Policy Perspective
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# 21st Century High Schools

## *New Designs Produce New Results*

by Jamie Story, Education Policy Analyst

Since the late 1960's, public education throughout the country has seen a host of "reforms": real per-student spending has more than doubled,[1] teacher salaries have increased by 10 percent in real terms,[2] and student-teacher ratios have fallen by more than one-third.[3] But despite these expensive changes, the average science scores of 17-year-olds have remained unchanged since 1992,[4] only 21 percent of ACT-tested high school graduates meet all four of the test's College Readiness Benchmarks,[5] and nearly 30 percent of entering college freshmen require remedial classes.[6]

This is no surprise, given that the public school system, as a whole, looks largely the same as it did decades ago—it has not undergone fundamental change. It is still a monopoly, with most parents having no choice as to which schools their children will attend. In addition, the centralized nature of the system gives teachers and principals little ability to shape classroom policy. It is no coincidence that the United States—as one of the only major industrialized countries without widespread school choice[7]—ranks near the top of the world in per-student spending, but near the bottom in academic achievement, especially in math and science.[8]

Realizing the urgent need for fundamental change, individuals and foundations across the country have embarked on an era of "high school redesign." Early college high schools, open enrollment charter schools, and schools of choice focused on topics such as math and science are just a few ideas that have begun taking hold.

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There are dozens, if not hundreds, of redesign success stories from around the country. This paper takes a brief look at five of these schools—four in Texas, and one in Colorado—that are using innovative, but common-sense, approaches to encourage student success. As schools of choice, these schools do not have an assigned body of students. They must therefore offer an excellent product, treat parents as shareholders, and produce positive academic results in order to attract students. Set relatively free from centralized bureaucratic control, these five schools are preparing students from all socioeconomic backgrounds for success in post-secondary education and the 21st century workforce.

## Carver High School

*http://www1.aldine.k12.tx.us/schools/websites/Carver/index.html*

"Good morning, Carver High School: where we have the best students, teachers, and staff, and the best test

CONTINUED ON NEXT PAGE

scores in the Aldine district!" Such is the way Principal Willie Pickens starts each and every day at Carver High School. Mr. Pickens believes in encouraging healthy competition, setting common goals, and highlighting student achievements for all to see.

Carver High School became a magnet school in 1995, focusing on engineering and the arts. Unlike magnet schools in neighboring Houston ISD, Carver has an open enrollment policy, with admissions decided solely through a random lottery system. Two years ago, total enrollment at Carter was 600 students—this school year it will jump to 1100. Rapid growth and an open enrollment policy can sometimes lead to challenges, such as the occasional symptoms of gang culture that arise at Carver. But Pickens notes that any potential conflicts are quickly brought under control due to the school's atmosphere of excellence that encompasses students, teachers, and staff.

A quick glance around Carver shows visitors that this school is different. The halls of Carver are treated as a gallery with which to showcase students' accomplishments and successes. Graduation photographs of former Carver students line the walls. One picture shows a Carver graduate who received a full scholarship to Stanford University, and there are many others with similar stories. Upon entering the front doors, students and visitors are greeted with a television playing the Carver High School video—newly created each year—that shows clips of successful students and reinforces the school's atmosphere of excellence. And Pickens runs a tight ship—students must have their shirt tails tucked in, no baggy pants, and if they see a piece of paper on the floor, they're expected not to walk past it, but to stop and pick it up.

Pickens constantly sets an expectation of excellence when students compete in any activity: "Everything we sign our name to, we plan to win it." Regarding competition, Carver students have seen tremendous results. Two years ago, Carver's engineering team won state and national competitions, and then represented the U.S. at the world competition, where Carver won second place. One student won the state history fair and proceeded to the national competition; the History Channel has expressed interest in airing the documentary he produced. An art student won Best in Show at the Houston Livestock Show and Rodeo art competition, and another student's award-winning piece of art was recently unveiled in a New York City museum.

Carver also focuses its engineering students on real-life applications. Seniors take a Capstone engineering class, in which they research a problem and create a real-world solution. For example, shortly after the completion of Harris County's light rail project, many pedestrians were being injured and even killed by the train. Carver students recognized the problem and invented pop-up warning lights as a solution. Harris County METRO now uses the exact same idea.

