parental income and socioeconomic status are accurate predictors of student achievement. The retention and achievement rates for lower class students have not significantly changed in years (Boylan, Bliss and Bonham, 1993; Hursh, D., 2008; U.S. Department of Education, 2008). Attention being given to data from standardized testing, as required by NCLB, does not begin to address the precipitating problems of low socioeconomic status and lack of opportunity. The academic achievement gap in our high schools and colleges is reflective of the general socioeconomic gap that is present in the United States.

All of the above trends result in a large group of students who are not as cognitively prepared for college as they could be. Another variable that currently impacts student learning

and academic performance is reflective of fast pace and a desire for instant gratification, especially when associated with use of technology. A number of significant behavioral changes have occurred in adolescents during the last twenty years that have dramatically impacted their engagement in learning and their expectations about classrooms, teachers, and even their own performance. The current generation of students, often referred to as the Net Generation or NetGeners, were born into the age of technology. Their learning characteristics include:

1. Increasingly visual and kinesthetically sophisticated learning preferences. They are not programmed to sit passively in a classroom and reflectively absorb language based auditory information. They become easily bored with lecture.
2. A decline in reading unless it is done electronically and even then it is seldom in the form of books.
3. Visual sophistication that is most applicable to multimedia, but not to printed materials that require substantial reading and comprehension.
4. Preparation to perceive and process data, facts, and chunks of information. This is consistent with inductive reasoning and with Level I of Bloom's Cognitive Taxonomy, Information/Remembering.
5. They tend to be social learners who are enthusiastic about multimedia resources, social networking, and are comfortable with multitasking while using them.

The attention span of today's adolescents is estimated to be between ten and fifteen minutes, as compared with twenty to twenty five minutes a decade ago. First semester students increasingly prefer and expect a classroom to be active, interactive, and visual, in contrast with conventional college classrooms that are reflective and verbal. Even when students find themselves engaged in a classroom that is interactive and fast paced, many struggle to remain alert and engaged in a classroom that requires extended concentration, listening, and critical thinking. Many students are extrinsically, rather than intrinsically, motivated and anticipate reinforcement for maintaining interest and successful performance, minimizing the role of student effort and time. Students often demonstrate high self-esteem, but not high self-efficacy. That is, they maintain a strong self concept but lose sight of the fact that a successful outcome is based on and consistent with their effort and performance. They often appear to be lacking indepth classroom experience requiring independent problem solving skills or defense of their own opinions.

### **National Data: A Reflection of Student Achievement**

Not everyone agrees that the responsibility for support services and developmental courses for underprepared students should be that of four year institutions. Kozeracki (2002) noted that even though high schools are criticized for failing to prepare students for post-secondary education, many four year colleges and universities are still exploring policies that would shift the responsibility of developmental education almost exclusively to the community colleges. In support of the effectiveness of developmental courses, available data indicates that they are indeed significant in preparing students for college work. According to McCabe (2000),

88% of remedial students pass college level English courses and 82% pass math classes following successful completion of a remedial course. This pattern suggests that although students might be underprepared for first semester college work, they have the ability to be successful once they have mastered the necessary prerequisites. If those prerequisites were not obtained in high school then it is logical that they be offered at the college level.

In the mid 1990's it was established that approximately 75% - 80% of institutions of higher education offered at least one remedial or developmental reading, writing, or math course. During that time, nearly all public two year institutions and community colleges offered remedial courses in these three areas. From the mid 1990's until the present, nearly 30% of first time freshmen have enrolled in one or more remedial course in at least one of these three subject areas. This trend is reflected nationwide. Remedial courses are necessary in order to narrow or close the gap between the skills demonstrated by underprepared students and those needed for successful college work. We have a responsibility to students to offer them the opportunity to acquire the skills that are needed for their success.

