By Tony Wagner

RIGOR redefined

THE SEVEN SURVIVAL SKILLS FOR CAREERS, COLLEGE, AND CITIZENSHIP

I've spent the last two years researching and writing a new book, The Global Achievement Gap: Why Even Our Best Schools Don't Teach The New Survival Skills Our Children Need—and What We Can Do About It. I began with several questions: First, in the new global economy, where any job that can be turned into a routine is being either automated or "off-shored," what skills will our students need to get—and keep—a good job? And what skills are needed for citizenship today? Are these education goals in conflict, I wondered.

With a clearer picture of the skills young people will need, I then set out to learn to what extent we are teaching and testing the skills that matter most. And because we already know that many of our nation's urban schools are failing, I chose to observe classrooms in some of our most highly regarded suburban schools in order to understand whether our "best" was, in fact, good enough for our children's future. What I discovered in this journey may come as a surprise to many.

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

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"First and foremost, I look for someone who asks good questions," Parker responded. "Our business is changing, and so the skills our engineers need change rapidly, as well. We can teach them the technical stuff. But for employees to solve problems or to learn new things, they have to know what questions to ask. And we can't teach them how to ask good questions—how to think. The ability to ask the right questions is the single most important skill."

"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."

"I don't understand," I confessed.

"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 the customer—to find out what his needs are. If you can't engage others, then you won't learn what you need to know."

I was initially skeptical of Parker's answers—thinking perhaps that his views weren't representative of business leaders in general. But after having completed nearly 100 interviews with leaders from Apple to Unilever to the U.S. Army and reviewed the research on the workplace skills most needed, I have come to understand that the world of work has changed profoundly. There are, I discovered, Seven Survival Skills that all of our students will need to master in order to get a good job in the new "flat" world of work. I also came to see how these are the same skills young people need in order to discuss, understand, and offer leadership to solve some of the most pressing issues we face as a democracy in the 21st century.

1. Critical Thinking and Problem-solving

In order for companies to compete in the new global economy, they need every worker to be a "knowledge worker"—and to think about how to continuously improve their products, processes, or services. Over and over again, executives told me that the heart of critical thinking and problem-solving skills is the ability to ask the right questions. As one senior executive from Dell Computer said, "Yesterday's answers won't solve today's problems."

Ellen Kumata, who is managing partner at Cambria Associates, consults to senior executives at Fortune 200 companies. She explained to me the extraordinary pressures on all leaders today, regardless of their product or service. "When I talk to my clients, the challenge is this: how do you do things that haven't been done before, where you have to re-think or think anew, or break set in a fundamental way—it's not incremental improvement anymore. That just won't cut it. The markets are changing too fast, the environments are changing too fast."

2. Collaboration Across Networks and Leading By Influence

Teamwork, it seems, is no longer just about working with others in your building. And traditional top-down accountability structures are rapidly being replaced by horizontal networks. My conversation with CEO Christie Pedra at Siemens, first suggested to me that the concept of teamwork today is very different than it was twenty years ago. "Technology has allowed for virtual teams," she explained. "The way some engineering projects in our company are set up is that you are part of a virtual team. 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. They don't work in the same room, they don't come to the same office, but every week they're on a variety of conference calls; they're doing web casts; they're doing net meetings."

Mike Summers, who is Vice President for Global Talent Management at Dell Computers, 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 versus direct and command."

3. Agility and Adaptability

Clay Parker explained that anyone who comes to work at BOC Edwards today "has to think, be flexible, change, and be adaptive, and use a variety of tools to solve new problems. We change what we do all the time. I've been here four years, and we've done fundamental re-organization every year because of changes in the business. People have to learn to adapt. 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, the Senior Vice President and General Counsel at Cisco was one of the strongest proponents of these traits. "Leadership is the capacity to take initiative and trust yourself to be creative," he told me. "I say to my employees if you try five things and get all five of them right, you may be failing. If you try ten things, and get eight of them right, you're a hero. If you set stretch goals, 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, who is Vice President for Global Talent Management at Dell Computers, spoke forcefully on this issue: "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. They are unable to communicate their thoughts effectively. You're talking to an exec, and 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."

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Listening to Summers' comments as a former high school English teacher myself, I was surprised by the list of skills he thought important: not only being able to communicate one's thoughts clearly and concisely, but also being able to create focus, energy, and passion. 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. While it's obviously important to write and speak correctly, the complaints I heard most frequently were more 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 flowing into their work lives on a daily basis. 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 just the shear quantity of information that represents such a challenge. It is also how rapidly and constantly the information is changing. Quick, how many planets are there? While I was at Harvard in the early 1990's, I heard then Harvard University President Neil Rudenstine say in a speech that the half-life of knowledge in the humanities is ten years, and in math and science, it's only two or three years. And that was fifteen years ago! I wonder what he would say it is today.

7. Curiosity and Imagination

Clay Parker stressed the importance of employees whom he hires being more than just smart. "I want people who can think—they're not just bright—they're also inquisitive. Are they engaged, are they interested in the world?" And Mark 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 most impact on innovation."

Daniel Pink, the author of A Whole New Mind, observes that with increasing abundance, people want more unique products and services. Plain vanilla won't cut it any more in today's crowded marketplace: "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." Pink notes that developing young people's capacities for imagination, creativity, and empathy will be increasingly important for maintaining our country's competitive advantage in the future.

The Global Achievement Gap Revealed

I've spent time leading what I call "learning walks" and observing in classrooms all over the country for more than twenty years. In my new book, I profile a number of secondary honors and Advanced Placement classes in three school systems that enjoy excellent reputations due to their high test scores. Here is a sampling of what I saw:

Advanced Placement Chemistry

Students are in groups of two and three mixing chemicals according to directions that are written on the blackboard. Once the mixtures are prepared, they then 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 blackboard and then at his notes. Then all three stop what they are doing—apparently waiting for the teacher, who is sitting at her desk, to come help them.

