NEW SKILLS FOR
Project-based learning teaches kids the collaborative and critical thinking abilities they’ll need to compete.

BY BOB PEARLMAN

Let’s assume the No Child Left Behind Act works fine and that by 2014 every student meets the targeted standards and passes his or her state’s exit exam. Will those students be successful as citizens and workers in the twenty-first century?

Not a chance.

Let’s further assume that each state’s governor gets the one-on-one computer bug and equips all of each state’s students with top-flight portable PCs. Will these students now be successful as citizens and workers in the twenty-first century?

Again, not a chance.

No matter how sophisticated the tools we put in classrooms, the curriculum designed to educate students to meet the new standards is sorely inadequate to help them after they leave school. In short, learning—and schooling—must be totally transformed.

“Today’s graduates need to be critical thinkers, problem solvers, and effective communicators who are proficient in both core subjects and new, 21st-century content and skills,” according to “Results that Matter: 21st Century Skills and High School Reform,” a report issued in March by the Partnership for 21st Century Skills.
These include learning and thinking skills, information- and communications-technology literacy skills, and life skills.

Students of today enter an increasingly globalized world in which technology plays a vital role. They must be good communicators, as well as great collaborators. The new work environment requires responsibility and self-management, as well as interpersonal and project-management skills that demand teamwork and leadership.

Enter project-based learning, designed to put students into a students-as-workers setting where they learn collaboration, critical thinking, written and oral communication, and the values of the work ethic while meeting state or national content standards. Homewood School, in Tenterden, England, in that spirit, calls its PBL program Total Learning.

In traditional classrooms, students typically work on simple assignments that emphasize short-term content memorization; they work alone, write for the teacher alone, and rarely make presentations. But don’t confuse PBL with simply doing activities injected into traditional education to enliven things as a culminating event for a learning unit. Real PBL, by contrast, is deep, complex, rigorous, and integrated. Its fundamentals are fourfold:
1. Create teams of three or more students to work on an in-depth project for three to eight weeks.
2. Introduce a complex entry question that establishes a student’s need to know; and scaffold the project with activities and new information that deepens the work.
3. Calendar the project through plans, drafts, timely benchmarks, and finally the team’s presentation to an outside panel of experts drawn from parents and the community.
4. Provide timely assessments and/or feedback on the projects for content, oral and written communication, teamwork, critical thinking, and other important skills.

One place where it’s working is the New Technology High School, in Napa, California, a thoroughly PBL school since its launch in 1996. “We needed a new type of instruction that better reflected the goals we wanted each student to achieve, demonstrate, and document,” says Paul Curtis, one of the original lead teachers at New Tech and now director of curriculum for the New Technology Foundation.

New Tech teachers build their instruction around eight Learning Outcomes—content standards, collaboration, critical thinking, oral communication, written communication, career preparation, citizenship and ethics, and technology literacy—which they embed in all projects, assessments, and grade reports. Instructors start each unit by throwing students into a real-world or realistic project that engages interest and generates a list of things they need to know. Projects are designed to tackle complex problems requiring critical thinking. The school’s strategy is simple:

To learn collaboration, work in teams.
To learn critical thinking, take on complex problems.
To learn oral communication, present.
To learn written communication, write.
To learn technology, use technology.
To develop citizenship, take on civic and global issues.
To learn about careers, do internships.
To learn content, research and do all of the above.

Examples of projects include presenting a plan to Congress on solving the oil crisis, addressing economic issues as a team of the president’s economic advisers, or inventing, under contract from NASA, new sports that astronauts can play on the Moon for exercise.

PBL gets even stronger when projects, and courses, fully integrate two or more subjects, such as English and social studies or math and physics.

At the MET/Big Picture Company network of small high schools, for example (see “High School’s New Face,” November/December 2004), the main component of every student’s education is the Learn Through Internships program, in which students complete authentic projects with the guidance of expert mentors a minimum of two days a week. One student, for example, worked in a fish hatchery to learn about the industry and develop a business plan. Others helped repair racing cars. “I’ve learned a lot about cars and how math relates to the world,” says student Clarence Wells, who worked at Gallant Racing Supply, in Oakland, California. “I’m taking a physics class, and that’s tied in with the stuff I do here. I wrote a paper about aerodynamics, and I’m learning a lot about that.”

Students at the Marin School of Arts and Technology, in Novato, California, meanwhile, complete schoolwide thematic and interdisciplinary projects. Last year, they compared the Indian Valley watershed, where their school is located, to other local ones.

Christopher Tan’s Knowledge Community students in Hong Kong and Singapore “form communities to solve problems, construct knowledge, explore ideas, and build projects.” Their 3-I (Interdisciplinary, Inter-school & International) Project Learning experience focuses on environmental protection of local communities.

