Research Brief

Urban Students Achieve when High Schools Implement Proven Practices

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Abstract

Students benefit from a year or more gain in student achievement when urban district and high school leaders commit to the implementation of the High Schools That Work *(*HSTW*) design. It is not enough to be a* HSTW *site — it is about taking effective actions to implement the design. Schools that do take action witness significant progress in student achievement, regardless of the demographic composition of their students.*

Urban schools that made the most progress in raising student achievement have taken actions to have more students complete the high level academic core curriculum and to have more students in English, mathematics and science classrooms where research-based teaching strategies are used. They set higher expectations for their students and provide quality and timely extra help to students to meet higher academic standards. A key factor for success is having open, strong and supportive leadership at the school level that involves teachers in understanding the school reform design. ***The conclusion: the more effort urban high schools put into implementing the* HSTW *design, the more likely they are to improve student achievement.***

Introduction

One of the great challenges facing the nation is improving urban education and giving urban students a better chance at obtaining a good job. Urban districts and high schools participate in multiple school improvement efforts, but too often the end game seems simply to name the initiatives with which an urban high school is involved. Too little attention is paid to whether the initiatives are actually implemented, to what depth they are implemented and to whether they are making a difference in student achievement. These are the questions that school boards and school superintendents should be asking.

This report seeks to answer two questions about schools participating in the *High Schools That Work* (*HSTW*) Urban Network:

- Do urban high schools that more deeply implement the *HSTW* design have higher student achievement?
- Did urban high schools that made the greatest gains in student achievement also make the most progress between 2002 and 2004 in implementing the design?

To answer these questions, data from the 2002 and 2004 *HSTW* Assessments, student surveys and teacher surveys were used to determine to what depth urban schools implemented the *HSTW* design in 2004, the changes schools made in the depth of implementation and the level of improvement in student achievement.

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Summary of Findings

Do urban schools that have more deeply implemented the *HSTW* design have higher student achievement?

- Students at schools that have more deeply implemented the design have significantly higher achievement scores in reading, mathematics and science than do students at schools with a lower level of implementation.
- Student achievement is positively related to the implementation level of the *HSTW* design, regardless of the demographic characteristics of the student population. Higher student achievement is strongly related to a higher level of implementation at the school level.

Did urban schools that made the greatest gains in student achievement also make the most progress between 2002 and 2004 in implementing the *HSTW* design?

- Urban schools with improved student achievement in all three subject areas (reading, mathematics and science) made more progress in having more students complete the *HSTW*-recommended academic core than urban schools showing achievement gains in only one or two subject areas.
- The most-improved urban schools in student achievement also made more progress and had more students: a) in English, mathematics and science classrooms where research-based teaching strategies were used; b) in classrooms where students were expected to do quality school work and where they received quality extra help to meet higher academic standards; and c) believing high school was important to their futures.
- The urban schools' improvement in student achievement is directly related to the implementation of the *HSTW* design and this relationship is not affected by the variation of parent education levels and the ethnicity of students. **The more effort high schools put into implementing the *HSTW* design, the more likely they are to improve student achievement.**

Goals of *High Schools That Work*

The primary goals of *HSTW* are to have

- 85 percent of students meet the *HSTW* reading, mathematics and science performance goals in a National Assessment of Educational Progress (NAEP)-referenced *HSTW* Assessment; and
- 85 percent of graduates complete the *HSTW*-recommended academic core and a concentration in an academic and/or career/technical area.

The *HSTW* Key Practices

- High expectations
- Challenging program of study
- Challenging academic studies
- Quality career/technical studies
- Quality work-based learning
- Teachers working together
- Students actively engaged
- Quality guidance
- Extra help
- Culture of continuous improvement

The *HSTW* Key Conditions

- A clear, functional mission statement
- Strong leadership
- Plan for continuous improvement
- Qualified teachers
- Commitment to goals for improving achievement
- Flexible scheduling
- Support for professional development

Do urban high schools that more deeply implement the *HSTW* design have higher student achievement?

Eighty-seven urban schools participated in the 2004 *HSTW* Assessment. To determine the depth that each of the 87 schools implemented the *HSTW* design, it was necessary to first define and measure each school's implementation level. Fourteen implementation measures, focusing on school and classroom practices, were chosen based on the level of experiences reported by a random sample of high school seniors participating in the 2004 *HSTW* Assessment. Each of the student survey items that make up the 14 measures has historically been a predictor of higher achievement. Another measure of implementation was based on a cluster of items from the teacher survey that has also been predictive of higher student achievement at the school level. The final measure of implementation is related to transitions and was taken from the *High Schools That Work* Annual Site Progress Report completed by active *HSTW* schools. The 16 measures of implementation[1] include

- completion of the *HSTW*-recommended curriculum, which includes
  - four credits in college-preparatory English/language arts;
  - four credits in mathematics, including Algebra I and higher; and
  - three credits in science, including at least two credits in laboratory science taught at the college-preparatory level;
- high classroom expectations;
- quality career/technical studies;
- quality of work-based learning;
- use of reading and writing for learning across the curriculum;
- quality of mathematics instruction;
- quality of science instruction;
- student access to quality extra help;
- guidance and advisement;
- student-perceived importance of high school;
- students earning postsecondary credit;
- faculty perception of continuous school improvement; and
- transition activities at the school level.

