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ABSTRACT

POLYTECH High School in Woodside, Delaware, has gone from being among the worst schools in the High Schools That Work (HSTW) network to among the best. Polytech, which is now a full-time technical high school, has improved its programs and outcomes by implementing a series of organizational, curriculum, teaching, guidance, and leadership changes, such as the following: applied learning; integration of academic and career-technical curricula; smaller learning communities with common time for teacher planning; flexible schedules with longer class time; state-of-the-art technology; a strong student advisement program; community partnerships; work-based learning experiences; and alternative assessments. In 1993, POLYTECH was a shared-time high school where occupations were taught in isolation from academic subjects, a general academic curriculum was offered, and expectations of students were low. By 2003, POLYTECH had been transformed into a full-time high school where occupations constitute the core of an integrated, college-prep curriculum and expectations of students are high. The impact of this transformation has been reflected in improvements of students' average scores in the reading, mathematics, and science sections of the HSTW assessment and on the Scholastic Aptitude Test. Another factor credited for POLYTECH's turnaround are its reorganization into five small learning communities/academies (educational foundations, industrial, modern technology, professional services, and health/medical); more rigorous graduation requirements; and new emphasis on curriculum integration and coordinated instruction/assessment. (MN)

HIGH SCHOOLS THAT WORK

SREB

MAKING MIDDLE GRADES WORK

Case Study

POLYTECH High School

Woodside, Delaware

POLYTECH High School has gone from being one of the worst schools in the *HSTW* network to being one of the best. In 1991, POLYTECH High School faced several thorny issues when the state board of education voted to make it a full-time career/technical high school. As a shared-time area vocational school, attendance plummeted. Students were not held to high academic standards in their sending high schools. There was no common vision and no coherent remedial strategy between students' high schools and the half-day vocational center, and students' academic studies had little relevance to the real world.

As a full-time technical high school today, POLYTECH has reversed its downward trend by implementing a series of innovative organizational, curriculum, teaching, guidance and leadership changes, such as applied learning, integration of academic and career/technical curriculum, smaller learning communities with common time for teacher planning, flexible schedules with longer class time, state-of-the-art technology, a strong student advisement program, community partnerships, work-based learning experiences and alternative assessments. Though it still faces challenges, student achievement results on high-stakes state exams show that POLYTECH High School is heading in the right direction.

The Setting

POLYTECH High School (PHS) is located in Woodside, Delaware, just south of Dover. The school's 1,100 students are 75 percent white, 20 percent black and 5 percent other minority. Students come to PHS from five school districts that are a mix of rural, small town and small city communities. Dover Air Force Base is one of the district's major employers, and farming still plays a large role in the area's economy. There are a number of postsecondary institutions in the district, including Delaware State University (a historically black university), and Wesley College. The University of Delaware, Wilmington College, and Delaware Technical and Community College also operate satellite campuses in the area.

PHS shares a 196,000-square-foot, state-of-the-art facility and a 75-acre campus with POLYTECH Adult Education. The school offers 21 different technical concentrations, and modern labs and more than 800 computers give students access to current technology similar to what they will encounter in the workplace. Everywhere on campus — from an impressive outdoor "living classroom" to the new roller hockey rink — visitors see evidence of student-completed projects that enhance the school and that serve as powerful learning experiences for the students.

Southern Regional Education Board

592 10th St. N.W.
Atlanta, GA 30318
(404) 875-9211
www.sreb.org

The Need for Change

By the late 1980s, career/technical education in southern Delaware was struggling for survival. Although the area was blessed with a stable and growing economy, the existing half-day career/technical center was not adequately serving either students or the business community. Career/technical students were usually in the general track at their sending high schools, where they were enrolled in only low-level academic courses. At the same time, they were losing valuable class time moving between schools. These circumstances resulted in poor student performance. Statewide analysis of student achievement showed that career/technical students were being shortchanged, and enrollments at the half-day career/technical center had been steadily declining for 10 years. Something clearly needed to change.

After recognizing the need for change, one of the first steps the district took was to become an early member of the Southern Regional Education Board's *High Schools That Work* network in 1989. This decision was instrumental in helping school leaders develop a vision of the kind of school they wanted to create, based on the *HSTW* key practices. At the recommendation of *HSTW*, the Kent school district joined forces with a team of experts from the National Center for Research in Vocational Education to review the current state of its programs and to develop a comprehensive improvement plan.

