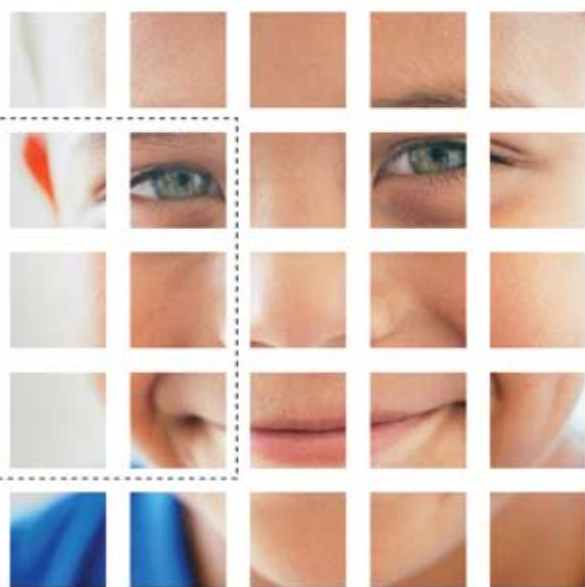


CHALLENGING THE Whole Child

Reflections on
Best Practices in Learning,
Teaching, and Leadership



Edited by
Marge Scherer

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Whole Child

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ASCD

Alexandria, Virginia USA



1703 N. Beauregard St. • Alexandria, VA 22311 1714 USA
Phone: 800-933-2723 or 703-578-9600 • Fax: 703-575-5400
Web site: www.ascd.org • E-mail: member@ascd.org
Author guidelines: www.ascd.org/write

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Foreword

The 21st century demands a highly skilled, educated work force and citizenry unlike any we have seen before. The global marketplace and economy are a reality. Change and innovation have become the new status quo while too many of our schools, communities, and systems use models designed to prepare young people for life in the middle of the last century. We live in a time that requires our students to be prepared to think both critically and creatively, to evaluate massive amounts of information, solve complex problems, and communicate well, yet our education systems remain committed to time structures, coursework, instructional methods, and assessments designed more than a century ago. A strong foundation in reading, writing, math, and other core subjects is as important as ever, yet insufficient for lifelong success.

These 21st century demands require a new and better way of approaching education policy and practice—a whole child approach to learning, teaching, and community engagement. What if decisions about education policy were made by first asking, “What works best for children?” What if the education, health, housing, public safety, recreation, and business systems within our communities aligned human and capital resources to provide coordinated service to kids and families? What if policymakers at all levels worked with educators, families, and community members to ensure that we as a society meet our social compact to prepare children for their future rather than our past?

The answers push us to redefine what a successful learner is and how we measure success. It is time to put students first, align resources to students’ multiple needs, and advocate for a more balanced approach. A child who enters school in good health, feels safe, and is connected to her school is ready to learn. A student who has at least one adult in

school who understands his social and emotional development is more likely to stay in school. All students who have access to challenging academic programs are better prepared for further education, work, and civic life.

ASCD proposes a definition of achievement and accountability that promotes the development of children who are healthy, safe, engaged, supported, and challenged.

ASCD's Whole Child Tenets

- Each student enters school **healthy** and learns about and practices a healthy lifestyle.
- Each student learns in an intellectually challenging environment that is physically and emotionally **safe** for students and adults.
- Each student is actively **engaged** in learning and is connected to the school and broader community.
- Each student has access to personalized learning and is **supported** by qualified, caring adults.
- Each graduate is **challenged** academically and prepared for success in college or further study and for employment in a global environment.

ASCD is helping schools, districts, and communities move from rhetoric about educating the whole child to reality. No single person, institution, or system can work in isolation to achieve such results so we have launched a Web site for educators, families, community members, and policymakers to share their stories, access resources, assess their progress, and advocate for children. Join us at www.wholechildeducation.org. Our children deserve it. Our future demands it.

—Molly McCloskey
Host of the Whole Child Podcast

Introduction

Rising to the Challenge

Think back to a recent challenge that you faced successfully. Are you recalling a problem you overcame, a task you accomplished, or a skill that you sharpened or even mastered? Did someone else set this challenge for you—your boss, a family member, students, colleagues? Was the challenge dictated by your life circumstances, or did you create the challenge for yourself? Depending on all these factors, you may or may not feel pleased that this particular challenge found its way into your life. But chances are that you are now more prepared than you used to be to tackle the next challenge that awaits you.

In a recent report titled *Diploma to Nowhere*, high school graduates who were struggling so much in college that they had to enroll in remedial courses reported something surprising: They said that they wished their high schools had challenged them more. About 40 percent of these students, most of whom had taken college prep courses and gotten *As* and *Bs*, said that their high schools had done a poor or fair job of helping them understand the knowledge and skills they needed for college success. Almost 60 percent said that high school classes were easy, and one half said they were bored in high school. Eighty percent said that they would have worked harder if their high school had set higher expectations.¹

Unfortunately, having to rise to the challenge of taking remedial classes during their college years did not ensure these students' success. The researchers note that a large number of them gave up on attaining their degrees and dropped out of college.

Too often the concept of challenging students is oversimplified. Some reformers believe that all students would benefit from universally tough classes. Others put their faith in the power of tests to challenge students to learn. But higher-level courses are not helpful if the students fail to receive adequate support for them or if the classes are pseudo-higher-level, taken only for credit and not for learning. And universal expectations—for example, that all students must study advanced mathematics or that all must go to college—smack of a lack of appreciation for the many ways society needs individuals to excel. As for the power of tests, most former students will admit that many difficult tests call for only shallow, short-term learning.

So what kinds of challenges *do* encourage students to rise to challenges of their own and lead to lasting achievement? This special e-book collection of articles from *Educational Leadership* and other ASCD publications examines the kinds of challenges that best prepare students for college, the world of work, and life.²

Challenging the Whole Child begins by probing what excellence and high performance mean in various schools and settings around the world. Lead author Robert Sternberg emphasizes that to realize all students' potential, all students need to be challenged—not only the gifted and the college-bound but also the non-college-bound and those who have not yet attained proficiency at basic skills. Authors Andreas Schleicher and Vivien Stewart provide a glimpse of the many different ways world-class schools further high achievement in schools—from emphasizing accountability to encouraging more autonomy.

Our authors also explore how to make learning richer and more thought-provoking through both rigorous curriculum and formative assessment. They look at some ways that both elementary and secondary school teachers can teach problem-solving and innovative and analytical thinking, and they consider how to challenge students preparing for college as well as those readying themselves for careers after high school.

Articles also examine ways to lead students to address today's 21st-century problems, acknowledging that citizens of the future will face new challenges and will need new knowledge and skills. The final section takes on the all-important question, How do we motivate students to embrace challenge? Both research and experience suggest that when students choose and take on the challenges themselves, they are much more likely to persevere.

In 2005 when ASCD decided it was time to reemphasize education for the whole child, some critics wrote that such an aim was “soft and squishy.” Their criticism overlooked an essential component of whole child education. Although those who advocate for education for the whole child may not believe that a single “get tough” strategy works, they know that offering students meaningful challenges does. Children—much like adults—learn best when they are engaged, supported, safe, healthy—and, most surely, challenged.

—Marge Scherer

Editor in Chief, *Educational Leadership*

Endnotes

¹ Strong American Schools. (2008). *Diploma to Nowhere*. Washington, DC: Author.

² See the first in this series of e-books, *Engaging the Whole Child* (ASCD, 2009).



Part 1

Challenging
Every Student

Excellence for All

Robert J. Sternberg

There's more to excellence than reading, writing, and arithmetic.

What does it mean for a school to be “excellent”? Is it excellent if no one fails but no one does terrifically well either? Is it excellent if the best, but only the best, do superbly? This question is important because the way we define excellence dictates the way we achieve it.

Common Models of Excellence

Let's look at four models of excellence that operate in our schools today. The following portraits are based on real schools that I have observed, although the names are pseudonyms.

Looking Only at the Bottom

Administrators at Shadyside School know which side their bread is buttered on. The district's rewards go to the schools that best meet the mandates of No Child Left Behind (NCLB). So Shadyside has put its resources into ensuring that it looks as good as possible under NCLB's definition of excellence.

The school places heavy emphasis on reading and math. Several other subjects get some attention, but less. The school has dropped physical education and minimized music and art. It has discontinued its gifted program, which, the administration believed, always con-

sumed more resources than it was worth for students who need special services the least.

Heavy spending goes into ensuring that students in the bottom half of the class perform well enough to meet minimum-competency standards. Because many of these low-performing students come from one section of town, some Shadyside administrators have been quietly lobbying for a redistricting plan that would reassign that area to a different school, thus raising Shadyside's test scores.

So far, the result of all these efforts has been modest but noticeable success in enhancing compliance with the federal law.

No Child Left Behind was advocated as a national model for achieving excellence in our schools. But this model is problematic because it focuses attention on only the bottom of the distribution. Imagine a hypothetical school in which, indeed, no child is left behind, but all children are achieving barely passing grades—in letter terms, *D-*. Would anyone call such a school excellent?

Further, No Child Left Behind encourages schools to drop or minimize important programs that are essential to truly excellent education—such as music, arts, and physical education—because these programs do not boost passing rates on particular tests. Even social studies may get short shrift. Do we really want our schools to resemble the test-preparation cram courses given by private tutoring organizations?

The law discourages schools from providing special services for gifted students because they will pass the tests anyway. It has even motivated some schools to stoop to such dubious practices as encouraging weaker students to drop out. Is this any way to achieve excellence?

Looking Only at the Top

Sunnyvale School is in one of the most economically advantaged sections of a wealthy suburb. The school is considered “la crème de la

crème” in the district. To be admitted to Sunnyvale’s gifted program, students need to have IQs in the top 1 percent of the general population. The school boasts of the number of its graduates who end up going to Ivy League schools and has a Hall of Fame for its most illustrious graduates.

Sunnyvale puts relatively few resources into students at the academic low end. Because few of these students are actually at risk for failing to meet minimum-competency standards, the administration believes it can afford to focus on stronger students who are likely to succeed in gaining admission to the most prestigious colleges.