In a 2002 Public Agenda Survey, a public policy polling group, 78% of high school teachers reported that diplomas prepare students for the workforce, whereas only 41% of employers agreed that high school graduates were prepared for the work force ("States Make Diplomas Count By Sticking With Senior Tests," 2003). Employers also raised questions about the ability of high school graduates to satisfactorily complete job applications, write coherently, perform basic math computations, communicate effectively, and understand the responsibilities associated with being an employee. The Governor's Association (2005) issued a report indicating that "graduation requirements remain so universally inadequate that it is possible to earn a diploma anywhere in the nation and still lack the basic skills required by colleges and employers" (Winter, 2005, p. A13). Most of these concerns are similar to those expressed by college personnel. The question still remains: Why does this gap exist between the skills needed to graduate from high college and those required for college success and employability? This is certainly not a new question yet it remains a current one.

For example, more than a decade ago, Governor Mark Warner of Virginia, then chairman of the National Governor's Association, looked at exit exams in thirteen states and said that nine of those "that talked tough in 2003 had retreated and pulled back from their consequences" (Winter, 2005, p. A13). Without proven performance based on exit exams, perhaps there is indeed a credibility gap that suggests that recent high school graduates appeared to be prepared for college level work, but in reality they were less prepared than in the past. The current concern about their diminished ability to write clearly, think critically, and to problem solve appears to be gaining momentum at the same time schools are focusing on the No Child Left Behind (NCLB) requirements associated with student performance on standardized tests.

The 2002 survey by Public Agenda noted that the majority of high school teachers believed grades reflected a student's ability, whereas only 23% of college professors agreed

("States Make Diplomas Count By Sticking With Senior Tests," 2003). A 1997 survey of teachers by a Georgia State University researcher indicated that 86% of teachers said students' "efforts" were a part of their high school grades. If student effort, extra credit, graded homework, special projects, bonus points, etc. become a significant portion of a student's class grade, then their actual learning and skill level can be questioned. If high school grade point averages are not reflective of ability, then it cannot be assumed that a high school diploma guarantees that a graduate has successfully mastered key skills at the level expected by colleges. Unfortunately, the gap in skills extends beyond the transition from high school to college and is also reflected in the labor force where employers complain that employees cannot competently perform even basic job functions.

In a recent Pennsylvania Dept. of Education news release (February 25, 2009) it was written: "Penn State's College of Education has found that only eighteen of Pennsylvania's 501 school districts, comprising less than three percent of the state's public school enrollment, appropriately measure whether students can read and do math at the 11<sup>th</sup> grade level in order to award high school diplomas. This study confirms that more than 80% of students are enrolled in districts that have not demonstrated that every student is prepared for post-high school success, according to Education Secretary Gerald. L. Zahorchak. In 2007, approximately 56,000 students received a diploma even though they did not pass the PSSA in 11<sup>th</sup> grade or the retest in the 12<sup>th</sup> grade" (Pennsylvania Dept of Ed. news release, 2009). These students received diplomas and many of them continued on to post-secondary education, vocational training, or attempted to obtain employment. Their lack of adequate preparation for any of these post-secondary options was predictable.

The issue of standardized test scores and student performance is one that extends beyond U.S. borders. Schleicher and Stewart (2008) reviewed data from the Organization for Economic Co-operation and Development (OECD, 2006) report that showed how fifteen year-olds in the United States compared academically with fifteen year-olds in other countries using the Programme for International Student Assessment (PISA) as the method of assessment. This instrument measures performance in math, reading and science, assessing not just what has been learned but how well students can *apply* their knowledge. Schleicher and Stewart (2008) noted, "This reflects the increasing understanding that in rapidly changing knowledge economies, critical thinking and problem solving are important parts of the new global skills set, whereas the labor market demand for routine cognitive competencies, the kinds of skills that are easy to teach and test- has declined rapidly over recent decades "(p. 47). Given the current focus in the U.S. on standardized testing rather than on effective teach and student learning, their observation begins to explain how out of thirty OECD countries, the United States ranked 21<sup>st</sup> in science, 25<sup>th</sup> in math, and 15<sup>th</sup> in reading literacy. The U.S. has moved away from teaching students how to think critically and apply their knowledge, and instead increasingly focuses on standardized testing. When the assessment is designed to measure comprehension and application of information, many U.S. students clearly struggle as compared with their international counterparts.