The result was a four-year transition, beginning in 1991, that led to the creation of POLYTECH High School, a fully comprehensive, technical high school. Students (and their parents) from five school districts would choose to attend the school at the end of grade eight and to complete both their academic and career/technical studies there. Guided by the motto, "Power of Knowledge for Work and College," POLYTECH created a challenging learning environment based on high standards and a commitment to teach career-oriented students a college-preparatory academic core. The teaching staff continues to lead the development of the vision and proudly takes ownership of it. All school policies and practices clearly reflect the vision.

The Old Versus the New

The POLYTECH staff recognized that they had to identify and correct what was not working and create a vision of what would work. The school community committed to provide a learning environment that emphasized high expectations and to require all students to meet standards. As they worked to complete the challenging curriculum, students would learn to think, solve problems and communicate in real-world situations. Students at POLYTECH would discover that the value of learning is in knowing how to apply knowledge to real life. The school set a goal that all students would be prepared for postsecondary education, successful careers and productive lives.

POLYTECH decided that the best way to achieve this goal was to emphasize applied learning, integration of curriculum, smaller learning communities, flexible schedules with longer class time, state-of-the-art technology, a strong student advisement program, community partnerships, work-based learning experiences and alternative assessments.

How POLYTECH Changed

Old Strategy	New Strategy
Shared-time high school	Full-time high school
Occupations taught in isolation from academic subjects	Occupations at the core of an integrated curriculum
General academic curriculum	College-prep academic curriculum
Low expectations	High expectations

Today, more than a decade after its move to become a full-time technical high school, POLYTECH can see its new strategies working. Since 1993 average student achievement scores on the *HSTW* NAEP-referenced exam have risen from below the basic level in reading, mathematics and science to above the basic level in mathematics and science, and they are approaching the proficient level in reading. Dropout rates have declined from more than eight percent to less than one percent, and the attendance rate has increased to 95 percent. Students' average scores on the 2002 *High Schools That Work* assessment exceeded the *HSTW* performance goals. (See Table 1.)

Forty-one percent of 2002 graduates participating in the assessment met both performance and curriculum goals and qualified for the *HSTW* Award of Educational Achievement.[1] Over the past five years, average SAT scores increased by 30 points on the verbal section and by 23 points on the mathematics section, while the percentage of students taking the test has increased from 36 to 48 percent. School leaders believe that the school's structure, curriculum and approach to teaching — coupled with strong extra-help and guidance systems — have made the difference in student achievement.

[1]To earn an Award of Educational Achievement, students complete three or four credits in a career/technical concentration and two of the following: four credits in college-preparatory-level English; three credits in mathematics, including two in courses equivalent in content to courses offered in the college-preparatory program; and three credits in science, including two in courses equivalent in content to courses offered in the college-preparatory program. They also must have scored at or above SREB's goals in reading, mathematics and science.

Table 1
POLYTECH's Performance on the *HSTW* Assessment

	1993	2003
Average reading score *HSTW* Goal: 279	252	286
Average mathematics score *HSTW* Goal: 297	273	303
Average science score *HSTW* Goal: 299	283	301

Note: Possible scores on the assessment range from 0 to 500. The reading goal and minimum score for the basic level is 279. The 2002 math goal and minimum score for the basic level is 297. The 2002 science goal and minimum score for the basic level is 299. The mathematics and science goals were 295 and 292 respectively between 1993 and 2000. To score at the proficient level, students must score at least 288 in reading, at least 328 in mathematics and at least 326 in science.

The Academy Structure

POLYTECH is organized into five small learning communities — a ninth-grade academy and four career academies for grades 10 through 12, which offer concentrations in high-demand career areas.

- **Educational Foundations Academy:** This academy focuses on a strong academic core and career exploration. All freshmen (with the exception of some special-needs students) take college-preparatory English, science, social studies, and either Core Plus I mathematics, Algebra II or Geometry. They explore each of the school's 21 career concentrations to determine a focus for their remaining three years of high school. Entering ninth-graders performing below state standards are enrolled in double doses of English and mathematics aimed at helping them meet state standards.
- **Industrial Academy:** This academy includes concentrations in building construction, electrical construction, masonry, welding and fabrication, auto body repair, and automotive technology.
- **Modern Technology Academy:** This academy includes concentrations in computer-aided drafting, computer engineering technology, radio/TV production and broadcasting, visual communications, electronics, and aviation/ROTC.
- **Professional Services Academy:** This academy includes concentrations in business education, cosmetology, criminal justice and environmental science.
- **Health/Medical Academy:** This academy includes concentrations in child development, dental assisting, medical assisting, nursing assisting, and health care and rehabilitation.