The administration’s general view is that weaker students do not really belong in the school. In many different, often not-so-subtle ways, the school sends the message to these students that they are a drag on its reputation. For example, academically challenged students tend to get the weakest teachers and diluted courses. Although the school is careful to meet its legal obligations to students with special needs, any parents who demand more are told that they always have the option of a private school.

Sunnyvale’s model is the opposite of Shadyside’s. Sunnyvale lavishes its attention on the top end, and the result is a *Matthew effect*—the intellectually rich get richer, and the intellectually poor get poorer. Can we really consider a school excellent if it settles for mediocrity for a large portion of its students and gives only the academic superstars the opportunity to flourish?

Looking Only at the Middle

Brookdale School believes that one size fits all. It does not group students by ability or achievement, nor does it recognize or celebrate any kind of diversity within the heterogeneous groups. The teachers are not sure what to do for students with special needs; some teachers wish that such students would just go away. The school has no gifted

program, and it provides the minimum service mandated by law, if that, to students with developmental disabilities.

The school reflects its community, which celebrates social and intellectual conformity. Many of the residents have similar belief structures, which they want to pass on to their children. Excellence, they believe, is a well-rounded child who does what he or she is told and does not stick out through exceptionally weak or strong academic performance. Being popular is good, but being intellectually excellent is suspect. People know that “tall poppies” tend to be cut down.

The administrators and parents of children at Brookdale believe they have created an excellent school and a superb environment for learning. Students and faculty are comfortable with one another, having similar ways of thinking, beliefs, and values.

Brookdale defines academic excellence as intellectual conformity. But Brookdale students are being educated for a world that does not exist—a world in which everyone thinks like they do. Some may be afraid to leave the community because they are unprepared to cope. Those who do leave may be bewildered by and perhaps resentful and intolerant of the astonishing diversity of people, values, ideologies, and worldviews they will encounter. This model of education poorly serves its students and their community because it isolates them from a rapidly changing world. We can hardly view Brookdale as providing an excellent education.

Looking Only at the Statistical Average

Every year, the *Riverside Observer* publishes the average test scores of the five elementary schools in the Riverside School District as well as those of other districts in the state. The newspaper does a detailed analysis comparing the local schools to one another and comparing the district as a whole to other districts. Parents are well aware that real estate prices coincide closely with the test scores, and the board of education has exerted pressure on district administrators to

raise the statistical averages. The five schools in the district engage in a not-always-friendly competition to have the highest average scores. In one school, a principal was reprimanded for engaging in shady practices to enhance his school's ranking: Certain students' scores were "overlooked" when the averages were computed.

Currently, there is a national craze in the United States to raise statistical averages. Such averages are reported in the media and play a prominent role in *U.S. News and World Report's* ranking of colleges and graduate schools.

Riverside's model looks for excellence in high average scores. Individual students become cogs in a machine that operates like a huge calculator. Students are valued only to the extent that they raise the average scores. The model ignores students at both the upper and lower end—and it dehumanizes all students, including those in the middle.

An Alternative: The Three *Rs* and the Other Three *Rs*

A better model for defining and achieving excellence is to focus on excellence in education for *all* students and let the numbers emerge as a result of seeking excellence, rather than the main goal. Actually, this is what many schools once did before testing mania co-opted education.

The criteria for excellence are neither arcane nor complicated. I propose a simple model that focuses on the traditional three *Rs* plus what I call the other three *Rs* (Cogan, Sternberg, & Subotnik, 2006; Sternberg, 2006; Sternberg & Subotnik, 2006). You are probably familiar with the first three *Rs*: *reading*, *'riting*, and *'rithmetic*. So let me focus on the other three: *reasoning*, *resilience*, and *responsibility*. These latter three *Rs* complement and enhance the first three: It's not either/or, but rather, both/and.

Reasoning

Reasoning is a broad term that encompasses the comprehensive set of thinking skills that a person needs to be an engaged, active citizen of the world. These skills include

- Creative thinking to generate new and powerful ideas.
- Critical and analytical thinking to ensure that the ideas (your own and those of others) are good ones.
- Practical thinking to implement the ideas and persuade others of their value.
- Wise thinking to ensure that the ideas help build a common good.

Schools can teach reasoning in a number of ways, either through the disciplines (Sternberg & Grigorenko, 2007) or through a separate course (Sternberg, Kaufman, & Grigorenko, 2008). Either way, good reasoning complements knowledge by enabling students to use that knowledge well.

For example, presenting stories like the following can introduce students to scientific reasoning:

Professor Flowers believes that his special plant food, Proflower, helps plants grow to their full potential. He wishes to design an experiment to show that Proflower really does help plants grow. He takes five individual plant stems of each of three types of plants—orchids, tulips, and roses—and carefully places them in his special experimental room. He measures the height of each plant. Then, each day, he places in the soil for each plant exactly 15 drops of Proflower. All plants are watered the exact same amount and receive the same amount of sunshine. After 20 days, he compares the height of each plant to its height 20 days before. He finds that *all* of the plants have grown by at least 10 percent, and some by more than 20 percent. He then prepares a speech in which he argues that he

has scientifically proven that Proflower really does help plants grow.

Is Professor Flowers' reasoning correct? Why or why not?

The answer is that Professor Flowers is not correct. The problem is that there is no control group that received equal amounts of water and light—and no Proflower at all. It is possible that all of the plants in the sample would have grown by the same amount (or more!) if they had not been given Proflower. Hence, Professor Flowers' reasoning is flawed.

Resilience

Resilience refers to persistence in achieving goals despite the obstacles life places in our way. Some children grow up with many obstacles strewn across their paths; others have relatively smooth roads to travel. Either way, everyone encounters roadblocks sooner or later; the question is how you surmount them. Resilience involves

- Willingness to defy the crowd in your thinking and actions—to take the road less traveled.
- Willingness to surmount obstacles in trying to achieve your goals.
- Passion in your pursuits—going for your goals with drive, motivation, and personal involvement.
- Self-efficacy—belief in your ability to achieve your goals.

Schools can build students' resilience by modeling it; by implementing programs designed to develop it (see Patrikakou, Weissberg, Redding, Walberg, & Anderson, 2005); and by creating challenging experiences for students that require resilience to see them through.

One way of developing resilience is to tell students about a challenging experience you have had in your own life, preferably when you were about the students' age, and how you got through the challenge.

You can then encourage students to share their own challenges and how they have coped with them. The class can discuss what constitutes better and worse coping mechanisms, and how people can decide to employ better ones. (In my own case, when I talk to elementary school students I often tell them of how I used to do poorly on standardized intelligence tests as a child, and nevertheless, when I was 22, I was graduated with highest honors from Yale. Resilience pays off!)

Resilience is an important component of academic excellence. For example, Dweck (1999) found that students who have an incremental view of intelligence—who believe they can modify their intelligence—perform better when faced with challenging courses than do students who believe that intelligence is a stable, fixed entity.

Responsibility

Responsibility covers the ethical and moral dimension of development. Four components are particularly important:

- Ethics—distinguishing right from wrong.
- Wisdom—forging or following a path that represents a common good and balances your own interests with those of others.
- Care—genuine understanding of and empathy for others' well-being that goes beyond an intellectual sense that you *should* care.
- Right action—not only knowing the right thing to do, but doing it.

Schools can teach responsibility by modeling it, by providing case studies, and by challenging students with situations that require them to develop their own unique and personal sense of responsibility.

One way to learn about personal responsibility is by reading biographies of people who have shown wisdom and positive ethical values in their own lives. Examples might be Martin Luther King Jr. and

Nelson Mandela, both of whom made many personal sacrifices to help others. Mandela spent much of his life in prison before becoming the first president of South Africa in an election with broad participation from South Africans. King led civil rights marches at great personal risk to his life, which he eventually forfeited in the cause of justice for all.

Students can contemplate their own lives and how they have taken opportunities either to work for a common good or to be selfish and look out only for their self-interest. The great leaders of society, and of communities and families, are inevitably those who care about and for others and not just about and for themselves.

How to Teach for the Other 3 Rs

1. Emphasize excellence for all—not just those at the top, bottom, or middle of the distribution—and recognize diverse forms of excellence.
2. Provide students with opportunities to learn through multiple modalities.
3. Value subject matter not only as important in its own right but also as a vehicle for teaching students to think critically.
4. Value creative thinking applied to a knowledge base, recognizing that knowledge forms the backbone for creativity.
5. Teach students to apply their learning to practical, real-world problems.
6. Promote students' *dialogical thinking*—the ability to understand things from multiple viewpoints and to appreciate diversity.
7. Promote students' *dialectical thinking*—the understanding that what is “true” now may not be true in the future and may not have been true in the past.
8. Teach students to take personal responsibility for mistakes and learn from them.
9. Teach students to care about people other than themselves and to think about the effects of their actions on others and on institutions, both in the present and in the future.
10. Teach students to use their knowledge ethically, promoting universal values like sincerity, integrity, honesty, reciprocity, and compassion.

Changing Direction

Our society is moving in the wrong direction. If we continue to turn our schools into test-preparation centers, we are neglecting the important

three *Rs* of reasoning, resilience, and responsibility. What's more, test prep is not even an adequate way of teaching the first three *Rs*.

We need to educate students, not merely prepare them for tests. We need to immerse them in the full range of curriculum, including music, the arts, and physical education. We also need special programs that meet the needs of gifted students and those with developmental disabilities.

If we return to education rather than test preparation, we may find that students improve in both the first three *Rs* and the other three *Rs*. We must not just concentrate on the top, bottom, middle, or statistical average of the distribution. We must concentrate on *all* students and teach them how to be active, productive citizens in a rapidly changing world.

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Robert J. Sternberg is Dean of the School of Arts and Sciences, Tufts University, Medford, Massachusetts; robert.sternberg@tufts.edu.

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Part 2

Offering a
Rigorous Curriculum

The Thought-Filled Curriculum

Arthur L. Costa

Everyone thinks. Keeping five themes in mind will ensure that every learner thinks skillfully.

How do you know that your students need to learn how to think?

When I have posed this question to teachers of all grade levels in countries around the world, teachers have given surprisingly similar and consistent descriptions of their students' thinking:

- They just blurt out answers. They should think before they respond.
- They depend on me for their answers. I wish they would think for themselves.
- They give up so easily on difficult tasks. I'd like them to hang in there.
- They can't seem to work in groups. They must learn to cooperate and work together.
- They don't apply their knowledge. I want them to use what they know in other situations.
- They are afraid to take risks. I'd like them to be more creative, more adventuresome.

