

SREB

Ready for Tomorrow:

*Six Proven Ideas to Graduate and
Prepare More Students for College and
21st-Century Careers*

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This report was developed by Gene Bottoms, SREB senior vice president; Marna Young, director of research for school improvement; and Lingling Han, director of data analysis and management for school improvement.

The Southern Regional Education Board is a nonprofit and nonpartisan organization based in Atlanta, Georgia, that works with state leaders and educators to improve education. SREB was created in 1948 by Southern governors and legislatures to help leaders in education and government work cooperatively to advance education and improve the social and economic life of the region. SREB has 16 member states: Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia. Each is represented by its governor and four gubernatorial appointees. For more information, visit www.sreb.org.

Executive Summary

If we truly want to . . .

- reduce the high school dropout rate,
- secure a well-prepared 21st-century work force,
- help schools have more students meet rigorous standards, and
- put more high school students on a path to success,

. . . then we first need to challenge our traditional thinking about the distinctions between college-bound and career-oriented studies. We need to build multiple pathways through high school and into the future — pathways that guarantee *every* student will have an educational experience that is challenging, engaging and responsive to his or her needs.

We need to stop labeling students at the high school starting line so we can maximize their choices at the finish line.

“Many people see no problem in preparing some students for college and others for work,” says education researcher Jeannie Oakes, director of education and scholarship at the Ford Foundation. “But hands-on, real-world education is not just for students who others believe are incapable of handling text-based, literacy-based college-prep courses.”¹ Oakes contends that a *multiple-pathways approach* recognizes that more students can master complex academic and technical concepts if they are taught in the right learning environment.

There will always be a place in high school for the college-preparatory academic curriculum that teaches pure math, pure science and other classical content. What schools now must create are other pathways of *equal* status, where high-level academics and high-quality career/technical (CT) studies are blended — where more students who need and desire something other than pure academics can achieve the essence of college-preparatory standards while applying rigorous content to authentic, real-world problems.

One size does not fit all students. A single pathway does not lead all students to their optimum destination. What’s more, educators and policy-makers are not soothsayers. On the front end, we cannot predict with any certainty which pathway a young teenager ultimately will choose or require as he or she moves through a secondary school experience.

What we *can* do is create more choice and flexibility. We can pave each pathway with a rigorous academic foundation and with rich, authentic learning drawn from a career field of particular interest to the student. We can support this network of pathways with adult mentors and advisers who will help students become effective navigators. *The end result:* More students will become engaged in their education and will graduate prepared to enter the adult world and pursue an associate’s degree, a bachelor’s degree or advanced training.

These issues are not new. Education circles, communities and legislative assemblies talk about solving “the high school problem.” But how far have school leaders and policy-makers gone beyond the talking stage? Judging from the evidence in high schools across America, we have not gone nearly far enough.

Many students in every demographic group are not being served by the two-track academic system, which forces them to choose between a straight college-prep course of study or a set of low-level academic courses with an overdose of boring, drill-oriented instruction and test preparation. These low-level academic courses are filled with

underserved youth, minority students and those from low-income families. Far too many become so disengaged that they choose an unacknowledged third track — a *de facto* component of many high school management plans: They drop out.

In the 21st-century economy, middle-class jobs often require at least some college or specialized preparation and a recognized credential. School systems need to create structures that enable leaders and teachers to make fundamental changes in what and how they teach; how they support struggling students; and how they provide purposeful, personalized and responsible learning experiences.

How do schools create these structures? More than 20 years of the Southern Regional Education Board’s (SREB) *High Schools That Work* research and field experience have identified six key strategies.

Six Proven Ideas Get More Students Ready for College and 21st-Century Careers

1. Provide students in every program of study with a rigorous academic core curriculum.

A strong academic curriculum can propel more high school students toward higher educational achievement. All students, including those concentrating in career studies, should complete, at a minimum:

- four college-prep English courses;
- four mathematics courses, including Algebra I, geometry, preferably Algebra II and above;
- three lab-science courses at the college-prep level;
- three social studies courses; and
- mathematics in the senior year.

2. Insist on high-quality career/technical course sequences that blend academic and technical content through challenging, authentic assignments.

Federal law holds career/technical programs accountable for “adding value” to academic achievement by embedding academic content into assignments. To add *enough* value, schools must align a sequence of well-developed CT courses that embed essential college- and career-readiness standards. These courses must use authentic and intellectually challenging learning experiences that motivate students to master academic and technical knowledge and skills. Through such experiences, students can relate academic studies to a future career by learning the language of the field and discovering how workers in that field think, troubleshoot and solve problems.

3. Equip all students with 21st-century skills through high-quality career/technical programs.

An examination of the 21st-century skills defined by industry and business leaders reveals that neither pure academic knowledge nor basic technical skills alone will give many students the capacity to excel in college, careers and civic life. To be ready for tomorrow, young people must be able to use their minds *and* their hands. Employers are eager to find employees who can solve problems, think critically, analyze data and communicate effectively. Outstanding CT programs can help equip any student with 21st-century skills by making assignments that engage students in linking academic content with authentic experiences, resulting in deeper understanding and retention.

4. Expect every student to strive to meet standards in academic *and* career/technical classrooms.

Employers in every field want workers with a high degree of professionalism, a strong work ethic and a commitment to doing quality work in a timely fashion. Schools and classrooms that hold students to high expectations can develop these skills by giving students opportunities to redo substandard work. Teachers can increase student achievement by clearly indicating the quality of work required to meet rigorous standards and indicating their willingness to do whatever it takes to help students succeed.

5. Guarantee students have the support needed to meet readiness standards for college, career training or both.

As schools urge more students to complete college-prep courses aligned with a CT concentration, many students will need extra help and time to meet higher standards. Students benefit from adults who believe in and respect them, who can give them credible reasons for mastering high-level content and who are willing to provide needed support. Without such assistance, many students will lose ground and fail to graduate from high school.

6. Connect every student to an adult adviser or mentor who has the time and skills to provide guidance and support.

A strong guidance and advisement system assists students in planning career-focused programs of study and preparing for a range of postsecondary options — a good job,ⁱ the military, apprenticeships, career training, community and technical colleges, colleges and universities. Such a system does not develop by accident. It is the result of a purposeful process that allows students to investigate, explore and reflect on their unique talents and interests. Competent and caring adult advisers help students discover what gives them the most satisfaction and aid them in setting education and career goals in anticipation of a rewarding career.

These six proven ideas are, in fact, SREB's six conditions for comprehensive, schoolwide student success.

They are the core principles that undergird the *High Schools That Work (HSTW)* program, tested and refined during two decades of action research in hundreds of urban, rural and suburban high schools across 30 states.

Since 1987, *HSTW*'s single-minded focus has been to help high schools upgrade school and classroom practices to produce college- and career-ready students. In 2008, a total of 146 schools in the *HSTW* network succeeded in having most students complete a college-preparatory core of classes. In 105 schools, at least 85 percent of students also met or exceeded rigorous college- and career-readiness standards in reading, mathematics or science.

SREB's 22 years of reform work in authentic school environments has proven the efficacy of these ideas, when they are properly funded, implemented and supported by committed school and district leaders. Research evidence from *HSTW* and other respected sources confirms that more students can be prepared for a *full range* of postsecondary opportunities when schools combine rigorous academics, relevance through authentic projects and assignments in academic and CT classes, and relationships with adult mentors who provide guidance and extra help.

Yet too many high schools still fail to provide these essential conditions that will bring success to all groups of students.

ⁱ The U.S. Department of Labor defines a good job as one that provides a family living wage and benefits and has a positive economic outlook.

This in-depth report describes the research findings that form these six ideas, or conditions, for success. This description of “what works” is designed to give educators and state decision-makers the confidence to ask: “*Why can’t we create these conditions for all students and make success an option for most students?*”

As secondary educators and policy-makers examine this question in depth, they need to recognize the barriers that have stymied so many efforts to build high-quality academic and career/technical programs in the past.

Hurdles on the Pathway to High School Success

In their important 2008 book, *Beyond Tracking — Multiple Pathways to College, Career and Civic Participation*, UCLA researchers Jeannie Oakes and Marisa Saunders describe a powerful multiple-pathways design for America’s high schools. Their conclusions reaffirm SREB’s findings about the learning potential of career-oriented programs and the conditions that will help most students meet college- and career-readiness standards.

The research-based blueprint proposed by Oakes and Saunders includes both a college-preparatory core and a CT core, with opportunities for more students to engage in quality CT studies and work-based learning with realistic workplace experiences. Reinforcing the entire design is a responsive guidance and mentoring system that tailors support to meet the needs of individual students.

The looming question, the authors say, is not whether the blueprint could produce successful high schools (it can and has), but whether policy-makers and local communities have the will to overcome key hurdles that stand in the way of its implementation. Chief among those hurdles is a long-standing social hierarchy that condones different opportunities for different students, rather than a unified educational experience for all students.

Any school district or high school seeking to reorganize by joining quality CT studies with challenging academic studies should consider these common barriers to re-creating the American high school for the 21st-century, as identified by Oakes and Saunders:

School reform is difficult and scaling up successful reform models is challenging. Effective school improvement requires a full implementation of a multitude of changes in curriculum and instruction. Incomplete implementation can give a reform effort the reputation of “not working” and encourage change-resistant educators to wait for a return to the status quo.

Blending academic and CT education requires ambitious structural changes. Such changes include dividing large schools into small ones; designing new schedules; preparing teachers to use integrated, theme-based assignments; establishing dual-enrollment programs, and extending learning beyond the school campus. Schools must bridge divides among program standards and address teachers with different professional backgrounds, capacities and certifications, while they grapple with uncertainty about reconfiguring current budgets and securing new funding.

Structural changes are necessary but insufficient. School and community traditions are being challenged as new learning structures emerge. Factors include relationships and interactions in the classroom, which courses should count for college admission, which types of academic and other supports schools should provide, and the role of parents and community leaders in holding schools accountable for student learning.

K-12 and postsecondary collaboration cannot be assumed. Schools that offer blended academic and CT education must reach understandings with postsecondary institutions around issues such as awarding credit for dual enrollment and requirements for success in higher education. Without such understandings, the multiple-pathways strategy may devolve into old-style vocational education tracking.

Partnerships with business and public entities may be difficult to establish. Business and public partnerships increase the probability that students will experience rigorous academic learning linked to real-world experience. School leaders will need to be proactive in creating partnerships with growing or stable industries, thereby ensuring that all students have equal access to opportunities that provide exposure to potential careers.

Investments in change are more controversial when impoverished communities and English-language learners are involved. Schools must provide a full range of college- and career-preparation opportunities to minorities, English-language learners and low-income students. However, targeting resources to high-needs communities may be seen as preferential treatment. It is incumbent upon the stewards of these public dollars to demonstrate why such investments serve the public good and the local economy.

Blended academic and CT education defies deep-seated cultural norms. A multiple-pathways approach takes the position that all students can master complex academic and technical concepts if they are taught in the right environment — giving them a full-range of education and career options after high school. This approach challenges racial, ethnic, gender and class biases that exist in traditional views of intellectual potential. Unless these biases are recognized and addressed during implementation, they can undermine the intended change.

Powerful resistance to change may come from many sources. Some may want to protect status and resource advantages for students enrolled in a college-prep program of study. They may fear that the best academic teachers will be shared among all students. Some may worry that improvements in CT education will diminish the status or quality of the college track. Some academic teachers will anticipate the loss of professional standing and the value of a liberal arts education, while some CT teachers will feel that resources for their occupation-specific training programs are threatened.

We Know How to Serve More Students Well

We cannot back down because the work is difficult.

Through the *HSTW* initiative, SREB has demonstrated — beyond any doubt — that when high school leaders and teachers nurture the distinctive interests and talents of all groups of students, they can help more students stay in school and find the motivation to prepare for college, careers or for both.

Across the SREB region, we see evidence of educational and policy leaders who are ready to create career/technical programs that are both academically rigorous and highly engaging. Yes, the work will be difficult. But if we do it and do it well, we increase likelihood that state and local communities can compete in the global economy — schools will better serve all groups of students and prepare them to succeed in this new economy.

It comes down to this: Will we make the hard choices and do the hard work that changing the entire school requires? Or will we continue to tell ourselves that 30 to 40 percent of students entering high school simply are not going to make it?

It's true that some broken schools are going to need extensive help and resources to reform themselves and become effective. But as a nation, we simply cannot afford to throw away students who fail to respond to outmoded or inflexible teaching methods. We know where they will land — in low-end jobs, in prison, or lost on the streets of our towns and cities.

Many of these students will rise to the learning challenge if responsible adult leaders give them the chance. The six key ideas examined in this report address specific aspects of curriculum, instruction and guidance that are proven to increase student performance and equip students with the academic, career and personal skills they need for a brighter future.

