

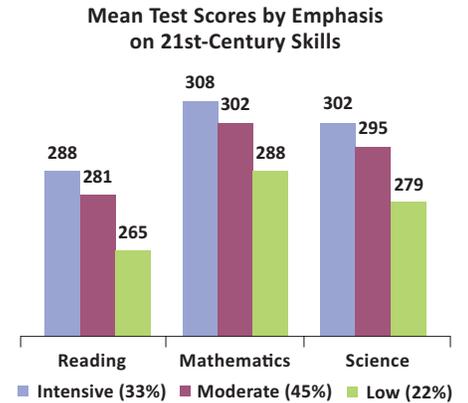
Competition for a good job is a fact of life for people throughout their careers. That is why it is so important for high school students to gain the knowledge and skills that will help them succeed in the 21st century.

Employers and industry executives have identified six major core skills high school graduates need to meet the challenges of education and careers in the future. These are the skills that successful schools emphasize as they prepare their students for graduation and beyond:

- critical thinking and problem solving
- teamwork and collaboration
- information technology application
- professionalism and work ethic
- written communication
- oral communication

The *High Schools That Work (HSTW)* Student Survey asks high school seniors about their experiences with multiple aspects of these six essential skills. By relating the students' reported assignments of these skills with the school's results on the *HSTW* Assessment of reading, mathematics and science, *HSTW* has been able to show a definite connection between assignments that require the use of these skills and higher achievement results.

The 2006 *HSTW* Assessment results showed that schools that placed intensive emphasis on the six skills in academic and career/technical classrooms had higher student achievement than schools that placed moderate or low emphasis on the essential skills. There was also a relationship between teaching the skills at an intensive level and making the most progress in implementing the *HSTW* school improvement model.



Schools that placed intensive emphasis on the six skills in academic and career/technical classrooms had higher student achievement.

Contact:

Gene Bottoms
 (gene.bottoms@sreb.org)
 Allison Timberlake
 (allison.timberlake@sreb.org)

Measuring the Quality of Career/Technical Programs



Students need access to quality career/technical (CT) programs — but what are the characteristics of a quality program, and what can schools do to improve their programs?

Drawing on knowledge and experiences from *HSTW* and *Technology Centers That Work (TCTW)*, program leaders have developed a rubric

for evaluating the quality of CT programs. This helpful tool focuses on 18 indicators of quality:

- programs of study
- career/technical syllabus
- work-based learning
- career/technical student organizations
- embedded literacy
- embedded numeracy
- use of technology
- professional development
- guidance and advisement
- parental involvement
- articulation and dual enrollment agreements
- advisory committee
- marketing, public relations and community outreach
- enrollment
- retention and completion
- post-program positive placement
- state assessments, *HSTW* Assessments and college readiness
- industry credentialing and technical assessments

To use this rubric effectively, school leaders at comprehensive high schools and technology centers will want to review the rubric with all CT faculty members. They will want to make sure everyone understands the 18 indicators and the four levels on which each indicator is to be judged. Each CT teacher will apply the rubric to his or her program. School leaders will meet with CT teachers individually or as a group to discuss why they rated the programs as they did. The intent is to see if the program truly reflects the program qualities implied by the rubric.

The second step is to begin the process of exploring with career/technical teachers the actions the school can take to raise the quality of CT programs. The purpose of

the rubric is to spark conversation at the building level in a way that will motivate CT teachers and school and district leaders to find the resources needed and to take other actions to develop CT programs that meet all 18 indicators at Level 4.

Not all of this can be accomplished in one year. It is suggested that school leaders and CT teachers, individually or in teams, agree on improvements to make each year over a three-year period until all 18 indicators are met.

To download the CT Program Evaluation Rubric, visit www.sreb.org. Select “*High Schools That Work*,” and then “Technical Assistance.”

Quality Is the Key in Three Texas Career/Technical Programs

Three diverse school districts in Texas have succeeded in developing career/technical (CT) programs that are known for quality and effectiveness in preparing students for careers and further learning. One common factor in all three districts has been a working relationship with business and industry leaders to offer programs of study that match real-world opportunities.

Grand Prairie Independent School District in the Dallas-Fort Worth Metroplex enrolls students in programs leading to industry certification and postsecondary education. The district offers CT programs in a shared-time center and at traditional comprehensive high schools. “All of our programs mirror the needs of business and industry,” said **Jim Ziegler**, district director of career/technical education.

The district has aligned its CT program with **AchieveTexas**, an initiative designed to help students make wise educational choices and to facilitate a seamless transition from high school to postsecondary education. The initiative emphasizes the importance of combining rigorous academic courses with relevant career education. It uses the 16 federally defined career clusters as the foundation for school restructuring.

Students in the Grand Prairie school district can seek the following certifications: Emergency Medical Technician, cosmetology, I-Car collision repair, Automotive Service Excellence, PrintED graphic communications, Microsoft Office Specialist in all areas, Computer Technology Industry Association A+ computer support, ServeSafe food safety and Final Cut Pro software editing. A total of 172 students in the district took certification/licensing tests in 2007-2008, including 159 who passed the tests.

Career/technical and academic teachers work together to design and develop integrated lessons that address students’ academic weaknesses. The lessons integrate the best practices of academic instruction with the relevance of CT courses. These lessons are delivered in both academic and CT courses.

“Many career/technical courses require a high level of mathematics expertise,” Ziegler said. “Our career/technical teachers help academic teachers develop lessons that use mathematics concepts in the context of real-world activities.”

When the district opens a new career high school for the 2009-2010 school year, all students will be required to read technical materials. The library at the new school will contain a large percentage of technical materials.

Students in the **Pasadena Independent School District** in Pasadena, Texas, have access to innovative programs, such as a new maritime academy. Program Director **Sarah Wrobleski** said the academy is designed to meet the workforce requirements of the Gulf Coast region. Students in the maritime academy may go to work after graduation or continue their studies at Texas A&M University.



A total of 172 students in the district took certification/licensing tests — including 159 who passed the tests.

Contact:

Jim Ziegler
(jim.ziegler@gpisd.org)
Sara Wrobleski
(swrobleski@pasadenaisd.org)
Debbie Thompson
(dthompson@mpisd.net)

While rural areas may lack the opportunities or resources of metropolitan areas, **Mt. Pleasant Independent School District** in Mt. Pleasant, Texas, has found ways to provide certifications, dual credit courses and quality programs of study. “Our programs are designed to meet workforce needs,” said **Debbie Thompson**, career/technical director for the district.