In applying the 16 measurements, we found that of the schools participating in the 2004 *HSTW* Assessment:

- 39 of the 87 urban schools are classified as high-implementation sites and had 2,862 students participating in the assessment;
- 31 are classified as moderate-implementation sites and had 2,110 students participating in the assessment; and
- 17 are classified as low-implementation sites and had 1,041 students participating in the 2004 assessment.

For comparison purposes, low- and moderate-implementation sites are combined into one group and compared with high-implementation sites. Table 1 and Figure 1 compare the two groups of schools by their students' academic performance. Table 2 compares the two groups by students' demographic information, and Table 3 compares the two groups by the 16 measures used in determining school implementation level.

[1] For a definition of these implementation measures, see the *HSTW* publication, *Establishing Benchmarks for New and Maturing* HSTW *Sites*, available online at www.sreb.org, *HSTW*, publications. See Appendix I for a description of the method used to determine implementation levels.

Relationship between Implementation Level and Student Achievement

Achievement scores of these two groups indicate that students at the high-implementation schools performed 13 points higher on the reading assessment, 11 points higher on the mathematics assessment and 17 points higher on the science assessment than students at low- and moderate-implementation schools. (See Table 1.) Students at high-implementation schools had achievement scores in reading and mathematics that are about one grade level higher than students at moderate- to low-implementation sites; in science, the scores are almost two grade levels higher. Based on *t*-tests analyses, students at high-implementation schools performed significantly better than those at low-implementation schools in all three subject areas ($p < .01$).

The high-implementation schools also have higher percentages of students meeting college- and career-readiness standards — evidenced by greater percentages of students meeting the *HSTW* performance goals[2] in reading, mathematics and science compared with the low- and moderate-implementation schools. (See Figure 1: 59 percent compared with 40 percent in meeting the reading performance goal; 58 percent compared with 45 percent in meeting mathematics performance goal; and 47 percent compared with 29 percent in meeting the goal in science.) Results of chi-square tests indicate that a school's level of implementation of the *HSTW* design is significantly associated with the percentages of students meeting performance goals in all three subject areas ($p < .01$). **Students in high-implementation schools are more likely to meet the performance goals of college- and career-readiness than students from the low- to moderate-implementation schools.**

On 15 of the 16 measures, implementation results **show that all differences between the two groups of urban schools are significant at $p < .01$.** (See Table 3.) The only measure of implementation that failed to show a significant difference was the measure relating to middle grades to high school transitions.

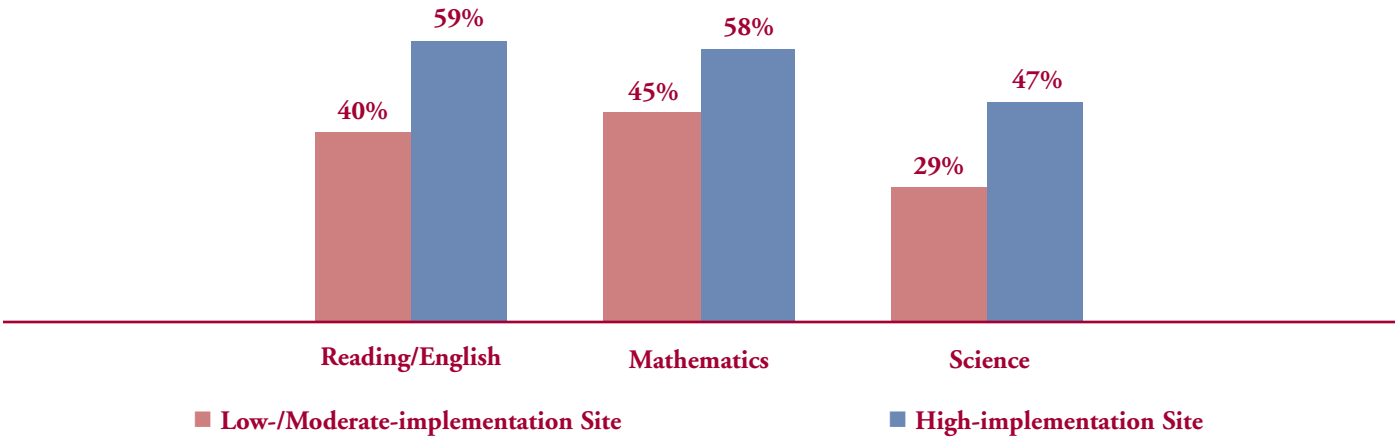
Table 1
Mean Test Scores of Urban High Schools by Implementation Level

Test Subject Areas	Low to Moderate Implementation (n = 3,151)	High Implementation (n = 2,862)
Reading	270	283**
Mathematics	291	302**
Science	277	294**

Source: 2004 *HSTW* Assessment, which scores on a scale of 0 to 500 for each test area
Note: ** $p < .01$, *t*-test

[2] The reading goal approaches the Proficient level on the NAEP-referenced exam; and the mathematics and science goals are at the Basic levels on the NAEP-referenced exam. For a description of what students should know and be able to do to meet each performance goals, see Appendix II of the SREB publication, *Rigor, Relevance and Relationships Improve Achievement in Rural High Schools-High School Reform Works When Schools Do the Right Things.*

Figure 1
Percentages of Students Meeting *HSTW* Performance Goals by Implementation Level



Source: 2004 *HSTW* Assessment
Note: Chi-square tests found significant differences between the two implementation groups in percentage of students meeting performance goals in all three subject areas ($df = 1$, $p < .01$).