The academy structure allows teachers to collaborate in designing and implementing instruction that meets the unique needs of the students they serve. Teachers meet four days a week before school to plan together. Decisions concerning curriculum content, instructional objectives, teaching strategies, learning projects and short-term regrouping of students are made as a team.

Within each academy of approximately 230 students, there are even smaller learning communities for each career concentration. These smaller learning environments create a haven where students feel safe in taking learning risks, where they are encouraged to succeed in meeting standards and where they are praised for their achievements. Many academies reward success with Student of the Month and other special recognition.

High Expectations and Standards

POLYTECH's curriculum reflects the need for students to graduate from high school with both marketable career/technical skills and the academic skills that prepare them for continued education. The curriculum is a blend of challenging academic courses and quality career/technical programs. For areas where state or national standards are available, the curriculum has been aligned with these standards.

Graduation requirements at POLYTECH match the state's academic requirements but also require students to complete 11 career/technical credits, making the school's graduation requirements the highest in the state. Although Delaware does not require students to complete foreign language courses, 75 percent of POLYTECH's students do. PHS graduates average 31 credits. In the 2002 *HSTW* Assessment, 80 percent of POLYTECH seniors had completed the *HSTW*-recommended curriculum[2] in language arts, mathematics and science, as compared to an average of 41 percent at other high-scoring sites.[3]

[2]The recommended curriculum consists of at least four English courses with the content and performance standards of college-preparatory English; at least three mathematics courses, including two courses with the content and performance standards of college-preparatory Algebra I, geometry, Algebra II and trigonometry; at least three science courses, including two courses with the content and performance standards of college-preparatory biology, chemistry, and physics or applied physics; and at least four courses in a planned career/technical concentration or additional course work in either mathematics and science, the humanities, or a blended concentration.

[3]High-scoring schools are those that were ranked, according to their mean scores, in the top 15 percent of all participating sites on two or more of three subject-based tests administered in the 2002 *HSTW* Assessment.

High Graduation Requirements Prepare Students for Postsecondary and Professional Success

Diploma

Standard — may be issued to students who completed 26 credits but have not met the requirements of the technical diploma. Each student receiving this diploma must accomplish at least four credits in the same occupational area.

Technical — may be issued to students who meet the requirements of the standard diploma and satisfactorily complete all technical competencies and occupationally related courses required by their respective occupational area. The diploma normally requires a minimum of 11.5 technical credits and may require the successful completion of an occupational competency test (national, state or local).

Master of Technology — requires students to complete all academic, technical, related courses and competency exam (when applicable). Additionally, students must complete the exhibition-of-mastery program which indicates superiority of achievement and technical competency mastery. To be eligible, students must have a 90 percent GPA in their occupational area and an 85 percent overall GPA. The program requires in-depth research and the development of a new or innovative product in the student's area of expertise.

Credit Requirements

- English — 4 credits
- Mathematics — 3 credits*
- Science — 3 credits
- Social Studies — 3 credits
- Physical Education — 1 credit
- Health — ½ credit
- Occupational — 11 ½ credits (One must be in computer skills.)
- **Total — 26 credits**

*Note: A vocational course will be scheduled each semester.

Students graduating in 2004 and later will be given Delaware state diplomas based on an index derived from the Delaware Student Testing Program index computed from the results of standardized state tests administered in the student's 10th grade year.

Technical Exhibition (TE)

In order to graduate, all students must successfully complete the TE which consists of a research report written in American Psychological Association format and based on an interest area of the student's occupational field, a product designed to show area mastery, and a presentation defending the report and product. The TE must be completed with a minimum of a 70 percent overall grade to be successful.

Tackling Achievement Problems Head-on

POLYTECH students' performance has earned "commendable" ratings on Delaware's three statewide assessments administered to 10th-graders. Since the state's testing program was implemented, the school has increased the percentage of students meeting or exceeding standards each year, largely because of its aggressive approach to aligning curriculum, instruction and assessment to state standards. Despite the progress, the PHS staff continually strives to improve each of the tested areas.

