A Comprehensive Process for Improving Student Performance

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Introduction

The challenges of a changing economy and society are well documented. Family life, the workplace, and community are all fundamentally different today than they were even 10 years ago. Because education is integral to maintaining society's cultural and structural stability, much of the responsibility for meeting and overcoming these challenges has been placed on our schools.

A "back to basics" rallying cry has ensued, but the skills that high school graduates – and all individuals – need for success in the 21st century information-based society are vastly different from those needed in the past. Unfortunately, the gap between the skills that curricula provide and the workplace of the future has only deepened. It is time for education to catch up with the real world. Much of today's K-12 curricula is still set up to support what is now an obsolete industrial era. Even the school buildings of 2007 generally look much as they did 50 years ago. We need to catch up.

To meet today and future challenges, education must break free of certain traditions, reign in the standards movement, and begin to really look at the learning styles of today's generation of students and alter instructional strategies to best meet their needs. Today's students are fundamentally different thinkers and learners than their predecessors. They require a highly rigorous and broad skill set to be work-ready upon graduation. Schools must develop a culture of excellence that challenges every student to acquire the critical thinking skills to achieve rigorous and relevant standards. They must develop relevant curricula to inspire students to excel.

While we often hear the call for rigor and relevance, leaders frequently are adding a third "R" and calling for schools that aspire to "rigor, relevance, and relationships" to address the increasing recognition about the critical importance of relationships to learning. It is impossible to forecast exactly where the future will take us, but it is obvious that as technology continues to evolve, it also will continue to alter and shape the workplace and our homes, personal lives, and education systems. This paper presents a number of initiatives, tools, and methodologies that can help schools and communities develop a process for change to improve education for our youth and move the educational experience into the age of technology and the global community.

Pressure for Change

The changing nature of work, technology, and competition in the global job market continues to widen the gap between the demands of school and the demands of life beyond graduation. Since the U.S. government-commissioned report *A Nation at Risk* was released in 1983, American schools have experienced increasing pressure from government and business leaders to raise academic standards for all students. Advancements in technology over time have shown that a quality education prepares students to enter the global economy with the ability to apply what they learned in school to situations that they cannot foresee before graduating. This is a true indicator of academic excellence. Few schools in the United States have been successful in restructuring their systems process to produce work-ready high school graduates.

Four major trends must be acknowledged and addressed to ensure that our nation and our students are prepared to meet the challenges of the near and distant future: technology, globalization, demographics, and the changing nature of work.

Technology

A recent issue of *USA Today* listed a number of inventions and gadgets that have drastically changed our lives over the last 25 years. Who in the 1970s or early '80s could have dreamed that such things as cell phones, laptop computers, debit cards, iPods, digital cameras, Doppler radar, and other high-tech items would be so commonplace? Obviously, some very bright people did, and many – such as Bill Gates, to name just one – are American. But how well is the United States positioned to cultivate that innovative spirit in young people today?

In the 1980s, Japan was America's leading global competitor. Today, the competition has extended to India, China, Eastern Europe and beyond. In the 21st century, science and engineering have become the cornerstones of what one must know and be able to do, but the United States is being outpaced dramatically by other nations. The decline of American enrollment in science and engineering fields concurrent with the increasing demand for professionals in these fields places the United States at a huge disadvantage in the global marketplace. Continuation of these trends could result in severe human and economic consequences for this nation.

Writing in the December 2005/January 2006 issue of *Educational Leadership*, Mark Prensky refers to today's kindergarten through college students as "digital natives." These students are the first generation

to grow up with the culture of computers, videogames, iPods, PDAs, and all of the other gadgets of the Digital Age. Anyone about 25 years or older is somewhat of a technology immigrant, having had to learn the language of new technologies in order communicate using such things as blogs, wikis, tagging, text messaging, MySpace, or podcasts. Today's students, immersed from the beginning in this technology-rich environment, are fluent in the many electronic tools and facets.

Advancements in technology will continue to accelerate. Research and development in the information technology sector will allow computers to run faster and diversify remote, digital processing capabilities. These technologies are geared toward the aptitudes and interests of the "Millennials" or "Net-Generation." Already, the startling impacts of such technology are evident in many fields, including biotechnology and nanotechnology.

In June 2000, advanced technology made possible an unparalleled scientific achievement: decoding of the human genome, the complete letter-by-letter sequence of genetic information that defines human life. That monumental breakthrough opened the door for other achievements in the rapidly growing field of biotechnology. Biotechnologies on the horizon include such things as machines that efficiently convert different human blood types into a neutral, or universal, type, thereby significantly reducing blood shortages, especially in large-scale emergencies. Scientists are using nonembryonic, adaptable stem cells to repair damaged tissue. These cells also may be engineered to grow replacement organs such as bladders, skin, and even hearts. A genetically engineered "light switch," which lets scientists turn selected parts of the brain on and off, may help improve treatments for depression and other disorders.

Nanotechnology has taken the idea of functional clothing to a new level. Fashion designers and scientists at Cornell University have created a dress that destroys bacteria and viruses and a jacket that shields against smog, noxious gases, and allergens. IBM has combined the self-assembling process of nanotechnology to conventional chip manufacturing. Researchers at the company have been able to harness nature's pattern-creating process, through which seashells, snowflakes, and tooth enamel are made, to form trillions of self-assembling nanoscopic pores. The pores create insulating vacuums around miles of nanoscale wires crammed next to each other inside computer chips. The process allows computer chips to flow 35 percent faster than the most advanced conventional chips. IBM expects to use the process to make chips by 2009.

The practical applications of such technology are far-reaching. A liquid made of nanoscale protein fragments, or peptides, has been engineered to stop bleeding almost instantly, for example. Under

conditions like those inside the body, the peptides self-assemble into a fibrous mesh, which to the naked eye, appears to be a transparent gel. This could be invaluable in operating rooms, at accident sites, or in the battlefield.

Researchers at Massachusetts Institute of Technology have developed novel "homing" nanoparticles that could help identify tumors via cancer imaging and then deliver chemotherapy locally. A key feature of these nanoparticles is that they mimic blood platelets, which flow freely in the blood and act only when needed by zoning in on injured blood vessels and accumulating there to form clots. Similarly, these new nanoparticles could lock in on particular features of tumor blood vessels to deliver treatment or choke off the blood supply to a tumor. In addition, by slipping through tiny gaps in fast-growing tumor blood vessels and then sticking together, the particles could create masses with enough of a magnetic signal to be detectable by magnetic resonance imaging (MRI).

Researchers at the University of California, Riverside, are developing nanodevices that can "listen" to the subtle cues that cancerous cells emit. The research is based in part on microelectrical arrays, thin metal plates about the size of a human hair in diameter, which are used to sense the electrical activity from different types of cells. The technique allows scientists to differentiate cells from various parts of the body as well as cancerous cells from healthy ones.

As part of the National Cancer Institute's $144.3 million, five-year initiative to incorporate nanotechnology into cancer research, scientists also are developing drug-delivery systems based on nanotubes in conjunction with microelectrical array devices. Researchers already have identified electrical activity differences among certain cells and have created a library of signature patterns. The objective of the research is to replace the standard practice of injecting what often are toxic dyes into cells to find out which ones are cancerous.

Interestingly, in the United States, students appear to be learning the majority of their technology skills in extracurricular settings rather than through formal schooling. Certainly, students continue to receive the requisite rigor of core subject matter in schools, but the skills they need to compete in the information age – relevant 21st century skills such as critical thinking, problem solving, and effective communication – seem to be more often acquired outside of the classroom. Through technology, millions of students from developing countries around the world now have the ability to develop this skill set, essentially leveling the global playing field. American high school graduates can no longer boast of an unparalleled education as theirs is not even near the top, as evidenced by comparative international assessments. One thing is

certain, however: technology will continue to advance at an accelerated pace. Will American students have been given opportunities to meet the demand, thus securing this nation's standing as the global leader?