The report also recommends ways schools can create and sustain these six conditions necessary for success. It recounts the experiences of *HSTW* schools that have taken steps to rethink curriculum and instructional practices on behalf of their students and, ultimately, the well-being of their communities.

High schools that are creating *multiple pathways* — linking intellectually demanding CT programs to broader high school reform under the conditions described in this report — are ensuring that more students will graduate prepared for college and careers and that more ninth-graders will graduate. These high schools equip students with academic skills for continued learning beyond graduation. They allow students to discover their own unique talents. They create a school community in which leaders and teachers believe in students and guide them to realize their potential. They sustain a positively charged school environment where students continuously explore new topics and ideas and express enthusiasm and optimism for their studies.

So once again, the question is:

Why can't we create these conditions for all students, in every high school in America?

We can — if we can find the will to do the work.

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Introduction: Guaranteeing Success for All Students

High schools that enable educators to nurture the distinctive interests and talents of all groups of students can help more students stay in school and find the motivation to prepare for college and careers. By implementing six clear-cut ideas, or conditions, that evidence shows can lead more students to success, schools and communities can realize great dividends.

Evidence from SREB's *High Schools That Work*² initiative confirms that more students can be prepared for postsecondary opportunities — college, advanced career training or both — when schools combine rigorous academics, relevance through authentic projects and assignments in academic and career/technical (CT) classes, and relationships with adult mentors who provide guidance and extra help.³

Other voices have joined SREB in recognizing that intellectually challenging academic and technical studies can enable more students to graduate from high school with the knowledge and skills to succeed in college and the workplace. The National Research Center for Career and Technical Education reported that high school students were least likely to drop out if they completed a combination of academic *and* CT courses⁴ and that a higher ratio of CT courses to academic courses reduced the odds of dropping out for disadvantaged students in high-minority communities.⁵ The National Governors Association found that, "... research proves that career/technical education engages and motivates students by offering them real-world learning opportunities, leading to lower dropout rates and greater earnings for high school graduates."⁶ The Advisory Committee for the National Assessment of Vocational Education also contends that more students stay in school when they enroll in CT programs.⁷

This report describes six conditions that high schools can create to help more CT students meet college- and career-readiness standards. The six conditions address specific aspects of curriculum and instruction that are proven to increase student performance and equip students with the academic, career and personal attributes they need for a successful future. The conditions deal with ensuring students have high-level academic courses, high-quality CT courses with embedded academics and 21st-century skills, high standards and expectations, extra help in meeting the standards, and guidance and advisement from adult mentors.

Too few schools have made the changes that will ensure that the six conditions exist for more of their students.

Educators and policy-makers have a moral obligation to remodel high schools to create increased opportunities for all groups of students. This report is designed to help districts and schools create the conditions that will make learning more relevant for students and will link high school studies more directly to college and advanced career training.

The Study Method

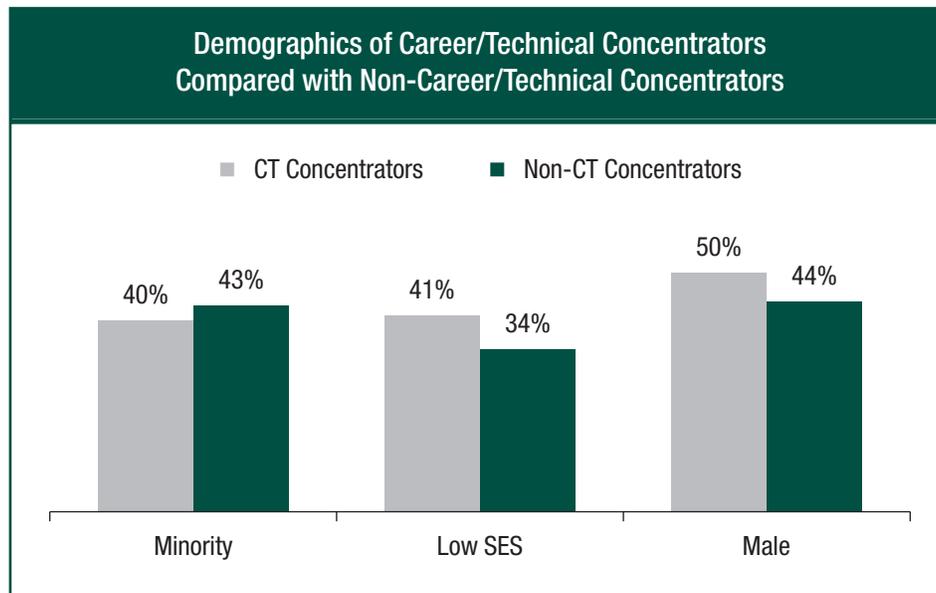
Historically, *HSTW* has worked to create career-focused programs of study that join challenging academic courses and a sequence of technical courses to prepare more students for success in a range of postsecondary endeavors.

Who are the students completing a career-focused program of study at *High School That Work* schools?

A total of 61,044 seniors in high schools across 38 states participated in the 2008 *HSTW* Assessment.ⁱⁱ This report focuses on the 57 percent of these seniors who completed a sequence of at least four credits in a CT area.

Compared with other 12th-graders, CT concentrators are less likely to be minority students but are more likely to be males and to come from families of low socioeconomic status (SES).ⁱⁱⁱ (See Figure 1.)

FIGURE 1



Source: 2008 *HSTW* Assessment

For this report, high school CT programs have been aggregated into 10 broad career areas of concentration. (See Table 1.) More than one in four CT concentrators were pursuing studies either in business, finance, and marketing/sales (15 percent) or in health sciences (12 percent). Another 29 percent were completing studies in STEM (science, technology, engineering and mathematics) and in STEM-related fields, including agriculture, architecture and construction, and information technology. Jobs in health- and STEM-related fields are projected to grow twice as fast as the average for all occupations to the year 2016.⁸ The gender, racial and socioeconomic background of students vary greatly across different career areas.

ⁱⁱ The *High Schools That Work* Assessment has five components: subject tests in reading, mathematics and science referenced to the National Assessment of Educational Progress (NAEP); a student survey; and a teacher survey.

ⁱⁱⁱ Parental education serves as a proxy for students' socioeconomic status (SES). A student who has at least one parent who has completed at least some college is classified as having a moderate to high SES. Conversely, if neither parent has pursued any postsecondary education, the student is classified as having a low SES.

TABLE 1

Demographics of Students Completing a Career Concentration				
Career Area	CT Concentrators*	Minority	Low SES**	Male
All CT concentrators	100%	40%	41%	50%
Agriculture	8	23	42	59
Architecture and Construction	8	29	44	89
Art, AV Technology and Communications	11	41	32	41
Business, Finance, and Marketing/Sales	15	53	39	43
Education, Government, and Law/Public Safety	5	41	41	43
Health Sciences	12	43	42	14
Hospitality/Tourism and Human Services	11	42	48	15
Information Technology	6	38	40	72
Manufacturing and Transportation	6	21	53	93
STEM	7	35	28	71
Other	10	45	44	57

Source: 2008 *HSTW* Assessment

* A total of 34,514 students in *HSTW* high schools completed a career concentration of four or more CT credits. The percentages in this column are based on students who identified the career cluster for their CT concentration and may not total 100 percent due to rounding.

** Parental education serves as a proxy for students' socioeconomic status (SES). A student who has at least one parent who has completed at least some college is classified as having a moderate to high SES. Conversely, if neither parent has pursued any postsecondary education, the student is classified as having a low SES.

The highest percentages of minority students completed a concentration in business, finance, and marketing/sales (53 percent); health sciences (43 percent); or hospitality/tourism and human services (42 percent). Nine of 10 concentrators in the two areas of architecture and construction and manufacturing and transportation were males, while seven of 10 concentrators in information technology and STEM were males. Students from low-SES backgrounds were most likely to concentrate in manufacturing and transportation or in hospitality/tourism and human services.

CT concentrators completed courses in a variety of institutional settings and arrangements. Of the 34,514 CT concentrators, 64 percent took CT courses at a comprehensive high school, 25 percent at a shared-time CT center and 11 percent at a community or technical college or through work-based learning programs.

Many CT concentrators get a jump-start on postsecondary studies by taking college-credit courses while in high school. Thirty-four percent of concentrators completed one or more Advanced Placement (AP) courses, 24 percent took one or more classes at a community or technical college, and 20 percent completed a dual enrollment class.

Six Conditions That Enable Career-Focused Programs of Study to Increase Students' College and Career Readiness

Too many students are not well served by today's high schools. The path to middle-class jobs often requires at least some college and specialized preparation and a recognized credential. Schools need to create structures that enable leaders and teachers to change what and how they teach students; how they support struggling students; and how they create purposeful, personalized and responsible learning experiences. Six conditions can spell success for more high school students:

Condition 1. Provide students in every program of study with a rigorous academic core curriculum.

Research⁹ increasingly shows that a strong academic curriculum can propel more high school students — especially those concentrating in career studies — toward higher educational achievement. In addition, *HSTW*'s extensive data confirm that more students will graduate ready to enter college and careers if they have access to a challenging career-focused program of academic and technical studies.¹⁰

Students who pursue career concentrations in high school clearly benefit from completing the *HSTW*-recommended academic curriculum consisting of:

- four college-preparatory or honors English courses;
- four mathematics courses, including Algebra I, geometry, Algebra II and above;
- three science courses at the college-prep level (or four courses in schools using a block schedule);
- three social studies courses; and
- mathematics in senior year.

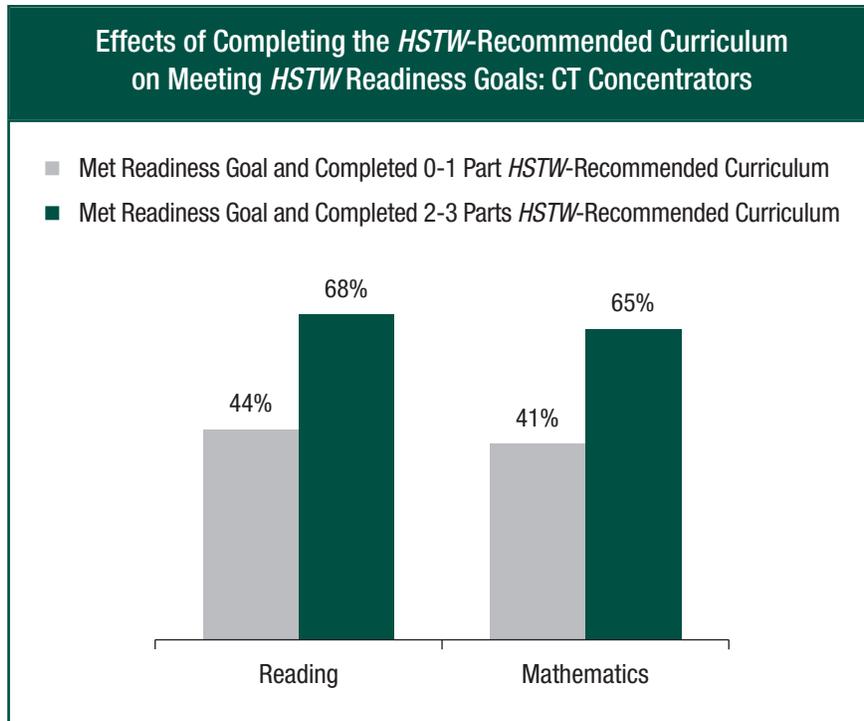
The *HSTW* initiative used scores from its biennial assessment of high school seniors to establish college- and career-readiness goals in reading and mathematics.^{iv} Students meeting these goals are more likely to be able to enter postsecondary studies without needing remediation or to pass employer exams for entry-level positions.

The college and career readiness of CT concentrators who completed two or three parts of the *HSTW*-recommended curriculum^v far surpassed CT concentrators who completed only one part or none. (See Figure 2.) The *HSTW* follow-up study of 2006 graduates showed that only 14 percent of CT concentrators who completed all portions of the *HSTW*-recommended curriculum (English, mathematics, science and social studies) were required to take remedial studies, compared with 31 percent who did not complete the strong academic core.¹¹ When CT concentrators completed as few as two parts of the recommended curriculum, they still were less likely to take remedial courses in college. Nineteen percent of this group took a remedial course, compared with 35 percent of those who completed one or no part of the recommended curriculum.¹²

^{iv} With the assistance of content experts, *High Schools That Work* set readiness goals for reading, mathematics and science to indicate the likely preparedness of graduates to enter postsecondary studies without needing remediation or to pass employer exams for entry-level positions.