Table 2
Demographic Background of Students at Low- to Moderate-implementation and High-implementation Urban High Schools

Student Group	Low to Moderate Implementation (n = 3,151)	High Implementation (n = 2,862)
Minority	87%	73%
African-American	70	60
Other	17	13
Parents with No College Education	34	27

Source: 2004 *HSTW* Assessment

The demographic information of these two groups shows that high-implementation schools have 14 percent less minority students than the low- and moderate-implementation schools. Furthermore, high-implementation schools have 7 percent less students whose parents had not progressed beyond high school. **Therefore, it is necessary to find out if the differences in student achievement between the two groups are truly related to the implementation level of the *HSTW* design and not just an effect of the differences in demographics between the two groups.** First, mean scores on the 2004 *HSTW* Assessment were calculated by ethnicity and by parental education level for the two implementation groups. (See Table 4.)

Table 3
Implementation Measures of Urban High Schools by Implementation Level

Implementation Measures/Indices	Low- to Moderate-implementation Sites (*n* = 3,151)	High-implementation Sites (*n* = 2,862)
Met *HSTW*-recommended Curriculum Goals		
Two or Three Parts	48%	80%
English Curriculum	38	68
Mathematics Curriculum	47	70
Science Curriculum	61	82
Measures of Implementation of Effective School and Classroom Practices (Percentages at intensive level)		
Literacy across Curriculum Index	10	21
Numeracy across Curriculum Index	23	34
Science Quality Instruction Index	15	28
Completing Four Semester Hours of College Credit	23	27
High Expectations Index	15	22
Guidance Index	42	49
Work-based Learning Index	50	52
Quality of Extra Help Index	27	33
Quality of CT Classes Index	14	23
Importance of High School Index	33	41
Continuous Improvement by Staff Index (faculty survey)	(*n* = 2,181) 24	(*n* = 2,073) 35
Transition Practices from Annual Reports:[3]	(*n* = 48)	(*n* = 39)
Percentages of schools with		
■ None or one practice	65	72
■ Two of five practices	19	8
■ Three or more of five practices	17	21

Source: 2004 *HSTW* Assessment
Note: Chi-square tests found significant differences between the two implementation groups in distributions of all but one implementation measures: four measures in meeting curriculum goals ($df = 1$, $p < .01$), all measures of school and classroom practices ($df = 3$, $p < .01$), except the transition measure (not significant).

[3] Refer to the 2005 Annual Site Progress Report, Question 5, part VI, Questions 1–3 and Question 6, parts A and B.

Table 4
Mean Scores of Students in the Two Urban High School Implementation Groups by Ethnic Group and Parent Education Level

Student Group/Subject Area	Low- to Moderate-implementation Sites	High-implementation Sites
White	(*n* = 421)	(*n* = 771)
Reading	278	296
Mathematics	306	319
Science	298	315
African-American	(*n* = 2,184)	(*n* = 1,704)
Reading	268	277
Mathematics	287	294
Science	274	284
Other Minority	(*n* = 516)	(*n* = 364)
Reading	270	284
Mathematics	294	307
Science	276	299
Parents with College Education	(*n* = 2,044)	(*n* = 2,059)
Reading	273	286
Mathematics	293	306
Science	282	299
Parents with *No* College Education	(*n* = 1,076)	(*n* = 780)
Reading	264	277
Mathematics	286	293
Science	269	283

Source: 2004 *HSTW* Assessment
Note: *t*-tests found significant differences between all three mean scores of students in the two implementation groups by all sub-groups at $p < .01$.

Test scores were compared between the two levels of implementation, the amount of parental education and among the different student ethnicities. Students' mean scores at high-implementation schools — regardless of ethnicity and parental education level — are higher in all three subject areas compared with the scores of students at low- and moderate-implementation schools. Results of these analyses indicate that a school's implementation level does make a difference in the performance of all student groups.

The following procedures use the implementation measurement as a continuous variable to further our understanding of the effect of implementation by measuring the degree of association between implementation and students' performance. Correlation coefficients were calculated among selected school measures: percentage of parents without college education; percentage of minority students; total implementation score; and mean scores of reading, mathematics and science. (See Table 5.) The numbers across the top row of the table correspond to the variables with the same number in the first column from the left. **The implementation depth measure (total implementation score) is significantly correlated with schools' mean reading, mathematics and science scores ($r(85) = .36$, $p < .01$, $r(87) = .46$, $p < .01$, $r(86) = .32$, $p < .01$).** The percentage of parents without a college education and the percentage of minority students are both significantly correlated with all three mean scores at $p < .01$ level. Furthermore, the school implementation score is not related to either the low rate of parental education or the number of minority students.