Writing

In 1994-1995, PHS faced the fact that its students had serious problems with writing. The school ranked 19th among 19 school districts on the Delaware Interim Writing Assessment given to 10th-grade students. By the time the 2001-2002 results were released, PHS ranked first and no special education student scored "well below standards" on the 2002 assessment.

How did this dramatic improvement come about? Going from last place to first required a concerted schoolwide effort that is indicative of POLYTECH's direct approach to meeting students' needs. The school achieved these remarkable results with a rigorous writing-across-the-curriculum program that required teachers to incorporate meaningful writing assignments into daily learning. Students do all kinds of writing — from songs or imaginary diaries to work logs, persuasive letters, research papers and book reports. All PHS teachers are trained to use the state's writing rubric to assess assignments. There are regular, schoolwide practice writing assessments for which students receive a grade and feedback. The student scores in Table 2 are testament to the fact that students get better when they are given the opportunity to use a skill frequently.

The school has experienced similar progress in reading. In 2002 POLYTECH students exceeded the state average. Eighty percent of students met or exceeded the standards, as compared to just 57 percent in 1998. The school ranks sixth among the 19 Delaware school districts in reading. (See Table 3.)

The school began a summer reading program for entering freshmen in 2002 and received an award as the high school whose students read the most books over the summer. All staff and incoming freshmen received *Chicken Soup for the Teenage Soul, Volume I.* Through coordinated efforts with the Dover Public Library System, the school offered students discussion groups for the reading exercise. Partners Actively Working for Students (PAWS) and MBNA, a Delaware-based national credit card company, paid for the books. The ninth-grade academy used the book as the basis for integrated lessons in English, social studies, science, human relations, mathematics and Junior ROTC. Plans are underway to expand the program to all grades next summer.

Mathematics

Progress in mathematics has been slower than the school would like (Table 4), but POLYTECH is taking strong action to improve results. To address concerns about mathematics achievement, PHS adopted an innovative new mathematics curriculum called Core Plus, which is aligned to state mathematics standards. The program eliminates teaching algebra and geometry as distinct courses. Core Plus puts mathematics in context and uses a balanced instructional approach that involves both direct instruction and discovery strategies. The program emphasizes helping students learn how to communicate mathematics concepts in writing.

Table 2
Delaware State Testing Program: Writing — Grade 10

	1998	1999	2000	2001	2002
POLYTECH: Percentage of Students Meeting or Exceeding State Standards	33%	36%	54%	53%	67%*
State: Percentage of Students Meeting or Exceeding State Standards	37%	37%	48%	57%	49%

*POLYTECH students score first among the state's 19 districts.

Table 3
Delaware State Testing Program: Reading — Grade 10

	1998	1999	2000	2001	2002
POLYTECH: Percentage of Students Meeting or Exceeding State Standards	57%	51%	70%	59%	80%
State: Percentage of Students Meeting or Exceeding State Standards	59%	54%	61%	61%	66%

Table 4
Delaware State Testing Program: Mathematics — Grade 10

	1998	1999	2000	2001	2002
POLYTECH: Percentage of Students Meeting or Exceeding State Standards	29%	23%	33%	31%	42%
State: Percentage of Students Meeting or Exceeding State Standards	31%	31%	36%	37%	43%

A New Way of Teaching

Perhaps the most notable change at PHS has been the way students are taught. Integration of academic and career/technical studies at POLYTECH is not an occasional thing; it is a way of life. POLYTECH's model of integration is built on state content standards for academic courses and workplace-derived academic and technical standards. Regular collaborative planning sessions give teachers ample opportunity to develop integrated learning activities. Students frequently receive joint assignments for two classes involving both academic and career/technical skills, which allow students to see the relationship among disciplines. Students learn academic skills in an applied context in career/technical classes, and academic teachers use career/technical applications to help students understand mathematics and science concepts. Because academics are not taught in isolation, students see how these skills are useful in the workplace.

Relating course work to the real world motivates students and gets them excited about learning. Integration efforts are guided by three key principles:

- Teaching in a new way;
- Occupations as the core; and
- Coordinated instruction/assessment.

The "living classroom" is the most outstanding example of integration at work at PHS. This nature area located on the campus offers a variety of opportunities for problem-based learning and performance-based assessment. The area includes a pond with an island and surrounding woods. Principles of Technology students designed a bridge to access the island, and Computer-aided Drafting (CAD) students worked on computer simulations of the finished design. Welding, carpentry and masonry classes joined forces to build the bridge.