The current focus in the U.S. on standardized testing and the consequent international comparisons of outcomes is startling. The following information is reported from the Organization for Economic Cooperation and Development (OECD 2004) and the U.S. Department of Education (2008):

- Half of American students fell below the threshold of problem-solving skills considered necessary to meet emerging workforce demands.
- The United States has an average number of students who performed at the highest proficiency levels but a much larger proportion who performed at the lowest levels.

The United States is the only OECD member country to have relatively higher proportions of both top and bottom performers (OECD, 2007a).

The last point, "...relatively high proportions of both top and bottom performers", is particularly significant and reflects the fact that too many U.S. schools are still doing an inadequate job of educating their students, especially low income students, while other schools are excelling. Too often, this is a direct result of economic and educational differences between poor and wealthy students and their poor or wealthy schools. In order to improve the low scores and increase learning, we need to focus on eliminating the causes of poverty, educating students from lower class families in better schools, and providing them with the same educational opportunities as students from middle class or wealthy districts. There is a strong correlation between socioeconomic status and academic achievement but that does not definitively determine educational outcomes. There are a variety of teaching strategies that are clearly more effective than others in engaging the minds of students and increasing their desire to learn. As educators we are faced with the challenge of providing learning environments that motivate students and reinforce them for their curiosity, creativity, and independent thinking.

Qualified teachers who provide students with the opportunity to actively engage in and construct their own learning are more likely to be successful than those who do not. Decreasing student passive listening time and increasing active engagement time will enhance concentration, motivation, and learning. A focus on standardized test scores, based too heavily on rote memory, will not alleviate this problem in learning and, in fact, will add to it. Many of the education "reforms" during the last twenty years have focused on elementary schools. The OECD international comparisons consistently showed that our high school students were losing a significant amount of ground very fast when compared with other countries. I am not suggesting that we minimize the effective work being done in the elementary schools. I *am* suggesting that more effective teaching strategies be used in our high schools to engage and retain students. In our increasingly digital world and global society, students need to be able to analyze and evaluate the information that is at their fingertips. They need to be able to apply valid information to new and unique situations. They are not learning these skills when faced with hundreds of hours of preparing for and taking standardized tests. Memorization and recall of isolated facts do not provide students with an opportunity to synthesize and apply what they learn. Excessive time spent on the preparation for standardized testing is eliminating

opportunities for learning. Teaching and learning standard course content is a necessity but students need an opportunity to *use* it and apply it to real world scenarios. Making it personally meaningful and relevant are the keys to increasing student interest and motivation.

### **Standards and Testing: What Happens When We Focus on Test Scores**

It's not the "*standards*", per se, that is the problem. It is how we are focusing on the *outcome*, the numbers, and have left out the *process*; that is, the teaching and learning. Standards are necessary so that we know who has acquired the necessary skills and knowledge to be passed into the next grade, graduate high school, or be successful in college. We have lost focus on teaching students the skills to become independent thinkers. They are seldom given time or encouragement to self-reflect and to think about their own thinking. They also need to learn and acquire the skills to enter the world of work as civil and compassionate human beings. Before we became hyper focused on standardized testing, particularly following the passage of No Child Left Behind (NCLB) in 2001, we focused more on reading, writing, math, literacy skills, and critical thinking as well as providing opportunities for students to become good citizens. But, in 2002, the race began to meet the requirements of NCLB and concern with effective teaching and higher order thinking skills was minimized.