Table 5
Correlations among Selected School Measures in 2004

School Measures	1	2	3	4	5
1. Percentage of parents with no college education	1.0				
2. Percentage of minority students	0.27*	1.0			
3. Total implementation score	–0.20	–0.17	1.0		
4. Reading mean score	–0.37**	–0.36**	0.36**	1.0	
5. Mathematics mean score	–0.46**	–0.36**	0.46**	0.79**	1.0
6. Science mean score	–0.50**	–0.38**	0.32**	0.89**	0.86**

Source: 2004 *HSTW* Assessment
Note: * $p < .05$; ** $p < .01$

The analyses results presented on the previous page indicate that the parent education variable and ethnicity variable directly affect student performance, since both of them are significantly correlated with reading, mathematics and science scores. However, this effect is not mediated through the effect of the school's implementation level, since the implementation level is not related to the low parent education rate and the minority student rate. In other words, these demographic factors do not have a significant impact on the relationship between student achievement and the implementation level. This relationship is independent of the effects of the demographic factors.

These results indicate that the implementation level of a school is strongly related to student achievement regardless of the demographic characteristics of the student population. Urban schools that have more deeply implemented the design did have a higher level of student achievement. This further supports our theory that when schools make measurable progress to implement the *HSTW* design, they realize higher student achievement.

Did urban high schools that made the greatest gains in student achievement also make the most progress between 2002 and 2004 in implementing the design?

When positive links can be established between the improvement of student performance in urban sites and the positive changes schools made implementing the *HSTW* design, it not only helps explain the academic progress made by students in urban sites, but also helps convince low-performing schools that implementing the *HSTW* design makes a difference. **This section addresses the critical issue of whether higher student achievement is realized when measurable progress is made in implementing the design.**

Sixty-nine urban schools participated in both the 2002 and 2004 *HSTW* Assessments. The demographic characteristics of the students participating in the two assessments remained quite consistent at the 69 urban schools from the 2002 to 2004 assessment period. (See Table 6.)

Table 6
Comparison of Student Demographics at Urban Schools for the 2002 and 2004 Assessments

Student Group	2002 (*n* = 3,646)	2004 (*n* = 4,877)
White	22%	21%
African-American	65	65
Female	57	56
Parent with No College Education	29	29

Source: 2002 and 2004 *HSTW* Assessments

Of the 69 urban schools that participated in the 2002 and 2004 *HSTW* Assessments, 28 made no improvement in their mean scores and in many cases their scores declined. Twenty of the schools made progress in one or two areas, and 21 of the schools made progress in all three areas. The changes in the reading, mathematics and science scores of these three groups of schools between 2002 and 2004 are presented in Table 7. The progress made by the students at the 21 schools are statistically significant in all three subject areas ($p < .01$, t-test).

Table 7
Changes in Students' Mean Scores between 2002 and 2004 at Urban Schools by Number of Subject Areas Improved

Subject Area	No Improvement (28 sites)	Improved in One or Two Subjects (20 sites)	Improved in All Three Subjects (21 sites)
Reading	- 9	0	+13
Mathematics	- 7	-1	+14
Science	- 12	+ 2	+18

Source: 2002 and 2004 *HSTW* Assessments

To explain these three groups' differences in achievement gains, the implementation changes were analyzed to determine if the progress in achievement scores is associated with progress in implementation, or if the declines in student assessment scores are related to declining implementation. Two procedures were conducted to accomplish this task: 1) comparing the three groups of schools by their implementation changes — based on 12 student survey measures and one teacher survey measure between 2002 and 2004 that use descriptive information; and 2) taking the 69 schools as a whole and using the correlation procedure to determine if achievement score changes are positively related to changes in implementing the design and, if so, to what degree.

To measure school changes in implementation between 2002 and 2004, 12 clustered measures of implementation, focusing on school and classroom practices, were chosen based on the level of experiences reported by a random sample of high school seniors participating in the 2002 and 2004 *HSTW* Assessments. Each of the student survey items that make up each measure has a history of correlating significantly with higher achievement scores, and these items are comparable between the two years. The 12 measures of implementation include

- high classroom expectations;
- quality career/technical studies;
- quality of work-based learning;
- use of reading and writing for learning across the curriculum (literacy);
- quality of mathematics instruction (numeracy);
- quality of science instruction;
- student access to quality extra help;
- guidance and advisement;
- student-perceived importance of high school; and

the *HSTW*-recommended curriculum in the following subject areas:

- four credits in college-preparatory English/language arts;
- four credits in mathematics, including Algebra I and higher; and
- three credits in science, including at least two credits in laboratory science taught at the college-preparatory level.

The teacher survey measure shows faculty perception of continuous school improvement efforts. Table 8 presents the changes in the percentages of students completing the *HSTW*-recommended curriculum between 2002 and 2004 at the three groups of schools.

Table 8
Changes in the Percentages of Students Completing the *HSTW*-recommended Curriculum at Urban Schools by Number of Subject Areas Improved from 2002 to 2004

Met *HSTW*-recommended Curriculum Goals	No Improvement Sites (%)	Sites Improved in One or Two Subjects (%)	Sites Improved in All Three Subjects (%)
English Curriculum (2002 version)	+ 1	+ 8	+ 11
Mathematics Curriculum	- 3	+ 8	+ 12
Science Curriculum	+ 5	- 2	+ 20

Source: 2002 and 2004 *HSTW* Assessments

All three groups of schools had more students completing the *HSTW*-recommended English curriculum in 2004 than in 2002.