Good projects engage students on their own need to know in tackling complex problems and working in teams to generate solutions, products, and presentations. In every project, they touch all the bases the Partnership for 21st Century Skills considers fundamental outcomes of a successful PBL program.

Measuring Results
How do we know PBL is working? Project- and problem-based learning doesn’t work unless learners obtain feedback. Current assessments don’t do the job. State testing and accountability are aimed at schools, not individual student learning, and reports are released once a year, after students have moved on to other teachers. Periodic assessments in managed curriculums mainly provide information to teachers. Students can’t improve or become managers of their own learning without constant, real-time assessment and feedback, referred to in PBL instruction as assessment for learning, as opposed to assessment for school, district, or

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Assessment for learning starts with outcomes, proceeds with projects, products, and performances that map to the outcomes, and completes the loop with assessment and feedback to students.

Rubrics, or scoring guides, delineate the criteria. But they are not just a way for teachers to evaluate student work. In the best PBL classrooms, students see the rubrics when they start the project and deploy them as tools to both self-appraise and assess their own learning.

Most schools give students a single grade for a course, often losing important data about their skills and abilities. At New Tech, by contrast, the grade report shows separate grades for content, critical thinking, written communication, oral communication, technology literacy, and any of the other Learning Outcomes appropriate for the course.

At New Tech, the grade book is online, accessible to students, their parents, and teachers with a password, and it is a living document—updated whenever new information is available. Students thus remain constantly aware of their strengths and weaknesses and can target their efforts toward improvement. This continuous feedback is critical in helping students become self-directed learners.

New Tech has developed unique ways to assess certain modern skills. At the end of every project, students assess their team members, anonymously, using the online Peer Collaboration rubric. Scores go into a database, where students, through a secure password, can see them. Students can then publish these scores as evidence in their digital portfolios. Teachers and visiting community experts, meanwhile, score the similar online Presentation Evaluation rubric.

**Tech in the Classroom**

In England, the government has increased its investment in technology for schools every year for the past seven years. Schools there now surpass U.S. schools in technology use, and many now have one-to-one computer environments. But go into a typical British school, and you’ll see not much has changed. Teachers still lecture, only using PowerPoint and interactive whiteboards, and students still take notes, though now on laptops.

Many schools here and abroad are experimenting with one-to-one computing and finding the results lacking. This is due to a traditional curricular approach that fails to engage students as directors of their own learning. Project- and problem-based learning, by contrast, bring one-to-one computing to life.

Technology plays a critical role in supporting PBL environments. Equipped with their own computers and Internet access, for example, New Tech students can research any topic, communicate with experts and teachers, write journals, develop presentations with PowerPoint, video, and podcasts, and develop their Professional Digital Portfolio, demonstrating their mastery of the school’s Learning Outcomes.

**PBL Challenge**

PBL has one factor in common with traditional education—it takes good teachers to make it work well. It’s hard work designing effective projects, scaffolding activities, benchmarks, rubrics, and culminating products and events. And it’s a challenge to manage the PBL classroom and orchestrate all phases of the project. But PBL leaves traditional education in the dust. It sets students to work on their own juices, as self-directed learners. It enables them to master state standards and a lot more.

Today’s new efforts in PBL are fully standards-based and methodologically sound and utilize some form of technologically based collaborative-learning environment to support these students as workers classrooms and schools.

New research demonstrates that PBL makes a difference. A recent study of eight New Tech graduating classes shows that 89 percent attended a two-year or four-year postsecondary institution, 92 percent applied some or a great deal of what they learned at New Tech to their postsecondary education or career, and 96 percent would choose to attend the school again.

Researchers in Singapore, who published the book *Engaging in Project Work*, have found a significant value add in student learning achieved from PBL since its nationwide implementation in 2000.

NCLB tells students that mastery of core subjects will lead to success. By contrast, Thomas L. Friedman, author of the best-seller *The World Is Flat*, tells his daughters an updated version of the old eat-your-supper-children-are-starving story: “Finish your homework. People in India and China are starving for your job.”

What do you tell your children, and your students? Just this: Globalization is flattening the world and challenging the United States as never before.

Students here and in other advanced countries must move up the value chain and lead a new era of global cooperation as twenty-first-century learners.

Tell them this, too: You, students of today, need a lot more than core academic subjects. You need to also learn teamwork, critical thinking, and communication skills. Look for a school where you can do real-world projects, where you are given assessment and feedback on all the skills essential in this century, and where you and your fellow students are provided with the workspaces and technology tools to become successful citizens and knowledge workers.

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