

BY JENNIFER ORLANDO

Brigid Blakeslee is an engineer. She creates robots, designs adaptive technologies for disabled students and understands that AC/DC isn't just a hard-rocking band from Australia. She's also only 17 years old.

Brigid is one of thousands of students across the nation involved in Project Lead the Way, a not-for-profit organization created to address the likely shortage of engineers in the United States. Established in 1997, Project Lead the Way (PLTW) began with 11 high schools in upstate New York. The program now exists in all 50 states and Washington, D.C., and by September 2008, the organization's engineering curriculum is estimated to reach more than 250,000 students in over 2,900 schools across the country.

As a high school student at the Bergen County Academy for Engineering and Design Technology (AEDT) in New Jersey, Brigid spends most of her days talking about and working with robotics, computer simulations and technology systems. AEDT adopted the PLTW curriculum nearly 10 years ago and houses over 100 engineering students each year. Because of the PLTW curriculum, students at AEDT participate in a number of unique engineering projects throughout the year, including a partnership with the Bleshman School, also in Bergen County, which serves disabled students.



PLTW students work together on a robotics engineering challenge.

PHOTOS BY ANDREW CRUDELE

Follow the Leader

The next generation of engineers and innovators follow Project Lead the Way.

"Our school is building a partnership so that engineering students will have the opportunity to meet with students at the Bleshman School and design and create an adaptive device to contribute to their quality of life," said Brigid. "Adaptive technologies are something that I've always been interested in."

Classes are in session

Schools that adopt the PLTW curriculum are provided with rigorous project and problem-based learning opportunities in the disciplines of engineering, biomedical sciences and engineering technology. The program offers curricula for both middle schools and high schools.

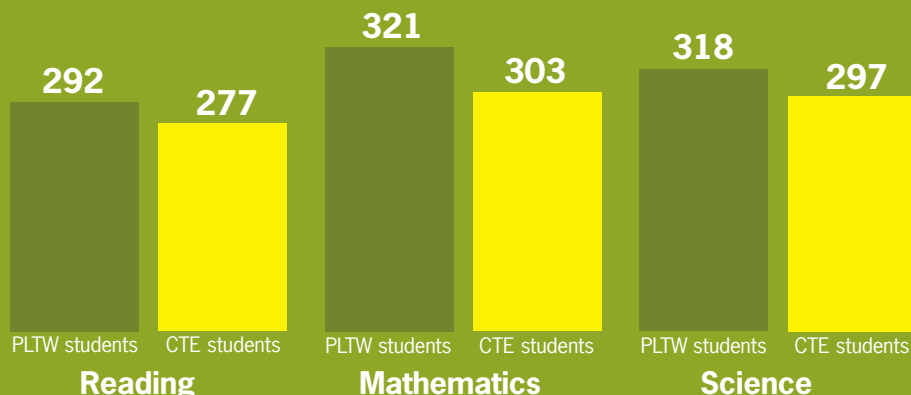
The middle school curriculum, Gateway to Technology, consists of five independent nine-week courses, usually taken as electives, developed to help students understand the rigorous and challenging workload that accompanies a career in engineering. The program is designed to engage the natural curiosities of middle school-aged students so they enter high school with both a passion for and an understanding of what it takes to be an engineer. Ultimately, the program aims to strengthen math, science and technology inquiry skills at a young age.

In 2004, the United States graduated 70,000 engineers. That same year, India graduated 200,000 engineers and China led the field with 500,000 engineering graduates.

Source: *Rising Above The Gathering Storm: Energizing and Employing America for a Brighter Economic Future*. National Academy of Sciences, 2005.



PLTW Students Outscore the Competition



Comparison of PLTW students' average National Assessment of Education Progress (NAEP) scores with a random sample of students from all career and technical education (CTE) fields

Source: 2006 High Schools that Work Assessment, <http://www.sreb.org/programs/hstw/Assessment/assessindex.asp>

“These students leave high school with a powerful set of skills that are applicable and transferable across a wide range of career pathways.”