- The most-improved schools had 11 percent more students completing the *HSTW*-recommended English curriculum. There were 8 percent more students completing the *HSTW*-recommended English curriculum in schools improving in one or two subjects and 1 percent more in no-improvement schools.
- Twelve percent more students at the most-improved schools were given access to four years of college-preparatory mathematics in 2004 than in 2002, compared to an 8 percent increase at schools improving in one or two areas and a 3 percent decrease in schools making no improvement.
- In science, 20 percent more students completed four years of a higher-level sequence of science courses at the most-improved schools, compared to a 2 percent decline and a 5 percent increase in the other two groups, respectively.

Making the rigorous core curriculum accessible to all students and encouraging as many students as possible to take them is at the heart of the *HSTW* design.

Table 9 presents the changes in the percentages of students having moderate and intensive[4] experiences in the other implementation measures and the changes in the percentages of teachers, from each of the three groups, perceiving schools as continuously improving from 2002 to 2004.

[4] An index is a measure of a school's degree of implementation of a particular cluster of indicators (school and classroom practices) associated with student achievement and determined by student responses to a series of questions about their high school experiences. For instance, the 2004 literacy across the curriculum index consists of nine indicators. A calculation is done to determine the distribution of students who received intensive, moderate or little experience in the cluster area. An example is the literacy measure of implementation, composed of 10 indicators. Students who report having predetermined levels of experiences on seven to 10 literacy indicators are considered to have had intensive school and classroom experiences with literacy; those who report positively on four to six indicators are considered to have had moderate experiences; those indicating zero to three are considered to have had little literacy experience.

Table 9
Changes in the Percentages of Students having Intensive or Moderate Experiences at Urban High Schools by Number of Subject Areas Improved from 2002 to 2004

Implementation Measures/Indices	No Improvement	Moderate: Improved in One or Two Subjects	Most: Improved in All Three Subjects
Literacy across the Curriculum	0%	+ 2%	+ 7%
Quality of Mathematics Instruction	0	+ 5	+ 11
Quality of Science Instruction	- 1	+ 3	+ 6
High Expectations	- 4	- 5	0
Guidance	+ 2	0	+ 7
Work-based Learning	- 4	- 5	- 3
Quality of Extra Help	- 4	- 3	+ 1
Quality of CT Classes	- 4	+ 1	+ 8
Importance of High School	+ 2	- 1	+ 10
Continuous Improvement by Staff	+ 4	+ 9	+ 12

Source: 2002 and 2004 *HSTW* Assessments

Literacy across the Curriculum

In addition to the 11 percent increase in students completing college-preparatory English reported in Table 8, the most-improved schools also mounted an effort resulting in 7 percent more students using reading and writing for learning in all of their classes, as measured by the literacy across the curriculum index in Table 9. In other words, more students were engaged using reading and writing as a means of increasing their subject-matter mastery across the curriculum, such as completing short writing assignments at least monthly, not only in English courses but also in science and social studies. The other two groups made little or no progress in this area. **Despite a relatively moderate increase in the percentage of students completing the *HSTW*-recommended English curriculum, this level of engagement should help better explain the greater gains in reading achievement by the most-improved schools.**

Quality of Mathematics Instruction

As measured by the quality of mathematics instruction index in Table 9, more students in 2002 and 2004 at the most-improved schools were engaged in using mathematics to solve real-world problems, were members of a mathematics study team and made greater use of technology to master mathematics skills and understanding. **These schools had significantly more students experiencing research-based teaching strategies in their mathematics classrooms, plus they had given more students access to four years of a rigorous mathematics curriculum.** In comparison with the 11 percent increase reported in Table 9 by the most-improved schools, the moderately improved schools had a 5 percent increase; and the no-improvement schools did not make any progress in this area. These results lend strong support to the most-improved schools' 14-point gain in mathematics achievement reported in Table 7.

Quality of Science Instruction

The 18 point gain in science achievement at the most-improved schools, reported in Table 8, is supported by the fact that 20 percent more students completed four years of the higher-level sequence of science courses, based on the quality of science instruction index in Table 9. Six percent more students were engaged in completing science labs based on real-world problems, worked as a member of a science study team, completed written science reports, made oral presentations regarding their findings, and frequently read science-related articles and reported on their understanding of the materials read. Again, the other two groups either made minimal or no progress in this area.

Progress on Other Implementation Measures

Based on the other indices represented in Table 9, the most-improved schools also made more progress than the other two groups in having a higher percentage of students in 2004 than in 2002 receiving expanded guidance services, experiencing quality career/technical studies and perceiving the high school experience as being important to their futures. Timely guidance is defined as involving students and their parents in a guidance and advisement system that develops positive relationships and ensures completion of an accelerated program of study. Quality career/technical studies provide more students access to intellectually challenging career/technical experiences in high-demand fields that emphasize the high-level mathematics, science, literacy and problem-solving skills needed in the workplace. The more students indicated understanding that their high school experiences were important to their futures, the harder they worked and the more likely they were to go to class prepared.

When the three groups of schools are compared by changes in their faculties' perceptions of continuous school improvement, the most-improved schools showed greater improvement than the other two groups. More teachers at the most-improved schools said the goals for the school are clear, teachers and administrators work as a team and are continuously learning and improving, and that teachers are urged to teach all students to the same high standards.

Summary of Descriptive Data

The descriptive data from the 2002 and 2004 *HSTW* Assessments and surveys show that urban schools improving their achievement scores in all three subject areas from 2002 to 2004 also outperformed the other two groups of schools. These schools:

- had more students taking college-preparatory courses in language arts, mathematics and science;
- had more students experiencing higher quality learning experiences in English, mathematics and science classrooms;
- provided more students timely guidance and assistance;
- provided more students with quality career/technical studies; and
- had more students working harder for a future they could relate to through their studies.