^v The *HSTW* Assessment measures students' completion of the English, mathematics and science portions of the *HSTW*-recommended curriculum. Because mathematics is the foundation of many career/technical fields, students had to complete the mathematics portion of the *HSTW*-recommended curriculum as one of the two to three parts of the curriculum completed for the purposes of this study.

FIGURE 2



Source: 2008 *HSTW* Assessment



Wide gaps in reading preparedness exist between CT concentrators who completed at least two parts of the *HSTW*-recommended curriculum and students who failed to do so.

Meeting the Readiness Goal in Reading

Reading achievement varies greatly not only between career areas, but also between students' level of completion of the recommended academic core. (See Table 2.) **Wide gaps in reading preparedness exist between CT concentrators who completed at least two parts of the *HSTW*-recommended curriculum and students who failed to do so.** The disparity is most evident in agriculture (29 percentage points), in STEM (28 percentage points), and in art, AV technology and communications (25 percentage points). The gaps are tighter, but remain in the double digits, for career areas such as hospitality/tourism and human services, and manufacturing and transportation.

Even when CT concentrators complete two or three parts of the *HSTW*-recommended curriculum, the percentages meeting the *HSTW* college- and career-readiness goal in reading vary greatly across broad career areas. At the high end, 79 percent of CT concentrators in STEM and 77 percent in art, AV technology and communications met the reading goal. In contrast, 57 percent in architecture and construction and 54 percent in manufacturing and transportation achieved the goal.

TABLE 2

Effects of Completing the *HSTW*-Recommended Curriculum on Meeting *HSTW* Reading Readiness Goal: CT Concentrators

Career Area	Met Reading Readiness Goal		Gap
	Completed 2-3 Parts of Curriculum*	Completed 0-1 Part of Curriculum	
Agriculture	71%	42%	29
Architecture and Construction	57	37	20
Art, AV Technology and Communications	77	52	25
Business, Finance, and Marketing/Sales	63	42	21
Education, Government, and Law/Public Safety	67	46	21
Health Sciences	73	53	20
Hospitality/Tourism and Human Services	64	44	20
Information Technology	75	56	19
Manufacturing and Transportation	54	33	21
STEM	79	51	28

Source: 2008 *HSTW* Assessment

* The *HSTW*-recommended mathematics curriculum was one of the two to three parts that students completed.

Students' reading achievement is linked to completing the *HSTW*-recommended curriculum. School and teacher leaders should not be satisfied if only a portion of CT students completing the recommended academic core are college- and career-ready. They must ask why students who take the right academic courses fail to meet college- and career-readiness standards. Evidence shows that it is because many schools do not create learning experiences that link high-level academic content to the unique talents, interests and goals of these students.

Meeting the Readiness Goal in Mathematics

Trends in meeting the mathematics readiness goal resemble those of the reading goal. (See Table 3.) The percentages of CT concentrators who completed two or three parts of the *HSTW*-recommended curriculum and met the mathematics readiness goal range from 54 percent to 83 percent across the career areas. Mathematics readiness was highest in the STEM area and lowest in hospitality/tourism and human services.

TABLE 3

Effects of Completing the *HSTW*-Recommended Curriculum on Meeting *HSTW* Mathematics Readiness Goal: CT Concentrators

Career Area	Met Mathematics Readiness Goal		
	Completed 2-3 Parts of Curriculum*	Completed 0-1 Part of Curriculum	Gap
Agriculture	71%	42%	29
Architecture and Construction	67	40	27
Art, AV Technology and Communications	70	44	26
Business, Finance, and Marketing/Sales	62	39	23
Education, Government, and Law/Public Safety	64	40	24
Health Sciences	62	40	22
Hospitality/Tourism and Human Services	54	37	17
Information Technology	71	51	20
Manufacturing and Transportation	62	38	24
STEM	83	58	25

Source: 2008 *HSTW* Assessment

* The *HSTW*-recommended mathematics curriculum was one of the two to three parts that students completed.

As expected, the percentages of CT students meeting the readiness goals are higher among students completing a strong college-preparatory curriculum. Interestingly, even when CT concentrators did not complete a rigorous academic core, about four to five of every 10 met the college- and career-readiness goals in reading and mathematics. (See Tables 2 and 3.) These results speak to the academic learning that occurs when students complete challenging, authentic assignments requiring academic knowledge and skills. When CT students read CT-related materials, they can simultaneously learn the language of the field and strengthen their literacy skills. The fact that mathematics is the foundation of many career areas provides frequent opportunities for CT students to apply mathematics in solving career-related problems.

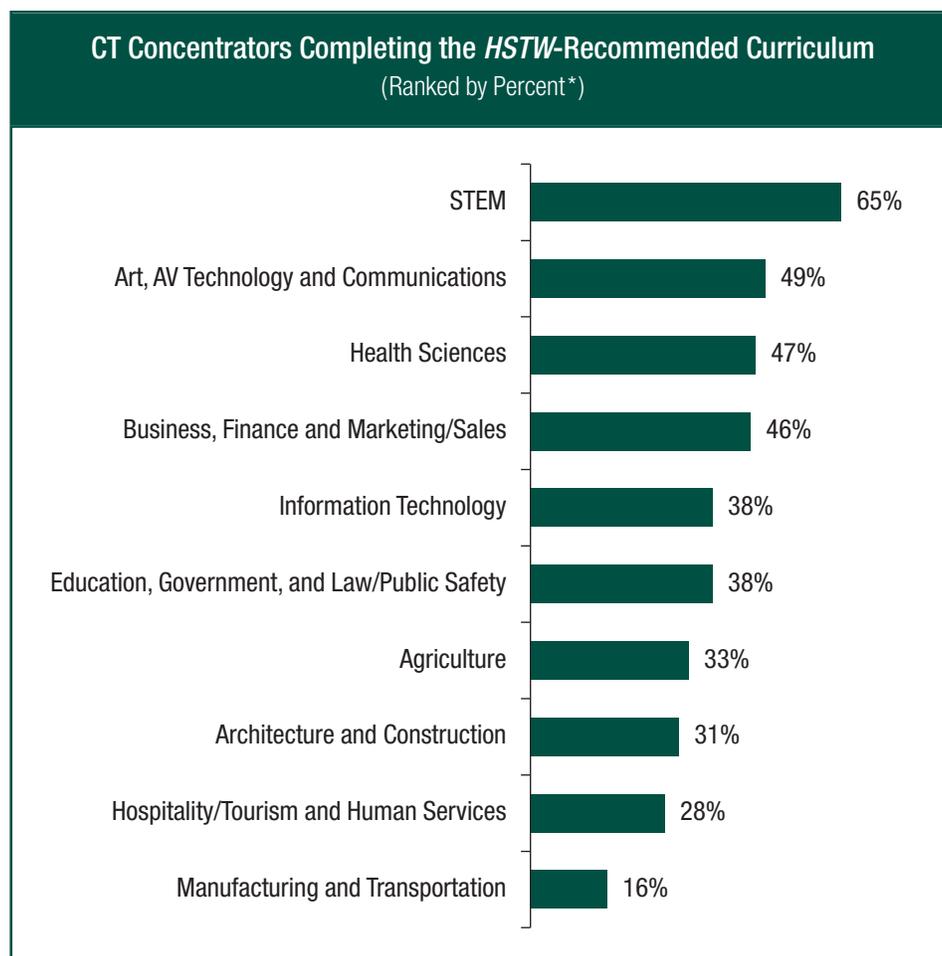
School and teacher leaders need to thoughtfully consider why so many students fail to meet the readiness goals in reading and mathematics. Perhaps some educators doubt that CT students can perform the deeper analyses required in higher-level language arts, mathematics and science, and so they do not expose students to such deeper learning. Educators may be failing to use new instructional methods for teaching the most essential standards of core academic subjects. **Challenging, hands-on and heads-on assignments that tap into students' talents, interests and aspirations can motivate students to make the effort to learn advanced-level materials.**

Academic Course-Taking Patterns Vary Across Career Areas

Stark differences in CT students' academic course-taking patterns exist across the broad career areas. For example, about two-thirds of STEM students and one-half of students in health sciences and in art, AV technology and communications completed the *HSTW*-recommended curriculum, compared with about one-fourth of students in trade and service programs, including architecture and construction, hospitality/tourism and human services, and manufacturing and transportation. (See Figure 3.) This disparity suggests that too many CT students in traditional trade and service career areas are being channeled into low-level academic courses because some fail to see the potential of combining CT programs of study with a challenging academic core.

Each career area has a vertical pathway to employment requiring further education or training beyond high school. High schools failing to enroll students in a solid academic core and to create sequences of CT courses aligned with postsecondary studies or advanced career training are limiting graduates' options for advancement.

FIGURE 3



Source: 2008 *HSTW* Assessment

* Percentages based on completing two to three parts of the *HSTW*-recommended curriculum, including mathematics.

School and teacher leaders must examine the wide variances in the percentages of students completing the *HSTW*-recommended curriculum across career fields. As part of this practice, faculty members will need to consider how their cultural beliefs about students from different ethnic or socioeconomic backgrounds may be affecting their teaching and guidance practices. Schools must create structures to enable academic and CT teachers to recognize the interests and learning styles of students and to create authentic assignments requiring students to use their heads as well as their hands. **Schools will improve as more educators come to believe that most students can succeed in challenging academic courses when they see such courses essential to success in their chosen career fields.**¹³ High schools must stop sorting students at the beginning of high school and start enrolling them in career-focused programs of challenging academic and CT studies to expand students' options at the end of high school.

Promising Practice: Providing a Challenging Academic Core for All Students by Eliminating the General Track

The **Lee County Schools** in Beattyville, Kentucky, took a bold step in the 1990s to eliminate the general track and require every high school student to complete a college-preparatory academic core.¹⁴ “We believe all students need the college-prep curriculum,” Superintendent **James Evans** said. “Our goal is to prepare all students for college and careers. We are about opening doors to opportunities and choices, not about closing doors with one curriculum for the so-called best students and something else for the rest.”

Lee County High School enrolls a large percentage of students eligible for free or reduced-price lunches, but Evans does not see that as a challenge. “We set the tone for staff and students and let them know that a college-prep curriculum is necessary to prepare our graduates for the 21st century,” he said. “When we eliminated the general track, we did what was best for our students.”

The decision to upgrade the curriculum also affected Lee County Area Technology Center (LCATC), the shared-time technical center^{vi} serving high school students in the county. “It was a painful process,” Principal **Jerry Hollan** said, “but in the long run it helped build stronger career/technical programs and better-prepared students.” In addition to completing the college-prep academic core for high school graduation, students at LCATC complete four CT credits and qualify for industry certification along with their high school diplomas.

Eliminating the general track resulted in teachers having much higher expectations for student achievement. The school also adopted a modified block schedule to allow students to earn eight credits per year and to participate in lab classes.

Students have risen to the occasion. Lee County High “has the lowest percentage of students in eastern Kentucky needing to take remedial courses when they enter college,” Hollan said.

The academic achievement of students at LCATC confirms the importance of a solid academic core for all students. On the 2008 *HSTW* Assessment, 79 percent of CT concentrators at LCATC met the *HSTW* readiness goal in reading, compared with 44 percent of CT concentrators at other schools in SREB’s *Technology Centers That Work (TCTW)* network. Moreover, 61 percent of students at the technology center met the college readiness goal in mathematics, compared with 44 percent at all *TCTW* sites.

In 2007-2008, the graduation rate was 81 percent, including students from LCATC.

“Are we satisfied with the results?” Hollan asked. “The answer is no.” Lee County keeps on exploring what it can do to have more students complete high school and be prepared for college, career training or both, and it continues to improve its curriculum and instruction to reduce the number of unprepared students.

^{vi} A shared-time technology center (e.g., tech center, technology center, technical center, career center, career/technical center) usually serves several high schools and offers a variety of career-focused programs of study. Shared-time centers are alike in that students attend the center for only a portion of the school day, week or year to learn occupational skills and to prepare for further studies. Some centers serve both technical and academic needs of students, while others focus only on technical knowledge and skills.

Multiple Career-Focused Pathways Provide Enriched Academic and Career/Technical Learning for More Students

Jeannie Oakes and Marisa Saunders, in the book *Beyond Tracking — Multiple Pathways to College, Career and Civic Participation*, point out the advantages of creating conditions that enable students to join challenging academic studies with career/technical studies. They propose that, to prepare more students for college, training or career options, a system of high school education should include a college-preparatory core, a sequence of CT courses, work-based learning with realistic workplace experiences and support services to meet the needs of individual students. What they propose reaffirms SREB's findings concerning the conditions that make it possible for career-oriented programs of study to increase the percentages of students meeting college- and career-readiness standards.