Such comments reflect teachers' awareness that to function in school, at work, and in life, students must persist when faced with adversity, solve cognitively complex problems, draw on vast reservoirs of knowledge, and work collaboratively. To strengthen these skills,

instruction must become more reflective, complex, and relevant (Commission on the Whole Child, 2007). Curriculums must become more thought-filled in the sense of enlarging students' capacities to think deeply and creatively.

Five Themes to Shape Curriculum

I propose that educators make five themes part of any thought-filled curriculum. These themes provide lenses through which we can shape, organize, and evaluate curriculums.

1. Learning to Think

Iron rusts from disuse; stagnant water loses its purity and in cold weather becomes frozen; even so does inaction sap the vigor of the mind.

—Leonardo da Vinci

Humans are born with the capacity and inclination to think. Nobody has to “teach us how to think” just as no one teaches us how to move or walk. Moving with precision and style, however, takes much time and coaching. The distinction between awkwardness and grace is obvious to even an undisciplined observer. A superb ballerina, tai chi master, or gymnast needs years of practice, concentration, reflection, and guidance to perform intricate maneuvers on command with seemingly effortless agility.

Like strenuous movement, skillful thinking is hard work. And as with athletics, students need practice, reflection, and coaching to think well. With proper instruction, human thought processes can become more broadly applied, more spontaneously generated, more precisely focused, more complex, and more insightfully divergent.

Unlike athletics, however, thinking is usually idiosyncratic and covert. Awkwardness and agility are not as easily distinguished in thinking as they are in athletics. Definitions of thought processes, strategies

for their development, and assessment of the stamina required for increased mastery, therefore, are elusive, as the following classroom interaction illustrates.

After showing a class of 8th graders how the Earth's population is likely to double in the next 50 years, a teacher asks students what could be done to solve the problem of population explosion.

Student: I don't know.

Teacher: Well, think about it. We may not have enough food and space. It's a problem we will need to solve.

Student: We could send some people somewhere where they won't need food and space.

Teacher: Where?

Student: Uh, into space.

Teacher: Why there?

Student: They won't need to eat our food or live here anymore.
(Swartz, Costa, Kallick, Beyer, & Reagan, 2007, p. 9)

Is this student thinking? Yes. Is this student thinking critically, skillfully, and creatively? It seems not.

Teachers who value thinking and habits of mind would ensure that students confront a problem like population expansion with a questioning attitude, arm themselves with attendant data, explore alternatives to the status quo, and predict the consequences of each of those alternatives. A contrasting teaching approach here might bring out strenuous thinking by taking time as a class to gather more information and understand why the problem exists. A teacher might pose such

questions as, Where in the world has this problem been encountered and resolved in the past? What alternative solutions might be generated? or, By what humane and just criteria might the consequences of each of those solutions be evaluated?

Although thinking is innate and spontaneous, *skillful* thinking must be cultivated. One way to enhance such thinking is to get students intrigued by relevant, generative, conceptual knowledge. Cognition and content are inseparable. One cannot think about “nothing,” and deep conceptual understanding requires such cognitive skills as comparing, analyzing, applying, translating, and evaluating (Wiggins & McTighe, 1998). Further, the deeper knowledge a learner has, the more analytical, experimental, and creative are that learner’s thought processes (Willingham, 2007).

We can catalyze learning to think by making thinking skills explicit. We should use cognitive terminology and label and identify cognitive processes, saying, for example, “So as you’re *analyzing* this problem ... “ (Costa & Marzano, 2001). Teachers should also employ thinking maps and visual tools (Hyerle, 2004) and model problem solving, decision making, and investigating (Swartz et al., 2007).

It is not enough, however, for students to learn thinking and problem-solving skills in teacher-constructed classroom situations. They must also develop the inclination to use productive habits of mind, including persisting, managing impulsivity, thinking flexibly, striving for accuracy, and remaining open to continuous learning—on their own (Costa & Kallick, 2001).

2. Thinking to Learn

Learning is an engagement of the mind that changes the mind.

—Martin Heidegger

Meaning making is not a spectator sport. Knowledge is a constructive process; to really understand something, each learner must create a

model or metaphor derived from that learner's personal world. Humans don't *get* ideas; they *make* ideas.

Content learning, therefore, should not be viewed as the only aim of instruction. Rather, teachers should select relevant, generative, wondrous content to serve as a vehicle for the joyride of learning. We can equip that vehicle by

- Posing challenging, content-embedded questions and problems that tax the imagination and stimulate inquiry.
- Inviting students to assess their own learning.
- Urging students to question their own and others' assumptions.
- Valuing students' viewpoints by maintaining a safe, nonjudgmental classroom atmosphere.

For example, to challenge students to dig deeper into historical perspectives, a teacher might have 5th graders compare and contrast two versions of the story of Pocahontas and John Smith by reading the fictionalized account *The Double Life of Pocahontas* (Fritz, 1987) and watching the Disney movie *Pocahontas*. Students could work in groups to take notes about the characters, setting, plot, and events depicted in the movie and to extract details from the text.

The teacher might direct student groups to draw conclusions about the accuracy of historical events after they identify significant patterns in the similarities and differences of the two sources (Reagan, in press). As each group shares its conclusions, the teacher should reinforce the skill of valuing others' viewpoints by reminding all students to paraphrase, clarify, or question what their peers in other groups report, so that they can better understand each group's conclusions rather than judging them. Following the discussion, students might reflect in their journals about skills to keep in mind when striving for accuracy and searching for truth; the value of listening to and empathizing with a speaker; how well they think they listened and empathized in this activ-

ity; and situations in school, home, and life that require them to strive for accuracy and listen with understanding and empathy.

3. Thinking Together

Friendship is one mind in two bodies.

—Mencius

Meaning making is not just an individual operation. Learning is a reciprocal process; the individual influences the group's thinking, and the group influences the individual's thinking (Marzano, Pickering, & Pollock, 2001; Vygotsky, 1978). Instructional techniques that encourage group activities help students construct both their own and shared knowledge.

When learners fail to see the interconnections and coherence of divergent views, collaborative thinking falters. If each student fixates on his or her own certainties, each perceives the solution to a problem solely from his or her own viewpoint. Such an egocentric view hinders serious reflection and honest inquiry.

Another purpose of a thought-filled curriculum, therefore, is to build an "ecology of thought"—a network of shared memories and awareness that links community members together (Isaacs, 1999). Collegial interaction is a crucial factor in the intellectual ecology of the school and classroom. Collaboratively, individuals can elicit thinking that surpasses individual effort, but such collaboration is difficult because it means temporarily suspending what I, individually, think. It means relaxing our grip on certainties and opening our minds to new perspectives, abiding by and supporting group decisions that are arrived at through deep, respectful listening and dialogue. Learners must come to understand that as they transcend the self and become part of the whole, they will not lose their individuality, only their egocentricity.

Learning to listen with understanding and empathy may be one of the least-taught skills in school, yet it is one of the most powerful skills

of intelligent problem solvers (Steil & Bommelje, 2007). Thought-filled curriculums should include instruction in and practice of

- Focusing mental energy on understanding others.
- Summarizing and paraphrasing others' thoughts.
- Empathizing.
- Monitoring clarity in communication.
- Setting aside judgments, solutions, and autobiographical responses.

4. Thinking About Our Own Thinking

I thank the Lord for the brain he put in my head. Occasionally, I love to just stand to one side and watch how it works.

—Richard Bolles

A broader intent of a thought-filled curriculum is the development of heightened consciousness of our own thinking among both teachers and students. The human species is known as *Homo sapiens sapiens*, which means “a being that knows its knowing.” What distinguishes humans is our capacity for metacognition—the ability to stand back and examine our own thoughts while we engage in them. Although the human brain is capable of generating this reflective consciousness, generally we are not very aware of how we are thinking. Not everyone uses his or her capacity for metacognition equally (Csikszentmihalyi, 1993).

Learning to think begins with recognizing *how* we are thinking—by listening to ourselves and our own reactions and realizing how our thoughts may encapsulate us. Much of the kind of thinking people practice happens simply by virtue of their embedded habits, not because they closely examine their assumptions, their limited history, or their mental models.

Metacognition involves the whole of us: our emotions, bodily sensations, ideas, beliefs, values, character qualities, and the inferences we generate from interactions with others. When confronted

with perplexing, ambiguous situations, skillful thinkers engage in an internal mental dialogue that helps them decide on intelligent actions. We can get students into the habit of such mindful probing by using self-reflective questions like these:

- How can I draw on my past successes to solve this new problem? What do I already know about the problem, and what resources do I have available or need to generate?
- How can I approach this problem flexibly? How might I look at the situation from a fresh perspective? Am I remaining open to new possibilities?
- How can I make this problem clearer, more precise, and more detailed? Do I need to check out my data sources? How might I break this problem down into its component parts and develop a strategy for approaching each step?
- What do I know or not know? What might I be missing, and what questions do I need to ask?
- What strategies are in my mind now? What values, beliefs, and intentions are influencing my approach? What emotions might be blocking or enhancing my progress?
- How is this problem affecting others? How might we solve it together, and what can I learn from others that would help me become a better problem solver?

Teachers can spur metacognition by directing students to verbalize plans and strategies for solving challenging problems—and by urging students to share their thinking as they monitor their progress, evaluate their strategies, and generate alternative strategies.

5. Thinking Big

I learned to make my mind large, as the universe is large, so that there is room for paradoxes.

—Maxine Hong Kingston

Building a thought-filled curriculum serves the larger agenda of building a more thought-filled world—an interdependent learning community where people continually search for ways to care for one another, learn together, and grow toward greater intelligence. We must deepen student thinking to hasten the arrival of a world community that

- Generates more thoughtful, peaceful approaches to solving problems, rather than resorting to violence to resolve differences.
- Values the diversity of other cultures, races, religions, language systems, time perspectives, and political and economic views.
- Shows greater consciousness of how humans affect Earth's limited resources and how we must live in harmony with our delicate environment.
- Engages in clear and respectful dialogue to resolve misunderstandings.

