



Forging new generations of engineers

# the sharp edge



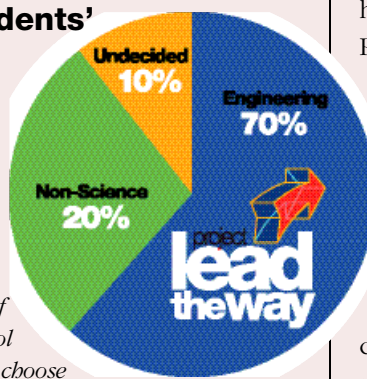
## PLTW Is Put to the Test

**P**ut down your #2 pencils. The results are in from the first year of a five-year assessment of PLTW's performance against strategic objectives.

An independent study, conducted by TrueOutcomes, a Pennsylvania-based research firm with extensive experience evaluating engineering programs, revealed encouraging data about PLTW's early performance against its long-term mission to increase the number of young professionals entering engineering and technology careers. Although preliminary, the first year results confirm that PLTW is making progress and that new courses have the potential to generate interest from traditionally underrepresented student populations.

"We are thrilled with the initial results from the assessment," says Niel Tebbano, PLTW's Vice President. "The objective feedback gives us a clear view of what we need to work on going forward." For Tebbano, the report yielded several headlines:

### PLTW Students' Major Choices



*TrueOutcomes' study shows that 70 percent of PLTW high school seniors intend to choose engineering as their college or post-secondary course of study.*

### Schools recognize the value of PLTW

In 2001 PLTW set a goal to reach 1,000 schools by the year 2005. As word spread and schools learned of PLTW's positive results, the program reached 1,300 middle and high schools earlier this year.

### Students influenced by PLTW

The fact that a majority of PLTW students chose to pursue additional engineering studies in college was not surprising. That the matriculation rate was so much

higher for those students who took PLTW courses than those who did not was unexpected.

In fact, the results show that PLTW students are *five times* more likely to enter post-secondary engineering programs than students who did not study PLTW. Eighty percent of PLTW graduates plan to attend college or community college, compared to the national average of just 65 percent. Of PLTW graduates, about 70 percent intend to enroll in engineering or engineering technology programs (*left*)

### Racial and ethnic representation in PLTW is improving

The representation of Hispanic and African-American students in PLTW courses is about double their representation in engineering programs nationwide. Although the study concludes that PLTW is "very effective at recruiting underrepresented segments of the population," PLTW is not satisfied. One major goal of PLTW is to achieve

*(Continued on page 2)*

## PLTW IN ACTION

### Success with the PLTW Method

**W**ith two more reports praising its curriculum and standards, PLTW is on a roll.

Two recent studies, from the Southern Regional Education Board's *High Schools That Work (HSTW)* initiative and the University of Houston, assess the effectiveness of PLTW's curriculum and standards for both students and educators. The studies' results prove that PLTW is both improving the learning

experiences and achievement levels of students, while increasing the confidence and effectiveness of teachers.

The purpose of the *HSTW* study, entitled *Project Lead The Way: A Pre-engineering Curriculum That Works* was to determine how the test results of PLTW students compare to those of students in career and technical programs. The study used random samplings of 274 PLTW students and 274 students from both high-tech and career and technical education (CTE) classes. The most encouraging results center on the rigorous academic requirements established by PLTW.

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## Put to the Test

proportional representation for all demographics. Efforts will continue in the coming years to reach that goal.

### New female-friendly curriculum shows promise

With a goal to enroll 10 percent more females in its courses than the national average, PLTW is developing and implementing new programs to generate interest among female high school students. The study notes the percentage of females in life science-based engineering programs is higher than 40 percent and recognizes PLTW's new bioengineering curriculum as an effective strategy to generate gains in female enrollment.

The PLTW Board of Directors commissioned the TrueOutcomes study in 2004. The firm conducted an exhaustive data collection effort and built a web-based protocol that has



led to the most comprehensive assessment of PLTW to date. The on-line data collection will allow PLTW to track students through high school, college, and their entry-level jobs.