All three of these districts invest heavily in professional development to ensure that teachers keep abreast of industry changes and new instructional strategies.

Regardless of size or location, the three districts use workforce partners and advisory committees to support their career/technical programs by reviewing workforce data, facilities and equipment and by providing employment opportunities for students.

“Expectations” and “Quality” Not Just Buzzwords at Oklahoma Center

High expectations and *quality work* are not just buzzwords at **Francis Tuttle Technology Center** (FTTC) in Oklahoma City, Oklahoma. One example is the center’s pre-engineering academy, which offers the Project Lead The Way® engineering curriculum and requires students to take higher-level mathematics and science courses. The academy boasts a 93 percent college attendance rate with more than 82 percent of its students pursuing an engineering career pathway in college.

“The focus in all instruction is on engineering,” said science and engineering instructor **Mark Pierce**. Students examine molecules in chemistry, study properties in geometry and create 3-D images using Autodesk Inventor computer software.

Students in the pre-engineering academy take sequences of rigorous mathematics and science courses, including pre-AP Chemistry the first year, pre-AP Physics or AP Chemistry the second year, and generally AP Physics the third year. The mathematics sequence includes pre-AP Geometry, pre-AP Algebra II, pre-AP Trigonometry Pre-Calculus and AP Calculus.

Academy teachers include a chemistry teacher, a physics teacher, two mathematics teachers and one teacher for Project Lead The Way classes. All academy teachers provide examples of how mathematics and science are related to engineering.

“Our instructors are committed to relevant teaching,” Pierce said. “All of our teachers are continuously learning and looking for current, authentic examples to use in the classroom. Collaboration runs high as teachers devise new and effective ways to connect mathematics and science concepts to engineering.”

Students work in teams on technical projects in the academy and in student competitions for extracurricular activities such as the *FIRST* Robotics Challenge and SkillsUSA. They also collaborate with students from other programs at the center. For example, students work with instructors and students in the Advanced Manufacturing Center to make parts for a *FIRST* robot.

Students attend FTTC for two 85-minute periods per day, either in the morning or in the afternoon. The center operates on an A/B block schedule, which allows students to take one mathematics, one science and two engineering courses at the center each year. Students spend the other half-day at their home high schools. If the school is on a block schedule, they take two classes there. If the school is on a traditional schedule, they take three or four classes there.

The home high schools and Francis Tuttle provide transportation to and from the technology center. The center has scheduled an hour and 20 minutes between the morning and afternoon sections to allow enough time for students to make the trip.

When academy leaders interview prospective students and their parents, they discuss the high standards and anticipate challenges the students may encounter after enrolling. Yet some students remain uneasy or unsure about handling the higher-level courses. To promote the success of these students, the center provides extra help in weekday AP study groups and Saturday extra-help sessions.

The center has learned several big lessons from operating the pre-engineering academy, Pierce said:

- For an academy to be successful, it must have a key focus, such as engineering, that is taught by all teachers.
- An academy needs to be a learning community where parents, postsecondary institutions and local businesses are members of the advisory committee. Other programs at Francis Tuttle are also involved in helping academy students.
- Having a key focus adds relevance to the curriculum and challenges teachers to examine their instruction and increase their knowledge of the academy subject, such as engineering.

The academy boasts a 93 percent college attendance rate with more than 82 percent of its students pursuing an engineering career pathway in college.

- Creating a teamwork community by using teamwork in most projects and activities is a way to build continuity among students from year to year and to prepare students for a future in engineering.
- Requiring students to do many presentations throughout the year — not only in class, but also for visitors and at conferences and other events — helps them develop presentation skills and connections that serve them well in life past high school.

“I believe a school could apply the basic principles of our academy to any other type of academy, whether biomedical or fine arts,” Pierce said. “Students learn more when a program has rigor and relevance.”

Contact:

Mark Pierce

(mpierce@francistuttle.com)

Academy Focuses on Research and Medical Careers

The biosciences and medicine academy at **Francis Tuttle Technology Center** (FTTC) in Oklahoma City, Oklahoma, focuses on preparing college-bound students interested in entering the fields of research and medicine. In its third year of operation in 2008-2009, the academy enrolls 75 students. It has a capacity of 120 students when the program is fully implemented.

Designed as a three-year program covering grades 10 through 12, the academy has two full-time science teachers, one full-time mathematics teacher and one full-time health teacher. Students are transported to FTTC from their home high schools for three hours of instruction daily.

The academy operates on an A/B block schedule with students earning a total of four high school credits per year. The credits are applied to students’ transcripts at their home high schools.

First-year students take chemistry, mathematics, Project Lead The Way® Principles of Biomedical Sciences and a health core course. Second-year students take anatomy and physiology, Project Lead The Way Human Body Systems, AP Chemistry or AP Biology, and mathematics. Third-year students take physics, AP Chemistry or AP Biology, microbiology, and Project Lead The Way Medical Interventions.

“We are looking for experiences that students are not able to receive at their home high schools.”

— Jennie Croslin
Academy Science Instructor

Contact:

Jennie Croslin

(jcroslin@francistuttle.com)

The mathematics sequence depends on the needs of students when they are accepted into the academy. The courses available are Geometry, Algebra II, Pre-Calculus with Trigonometry, and AP Calculus. All of the mathematics and science courses are taught at the pre-AP level leading into AP Chemistry, AP Biology and AP Calculus.

FTTC provides guest speakers, field trips and other hands-on experiences to students in the program. After only one year, students performed well at the Health Occupations Students of America (HOSA) conference, and the school was a finalist for the Innovator of the Year award given to companies and programs in 2008 by the *Oklahoma Journal Record* newspaper in Oklahoma City.

“We want to partner with local hospitals and the health community to provide exceptional experiences for our students,” said **Jennie Croslin**, academy science instructor. “We are looking for experiences that students are not able to receive at their home high schools. We are also developing integrated themes that will be woven into the four classes that students take at the academy each quarter.”

Technical Students Design Authentic Business Plans

Students in two classes — Business Information Technology and Graphic Design — at **Northwest Technology Center** in Fairview, Oklahoma, use computer skills to develop high-quality business plans. Playing the role of an entrepreneur, each student works individually and in teams to design an authentic business, complete with an operations plan and marketing materials.