In order to better focus on its engineering and arts programs, Carver High School does not participate in inter-varsity sports. Carver has been chosen as one of the first of the Governor's T-STEM (Texas-Science, Technology, Engineering, and Math) Academies. Carver is also in the process of starting an Early College program, through which students can earn college credits during their junior and senior years of high school. Throughout the school year, students who need extra help are assigned mandatory after-school tutoring. If they fail to sign up for tutoring, they're assigned to SAC—Saturday At Carver—where they help Pickens with landscaping, picking up trash, and cleaning windows.

For all of its effort, Carver has achieved tremendous results. Aside from the students' numerous individual awards, Carver is designated a Model School by the Texas Education Agency. Furthermore, Carver graduates more than 96 percent of its students, with approximately 85 percent going on to college. Carver High School has proven that higher expectations help produce higher student achievement.

## Harmony Science Academy

*www.hsatx.org*

Harmony Science Academy was founded by a group of dedicated university researchers and doctoral students from the University of Texas, Texas A&M, University of Houston, and Rice University. As teaching assistants at the college level, these young visionaries had been disappointed to encounter many entering freshmen who lacked basic math and science skills, and they saw the need to develop a program

that would adequately prepare incoming students for the rigors of post-secondary education. With this goal in mind, the team of educators applied for and received a charter from the Texas Education Agency. In 2000, they established Harmony Science Academy in Houston, Texas.

A defining characteristic of Harmony Science Academy is its emphasis on parent involvement. Parents attend an open house prior to the beginning of the school year, where they are informed of the school's expectations for both students and parents. Parents also sign a contract detailing the school's strict policies. One of the founders remarked, "These parents all want their children to excel, so they agree with and understand even the most challenging discipline policies. If you have parents on your side, and they understand they need to work with teachers to help their children, you have a win-win situation."

The most unique of these parent involvement efforts is Harmony's home visit requirement. At least once a year, teachers visit each student's home—often around their birthday—and discuss the student's academic progress. Both students and parents are involved in the discussion, which steers away from disciplinary issues, focusing rather on academic goals and performance. For safety reasons, teachers always attend the home visits in pairs.

Harmony also makes after-school activities and real-life application of lessons a priority. The largest annual event at Harmony is a school-wide science fair. Starting in the fourth grade, every student participates by choosing, designing, and conducting an individual science experiment. A partnership with the University of Houston allows some older students to conduct their experiments in supervised university laboratories. Each experiment falls within a specific subject area, such as mechanics, genetics, or biochemistry. The fair takes place in December, with outside judges (often university professors) awarding prizes to the top ten projects in each subject area. The best projects advance to the city-wide competition, where Harmony is consistently well represented among the top awardees.

Interestingly, Harmony teachers are typically paid a lower base salary than their public school counterparts. But in return for lower pay, Harmony attracts teachers by offering smaller school and class sizes, and finds that teachers also appreciate the increased parental involvement. Harmony also pays its teachers based on performance, so the most effective teachers are rewarded accordingly. While the TEA requested the submission of a salary schedule in its most recent charter renewal application, Harmony submitted a schedule containing salary ranges rather than strict annual steps.

This emphasis on parent involvement, after-school learning opportunities, and excellent teaching has propelled Harmony to great success and notoriety. Among the four existing campuses in the 2005-06 school year, two were rated exemplary and one recognized by the TEA. The fourth campus, a brand new school, was rated academically acceptable. In addition, the Houston campus was recently named one of 52 National Title I Distinguished Schools in the country. And every graduating student has been accepted to college, with Harmony students now attending such schools as Rice University, the University of Texas, and Texas A&M University.

Along with this success has come increased demand from hopeful Harmony parents. Harmony is opening five additional campuses in the 2006-07 school year, for a total of nine schools in the state. The new Fort Worth campus attracted more than 1500 applicants for only 350 places, and the El Paso campus received more than 800 applications. While this great response is a testament to Harmony's demonstrated excellence, it is also an indication of the need for more, and better, academic options for Texas children and parents.

## Science Academy of South Texas

*http://scitech.stisd.net*

Recent legislative changes have made Texas the first state in the country where the default high school curriculum includes four years of each of the four core subjects, meaning the majority of Texas students will soon take four years of math and science, in addition to the four years of language arts and social studies that was already in place. However, the Science Academy of South Texas (SAST), located in Mercedes, was well ahead of the curve. Since its inception 15 years ago, SAST has required its students to take a minimum of four years of both math and science. In reality, though, SAST students typically take much more.