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**For more information on the study, "Report on the First Year of Implementation of the TrueOutcomes Assessment System for Project Lead The Way," visit [www.pltw.org/TrueOutcomesMain.shtml](http://www.pltw.org/TrueOutcomesMain.shtml). If you are interested having your school participate in the assessment, contact Debra Mendelson at 703-764-0224 or [dmendelson@trueoutcomes.com](mailto:dmendelson@trueoutcomes.com).**

# The Director's Corner

By Richard Blais

## Beyond the Primary Sciences

**W**hen we think about biology, chemistry, and physics, we know that these are general fields of study that represent the basic disciplines of science. In fact, virtually all high schools in America have courses in these subjects.

The following terms have several things in common: bioinformatics, gene sequencing, mathematical modeling, evidence-based medicine, statistical-based evaluation, and fluid dynamics. These terms are frequently used by scientists, engineers, doctors, medical technicians, and others using an integration of mathematics and sciences in the new frontier of science and medicine. They represent the new knowledge and skills of people who will fill the ranks of jobs in the biomedical and life sciences.

The questions we must ask are: Do the three primary science subjects adequately prepare our students? Are traditional biology, chemistry, and physics relevant to the



Richard Blais

Shelby Larsen

needs of the future work force?

At Project Lead The Way we believe that they are not enough.

The Board of Directors of PLTW has decided to create a new sequence of courses intended to expose students to the mathematics and sciences that must be added to the traditional coursework. Our goal is to provide the integrated rigor and contemporary

relevance that will prepare students for future careers in the biomedical and life sciences.

The new curriculum will follow the existing PLTW curricula frameworks and standards of quality that will be supported by the same systems already in place for schools, teachers, and students.

We have already partnered with the states of Indiana, Maryland, Missouri, Oklahoma, and South Carolina to develop this breakthrough curriculum program. Interest from other states is being generated. PLTW will keep you advised as to the progress of this initiative.

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## Success

"PLTW students are leaving high school with better math and science skills than other students, and that explains why they are more successful in college," says Pamela Newberry, PLTW's Director of Curriculum. For these reasons, HSTW is advocating that other schools in the SREB network adopt the key practices of PLTW.

PLTW students' results are promising, but the need for well-trained, effective teachers has not been overlooked. In the University of Houston's study, *Project Lead*

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educators were surveyed on their experiences in teaching the PLTW curriculum. Overall, PLTW teachers reported feeling "empowered" by the training and curriculum of the program.

Both studies prove that with highly trained teachers, students are able to perform better across the high school curriculum, an encouraging fact to parents, educators, and the community alike.

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**To download the SREB study, visit [www.pltw.org/bulletins.shtml](http://www.pltw.org/bulletins.shtml).**

## Equity Training to Benefit 300,000 PLTW Students

**The Center for Advancement of Scholarship in Engineering Education has awarded a five-year grant to promote gender equity practices throughout PLTW.**

Studies show that students possess a wide range of learning styles. Often, portions of the student population are overlooked by the use of teaching limited to specific techniques, such as the lecture-listen format. In math and science classrooms, many experts believe that young women suffer from unconscious, but detrimental, negative assumptions about female aptitude and interest. All of the above contribute to the lack of women participating in the scientific fields.

The Washington D.C.-based Center, part of the National Academy of Engineering (NAE), has awarded a grant calling on PLTW to develop expertise in gender equity teaching and counseling. The five-year grant will provide funding to train a cadre of PLTW Master Teachers

annually in gender equity teaching strategies. The Master Teachers will serve as trainers within the PLTW program for their more than 300 Master Teacher colleagues who provide training to PLTW teachers and classroom instruction to PLTW students. By the end of the program, more than 5,000 classroom instructors will be trained, who in turn will touch more than 300,000 students.

Teachers will learn about gender learning differences and how to foster a welcoming environment. Specific teaching techniques, such as personalizing large classes, will help to prevent capable students from leaving the sciences.

Another part of the grant will provide an annual, one-day training to PLTW's network of University Affiliate directors. This professional development will focus on improving career and academic counseling skills, so that school counselors may present career advice without gender bias.