Teachers **Lisa Fuller** of Business Information Technology and **Amy McClure** of Web Development and Graphic Design use seven elements of good projects to guide students to success in the project. The elements are authenticity, academic rigor, applied learning, active exploration, adult connections, assessment and alignment.

Students strengthen their academic, technical and problem-solving skills as they write a business description and produce marketing materials such as company logos, letterheads and business cards. They also create a customer database.



Contact:

Lisa Fuller

(lisaf@nwtechonline.com)

Amy McClure

(amym@nwtechonline.com)

Students edit their business plans to present to financial investors. Initially, the students struggled with technical writing and research, but they overcame these obstacles by revising their plans and receiving direction and feedback from their teachers.

Research is done through local sources and Web sites as students estimate the costs of business expenses such as rent, inventory, utilities and licenses. Students use mathematical formulas to create a sales forecast spreadsheet.

The teachers use a rubric to guide students in the project and to assess each assignment. The rubric is a dynamic document that incorporates students' input, project evolution and teachers' experiences as it improves from year to year.

As a culminating activity, the center's business department plans to sponsor a special night during which students will present their business plans to parents and other adults in the community.

Preparing for Careers in the Biofuel Industry

“Biofuel” is a new word in the American vocabulary. It is broadly defined as solid, liquid or gas fuel derived from “recently dead” biological material or made from plants such as corn and soybeans and/or animals and their byproducts. Fossil fuels, on the other hand, come from biological material that has “been dead for a long time.”

Many opportunities exist for technical education programs in high schools and postsecondary institutions to incorporate biofuel-related learning into the curriculum to prepare students for careers in this emerging field. The tie-in with agriculture education is natural, since grain crops are needed in alternative fuel production.

David Hall, grants manager for the Montana University System, is handling a grant from the U. S. Department of Labor to establish a network of schools offering courses in biofuel research, production and processing. “High schools and colleges are making it possible for students to prepare for careers in the biofuel industry to address the increasing need for alternative fuels,” he said.

The three main categories of biofuel careers are oil production, fuel processing, and fuel testing and distribution. All of them require strong academic knowledge and skills in mathematics, science and communications. High schools that incorporate biofuel careers into their agriculture education programs focus on oil seed crop production, biodiesel and ethanol processing, energy mechanics and energy entrepreneurship.

“High schools and colleges are making it possible for students to prepare for careers in the biofuel industry to address the increasing need for alternative fuels.”

— David Hall
Grants Manager
Montana University System

The following examples illustrate how high schools are responding to the need for more knowledge of alternative fuels:

- The new Bertie County Early College Agriscience Biotechnology High School in Bertie County, North Carolina, is the only one of its kind in the state. As students work toward graduation, they will take a series of rigorous academic courses and modern biotechnology courses resulting in a high school diploma and up to two years of college credit. The school is partnering with Shaw University and North Carolina State University, both in Raleigh. Jim Guard, 2008 Agriculture Teacher of the Year in North Carolina, is lead teacher for the new school.
- Two statewide workshops for agriculture teachers in Pennsylvania in spring 2008 incorporated a training toolkit of materials from the National Biodiesel Board. Paul Heasley of the State College Area School District in State College, Pennsylvania, has information on the workshops as well as copies of two PowerPoint presentations — one containing six lessons and the other to be used in teaching physical science and mathematics concepts in biodiesel production.
- Dave Briggs, agriculture teacher at Jefferson-Scranton High School in Jefferson, Iowa, teaches a dual credit biofuel course with Iowa Central Community College in Fort Dodge. He has a schedule for the course, a PowerPoint presentation on how to report on a lab, and a rubric for scoring lab reports.
- Washington High School in Washington, North Carolina, received a grant to construct a tank and filtering system to convert the school's cafeteria grease to diesel fuel.
- Gary Schaff of Sidney High School in Sidney, Montana, believes it is imperative to teach students about alternative fuels. He conducts a demonstration that serves as a catalyst for student debate, research and application. Two clear specimen jars act as simulators of a piston cylinder. With two ounces of denatured fuel ethanol in one jar and two ounces of gasoline in the other, he lights both jars and asks students to observe them for a minute and then consider factors such as volatility, emissions, cylinder temperature, BTU rating, flame color and cylinder deposits. He points out that a bushel of wheat or corn produces 2.5 gallons of ethanol.

Contact:

Jim Guard
(jguard@bertie.k12.nc.us)

Contact:

Paul Heasley
(plh11@scasd.org)

Contact:

Dave Briggs
(dbriggs@jefferson-scranton.k12.ia.us)

Contact:

Josh Davenport
(jdavenpo@beaufort.k12.nc.us)

Contact:

Gary Schaff
(gschaff@metnet.mt.gov)

Postsecondary schools in Montana have developed a number of biofuel courses, including introduction to biofuels, hazardous materials handling, renewable energy, energy mechanics, biofuel production, and processing plant management. Some of the schools are:

Miles Community College in Miles City

Kristin Buck (buck@milescc.edu)

Montana State University — Northern in Havre

Jessica Windy Boy (jalconwindyboy@msun.edu)

Dawson Community College in Glendive

Bruce Bainbridge (bainbridge@dawson.edu)

Montana State University — Billings

James Hughes (jrhughes@msubillings.edu)

Another postsecondary example is:

Blue Mountain Community College — Oregon

Jon Farquharson (jfar@bluecc.edu)

David Hall (davidhall@montana.edu)

High-Interest Career Courses Give Students a Future Now

Los Fresnos High School is a comprehensive high school in rural Los Fresnos, Texas, 11 miles from the Mexican border. More than 93 percent of its 2,364 students are Hispanic. All students are eligible for free or reduced-price lunches.

A member of the *HSTW* school improvement initiative since 1992, Los Fresnos High School has received numerous awards for implementing the *HSTW* Key Practices and improving student achievement. The school was named one of 25 *HSTW* Pacesetter Schools in the nation for 2008-2010.

Seventy-one percent of students at Los Fresnos High School are seeking a brighter future through career/technical studies.

Students are required to earn 26.5 credits for graduation. The high school completion rate was 86 percent for the Class of 2007, the latest year for which data are available.

All students select a career pathway that guides their program of study for four years. The curriculum includes electives that are appropriate for each pathway.