SAST has block scheduling, meaning that students take four 90-minute classes each day, and then alternate classes from one day to the next. However, science is double-blocked, meaning students take science every day. This enables freshmen to finish Integrated Physics and Chemistry (IPC) and Biology in their first year, and sophomores to finish Environmental Systems and Chemistry in their second. If they take a science class each of their junior and senior years (typically AP classes such as chemistry, physics, and biology), an SAST student will graduate with six credits of science. While math is only single-blocked, SAST students are encouraged to take geometry during the summer after their freshman year, meaning they graduate with five credits of math, including Calculus.

In addition to the extra math and science classes, SAST students take one technology class each year, in courses such as Computer Integrated Manufacturing, Digital Electronics, and Principles of Engineering. In order to offer these technology classes, SAST partners with the Rochester Institute of Technology and Project Lead the Way (a national alliance of pre-engineering programs).

To make room for the extra math, science, and technology classes, SAST—like Carver—does not participate in inter-varsity team or individual sports, but does promote the learning of lifelong sports such as tennis, volleyball, and cross country. Students may also choose to participate in art or theater classes.

SAST, along with its three sister campuses (for health professions, educators, and medical technology), is similar to a charter district. The district serves a three-county area covering a radius of 60 miles. This area includes 28 traditional school districts, from which SAST draws its students. While the schools were originally created to serve special needs students, they now serve students ranging from self-contained special education to gifted and talented—in the words of Principal Edward Argueta, "From special needs to special desires." SAST serves special education students with two trade programs: auto mechanics and building. The school population is about two-thirds Hispanic, and at least 40 percent low-income. Just like charter schools, the district is open enrollment—first-come, first-served—so it truly serves a representative sample of the area population. For the first time, applicants for the 2006-07 school year exceeded the school's capacity, so the school had to cut off enrollment at 700 students. SAST has strictly enforced its first-come, first-served policy; in fact, Argueta commented that the top-ranked student from the best high school in the area was recently turned away because enrollment had reached 700.

Many teachers, parents, students, and other stakeholders indicate increasing dissatisfaction with the high-stakes TAKS. However, SAST has succeeded not only in TAKS performance, but also ensuring that its students' day-to-day lives are not controlled by the TAKS. Due to its rigorous curriculum and standards, SAST feels its students are well-prepared for the TAKS without having to focus on the test itself. To ensure readiness, the school administers one diagnostic test to students at the beginning of the spring semester. Students at risk of not passing the TAKS (about 20 percent of the student body) are then assigned to after-school tutorials. SAST provides both teacher- and computer-based tutorials, although the computer tutorials initially appear to produce better results.

SAST has found tremendous success. Despite its diverse student body, SAST has historically been rated an exemplary school. (It missed the exemplary rating in 2004-05 by just a few percentage points in one subgroup.) Even more importantly, SAST graduates attend college at astoundingly high rates. The school estimates that over 95 percent of its graduates continue to a four-year university, with over 90 percent finishing a four-year course of study.

By setting high expectations, establishing a rigorous curriculum, and focusing on academics, the Science Academy of South Texas provides an excellent college preparatory program for public school students in the Rio Grande Valley.

## YES College Preparatory Schools

*www.yesprep.org*

The first YES College Preparatory School opened in Houston in 1998. By 2003, when the second campus opened, the waiting list included nearly 300 students. Today, YES Prep has expanded to four Houston-area campuses serving grades 6-12, with approximately 100 students per grade in each school. Altogether, the campuses now draw students from more than 80 zip

codes and 15 school districts across the Houston area. At least 85 percent of students are designated as low-income. Eighty-four percent are Hispanic, and another 13 percent are African-American.

At YES, acceptance to a four-year college is a requirement for graduation, as is participation in at least one Advanced Placement and/or Dual Credit class. Consequently, 100 percent of all YES graduates—five classes of them—have matriculated into four-year colleges and universities. YES seniors have been accepted to 170 institutions nationwide, including Brown, Columbia, Cornell, Georgetown, Yale, Penn, Stanford, and more than 25 Texas schools. Not only do YES students enter college, but they also remain there. Seventy-six percent of YES alumni still attend college four years later, compared to national retention rates of 50 percent overall and 22 percent for Hispanics. Eighty-six percent of YES students are the first in their families to attend college.

YES Southeast is the only Houston school ranked by *Newsweek* in its 2006 "Top 100 High Schools" list. In addition to the *Newsweek* ranking, YES was also named by the *Houston Press* as the top open enrollment high school in Houston. YES is the only charter school system in Texas to be named Exemplary or Recognized in every year of operation. And YES consistently outperforms other HISD schools each year on the TAKS and SAT.