High schools can expect multiple career-focused pathways to do these things:

- **Increase student engagement in learning.** Many more students will be motivated to learn in this system than in a theory-based, college-prep curriculum or in lower-level courses that teach basic skills.
- **Deepen learning.** Students will strengthen understanding and retention of academic and technical concepts required for college or further training while they learn competencies needed for good jobs.
- **Promote graduation and college readiness.** When struggling students take a well-defined sequence of blended college-prep and CT courses, they are less likely to fall into an unproductive course-taking pattern associated with dropping out of high school.
- **Keep college options open.** The alignment of college preparation with work force readiness keeps college as an option for more students without sacrificing career preparation.
- **Address the special needs of English-language learners.** A combination of academic and CT skills will give these students authentic work experiences, more time to practice the language they are learning and more time to work on projects in which the need for English skills poses fewer constraints on learning.
- **Link young people with meaningful, well-paying career options.** Mentors and employed adults can help students make career choices, improve their college prospects and prepare for success. This is particularly important for young people who lack social networks or other connections to good jobs.
- **Prepare a skilled, nimble work force.** A blend of academic and CT education will equip young people to move easily among work, on-the-job training and higher education as the economy changes and jobs are upgraded.
- **Promote a healthy economy in the context of changing demographics.** Minority students will have the knowledge and skills to shore up the economy through higher wages and lower demand for government services.
- **Promote civic engagement.** A combination of academic and CT education encourages civic learning that includes the facts, skills and values required for community participation and leadership.

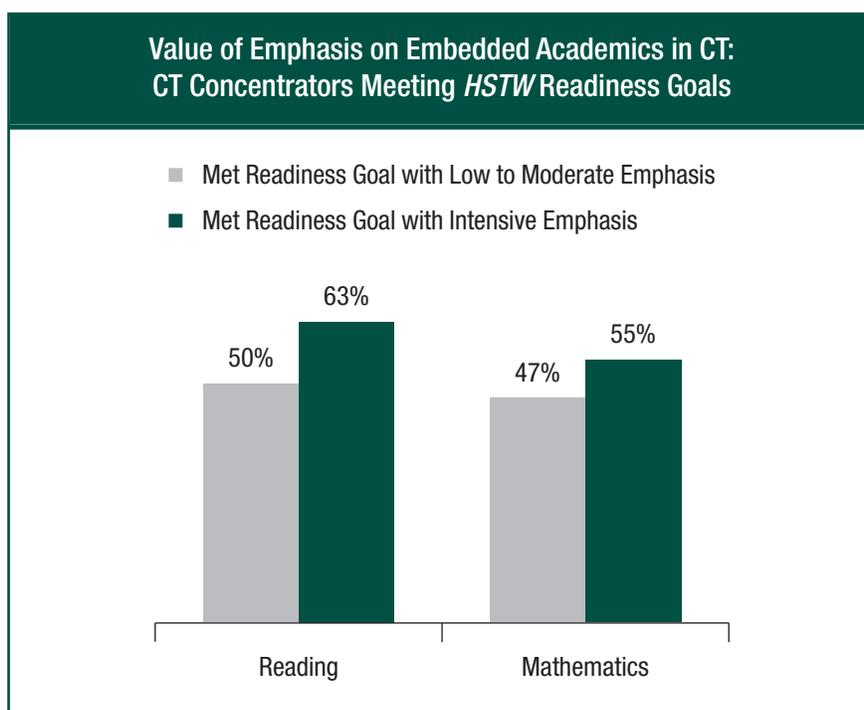
Condition 2. Insist on high-quality career/technical course sequences that blend academics and technical content through challenging authentic assignments.

The federal Perkins IV legislation holds CT programs accountable for “adding value” to academic achievement by embedding academic content into assignments. To meet this goal, schools must align a sequence of well-developed CT courses with essential college- and career-readiness standards through authentic and intellectually challenging learning experiences that motivate students to master academic and technical knowledge and skills. Such assignments enable students to relate academic studies to a future career by learning the language of the field and discovering how workers in that field think, troubleshoot and solve problems.

When students learn academic knowledge through authentic assignments and applied methods, they grasp abstract concepts more readily. They are able to use the knowledge in novel situations, as well as in the context in which they originally learned it. Teachers can build on this type of learning and create robust opportunities for learning by asking students to decide on a next step after high school, justify a particular action, tell why the action was chosen and explain expected outcomes of taking a given approach. The best CT teachers equip students to connect academic and real-world learning by showing students that they are using high-level mathematics, reading and writing in their assignments.

CT concentrators were more likely to meet the reading and mathematics readiness goals on the *HSTW* Assessment if they frequently completed CT assignments requiring them to read and write, interpret technical books and manuals, use computer skills and apply mathematics. With such intensive experiences, 13 more students per 100 met the reading readiness goal and eight more per 100 met the mathematics readiness goal.¹⁵ (See Figure 4.)

FIGURE 4



Source: 2008 *HSTW* Assessment

Only one in four CT concentrators had frequent opportunities to apply reading and writing skills to complete career-related assignments and problems. Less than one-third had similar opportunities to use mathematics skills. Students who have these experiences are more likely to meet the readiness goals.

Embedding Reading into Career/Technical Studies

Students in all career areas need to know how to comprehend and analyze technical materials and to communicate orally and in writing in a chosen career field. When CT teachers require students to do research, select strategies for the task at hand, and summarize and organize findings into a work plan, they improve students' capacity to plan and prioritize tasks and use what they read. Students across all career areas were more likely to meet the reading readiness goal if they experienced an intensive emphasis on reading and understanding technical materials to complete CT assignments. (See Figure 5.)

The career areas of information technology and health sciences showed the greatest gains: Fourteen more students per 100 met the reading readiness goal when they were asked to read technical materials, write about what they had learned and use the information to complete assignments. Even in STEM — the field with the least gain — seven more students per 100 met the goal when they had been engaged in reading and using technical information to complete assignments.

CT classrooms and labs provide a natural environment to advance students' ability to interpret and analyze technical materials because they enable students to complete assignments with relevance to their career interest. The best CT teachers know success in work and further study depends on whether students have been prepared to continue their learning in both formal and informal settings.

The practice of incorporating reading and writing standards and strategies into CT courses can add value in raising student achievement. Unfortunately, only about

Indicators of Intensive Emphasis on Reading and Mathematics in Career/Technical Studies

When schools place an intensive emphasis on incorporating literacy skills into CT courses, students are more likely to report at least three of these indicators of embedded reading and writing:

- Their CT teachers **often** stressed reading.
- Their CT teachers **often** stressed writing.
- They read and interpreted technical books and manuals to complete assignments in their CT areas **at least weekly**.
- They used computer skills to do assignments in their CT studies **at least weekly**.

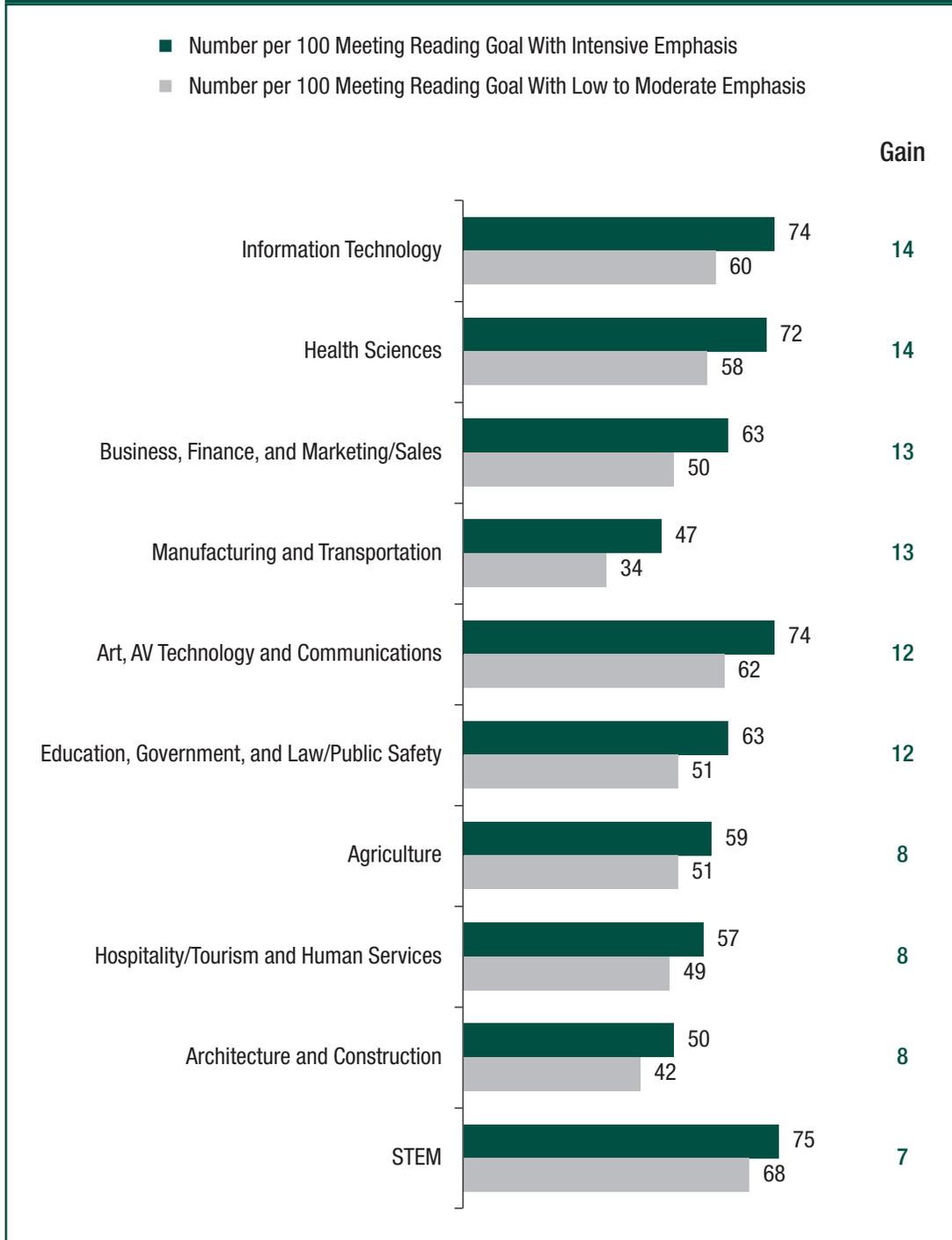
When students experience at least two of three indicators of embedded **mathematics**, the school likely has focused intensively on embedding mathematics content and skills into CT courses. Students at these schools report:

- Their CT teachers **often** stressed mathematics.
- They used mathematics to complete challenging assignments in their CT areas **at least weekly**.
- They used computer skills to do assignments in their CT studies **at least weekly**.

two in five CT concentrators reported that CT teachers often stressed reading (41 percent) and writing (39 percent) in assignments. Only one in three (32 percent) said they were required at least weekly to read and interpret technical books and manuals to complete assignments. This finding suggests a need for professional development to help teachers better understand how to embed reading and writing standards and strategies into CT courses and assignments on a daily basis. **To equip more CT students to meet the reading readiness goal and prepare them for further study, career training and work, schools need to engage students in assignments that require them to read, interpret and make judgments about career-related technical materials to complete assignments.**

FIGURE 5

Value of Intensive Emphasis on Embedding Reading and Writing Into
CT Studies: Gains in CT Concentrators Meeting *HSTW* Reading Readiness Goal
(Ranked by Gain)



Source: 2008 *HSTW* Assessment

Promising Practice: Students Bake a Batch of Literacy Skills

Reading, writing, listening and speaking are the not-so-secret ingredients for success in the retail commercial baking program at **Bethlehem Area Vocational Technical School (BAVTS)** in Bethlehem, Pennsylvania. School literacy coordinator and former baking instructor **Linda Grim** says the program helps students develop better oral and written skills, contributing to “improved student behavior, classroom attendance, standardized test scores, self-confidence, postsecondary education options and work ethic.” Using a variety of reading materials and a series of literacy strategies, Grim has been successful in helping students read and comprehend technical materials to complete classroom and lab assignments.¹⁶

- Each day of class begins with a five-minute “team talk,” during which students share inspirational quotes from life, home, school or the workplace. Students practice listening, writing and speaking skills as they write quotes in their journals, discuss the meanings and write their reactions to the quotes.
- Diane Mott Davidson’s mystery series about a caterer/detective who cooks to relieve stress became the basis of a class project in which students prepared recipes from the author’s book *The Last Suppers*. Students also created and printed recipes in collaboration with the BAVTS commercial arts program, created a scrapbook of recipes, and calculated the cost per serving of each dish.
- Students reacted positively to reading *How Full Is Your Bucket?* by Tom Rath and Donald Clifton. The book is based on a metaphor about dipping from a person’s emotional bucket or adding to the bucket drop by drop. “The book made a noticeable difference in promoting teamwork in the pastry kitchen and excitement in the classroom,” Grim said. Students wrote letters to the authors about the relevance of the concept to their lives and school. They also implemented the strategies taught in the book to improve teamwork and attitudes in the classroom. By logging on to the Web site, www.bucketbook.com, students completed a self-assessment and promoted positive traits in their lives.
- Students keep career portfolios containing a career research paper, a résumé, business correspondence, letters of recommendation, certificates and awards, photos of class projects, and records of community service activities. They keep a timeline of their progress and the educational and career choices they have made. They also collect recipes from various components of the baking industry for use when they enter pastry school or the work force after graduation.
- In an extensive project that involves creating a wedding cake, students show how English/language arts and mathematics are integrated into a career/technical area. Students develop a plan of work with explicit tasks and deadlines. They research the history of wedding cakes and find a customer for a made-to-order cake. Students communicate with the customer; estimate the cost; and mix, bake and display the cake. While serving the cake, students explain how they completed the project to teachers, other students and school guests.