The National Alliance of Partnerships in Equity (NAPE) will provide the technical assistance and resources needed to develop the training programs. NAPE is a consortium of state and local agencies with a common interest in improving equity issues.

NAPE and PLTW share the common goal of increasing female participation in pre-engineering. Both organizations have been looking for ways to capitalize on their complementary expertise. The grant from NAE will do just that by combining PLTW's engineering education expertise with NAPE's expertise in gender equity.

PLTW Vice President Niel Tebbano is enthusiastic about the upcoming training. "We are going to increase awareness of gender equity issues and the difference between boys' and girls' learning styles throughout our network."

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**For more on PLTW's efforts towards gender equality in education, visit [www.pltw.org](http://www.pltw.org).**

### STUDENT SPOTLIGHT

## In the Big Leagues

**Janelle Crockett scored a scholarship from the Indianapolis Colts to play in the big leagues of postsecondary education.**

Drafted not to play football but to pursue a degree in biotechnology engineering, Janelle Crockett, a recent graduate of Lawrence North High School in Indianapolis, is one of the first recipients of the Colts Minority Science and Engineering Scholarship.

The scholarship covers full-time tuition for four years at the Rose-Hulman Institute of Technology in Terre Haute, Indiana, one of the nation's top undergraduate engineering, science, and math colleges.

The Indianapolis Colts have conducted their

summer training camps on the Rose-Hulman campus for many years. Recently, they extended their contract for an additional four years and also created two annual scholarships to be awarded to qualified minority students from Indiana.

"Our organization holds a deep regard for the quality of instruction and the exemplary national profile that Rose-Hulman has forged through many years," Indianapolis Colts President Bill Polian says of the scholarships. "We are pleased to contribute to the academic mission of Rose-Hulman."

Crockett received her honor earlier this year during the annual Colts Training Camp dinner, where she met many of the Colts players and



*"I am and always will be a Colts fan. I was extremely excited about meeting Coach Dungy."*

**—Janelle Crockett**

*(pictured with Indianapolis Colts Head Coach Tony Dungy)*

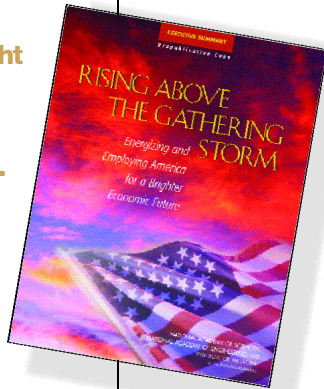
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## Looking Ahead

**A** new study from the National Academies shines a positive light on PLTW, attracting a new round of media attention to the need for more engineers.

In late October, the Washington, D.C.-based group, which is the nation's leading science advisory group, published the report, *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*. The report confirms the nation's dire need for broad-based sweeping efforts to strengthen the country's scientific competitiveness.

Despite an overall sobering assessment of the state of U.S. K-12 math and science education, PLTW was singled out for its approach and results. The report



noted that "students participating in PLTW courses are better prepared for college engineering courses" and recommended PLTW's pre-engineering courseware serve as a model for future federal efforts to develop K-12 curriculum materials with world-class standards.

Stay tuned for the next installment of *The Sharp Edge* for a full summary of the report, the resulting media coverage, and PLTW's next steps to rally support for the field of engineering in the U.S.

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**Can't wait for the next issue of *The Sharp Edge*? Download and read the full report on the Internet at [www.nap.edu](http://www.nap.edu).**

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## Crockett

coaching staff.

While in high school, Crockett earned an academic honors diploma, was inducted into the National Technical Honor Society, and played in the high school marching, pep, and concert bands.

She cultivated her interest in engineering during her involvement in PLTW. Crockett "enjoyed taking the PLTW courses in high school. They were my favorite courses, especially Biotechnical Engineering, and have helped me adjust to college life. The classes were college-structured and have made the transition from high school very easy. I am so glad I had the opportunity to take them."

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**For more information on the Rose-Hulman Institute of Technology, visit [www.rose-hulman.edu](http://www.rose-hulman.edu).**



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