The school provides support for students to meet higher standards. Teachers from all four core content areas are available in the homework center four days a week after school. Teachers also stand ready to help students through individual tutorials.

Los Fresnos benefits from a true partnership of academic and career/technical (CT) teachers, who work together to raise students' reading, writing and mathematics skills in all classes. Writing assignments relate not just to the course content, but to students' interests and plans for college and a career. "Teachers assign meaningful work that will help students now and later," Principal **Virginia Miller** said.

Seventy-one percent of Los Fresnos students are seeking a brighter future through CT education. Many are enrolled in four outstanding programs that meet the needs of students and the business community.

Hospitality Program — This work-based learning program involves junior and senior students who receive training four days a week at the Sheraton South Padre Island Beach Hotel. Students wear uniforms provided by the school and name tags provided by the hotel as they rotate through various departments to learn the hospitality business. They have employee files and time cards just like regular employees.

"Students are given the opportunity to learn from professionals who have years of experience in the hotel field," said Los Fresnos instructor **Sue Ellen Hill**. Many students are invited to join the staff on the weekends and after they graduate from high school. "Even if they don't continue in the hospitality business, they learn skills that they will need in the world of work," Hill said.

Ready, Set, Teach — Four days a week, students in this teaching internship program report to middle grades or elementary classrooms where they do everything but grade papers. These future teachers observe, tutor individual students, and work with small groups of students and the entire class. They are assigned a bulletin board project and a lesson that they develop, prepare and deliver with the classroom teacher.

Prior to the experience, students receive instruction on effective teaching methods, lesson planning, learning styles, professionalism in the teaching field and the necessary academics to be a successful teacher.

Accountability takes many forms: **Sue Ellen Hill**, the family and consumer sciences teacher, visits the middle grades and elementary classrooms to observe the interns and to assist the field site teachers, who evaluate the interns every two weeks. Students turn in weekly logs of their experiences.

"One student was so interested in teaching that she volunteered to help freshmen at her school with their mathematics assignments," Hill said. "Ten former interns have graduated from college and are now teaching in the school district."

Welding Program — With the shortage of skilled welders across the nation, students who apply themselves in the Los Fresnos welding program can look forward to jobs that pay as high as \$80,000 per year in the case of qualified welding inspectors.

A total of 120 juniors and seniors per school year complete the 18-week welding course, which is part of the school's agricultural science program. The school created the program by combining Agriculture Metal Fabrication Tech (Ag Science 322) and Agriculture Structure Tech (Ag Science 321).



"Students in the program receive the knowledge and skills they need to get started in the welding industry."

— Edwin Rivera
*Agriculture Instructor
Los Fresnos High School*

The well-equipped welding shop at Los Fresnos High School has a real-world atmosphere. It contains 20 welding machines and 20 welding booths plus oxy-acetylene torches and many other modern tools and equipment.

“Students in the program receive the knowledge and skills they need to get started in the welding industry,” said **Edwin Rivera**, head of agriculture and welding at the school. They can apply for certification in a number of aspects of the business. “Students are able to receive certification on what they have achieved,” Rivera said.

The welding field has approximately 30 certifications, from structural steel to pipe to metal specific, Rivera explained. Los Fresnos uses an American Welding Society (AWS) structural code to certify students. Certification depends on which codes they pass. Students may receive certification in only one position, one thickness or one electrode type, or they may be certified in up to four positions on all electrode types. It depends on each student’s skills and progress.

“It behooves students to try to receive as many certifications as possible and at least a certification in the vertical and overhead position,” Rivera said. “This will qualify them to join most companies as a basic welder.”

Students can continue their instruction by taking an advanced welding class at Los Fresnos or at a community college. Sometimes a company will provide the training. In almost all cases, welders are required to demonstrate proficiency to the company they want to join, Rivera said.

Media Technology — Some students that other teachers had given up on have found their niche in this program. Students are actively involved in operating an on-site TV station, creating public service announcements, producing shows for the school and the community, making videotapes, and doing a variety of other jobs related to the rapidly expanding media field.

Students say they have become more responsible as a result of being in the public eye and producing products that are seen throughout the school and the community. Many students go to work for local radio and TV stations after graduation.

Los Fresnos Independent School District provides funding for the program, which has opened doors of opportunity to students who otherwise might have lost interest in school and dropped out.

“We have issued an invitation to any school that wants to visit the campus to see these programs and others in action,” said Principal **Virginia Miller**. “Feel free to contact us with any needs, questions or feedback.”

Contact:
Sue Ellen Hill
(shill@lfcisd.net)
Edwin Rivera
(erivera@lfcisd.net)
Virginia Miller
(vmiller@lfcisd.net)

Health Care Students Give Second-Graders ‘Hospital’ Experiences

Opportunities for health care students at **Wes Watkins Technology Center** (WWTC) in rural Wetumka, Oklahoma, to get practical experiences in pediatric care are limited by the size of the community. So it made good sense for the center to establish a simulated “hospital” where students “examine” and “treat” children on field trips from nearby elementary schools.

“This annual event at make-believe Scratch and Patch Hospital has proven successful in immersing health care students in the clinical fields they are pursuing and in introducing second-graders to future careers in the medical field,” said **Linda Sanford**, health programs director at WWTC.

Before the event, Practical Nursing (PN) students develop a skit that is approved before it is taken on the road to each sending school in the Wes Watkins network. The purpose of the skit is to preview the Scratch and Patch Hospital experience and decrease younger students’ anxiety about receiving medical care.

In another pre-event activity, health care students choose age-appropriate medical words, such as “surgery” and “blood,” for second-grade teachers to incorporate into their spelling lists.

All activities leading up to the “hospital” experience are combined in a learning activity package that health care students must complete successfully to receive a grade for the clinical day. The grade also takes into consideration a student’s effectiveness in participating in the event.

Here are some activities that take place on the day of the event:

- Students in the Medical Office Technology program “admit” second-graders to the “hospital” for conditions such as make-believe broken arms, legs and fingers. The WWTC students give the younger students hospital ID bracelets, insurance cards and Monopoly game money to pay their “bills.”

- Students in the Health Careers Certification program simulate doing lab work and making electrocardiograms and chest X-rays.
- PN students staff the pre-op area where the “patients” receive hospital gowns and booties and sign a “release form” for “surgery.” The PN students start a mock intravenous (IV) treatment, take vital signs and measure height and weight.
- The Surgical Technology lab at WWTC serves as a “surgery suite” where students perform the roles of surgeon, anesthesiologist and surgical technologist.
- Practical Nursing students also staff a post-op area where the young “patients” receive discharge information.
- Medical Office Technology students discharge the “patients” from the hospital and present them with their “bills.”