While designing each lesson, thought-filled teachers focus on this larger vision by asking themselves, Are these learnings essential? How do they contribute to building more thoughtful classrooms, schools, and communities, and a more thoughtful world? Teachers encourage students to “think big” when they lead them to inquire into such moral, ethical, and philosophical questions as, What makes human beings human? What is beauty? What is justice? How can we learn to unite and not divide?

These five themes constitute unfinished tasks for teachers and curriculum designers in building a more thought-filled curriculum. As noted computer scientist Alan Kay (1990) stated, “The best way to predict the future is to invent it.” If we want a future that is vastly more thoughtful, cooperative, compassionate, and loving, then we have to create it. The future is in our schools and classrooms today.

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Arthur L. Costa is Emeritus Professor of Education, California State University, Sacramento. He is the coauthor of ASCD's four-volume series *Habits of Mind* and a former president of ASCD; Artcosta@aol.com.

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Part 3

Developing
Student Thinking

Little Philosophers

Katie Goodman Le and Carol L. DeFilippo

Socratic seminars can help even the youngest learners think critically and creatively.

During the last hour of the school day at Hunters Woods Elementary School for the Arts and Sciences in Reston, Virginia, a group of kindergarten and 1st grade students are huddled in a circle with a parent, enmeshed in a philosophical discussion. They've just read Langston Hughes's "Poem,"¹ in which the speaker tells how he misses a friend who has gone away. Now they're wondering what the poem means.

"I think Langston was sad because his friend died," one student says.

"It doesn't say he died for sure," a classmate responds. Another student agrees, adding, "Maybe his friend just didn't want to play with him any more."

Such sophisticated thinking for 5- and 6-year-olds! But these students didn't start out thinking of poetry in this way. They are participating in a pilot program based on the Socratic seminar method and adapted for young learners and parent volunteers. Their movement toward this high level of discussion began with both of us—the school's reading specialist and the gifted and talented specialist—trying to discover a meaningful way to provide reading enrichment for our younger learners.

Partnering with Parents

Five- and six-year-olds are renowned for their innate curiosity. Their never-ending questions and desire to share ideas verbally are a perfect fit with Socratic seminars—high-level discussions that help focus thought, encourage questions, and develop critical- and creative-thinking skills. But how could we provide this level of engagement for our students?

We realized that parents are often looking for compelling ways to work with their children and improve the quality of conversation at the dinner table. How efficient, then, to train parents on the seminar method, putting essential elements of high-quality discussion right in their hands.

We developed a Socratic seminar pilot program that consisted of four 45-minute poetry lessons. Poetry was a logical choice because its density in meaning allows for rich conversations in a manageable amount of time. Through fliers sent home to all families in the school, we recruited seven parents who were interested in working with kindergartners and 1st graders for literacy enrichment. The diversity among the parents was representative of the cosmopolitan makeup of our student body. All but two of our parent volunteers had children in kindergarten and 1st grade.

In a one-hour training session, we introduced the Socratic method, presented the seminar's framework for developing questions and facilitating discussion, and addressed group management expectations. To ensure that parents had a clear idea of what the seminars would look like, we closed the training session with a seminar using E. E. Cummings's "In Just—." We also created a take-home handbook that provided background information on the Socratic method and the lesson plans and other tools needed to implement the program.

Even though several of the parent volunteers worked full time, most were able to incorporate the sessions into their schedules. With the help of the classroom teachers, we created six groups of eight

students each. All 1st graders reading on grade level participated, and kindergartners were selected by their classroom teachers on the basis of their reading skills. Having eight students in a group allowed for a range of ideas even if one or two were absent. We balanced these groups by gender, ethnicity, teacher, and students' reading ability. Student groups met with the same parent for 45 minutes every other week.

Listening In: A Seminar on "Poem"

A glimpse of a seminar on Langston Hughes's "Poem" shows how a parent might begin a seminar:

The poem we are going to read today is quite different from a lot of the poems you have seen. This poem is very short, and it talks about feelings. That's true about a lot of poems you will read. I'm going to wonder about how this poem makes you feel and what pictures it brings to your mind. I think we will have a lot to share with one another about this sensitive poem.

Each student has a copy of the poem to follow along with when listening to the parent read the poem aloud the first time. Then they all join in and choral read the poem a second time.

Next, the parent introduces the third reading, "I'm going to reread it one more time. This time, let me know when you have a question so I can stop to write it down. That way, I can capture all your wonderings so we will have lots to discuss."

The parent begins to read the poem again. "'Poem' by Langston Hughes."

"Why does he call it 'Poem'?" Nikko wonders aloud. "That's a funny name for a poem." The parent writes Nikko's question on the chart paper for everyone to see and continues with the poem.

"I loved my friend," the parent reads. Several hands are up in the air now. "Claire?"

“Who’s his friend?” Several other children chorus that that was their question, too.

Other student questions include, Why did his friend go away? Why does he say “there is nothing more to say” and then says more things? How can a poem be soft? Together, the parent and students study the list of questions to see which are the most compelling.

“What great wonderings!” says the parent. “I heard a lot of you wonder who Langston Hughes was writing about. Let’s begin with ‘Who is the friend?’”

“Why didn’t he tell us his friend’s name?” asks Yolanda. “If he’s important enough to write a poem about, he should be important enough to tell his name.”

“Maybe he didn’t want his other friends to be jealous,” says Jacob.

“Maybe it doesn’t even matter who it was, maybe he just wrote it to feel better,” suggests Priya, a sensitive 1st grader.

“Well, I think the friend mattered a lot,” insists Claire.

The parent interjects, “What do you think it means when the poem says he went away?” Danny has his hand up for the first time that week.

“I think he moved away like my friend Varun moved away this year,” he says.

“I remember Varun!” says Kari. “Was he your friend too? Are you sad that he isn’t here anymore?”

Danny nods, and the parent says, “Kari asked if Danny was sad about Varun leaving. Do you think that Langston Hughes wrote ‘Poem’ to be a sad poem?” Many of the students nod their heads, but not Jessie, who is frowning and looking thoughtful. “What are you thinking, Jessie?”

She points to her copy of the poem. “It has the word *soft* in it, and soft doesn’t make you feel sad. Soft is nice.”

“Yeah,” agrees Kari, “and I think the most important word in this poem is *loved*, and that isn’t sad either!”

After about 10 more minutes of discussion, students take five minutes to reflect quietly and write a letter or draw a picture for a friend that demonstrates their understanding of the poem. The children each carry a copy of the poem home to share with their families.

Assessing Growth

The overall purpose of our seminar program was to provide an opportunity for students to explore poetry and discover the richness of shared ideas and experience. The *National Standards for the English Language Arts* provided the foundation for us to develop three categories to guide our assessment of student growth:

1. Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate the mechanics, rhythm, and main ideas of poems.
2. Students are knowledgeable, reflective, creative, and critical members of poetry groups.
3. Students' active participation in poetry groups enhances their comprehension, interpretations, evaluations, and appreciation of poetry.

We developed a five-point scale for each of our three reporting areas. When we compared the pre- and post-assessment scales, student growth exceeded our expectations in all three areas.

Then . . .

Before launching the seminars, we conducted a pre-assessment focus group and preliminary seminar on Emily Dickinson's "I'm Nobody! Who Are You?" (see p. 68) with six students, a representative sample of Hunters Woods kindergarten and 1st grade classes.

In the interview, the students indicated that they had a limited understanding of poetry, ranging from "nothing" to "it rhymes." Only

one student said that she really liked poetry. Even worse, none of the students wanted to know their peers' ideas or opinions.

During the seminar, the students' questions centered on word definitions: "What does *banish* mean?" "What's a *dreary*?" The most sophisticated response was "How public like a frog' doesn't make any sense." Students weren't able to respond to the poem either in writing or by drawing. Reba expressed the group's frustration by saying, "I don't have any pictures in my mind about that poem."

. . . And Now

Flash forward to the conclusion of the pilot, when we reconvened the focus group and repeated the interviews and seminar. Most of the students indicated that now they thought poetry was fun. They knew that although it could rhyme, it did not have to. Two students commented that poets could make up words. One said poets could "zigzag words across the page if they want to." We still had one holdout who did not like poetry, but three thought it was great.

Most impressive was the fact that all of the students now liked to hear other people's ideas. Nashad said, "I like to hear other people's [ideas] because my ideas might be weird and then I understand it better." Emma said, "It's sometimes exciting to hear the other people's ideas."

We told the students that the parents had agreed to continue the poetry groups to the end of the year and asked them to choose an answer that expressed how they felt: either Great, OK, or Why Me? Three said, "Great"; and two said, "OK"; but Benny said, "Why me?" We thanked Benny for sticking with the program even though he hadn't really enjoyed it and told him that he would not have to participate for the last three sessions. His response was immediate—"Change my answer to OK! You can go all the way to great if you have to!" He was an enthusiastic participant for the remaining poetry groups.

In the repeat seminar on the Dickinson poem, the level of questions was richer and more thoughtful than in the earlier session:

“Maybe she feels like a nobody,” said Emma.

Jahar responded, “What’s a nobody anyway?”

“I think a nobody is invisible,” said Lina.

Benny replied, “I’ve felt invisible before.”

“So have I!” echoed Reba and Nashad.

When asked to respond to the poem, students did not hesitate. Four students drew pictures and wrote an explanation of their drawings. One simply drew a picture. Lina wrote this little poem:

Just Me

Just me.

All me.

Why is it

Just me?

“It has to be a little poem,” Lina told us, “because Emily makes me feel like she is very little in her poem. I hope she didn’t always feel that way.”

Begin Young

As we develop new ways to appropriately challenge our littlest learners, it is essential to remember the importance of developing foundational skills in critical and creative thinking. Adopting a dynamic teaching strategy like the Socratic seminar is one way to capitalize on young students’ natural eagerness to question and discuss.

Socratic seminar for kindergartners and 1st graders is alive and flourishing at Hunters Woods Elementary School for the Arts and Sciences. Parents and students requested more lessons to last until the end of the year, and we obliged. What started out as an attempt to provide additional reading enrichment has since become proof of the power in

partnering with parents to strengthen a vision of educational excellence that begins with our youngest learners.

“I’m Nobody! Who Are You?”

I’m nobody! Who are you?

Are you nobody, too?

Then there’s a pair of us—don’t tell!

They’d banish us, you know.