Globalization

Developing nations in Asia and in other areas of the world place a premium on educating students to excel in industries that will drive the future global marketplace. While the number of scientists and engineers who graduate from Indian and Chinese universities is increasing, American universities are awarding fewer degrees in science and engineering every year, and many of those go to international students. Higher education in the United States continues to have excellent standing worldwide, but increasing numbers of foreign students are taking their diplomas back home, some because they believe their quality of life will be better and some because they cannot obtain visas to remain in the United States to work.

While it is the highest honor for a Chinese, Indian, or Eastern European student to land a job in a science or technology field, many American students seem to believe the stereotype that science, technology, engineering, and mathematics are fields populated by geeks or nerds. This is a big problem in a country that built itself up as a global superpower on the shoulders of culture that prided itself on its innovative spirit.

The United States remains unsurpassed in research and development, but that will change if we cannot recruit, educate, and keep talent within our borders. Countries whose economies are growing two or three times faster than ours can offer opportunities for elite students that are too tempting to pass up. In India, wages for skilled workers is a fraction of that for a comparable job in the United States, so it is no surprise that many major American companies, such as Microsoft and Intel, are investing there; it makes good business sense. In the last four years, IBM has invested $2 billion in research and development in India, where it has about 43,000 employees. In the next two years, the company will invest another $6 billion.

The exportation of American technological leadership signifies the beginning of a new world order. The U.S. economy will suffer while historically poor countries grow richer, distributing wealth more evenly around the world. Traditionally poorer countries, such as Vietnam, China, and India are doing very well these days. China is the world's largest holder of foreign exchange reserves, which approached $1 trillion in 2006. Trade between China and India is growing more than 40 percent annually and, this year, China will unseat the United States as India's largest single-country trading partner.

In 2004, Shirley Ann Jackson, president of Rensselaer Polytechnic Institute in Troy, New York, and past president of the American Association for the Advancement of Science, said "The United States is still the leading engine for innovation in the world. It has the best graduate programs, the best scientific infrastructure, and the capital markets to exploit it. But there is a quiet crisis in U.S. science and technology that we have to wake up to. The U.S. today is in a truly global environment, and those competitor countries are not only wide awake, they are running a marathon while we are running sprints. If left unchecked, this could challenge our preeminence and capacity to innovate."

Presently, our ability to innovate remains unsurpassed, especially in the information technology sector with such giants as Google, Microsoft, Cisco, IBM, and Intel leading the way. And while these companies have business investments overseas, they are based in the United States, where the highest paying jobs are. President Jackson explains that the American standard of living will not disappear overnight, but the shrinking pool of scientists and engineers possessing the ability to innovate and discover will eventually have critical consequences.

In 2004, Congress cut the 2005 budget for the National Science Foundation (NSF) by 1.9 percent, or $105 million dollars. Created by Congress in 1950, NSF is an independent federal agency whose mission is "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense..." NSF is an influential agency that strives for the betterment of science education and technology research in the United States. The fact that its budget has been continually cut is indicative of the misplaced values that permeate this country's attitude toward science education.

Demographics

In 1900, the typical American employee worked until he or she died. The average life expectancy was 47 years. Life expectancy began to increase considerably, however, during the 20th century. When Social Security was implemented in the 1930s, a retirement age was set at 65. This age was still well beyond the average life expectancy, so most people still worked until death. What the retirement age did accomplish, however, was to keep the American workforce fluid by continually pumping new employees into the jobs vacated by retirees as well as those who died. This model is not true today, however. With baby boomers retiring and becoming eligible for federal retirement benefits in the next few years, the balance that kept Social Security running in the past will be tipped. In 1950, there were 16 people working for every person drawing Social Security benefits; by 2030, only about two people will be working for each beneficiary.

Today the minimum retirement age to collect Social Security is 62; however, the average life expectancy is up to age 78. Prolonging life is a result of advancements in healthcare and medicine. Experts in geriatrics and genetics expect the increase in longevity we experienced during the last century to continue throughout this one. Even greater advancements and breakthroughs in healthcare and pharmaceuticals have the potential to keep the average American alive, on average, to the ripe old age of 107 by the year 2100. Modern medicine, however, is less able to promote healthy aging. It is possible that today's Americans will spend more years caring for their parents than for children. By 2040, it is estimated that 5.5 million Americans will live in nursing homes and another 12 million will require ongoing home healthcare services

What implications do these trends suggest? The only trend that remains somewhat static is the current average retirement age, which has gone down slightly. By the end of this century, if the average American begins to work at age 21, retires in his or her 60s, and lives to age 107, he or she will spend more time in retirement than in the active workforce.

By 2008, the oldest of the baby-boom generation will be 62 years old, marking the first wave of early retirees from the largest generation in U.S. history. With so many workers phasing out of the labor force and not enough new talent entering, many of the nation's leading financial experts see dark days ahead for the American economy. The fast-rising costs of healthcare benefits for retirees coupled with the strain that baby boomers will place on the Social Security system and the high cost of many existing pension plans, place these systems in severe fiscal jeopardy. In New Jersey, for example, a prominent council member who oversees investments by the state's pension funds concluded that the state had been purposefully underestimating how much money it should have to pay for retirement benefits promised for state employees. New Jersey's most recent bond-offering statement calculated an $18 billion deficit but the figure is more realistically calculated to show a $56 billion deficit. State workers are now considering whether to ratify a tentative labor contract that would require employees to increase their contributions to the state pension fund, while also raising the retirement age for new employees from age 55 to age 60.

There is a growing divide between the rich and poor in the United States, as well. It is not a divide between upper, middle, and lower classes, however, but more of a generation gap. Since 1989, nearly all additional wealth generated in the United States has gone to people age 55 and older, according to Federal Reserve data. Households owned by people in their 20s, 30, and 40s have struggled to keep up with inflation and individuals ages 30 to 50 have lost wealth since 1989 after adjusting for inflation.

The fiscal woes of Social Security and Medicare have been well documented. Increasingly, they are functioning as a transfer of money from the lesser affluent younger generations to the already wealthier older generation. Because the baby boomer and older generations have not set aside enough funds to cover the promised benefits and pension plans, the younger generations will be forced to cover the difference or the elderly will be forced to relinquish some of what has been promised to them. Over the next 75 years, the shortfalls of Social Security and Medicare are estimated at $340,000 per household, far in excess of the wealth of every age group. Rather than accumulating wealth, like generations before had the opportunity of doing, younger people will spend their long lives struggling to get out of debt.

The Changing Nature of Work

The importance of providing students with the rigorous and relevant education they need to not only survive but to thrive in the global economy cannot be overstated. The skills needed today are not the same as they were 50, 10, or even five years ago. The Information Age is about continuous progress and innovation. The externalization, standardization, and collaboration that technology fosters essentially make the world a smaller place. When we consider that computers are becoming more "intelligent" and less reliant on human interaction, it is apparent that the need for low- and medium-wage earners is declining dramatically in the United States.

One sector of the U.S. population that understands the dynamics of competition at the national and global level and the challenges America faces is the business community. The economic trends became evident in the early 1980s, with the dramatic decline in the number of unskilled jobs. Jobs that were once routine and sequential have been eliminated or replaced by technology that speeds production and reduces costs. Furthermore, the ease with which information can be shared allows businesses to outsource work overseas with a high-quality, low-cost return. Medium wage, high-skill jobs are the standard for today's global economy. Unfortunately, the high cost of American labor, coupled with the vast amount of money required to support an aging population, makes outsourcing desirable to American companies.

Yet, although technology is able to perform more complex processes, it cannot apply relevance to the mechanical task of information processing. We still need people to use the information that technology produces and to critically apply the data. Furthermore, computers do not invent themselves, so people with the technological know-how to design the mechanisms by which technology runs are essential.

To be competitive and marketable in the global economy, a high school graduate must be capable of reflective thought, able to think critically rather than merely problem solve basic problems. Students

today are good at solving problems, especially by using technology to assist them, but they are not learning the critical thinking skills used in reflective thought.

School buildings look about the same as they did 50 years ago and so does the education system model most schools are using. If American students are going to be able to compete and be successful in the 21st century workplace, schools must develop the processes and critical skills that students need in order to carry on the culture of innovation and creativity that built our nation up in the last century.