While we were losing sight of effective teaching and learning, John Gatto (2009) reminded us of the three original "purposes of schooling":

1. To make good people
2. To make good citizens
3. And to make each student find some particular talents to develop to the maximum

In his book, *Dumbing Us Down*, Gatto (2005) wrote "*Discovering meaning for yourself*" as well as "*discovering purpose for yourself*", is a big part of what education is. How this can be done by locking children away from the world is beyond me. What are we doing keeping children inside a school all day where they are inside endless classrooms, prepping for standardized testing?" (p.62) The current focus on standardized tests does not leave much time for students to discover such meaning and purpose. Rather than expecting students to retain isolated pieces of information, we need to provide them with time to read literature, strengthen writing skills, and solve problems that are related to the real world. Currently, they are provided with limited time to think, reflect, and create. It is the higher level thinking skills and an opportunity to apply them that are so often lacking in our public schools and without which students have become bored and unmotivated.

Gatto (2005) poignantly wrote, "The simplistic notion that 'our schools are failing' easily translates into a limitless demand for more resources for the institution and its supports: for

books, for teachers, for computers, for real estate (and hence for book publishers, graduate schools of education, computer manufacturers, and real estate developers) – and for more time: for more pre-school, more homework, longer school years, then end of recess, and semi- (and soon fully) compulsory summer schools. And to the copywriter’s delight, it’s a zero-sum game. Not only is there an endless stream of consumers with little or no institutional memory and an absolutely insatiable demand, but the truth is that no matter how much is expended in the educational marketplace, 50% of the schools will remain below average” (p. xxii). More funding will not solve this problem. More time in school will not solve the problem. Making better use of time and available resources will begin to solve the problem.

Isaacson (2009), in an article addressing current and unsatisfactory educational standards noted, “The result is a K-12 education system in the U.S. that is burdened by an incoherent jumble of state and local curriculum standards, assessment tools, tests, texts, and teaching materials. Even worse, many states have bumbled into a race to the bottom as they define their local standards downward in order to pretend to satisfy federal demands by showing that their students are proficient” (p. 32). Consider the significance of that statement. If students are not meeting the established standards, simply lower the standard. If set low enough, no one will have to worry about students meeting the standard. They all will.

Explaining the difficulty of aligning our state standards equally and fairly Isaacson (2009) noted, “The U.S. Constitution leaves public education to the states, and the states devolve much of the authority to local school districts, of which there are now more than 13,000 in the U.S. The Federal Government provides less than 9% of the funding for K-12 schools. That is why it has been impossible thus far to create common curriculum standards nationwide” (p. 32). With states and local governments providing the majority of the funding, the federal government had very little influence when it came to what standards each state would use. That is a formula that establishes the groundwork for the problem of significant differences in the standards determined by each state. An issue currently being studied is how to establish fair and equitable state standards. The question remains: What is an acceptable standard?

What we are doing now based on NCLB is not working. Consider again the implications of the international test score comparisons. Regarding the need for new and consistent standards, Isaacson (2009) wrote that the 21<sup>st</sup> century American standards should be comparable to, and benchmarked against, the standards of other countries so that we can determine how globally competitive our nation’s economy will be in the future. Forty years ago, the U.S. had the best graduation rates in the world. As President Obama said in a speech to Congress in the Spring of 2009, noting our decline in test scores, “This is a prescription for economic decline, because we know the countries that out teach us today will out compete us tomorrow” (p. 35). They are already doing that. We recognize that fact yet we continue the frenetic pace of focusing on standardized test scores. We continue to ignore the fact that we are not teaching what needs to be learned in preparation for life outside of the public schools. Students are not prepared to think autonomously, application of knowledge is an area of

significant weakness, and the result is that we have fallen far behind other countries. What can we do to change direction?