YES founder Chris Barbic attributes this success largely to the fact that YES students spend 65 percent more time in school than do their Houston public school counterparts. Students have a longer school day, a three week summer school session, and service-learning Saturdays once a month. In addition to this extra time in school, students also have access to homework help during after-school hours; YES teachers are equipped with cell phones so that students can reach them in the evenings as needed.

As with the schools already discussed, parents are an important factor in the YES equation. Each school year, faculty, parents, and students sign a "Commitment to Excellence" contract, outlining their promise to do "whatever it takes" to succeed. In signing the contract, parents vow to support the rigorous standards and expectations held by YES for its students. Parental commitments include ensuring that students arrive by 7:30 a.m. and stay until 5 p.m.; ensuring that students attend Saturday sessions; allowing students to stay after school if homework is incomplete; and checking homework every night. If students or parents fail to live up to the contract, the student may be removed from YES; if teachers fail to live up to the contract, they could lose their jobs.

Another unique aspect of the YES model is the annual college research trip. Starting in the eighth grade, every YES student embarks on an annual, multi-day "field trip" around the country. By the time they graduate high school, YES students have researched and visited dozens of premier universities in all regions of the United States.

The YES North Central campus, which opened in 2003, has taken a unique, integrated approach to the teaching of math and science. Rather than treating the subjects separately, YES North Central pairs math and science teachers so they are both in the classroom at the same time. Students take a two-hour integrated math/science class each day. In addition, students produce an integrated math/science final project at the end of each six-week unit. Students must present this project at a public exhibition, where they are questioned and critiqued by outside observers. Language arts and history classes are also paired in a similar fashion.

This "team teaching" model has received rave reviews from teachers, and has even served to attract a handful of new teachers to the school. In math, North Central students are performing as well as other YES campuses, despite having less time devoted strictly to math each day. The system is still being tweaked, however, and one drawback is that it requires 33 percent more teachers. In order to combat the related costs that accompany additional teachers, North Central will instead be enlarging class sizes to 36 for the 2006-07 school year. If student performance is not negatively impacted, this class size will allow the integrated system to be sustainable, since its costs will be similar to those of the traditional model used at the other YES campuses.

The formulaic approach of YES allows for successful replication of its schools, while its autonomy as a charter school system enables it to try new ideas such as the integrated math/science model. As its website proclaims, "The YES model is proving that it is possible for

all students, regardless of their socio-economic background, to achieve the goal of college matriculation."

## Denver School of Science and Technology

*www.scienceandtech.org*

The students of the Denver School of Science and Technology (DSST) start each day to the same beat. It's the beat of an African drum played by a DSST student, whose charge it is to assemble the troops for the morning meeting. Every morning, Head of School Bill Kurtz, students, and faculty meet to share announcements, presentations, and "shout-outs" to students for special accomplishments. In the event that a student is nearing the end of an assigned suspension, the suspended student uses this time to read a written statement before asking to be readmitted to the community by popular vote. If anyone—faculty member or student—is late to the morning meeting, he or she must publicly apologize to the group. The morning meetings typically last about 15 minutes, after which everyone returns to their classrooms to start the day. Founder David Greenberg credits the morning meetings with establishing the culture of excellence and collaboration existing at DSST.

DSST has two missions. The first is to be the premier public school in Colorado focusing on science, math, and technology. In its first year, DSST's founding ninth-grade class was the highest scoring ninth grade class in math in the Denver Public Schools. In addition, DSST was the only high school in Denver to earn a "Significant Improvement" rating from the Colorado Department of Education, demonstrating dramatic growth in student test scores during their first year at DSST.

DSST has also already accomplished its second mission: to serve underrepresented populations. While these targeted populations were originally low-income and female students, in the third year more girls were enrolled than boys. By design, DSST has the most diverse student body in the state, both ethnically and economically. It accomplishes this by aggressively recruiting highly motivated low-income students. The school is 45 percent low-income and 65 percent minority, with students hailing from such countries as Afghanistan, Sudan, Mongolia, Somalia, Germany, and Mexico.

While the aggressive recruiting policy guarantees a diverse student body, it also increases the odds that students will arrive academically unprepared. On a Saturday every April, prospective ninth graders take a computational math assessment based on seventh grade skills. In the first year, 100 out of 131 entering freshmen failed the test and were required to take summer school before starting ninth grade. In the fall of their freshmen year, all students are enrolled in an accelerated ninth-grade level math class. Some students take one or two additional math classes (up to 500 minutes per week) in order to catch up to grade level, ideally by the end of their first semester.