Challenges to Change

Overcrowded Curriculum

When everything is a priority, nothing is a priority. Traditionally, American schools have presented an overabundance of knowledge-driven material to be taught. With so little or no time to effectively plan instruction that is both rigorous and relevant, students do not have the opportunity to develop the process skills or sense of relevance needed to apply such knowledge to practical situations. These skills are essential for success in postsecondary studies and adult roles.

Traditionally, the reflex response to teach modern-day skills and knowledge to students has been to stuff the curriculum with more content standards. Nothing is ever taken off the plate, however, and little or no time is allotted for teachers to provide students with the critical-thinking skills that enable students to engage and apply the standards content in meaningful ways.

Teachers need a clear way to help differentiate among curriculum topics that are essential for all students and those that are merely nice to know about. The International Center's Curriculum Matrix resource, which includes comprehensive research on essential skills in the core areas of English, mathematics and science, can be used as a road map that to lead to more targeted instruction and assessment. A later section of the paper will describe how the International Center's ongoing National Essential Skills Study (NESS) will produce data to further help answer the question "What should I teach?"

Since the government enacted the *No Child Left Behind Act of 2001* (NCLB), virtually every state has raised its graduation requirements and intensified its testing program. "Back to basics" has become a rallying cry. But these efforts have concentrated on the same academic, theoretical, abstract teaching areas that caused the education crisis in the first place. What is taught in schools and the way instruction is organized and delivered often do little to prepare students to assume their adult responsibilities.

The organization of U.S. schools and American culture have become the biggest obstacles to school reform and higher standards. Offering discrete courses taught in isolation, with little connection to other subjects or other learning, may be compatible with teacher training and certification, but it bears no resemblance to the integrated way knowledge is used in life.

Although high-stakes state assessments and teacher accountability were intended to increase student proficiency, this initiative has backfired on a number of fronts. When schools focus on getting at-risk students to pass tests, so much time is wasted in test preparation that more essential subject matter, those things not tested, is neglected. This is a disservice to students. Although more of them may pass the tests, they are merely becoming test ready rather than workplace ready.

Furthermore, as a society, we have come to view preparing students for college as the primary goal of K-12 schooling. Yet, while the level of skills needed for employment climbs every year, requirements for college entry stay the same — or even diminish — in years when demographics produce a dip in the number of high school graduates and many colleges struggle to fill seats.

Skills Gap

Based on the rapid pace at which society is changing at the global level, it is imperative for the United States to consider what actions to take to remain a viable world presence. More and more, the American public points to education as the answer ... or part of the problem. The Trends in International Mathematics and Science Study (TIMSS) has shown American students to be only average among participating nations. The gap between technology and education continues to widen in America because education in this country is not adapting to societal changes. Perhaps the added scrutiny about education will, in the end, help create the spark that ignites a renaissance for America, just as it did more than a century ago when the United States was beginning its rise to world prominence.

Looking back to the late 19th century, America was emerging from an agrarian-based economy and culture. The rural landscape was home to a large portion of the population, and the vast majority of workers were self-employed or worked for small companies or on farms. When the Industrial Revolution hit and factories became the economic focus of the country, workers flocked to urban centers to seek employment. It was apparent that more leaders were required to keep pace with the changing climate of business, urban infrastructure, and cultural diversity. In 1893, the Committee of Ten was appointed to conceptualize how American schools should be structured to meet the demands of the time.

In the agrarian economy, most children completed their formal schooling by age 14 in order to begin working full time. They did not need additional book learning to succeed. The change to an economy based on manufacturing required more young people to be educated to assume leadership positions not only in industry, but in government, business, and communities. The Committee of Ten raised education standards and extended the years of schooling for a select 15 – 20 percent of young people, thus putting them through the equivalent of today's high school-level education.

The committee's select-and-sort methodology was effective. The United States was the world leader in manufacturing throughout most of the 20th century. As the century drew to a close, however, it was apparent that the United States was not the economic monolith that it had been. At the same time, society was experiencing another significant upheaval in form of the Information Age. Technology abounded around us, most people were employed in large companies, and we began to see a growing economic threat from other parts of the world.

Whereas the Committee of Ten promoted a methodology of raising standards for a select few, the publication of *A Nation at Risk* accentuated the need to provide all students with an academically rigorous and relevant education. Just as the education system designed for the agrarian calendar made little sense in the industrial age, the education system of the industrial age makes no sense in today's information-based society. Tinkering at the margins will not help us to achieve our mission of effective change. Schools need to fix the antiquated systems model if they are serious about getting all students to the high standards necessary for them not only to compete but to excel globally.

System Models: Schools vs. the Real World

The American education system is just that: a system. Improving the system requires changing the inputs or changing the process. Yet, education is unlike any other system in the United States; it is a system with certain constraints that other industry models do not have. The desired output for the education system is work- or college-ready high school graduates who have received a rigorous and relevant education. However, the education system inputs are students – real people who cannot be changed or discarded because the United States is committed to providing all children with access to an education.

The American commitment to equity and excellence sets it apart from the many nations that select only the best and brightest to educate. Therefore, if we intend to better prepare high school graduates for college or work, the only feasible way to do this is to change the process of the education experience. To

effectively do this, it is important to understand fully that which cannot be altered: the students and the high standards of the global economy.

Schools vs. Students

A school's success is primarily dependent upon student learning, which is influenced by three primary factors:

1. what is taught
2. students' willingness and ability to learn
3. how things are taught

In the quest to raise standards in schools, we, as a nation, have become fixated on what to teach with a focus on what can be assessed. We have not paid enough attention to students' willingness and ability to learn and how we should teach to their learning styles. Yet, these factors are the basis of effective instruction.

Instruction needs to be focused on how students learn. Students today learn differently because they have been "wired" differently. The ubiquitous technological environment in which they have grown up and engaged in for their entire lives has had a profound impact on the way they think, learn, and interact. How successful a school is in teaching today's students depends on a clear understanding of how youth learn from early childhood through adolescence.

In recent years, research on how the brain develops has grown significantly. For example, through MRI advancements, scientists have discovered a wave of massive proliferation of gray matter in children between the ages 6 – 12. During this time, children develop enormous brain capacity to learn in many areas. It is also a time when children transition from being highly skilled dependant learners to novice independent thinkers.

The proliferation of gray matter is followed by a pruning period that lasts for several years. Pruning, also known as the "use-it-or-lose-it" phase, is a time when neurons that are frequently stimulated make connections with other neurons, allowing for growth, while neurons that are idle, wither and die. Nobel prizewinning neuroscientist Gerald Edelman has described this process as "Neural Darwinism." Once the first connection is made, subsequent transmission will become faster and more efficient, resulting in greater long-term memory.

Research further indicates that the prefrontal cortex – the region of the brain that performs executive functions such as making sound decisions, setting goals, planning and organizational strategies, multi-tasking, impulsivity, and self-control and emotional control – does not fully develop until early adulthood. Unfortunately, teenagers are put in situations daily where they are expected to demonstrate adult-like organizational and decision-making skills when, in fact, they are not biologically prepared to do so. The good news is that these skills and functions improve significantly with age and experience. Adults who demonstrate patience and understanding with teenagers create an environment that allows students to become more skilled in managing their behaviors and decisions. Such an environment also helps to build trust and lasting relationships.

Another region of the brain that plays a significant role is the amygdala. This area is often referred to as the emotional center of the brain because of its control over "gut" reaction and the so-called "fight or flight" response. Emotional response and irrational behavior, characteristics of the adolescent, have long been blamed on raging hormones, but recent science has added brain development into the mix. MRI has shown that hormones released from the adrenal gland work their way to the amygdale, causing flare up, which results in frequent emotional outbursts and often tempts adolescents to seek out exciting and thrilling experiences. Research suggests that the emotional center of the teen brain holds control over the more rational prefrontal cortex. This results in teenagers responding to situations with more emotion and gut reaction instead of with more executive, thoughtful, and measured responses.