### **The Powerful Impact of Poverty**

We know that socioeconomic status is a predictor of student achievement. Rothstein (2008) wrote: "It's no cop-out to acknowledge the effects of socioeconomic disparities on student learning. Rather, it's a vital step to closing the achievement gap" (p. 8). Consider the issues of health care, low birth weight, family stress, school absences, lack of reading materials, and less adult attention. These are all associated with low income families and all impact school achievement. "Each of these disadvantages makes only a small contribution to the achievement gap, but cumulatively, they explain a lot. ....There's a lack of moral, political, and intellectual integrity in this suppression of awareness of how social and economic disadvantage lowers achievement.....Closing achievement gaps requires combining school improvements with reforms that narrow the vast socioeconomic inequalities in the United States". (Rothstein, 2008, p 10)

Students from low income families pay a price throughout their entire academic careers for being born and raised poor. Balfanz & Legters (2004) wrote that for poor and minority students our education system exacerbates a preexisting divide between the rich and the poor. They refer to the 2,000 U.S. schools – called dropout factories and serving mainly minority youth - whose students face a less than 60% chance of graduating. It is not acceptable to waste the potential of so many young people, especially considering the few options available to high school drop outs. We need to closely examine the reasons that we are losing 50% of our urban youth to drop out status rather than completion of high school and offer them a better alternative.

Poverty is a general predictor of low academic achievement from preschool through college. Carnavale and Rose (2003) found that approximately three quarters of students at our top tier universities are from families in the top socioeconomic quartile. Only 3% come from families in the lowest socioeconomic quartile. In fact, only 10% of students at our top tier schools come from the lower *half* of the socioeconomic scale. This pattern perpetuates the status quo of students who are admitted to top tier institutions, graduating at higher rates, and being afforded more opportunity than those graduating from lower tier schools. These advantages are available to students who already benefit from advantage. For students of low socioeconomic status who are admitted to lower tier schools, standardized test scores, especially SATs, do not reflect their capability and potential. Instead, they reflect their limited opportunities and experiences. Students are not presented with the same advantages available to those at top tier schools. And the pattern continues with low income predicting low achievement and continued limited opportunity. The cycle needs to be broken in order to provide educational opportunities to these students that engage them, motivate them, and allow them to make satisfactory progress.

## The Thinking Gap – Implications and Solutions

Larry Spence (2001), the founding director of the Schreyer Institute for Innovation in Learning at Penn State, wrote in an article titled, *The Case Against Teaching*: “Everyone knows what teaching is, what learning is, and how to improve higher education. Yet no one is satisfied. Today’s graduates cannot meet the demands of workplace or community without several more years of learning on the job. They cannot formulate messy real-world problems, work well with others in high-stress team situations, write and speak forcefully and persuasively, or improve their own performance” (p. 1). Spence (2001) discusses the reality that educators have been slow to change, asking: “Why is education more resistant to innovation than business, agriculture, or communication? Because parents, reporters, citizens, children, politicians, and professional educators share an unshakable image of what teachers and students are supposed to do. Learning is an active process of making changes in the mind’s representations by reasoning about the world - not just taking it as it comes. Learning means breaking, making, and remodeling connections in our brains. The physical structure of the brain and the inferred representations of the mind depend not only on innate processes, but also on prior experience and knowledge” (p. 7). We need to provide more opportunities for students to acquire that experience.

In describing classroom testing at the college level Spence noted: “Our testing practices assume that students’ brains are homogenous and that they all learn the same things. But that can’t be true. Time limits force us to ask students to regurgitate terms, definitions, and formulas a few times a semester and infer learning from the results. This focus on brute recall disrupts learning” (p 8). Spence (2001) concluded, “There are two ways that humans learn – one-on-one and on their own” (p 10). That might seem a bit extreme to a lot of readers and educators might vehemently disagree. But it is difficult to argue against that point. Gatto (2005, 2009) would certainly agree that we discourage learning and creativity when we limit students to the classroom and expect them to intellectually thrive. Students thrive when provided with out of class opportunities to pursue their interests, driven by their own curiosity, motivation and skills.

