# Rigor Redefined

## *Even our "best" schools are failing to prepare students for 21st-century careers and citizenship.*



In the new global economy, with many jobs being either automated or "off-shored," what skills will students need to build successful careers? What skills will they need to be good citizens? Are these two education goals in conflict?

To examine these questions, I conducted research beginning with conversations with several hundred business, nonprofit, philanthropic, and education leaders. With a clearer picture of the skills young people need, I then set out to learn whether U.S. schools are teaching and testing the skills that matter most. I observed classrooms in some of the nation's most highly regarded suburban schools to find out whether our "best" was, in fact, good enough for our children's
future. What I discovered on this journey may surprise you.

**The Schooling Students Need**

One of my first conversations was with Clay Parker, president of the Chemical Management Division of BOC Edwards—a company that, among other things, makes machines and supplies chemicals for the manufacture of microelectronics devices. He's an engineer by training and the head of a technical business, so when I asked him about the skills he looks for when he hires young people, I was taken aback by his answer.

"First and foremost, I look for someone who asks good questions," Parker responded. "We can teach them the technical stuff, but we can't teach them how to ask good questions—how to think."

"What other skills are you looking for?" I asked, expecting that he'd jump quickly to content expertise.

"I want people who can engage in good discussion—who can look me in the eye and have a give and take. All of our work is done in teams. You have to know how to work well with others. But you also have to know how to engage customers—to find out what their needs are. If you can't engage others, then you won't learn what you need to know."

I initially doubted whether Parker's views were representative of business leaders in general. But after interviewing leaders in settings from Apple to Unilever to the U.S. Army and reviewing the research on workplace skills, I came to understand that the world of work has changed profoundly.

Today's students need to master seven survival skills to thrive in the new world of work. And these skills are the same ones that will enable students to become productive citizens who contribute to solving some of the most pressing issues we face in the 21st century.

**1. Critical Thinking and Problem Solving**

To compete in the new global economy, companies need their workers to think about how to continuously improve their products, processes, or services. Over and over, executives told me that the heart of critical thinking and problem solving is the ability to ask the right questions. As one senior executive from Dell said, "Yesterday's answers won't solve today's problems."

Ellen Kumata, managing partner at Cambria Associates, explained the extraordinary pressures on leaders today. "The challenge is this: How do you do things that haven't been done before, where you have to rethink or think anew? It's not incremental improvement any more. The markets are changing too fast."

**2. Collaboration and Leadership**

Teamwork is no longer just about working with others in your building. Christie Pedra, CEO of Siemens, explained, "Technology has allowed for virtual teams. We have teams working on major infrastructure projects that are all over the U.S. On other projects, you're working with people all around the world on solving a software problem. Every week they're on a variety of conference calls; they're doing Web casts; they're doing net meetings."

Mike Summers, vice president for Global Talent Management at Dell, said that his greatest concern was young people's lack of leadership skills. "Kids just out of school have an amazing lack of preparedness in general leadership skills and collaborative skills," he explained. "They lack the ability to influence."

**3. Agility and Adaptability**

Clay Parker explained that anyone who works at BOC Edwards today "has to think, be flexible, change, and use a variety of tools to solve new problems. We change what we do all the time. I can guarantee the job I hire someone to do will change or may not exist in the future, so this is why adaptability and learning skills are more important than technical skills."

**4. Initiative and Entrepreneurialism**

Mark Chandler, senior vice president and general counsel at Cisco, was one of the strongest proponents of initiative: "I say to my employees, if you try five things and get all five of them right, you may be failing. If you try 10 things, and get eight of them right, you're a hero. You'll never be blamed for failing to reach a stretch goal, but you will be blamed for not trying. One of the problems of a large company is risk aversion. Our challenge is how to create an entrepreneurial culture in a larger organization."

**5. Effective Oral and Written Communication**

Mike Summers of Dell said, "We are routinely surprised at the difficulty some young people have in communicating: verbal skills, written skills, presentation skills. They have difficulty being clear and concise; it's hard for them to create focus, energy, and passion around the points they want to make. If you're talking to an exec, the first thing you'll get asked if you haven't made it perfectly clear in the first 60 seconds of your presentation is, 'What do you want me to take away from this meeting?' They don't know how to answer that question."

Summers and other leaders from various companies were not necessarily complaining about young

people's poor grammar, punctuation, or spelling—the things we spend so much time teaching and testing in our schools. Although writing and speaking correctly are obviously important, the complaints I heard most frequently were about fuzzy thinking and young people not knowing how to write with a real voice.

#### 6. Accessing and Analyzing Information

Employees in the 21st century have to manage an astronomical amount of information daily. As Mike Summers told me, "There is so much information available that it is almost too much, and if people aren't prepared to process the information effectively it almost freezes them in their steps."

It's not only the sheer quantity of information that represents a challenge, but also how rapidly the information is changing. Quick—how many planets are there? In the early 1990s, I heard then–Harvard University president Neil Rudenstine say in a speech that the half-life of knowledge in the humanities is 10 years, and in math and science, it's only two or three years. I wonder what he would say it is today.

#### 7. Curiosity and Imagination

Mike Summers told me, "People who've learned to ask great questions and have learned to be inquisitive are the ones who move the fastest in our environment because they solve the biggest problems in ways that have the most impact on innovation."

Daniel Pink, the author of *A Whole New Mind*, observes that with increasing abundance, people want unique products and services: "For businesses it's no longer enough to create a product that's reasonably priced and adequately functional. It must also be beautiful, unique, and meaningful."[i] Pink notes that developing young people's capacities for imagination, creativity, and empathy will be increasingly important for maintaining the United States' competitive advantage in the future.