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

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

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

The three look at each other, and then the student who has been doing all the speaking looks at me and shrugs.

"Do you know what a hypothesis is?" I press.

My question is greeted with blank looks. Finally, their spokesperson says, "We had it on a test as a vocab question. Isn't it—like—an idea of what's supposed to happen?"

Advanced Placement U.S. Government

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

When he's done, he says "Okay, now let's look at some sample free response questions from previous years' AP exams." He flips the overhead projector on, turns out the lights, and reads from the text of a transparency: Give 3 reasons why the Iron Triangle may be criticized as undemocratic.

"How would you answer this question?" the teacher asks. No one replies. "Ok, who can give me a definition of the Iron Triangle?"

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

"Okay, 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 . . ."

Advanced Placement English

It is the beginning of class, and the teacher explains that they are going to review students' notes on the literature they will use to answer questions on the Advanced Placement exam, which will be given next week.There are seven students in the room, and all of them are deeply slouched in their chairs, which are arranged in a semi-circle around the teacher's desk.

The teacher is seated at her desk, as she asks: "Now what is Woolf saying about the balance between an independent 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 the artist, Lily? How did she construct meaning?"

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

"And 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.

Once in a great while, I observe a class where a teacher is using academic content as a means of developing students' core competencies. When you see such a class, the contrast to the others is stark:

Algebra II

It is the beginning of the period, and the teacher is finishing up writing a problem on the board. He turns to the students, who are sitting in desk-chairs which are arranged in squares of four that face one another. "You haven't seen this kind of problem before," he explains. "And solving it will require you to use concepts from both geometry and algebra. Each group will try to develop at least two different ways of solving this problem. After all the groups have finished, I'll randomly choose someone from each group who will write one of your proofs on one of the boards around the room, and I'll ask that person to explain the process your group used. Are there any questions?"

There are none, and the groups quickly go to work.

There is a great deal of animated discussion within all of the groups as they take the problem apart and talk about different ways to solve it. While they work, the teacher circulates from group to group. Occasionally, a student will ask a question, but the teacher never answers it. Instead, he either asks another question in response, such as "have you considered…?" or "why did you assume that?" or simply "have you asked someone in your group?"

What are some of the design elements that make this an effective lesson—a lesson in which students are, in fact, 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 the ones they've seen in the past and, to solve it, they have to apply previously acquired knowledge from both geometry and algebra. Mere memorization won't get them very far in this lesson; critical thinking and problem-solving skills are required. Second, they have to find two ways to solve the problem, which requires some initiative and imagination. Just getting the correct answer isn't good enough; they have to explain their proofs—using effective communication skills. Third, the teacher does not spoon feed students the answers; he uses questions to push students' thinking—as well as their tolerance for ambiguity. Finally, because the teacher has said that he'll randomly call on a student to show how the group solved the problem, each student in every group is held accountable. The group can't rely on the work of one or two students to get by, and the teacher isn't going to just call on the first student to raise a hand or shout out an answer. Teamwork is required for success.

"Rigor" for the 21st Century

Increasingly in American schools today, there is only one curriculum: test prep. Assessment drives instruction—for better or for worse. And when most of the tests are multiple choice and require mainly memorization of facts—it's definitely for the worse. It is the rare teacher—like the one whom I described above—who is willing to risk teaching students to think versus merely drilling what must be covered for the test. Of the classes that I've observed, fewer than one in twenty met this criterion, unless you are in one of the exceptional schools I describe later in the book where teaching all students "habits of mind" is the curriculum.

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Even in our best schools, we are teaching kids to memorize much more than to think. And in the 21st century, mere memorization won't get you very far. There's too much information, and it's changing and growing exponentially. Besides, most of the information we need is readily available on the nearest computer or PDA screen—provided we know how to access and analyze it. Where in the 20th century, rigor meant mastering more—and more complex—academic content, 21st century rigor is about creating new knowledge and applying what you know to new problems and situations.

All over the country, I see schools that are succeeding at making AYP but failing our students. We are not teaching or testing the skills that our students need for college, careers, or citizenship. These skills have, in fact, converged, but they are rarely the focus of work in classrooms. In order for this change to occur, we must first re-define excellent instruction. Excellent teaching is not a check list of teacher behaviors

and a model lesson that covers content standards. It is working with colleagues to ensure mastery by all students of the skills they need to succeed as lifelong learners, workers, and citizens. I have yet to talk to a recent graduate or a college teacher or a community leader who said not knowing enough academic content was a problem. In my interviews, everyone talked about the importance of critical thinking, communication skills, and collaboration.

We need to use academic content as a means of teaching the Seven Survival Skills every day—in every grade level and every class. The Seven Survival Skills can and must be tested through a combination of locally developed assessments and new nationally-normed, online tests such as the College and Work Readiness Assessment, which measures students' analytic reasoning, critical thinking, problem-solving, and writing skills.

It is time to hold ourselves and all of our students to a new and higher standard of rigor—one that is defined according to 21st century criteria. It is 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—and the future of our country—are at stake.

Tony Wagner is Co-Director of the Change Leadership Group at the Harvard Graduate School of Education and can be reached through his website: www.schoolchange.org. This article is adapted from his book, *The Global Achievement Gap: Why Even Our Best Schools Don't Teach The New Survival Skills Our Children Need—and What We Can Do About It* (New York: Basic Books, 2008)

[I]Daniel Pink, A Whole New Mind: Moving from The Information Age to The Conceptual Age, Riverhead Books, New York, 2005, pp. 32-33
[II]Information on the College and Work Readiness Assessment can be found here: www.cae.org