When Grim began teaching the baking class 10 years ago, only 25 percent of students passed the National Occupational Competency Testing Institute (NOCTI) certification test. In 2003 and 2006, all students taking the test received certificates for at least the “basic” level. Then, 2008 scores showed that 100 percent of BAVTS baking students who took the test achieved the “advanced” level. In 2009, all students reached 100 percent in the written component of the exam, and about 60 percent of them were students with disabilities or in special education.

“Since embedding literacy into the CT curriculum, all students have become better learners. Embedding literacy into technical content not only improves student performance, but also opens doors to independent, lifelong learning in the future,” Grim said.



“Embedding literacy into technical content not only improves student performance, but also opens doors to independent, lifelong learning in the future.”

Linda Grim

Bethlehem Area Vocational Technical School

Embedding Mathematics into Career/Technical Studies

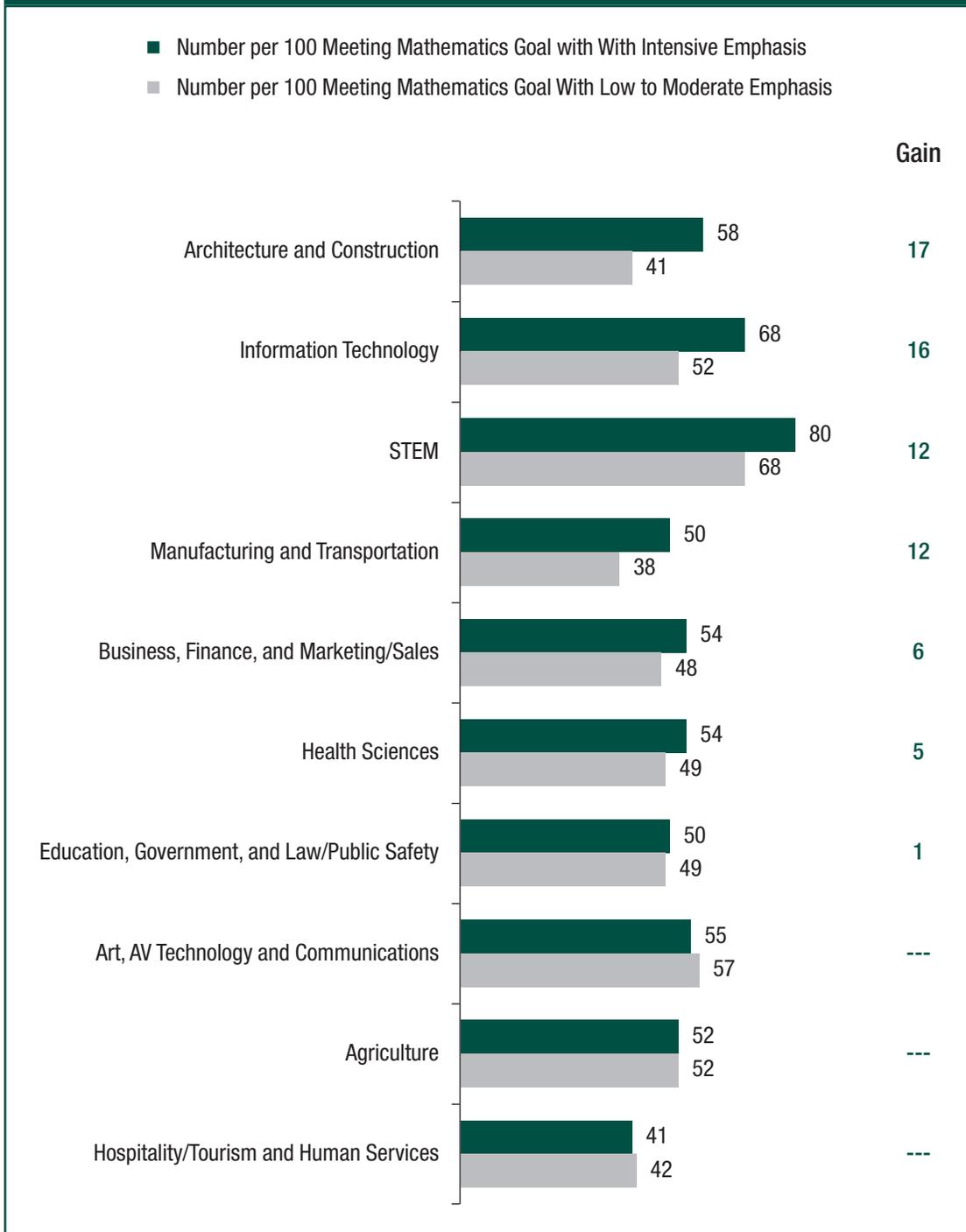
Students achieve at higher levels when they use mathematics knowledge, skills and symbols to solve problems as they would in a genuine job. They learn much more when, for example, they set priorities, analyze costs, develop estimates for a bid or complete cost-benefit analyses than when they only study abstract mathematical concepts and procedures. The number of CT concentrators meeting the *HSTW* mathematics readiness goal increased by up to 17 students per 100 in schools in which students perceived an intensive effort to integrate mathematics into career areas such as information technology and architecture and construction. These two areas saw the greatest increase in the number of students meeting the mathematics readiness goal, between students who experienced a low or moderate emphasis on mathematics in CT and students who experienced an intensive emphasis. (See Figure 6.)

Career areas such as architecture and construction and manufacturing and transportation have the potential to create rich learning experiences by linking academic concepts to students' interests through meaningful and purposeful assignments. Interestingly, **the career areas with the greatest increases in the number of students meeting the mathematics goal between students who experienced an intensive emphasis and those who did not are those in which fewer students completed the *HSTW*-recommended academic curriculum.** For example, just 16 percent of CT concentrators in manufacturing and transportation completed the recommended curriculum, but 50 percent met the mathematics readiness goal when CT instruction was rich in applied academic concepts. While only one in three students in architecture and construction completed a rigorous academic core, 58 percent met the mathematics goal when they used mathematics frequently to complete CT assignments. **Schools can raise achievement by offering hybrid mathematics and CT courses that include complex problems requiring higher-level mathematics.** Hybrid courses provide students numerous opportunities in the context of their career field to develop trouble-shooting and problem-solving skills, develop research and organizational skills to address a problem or task, use mathematics to support decisions and to complete authentic assignments.

Comparing improvements in readiness across the 10 career areas, the greatest gains occurred in fields where mathematics is emphasized in teaching and learning. For example, two in five CT concentrators in information technology and architecture and construction, and one in two in STEM reported classroom experiences that had strong infusions of mathematics into CT coursework. At the other extreme, with minimal or no gains in students meeting the goal, only one in five CT concentrators in art, AV technology and communications and in hospitality/tourism and human services reported having rich experiences using mathematics to solve career-related problems.

FIGURE 6

**Value of Intensive Emphasis on Embedding Mathematics Into CT Studies:
Gains in CT Concentrators Meeting *HSTW* Mathematics Readiness Goal
(Ranked by Gain)**



Source: 2008 *HSTW* Assessment

Promising Practice: Students Benefit From Embedded Mathematics

Career/technical students at Tecumseh High School in Oklahoma who participated in the 2008 *HSTW* Student Survey benefit from using mathematics in their CT studies. These students are enrolled at **Gordon Cooper Technology Center**, an SREB *Technology Centers That Work* site in Shawnee, Oklahoma, where the mathematics instructor works with CT teachers to embed algebra, geometry and trigonometry into CT programs. The technology center offers more than 20 CT programs, all of which depend on mathematics knowledge and skills.

The students reported that their CT teachers often stressed mathematics and that they used mathematics to complete challenging assignments in CT areas. Their responses on the *HSTW* Student Survey placed the school among the top schools in the *HSTW* network in embedding mathematics into CT courses.

Before students enter the technology center, they take a mathematics test to assess their mathematics knowledge and to identify the skills that should be emphasized in mathematics classes. Students with gaps in their mathematics skills receive one-on-one tutoring each Friday to improve their chances for success in CT courses at Gordon Cooper.

Janet Capps, integrated mathematics instructor at the technology center, plans assignments and projects to help students learn the mathematics that will help them advance in their chosen career field. Students receive report cards in mathematics and career courses. Capps often works alongside CT instructors to help them teach mathematics in various fields. “After I taught area and volume in carpentry, the instructor wrote a test that looked like one I might have written,” she said.

Each year, carpentry students build a three-bedroom house, which they sell to cover the cost of the materials. The mathematics teacher and carpentry teacher plan together to



“Students will be successful if they see a reason for learning math and have a support system to help them apply math in a career area.”

Janet Capps
Gordon Cooper Technology Center

embed mathematics into every step of the building process and teach a series of mathematics standards around the home construction project.

Every Friday, academic teachers at Gordon Cooper spend the day meeting one-on-one with students who need to make up work, review work or get tutoring and extra help. Meanwhile, other students use Fridays to work on individual projects in a CT shop. The academic instructors send by e-mail to all other instructors a list of students who may need assistance in mathematics. The instructors who receive the e-mail inform students on the list to visit the mathematics lab for additional help. Also, the CT instructors often ask academic instructors to work with students who need help with mathematics skills to complete projects in CT classes.

“Students will be successful if they see a reason for learning math and have a support system to help them apply math in a career area,” Capps said.

Reading, writing and mathematics are keys to success in both postsecondary studies and the workplace. When CT teachers routinely incorporate reading, writing and mathematics into assignments, they are helping more CT completers meet the readiness goals. When teachers ask students to apply mathematics concepts to complete authentic problems and projects, they are empowering students to grasp abstract concepts, increase technical knowledge and skills, and become independent learners.

The challenge is to prepare and support CT teachers as they help students build a strong academic foundation. Teachers must know how to motivate students to read technical materials and apply academic concepts in completing authentic projects. They also need to be able to assess students to ensure that they are absorbing the academic knowledge and skills.

Many CT teachers need to stop doubting that their students can read complicated materials and use advanced math skills to solve problems. More students will make the effort if they see a reason for learning. **Education research literature contains many examples of students who mastered complicated materials when they realized what the information meant to them.** When students see that succeeding in a chosen career depends on using reading, writing and math, they are far more motivated to learn.

CT teachers may need to ask academic teachers for help in preparing students to undertake complex reading and math assignments. School leaders can create the conditions and make the time for academic and CT teachers to work together to design interesting and challenging projects and problems.

Condition 3. Equip all students with 21st-century skills through high-quality career/technical programs.

Outstanding CT programs give students the knowledge and skills to excel in college, careers and civic endeavors. Technical skills alone are not enough for today's workplace. Employees need to be able to use their minds *and* their hands on the job. Employers are eager to find employees who can solve problems, think critically, analyze data and communicate effectively.