WWTC instructors read about a similar program at the University of Alabama in an article in the *American Journal of Nursing* and decided it filled a need at the center. The WWTC project has received community service awards at the state and national levels and a special award from the Oklahoma Department of Career and Technology Education. It was also featured on Oklahoma Horizon TV, a station in Stillwater that covers stories in the state, nation and world to showcase people and businesses that contribute to Oklahoma’s economy and quality of life. The station is a project of the Oklahoma Department of Career and Technology Education.

One second-grade teacher who accompanied her students to Scratch and Patch Hospital said it was “by far” the best educational field trip she had experienced in 32 years in education.

The technology center has created a compact disc containing organizational and evaluation materials that will be helpful to other schools in launching such a project. The disc is available free on request from Linda Sanford (lsanford@wwtech.org).

Career Portfolios Reinforce Literacy, Ensure Success

All students at **Wes Watkins Technology Center** (WWTC) in Wetumka, Oklahoma, develop career portfolios that showcase their academic and career/technical knowledge and skills, experiences in a career field, career planning and job qualifications.

Graduates say the portfolios really work:

“The letters and assignments I wrote for my portfolio helped me make an A on my first college essay,” one former student said.

“Someone with identical skills was applying for the job I wanted, but my portfolio helped me get hired,” another graduate said.

A portfolio contains a wide range of materials, such as a résumé, school and work-based learning samples, evidence of achievement and recognition, letters of recommendation, and career correspondence. All of the pieces show that the student has mastered the use of information and communication skills; basic grammar and comprehension; and the collection, organization, management and evaluation of information.

Natalie Kennedy, a surgical technology instructor, says her students put surgical case reports, work folders and chronological and paragraph summaries of surgical procedures in their portfolios. Students in other career fields build similar portfolios that highlight their educational and work-based experiences.

When students complete their portfolios, they go through a mock interview and answer career-based questions. Students say it helps greatly to have a portfolio to display in an interview. “It gives them more confidence in their knowledge and skills if they can show the interviewer what they have accomplished,” Kennedy said.

“Someone with identical skills was applying for the job I wanted, but my portfolio helped me get hired.”

— WWTC Graduate

Contact:
Natalie Kennedy
 (nkennedy@wwtech.org)

Technical School Reinvents Itself to Raise Achievement

The classic success story of Sussex Technical High School in Georgetown, Delaware, has been told many times — but it never goes out of style. It is a pure example of how a school that embraces the *HSTW* Key Practices can turn itself around and achieve national prominence.

Sussex Tech was a shared-time vocational school that was about to go out of business. With a downward spiral in enrollment and achievement, the school conducted a self-examination that revealed many problems: low standards; a reputation for discipline issues; little coordination with feeder schools in terms of students' arrival and departure times and professional development days; no control over admissions; no integrated academic and career/tech studies to give students a look at the real world; and no guidance to help students choose careers and postsecondary education.

Everything changed when Sussex Tech learned how to empower the staff with the *HSTW* model of whole-school improvement. The school became a full-time “choice” high school that receives twice as many applications as it has openings each year. Enrollment has doubled to 1,200 students.

The school adopted a block schedule with 90-minute classes; developed a structured program of study with rigorous academic and CT courses; required every student to have a major; offered a creative and integrated approach to learning known as “techademics”; required a research paper in junior year and a senior project in the 12th grade; and initiated guidance and extra help programs.

Sussex Tech has been recognized as a National School of Excellence. It is also one of 10 original New American High Schools. The recipient of many awards from the Southern Regional Education Board, it received a Gold Achievement Award in 2008 for having at least 50 percent of its students to earn the *HSTW* Award of Educational Achievement based on their reading, mathematics and science scores in the *HSTW* Assessment and on completing a solid academic core and a program of study.

Contact:

Pat Savini

(psavini@sussexvt.k12.de.us)

Distance Learning Delivers Career/Technical to More Students

Caddo Career & Technology Center (CC&TC) in Shreveport, Louisiana, is a charter member of *HSTW*. For two decades, this shared-time facility has implemented the *HSTW* Key Practices to raise achievement and to ensure the success of its students.

The center upholds high expectations for teachers and students through programs such as industry-based certifications, dual enrollment and work-based learning. Students complete a capstone project and develop a career portfolio prior to graduation.

Constantly seeking ways to expand and reach the greatest number of students, CC&TC has launched a distance-learning program that connects students who want certain courses to teachers located either at CC&TC or at another site, such as a college campus.

The program allows students to be enrolled in high school and college at the same time and to interact and participate in learning with college students.

“The prime advantage of distance learning is the ability to reach a broad range of students with courses that support their career interests,” said **Gayle Flowers**, director of Career, Adult and Alternative Education for Caddo Public Schools. “The program makes it possible for many more students, especially in rural areas where travel can be a problem, to have access to career/technical education.”

Flowers said CC&TC has seen increased motivation in students who participate in distance learning and have observed higher achievement in critical thinking and problem solving.

CC&TC offers three distance learning courses: Teaching Professions, in which the teacher is located at CC&TC and the students are located both on and off campus; Education for Careers, in which the teacher is on campus and the students are off campus at two different sites; and Human Anatomy, in which the teacher (a community college instructor) is off campus but the students are at CC&TC.

The Teaching Professions course enrolls about four students from the off-campus site each year for the entire year; Education for Careers has about 40 distance learning students (20 from each site) each semester, for a total of 80 students each year; and Human Anatomy, with its stringent qualifications, has about four students per year.

The qualifications for teachers of distance-learning courses vary according to the course and depend on whether students will receive college credit. All students in the Teaching Professions course have the opportunity to receive dual enrollment credit, so the teacher must have a master's degree. The teacher of Education for Careers must be trained and certified in that area. Human Anatomy requires the instructor to have a master's degree.

The start-up cost of a distance-learning course is high because of the equipment needed to teach the course. Both locations must have a computer

CC&TC has launched a distance-learning program that allows students to be enrolled in high school and college at the same time and to interact and participate in learning with college students.

for each student, cameras and microphones to ensure quality video and sound, large screens to be able to see the entire class, a special computer setup for PowerPoint presentations and a document cam to project items onto a screen.