Students also have built Camp Pride, a confidence- and team-building survival camp. ROTC students designed an obstacle course, and carpentry students built it. Future plans call for building an ecosystem observation platform, a bandstand for outdoor concerts on the island and an outdoor amphitheater on the banks of the pond.

The living classroom has endless learning applications: history (students have started to develop a mini-historic settlement), architecture, anthropology, nature studies, aquaculture, fish farming, herbal gardening, ecology conservation and indigenous plants.

Many integration projects evolve to address needs in the POLYTECH community. Students and faculty formed a roller hockey club and played hockey after school in the student parking lot, so safety was an issue. To solve the problem, a senior CAD student decided to design a roller hockey rink as part of his senior project. Three mathematics teachers helped the student secure a grant to fund the construction of the outdoor rink. Students and faculty collaborated to design and construct the new rink. Students were involved in every phase of the project: designing the facility, constructing the boards, drilling the holes and setting the posts, erecting a block-and-stone building for storing equipment, and pouring an aesthetically pleasing sidewalk to the rink. Future plans include a toddler playground/picnic grove designed by a child care student, as well as lights and artwork on the rink's surface.

Other integrated projects students are engaged in include:

- **Restoring a Piper Tomahawk aircraft for display on the front lawn**. The aircraft was restored by aviation, masonry, welding, CAD, auto body, auto tech, visual communications, environmental science, radio/TV, electrical construction, mathematics, science and ROTC students.
- **Designing and installing an outdoor atrium that includes a pond, water wheel and patio**. Environmental science, electrical construction, masonry, welding and geometry students completed the project.
- **Filming and editing a TV production for the state department of education**. Radio/TV, language arts and visual communications students collaborated on the production.

All seniors must complete a technical exhibition as a graduation requirement. The exhibition includes a research paper which must follow American Psychological Association style, a product demonstrating technical mastery and a presentation. Many of the improvements seen around campus are the culmination of senior projects.

Students have received scholarships and awards for their projects. Recently, one student's outstanding work on an aquatic plant bio-filter project earned her a $16,000 college scholarship. A second student received a $9,500 grant from MBNA to convert a racecar from diesel to electric power as his technical exhibition.

A 2001 graduate devised a multifunction robotic manipulator designed to deliver mail to teachers' classrooms or offices. She presented her project to a group of schools that visited PHS when the school was selected as one of 10 *HSTW* Pacesetter Sites. This presentation led to her selection to present at the 2001 *HSTW* Summer Conference and to an unsolicited full college scholarship.

As a natural extension of the school's integrated approach to learning, multiple assessment strategies are used to measure student progress. Students frequently receive grades for oral presentations and demonstrations. Portfolios are used schoolwide as a means for students to display and record accomplishments. In the ninth grade, students use their portfolios to guide the selection of their career concentration. Once students enter a career academy, the portfolio becomes a record of accomplishments that teachers use to assess progress. Students use their portfolios after graduation to demonstrate what they know and can do. Assessments, scoring guides and exams are standardized within academic departments to ensure consistent curriculum delivery, instruction and classroom assessment and to ensure that all students are taught to the same high standards. Teachers use test results for self-assessment and curriculum adjustment.

A 4-by-4 block schedule, with the longer class periods it provides, facilitates an active approach to learning and makes integrated academic and career studies possible. Students are motivated by the frequent change of activities during each class. They also have more time to concentrate on fewer subjects, which has contributed to achievement gains.

Technology is an integral component of the curriculum. Each classroom has at least one computer with Internet access, e-mail and research databases. In addition, there are two computer labs with networked computers for individual and class research, two skills classrooms, and a word-processing computer lab.

A Technology Infusion Specialist helps teachers design projects that maximize the use of technology. Students work regularly with graphing calculators, spreadsheets and PowerPoint software. They frequently use the Internet for research. Teachers can access lesson plans on-line, making it much easier to share standards-based instruction units. A Web master for each academy is responsible for putting projects on the Web site.

The 2002 *HSTW* Assessment provides evidence that these new teaching strategies are working at POLYTECH. Students must complete assignments that require them to use research skills, apply what they are learning to solve problems and use what they learn in workplace experiences. Table 5 shows that more POLYTECH students complete challenging integrated academic and technical assignments than do students at other high-achieving sites in the network.