These findings provide logical explanations of why students in these high-implementation schools had greater improvement in their achievement scores than students in the other two groups.

To conduct the correlation procedure to find out to what degree changes in achievement scores are related to changes in implementing the *HSTW* design, a score is generated for each school. This score is based on the changes from 2002 to 2004 (the two survey years) in terms of the percentages of students reporting intensive experiences in each of the 12 measures. This implementation change score, ranging from 0 to 60 points, measures the degree of changes in implementation by each school over the two years. (See Appendix II for detailed description of the method used to determine the changes in high school implementation.) Differences between test scores during the two years in each of the three subject areas are then calculated for each site. The differences between the percentages of students' parents having no college education and the differences between the percentages of minority students over the two years are also calculated for each site.

To determine to what degree the changes of student performance in urban sites are related to changes in implementing the *HSTW* design, correlation coefficients are calculated among relevant variables. The results are presented in Table 10. The numbers across the top row of the table correspond to the variables with the same number in the first column from the left.

Table 10
Correlations among Selected School Measures of Changes from 2002 to 2004

School Measures	1	2	3	4	5
1. Percentages of parents with no college education	1.0				
2. Percentages of minority students	–0.13	1.0			
3. Implementation change score	–0.30*	0.06	1.0		
4. Reading mean score	–0.06	0.01	0.45**	1.0	
5. Mathematics mean score	–0.08	–0.17	0.53**	0.72**	1.0
6. Science mean score	–0.07	–0.08	0.56**	0.62**	0.78**

Source: 2002 and 2004 *HSTW* Assessments
Note: * $p < .05$; ** $p < .01$

The results can be summarized as follows:

- **The implementation change score** is positively correlated with the schools' change in all three assessment scores: reading ($r(68) = .45$, $p < .01$), mathematics ($r(64) = .53$, $p < .01$), and science ($r(66) = .56$, $p < .01$). The implementation change score is also correlated with the changes in the percentage of parents without college education ($r(69) = -.30$, $p < .05$), but not correlated at all with the changes in the percentage of minority students.
- **Changes in the percentages of parents with no college education** are not correlated with the changes in any of the scores. They are only correlated with the implementation change scores.
- **Changes in the percentages of minority students** are not correlated with either the implementation change scores or the changes of any of the three test scores.

These findings indicate that the improvements in achievement scores at urban sites are directly related to improved implementation of the *HSTW* design. The more progress schools made in implementing the design, the more they improved their students' achievement. This relationship is not an effect of the variation of the parent education factor and students' ethnicity. **These results suggest that the more effort schools put into implementing the *HSTW* design, the more likely they will improve student achievement scores as measured by the *HSTW* Assessment, regardless of the changes in the demographic background of the students.** In other words, **a school improved its scores not because it tested fewer minority students or fewer students from poor families, but because the school made positive changes implementing the *HSTW* design.**

Recommended Actions

How long must students wait before district and school leaders take action to get improved results? We can't afford to continue to fail to develop the talent of our youth. State and district leaders must act now. ***What actions can all districts and states take to accelerate implementation of* HSTW *in ways that improve student achievement?***

- *Provide technical support:* States must recognize that many chronically low-performing high schools cannot improve without outside assistance. States and districts can work together in identifying those high schools that need to be reformed or restructured and then ensure that they have the resources and external technical assistance they need to make fundamental changes.
- *Teach a rigorous academic core:* 1) Have schools increase by 20 percent each year the numbers of students completing the *HSTW*-recommended curriculum, which includes four years of college-preparatory/honors English, mathematics and three years of lab-based science — until the 85 percent goal is met in all three subject areas. 2) Train all teachers to use reading and writing strategies across the curriculum and to align their assignments and classroom assessments to college-readiness standards for reading and writing. 3) Prepare teachers to make greater use of cooperative learning, technology, project- and problem-based learning, and student presentations in all core academic classes. 4) Set up and engage students in study teams, investigative science, reading and writing about science, and writing up and orally reporting lab findings.
- *Assign literacy and numeracy coaches to the school:* School leadership teams need outside technical assistance to 1) align classroom assignments, student work and assessments to college- and career-readiness standards; 2) define what is required to earn an A or a B and have students redo work until it meets standards; and 3) couple more demanding courses and higher classroom expectations with a system of extra-help/credit recovery programs that raise achievement and motivate students to work harder.
- *Connect students to adults and to a postsecondary goal:* Have schools provide each student with an adult mentor who assists him or her to 1) set goals; 2) get the assistance necessary to succeed; 3) keep parents engaged; and 4) acquire the study skills, relationship skills and time management skills needed to succeed.