Annie Cherry, Teaching Professions instructor, listed some potential challenges in teaching a distance learning course: the effort required to get supplies and materials to other sites, taking up and returning work in a timely fashion, keeping the teacher and a facilitator at an off-campus site on the same page, quirky computers and equipment, bad weather that interferes with reception, and bandwidth size (capability to transmit information).

Because career/technical courses require hands-on learning, CC&TC has had to make arrangements to ensure the active participation of students in distance-learning courses. All materials and supplies are given to the off-campus sites so that students can take part in hands-on activities. After the teacher demonstrates what students are asked to do, the facilitator helps students complete the assignments. The teacher remains logged on to answer questions and to monitor students' progress.

"One of the most important things to do to make the courses a success is to make personal visits to the off-site school as often as possible," Cherry said. "It is very important to have face-to-face interactions with the off-campus students and to schedule activities that will allow all students to meet together every once in a while."

Facilitators are dedicated individuals who must be willing to check e-mails and faxes, copy handouts, distribute materials, operate the equipment, monitor the students, and pick up students' work and forward it to the teacher. Even though facilitators do not have to plan for the lessons, they have many duties as the go-betweens for the two locations.

"Students who enroll in a distance learning class must be responsible and self-motivated," Cherry said. "They must be able to take the initiative to get things done on their own and must be able to handle the lack of human contact in the course." Students must be computer literate to handle the e-mail and PowerPoint aspects of the course.

Even though distance learning is challenging to accomplish, it is amazing that technology is giving students opportunities that would not have been possible only 10 years ago, Flowers emphasized.

Contact:

Gayle Flowers

(gflowers@caddo.k12.la.us)

Bonnie Martinez

(bmartinex@caddo.k12.la.us)

Annie Cherry

(acherry@caddo.k12.la.us)

Center Joins *TCTW*, Launches Senior Project

Winston County Technical Center (WCTC) in Double Springs, Alabama, enrolls 436 students from four home high schools and offers nine career/technical programs. When the center received a grant to join *Technology Centers That Work (TCTW)*, an initiative of the Southern Regional Education Board, it kicked off its participation by implementing a senior project in the 2007-2008 school year.

The project called for seniors to interview professionals in business, health care or other career fields (matching what they were studying at the center), write a paper about the career field, create a PowerPoint program, and make an oral presentation to experts from the community. Students were told to use a job-interview format, as if they were making a real presentation in a real business setting. Judges were given guidelines and score sheets to rate such things as students' knowledge of the career field, the quality of their presentations, and how seriously they took the project.

The senior project is a major component in the center's efforts to increase rigorous academics in career/technical courses. Students are given lessons on how to write a research paper, how to conduct a job interview, how to prepare résumés and applications, and how to make PowerPoint presentations at each stage of the senior project.

"We only had time to offer an abbreviated version of the senior project last year," said **Shandy Porter**, director of the center. "We are asking teachers for input and looking at materials from schools that have effective, well-established senior projects to strengthen our guidelines as we go to a full-scale project in the future." The center plans to involve students earlier and to draw on a schoolwide reading initiative in building students' skills for completing their projects.

The center chose the senior project to heighten students' understanding of career programs offered at the center and what they will be expected to know and do to enter those fields. The project shows underclassmen the expectations they will need to meet at the center.

The center's advisory council has been very active in helping the school to meet the higher standards of *TCTW*, including serving as interviewers and judges and awarding certificates in connection with the senior project. The council is composed of business and industry leaders, elected officials, postsecondary instructors, parents and former WCTC students. The council president accompanied center leaders and teachers to the *HSTW* Staff Development Conference in Nashville in July 2008.

Contact:

Shandy Porter

(sporter@winstonk12.org)

Criminal Justice Program Captures Students' Attention

The criminal justice program at Lanier High School in San Antonio, Texas, is a “crime of passion.” It combines the hard work and ambition of students with the faculty’s zeal to make learning real through authentic projects, law enforcement mentoring, guest speakers, field trips, competitions and certifications.

Students take a series of rigorous courses focusing on criminal justice, crime in America, criminal law, criminal investigations and emergency communications. The course work demonstrates the relevance of academic subjects such as geometry, anatomy, physics and government. The instructor increases students’ literacy levels by requiring good writing skills on fictitious police reports and good speaking skills for school and community presentations.

In one project, students collected data on gangs, violence and school attendance to develop brochures and presentations encouraging their fellow students to stay in school and attend class regularly. Projects are often used for community service events.

After completing a training program delivered by law enforcement officers, students are sworn in as police explorers by the San Antonio Independent School District police force. This experience provides an opportunity for law enforcement mentors to guide and advise students about the knowledge and skills they will need and the obstacles they will encounter in the criminal justice field.

An articulation agreement with San Antonio College makes it possible for students to earn college credit for the program. Students can also qualify for professional certification in Emergency Communications, Homeland Security, the Occupational Safety and Health Administration (OSHA) and the Texas Alcoholic Beverage Commission (TABC). Certifications provide internship and employment opportunities for students to work at local law enforcement agencies.

SkillsUSA competition allows students to prove that they are adept in criminal justice topics such as crime scene processing, felony apprehension, suspect search and handcuffing, and building search, as well as in job interviewing and public speaking.

“Twenty-four students graduated from the criminal justice program in 2007, including 22 who entered higher education and two who enlisted in the military,” said instructor **Tamara Ford**. She believes that providing real-life experiences prompts students to become excited about learning.

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— Tamara Ford
*Criminal Justice Instructor
Lanier High School, TX*

Contact:
*Tamara Ford
(tford2@saisd.net)*

Industry Approval Promotes Success in Tech Careers

Preparing students for careers in the 21st century is an ongoing and constantly changing target for career/technical instructors. As schools revise, revamp and introduce new courses, the concept of industry credentialing can be the answer to embedding modern workforce skills into career/technical instruction.

Industry credentials benefit students by: 1) providing evidence that a student has completed advanced educational preparation by verifying competency in career/technical skill areas that matter to business and industry; 2) increasing opportunities for advancement in a chosen career pathway; and 3) enhancing the confidence of students that they have achieved national competency standards recognized by business and industry.