Judy D’Amico, director of state and corporate relations for PLTW’s western region

Pathway to engineering

Unlike the middle school curriculum, PLTW’s high school program, Pathway to Engineering, is an intensive four-year sequence of courses that introduces students to the scope, rigor and discipline of engineering prior to entering college. Integrated into students’ core curriculum, Pathway to Engineering is a structured program that offers students the option to replace standard electives with engineering courses that are meant to provide students with a hands-on view of engineering and technology-based careers.

“All students respond better to project-based learning because it is easier to learn by doing than (to) learn by watching others do,” says Daniel Jaye, principal and director of Bergen County Academies. “Actively engag-

ing students in learning is key to thorough understanding of content.”

Seven of the eight high school PLTW courses can be used toward college credit at participating colleges and universities, so while some students may decide to pursue careers outside of engineering, PLTW still boasts a dynamic curriculum that is beneficial to all students, engineering hopefuls or not.

“These students leave high school with a powerful set of skills that are applicable and transferable across a wide range of career pathways,” says Judy D’Amico, director of state and corporate relations for PLTW’s western region.

At its core, Project Lead the Way aims to position students at the spearhead of the new technological frontier, and it brings teachers along for the ride.

Professional development

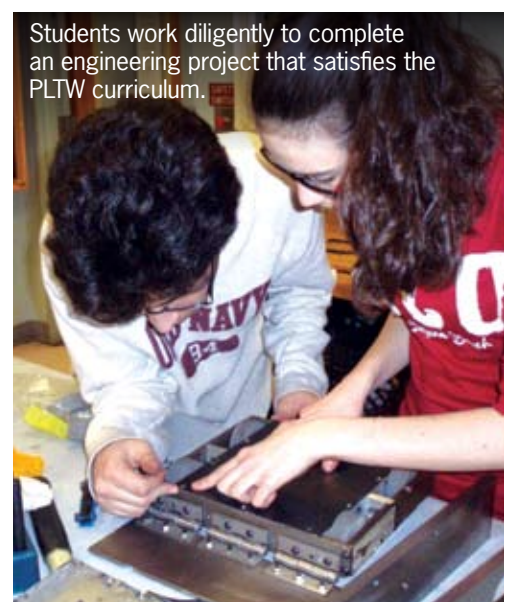
Students aren’t the only ones benefiting from PLTW’s unique curriculum. Every instructor who teaches a PLTW course is provided two weeks of intensive professional development at the Summer Training Institute (STI), with “master teachers” – current teachers of the PLTW curriculum – leading the summer training classes.

“By having a master teacher teach the STI, a teacher in training can ask questions specific to the implementation and get real-world answers,” says Debora Crane, a PLTW instructor at Galt High School in Galt, Calif.

The STI’s structured training prepares teachers with tools and resources for success as PLTW instructors.