Technology and science have provided educators with a map of the adolescent brain and an explanation of how this complex organ works. This knowledge will empower teachers to make curricular and instructional decisions that have effective impacts on learning. It also challenges them to provide stimulating instruction and activities that will foster learning for every student in class. To meet these challenges, educators must:

- provide flexible and safe environments that encourage students to challenge themselves without the fear of failure
- develop rigorous and relevant curricula and use instructional techniques designed to meet students' varying abilities
- involve students in the collaborative establishment of classroom rules and procedures
- encourage exploration of creative alternative solutions to school and classroom tasks
- thoroughly explain the complex development and function of the brain so students can understand the situation that they are in and help identify many of the major obstacles and challenges students will face
- foster a supportive environment that will allow for trial and error
- use multiple assessments – such as portfolios, rubrics, teacher observation, and student performance – to gauge student success and academic development
- encourage and allow for children to develop individually and at their own paces

- use cooperative learning and activities that stimulate positive student emotion, such as debates and real-world experiences
- understand that state assessments are a starting point, not a finish line.

The Solution

Throughout the United States, many schools are working diligently to improve education practices. At the heart of these improvement efforts lies a strong commitment to meet the needs of learners, to satisfy the mandates embedded in NCLB, and to raise scores on standardized tests in all academic areas. It is frustrating, however, if schools embrace this goal without a systematic approach in measuring student learning, setting goals, monitoring progress, and recognizing successes.

Some school improvement initiatives are carefully constructed, viewed appropriately through the lens of a school's mission, driven by data, and accountable to multiple stakeholders. Other initiatives, however, are not so meticulously conceived. Rather than allowing data to drive goal setting and decision making, some schools are still guided by good intentions, hunches, and impressions. Often, these schools inadvertently lose sight of learners' needs as they struggle to ensure compliance with state regulations.

The International Center's Learning Criteria to Support Rigor, Relevance, and Relationships is one tool that supports school improvement processes through a stepwise data collection and analysis process. In the hands of a thoughtful and broad-based school leadership team, the Learning Criteria framework helps schools clarify their missions, prioritize problems and interventions, and critically review school performance. Further, these analyses provide critical rationales for establishing goals and developing action plans. Most importantly, the data generated by the Learning Criteria reflect the needs of learners in ways that less complex and more traditional measures overlook. The framework is designed to provide a robust, comprehensive, and detailed portrait of school performance that clearly maps out a route for school improvement efforts.

Increased expectations and testing demands have placed a heavy burden on schools. The Learning Criteria accounts for both expectations and demands and, simultaneously, breaks new ground in the territory of school improvement in that it redefines school success in terms of what is unique to each school, in terms that meet standardized test measures of school success, and in terms that reveal the school environment in all of its complexity and depth.

An Overview of the Learning Criteria

The Learning Criteria is arranged in four data categories that educators can use to determine the success of their school in preparing students for current assessments as well as for future roles and responsibilities. A school should have data indicators in each of the categories listed. At least one indicator in each category should apply to a school's entire student population.

1. **Core Academic Learning** refers to achievement in the core subjects of English language arts, mathematics, science, and other subjects identified by the school. Sample data indicators include:
   - percentage of students meeting proficiency level on state tests (required)
   - average scores on ACT/SAT/PSAT tests
   - achievement levels on standardized tests other than state exams
   - percentage of students requiring English/mathematics remediation in college
   - follow-up surveys of graduates' academic achievements
   - percentage of students graduating high school in four years
   - percentage of students earning a college degree within four years after high school completion
   - military ASVAB score

   The International Center believes that core academic learning and state testing are essential, but not adequate. It defines the problem, not the solution, and predominantly represents Quadrant A learning on the Rigor/Relevance Framework (see Appendix A).

2. **Stretch Learning** refers to the demonstration of rigorous and relevant learning beyond minimum requirements through participation and achievement in higher level or specialized courses. Sample data indicators include:
   - number of credits required to graduate
   - average number of credits earned at graduation
   - interdisciplinary work and projects, such as a senior exhibition
   - participation/test scores in International Baccalaureate courses
   - average number of college credits earned by graduation through dual enrollment
   - enrollment in advanced mathematics or science courses
   - enrollment in Advanced Placement (AP) courses, scores on AP exams, and percentage of participants achieving a score greater of three or higher on a five-point scale
   - percentage of students completing career majors or career/technical education programs
   - four or more credits in a career area
   - four or more credits in arts
   - three or more years of foreign language
   - value of scholarships earned at graduation
   - achievement of specialized certificates (e.g., Microsoft, Cisco Academy)

   Stretch learning is the most difficult of the criteria because it compels schools to define how they are stimulating and stretching each student and not just the best and brightest. It challenges a school to find data to validate the claim that "all students will …" If schools are truly stretching them, students

will spend most of their time in Quadrants C and D of the Rigor/Relevance Framework (see Appendix A).

3. **Student Engagement** is the extent to which students (1) are motivated and committed to learning, (2) have a sense of belonging and accomplishment, and (3) have relationships with adults, peers, and parents who support learning. Sample data indicators include:

   - student satisfaction surveys
   - student risk behaviors
   - drop-out rate
   - attendance rate
   - graduation rate
   - discipline referrals
   - participation rates in extracurricular activities
   - follow-up survey about enrollment in higher education
   - percentage of students taking ACT or SAT
   - tardiness rate
   - surveys about degree to which teachers know their students
   - surveys about positive peer relationships
   - percentage of students going to two-year colleges
   - percentage of students going to four-year colleges

   Students need to be engaged before they can apply higher order, creative thinking skills. They learn most effectively when the teacher makes sense and meaning of the curriculum material being taught. This can only happen if the teacher has created a safe learning environment that encourages students to meet challenges and apply high rigor skills to real-world, unpredictable situations inside and outside of school.

4. **Personal Skill Development** includes (1) measures of personal, social, service, and leadership skills and (2) demonstrations of positive behaviors and attitudes. Sample data indicators include:

   - service-learning participation
   - students holding leadership positions in clubs or sports
   - assessment of personal skills, such as time management, ability to plan and organize work, leadership, being a team player, etc.
   - respect for diversity
   - teamwork
   - trustworthiness, perseverance, other character traits
   - conflict resolution
   - reduction in number of student incidences of conflict
   - follow-up survey of graduates about development of personal skills

   Think about a son or daughter's new friend. Are you more concerned about the friend's grades or his or her character qualities? Personal skill development gets to the heart of what makes a citizen, friend,

or community member. What are schools doing to promote these qualities? Are they making leadership opportunities available for all students? Are they creating a curriculum that teaches these skills and making them graduation requirements?

Literacy Is Key

Valued employees in the 21st century are creative problem solvers and adaptive to change. They interact fluidly with ever-changing technology, communicate, collaborate, and are highly literate. Employees in most occupations regularly handle forms of text and writing that lead to actions necessary to complete work, communicate, be safe, acquire information and goods, establish relationships, and collaborate.

The Lexile Framework® for Reading

The International Center has researched the level of reading the real world demands using the Lexile Framework® for Reading. This innovative approach to reading comprehension, developed by MetaMetrics, is being widely adopted and implemented in schools across the United States. Lexile measures, as components of the incremental Lexile scale, measures both text difficulty and reader ability. This enables readers to be matched with books that are appropriately engaging and challenging.

Unlike grade equivalent measures of readability, the Lexile scale is based on uniform increments from 200L to 2000L. Using this scale, an increment of 100L is constant in terms of increase in semantic and syntactic complexity; a one-grade difference expressed in grade equivalents, however, is not. For example, the difference in reading difficulty between 3.2 and 4.2 may be much greater than the "one-grade" difference between 9.2 and 10.2. Moreover, Lexile measures avoid the problem of labeling reading expectations for a particular grade level; referencing Lexile measures also reinforces the notion that reading abilities differ broadly within any grade.