Teachers can help prepare students for good careers by making assignments that require the use of 21st-century skills. These assignments should engage students in linking academic content with authentic experiences that result in deeper understanding and retention. Teachers can develop students' 21st-century skills through effective strategies and challenging assignments that require:

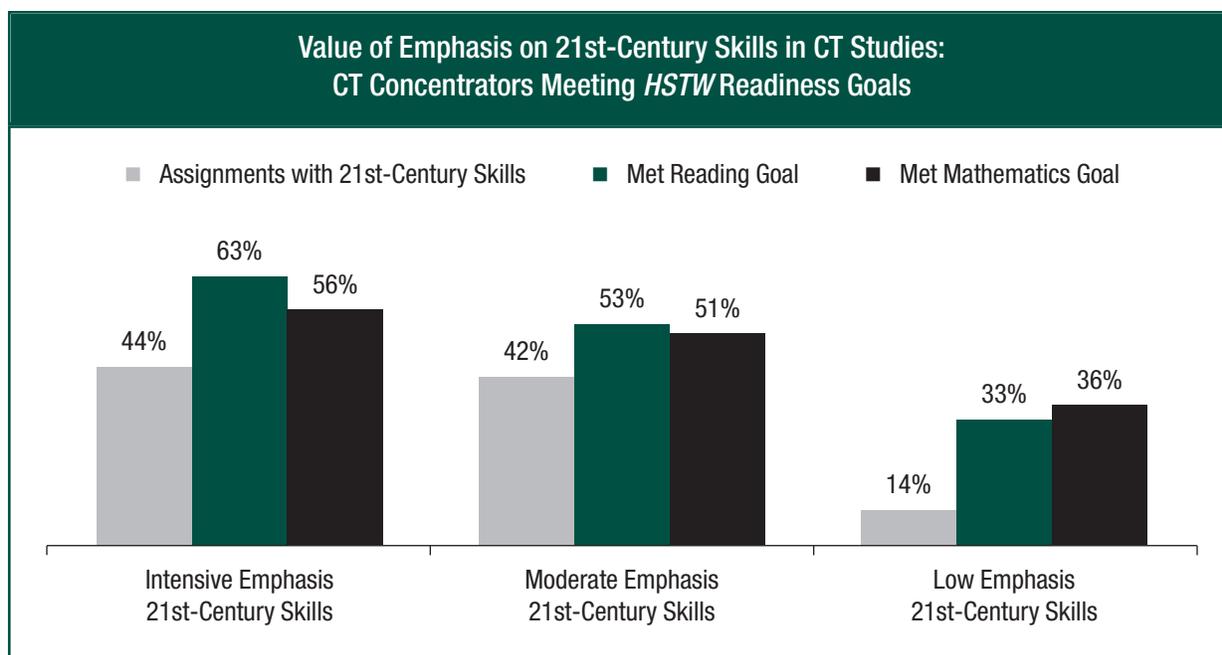
- critical thinking and problem-solving skills.
- oral and written communication skills.
- teamwork and collaboration.
- doing quality work and completing it on time.
- using technology to complete assignments.

Do CT students receive assignments that incorporate 21st-century skills — and does it matter? Forty-four percent of CT concentrators who took the *HSTW* Assessment reported they had participated in classroom assignments that incorporated the types of skills that lead to success in the workplace. Students who have frequent opportunities to use these skills met the *HSTW* readiness goals in reading and mathematics at much higher rates than other students. The gap between students meeting readiness goals with intensive emphasis and low emphasis was 30 percentage points in reading and 20 percentage points in mathematics. (See Figure 7.) Schools do not need a special curriculum to teach 21st-century skills, but they do need to give students assignments that require the use of those skills.

More students succeed when they are asked to troubleshoot and solve problems, collect and organize information for a work plan, write to complete assignments, use mathematics to support decision-making and planning, and communicate and interact with community role models. Students think critically and problem-solve when they are asked to experiment, invent, design and construct prototypes and/or develop and test concepts.

Students who were asked to complete assignments rich in 21st-century skills met the reading readiness goal at higher rates in all career areas. (See Figure 8.) The largest increase occurred among students in the field of business, finance, and marketing/sales, where 18 more students per 100 met the *HSTW* reading readiness goal than students who did not have assignments requiring 21st-century skills. Without an intensive emphasis on these experiences, only 44 students per 100 met the reading readiness goal.

FIGURE 7



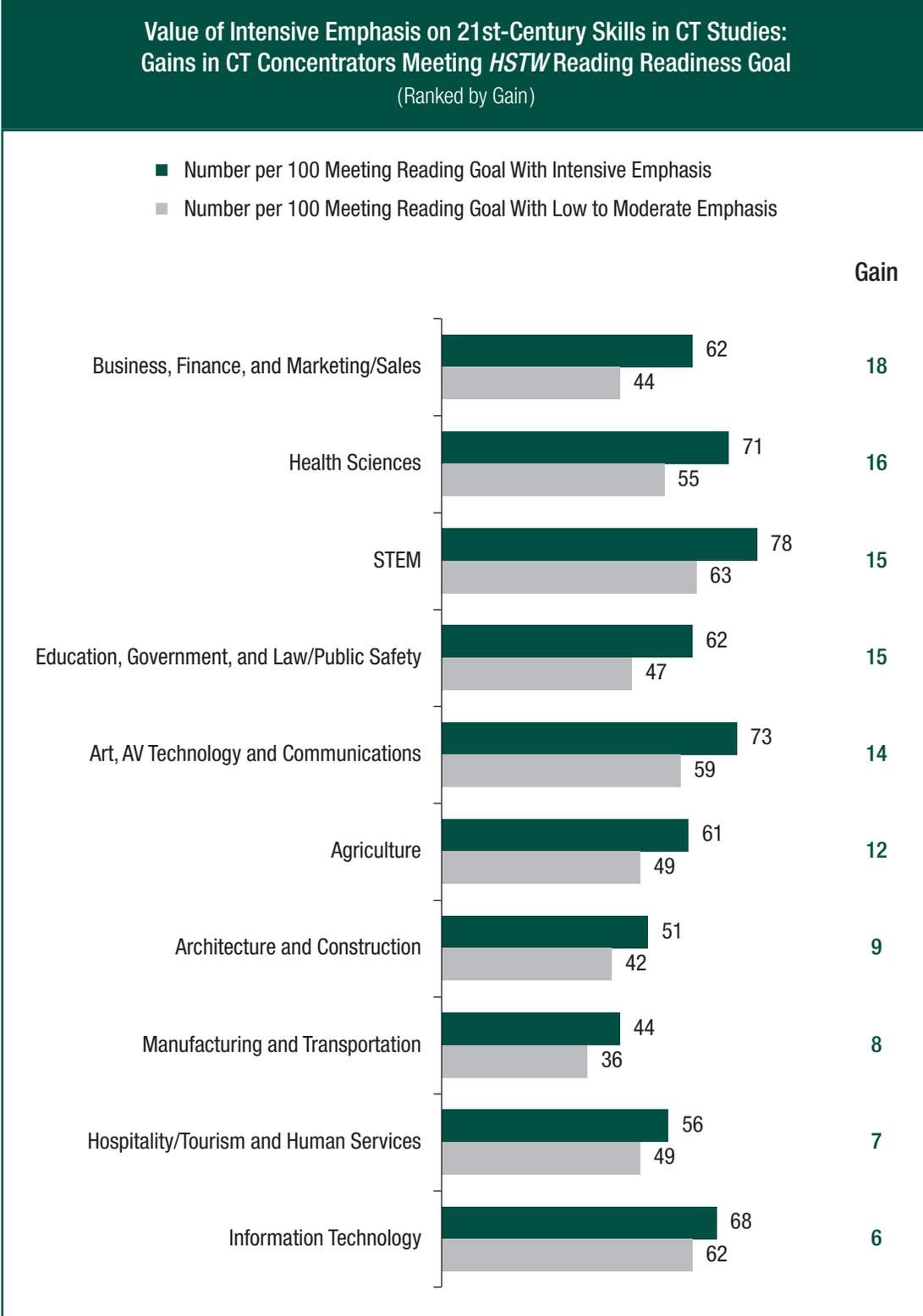
Source: 2008 *HSTW* Assessment

Intensive Emphasis on 21st-Century Skills

When students experience at least 11 of the 18 indicators of 21st-century skills, the school likely has focused intensively on developing students' 21st-century skills. CT students at these schools report:

- They **often** had to develop and analyze tables, charts and graphs in their schoolwork.
- They analyzed works of literature in class at **least monthly**.
- They were assigned word problems in mathematics **at least monthly**.
- Employers showed them how to use communication skills in job-related activities **at least monthly** (students holding a job only).
- They stood before the class and made an oral presentation on a project or assignment to meet specific requirements of quality **at least monthly**.
- They orally defended a process they used to solve a mathematics problem **at least monthly**.
- They stood before the class to make a presentation about an assignment they completed **at least once a semester** (CT students only).
- They **often** revised their essays or other written work several times to improve their quality.
- They drafted, rewrote and edited writing assignments before they were given a grade **at least monthly**.
- They **often** were part of a team or small group in class.
- They worked with one or more students in their class on a challenging science assignment **at least monthly**.
- They **often** used word-processing software to complete an assignment or project.
- They used graphing calculators to complete mathematics assignments **at least monthly**.
- They used computer skills to do assignments in their career/technical studies **at least monthly** (CT students only).
- They used database or spreadsheet software to complete an assignment or project **at least monthly** (CT students only).
- They **often** worked hard to meet high standards on assignments.
- They thought it is **very important** to continue their education beyond high school.
- They **often** tried to do their best work in school.

FIGURE 8



Source: 2008 *HSTW* Assessment

The challenge is for school leaders to support CT teachers in designing creative assignments that cause students to draw upon practical skills. UCLA professor Mike Rose quoted one policy-maker as saying, “Vocational programs tend to get implemented in the lowest, least imaginative form possible.”¹⁷ Career/technical education’s contributions to high school reform are dependent upon more teachers giving more students access to challenging assignments that draw from real-life problems. Assignments frequently should engage students in giving written and oral reports and using technical knowledge not only to solve career-related problems, but also to better understand the role of technology in modern careers.

Promising Practice: Technical High School Uses Senior Projects to Develop 21st-Century Skills

Tri-County Regional Vocational Technical High School in Franklin, Massachusetts, is a full-time technical high school serving 916 students from 11 different towns. Each student chooses one of 16 CT programs and completes a sequence of college-preparatory academic courses. In 2007, Tri-County graduated 93 percent of students who had entered four years earlier and 91 percent in 2008.

CT teachers at Tri-County develop intellectually demanding assignments. One example is the senior project that the school implemented nine years ago as a graduation requirement after joining the *HSTW* network. The senior project gives students an opportunity to showcase integrated academic and career/technical skills. “To be successful in the modern workplace, students must master the integrated learning process,” said Tri-County academic coordinator Mary O’Connor.

The senior project has three components — a research paper on a career-related topic, an original product or project and a formal presentation. Each student works with a CT instructor and an English teacher on the project.

Begins in Grade Nine

Students learn the basics of writing a major research paper and writing several brief papers on work-related topics throughout high school. Students in grade 10 receive an overview of the senior project, pick three possible topics, identify and review at least three research sources for each topic, and choose a final topic. Students in grade 11 create a working outline for a report, produce preliminary drafts and submit a final draft of the research paper, and identify a product to be completed in grade 12.

Seniors finish their products and make presentations to a review panel of judges from a related industry, the administration and the teaching staff. For example, a student made a custom acoustical guitar and used multi-media and hands-on explanations of the mathematics and science principles needed to develop the product and the processes used to select the wood.

Further, all students in grades nine through 11 must perform community service (10 hours in grade nine and 20 hours in grade 11) and prepare a PowerPoint presentation on the community service project. All Tri-County juniors in 2008-2009 passed the state assessments in English/language arts and mathematics, and all but one (needing to retake the test) had passed the state biology exam by spring 2009.

Daily Evaluation

Products are evaluated daily on the basis of students’ product knowledge (applying technical knowledge, using critical thinking and problem-solving skills, seeking extra help when needed, and demonstrating creativity and organization); reliability (students’ attendance and punctuality, working independently and staying on task); and safety (using proper safety equipment and following safety procedures).

Students are graded in five categories: application to the career field, relevance to the topic, incorporation of the product into the presentation, workmanship, and use of technology and resources. Another rubric gives students and judges guidelines for the presentation phase of the senior project. Points are awarded for: project content and research, project demonstration skills, creativity and multimedia. Students also receive grades on their speaking skills, the length of the presentation and their appearance.

Meeting Expectations

Recently, Tri-County made the senior project more rigorous by establishing a policy that students cannot develop their products until they receive acceptable grades on their research papers. “We even required students to come to school in the summer until their papers met expectations and they received the go-ahead to work on their products,” O’Connor said. The summer of 2008 was the first time Tri-County did not have any students needing remediation for the senior project paper.

Tri-County students are aware that they are benefiting from the senior project. Here are some examples:

- One student said his project (a computer-driven robot) enabled him to expand the applications of two different software programs. The student learned how to make adjustments for the applications to interface correctly to power the robot.
- A graphics communication student learned the differences between applying downloaded graphics and designing and editing one’s own graphics. She designed and produced all of the advertising for an original magazine.
- Several students said their projects helped them focus more clearly on what they intended to do in college. A student in medical careers produced a documentary and a handbook on postpartum depression and now wants to study nursing obstetrics. An electronics student developed a Morse Code generator and now wants to study computer languages in college. Another electronics student built a custom audio system for his car and will major in audio electronics.

A vocational resource teacher works individually with some students who need more intensive help on their projects. “This opportunity has spawned a healthy sense of competition among teachers and a willingness to challenge students who struggle the most,” O’Connor said. “When the final version of a paper does not receive an acceptable grade, CT instructors and English teachers work with students after school to make necessary modifications.”