How dreary to be somebody!

How public, like a frog

To tell your name the livelong day

To an admiring bog!

—Emily Dickinson

Source: From Poems by Emily Dickinson, Three series, Complete, by Emily Dickinson, edited by Mabel Loomis Todd & T.W. Higginson, 1896, Boston: Roberts Brothers.

Endnote

¹ Hughes, L. (1994). Poem. In *The dream keeper and other poems* (p. 12). New York: Scholastic.

Katie Goodman Le (Katharine.Le@fcps.edu) is the Gifted and Talented Specialist and **Carol L. DeFilippo** (Carol.DeFilippo@fcps.edu) is the Reading Specialist at Hunters Woods Elementary School in Reston, Virginia.

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Part 4

Meeting
21st Century
Challenges

Becoming Citizens of the World

Vivien Stewart

*The future is here. It's multiethnic, multicultural, and multilingual.
But are students ready for it?*

The world into which today's high school students will graduate is fundamentally different from the one in which many of us grew up. We're increasingly living in a globalized society that has a whole new set of challenges. Four trends have brought us here.

The first trend is economic. The globalization of economies and the rise of Asia are central facts of the early 21st century. Since 1990, 3 billion people in China, India, and the former Soviet Union have moved from closed economies into a global one. The economies of China, India, and Japan, which represented 18 percent of the world's gross domestic product (GDP) in 2004, are expected to represent 50 percent of the world's GDP within 30 years (Wilson, 2005). One in five U.S. jobs is now tied to international trade, a proportion that will continue to increase (U.S. Census Bureau, 2004). Moreover, most U.S. companies expect the majority of their growth to be in overseas markets, which means they will increasingly require a workforce with international competence. According to the Committee for Economic Development (2006),

To compete successfully in the global marketplace, both U.S.-based multinational corporations as well as small businesses increasingly need employees with knowledge of foreign languages and cultures to market products to customers around

the globe and to work effectively with foreign employees and partners in other countries.

Science and technology are changing the world and represent a second trend. In *The World Is Flat*, Thomas Friedman (2005) describes how the “wiring of the world” and the digitization of production since 1998 are making it possible for people to do increasing amounts of work anywhere and anytime. Global production teams are becoming commonplace in business. In addition, scientific research, a key driver of innovation, will increasingly be conducted by international teams as other countries ramp-up their scientific capacity.

The third trend involves health and security matters. Every major issue that people face—from environmental degradation and global warming, to pandemic diseases, to energy and water shortages, to terrorism and weapons proliferation—has an international dimension. Solving these problems will require international cooperation among governments, professional organizations, and corporations. Also, as the line between domestic and international affairs blurs, U.S. citizens will increasingly vote and act on issues—such as alternative energy sources or security measures linked to terrorism—that require a greater knowledge of the world. In response to this need, a 2006 report from the National Association of State Boards of Education recommends infusing classroom instruction with a strong global perspective and incorporating discussions of current local, national, and international issues and events.

The fourth trend is changing demographics. Globalization has accelerated international migration. New immigrants from such regions as Asia and Central and South America are generating a diversity in U.S. communities that mirrors the diversity of the world. Knowledge of other cultures will help students understand and respect classmates from different countries and will promote effective leadership abroad.

In short, U.S. high school graduates will

- Sell to the world.
- Buy from the world.
- Work for international companies.
- Manage employees from other cultures and countries.
- Collaborate with people all over the world in joint ventures.
- Compete with people on the other side of the world for jobs and markets.
- Tackle global problems, such as AIDS, avian flu, pollution, and disaster recovery (Center for International Understanding, 2005).

However, U.S. schools are not adequately preparing students for these challenges. Surveys conducted by the Asia Society (2002) and National Geographic-Roper (2002) indicated that, compared with students in nine other industrialized countries, U.S. students lack knowledge of world geography, history, and current events. And shockingly few U.S. students learn languages that large numbers of people speak, such as Chinese (1.3 billion speakers) and Arabic (246 million speakers).

Many countries in Europe and Asia are preparing their students for the global age by raising their levels of education attainment; emphasizing international knowledge, skills, and language acquisition; and fostering respect for other cultures. The United States must create its own education response to globalization, which should include raising standards, increasing high school and college graduation rates, and modernizing and internationalizing the curriculum.

What Global Competence Looks Like

The new skill set that students will need goes well beyond the United States' current focus on the basics and on math, science, and technology. These skills are necessary, of course, but to be successful global citizens, workers, and leaders, students will need to be knowledgeable about the

world, be able to communicate in languages other than English, and be informed and active citizens.

World Knowledge

Teaching about the rest of the world in U.S. schools has often focused on the superficial: food, fun, and festivals. Today, we need deeper knowledge, such as understanding significant global trends in science and technology, how regions and cultures have developed and how they interconnect, and how international trade and the global economy work. For example, students might consider how increasing the supply of fresh water or changing forms of energy use in one country could have major effects on another country.

In a world in which knowledge is changing rapidly and technology is providing access to vast amounts of information, our challenge is not merely to give students more facts about geography, customs, or particular conflicts. Rather, our challenge is to hone students' critical-thinking skills and to familiarize students with key concepts that they can apply to new situations. In this way, they can make sense of the explosion of information from different sources around the world and put factual information into perspective and context. Only then can this information become meaningful.

Teaching students about the world is not a subject in itself, separate from other content areas, but should be an integral part of *all* subjects taught. We need to open global gateways and inspire students to explore beyond their national borders. Programs like iLEARN and Global Learning and Observations to Benefit the Environment (GLOBE) make it possible for students to work collaboratively with peers in other countries. School-to-school partnerships enable both real and virtual exchanges.

U.S. students are global teenagers, similar in many ways to their technology-enabled peers around the world. Adding an international dimension to subjects and encouraging students to reach out to peers

in other countries are powerful ways to make the curriculum relevant and engaging to today's youth.

Language Skills

Only about one-half of U.S. high school students study a foreign language. The majority never go beyond the introductory level, and 70 percent study Spanish (Draper & Hicks, 2002). This results in a serious lack of capacity in such languages as Arabic and Chinese, both of which are crucial to the prosperity and security of the United States.

The United States should do as other industrialized countries in Europe and Asia do—start offering foreign languages in the elementary grades, where research has shown that language learning is most effective (Pufahl, Rhodes, & Christian, 2001), and continue the emphasis in secondary school to create pipelines of proficient language speakers. U.S. students need opportunities to learn a broader range of languages, as in Australia, where 25 percent of students now learn an Asian language (Asia Society, 2002). Heritage communities in the United States—communities in which a non-English language is spoken at home, such as Spanish or Navajo—provide rich sources of teachers, students, and cultural experiences (National Language Conference, 2005). Specific practices, such as immersion experiences, can greatly enhance language proficiency.

The growing interest in learning Chinese, as shown by the fact that 2,400 U.S. high schools expressed interest in offering the new advanced placement course in Mandarin, suggests that parents and teachers are realizing the importance of communication skills in a multilingual, multicultural world (see www.AskAsia.org/Chinese). Even if graduates don't use a second language at work, quite possibly they will work in cross-cultural teams and environments.

Civic Values

U.S. students need to extend traditional American values into the global arena. These include a concern for human rights and respect for cultures that differ from the United States. By learning to understand other perspectives, students can develop critical-thinking skills and enhance their creativity.

Students should focus on becoming active and engaged citizens in both their local and global environments. Schools can promote civic engagement by weaving discussions of current events throughout the school day and through participatory forms of education, such as Model UN or the Capitol Forum on America's Future, in which high school students voice their opinions on current international issues. Schools should use technology to connect students directly to peers in other parts of the world and promote service learning projects on issues that students can address at both the local and international levels, such as alleviating hunger, providing education support to students in poverty, and improving the environment.

What Schools Can Do

Across the United States, many schools already define their mission as producing students who are prepared for work, citizenship, and leadership in the global era. These schools have found that internationalizing the curriculum creates a more exciting environment for students and teachers alike (Bell-Rose & Desai, 2005). Several approaches have proven successful.

Introducing an international studies requirement for graduation. More than a decade ago, the school board of Evanston Township, Illinois, introduced an international studies requirement for graduation and asked the high school's teachers to develop the necessary courses. Now, every sophomore in this diverse Chicago suburb must complete

the one-year international studies requirement. Students choose from a series of in-depth humanities courses on the history, literature, and art of Asia, Africa, Latin America, and the Middle East. Simulations and participatory projects are central to instruction, and partnerships with local universities ensure that teachers have ongoing professional development in international affairs.

Creating an elementary school immersion program. After surveying parents and local businesses about the future needs of the community—they cited skills in English, Spanish, and Japanese as important—Seattle public schools created the John Stanford International School, a public elementary bilingual immersion school. Students spend half the day studying math, science, culture, and literacy in either Japanese or Spanish; they spend the other half of the day learning reading, writing, and social studies in English. The school also offers English as a second language courses for immigrant students and after-school courses for their parents. As a result of the school's success, the city of Seattle has recently decided to open 10 more internationally oriented schools.

Developing international schools-within-schools. The Eugene International High School is a school-within-a-school on four high school campuses in Eugene, Oregon. The school is open to all interested students. The four-year sequence of courses centers thematically on culture, history, and the political, economic, and belief systems of different world regions, such as Asia, Africa, the Middle East, and Latin America. The school also emphasizes independent research courses to give students the tools to address global issues. An extended essay and a community-service requirement in 11th and 12th grade both have an international focus. For example, one student wrote a 4,000-word research essay on hydrogen cars and their place in the world economy. Students volunteer at such places as Centro Latino Americano, University of Oregon International Education and Exchange, and Holt International Children's Services. Finally, students have the option of pursuing the International Baccalaureate.

Teaching crucial language skills to prepare for the global economy. With strong support from Mayor Richard M. Daley, whose goal is to make Chicago a hub for international trade, the city has created the largest Chinese-language program in the United States. Twenty public schools teach Mandarin, from an all-black school on the West Side to a nearly all-Hispanic school on the South Side to more diverse schools throughout the city. For many of these students, Chinese is their third language after English and Spanish. The program resulted from partnerships among political, business, school, and community leaders and the Chinese Ministry of Education, which provides Chinese teachers and organizes a summer cultural program for Chicago educators in China.