Findings of a comprehensive research study using the Lexile Framework were reported at the 2003 Model Schools Conference. The findings showed a gap between the average student's reading level and real-world reading requirements. The greatest gap among texts analyzed was between the reading requirements of workplace materials and literature assigned in schools. The International Center conducted a detailed study of the readability levels of a wide array of print materials encountered in the workplace. These occupational reading materials were linked to the U.S. Department of Education's 16 Career Clusters at three job levels: entry, intermediate, and advanced. The International Center's Lexile analysis showed that a large number of entry-level jobs have higher reading requirements than that required for high school graduation.

In 2006, the International Center concluded a new round of research using the Lexile Framework with more than 60 Successful Practices Network (SPN) high schools. As part of the study, the International Center asked the SPN schools to submit a variety of reading samples used in their classrooms, such as high school literature and textbooks and first-year college literature and textbooks, as well as reading materials found in their community, including armed forces texts, entry-level occupational texts from local businesses, and personal-use or adult-roles texts, such as tax forms, insurance policies, and loan applications. The study shows that a reading gap still exists. Table 1 shows the interquartile (middle 50 percent) range of Lexile measures (25^{th} percentile to 75^{th} percentile) of the texts analyzed as part of this study.

Table 1
Interquartile Ranges of Lexile Measures
(25^{th} to 75^{th} Percentile)

Sample Group	Interquartile Range of Lexile Measures
High School Literature	730-960L
First-Year College Literature	815-1050L
High School Textbooks	960-1140L
First-Year College Textbooks	1095-1320L
Armed Forces Texts	1170-1225L
Personal-Use/Adult-Roles Texts	1160-1358L
Entry-Level Employment Texts	1170-1380L

From this list, it is easy to see the reading challenge: even more so than post-secondary education, the real world requires substantially higher levels of reading proficiency than most students possess. States need to be sure that the reading proficiency levels they set under NCLB account for not just traditional academic measures of reading competence, but also the skills that make individuals employable and poise them for success in their lives after graduation. This broader view of reading competency is an example of the academic proficiency that must become part of program improvement under NCLB.

The Need for DTQ Literacy

One of the key challenges schools face is to redefine what it means to be literate today. The future requires students to function in multiple jobs in a global economy filled with diverse workers and as yet unimagined work and lifestyles. This requires a foundation in literacy that is different from that of the last century. The 21st century demands people who can read, write, speak, and listen so they may do and create, not just understand.

The business community has long identified inadequate reading proficiency as a leading problem among entry-level employees. Educators have attempted to solve the problem by assigning more reading, mostly literature. The problem with this is twofold.

First, assigning more reading usually will not result in higher reading proficiency. Second, prose is not read in most workplace situations. Students need to be exposed to a variety of texts, not just from other content areas, but from career and technical education courses, personal-use or adult-roles texts, and sample occupational materials. The modern definition of literacy needs to encompass far more than just prose; students need to be exposed to high levels of document, technological, and quantitative literature to be successful in the workplace of the present and future.

Literacy in the context of work requires better reading skills for understanding documents and technological and quantitative (DTQ) materials:

- **Document literacy** involves the skills needed to perform tasks associated with nonprose-based charts, maps, graphs, forms, tables, photos, video, Internet sources, and other visual materials. Technological and quantitative forms of literacy support document literacy.

- **Technological literacy** refers to the ability to comprehend, use, solve, and create with Web-based information and sources, video-based information, or other multimedia information sources.

- **Quantitative literacy** involves the use of materials or sources that require mathematical understanding and the ability to solve problems or calculate answers.

Less is More – The National Essential Skills Study (NESS)

The International Center for Leadership in Education is conducting a nationwide study – the National Essential Skills Study (NESS) – to identify the most essential skills and knowledge in the core areas of English, mathematics, science, and social studies. Essential skills are those that all students should master in order to be successful after they graduate from high school and move forward into postsecondary

studies, careers, and other aspects of life as productive adults and citizens. NESS is designed to enable schools or districts to address a common concern in the United States today: the overcrowded curriculum.

The topics compiled for each content area in the study were adapted from national standards as identified by the National Council of Teachers of English, National Council of Teachers of Mathematics, National Research Council, National Council for the Social Studies, and from various state standards. All topics also have been reviewed by teams of subject specialist teachers from several states.

NESS is an updated version of the International Center's 1998 Curriculum Survey of Essential Skills that also has been expanded to include social studies. In recent years, the demand to improve social studies instruction has increased as a result of a world economy that is becoming more interdependent. More than 20,000 educators, parents, businesspeople, and other stakeholders responded to the 1998 survey. Those results were compiled into three lists of the most valued and highly ranked skills in English language arts, mathematics, and science.

NESS will reveal which topics are ranked nationally as the most important curricular content in terms of rigor and relevance. A school or district can compare its local results to national results and engage faculty and the community in discussions about curricular changes needed to enable all students to achieve high performance in the essential skills. Topics identified as low priority would not necessarily be omitted from the curricula, but could be incorporated into instruction of the essential topics.

The January 2000 results from the 1998 study have been used by districts and schools to identify the most essential curricular content on which to focus instruction. Data collected are used in the International Center's Curriculum Matrix, which identifies each state's most tested standards and performance indicators in its assessment program and crosswalks them to the essential skills.

Table 2 shows preliminary figures – as of June 6, 2007 – for the NESS in the four subject areas. The five highest ranked topic statements (skills) identified by all participants who completed each survey are presented. Also shown are the relative rankings of the skills by the various cohorts that participated: Business/Industry, Other Non-educators, subject area Educators, and Other Educators.

Table 2
Preliminary Results of Rankings from the 2007 National Essential Skills Study

English Language Arts Topic Statements	National Rank	Business/ Industry	Other Non-Educators	English Language Arts Educators	Other Educators
Apply writing rules and conventions, (grammar, usage, punctuation, sentence structure, and spelling)	**1**	1	1	1	1
Read for main ideas and supporting details and discriminate important ideas from unimportant ideas to aid comprehension	**2**	3	2	2	2
Follow oral directions	**3**	5	4	8	3
Use resources (dictionary, grammar books, thesaurus, online references, etc.) as needed to edit	**4**	7	3	7	4
Develop processes or techniques for building vocabulary, decoding unfamiliar words/texts, and understanding or remembering information by using such strategies as context clues, word structure, letter-sound relationships, word histories, and mnemonics	**5**	11	6	4	5

Mathematics Topic Statement	National Rank	Business/ Industry	Other Non-Educators	Mathematics Educators	Other Educators
Perform operations fluently with positive and negative numbers, including decimals, ratios, percents, and fractions, and show reasoning to justify results	**1**	1	1	1	1
Understand and apply basic algebraic properties (commutative and associative laws of addition and multiplication, distributive law of multiplication over addition, and identities and inverses)	**2**	2	2	11	2
Use proportional reasoning to solve real-world problems	**3**	7	8	2	4
Understand the properties of and apply parallel, perpendicular, and intersecting lines in problem-solving situations	**4**	4	3	8	3
Simplify and solve algebraic equations by identifying and using the correct order of operations and techniques necessary to carry out the solution	**5**	8	5	7	8

Science Topic Statement	National Rank	Business/ Industry	Other Non-Educators	Science Educators	Other Educators
Know and apply the principles of scientific inquiry for generating knowledge, including prediction, estimation, developing hypotheses, drawing conclusions, evaluation, and following ethical principles and professional procedures	**1**	1	1	1	1
Identify and understand the structure and parts that compose the human body systems (e.g., cardiovascular, nervous, reproductive, lymphatic, muscular regions)	**2**	2	4	2 tie	2
Use the Scientific Method to collect data and draw conclusions. Understand that all scientific conclusions and theories are subject to modification as new data are collected and reviewed publicly by peers and that all scientific ideas must satisfy common criteria including the ability to be tested	**3**	4	3	2 tie	3
Make observations and accurate and precise measurements using senses, tools, and technology	**4**	8	6	3	5
Examine how natural events cause environmental change and impact populations	**5**	7	8	9	6

Social Studies Topic Statement	National Rank	Business/ Industry	Other Non-Educators	Social Studies Educators	Other Educators
Employ geographic tools (maps, globes, photographs, models, satellite images, charts, databases, GPS, etc.) and other visual images (physical, mental, and electronic representations) to acquire, process, and report information about people, places, and environments from a spatial perspective	**1**	1	1	2	1
Explain the roles, rights, and responsibilities of the U.S. citizen in our democracy	**2**	2 tie	4	1	2
Examine the purpose of rules and laws, explain how governments enact and enforce them, and assess ways to evaluate rules and laws	**3**	2 tie	5	3	3
Examine the concepts of civic life, politics, and government and explain why government is necessary	**4**	5	2	7	4
Describe the U.S. Constitution and why it, or any constitution, is important	**5**	4	3	11	5

Note: These results are preliminary and are likely to change when final NESS data are collected later this summer.