Learning cannot be effectively measured or demonstrated through standardized testing. Rather, it is demonstrated through application, problem solving, and transfer of knowledge and skills. Standardized testing is just one method by which to attempt to measure specific elements of learning, particularly that which is learned via rote memorization. It does a disservice to the goals of deep learning that cannot be easily demonstrated via standardized test responses. I cannot help but wonder what those who compile the questions for standardized tests must be thinking. Perhaps they believe that “if it cannot be measured via standardized testing then it is not worth teaching”? That is certainly a narrow and dangerously restricted approach to learning and therefore to teaching. It all but eliminates the pursuit of creativity from both processes. That is unfair to our teachers and certainly to their students. Teaching and learning are being restricted and controlled by the requirements of NCLB and the

demands of standardized testing practices. There is not enough time in a school day to “teach to the test” and also provide students the time to think, reflect and create.

Since there are a number of variables that contribute to the status of an underprepared student, multiple strategies are required to effectively address the problem. Many of the causative variables are societally based and very difficult to remediate, including single parent families and consequent low socioeconomic status. Grade inflation in the high schools and what appear to be lower academic standards required for graduation are easier to correct. Add to these the characteristics that reflect current student learning preferences and classroom expectations, including visual and kinesthetic learners who are not comfortable with reflective, language based teaching. Creative and thoughtful use of technology and multimedia are compatible with the learning preferences of many students and will actively engage them in the processes of teaching and learning.

Post-secondary institutions need not lower their academic standards and should begin to address the issues associated with underprepared students even before students arrive on campus. Assessment of their academic skills is a necessity, as is offering remediation and/or study skills and “learning to learn” instruction. If underprepared students are admitted to college, then academic support services are not optional. They are a necessity. Learner centered classes tend to increase student engagement and motivation, providing a greater sense of belongingness and accomplishment and increasing the likelihood of retention. We need to build on an achievement model rather than on a deficit model, focusing on academic as well as personal gains and success. We can encourage students to choose a major prior to the end of their first year, as retention is increased when there is a clear connection between choice of major and current classes work. A course in critical thinking and problem solving is recommended as a required course for all new students. Students need to be prepared for what they should expect, using data that includes where each student’s scores fall along a continuum, distinguishing between successful and unsuccessful students. Faculty and learning support services should provide opportunities for student success, increasing their confidence, and strengthening self-efficacy. Remember that perception *is* reality, and unless students are faced with concrete data, they are inclined to function based on their own perceptions, perhaps oblivious to the reality of the skills that are needed for college success and what their own skills are.

Incentives can be provided to colleges that effectively serve AND graduate low income, first generation, and minority students. There is still too much stigma associated with working with these students and very little reinforcement or reward for effectively doing so. High schools and colleges can focus more directly on teaching thinking skills; ie, *how* to think, not *what* to think. Students need more experience learning how to analyze, evaluate and apply what they do know. They will benefit from familiarity with metacognitive skills so that they think about their thinking, the quality of their thinking, and how to improve their thinking. This means raising our expectations for students and teaching them the necessary cognitive discipline that is required for effective acquisition of critical thinking skills. I have wondered whether we assume students will acquire these skills independently since they are so often over looked and omitted from the curriculum in schools. I believe that many students will not

acquire effective critical thinking skills until they are specifically taught the skills and provided with the opportunity to apply them.

More significant, too many students have not had the experience, or the expectations, that they think for themselves. They have grown accustomed to “group think”, freeing themselves from the responsibility of independent thought. Paul and Elder (2009) address issues related to sociocentric thinking. They write, “Most people do not understand the degree to which they have uncritically internalized the dominant prejudices of their society or culture. Sociologists and anthropologists identify this as the state of being culture bound.... Sociocentric thinking is a hallmark of an uncritical society. It can be diminished only when replaced by cross-cultural, fair-minded thinking - critical thinking in the strong sense” (p. 22). We need to *teach* students not only *how* to think but also how to reflect and critically examine their own thinking. Not doing so implicitly suggests that it is acceptable not to question one’s own biases and stereotypes. Opportunities to reflect and to think critically have been minimized in too many schools yet they are necessary for the development of higher order thinking.