Redesigning urban secondary schools with an international focus. Using the International High School of the Americas in San Antonio, Texas, and the Metropolitan Learning Center in Hartford, Connecticut, as anchor schools, the Asia Society has created a network of small, internationally themed secondary schools across the United States (www.asiasociety.org). The mission of each school is to prepare low-income students for college and to promote their knowledge of world regions and international issues. Each public or charter school incorporates international content across the curriculum, offers both Asian and European languages, provides international exchange opportunities, and provides links to international organizations and community-service opportunities. To date, 10 schools have opened in New York City; Los Angeles; Charlotte, North Carolina; Denver, Colorado; and Houston, Texas. Additional schools are slated to open in other locations, such as Mathis and Austin, Texas, and Philadelphia, Pennsylvania.

Using student-faculty exchanges to promote curriculum change. Two public high schools in Newton, Massachusetts—Newton North and Newton South—run an exchange program with the Jingshan School in Beijing, China. Created by two teachers in 1979, the exchange enables U.S. and Chinese teachers and students to spend time in one another's schools every year. The program has served as a catalyst for

districtwide curriculum change, bringing the study of Asian cultures into various academic disciplines, from social studies to science, and adding Chinese to the district's broad array of language options. The leaders of this exchange now help schools around the United States develop exchange programs with China as a way to internationalize their curriculums.

Using a K–12 foreign language sequence to promote excellence.

The Glastonbury School District in Connecticut has long promoted language study, beginning with a K–8 language requirement. Ninety-three percent of students study at least one foreign language, and 30 percent study more than one. The foreign language curriculum is thematic and interdisciplinary, integrating both foreign language and world history standards. All high school students take a one-semester history course on a non-Western geographic/cultural region and a civics/current issues course that includes international content. The school district's reputation for languages and international studies is a major draw for families moving to the area.

These and other pioneering schools offer models that all schools can replicate. What are the lessons learned? Have a large vision of what you want to achieve, but start slowly, one course or grade level at a time. Involve parents as well as business and community leaders in planning and supporting international education and world languages. Focus on professional development for teachers, including partnerships with local colleges, so teachers can broaden and deepen their international knowledge. Include a focus on mastery of languages, including nontraditional languages, and start at the lowest grade levels possible. Use international exchanges, both real and virtual, to enable students to gain firsthand knowledge of the culture they are studying. If it is unfeasible for students to travel, try technology-based alternatives, such as classroom-to-classroom linkages, global science projects, and videoconferences (Sachar, 2004).

What Policymakers Can Do

Recognizing that future economic development and jobs in their states will be linked to success in the global economy, many states are developing innovations to promote international knowledge and skills. Nineteen states have been working together through the Asia Society's States Network on International Education in the Schools. States have developed commissions (North Carolina, Vermont); statewide summits (Delaware, Indiana, Massachusetts, Washington); and reports to assess the status of international education in their state (North Carolina, New Jersey, Wisconsin, West Virginia). They have created mechanisms, such as International or Global Education Councils (Ohio, Indiana, Wisconsin), and appointed International Education Coordinators to develop new policies and action plans (Delaware, Indiana, Ohio, New Jersey, Wisconsin). They are revising standards (Delaware, Idaho) or high school graduation requirements (New Mexico, Virginia) to incorporate international content. Some states are offering professional development (Oklahoma); initiating new language programs (Connecticut, Delaware, Illinois, Minnesota, Wisconsin, Wyoming); engaging in school exchanges with China (Connecticut, Massachusetts); adding crucial foreign language courses to their virtual high schools (Kentucky); and adding an international dimension to science, technology, engineering, and math (STEM) schools (Ohio, Texas). Finally, some (Arizona, Massachusetts, North Carolina, Washington) have introduced state legislation to provide additional funds to incorporate a global dimension into their schools (see <http://Internationaled.org/states>).

In 2006, the National Governors Association held a session on International Education at its annual meeting. In addition, the Council of Chief State School Officers recently adopted a new policy statement on global education (2007). These state efforts are a good start, but the United States has yet to make international knowledge and skills a policy priority on the federal level and develop the systems and

supports necessary to get high-quality international content into U.S. classrooms.

States need to pursue four policy goals to make this happen. They should

- Redesign high schools and create new graduation requirements to motivate higher achievement and promote important international knowledge and key skills.
- Expand teacher training to deliver rigorous study in world history and cultures, economics, world regions, and global challenges.
- Develop world language pipelines from primary school to college that focus on crucial languages, such as Chinese, and that address the acute shortage of language teachers.
- Use technology in innovative ways to expand the availability of international courses and ensure that every school in the United States has an ongoing virtual link to schools in other countries.

For almost 50 years, the U.S. government has played a crucial role in fostering foreign languages and international education in *higher* education. We need to extend this commitment to K–12 education and make it an urgent priority. By doing so, we can improve students' international knowledge and skills and increase both the competitive edge and security of the United States.

In his 2006 report, *The Economics of Knowledge: Why Education Is Key for Europe's Success*, Andreas Schleicher from the Organisation for Economic Cooperation and Development wrote,

The world is indifferent to tradition and past reputations, unforgiving of frailty and ignorant of custom or practice. Success will go to those individuals and countries which are swift to adapt, slow to complain, and open to change.

Part of the great strength of the United States is its adaptability. U.S. schools adapted to the agrarian age, then to the industrial age. It's time to open to change once more and adapt to the global age.

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Vivien Stewart is Vice President, Education, at the Asia Society, 725 Park Ave., New York, New York, 10021; vstewart@asiasoc.org.

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Part 5

Using Assessment
to Spur Achievement

Data in the Driver's Seat

Paul Bambrick-Santoyo

Two New Jersey schools discover the benefits of interim assessments, clearly defined standards, and data-driven instruction.

Our story starts with two public middle schools in Newark, New Jersey. Both had student populations representative of Newark's Central Ward, where 90 percent of students qualify for free or reduced-price lunch and 85 percent are black. Students in both schools were generally well behaved and academically on task.

Despite the two schools' similar student populations, their 2003 achievement results revealed two very different pictures. One school, Greater Newark Academy, was in a tailspin: Only 7 percent of its 8th grade students had passed the state math test. The second school, North Star Academy, had more respectable results—well above the district average—but it was still behind its suburban New Jersey counterparts.

Over the ensuing four years, each school made massive gains in student achievement, outstripping the district average by at least 30 points on both math and English/language arts assessments and surpassing the statewide average in almost every category. How did these two schools end up with such tremendous student achievement? Therein lies our story.

Beginning in the 2002–03 school year, North Star Academy launched a model of data-driven instruction with interim assessments at the center, and Greater Newark followed suit the next year. In this

case, interim assessments are defined as assessments given every 6 to 8 weeks throughout the school year to measure student progress toward meeting standards. Many schools are using interim assessments today, but not all are seeing such strong achievement gains. What separates those schools that use interim assessments effectively from those that do not? Certain key drivers of data-driven instruction made these two schools—and many more like them—so successful.

Assessment: Great Expectations?

Most 7th grade state math standards have a standard similar to this one used in New Jersey: “Understand and use ... percents in a variety of situations” (State of New Jersey, Department of Education, 2004). With this limited guidance, math teachers are told to teach to mastery, but it’s not always clear what mastery should look like. Consider these classroom assessment questions that six different 7th grade math teachers created to measure mastery of this standard:

1. What is 50% of 20?
2. What is 67% of 81?
3. Shawn got 7 correct answers out of 10 possible answers on his science test. What percentage of questions did he answer correctly?
4. J. J. Redick was on pace to set a college basketball record in career free throw percentage. Going into the NCAA tournament in 2004, he had made 97 of 104 free throw attempts. What percentage of free throws had he made?
5. J. J. Redick was on pace to set an NCAA record in career free throw percentage. Going into the NCAA tournament in 2004, he had made 97 of 104 free throw attempts. In the first tournament game, Redick missed his first five free throws. How far did his percentage drop from right before the tournament game to right after missing those free throws?

6. J. J. Redick and Chris Paul were competing for the best free throw percentage. Redick made 94 percent of his first 103 shots, whereas Paul made 47 of 51 shots. (a) Which one had a better shooting percentage? (b) In the next game, Redick made only 2 of 10 shots, and Paul made 7 of 10 shots. What are their new overall shooting percentages? Who is the better shooter? (c) Jason argued that if J. J. and Chris each made their next 10 shots, their shooting percentages would go up the same amount. Is this true? Why or why not? Describe in detail how you arrived at your answers.

Note how the level of difficulty increases with each question. For the first question, a student could understand 50 percent as one-half and determine the answer without actually using percentages. Questions 3–6 could be considered attempts at real-world application or critical thinking, but Question 6 requires far more critical thinking and conceptual understanding than any other question. Despite these drastic differences, every one of the questions is standards based. This leads to the central point about the relationship between standards and interim assessments: Standards are meaningless until you define how you will assess them.

In many schools, teachers define the standards according to their own level of expectation, and those expectations vary radically from one classroom to the next. Thus, different teachers teach to different levels of mastery. We cannot expect every teacher to teach the skills required for complex problems like Question 6 as the standard for learning if that expectation is not explicit and transparent.

To help teachers hold their students to a common standard of rigor, Greater Newark Academy and North Star Academy shared the same interim assessments that North Star originally designed in alignment with New Jersey state tests. In this way, they defined one common level of mastery to which every grade-level teacher should teach. Teachers saw the assessments before teaching their unit so that they

could plan their lessons with those expectations in mind. The assessments were administered every eight weeks, and the tests measured every standard that had been taught up to that date. Thus, the first step on the path to high student achievement was established: transparent, common, rigorous assessments.

Analysis: Watching “Poolside”

High-quality assessments do not guarantee student achievement; neither does the analysis of assessment results. For example, imagine a swimming coach trying to analyze the performance of his team. If he picked up the newspaper the day after the meet and read the times of his third-place swimmer, he might decide that she just has to swim faster. Yet if he had watched that swimmer at the meet, he would have noticed that she was the last one off the starting block but the fastest one in the water. At that point, his analysis would be clear: He needs to focus on getting her off the block faster.

School assessment analysis is no different. Looking at state test or interim assessment results in isolation is like reading a newspaper summary of a sports event: You can only draw summative conclusions, and those conclusions might actually be inaccurate. You have to be “poolside” to analyze effectively.