Later this summer, the International Center will update the *Achieving AYP – Using State-Specific Curriculum Matrix Data* resource kits to reflect the final results of the NESS. A separate resource kit will be developed for social studies and is planned for release in early 2008.

The Curriculum Matrix is a user-friendly crosswalk of each state's standards and subcategories (e.g., benchmarks, performance indicators, topics) to corresponding state assessments in mathematics, science, and English language arts and, until the NESS data are final, to the International Center's Curriculum Survey of Essential Skills. High-, medium-, and low-priority rankings are assigned to the standards based on the crosswalks. These crosswalks are combined in the Curriculum Matrix. The *Achieving AYP* resource kit also includes professional development activities to help educators set instructional priorities, improve pedagogical skills, and teach for rigor and relevance.

While the Curriculum Matrix assists teachers in improving the performance of their students on high-stakes assessments, it also helps pinpoint the knowledge and skills students will need to succeed after graduation. The Curriculum Matrix indicates which state standards, benchmarks, performance indicators, or topics should be high priorities, based on how and if they are tested and how they are rated as essential skills. With this tool at their fingertips, educators can make informed decisions about whether to place more or less emphasis on a particular standard or grade-level expectation. In short, this resource kit helps answer the critical question: What should I teach?

Furthermore, early results from NESS raise questions about the structure of various states' standards and assessment systems. In many states, skills being rated as important for students to know upon graduating high school are addressed far more seldom – or not at all – than other skills that are not nearly as highly rated. States that show a correlation of NESS-identified high-priority material to their standards do not always address these standards in the assessments. On the other hand, there is an abnormally high incidence of states that assess curriculum material that NESS participants consider less important.

The good news is that the data do not indicate a problem that cannot be overcome, but a roadmap to better design curriculum and assessment programs. The NESS data will allow us to show how and where instruction should be emphasized at both the district and state levels.

Curriculum

Answering this question, "What do I teach and how do I teach it?" is becoming increasingly complex for teachers and schools leaders. Teachers are accustomed to being confident in their profession and knowing

what and how to teach the basic skills appropriate to a grade level or the content of a secondary subject. Yet, in this era of increasing standards, accountability, social and technological changes, many educators seem to be less confident of what and how to teach.

Looking to past practices, teachers often have relied on what they learned in school and replicated the practices of their best teachers. Publishers provide short versions of well-organized content in textbooks that are linked to standards. School districts align and standardize instruction in an attempt to make sure each student is introduced to the same curriculum in the quest of all students succeeding. In spite of these best efforts, student achievement stagnates. Students are bored and teachers question their own competence. In schools, the lowest level students see neither rigor nor relevance and it is no surprise when they fail to work hard in an engaged manner.

The search for better instructional practices does not lie with standards, state assessments, textbooks, or recalling how teachers learned. State tests are but a brief snapshot of learning, and while they need attention, they should not be the singular focus of what teaching. Teaching to the test is not a true instructional or learning strategy. Textbooks are comfortable with their convenient organization and parceling of content but they don't help teachers deal with the dynamics of each class of students. Textbooks are loaded with content, but content alone is not a curriculum. And when teachers teach as they were taught, they fail to recognize that not every student learns in the same way and students bring different experiences to today's classroom.

The three perspectives that do define curriculum and instruction are:

1. What does society expect of students to be successful in the 21st century?
2. What have we learned from brain research on the way student learn best?
3. How do students view learning?

Since there is not a single standard teaching prescription that will work with every student and in every teaching situation, a curriculum model must include these three perspectives and be flexible enough to consider the complex needs of students. We need to provide teachers guidelines for rigorous and relevant curriculum and data on priority and achievement, along with an abundance of curriculum and instructional ideas.

Luckily, technology is providing a model of how to accomplish this abundant curriculum resource. Open-source systems, through the Internet, are changing the mindset of the publishing industry as well as the ability to share information. Some of the best software is open-source and free, such as Linux Operating

System or Moodle learning management system. Universities like MIT's open courseware project are making large amounts of content available free on the Internet. Google Books is undertaking an ambitious project to make the reading materials in the libraries of major colleges searchable free.

The time is ripe to consider how to expand K-12 curriculum in using this open- source model. The template for an open-source system needs to be flexible to allow all types of high-quality materials to be connected. Teachers can locate curriculum ideas easily in this open source system if we tag ideas to:

Standards – tagged to each of the state standards
Content – searchable by key words related to content (e.g., constitution, cells, probability)
Strategy – searchable by instructional strategy (e.g., inquiry, project-based learning, formative assessment, warm-up activity)
Population – specifying grade level, or special population

Merely creating this rich curriculum resource will not be enough. It will only be effective in raising student achievement if it is coupled with school staff that possess a passion for change guided by leadership, driven by data and supported by continual learning.

Instruction

Recognizing the critical nature of the important issues facing educators is a promising start. Translating them into action is the challenging next step. Below are some suggestions on how to move forward. Certain Model Schools Conference general and breakout sessions will discuss these areas in-depth. White papers and additional information on technical assistance, staff development, resource kits, and can be found at www.LeaderEd.com.

1. **Teach and learn with Rigor and Relevance.** Since the mid-1990s, the International Center has made the Rigor/Relevance Framework™ a centerpiece for its efforts in school improvement. The elegantly easy-to-understand and memorable construct of the knowledge taxonomy and application model built into an A-B-C-D four-quadrant grid (representing respectively Acquisition, Application, Assimilation, and Adaptation) has provided educators with a tool for thinking and talking about curriculum and instruction (see Appendix A). Recognizing where the concept or skill to be taught fits on the Rigor/Relevance continuum allows educators to match learning with instructional process. For example:
   - Is the topic or lesson to be learned academically complex, but not readily applicable in real-world learning situations? Can it be?
   - Is the learning outcome easily applied but not complex on the knowledge hierarchy? Can it be enriched to add rigor to the application?
   - How many standards and outcomes within the intended curriculum are clearly within the A (moderate academic rigor, low application) Quadrant?

- How many require learning in the D (high academic rigor, high level of problem solving application) Quadrant?
- Does the teaching staff strive to move more and more instruction into the D Quadrant, where cognition and engagement are maximized?

The Rigor/Relevance Framework, especially when based on strong and mutually respectful relationships at school and in the classroom, serves as a way to craft instruction that will maximize learning. The model has been successfully adopted by thousands of districts, schools and educators.

2. **Develop a literacy plan.** The literacy demands of lifelong learning and work after high school are expanding. Yet, far too many secondary level students struggle with class work and state tests, not because the subject matter or tasks are too complex, but because the students have not developed sufficiently high levels of proficiency in reading and literacy. Most reading instruction ends after the elementary grades and few middle grades schools or high schools offer dedicated reading instruction. Many schools that work with the International Center have discovered that one of the single, best investments they can make in instruction is the implementation of a schoolwide literacy and reading plan.

3. **Use data-based decision making to take something off the plate.** There is simply too much to teach and too much to learn. Education leaders need tools and support to help set priorities in curriculum and instruction. The International Center's Curriculum Matrix data have helped many individual schools and districts answer the question, "What should I teach?"

4. **Focus on instruction.** Great teachers supported by innovative leaders make the difference. The International Center has worked with thousands of educators to help them to successfully implement strategies that promote "D-Quadrant Instruction" and make high quality instructional practices central to the entire school's learning culture.