- *Address middle grades to high school transitions and high school to postsecondary transitions:* With the support of state and district leaders, have schools develop a transition system that provides extra help and enables all students to be successful meeting course standards through a ninth-grade program. This program may include 1) a four- to six-week summer acceleration bridge providing intensive extra help in language arts, reading and mathematics to incoming ninth-graders who score below grade level in reading and/or mathematics and need further study; 2) a ninth-grade academy in large schools as a small learning community; 3) a mastery approach to accelerate 10 to 20 percent more ninth-graders each year into higher-level Algebra I and English 9 classes and to provide low-performing students who did not make adequate gains on the summer bridge a double-dose (extra help) of English and mathematics; 4) enrollment of all ninth-graders into a support class to learn the habits of success; and 5) getting each ninth-grader and his or her parents to develop post-high school goals for further learning and a career and a plan for attaining the goals. States can support districts in organizing a series of high-quality staff development programs to help schools plan and implement such a program.
- Develop new options for special senior-year transitional courses in English/reading and mathematics for students planning to attend college who by the end of 11th grade have failed to meet college-readiness standards on placement exams.
- Create theme-based Small Learning Communities (SLC) that integrate high-quality career/technical programs with rigorous academic studies.
  - Provide incentives for districts with low-performing schools and low high school completion rates to organize into small learning communities centered on a career theme.
  - Have schools develop plans and organize into themes such as mathematics, science and technology; health sciences; the humanities; etc.
  - Develop partnerships with community colleges and local colleges to offer courses for college credit.
  - Develop partnerships with business and industry in order to offer students employer-recognized certification.
- *Leadership for continuous improvement:* Assign leaders to schools who can maintain continuous improvement of school and classroom practices and student achievement by developing a school leadership team; engaging faculty in using data; engaging staff in seeking out and trying proven practices; supporting teachers with quality time for planning and with staff development aligned to the school plan; working with teachers to align assignments to standards; employing research-based instructional practices; and aligning classroom exams to assignments and standards.

Appendix I

Computation of Implementation Levels of High Schools

Data from the 2004 *HSTW* High School Student Survey, High School Teacher Survey and Annual Site Progress Report were used to measure the level of implementation of the *HSTW* design. Sixteen indicators of implementation were formed based on clusters of items from these three surveys.

The definition of full implementation was established for each of the 16 measures based on student and faculty surveys, annual reports and course-taking patterns. Full implementation is based on at least 40 percent of students reporting intensive levels of experience on nine measures: high expectations, quality career/technical studies, quality work-based learning, extra help, literacy, numeracy, science, opportunities to take college-level courses for credit and understanding the importance of high school. Further, full implementation is based on at least 60 percent of students having intensive experiences in a structured guidance and advisement system; at least 60 percent of students completing at least two of the three parts of the *HSTW*-recommended academic core;[5] at least 50 percent of teachers reporting that their schools are in a state of continuous improvement; and school leaders reporting the practice of at least four of the five transition strategies.

A value of 1 to 5 was assigned to each measure based on the percentages of students reporting intensive experiences with each implementation measure. The assigned values for all 16 implementation measures were combined to get an implementation score for each school, which ranged from 16 to 85. Sites with implementation scores of 39 or below are categorized as low-implementation; a score of 40 to 49 is in the "moderate-implementation" category, and scores of 50 and above are in the "high-implementation" group. The following table presents details on how the score is assigned in each measure.

[5] Students completed the *HSTW*-recommended academic core in English (four credits in college-preparatory or higher-level), in mathematics (four credits, beginning no lower than Algebra I), and science (three college-preparatory or higher-level credits) or completed at least two of three components.

Assignment of Implementation Scores

Measures of Implementation	Level of Implementation				
Assigned Score	Low 1	Low – Moderate 2	Moderate 3	Moderate – High 4	High 5
Meeting *HSTW*-recommended curriculum					
English	<40%	40–54%	55–69%	70–84%	85% or +
Mathematics	<40%	40–54%	55–69%	70–84%	85% or +
Science	<40%	40–54%	55–69%	70–84%	85% or +
Composite: 2 or 3 of the above **(double assigned score)**	<30%	30–39%	40–49%	50–59%	60% or +
Quality CT Studies Index (intensive level)	<10%	10–19%	20–29%	30–39%	40% or +
High Expectations (intensive level)	<10%	10–19%	20–29%	30–39%	40% or +
Literacy (intensive level)	<10%	10–19%	20–29%	30–39%	40% or +
Numeracy (intensive level)	<15%	15–24%	25–34%	35–44%	45% or +
Science (intensive level)	<10%	10–19%	20–29%	30–39%	40% or +
Work-based Learning (intensive level 3-4)	<30%	30–39%	40–49%	50–59%	60% or +
Quality Extra Help (intensive level)	<20%	20–29%	30–39%	40–49%	50% or +
Guidance (intensive level 6-8)	<15%	15–29%	30–44%	45–59%	60% or +
Earned College Credit: 4 or more (Q142)	<15%	15–24%	25–34%	35–44%	45% or +
Importance of High School (intensive)	<20%	20–29%	30–39%	40–49%	50% or +
Continuous Improvement: Teacher Survey	<20%	20–29%	30–39%	40–49%	50% or +
Middle Grades to High School Transition index: Five questions in 2004 Annual Report — School Level Data (Q5 1–3, Q6 a, b)	0 of 5	1 of 5	2 of 5	3 of 5	4 or 5 of 5

Source: 2004 *HSTW* Assessment Results

Appendix II

Computation of Changes in the Implementation Level of High Schools between 2002 and 2004

Percentages of students reporting intensive experiences with each of the 12 measures of implementation[6] are calculated for both 2002 and 2004 for each site. Then, the differences between the values of the two years are calculated for each of the 12 measures. Thirdly, a score of 0 to 5 is assigned based on the value of changes in the percentages for each of the 12 measures for each site. The following table presents the details in the score assignment. Lastly, the 12 assigned scores are summed up to generate the implementation change score for each site. The minimum implementation change score a site can receive is 0 and the maximum possible score is 60.