For the past three years, Tri-County has sponsored a senior project fair featuring the best projects in each CT program. Students in lower grades visit the fair to hear abbreviated presentations and ask questions. The fair continues in the evening and is open to the public. Visitors vote for the three best projects, and the winning students receive a monetary award and recognition at Honors Night. “Career/tech teachers are highly visible at the senior project fair and are beaming over the success of their students,” O’Connor said.

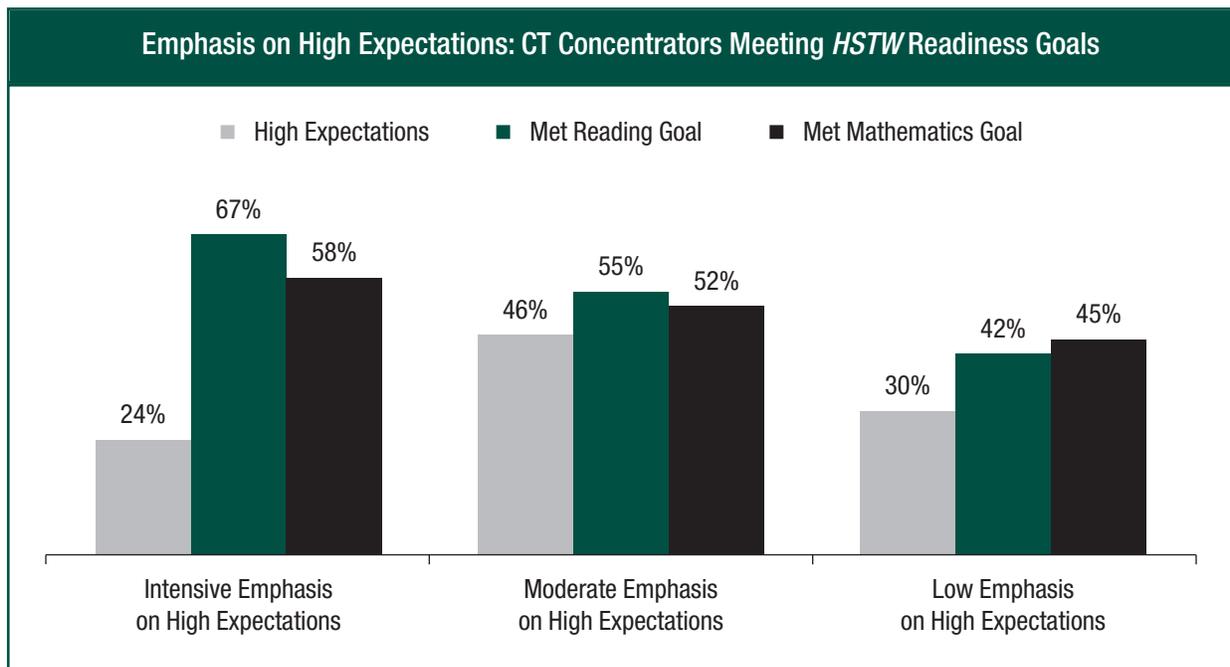
CT teachers at Tri-County have come to believe that all students can achieve at a higher level if assignments are interesting and challenging. They see the value of using real-life problems in preparing students for college and careers and integrate academic and career/technical studies to equip students for more success.

Condition 4. Expect every student to strive to meet standards in academic and career/technical classrooms.

Employers prefer workers with a high degree of professionalism, a strong work ethic and a commitment to doing quality and timely work. Schools and classrooms that hold students to high expectations can develop these skills in students by providing them opportunities to redo substandard work. Teachers can increase student achievement by clearly indicating the quality of work needed to earn an A or a B and by providing extra help before, during and after school.

CT concentrators benefit from striving to meet high expectations. Sixty-seven percent of students in high-expectations courses met the *HSTW* readiness goal in reading and 58 percent in mathematics, compared with 42 percent in reading and 45 percent in mathematics for students in low-expectations classes. (See Figure 9.) The gap amounted to 25 percentage points in reading and 13 percentage points in mathematics between the percentages of students meeting the readiness goals.

FIGURE 9



Source: 2008 *HSTW* Assessment

TABLE 4

Value of Intensive Emphasis on High Expectations: Gains in CT Concentrators Meeting <i>HSTW</i> Readiness Goals		
Career Area	Increase in Number of Students per 100 Meeting Readiness Goals	
	Reading	Mathematics
Agriculture	+17	+12
Architecture and Construction	+18	+10
Art, AV Technology and Communications	+15	+10
Business, Finance, and Marketing/Sales	+15	+8
Education, Government, and Law/Public Safety	+18	+12
Health Sciences	+14	+7
Hospitality/Tourism and Human Services	+10	+3
Information Technology	+8	No Gain
Manufacturing and Transportation	+14	+8
STEM	+14	+6

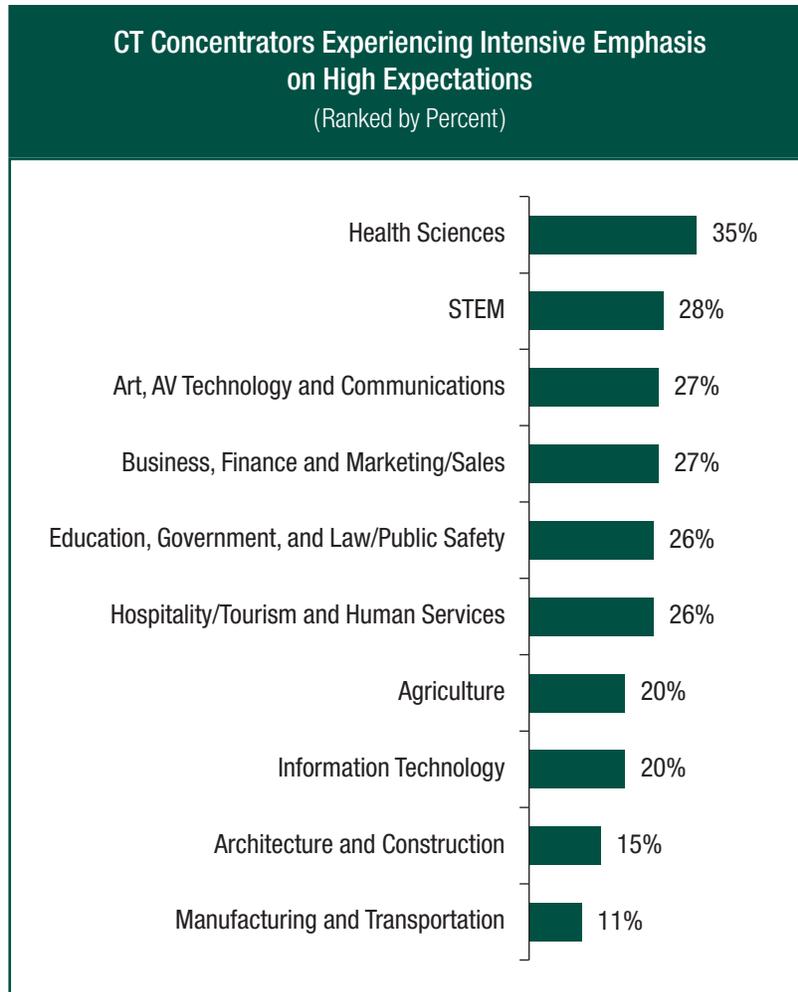
Source: 2008 *HSTW* Assessment

High-expectations classrooms contributed to double-digit differences between the number of students per 100 meeting versus not meeting the reading readiness goal in nine of 10 career areas. (See Table 4.) The largest gains occurred in architecture and construction and in education, government, and law/public safety, where students who experienced high expectations met the readiness goal at a rate of 18 more per 100 than students who did not experience high expectations. The smallest gain — eight students per 100 — was in information technology.

The increases between the number of students meeting the mathematics goal with an intensive emphasis on high expectations and the number meeting the goal without such an emphasis ranged from no increase in information technology to an increase of 12 students per 100 in the fields of agriculture and education, government, and law/public safety.

An emphasis on high expectations shifts teachers' instructional focus from merely delivering content to helping students master the materials. This helps more CT concentrators meet readiness goals. Unfortunately, too few CT concentrators are enrolled in high-expectations classes. Overall, only 24 percent had the benefit of such classes, and the percentages varied widely across career fields. For example, 11 percent of students in the area of manufacturing and transportation and 20 percent in the areas of agriculture and information technology reported experiencing school and classroom practices representative of high expectations. (See Figure 10.) The largest percentage was in health sciences, where 35 percent of CT concentrators reported high expectations. Many health science programs of study in high school require students to pass state licensure exams as an end-of-program assessment. This may contribute to the higher percentage of health science students being in classrooms with high expectations.

FIGURE 10



Source: 2008 *HSTW* Assessment



School and teacher leaders need to examine their core beliefs as individuals and as members of the school community to determine if they truly believe that most students can meet college- or career-readiness standards.

The lack of high expectations for CT students in both academic and CT classes is a challenge for schools that want to promote powerful learning. The expectations being set for specific groups of students, especially male students, is even more troubling. Fewer than two in 10 male students, compared with three in 10 females, reported being in high-expectations classrooms leading to higher achievement. (See Table 5.)

Low expectations for CT students should signal to school leaders and teachers the need to build challenging assignments into all academic and CT courses in a career-focused program of study. **School leaders should facilitate grade-level work and support teachers to re-teach students and re-assess student learning.**

School and teacher leaders need to examine their core beliefs as individuals and as members of the school community to determine if they truly believe that most students can meet college- or career-readiness standards. Students are motivated to make a greater effort to succeed when given challenging assignments that have meaning and relate to their interests. Schools must be willing to exert the effort to change school and classroom practices so that all students are expected to perform at a high level and receive support and encouragement to succeed.

To set and help students meet higher standards, teachers need to create intellectually demanding assignments based on students’ talents, interests and goals. They need to think about the essential standards, the required level of mastery and the best way to connect learning to students’ individual strengths and plans for the future. They need to be familiar with the attributes and aspirations of each student. **School leaders need to modify the school structure to provide time for academic and CT teachers to work and plan together to connect learning across two or more classrooms.**

High-expectations schools will need a different kind of school leader — a person who knows how to capitalize on students’ interests, strengths and plans. This new type of administrator must realize that students work harder when they are enrolled in a program of study that focuses on a career area and provides real-life assignments. The best leaders select teachers who believe in students and are enthusiastic about developing challenging problems and projects that tap into students’ talents and interests.

TABLE 5

Demographics of CT Concentrators Experiencing Intensive Emphasis on High Expectations	
Demographics	Percentages of Students With Intensive Emphasis on High Expectations
All CT Concentrators	24%
Socioeconomic Status*	
Low	21%**
Moderate to High	26
Race/Ethnicity	
Minority	26%**
Non-minority	23
Gender	
Male	17%**
Female	31

Source: 2008 *HSTW* Assessment

* Parental education serves as a proxy for students’ socioeconomic status (SES). A student who has at least one parent who has completed at least some college is classified as having a moderate to high SES. Conversely, if neither parent has pursued any postsecondary education, the student is classified as having a low SES.

** The differences between the distributions of level of emphasis on high expectations in student subgroups are significant at the .01 level ($p < .01$).

Promising Practice: School Has Reputation for High Standards and Expectations

High standards and expectations surround students at **Sussex Vocational Technical High School** in rural Georgetown, Delaware. “We don’t accept mediocrity and we don’t allow students to quit,” Assistant Principal **John Demby** said. “We are serious about raising achievement and ensuring that students are ready for college and the workplace.”

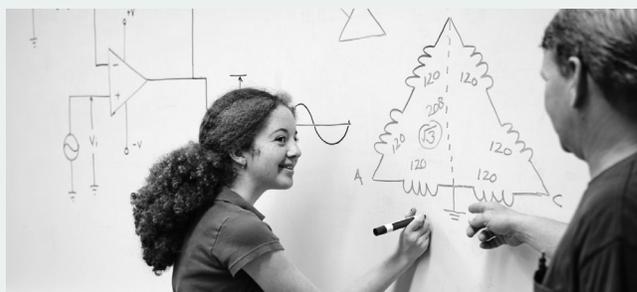
When students enter a lottery for admission, they already know the school’s reputation for offering a college-prep curriculum, modern career/technical majors, challenging assignments and individual attention and support. They agree to work hard to prepare for future college and careers.

The school holds an open house for prospective students to showcase the rigorous academic courses, the 14 technical areas and the opportunities to learn through assignments that blend academic and CT content. “We want students to know that they will be taking courses at an elevated level right from the start,” Demby said.