## The Schooling Students Get

I've spent time observing in classrooms across the United States for more than 20 years. Here is a sampling of what I've seen recently. These examples come from secondary honors and advanced placement (AP) classes in three school systems that enjoy excellent reputations because of their high test scores.

#### AP Chemistry

Students work in groups of two and three mixing chemicals according to directions written on the chalkboard. Once the mixtures are prepared, students heat the concoction with Bunsen burners. According to the directions on the board, they are supposed to record their observations on a worksheet.

I watch a group of three young men whose mixture is giving off a thin spiral of smoke as it's being heated—something that none of the other students' beakers are doing. One student looks back at the chalkboard and then at his notes. Then all three stop what they are doing, apparently waiting for the teacher to come help them.

"What's happening to your mixture?" I ask the group.

"Dunno," one mutters. "We must have mixed it up wrong."

"What's your hypothesis about what happened—why it's smoking?"

The three look at one another blankly, and the student who has been doing all the speaking looks at me and shrugs.

**AP U.S. Government**

The teacher is reviewing answers to a sample test that the class took the previous day. The test contains 80 multiple-choice questions related to the functions and branches of the federal government.

When he's finished, he says "OK, now let's look at some sample free-response questions from previous years' AP exams." He flips the overhead projector on and reads from the text of a transparency: "*Give three reasons why the Iron Triangle may be criticized as undemocratic*. How would you answer this question?"

No one replies.

"OK, who can give me a definition of the Iron Triangle?"

A student pipes up, "The military-industrial-congressional complex."

"OK, so what would be three reasons why it would be considered undemocratic?" The teacher calls on a student in the front row who has his hand half raised, and he answers the question in a voice that we can't hear over the hum of the projector's fan.

"Good. Now let's look at another one." The teacher flips another transparency onto the projector. "Now this question is about bureaucracy. Let me tell you how to answer this one. . . ."

**AP English**

The teacher explains that the class is going to review students' literature notes for the advanced placement exam next week. The seven students are deeply slouched in their chairs, arranged in a semicircle around the teacher's desk.

The teacher asks, "Now what is Virginia Woolf saying about the balance between an independent life versus a social life?"

Students ruffle through their notebooks. Finally, a young woman, reading from her notes, answers, "Mrs. Ramsey sought meaning from social interactions."

"Yes, that's right. Now what about Lily, the artist? How did she construct meaning?"

"Through her painting," another student mumbles, her face scrunched close to her notes.

"So what is Woolf saying about the choices these two women have made, and what each has sacrificed?"

No reply. The teacher sighs, gets up, goes to the board, and begins writing.

**A Rare Class**

Once in a great while, I observe a class in which a teacher is using academic content to develop students' core competencies. In such a class, the contrast with the others is stark.

At the beginning of the period in an Algebra II class, the teacher writes a problem on the board. He turns to the students, who are sitting in desks arranged in squares of four that face one another. "You haven't seen this kind of problem before," he explains. "Solving it will require you to use concepts from both geometry and algebra. Each group will try to develop at least two different ways to solve this problem. After all the groups have finished, I'll randomly choose someone from each group who will write one of your proofs on the board, and I'll ask that person to explain the process your group used."

The groups quickly go to work. Animated discussion takes place as students pull the problem apart and talk about different ways to solve it. While they work, the teacher circulates from group to group. When a student asks a question, the teacher responds with another question: "Have you considered . . .?" "Why did you assume that?" or simply "Have you asked someone in your group?"

What makes this an effective lesson—a lesson in which students are learning a number of the seven survival skills while also mastering academic content? First, students are given a complex, multi-step problem that is different from any they've seen in the past. To solve it, they have to apply critical-thinking and problem-solving skills and call on previously acquired knowledge from both geometry and algebra. Mere memorization won't get them far. Second, they have to find two ways to solve the problem, which requires initiative and imagination. Third, they have to explain their proofs using effective communication skills. Fourth, the teacher does not spoon-feed students the answers. He uses questions to push students' thinking and build their tolerance for ambiguity. Finally, because the teacher announces in advance that he'll randomly call on a student to show how the group solved the problem, each student in every group is held accountable. Success requires teamwork.

## Rigor for the 21st Century

Across the United States, I see schools that are succeeding at making adequate yearly progress but failing our students. Increasingly, there is only one curriculum: test prep. Of the hundreds of classes that I've observed in recent years, fewer than 1 in 20 were engaged in instruction designed to teach students to think instead of merely drilling for the test.

To teach and test the skills that our students need, we must first redefine excellent instruction. It is not a checklist of teacher behaviors and a model lesson that covers content standards. It is working with colleagues to ensure that all students master the skills they need to succeed as lifelong learners, workers, and citizens. I have yet to talk to a recent graduate, college teacher, community leader, or business leader who said that not knowing enough academic content was a problem. In my interviews, everyone stressed the importance of critical thinking, communication skills, and collaboration.

We need to use academic content to teach the seven survival skills every day, at every grade level, and in every class. And we need to insist on a combination of locally developed assessments and new nationally normed, online tests—such as the College and Work Readiness Assessment (www.cae.org)—that

measure students' analytic-reasoning, critical-thinking, problem-solving, and writing skills.

It's time to hold ourselves and all of our students to a new and higher standard of rigor, defined according to 21st-century criteria. It's time for our profession to advocate for accountability systems that will enable us to teach and test the skills that matter most. Our students' futures are at stake.

Pink, D. (2005). *A whole new mind: Moving from the information age to the conceptual age*. New York: Riverhead Books, pp. 32-33.

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