Measures of Implementation: 2002 and 2004	Percentage Changes in Measures of Implementation and Value Assigned
Meeting *HSTW*-recommended curriculum English Mathematics Science Quality CT Studies Index (intensive level) High Expectations (intensive level) Literacy (intensive level) Numeracy (intensive level) Science (modified, intensive level) Work-based Learning (intensive level 3-4) Quality Extra Help (intensive level) Guidance (intensive level 6-8) Importance of High School (intensive level)	Negative – 0 percent = 0 1 – 5 percent = 1 6 – 10 percent = 2 11 – 15 percent = 3 16 – 20 percent = 4 21 percent and greater = 5

Source: 2002 and 2004 *HSTW* Assessment Results

[6] The indicators for the measures of implementation indices in the table above can be found in the *HSTW* publication, *Establishing Benchmarks for New and Maturing* HSTW *Sites*; the recommended *HSTW* curriculum can be found in the publication, High Schools That Work*: An Enhanced Design to Get All Students to Standards*. Both are available at www.sreb.org.

Recent Publications

High Schools That Work *Follow-up Study of 2004 High School Graduates: Transitioning to College and Careers from a* High Schools That Work *High School*

This brief summarizes the results of the *High Schools That Work* follow-up survey of 2004 graduates from its network schools. The survey gathered information about graduates' pursuit of postsecondary studies and careers for 18 months after high school and provides insights into how well-prepared these graduates felt they were. *By Gene Bottoms, Marna Young and John Uhn* (06V54); 24 pages; 2006; $2 each; $1 each for 10 or more

What Really Works? Schools Succeed When Using the Key Practices of High Schools That Work

High Schools That Work combines academic and career/technical education in order to improve student achievement. This report presents research showing that *HSTW*'s Goals and Key Practices increase student achievement when deeply implemented in schools. (06V21); 12 pages; 2006; $5 each; $3 each for 10 or more

Students Can't Wait: High Schools Must Turn Knowledge into Action

A high school reform effort that fails to accelerate all students' achievement cannot be called successful. The 2002 and 2004 *High Schools That Work* Assessments show some *HSTW* schools posted significant improvement in achievement across every student group, while others did not. This report looks at the factors that separate the improved schools from the non-improved schools. *By Gene Bottoms, Alice Presson and Lingling Han* (06V19); 96 pages; 2006; $7.50 each

Making Middle Grades Work*: An Enhanced Design to Get All Students to Standards*

This brochure describes the *Making Middle Grades Work* enhanced design for school improvement, including the updated *MMGW* framework of Goals and Key Practices, recommended core curriculum and Key Conditions. Those interested in joining the *MMGW* network can learn what states, network sites and member states agree to do as part of *MMGW*. (06V15); 16 pages; 2006; free

Establishing Benchmarks of Progress for Middle Grades Sites

Making Middle Grades Work expects schools to show continuous progress in implementing classroom practices and improving student achievement. This document helps verify improvement in student achievement and determine if 85 percent of all student groups are meeting the *MMGW* Goals in reading, mathematics and science. (06V14); 28 pages; 2006; free

Establishing Benchmarks for New and Maturing HSTW *Sites*

High Schools That Work expects schools to show continuous progress in implementing classroom practices and improving student achievement. This document can be used to verify improvement in student achievement and to determine if 85 percent of all student groups have reached the *HSTW* Goals in reading, mathematics and science. (06V05); 28 pages; 2006; free

Schools Can't Wait: Accelerating the Redesign of University Principal Preparation Programs

Better-prepared school leaders are essential for implementing school reform, maintaining continuous school improvement and realizing higher student achievement. This report highlights the redesign process for principal preparation programs, and it recommends a course of action for states to follow in planning and implementing successful program reform. (06V04); 96 pages; 2006; $8 each; $5 each for 5 or more

Implementing School Reform: Making Middle Grades Work *for All Students*

The Research Triangle Institute prepared this report for SREB's *Making Middle Grades Work* initiative. It compared 28 high- and low-implementation schools and found that students at middle grades schools that more fully implement the *MMGW* design have higher student achievement than those at schools that do not fully implement the design. *By Sondra Cooney and Beth Lasater* (06V03); 32 pages; 2006; $2 each; $1 each for 10 or more

Case Study: Henry W. Grady High School, Atlanta, Georgia

Grady High School is part of the Atlanta Public School system, and through its participation in *High Schools That Work*, the school has overcome the challenges of changing student demographics and falling test scores to regain its academic standing. Strategies adopted by Grady to improve student achievement include increasing teacher expectations, implementing proven mentoring programs and using data to guide their improvements. (05V74); 28 pages; 2005; This publication is only available online.

Actions States Can Take to Place a Highly Qualified Career/Technical Teacher in Every Classroom

This report presents actions for states to take to strengthen the preparation of their career/technical teachers and also addresses key questions with respect to recruitment, preparation, induction and support of career/technical teachers. *By Gene Bottoms and Kathleen McNally* (05V73); 26 pages; 2005; $2

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