Table 5
Using Academic Content and Skills at POLYTECH

Students said they:	POLYTECH	High-scoring Sites
Research a topic, create a product or perform a service and present information learned to others.	95%	60%
Read a science article or book each month.	66%	36%
Design a science experiment at least once a month.	45%	21%
Use science equipment in a lab at least weekly.	69%	28%
Read a career-related article and demonstrate understanding of the content at least once a month.	60%	47%
Complete a math project at least once a month.	47%	28%
Complete on-the-job internships.	50%	35%

Extra Help to Meet Higher Standards

The core of POLYTECH's curricular philosophy is to "meet each student at his or her current level of achievement and take that student as far as his or her ability permits." The school recognizes that some students simply require more time to master certain knowledge and skills. A first step for all new students is to determine their current status and to take catch-up action when they are not where they should be. Extra help takes the form of summer programs, catch-up courses, extended time courses, academic coaching and assistance with test preparation.

The school's ninth-grade transition program is particularly important to the school's success. POLYTECH faces the challenge of working with more than 300 new freshmen annually. Students are selected on a first-come, first-served basis so the school admits students with a wide range of achievement levels. About 12 percent of the school's population are special-needs students.

PHS gets off to an early start in getting to know incoming students. In May, the students who have been accepted as entering freshmen and their parents meet with a counselor to discuss the ninth-grade curriculum and to develop the student's schedule. Prior to the school's opening, ninth-grade counselors and teachers try to visit every incoming student's home. This is an effective, highly personal way to familiarize the families with the expectations of the school and to answer any questions they might have. Typically, more than 90 percent of the entering freshmen receive home visits.

For the past two summers, all eighth-grade students who score "well below standards" or "below standards" on the eighth-grade statewide exams in reading and mathematics have been strongly encouraged to attend the Summer Readiness Program. Effective in 2002, students who score "well below standards" were required by state law to attend summer school. In 2002, 100 percent of the mandated students and 73 percent of the students scoring "below standards" attended the summer program. PHS leaders identify the group of students scoring "below standards" and look at the courses they have taken, the grades they have earned, and their test results for grade eight and previous years to identify which students need improvement. If the school does not take action on students who "need improvement," it is in violation of state law. If parents of students who "need improvement" do not require their children to attend the summer program, the school has a document trail that says the parents are not doing enough to prepare their children for success. Any incoming ninth-graders may attend the summer program if they want to strengthen their academic skills. School leaders view the ninth grade as the doorway to high school and believe that it sets the scene for students who will be expected to pass high-stakes state exams. The summer program enables students to build the skills they need to be successful in the ninth grade.

The four-week summer program follows the same integrated approach to instruction used during the school year. Students solve real-world problems and participate in hands-on activities. Instructional teams include academic, technical and special-needs teachers working together.

Results so far have been very encouraging. In 2002, 54 percent of students in the readiness program improved their mathematics scores, with 40 percent improving from "well below standards" or "below standards" to "meets standards." In reading, 59 percent of students improved, with 51 percent improving from "well below standards" or "below standards" to "meets standards." This was a significant improvement over 2001 test results.

Students who still do not meet state standards by the time they enter ninth grade will take two mathematics courses (with one counting for elective credit only), a reading course and a college-preparatory English course. Additionally, they receive academic coaching after school as needed.

The freshmen academy's Career Exploratory Program, in addition to its emphasis on academy selection, includes three specific programs to address the needs of ninth-graders. They include human relations, designed to help students relate effectively to others; study skills; and a program to help students improve their mathematics and science skills.

POLYTECH Advisement and Support System (PASS)

POLYTECH believes much of its success can be attributed to the POLYTECH Advisement and Support System (PASS), now in its seventh year of operation. All staff members — administrators, teachers, counselors, the district superintendent and the principal — are advisers to groups of approximately 10 students each. The advisers work with the same group of students throughout high school to help them and their parents make informed decisions about education and future goals.

Advisers meet with students three to eight times a year to help them set goals and develop a six-year plan (four years of high school and two years after graduation). Each spring, all students — starting with entering ninth-graders — and their parents have personal meetings with advisers to discuss course selections for the following year and to review the six-year plans. At least 90 percent of parents take part in the meetings, which they rate as very beneficial.

Community Partnerships

Another of POLYTECH's strengths is its work-based learning program. Students at POLYTECH prepare for a career field through job shadowing, internships or cooperative education. More than half of all students at POLYTECH have experiences at a work site related to their career/technical studies. In addition, 71 percent of the students participating in the 2002 *HSTW* assessment said they learned things at school that helped them at work. This was substantially higher than the 59 percent of students at other high-scoring sites who said the same.