DSST has a longer school day that resembles a full-time job—9 a.m. to 5 p.m. In addition, every student at DSST is expected to have at least two hours of homework per night. Those who don't complete two hours of homework must stay the next day until it's complete. Despite such rigorous requirements, only a handful of students have left the school because of its difficulty.

DSST receives operating funds of $6500 per student from the state, and raises another $1000 per student to provide additional services. The Bill & Melinda Gates Foundation provided $1.4 million in seed money, with the school's founders raising another $15 million for the building and land. A four-year partnership with Hewlett Packard has enabled DSST to equip every student with a laptop, and every student creates a personal website using their laptop and the wireless internet accessible throughout the school.

At DSST, there are no guidance counselors. Instead, the school takes a more personalized approach, assigning approximately twelve students to each teacher and member of the leadership team, who serve as advisors. Each advisor is responsible for the emotional and academic well-being of the students, as well as the typical tasks of a guidance counselor, advising students and assisting them throughout high school and the college preparation process. Each advisory group is named for the advisor's alma mater, further contributing to the culture of high expectations. While the school has yet to graduate a class of students, faculty members expect that this advisory group system will have a significant effect on college-going rates and post-secondary success.

## Conclusion

The schools highlighted in this paper have much in common. Most importantly, they have all helped students from diverse backgrounds achieve excellent academic results, largely because they have been allowed to operate with a significant amount of freedom from bureaucratic controls. Interestingly, this autonomy has led to the development of several common themes among the schools.

These schools are capitalizing on the benefits of school choice, parental involvement, academic rigor, and high expectations, thus preparing their students for post-secondary success in the 21st century workforce.

One of the most prevalent themes is parental involvement. While the act of choice in itself both indicates and improves parental involvement, these schools have welcomed and encouraged parents to become further involved. Items such as parent contracts and home visits have invited parents to be teammates in their child's education—and in the schools profiled here, parents have willingly accepted the invitation.

Another common theme is the schools' focus on academics. From the additional math and science classes required at the Science Academy of South Texas, to the longer school hours at Denver School of Science and Technology and YES Academies, these schools are ensuring adequate exposure to the core subjects for students of all academic backgrounds. The type of extracurricular activities, whether the science fair at Harmony Science Academy or the foregoing of intervarsity athletics at Carver and SAST, further indicates a commitment to academics.

A characteristic at least as important, although perhaps less tangible than the others, is the culture of excellence and high expectations established at each of the schools. While YES is the only school profiled where college acceptance is a requirement for graduation, other schools aim to create a college-bound culture by highlighting alumni success stories (Carver), or by naming advisory groups after universities (DSST). In doing so, they have achieved graduation and college-going rates that far surpass state norms.

While this paper only highlights a handful of successful schools, dozens of similar schools are founded every year throughout Texas and the United States. These schools are capitalizing on the benefits of school choice, parental involvement, academic rigor, and high expectations, thus preparing their students for post-secondary success in the 21st century workforce. And perhaps more importantly, they are helping to spread successful school reforms throughout the state and country.

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## Endnotes

[1]Calculations based on "Digest of Education Statistics Tables and Figures 2005," Table 162, National Center for Education Statistics (2005) http://www.nces.ed.gov/programs/digest/d05/tables/dt05_162.asp.

[2]Calculations based on "Digest of Education Statistics Tables and Figures 2005," Table 76, National Center for Education Statistics (2005) http://www.nces.ed.gov/programs/digest/d05/tables/dt05_076.asp.

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[4]"NAEP 1999 Trends in Academic Progress: Three Decades of Student Performance in Reading and Mathematics" by Jay R. Campbell, Catherine M. Hombo, and John Mazzeo, National Center for Education Statistics (2000) 10.

[5]"ACT High School Profile Report: The Graduating Class of 2006," ACT, 2006.

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[7]"School Choice: Learning from Other Countries" by David Salisbury, CATO Institute (May 31, 2005) http://www.cato.org/pub_display.php?pub_id=3786.

[8]"Rhetoric is Clouding the Facts," by Jamie Story, Texas Public Policy Foundation (Mar. 2006) http://www.texaspolicy.com/pdf/2006-03-edspendingfacts-js.pdf.

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