“Industry credentials give high school graduates a competitive edge in obtaining high-wage, high-growth positions and in connecting to community college industry credentialed programs,” said **Elizabeth Russell**, state director of career/technical education in Virginia.

Credentials in career/technical education have been defined as:

- industry certification, such as Certified Nursing Assistant (CNA) that can be earned before high school graduation.
- industry certification “pathway” examinations leading to industry certification in a particular area and/or skill level (such as Automotive Service Excellence and various computer certifications).

- state-issued licenses that validate the essential skills needed for a specific job as determined by a state licensing agency (such as cosmetology and barber licenses).
- occupational competency assessments from the National Occupational Competency Testing Institute (NOCTI) that provide credentialing options in career/technical education. NOCTI provides a large number of job-ready assessments, many of which include both knowledge and performance-based components. Examples are horticulture-floriculture, dental assisting, pre-engineering and criminal justice.

The following suggestions will help school districts that want to provide funds to cover students' testing costs for industry certification:

- Career/technical education advisory committees can "adopt" students in approved credentialed programs and assist with their testing fees.
- School boards can build test fees into their annual budgets.
- State legislation can be developed to provide funding for industry credentials, or state and federal funds can be utilized for third-party testing.

"All career/technical programs should offer at least one industry credential," said **Jean King**, school improvement consultant for SREB. "If a program doesn't offer credentialing, it should be revised with that goal in mind."

King advised schools to work closely with their local community colleges to ensure a seamless transition for students who want to obtain higher levels of industry credentials in postsecondary education.

The state of Virginia began with a small credentialing program in 2002. Its first official data collection was in 2004-2005, when more than 5,000 credentials were earned. The general assembly provided the first state funding in 2005. In the 2006-2007 school year, the most recent year for which data are available, the number of credentials had increased to 13,325.

Career/technical education administrators and teachers wanting to learn more about industry credentialing can visit the Virginia Department of Education's Web site at www.doe.virginia.gov/VDOE/Instruction/CTE/certification. Visitors to the site can download "voice-over" PowerPoint presentations about career pathways as well as information about credentials related to each pathway.

Contact:

Elizabeth Russell
(elizabeth.russell@doe.virginia.gov)

Jean King
(jmk4@cox.net)

Ten Tips for Success Increase Performance at Tech Center

Who can resist a list of top 10 tips for raising student achievement? **Trumbull Career and Technical Center** (TCTC) in Warren, Ohio, used results from the *HSTW* Assessment of reading, mathematics and science, as well as findings from *HSTW* student and teacher surveys, to compile a list of 10 ways to improve school and classroom practices.

The school has had success with its “Top 10.” The graduation rate for 2008 was expected to be greater than 99 percent as the school works toward a goal of having every student graduate. This compares with 84 percent in 2001. The percentage of students passing the Ohio Graduation Test in 2007 was 97 percent.

1 Incorporate numeracy throughout the curriculum. The teacher heading the numeracy focus team attended a *HSTW* conference in Ohio in 2007 during which she collected ideas from another career center. Two ideas that have worked at TCTC are a numeracy challenge competition and a problem of the week. The numeracy challenge takes place in the cafeteria with teams of four students from the same program on a team. Each team has its own table where it solves mathematics problems created by students in various other programs. The team that solves the most problems correctly within the time limit receives a traveling trophy. The problem of the week is a mathematics problem from a particular program each week. Students work out the problem and turn in their answers. All students that solve the problem correctly are eligible for food prizes such as pizza or a burger that is delivered during lunch period.

2 Structure an extra-help program. Teachers refer struggling students to extra help, or students can request help on their own. TCTC notifies parents when students are failing or needing extra assistance in academic courses. Students’ program and academic instructors are notified when the students enroll in extra help. Students can use an Internet-based program known as a Virtual Learning Academy (VLA) to recover credit to graduate. During the 2007-2008 school year, 12 students completed the VLA program and received their diplomas. The attendance supervisor and the VLA teacher track and monitor the use of extra help and meet with students who need it but are not participating. Parents are notified twice a month of how many sessions their students have attended. Parents may also receive phone calls stressing the importance of extra help.

3 Cooperate with local universities. After receiving a critical transitions grant in 2006 and seeing data on the number of students who need remediation in college course work, TCTC asked the Kent State University Trumbull Campus, with which it has a strong alliance, to administer ACT’s COMPASS college placement test to all current and incoming college tech prep students. Students test in the spring of each year and receive their results immediately from TCTC staff. The information is used in scheduling students’ classes for the coming year. As a result, the school has found more students taking a fourth year of mathematics and/or science when their schedules allow it.

4 Increase student attendance and retention. TCTC requires a handbook orientation to acquaint all students with attendance and grading policies. Students who meet the guidelines and whose names are selected in a quarterly drawing receive incentives, such as digital cameras.

5 Participate in middle grades outreach. TCTC students visit feeder middle grades schools to talk with students about academic and career opportunities and TCTC programs of study.

6 Increase awareness through community outreach. During an open house at the school each March, students offer free services such as auto repair and hair styling. The local newspaper publishes stories about student achievement and participation in community service activities. Breakfasts are held five times a year at the school to give parents, grandparents and others a better understanding of what the school offers to students. The superintendent, director and district administrators stress the importance of communication and encourage parents to call with any questions or concerns throughout the year. Parents tour the building after the program.

7 Implement senior projects. The more the school learned from *HSTW* about the benefits of senior projects, the more determined it was to implement this type of demonstration of mastery. All TCTC students complete senior projects consisting of a research paper, a product, a portfolio and a presentation. Recent themes have included “The Role of Women in the Military” and “Blu-ray vs. High Definition.” The school has found that students become “experts” on their topics and strengthen the time management, organization, responsibility, critical-thinking, evaluation and application skills they will need beyond high school. In working with mentors on their senior projects, students develop networks of professionals in their chosen career fields.

8 Engage student learning with technology. TCTC instructors receive professional development in how to use modern technology, such as interactive whiteboards and computer software, to engage students in learning. Teachers have found that technology is effective in raising achievement and in communicating with parents. Often, the school is more technically advanced than its business and industry partners. Technology-oriented students expect schools to be able to challenge them.