North Star developed a spreadsheet that teachers in both schools used to analyze results on the interim assessments, but the key factor was having teachers go back to the test to look at individual questions. Teachers in the two schools received results on the day after each assessment. They could then examine the data to determine where the students erred. Seeing which distractors students chose on the multiple-choice questions and examining student work on open-ended questions helped teachers recognize what students misunderstood and plan their instruction accordingly.

For example, a 6th grade math teacher thought her students had problems with rates until she analyzed the question more closely. The

question was, “How far would Jennifer travel in $2\frac{1}{4}$ hours if she drove 36 miles per hour?” The teacher analyzed the students’ answers and discovered that most chose Answer C: 72 miles, instead of the correct answer of 81 miles. Thus, the students actually understood rates—because they multiplied 2 hours by the 36 miles to get 72—but they didn’t know how to multiply by a mixed number ($2\frac{1}{4} \times 36$).

Greater Newark and North Star were able to avoid the mistakes of the swim coach by doing item-level, test-in-hand analysis. This enabled teachers to make solid, root-cause analyses, which in turn facilitated far more effective action plans. Being “poolside” made all the difference: Assessments and analysis were now linked.

Action: Taking Data out of the Binder

Even with high-quality interim assessments and effective analysis, student achievement will not improve without targeted follow-through. Most research about highly effective schools focuses on developing an action plan for reteaching particular standards (Symonds, 2003). Following this advice, schools often develop data binders containing analyses and action plans based on the previous round of assessments and keep a copy in the main office or in each classroom.

Yet the key question remains: Where is that information when teachers plan lessons? If a teacher plans lessons on Sunday night and the data binder is in the classroom, then the effect on teaching is greatly diminished. Action plans must be connected to lesson plans, which need to translate to changes in teaching.

Teachers at Greater Newark and North Star developed six-week action plans based on interim assessment results, and the most successful teachers had those action plans in hand when planning lessons. A 5th grade literacy teacher, for example, learned that her students could make basic inferences and identify the main idea, but they couldn’t keep track of the sequence of events, nor could they identify the evidence in the text that supported their inferences. So the teacher redesigned her

guided reading lessons to ask more questions related to these skills, and she created scaffolded guides to teach these skills more efficiently.

Teachers also used the action plans to design targeted tutoring sessions and differentiated small groups. Some teachers actually stapled their action plans to the front of their lesson plans to remind themselves of the connection between their assessment analysis and their teaching. The seamless coherence among assessments, analysis, and action creates the ideal classroom environment for significant gains in student learning.

Buy-In: Chicken or Egg?

Much research has been done about the data-driven culture of high-achieving schools, especially the role of teacher buy-in (Datnow, Park, & Wohlstetter, 2007). Unfortunately, the research has not adequately answered the question of whether that buy-in was a prerequisite for success—a true driver of achievement—or a by-product of a data-driven culture. An example from one of our two schools helps address this question.

When North Star launched its data-driven instruction model in 2003, most teachers were ambivalent about whether using interim assessments would have any effect. Some wondered, Don't we already assess our students and analyze their progress? A few were outright resistant.

Before the first interim assessment, North Star's leaders had teachers predict the performance of their students by labeling each question in one of three ways: *Confident* (students would answer correctly); *Not Sure* (students might or might not answer correctly); or *No Way* (students would not answer correctly). When the results came in, teachers were shocked to see that their students performed far worse than they expected. They implemented the three principles mentioned previously: using the assessments to evaluate the rigor of their teaching, doing test-in-hand analysis, and applying targeted action plans when

planning lessons. They also pored over the next assessment in advance, hungry to prove that they could do better. On that next assessment, almost every teacher had students show gains in achievement.

While the school celebrated these improvements, some teachers still resisted the process. One teacher in particular, Ms. J, was adamant that she was not really improving her teaching and was only teaching to the test. At the end of the 2003–04 school year, school leaders compared her results from the previous year with the current year and saw that her students that year had shown much stronger gains in reading and language than did her students for the previous year, before interim assessments were implemented. The teachers and school culture were the same for both cohorts; the only thing that changed was effective implementation of interim assessments. Although Ms. J clearly saw the incredible gains she had made, she still did not fully endorse the process.

Two years later at a faculty meeting, teachers debated shortening one part of the analysis and action plan process. Ms. J stood up and firmly defended keeping the process as it was because of the incredible value it added to her teaching. In two years, this teacher had gone from being the most vocal opponent to being an ardent supporter. The results came first; the buy-in came next. Data-driven instruction does not require teacher buy-in—it creates it.

Creating Better Schools

Greater Newark Academy and North Star Academy started at two different places when they decided to implement data-driven instruction: One was in danger of sanctions, and the other was considered good but had not made the transition to excellence. Both saw significant gains as a result of the effective implementation of interim assessments, which included a preestablished assessment calendar and a trained leadership team. In essence, they shifted the focus of the schools from what was being taught to what the students were learning.

These two schools are not alone. Over the past three years, more than 500 school leaders have attended workshops that I have delivered through New Leaders for New Schools and for various school systems. Participants then launched interim assessments and data-driven instruction in their schools. From this work have come dramatic student achievement gains in charter and district schools in the San Francisco Bay Area, Chicago, New York, Memphis, Baltimore, and Washington, D.C. With the proper interplay among interim assessments, analysis, action and data-driven culture, schools can be transformed, and a new standard can be set for student learning.

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Paul Bambrick-Santoyo is Managing Director of North Star Academy Charter School of Newark, New Jersey, and Lead Faculty for Data-Driven Instruction for New Leaders for New Schools; pbambrick@uncommonschoools.org.

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Part 6

Preparing Students
for College and
the World of Work

Bringing Industry to the Classroom

Gary Hoachlander

Students shouldn't have to choose between an education that readies them for college and one that prepares them for a career. Pathways provide both.

What if vocational education turned out to be the ugly duckling of high school reform?" So asked Charles Benson nearly two decades ago, when he assumed leadership of the National Center for Research in Vocational Education at the University of California, Berkeley. Although he is no longer with us, Benson would not be surprised by one of the most remarkable, but least remarked upon, trends in U.S. high schools during the past 15 years—the continued popularity of vocational education or, as we now call it, career and technical education.

Data released last year by the U.S. Department of Education (National Center for Education Statistics, 2007) show us that in 2005, high school graduates in the United States took, on average, four Carnegie units of career and technical education (CTE)—as many or more units than in any other subject except English. During a period of unprecedented attention to raising academic achievement, with greater numbers of academic courses required for earning a high school diploma and enormous pressure on schools (and students) to meet goals of annual yearly progress on academic tests, virtually all high school students *chose* to take at least one CTE course, and more than 60 percent elected to take three or more. CTE courses are electives; few schools require students to take them.

For champions of more academics, the appeal of career and technical education may seem like bad news. But they have much to cheer about. Compared with graduates in 1990, high school graduates in 2005 took 4.3 units of English (up from 4.1); 3.8 units of mathematics (up from 3.2); 4.1 units of social studies (up from 3.5); and 3.4 units of science (up from 2.8). In short, 2005 high school graduates completed a total of 26.8 units, an increase of more than 3 units (the equivalent of one-half year of schooling!) compared with graduates in 1990.

Even more remarkable, a small but rapidly growing number of high school students have discovered what many educators and policymakers still overlook—that it is possible to prepare for both college and career simultaneously. In 2005, fully 8 percent of all high school students completed not only three or more Carnegie units of CTE but also the full complement of college-preparatory courses, including two years of foreign language. This was up from 6 percent in 2000 and up from less than 1 percent in 1990.

For the most part, this increase in the number of students concentrating in both CTE and college-preparatory academics has been happening *in spite of* high school reform—not because of it. It's time to change that, to begin fashioning new options for students that connect challenging technical courses with demanding academics. In the career and technical education field, we call these new options *multiple pathways*.

Multiple Pathways Defined

Pathways are programs of academic and technical study that integrate classroom and real-world learning organized around multiple sectors of industry—fields such as finance and business; health science and medical technology; building and environmental design; and arts, media, and entertainment. Pathways combine college-preparatory curriculums with exceptional career and technical education, motivating

students to learn by helping them answer the question, Why do I need to know this?

Organizing Principles

In high schools, pathways can take various forms and be offered through different delivery systems. But whatever their design, each pathway is grounded in four guiding principles.

- *Pathways prepare students for both postsecondary education and a career.* A pathway is always about both objectives; it's never a choice between the two. Although the Bureau of Labor Statistics projects only modest increases during the next 10 years in the number of occupations requiring a bachelor's degree (Barton, 2006; Mishel, 2007), there is consensus that career success will increasingly depend on the student taking some postsecondary education and completing a formal credential—a certificate, associate's degree, bachelor's degree, or higher credential.
- *Pathways connect academics to real-world applications.* Pathways alter *how* core academic subjects are taught; they do not lower expectations about *what* is taught. Through the pathways approach, students are expected to achieve at high levels in mathematics, science, English, social studies, and foreign language. Students master these subjects by tackling authentic problems and situations that are part of the modern workplace.
- *Pathways lead to the full range of postsecondary opportunities.* These include two- and four-year colleges, apprenticeships, formal employment training, and the military. Each pathway represents a broad industry theme that can appeal to a student regardless of his or her prior academic achievement or postsecondary aspirations. Pathways can eliminate current

practices that sort and track high school students in ways that limit their options after high school.

- *Pathways improve student achievement.* Pathways are based on accountability. They are designed to produce higher levels of accomplishment in a number of measurable arenas, including grade-level performance on tests of academic achievement, demonstrated mastery of demanding technical knowledge and skill, high school completion, postsecondary transition, and attainment of a formal postsecondary credential. Pathways also contribute—in ways that most conventional academic and CTE curriculums do not—to increased student proficiency in such vital areas as critical thinking, problem solving, media and information literacy, and collaboration. Finally, pathways make an immediate difference, helping young people gain higher earnings right after high school and giving them a leg up in the labor market while they pursue postsecondary education.