5. **Change or enhance the culture of the school.** Every school has its own "institutional DNA," but some are more successful than others. The culture and leaning environment of the school matter. Do students feel safe, respected, and cared about? Do adults model desired behaviors? Do staff members and students feel that school is "a good place to be?" Is every student engaged and able to achieve to his or her fullest potential? Is the school a true community of learners? Does the school refuse to accept failure as an option for any student? The International Center helps leaders to engineer sustainable culture change and create and sustain a winning attitude among staff, students, and stakeholders.

Characteristics of the Highest Performing Schools

The 30 high schools included in the International Center's *Bringing Successful Practices to Scale* initiative have provided great insight into how American high schools can help *all* students complete an academically rigorous and relevant curriculum. Especially insightful is the comparison of findings from these 30 high schools to the many good high schools that will need to make some further changes before they can be classified as great in terms of all students' academic success. While there is no one formula for a successful high school, certain characteristics appear to be consistent. They are:

- focusing instruction around students' interests, learning styles, and aptitudes through a variety of small-learning community approaches, most commonly academies
- administrators and teachers sharing an unrelenting commitment to excellence for all students
- an emphasis on literacy across the curriculum
- a laser-like focus on data at the classroom level to make daily instructional decisions for individual students
- an extraordinary commitment of resources and attention to 9th grade students
- a rigorous and relevant 12th grade year
- a high-quality curriculum and instruction that focus on rigor, relevance, relationships, and reflective thought
- solid and dedicated leadership.

It has become apparent in recent years that most American high schools need some degree of reform if they are to get all students toward a rigorous and relevant curriculum. The process of change typically involves three stages:

1. Create a broad-based understanding of WHY these schools need to make fundamental change.
2. There needs to be a clear identification of WHAT should be changed.
3. Determine HOW to make the fundamental changes.

The following is a brief description of the characteristics that stood out to the International Center reviewers when they visited the 30 high schools.

Small Learning Community

Small learning communities were found in nearly all of the schools. The small learning community provides the platform to focus instruction around a student's interests, learning style, and aptitudes. It permits educators to develop a personal relationship over an extended period of time with students. It also enables outside mentors, business partners, and others to create personal relationships with the faculty and students. These personal relationships prove to be essential in motivating and nurturing students.

Simply creating a small learning community, however, without addressing the other characteristics will not lead to improved student performance. It is the many changes made possible by a small learning

community that lead to improved student performance. Without these other changes, small learning communities will become one more fad and we will have missed the opportunity this innovation provides.

Culture of Commitment to Academic Excellence

High-performing schools believe that all students can and must achieve high standards. They have a few academic priorities and do them well. They recognize that *No Child Left Behind*, AYP, and state testing programs create the floor on which all students need to stand to achieve. In other schools, this floor all too often becomes the ceiling: if the students have passed the state tests, they have achieved academic excellence. High-performing schools believe that passing the test is the minimum and is far from the definition of academic excellence.

The highly successful schools take the time upfront to create a clear understanding among students, parents, faculty, and the general public as to why high standards are essential for all students. Jobs for the unskilled are disappearing in this country. Simply obtaining admission to college — where a large percentage of students begin by taking remedial courses — is not a definition of excellence. The human and economic consequences to individual students who have not mastered and are unable to apply rigorous academic standards in the society in which they live are too severe for this nation to ignore.

In addition, these educators believe that all students can learn. But they recognize that a wide variety of delivery and support systems must be put in place to enable students to achieve their potential. Given the support structures, they believe that students will achieve the high standards. While they focus on the need for high standards in all subjects, they make the greatest effort to stress the need for excellence in the area of literacy. Literacy is king in many of these schools.

These highly successful schools also make a deep commitment to creating personal relationships with students that will help nurture, motivate, and guide them. Teachers know their students and often their families well. This strong focus on relationships helps create an environment that enables all students to achieve at high levels.

Data

The schools have a laser-like focus on data that assist classroom teachers in making daily decisions about instruction. Teachers are able to identify which of their state standards, benchmarks, and student expectations are essential or merely nice to know.

They use a wide variety of data sources, such as the Lexile Framework for Reading, to analyze where students' present performance levels are, how those performance levels compare to the instructional materials, and the performance levels required of students once they graduate from high school.

9th Grade

Ninth grade in many of these schools looks dramatically different from 9th grade in other schools. Students' academic levels are analyzed as they enter 9th grade. If they do not have adequate academic skills to succeed in the high school curriculum, they are enrolled in an enrichment program. Other schools typically use traditional remediation approaches for students, often with limited success in improving performance.

Some schools begin the small learning community approach around a thematic area of interest to the student as part of the enrichment program. The thematic program might be in the arts, environmental science, construction, etc. The students take intensive reading, writing, and mathematics courses that use the thematic area as the content for developing students' skills. The motivation of the students in these enrichment programs is remarkably different from typical remedial programs. However, some degree of drill-and-skill approach is still necessary to get struggling students to pass the state tests.

By the end of grade 9, these students have typically made dramatic improvements in their skills, enabling them to complete a basic high school curriculum. They also have been indoctrinated into the culture of high expectations and caring adults.

When grade 9 is used for enrichment, the normal four-year high school curriculum needs to be collapsed into three years, in grades 10, 11, and 12. This is possible because in most high schools, the senior year has a limited number of required courses. Furthermore, students often do not have a full slate of required courses in grade 11. Therefore, teachers continue to use the thematic approach of the small learning community to teach academics. In effect, these schools trade off elective courses for the election of a thematic approach to teaching academies. The older students serve as mentors to 9th grade students. Theses upper class students model expected behavior, provide ongoing guidance to the freshmen, and in many cases tutor struggling students.

12th Grade

Twelfth grade can look dramatically different in these schools as well. For students who entered 9th grade with adequate academic preparation for high school, the four-year program may also be collapsed into

three years. These students complete the normal high school curriculum by the end of grade 11. They then use grade 12 as an "advanced placement" year. Through strong articulation with higher education, many of these students are then able to earn up to 30 college credits by the time they graduate.

Curriculum and Instruction

During the past several years, state education departments have struggled with fewer financial resources, leading to retrenchment of staff. All too often that retrenchment has resulted in the loss of curriculum and instruction specialists. A similar trend has occurred in large school districts. This circumstance has led to a decrease in the development of quality curriculum and instructional materials throughout this country. Teachers have fewer instructional resources than in the past. The textbook has become the curriculum and teachers are limited to state standards to help guide them.

By contrast, the 30 high schools have high-quality curricula to guide instruction. They also have moved forward by creating an instructional framework for students to use in the development of their skills and learning the applications of those skills. Furthermore, business and postsecondary partnerships exist within the high school community, enriching instruction. Moreover, teachers across disciplines know, respect, and interact with each other on an ongoing basis.

In many of these schools, students are given time to reflect on and apply the knowledge they are gaining. In addition, teachers are given time for reflective thought, using good data, to make decisions about what and how to teach. Time for reflective thought is often lacking in other high schools.

Leadership

Leadership is key in these highly successful high schools. These schools have leaders with solid skills. They are well focused and stay in the position long enough to sustain change within the school.

Conclusion

The Process of Change – What Do I Do?

The process of improving student performance has come in many different forms and packages. It has been referred to as school improvement, school reform, and school restructuring. No matter what it's called, it comes down to the single goal of raising student achievement through a rigorous and relevant education. In working with schools across the county that are making concerted efforts at reform, we have found two characteristics to be true:

1. Change needs to be evolutionary and not revolutionary.
2. Each school community has its own "DNA"; what works in one does not necessarily translate to another.

These schools also have abided by the basic principles outlined in this paper. In summary, educators can take the following eight step to improve student performance.

Step 1. Create a culture to support change. We will not improve student performance until there is more pressure for change than resistance to it. Schools need to create a clear understanding among students, parents, faculty, and the general public as to why high standards are essential for all students. Schools are able to communicate their message to the community during back-to-school nights, community newsletters, meeting with parents, community forums, etc. In addition, educators have to believe that all students can learn. Teachers must recognize that a wide variety of delivery and support systems must be put in place to enable students to achieve their potential. Given the support structures, they believe that students will achieve high standards.