We can deemphasize the focus on and resultant significance of standardized test scores. These tend to be “middle class tests” and are biased against students from disadvantaged and minority families. As noted by The College Board (1999), a decade ago, “Not all students have the same educational opportunities. For some students, even surpassing the basic eligibility hurdle in order to be considered for admission at a selective institution represents a major achievement” (p. 34). We need to return to a point where we can focus on teaching and learning, not testing and test scores. We do need data, but not just for the purpose of identifying low and high scores, but to actually improve education. Hess (2009), in *The New Stupid*, writes “data driven management should not simply identify effective teachers or struggling students but should also help render schools and school systems more supportive of effective teaching and learning” (p. 16) Have we done that since the passage of NCLB in 2001?

The U.S. must actively address the specific issues associated with low income. Identifying many of the critical issues associated with the impact of poverty on academic achievement and Rothstein (2008), suggested the following in order to lessen the impact on education:

- Ensure good pediatric and dental care for all students
- Expand existing low income housing subsidy programs to reduce families’ involuntary mobility
- Provide higher quality early childhood care
- Increase the earned income tax credit, the minimum wage, and collective bargaining rights so the families of low-wage workers are less stressed
- Promote mixed-income housing development in suburbs and in gentrifying cities
- Fund after-school programs” (p 12)

Resolving some of the above issues for low income families will decrease the amount of funding needed as children mature. Early childhood services and programming should not be available only

to the middle class or wealthy. They are most needed by low income families where the impact will be the greatest.

It is known that it is easier to apply what one knows when the information is personally meaningful. When knowledge can be personalized and internalized it takes on more value and greater meaning. Application of knowledge strengthens value and meaning but we do not provide students with sufficient opportunity to use the process of application as they learn. Educators have become too satisfied with rote memorization and recognition of bits of isolated information needed for standardized testing. This pattern relies too heavily on lower levels of thinking. Schools need to focus more on teaching students how to analyze and evaluate their own thinking and to take ownership of its content and quality. Thinking and learning are not passive activities. Effective thinking takes practice and requires feedback so that students learn to distinguish between inaccurate or superficial thinking and valid, effective critical thinking. Our obsession with standardized testing moves us away from this focus. Sloppy or superficial thinking results in sloppy and superficial learning. More time spent on written language and oral communication will provide students with the experiences to recognize the weaknesses in their thinking skills and opportunities to strengthen them.

## **Conclusion**

We cannot continue to lose roughly 50% of our high school students to drop out status. Add to those numbers the 60-70% of students who begin college but do not graduate. Low income students are half as likely to graduate as upper income students. We need to equalize educational opportunities available to the poor and narrow the achievement gap between the classes. At the same time, decisions need to be made about what we want high school students to learn and to make sure those skills are being taught.

There are more concerns now than ever about preparedness of our students. Middle and upper income students from middle to upper upper middle class schools will be fine. That is, they will be fine as long as they are expected to think and are provided with opportunities to apply what they learn. Those who take college prep courses are even further ahead. But even these students, the middle class students from middle class schools, will struggle with college work if they are taught via primarily rote memorization skills and only lower levels of cognition. Content knowledge is certainly necessary but critical thinking, application of learning, and creativity are the keys to being prepared for the competitive world of work. Infants are born ready to learn and the natural curiosity and energy of young children lead them to explore and interact with their environment. They thrive when provided with opportunities to play; to be outside, use their imagination, and pursue their natural curiosity. They are born self driven and motivated to engage in social interaction. They are magnificent learners when given the opportunity to use what they are provided with at birth. As educators, we too often have restrained their natural desire to learn and to create by limiting their opportunities to explore and to pursue their own interests. We can do a much better job of actively engaging their minds. We can then continue that process of engagement into our middle and high schools. As a nation, we need to increase our expectations for all children, teach them how to think autonomously and confidently, and

allow them to creatively apply what they learn. Those activities will strengthen the cognitive abilities of all children and narrow the thinking gap that exists between high school and college.

No problem can withstand the assault of sustained thinking.  
Voltaire

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