Core Components

Multiple pathways offer many strong options for students. Organized around a major industry sector, each pathway contains four essential ingredients:

- A challenging *academic component*, which typically spans multiple years and places learning in the context of real-world applications. Subjects studied include college-preparatory English, mathematics, science, and social studies.
- A demanding *technical component*, which delivers concrete industry-related knowledge and skills required for high-skill, high-wage employment.
- A *work-based learning component*, which offers students opportunities to learn through intensive internships, virtual apprenticeships, and school-based enterprises.

- *Supplemental services*, which include counseling as well as additional instruction in reading, writing, and mathematics to help students succeed with a challenging program of study.

For example, consider a pathway in Building and Environmental Design. Core academic courses systematically take advantage of the building theme to introduce authentic applications of essential academic knowledge. Geometry classes teach the concepts and skills needed to build roofs and frame walls that can withstand gale force winds. A precalculus class stresses the role of mathematics in designing and building a seismically sound bay bridge. History helps students better understand how the built environment reflects and also helps shape culture, politics, and the economy. An English class not only emphasizes the importance of mastering strong technical reading and writing, but also helps students appreciate relevant literature, such as *House*, the compelling nonfiction account of building the American dream by Pulitzer Prize winner Tracy Kidder.

Technical courses include instruction in carpentry, electricity, and masonry; but they also introduce students to fundamental principles of engineering and design, project and site planning, construction management, and emerging technologies. The work-based component connects 9th and 10th graders to mentors in such fields as architecture, construction, planning, and interior design; in 11th and 12th grade, students engage in more intensive internships, working with professionals who assess their work according to industry standards. Finally, supplemental services provide additional instruction in reading and mathematics and use industry themes to give meaning to the academic content. For example, to help students better understand the Pythagorean theorem, a supplemental mathematics class that is part of a construction technology academy may engage students in using the standard “three-four-five” triangle to ensure plumb construction of wall frames or parallel layout of flooring tile.

On-site learning is integral to the pathway approach. Seniors at Palmdale High School's Health Careers Academy in California spend two mornings each week at Kaiser Permanente learning under the supervision of their classroom teacher, who works side by side with a physician's assistant, nurse, radiology technician, or other medical professional. Students interact with real patients and learn how to conduct electrocardiograms, draw blood, interpret X-rays, set broken bones, and perform a range of other challenging tasks. Back in the classroom in the afternoon, their medical sciences class connects practical work-based experiences to in-depth study of such topics as the human cardiovascular system and the role that electricity plays in regulating the heart. Alternatively, students may dig into nuclear cardiology and the science of injecting isotopes into the blood system to assess the flow of oxygen to the heart.

Pathways in Practice

Today, multiple pathways are hardly the norm in U.S. high schools. Yet they are emerging as a fresh, comprehensive, and practical solution to the need for transforming education.

In California, the multiple-pathways approach is practiced in numerous places: at the Construction Technology Academy at Kearny High and at High Tech High School, both in San Diego; at the Health Careers Academy at Palmdale High School in Palmdale; at the Health Professions High School in Sacramento; at the Manufacturing Production Technology Academy at Laguna Creek High School in Elk Grove; at the Life Academy of Health and Bioscience in Oakland; and at the Media Academy at Grover Cleveland High School in Los Angeles.

Today in California, 296 Partnership Academies (the equivalent of career academies) are organized around the state's 15 major industry sectors; another 300 career academies are in operation. Two or more school districts often join together to create Regional Occupational Centers and Programs to offer more advanced career and technical

courses. These programs play an important part in many academies; in other high schools, they innovatively integrate academic and technical education.

For example, at the Center for Advanced Research and Technology, a regional center operated jointly by Clovis and Fresno Unified School Districts in California, 11th and 12th graders undertake projects typically involving a research paper, product development, and a final oral presentation and demonstration of their work. Last year, two students in architecture and engineering undertook an in-depth study of the history of Georgian architecture and its influence on contemporary design. A student enrolled in environmental research and technology designed and built a “fire popper,” a forest fire-fighting device that is dropped from an airplane to spread carbon dioxide foam. Still another team of students, in conjunction with their program in psychology and human behavior, developed an electronic role-playing game.

In addition, the National Academy Foundation currently serves more than 50,000 students in 41 states through 500 academies organized around finance, information technology, hospitality and tourism, and engineering. Other organizations—such as the Ford Partnership for Advanced Studies, Project Lead the Way, Acme Animation, the Big Picture Company, Talent Development High Schools, and High Schools That Work—actively support high schools seeking to better engage and teach young people through instruction that connects challenging academic and technical content.

Further supporting these new directions is the States’ Career Clusters Initiative established by the National Association of State Directors of Career and Technical Education Consortium. The consortium is working with educators and business partners to develop program specifications, curriculums, and other tools that will help states and high schools design and implement pathways in 16 major industries, including agriculture, food, and natural resources; education and training; manufacturing; and transportation, distribution, and logistics.

Most of these initiatives do not yet embrace all the organizing principles and key components of multiple pathways. Integrating academic and technical curriculums, linking classrooms to robust work-based learning, promoting project-based learning, facilitating effective team teaching among academic and CTE teachers, and engaging postsecondary faculty in the design and delivery of challenging curriculum—none of these tasks is easy, and few schools have mastered them all.

Given the difficulty, why should we persevere to make this kind of education work? Because the multiple-pathways approach offers a credible strategy for helping more young people stay engaged in high school and emerge better prepared for success in postsecondary education and careers.

The Evidence Base

Some of the most convincing evidence that a multiple-pathways strategy will improve student outcomes comes from work in cognitive science. Research concludes that many people learn better and faster, and retain information longer, when they are taught concepts in context. One particularly high-quality study (Sticht, 2002; Sticht, Armstrong, Hickey, & Caylor, 1987) found that teaching young soldiers who lacked even basic literacy skills to read in the context of their daily tasks not only increased their competency in those tasks but also improved their general reading skills—all in a relatively short time period. In fact, the gains in general reading skills were equal to or greater than those produced by the conventional literacy program; gains in job-related reading exceeded the traditional program by a factor of four or five.

Another rigorous and prominent study (Stone, Alfeld, Pearson, Lewis, & Jensen, 2006) offered strong evidence that an integrated academic and technical curriculum leads to higher test scores if implemented well. In this research, career and technical education teachers were paired with mathematics teachers who identified the mathematical content embedded in the CTE teachers' subjects—agriculture,

automotive technology, business and marketing, health, and information technology. The teacher teams then developed lesson plans to teach the math within the occupational context. Students who were taught the integrated curriculum significantly outscored the control group on two tests of math ability.

An integrated curriculum combined with work-based learning and career guidance can lead to higher wages after high school, as well as improvement in other student outcomes. For example, one of the most rigorous recent evaluations found that, five years after completing high school, males who had enrolled in career academies earned \$2,500 more than their peers annually (Kemple & Scott-Clayton, 2004).

Along similar lines, a recent examination of data from California's Partnership Academies found that academy students passed the high school exit exam at much higher rates than other high school students (Bradby, Malloy, Hanna, & Dayton, 2007). Academy students were also much more likely to complete challenging academic courses. Fifty percent of academy seniors met the minimum "A to G" course requirements—the major academic subjects that the University of California and the California State University require for admission—compared with only 37 percent of all seniors statewide.

Even without an integrated curriculum, students taking both academic and technical courses may have lower dropout rates and better achievement gains than other students. In an analysis of the National Education Longitudinal Survey, a large study monitoring student achievement data and other factors for more than a decade, researchers found that the risk of dropping out was four times higher when students took no CTE courses than when they completed a balance of CTE and academic subjects (Plank, DeLuca, & Estacion, 2005).

Finally, postsecondary participation rates may be higher for those enrolled in multiple-pathways programs. In three studies of career academies that followed students beyond high school, two found higher rates of postsecondary participation among academy students

compared with their peers, whereas one found no difference (Stern & Stearns, 2007). Research on school-to-work programs in the 1990s also frequently found high rates of postsecondary participation among graduates (Kazis, 2005).

In short, research to date suggests that multiple pathways integrating challenging academics with demanding career and technical education around major industry themes can produce many benefits for students, especially those who have not done well in conventional high school programs. Perhaps just as compelling, none of the studies indicates that students participating in pathways perform *less* well on key measures than students who elect other high school programs.

Bringing the Two Together

Often dismissed as a program for non-college-bound students and largely ignored by the champions of academic excellence in U.S. high schools, career and technical education may, ironically, hold the key to achieving gains on a wide range of student outcomes, including standard academic achievement. We will not realize this potential, however, if we continue to isolate career and technical education from challenging academic instruction. Nor are we likely to reengage many young people if we squeeze CTE out of the curriculum and promote conventional academic instruction to the exclusion of all else.

By connecting demanding technical education to challenging academics, CTE transforms both domains. Academic subjects acquire authenticity and real-world meaning; technical content becomes grounded in scholarship and intellectual rigor. Students come to understand that both are important, and they are therefore more likely to emerge from high school ready for lasting success in both college and career.

Getting Started on Multiple Pathways

Schools don't need to go it alone in designing and implementing their own industry-focused programs of study. Several resources are available:

ConnectEd: The California Center for College and Career (www.connectEdCalifornia.org). Click on "The Toolkit" for helpful resources in such areas as creating and managing career and technical education at your school, mapping and monitoring curriculum, providing professional development, and making postsecondary and industry connections. Click on "Curriculum Development" for integrated lesson units for academic teachers involved in biomedical and health sciences, engineering, and other sectors.

The Career Academy Support Network, University of California, Berkeley (<http://casn.berkeley.edu>). The *Planning Guide for Career Academies* explains how to start a career academy. It includes a schedule of tasks, roles and responsibilities of the various stakeholders, stages of evaluation, and related costs and sources of support.

The National Academy Foundation, New York City (www.naf.org). Check out NAF's *Academy Planning Guide*. The Academy Development Model can help schools decide whether to introduce or expand the NAF Academy Model in their communities.

The Ford Partnership for Advanced Studies (www.fordpas.org). Developed by Ford Motor Company Fund as part of its effort to encourage high school students to build careers in business, engineering, and technology, the Ford Partnership offers an inquiry- and project-based program that links learning in traditional academic subjects with the challenges students will face in postsecondary education and careers.

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Gary Hoachlander is President of ConnectEd: The California Center for College and Career and its affiliate, MPR Associates, Berkeley, California; www.ConnectEdCalifornia.org.

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