Step 2. Begin with the end in mind. Schools need to know where they are going before they try to get there. While this may seem like commonsense, most schools do not begin with a clear picture of what their desired student results are. Typically, schools that are high performing use a tool, such as the Learning Criteria to Support Rigor, Relevance, and Relationships described earlier, to guide them through a stepwise data collection and analysis process that supports school improvement.

Step 3. Use data to guide instructional decisions. The determination of what and how much to teach must be based on data that shows what the world beyond school expects high school graduates to know and be able to do. This includes the requirements of higher education, the workplace, home and in society. The National Essential Skills Study, the Lexile research on literacy requirements, the Curriculum Matrix data, etc., are all sources of information available to schools and district that will allow them to guide instructional decisions and assess student performance.

Step. 4. Have an unrelenting focus on literacy. Literacy is the highest priority in the nation's most successful schools. All teachers in all disciplines need to teach reading and writing skills that are both rigorous and relevant to the real world. It is important to note that literacy is much more than reading and writing prose. The skills of the 21st century require students to be document, technologically, and quantitatively literate.

Step 5. Create a coherent curriculum. Many schools have yielded to state standards and study guides to prepare students for assessments. This is not a curriculum and effective schools realize this. Schools that are raising student achievement have developed a scope and sequence between grades and across disciplines.

Step 6. Develop a framework for instruction. Just as standards and tests do not constitute a curriculum, high-performing schools recognize that curriculum is not instruction. A systematic framework needs to be put in place to guide instruction. Many of the nation's most successful schools use the International Center's Rigor and Relevance Framework to accomplish this. The Rigor and Relevance Framework is described in Appendix A.

Step 7. Address organizational issues. Only after the first six steps described above have been done should schools begin to address the issues of organization, such as school schedules, schools-within-schools, school calendars, etc. In short, instruction needs to drive structure, not the other way around.

Step 8. Choose professional development programs wisely. In many schools and districts, professional development is like a burst of energy. After an initial flurry of activity, however, that energy dissipates and fizzles to nothing. High-performing schools are able to carefully select a few professional development initiatives that they then are able to focus on and sustain for as long as it takes to be effective.

By following these steps, schools will be able to develop a plan that will lead to improved student performance. The International Center has the experience and resources to guide schools and districts in implementing these eight steps so that they may become highly successful.

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Appendix A – The Rigor and Relevance Framework

To help educators better understand these concepts and their importance to creating high-quality educational experiences that enable student success in and beyond the classroom, the International Center created the Rigor/Relevance Framework™ in 1997. The Rigor/Relevance Framework is based on two dimensions of higher standards and student achievement: knowledge and application.

Knowledge Taxonomy

There is a continuum of knowledge that describes the increasingly complex ways in which we think. In defining rigor in this framework, we use the Knowledge Taxonomy, which is based on the six levels of Bloom's Taxonomy:

1. Awareness
2. Comprehension
3. Application
4. Analysis
5. Synthesis
6. Evaluation

The low end of this continuum – levels one and two and, to a degree, level three – involves acquiring knowledge and being able to recall or locate such knowledge in a simple manner. Just as a computer completes a word search in a word processing program, a competent person at this end of the continuum can scan through thousands of bits of information in the brain to locate desired knowledge.

The high end of the Knowledge Taxonomy – which includes high-level activity at level three as well as at levels four through six – labels more complex ways in which individuals use knowledge. At this end of the continuum, knowledge is fully integrated into one's mind, and individuals can do much more than locate information. They can take several pieces of knowledge and combine them in both logical and creative ways. Assimilation of knowledge is a good way to describe this high level of the thinking continuum. Assimilation is often referred to as a higher order thinking skill: at this level, the student can solve multi-step problems and create unique work and solutions.

Application Model

The second continuum, created by the International Center, is known as the Application Model. The five levels of this action continuum are:

1. Knowledge in one discipline
2. Apply knowledge in discipline
3. Apply knowledge across disciplines
4. Apply knowledge to real-world predictable situations
5. Apply knowledge to real-world unpredictable situations

The Application Model describes how knowledge is put to use based on the levels of relevance. While the low end is knowledge acquired for its own sake, the high end signifies action: using the knowledge to solve complex real-world problems and to create projects, designs, and other works for use in real-world situations.

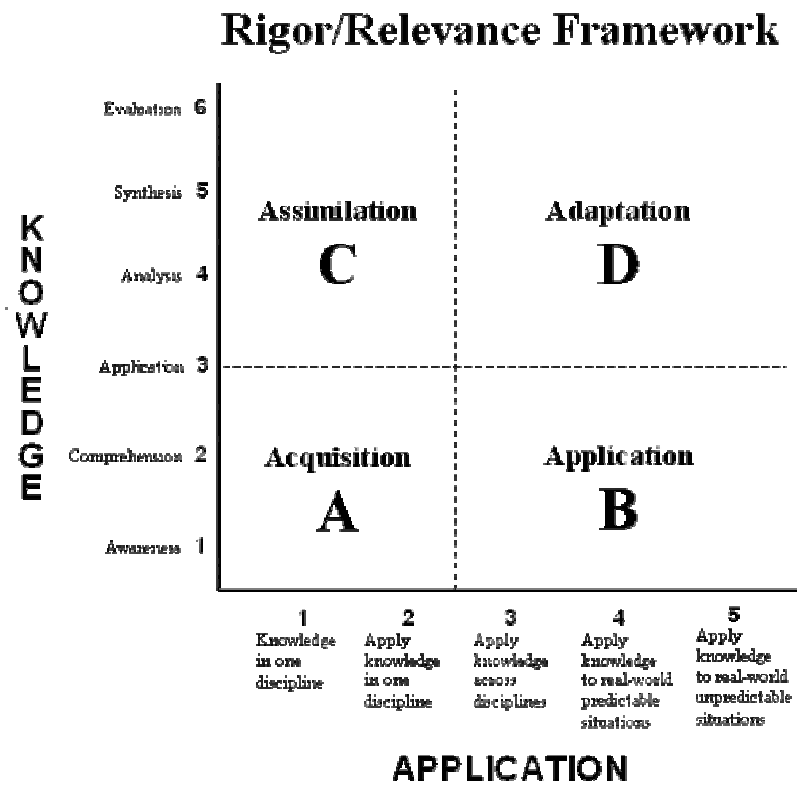
When instruction moves to high relevance, it is generally defined as "real-world," meaning the students' work is similar to that done by adults outside of school. The advantage of this is that students are more

likely to be motivated to engage in learning since it is easier the see the purpose for learning. High-relevance learning also helps students retain their learning beyond the end of a chapter or completion of a test. Moving to higher relevance begins with an integrative approach including two or more disciplines, such as math and science, or history and language arts.

Using the Rigor/Relevance Framework

The Rigor/Relevance Framework, illustrated below, uses four quadrants that represent levels of learning. On the Knowledge axis, the framework defines low rigor as Quadrants A and B and high rigor as Quadrants C and D.

On the Knowledge axis, Quadrant A represents simple recall and basic understanding of knowledge for its own sake. Quadrant A is labeled "Acquisition" because students gather and store bits of knowledge and information.



Quadrant C, "Assimilation," represents more complex thinking, but still knowledge for its own sake. In Quadrant C, students extend and refine their acquired knowledge to be able to use it automatically and routinely to analyze and solve problems and to create unique solutions.

Quadrants B and D represent actions or high degrees of application. In Quadrant B. "Application," students use acquired knowledge to solve problems, design solutions, and complete work.

In Quadrant D, "Adaptation," students have the competence to think in complex ways as they apply knowledge and skills they have acquired to new and unpredictable situations. Students create solutions and take actions that further develop their skills and knowledge.

For students to become lifelong learners, problem-solvers, and decision-makers, Quadrant B and D skills are required. In effect, our students need to *know what to do when they do not know what to do*. The Rigor/Relevance Framework provides a structure to enable schools to move all students toward that level.