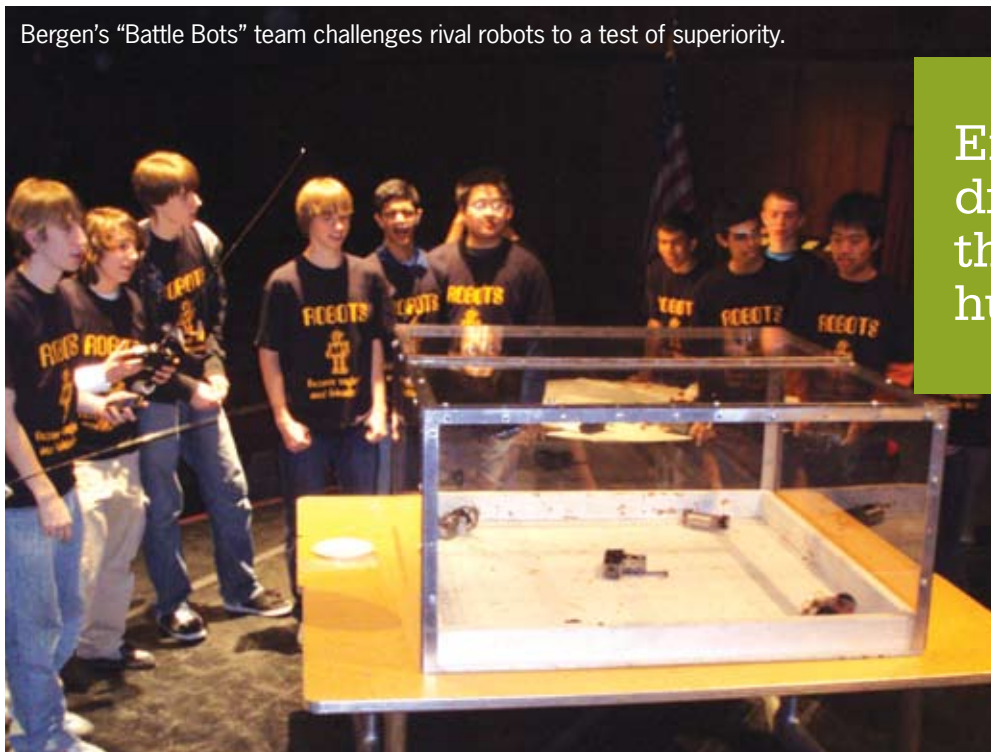
“Every teacher that I have ever spoken to about PLTW has come back from training energized with ideas for exciting implementation in the classroom,” said Jaye.

For PLTW, counselors are a driving force behind student recruitment for the program, and a one-day seminar is included to introduce counselors to the curriculum. A goal of PLTW is to recruit the top 80 percent of interested students, and counselors help to recruit and guide students interested in



Students work diligently to complete an engineering project that satisfies the PLTW curriculum.

Bergen's "Battle Bots" team challenges rival robots to a test of superiority.



Engineering is the driving force behind the advancement of human civilization.

has shaped the way human society functions and thrives.

Unfortunately, engineering is one of the least sought-after careers among the United States' degree-seeking students. According to the 2005 study, *Tapping America's Potential*, the number of engineering degrees awarded in the United States has decreased 20 percent from the peak year of 1985.

Great Engineering Feats of the 20th Century

With great inventions like these, it's no wonder the world needs more engineers for the new millennium.

1903	Airplane
1922	Insulin
1928	Penicillin
1937	Jet engine
1939	Electron microscope
1940	Color television
1944	Kidney dialysis machine
1947	Microwave oven
1953	"Black box" flight recorder
1969	The artificial heart
1969	The ATM
1979	The cell phone
1988	Doppler radar
1989	The Internet

Source: www.inventors.about.com.

"I feel like (engineering) is something that is both creative and concrete; there is a known end, but you can use any means to reach it."

Brigid Blakeslee, student, Bergen County Academy for Engineering and Design Technology

PLTW and engineering in general. Because PLTW's curriculum doesn't consist of traditional middle school and high school classes, it may be difficult to determine which students will succeed. The one-day seminar helps counselors identify which students will thrive as PLTW kids and which students will struggle.

More engineers, please

Engineering is the driving force behind the advancement of human civilization. Ever stop to think who invented the first clock or television? What about aspirin or ATMs? From simple yet ingenious inventions like the wheel and rubber bands, to sophisticated developments like the Internet and modern medicine, engineering

Project Lead the Way intends to rekindle American students' interest in engineering, and in Brigid's case, it seems to be working.

"I love being able to create and build something new; it is an incredible experience to bring something from an idea to the planning stages, through the building process, and ultimately have a working project," says Brigid. "I love how engineering couples both design elements and practical specifications. I feel like it is something that is both creative and concrete; there is a known end, but you can use any means to reach it." ●