9 Write a solid literacy plan. The TCTC plan contains five parts: reading the equivalent of 25 books across the curriculum per school year; using reading and writing strategies to understand content in all classes; writing weekly in all classes; writing research papers in all classes; and being taught at the honors level in all English/language arts classes. In 2004, before the plan went into effect, 19 percent of students participating in the *HSTW* Student Survey said the school had an intensive emphasis on literacy across the curriculum. That response grew to 32 percent in 2006 after the plan was implemented in the 2004-2005 school year. The 2004 student survey also showed that students were not reading anywhere near the 25 books or equivalent recommended by *HSTW*. Only 2 percent reported reading more than 20 books per year. Students are reading much more than in the past. Fifty-four percent of students in 2006 said their career/technical teachers often stress reading — an increase from 25 percent in 2004. Forty-nine percent of students in 2006 said their career/technical teachers often stress writing — a gain from 27 percent in 2004. Teachers have participated in professional development to learn how to teach reading and writing in the content areas. A literacy coach is available to help teachers implement reading and writing strategies.

10 Offer challenging courses. The school has responded to the *HSTW*-recommended curriculum and to the state’s recommended curriculum and higher graduation requirements in giving students access to higher-level courses such as Honors English, zoology (articulated with a local university), calculus, physics and chemistry. Several years ago, TCTC established an admissions policy that limits students to two credit deficiencies for admission to its programs. As a result, students are better-prepared and are asking for higher-level courses.

School District Certifies Career/Technical Programs

When **Brevard Public Schools** in Brevard County, Florida, mandated that all CT programs would be industry certified, district personnel set to work to make it happen. The result is an increasing number of certifications and a printed guide that outlines the certification process. Teachers have received professional development in how to provide evidence of a program's performance.

Brevard is a large high-performing district with approximately 18,000 students enrolled in CT programs in grades seven through 12 each year. "Industry certification ensures that these students receive a quality education," said **Margaret Lewis**, director of the Office of Career and Technical Education for Brevard Public Schools.

Not all CT programs have national industry certification, and most do not certify career/technical programs at the high school level. When there is a national industry certification that is appropriate for a high school program, the Brevard school district uses it. One example is the culinary program that the American Culinary Federation (ACF) had already certified. If no such certification is available, the district uses its own model of certification. The district had a total of 39 certified programs in 2006-2007, up from 30 the previous year. (See the Brevard career/technical education Web site at ctebrevard.com for updates on certified programs.)

The four pieces of the Brevard Public Schools industry certification model are:

Curriculum — The program is examined in terms of scope and sequence, program length and enrollment, instructional materials, safety instruction, articulation with community colleges, an active advisory committee, and involvement of student organizations such as Future Business Leaders of America (FBLA).

Equipment, Tools, Furniture and Supplies — The equipment should be assembled and installed. It should be relevant to industry use and should be modified for students with special needs. Safety is a major consideration. There should be a written inventory of equipment as well as a plan for replacing worn-out or obsolete items.

Facilities — Certification takes into consideration the safety and health of students and teachers. The space should conform to state agency requirements and program certification regulations. It should be large enough; be configured properly; and be kept neat, clean and orderly.

Personnel — Instructors should be qualified to meet increasingly high industry standards. They should have industry credentials and industry experience, should participate in professional development and should maintain professional affiliations.

"All of the pieces lead to higher student achievement," Lewis said.

The implementation stage of the district certification process includes reviewing a program's standards and identifying evidence that the program is worthy of certification. A team conducts an on-site validation to verify the accuracy of the self-study and makes the decision about certification. The validation team is composed of two to five members, including at least one industry representative and one professional educator familiar with the requirements of the occupation taught in the program. The district resource teacher is the facilitator for the validation process. The career/technical program instructor and the district resource teacher determine and agree on the members of the validation team.

Administrators and teachers receive a summary report saying whether the program has been certified. If a program is denied certification, the school receives a corrective action plan to implement in working toward full approval.

"An advisory committee for each program meets at least twice a year to recommend content based on industry trends," said Janice Scholz, CT education resource teacher for the district. "Teachers incorporate the recommendations and then demonstrate to the committee that they are using the recommendations."

The advantages of program certification are numerous, including priority for federal and local resources to upgrade the programs; greater knowledge of the programs by representatives of business and industry; increased advisory committee networking with employers and postsecondary schools; recognition of outstanding programs; districtwide program standards; curriculum alignment with industry standards; and sharing of best practices throughout the district.

"Certification takes accountability into the classroom and results in improved career/technical programs and higher student achievement," Lewis said. "Teachers engage in professional development to update their skills so that they can use the latest software and equipment to deliver the

"Certification takes accountability into the classroom and results in improved career/technical programs and higher student achievement."

— Margaret Lewis
*Director
Brevard Public Schools*

program content. In addition to making regular revisions to the curriculum, teachers have the advantage of receiving more specific direction and input from industry about what they should be teaching students.”

One example of how certification impacts instruction and equipment in a career/technical program is the National Automotive Technicians Education Foundation (NATEF), which requires Automotive Service Excellence (ASE) teacher certification, curriculum alignment with NATEF requirements and equipment that meets industry standards.

Certification for Students — Brevard Public Schools also promotes industry certification for students, who must have a minimum of three credits in at least one of the following areas prior to graduation:

- Approved dual enrollment, Advanced Placement (AP), International Baccalaureate (IB), Advanced International Certificate of Education (AICE) approved honors courses (three credits in any combination)
- Career/technical education program of study (three or more credits to complete a sequential career/technical education program resulting in a credential endorsed by a national, state or local industry).

Brevard has identified at least one industry certification of students in three distinct CT programs and is still attempting to locate additional industry certifications for students in three or four programs. Students are not required

to take certification exams, but in cases where industry certifications have been in place for several years, all students participate. The district pays for students to take the certification exams.

“If a license is required in the career field in which a student tests, certification gives the student an opportunity for employment,” Lewis said. “We have heard of higher hourly wages for graduates who have achieved certification.”

District leaders are discussing whether it will be possible to modify its community college articulation agreement so that students can receive credit for passing an industry certification exam. This would require an alignment of industry specifications with community college degree or certificate requirements and certifications.

The Florida Legislature enacted the Cape Act in 2007 requiring career courses to lead to industry certification. The federal act known as Perkins IV requires “student attainment of career and technical skill proficiencies, including student achievement on technical assessments that are aligned with industry-recognized standards, if available and appropriate.”

Contact:

Margaret Lewis

(lewis.margaret@brevardschools.org)

Janice Scholz

(scholz.janice@brevardschools.org)