One of the more effective community partnerships is between POLYTECH and Dover Air Force Base. Aviation students attend Ground School and receive their flying instruction at the base. Dental students intern at the base's dental clinic, and many technical students complete on-the-job training in a myriad of career fields on the base, often receiving the same training as active Air Force personnel.

POLYTECH has Tech Prep articulation agreements with a number of local colleges and universities. Presently, 47 technical courses are articulated. In the 2001-2002 school year, 561 students were enrolled in the program. Tech Prep programs combine the last two years of high school with two years of postsecondary education to prepare students for many high-skills jobs that require more than a high school diploma.

In Fall 2002, the school started an innovative training program for future information technology professionals. In order to offer industry-recognized professional certifications, POLYTECH has joined with Microsoft and CompTIA (Computing Technology Industry Associations). This exciting four-year course of study will prepare students for careers in computer networking and systems engineering. Students have the opportunity to earn certifications including Microsoft Certified Professional (MCP), Microsoft Certified Systems Administrator (MCSA) and Microsoft Certified Systems Engineer (MCSE).

The support PHS has received from the MBNA Grants in Excellence Program is also of interest. During the past five years, PHS has received $126,332 in individual grants to support a number of programs. These grants range from classroom projects to grade-level projects to schoolwide integration efforts such as "POLYTECH's Arts Weeks Celebration." The variety of topics addressed by the grant requests is only limited by the staff's and the students' imaginations. To date, imaginations have run wild, and funding has been garnered for the construction of an ultra light aircraft, the roller hockey rink and a 12-passenger van for school-to-work activities.

Professional Development

Giving teachers access to quality professional development experiences has been a critical element in POLYTECH's transformation. School and district professional development committees maximize available resources to foster both school and individual development. A Professional Development Center on campus is used frequently for local and state-led workshops, making access easy for faculty. Many teachers and administrators have attended *HSTW* events, and they also take advantage of state conferences and workshops.

POLYTECH now has a large cadre of experienced teachers who can offer professional development to others on integrated learning, applied teaching strategies and other priority issues. After sessions they are available to offer follow-up advice and support as teachers implement new techniques. In response to teacher requests, most professional development is offered during the school day. Teachers participate in small study groups on topics of their choice, and faculty meetings are devoted to professional development.

POLYTECH, in cooperation with the Delaware Department of Education, implemented an exciting new professional development model for mathematics teachers statewide in Fall 2002. A POLYTECH math teacher, currently serving as a Teacher on Loan to the Department of Education, has a model classroom at PHS that is open for visits from teachers across the state. The teacher consults with visitors and demonstrates effective techniques in her class of at-risk ninth-graders.

What's Next?

POLYTECH still has several challenges it wants to tackle:

- Continue efforts to accelerate academic achievement in reading and mathematics for entering ninth-graders who perform below grade level.
- Explore new ways to engage and motivate students for deeper learning in all classes.
- Hold students to high standards while reducing the failure rate.
- Make improvements in the quality of teaching and learning in career/technical courses.
- Provide professional development in teaching methods to integrate mathematics in all classes.
- Develop a plan to make the senior year more rigorous.

Membership in *HSTW* has been a catalyst for POLYTECH's transformation. By incorporating the key practices into the fabric of the school, the staff has seen the benefits of higher expectations both for themselves and their students. They credit technical assistance visits and assessment results as the sources of many of the innovative approaches they have pursued. Today they are determined to stay the course with their vision of a new career/technical school that has:

- shared mission, values and goals;
- high expectations for all students;
- collaborative teams;
- data-driven decision making; and
- commitment to continuous learning.

Visit POLYTECH on the Web

The POLYTECH Web site is a central hub for the exchange of information between and among teachers and students. All integrated projects are posted there, along with other pertinent facts about the school. Other educators are welcome to visit the site at www.polytech.k12.de.us.

Contact: Dr. Dianne G. Sole, Superintendent
POLYTECH School District
PO Box 22
Woodside, DE 19980
Phone: (302) 697-2170
Fax: (302) 697-6749
E-mail: dsole@polytech.k12.de.us

Bruce Curry, Principal
POLYTECH High School
PO Box 97
Woodside, DE 19980
Phone: (302) 697-3255
Fax: (302) 697-4536
E-mail: bcurry@polytech.k12.de.us

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