Sussex Tech is a comprehensive, four-year technical high school that enrolls over 1,200 students from six school districts in the county. The demographic composition of the student population is 79 percent white, 16 percent black, 4 percent Hispanic, 1 percent Native American and 0.8 percent Asian. Ten percent of students are special education students, and 20 percent are eligible for free or reduced-price lunches.

Here are some of the techniques that have worked for Sussex Tech:

- **Sussex Tech Exhibition of Mastery** — All students complete a mandatory senior project consisting of a research paper, a product from the student’s technical area and a presentation to a panel of judges. Students receive grades that apply to an English/language arts class and their career/technical program. Some of the sophisticated products that students have created include robots, health emergency survival kits and printed promotional materials for businesses. The projects engage students in in-depth, integrated learning and have yielded scholarships and job offers.
- **Homework intervention system** — Homework assignments comprise 20 percent of a student’s classroom grade. Teachers immediately intervene when students do not complete homework and may meet with parents and the assistant principal to discuss possible interventions to encourage the student to do the work.



“We want students to know that they will be taking courses at an elevated level right from the start.”

John Demby
Sussex Vocational Technical High School

- **Faculty support for student success** — To ensure that teachers are successful in helping students develop academic, career and personal strengths and meet their life goals, each new teacher is assigned a mentor. Mentors encourage teachers to believe that all students can learn at high levels and that their job is to discover how each student learns best. Professional development is “homegrown” in that experienced teachers share effective strategies with colleagues on topics such as differentiated instruction, classroom management and student assessment. “Teachers are expected to teach at a high level and to individualize the instruction to meet the learning styles of all students,” Demby said. “They create positive relationships with students and provide unconditional support if a student does not meet performance standards.” Teachers are always available to students — before school, during lunch and at a regularly scheduled tutoring session after school. “Our teachers never give up on students,” Demby said. “If a student’s work is not high quality, a teacher will help the student redo the work until it meets standards.”

Sussex teachers take pride in seeing students reach their potential: The graduation rate was 96 percent in 2006, 97 percent in 2007 and 95 percent in 2008. In 2008, the graduation rate for special education students rose to 96 percent. About 75 percent of the school’s graduates enter four-year colleges and universities, and the remainder enter work, with many also attending two-year technical colleges.

Sussex Vocational Technical High School has been named a U.S. Department of Education National School of Excellence and a *High Schools That Work* Pacesetter School.

Condition 5. Guarantee students have the support needed to meet readiness standards for college, career training or both.

As schools urge more students to complete college-prep courses aligned with a career/technical concentration, many students will need extra help and time to meet higher standards. Students benefit from adults who believe in and respect them, who can give them reasons for mastering high-level content and who are willing to give students the extra assistance they need to succeed. Without such assistance, many students will lose ground and fail to graduate from high school.

On the *HSTW* Assessment, some CT concentrators reported that they often received extra help to understand their schoolwork and get better grades. The support usually came from their teachers, and students felt they could get help without much difficulty. These students reported their teachers frequently were available before, during or after school to answer questions and give assistance.

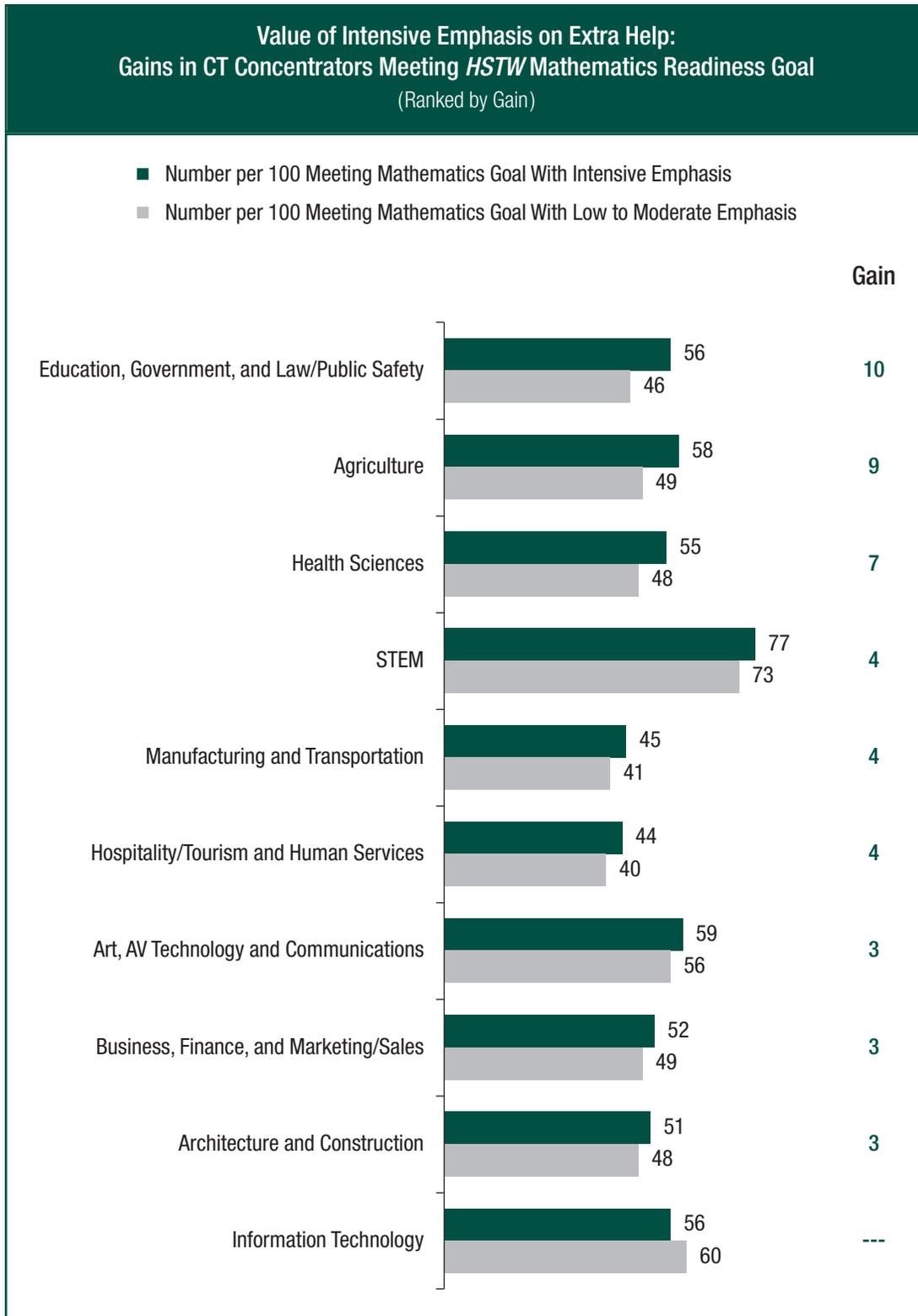
Students who regularly received extra help were more likely to meet the readiness goals in mathematics and reading. In fact, students who received intensive extra help met the mathematics readiness goal at higher rates than students who did not receive such help in nine of 10 career areas. The gains ranged from no gain in information technology to 10 more students per 100 in the field of education, government, and law/public safety. (See Figure 11.) Progress in meeting the reading readiness goal occurred in all career areas. The results were slightly stronger in reading than in mathematics, with reading increases ranging from one to 14 students per 100.

The disturbing news is that, despite evidence of the positive effects of extra help, two-thirds of CT concentrators did not experience an intensive emphasis on this important strategy. (See Figure 12.) Just 33 percent CT concentrators reported an intensive level of support. With intensive support, 59 percent of students met the readiness goal in reading, compared with 49 percent who had little or no support. Fifty-three percent of students met the mathematics readiness goal with intensive support. School leaders and teachers need to recognize the potential of students and deliver quality extra help so that more of them reach readiness standards for college and advanced career training.

Intensive support for students varied across the 10 career areas, ranging from a high of 39 percent in health sciences to a low of 24 percent in manufacturing and transportation.

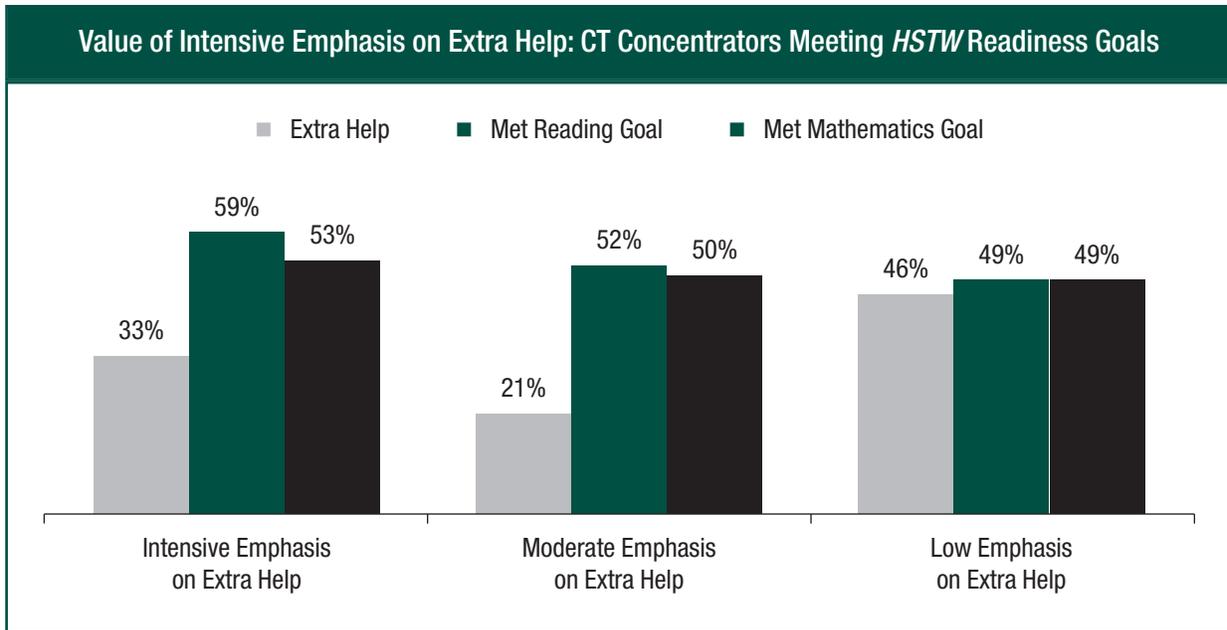
Significant gaps appeared in the extra help received by specific groups of students. (See Table 6.) Twenty-eight percent of males, compared with 38 percent of females, had the benefit of a strong extra-help system. Students from low-SES backgrounds also were less likely to obtain the extra help they needed to meet high standards.

FIGURE 11



Source: 2008 *HSTW* Assessment

FIGURE 12



Source: 2008 HSTW Assessment

TABLE 6

Demographics	Percentages of Students Receiving Extra Help		
	Intensive Emphasis	Moderate Emphasis	Low Emphasis
Socioeconomic Status*			
Low	31%**	21%	48%
Moderate to High	35	21	44
Race/Ethnicity			
Minority	34%**	22%	44%
Non-minority	32	21	47
Gender			
Male	28%**	21%	51%
Female	38	22	40

Source: 2008 HSTW Assessment

* Parental education serves as a proxy for students' socioeconomic status (SES). A student who has at least one parent who has completed at least some college is classified as having a moderate to high SES. Conversely, if neither parent has pursued any postsecondary education, the student is classified as having a low SES.

** The differences between the distributions of the levels of emphasis on extra help in student subgroups are significant at the .01 level ($p < .01$).

Extra help is an essential condition for more students to earn a diploma and enter and succeed in college and careers. Schools need to intensify their assistance and focus more heavily on students they might overlook. All students can achieve at higher levels, but they must enroll in challenging academic and CT courses and be able to obtain extra help to succeed in them.

Promising Practice: Diverse Student Population Receives Extra Help

Extra help is a way of life for students and teachers at **Talawanda High School (THS)** in Oxford, Ohio.¹⁸ An intensive intervention system is part of the school culture at this *HSTW* Pacesetter School. “Our teachers don’t have hall duties or cafeteria duties,” Principal **Vicki Brunn** said. “They have extra-help duties.”

When the school joined *HSTW* 10 years ago, it set out to meet the needs of a highly diverse group of students, including children of farm families, children of university professors and children living in area group homes. One-third of school’s 1,035 students are economically disadvantaged.

One of the school’s first actions as a *HSTW* site was to create an all-day extra-help room staffed by teachers. THS is located in one of the largest school districts in the state, where students would find it difficult to travel to school when buses were not running.

Student Assistance

Talawanda follows the Masonic Model for Student Assistance, in which teachers are trained to address the academic and personal needs of students, including attendance and behavior. All students in the assistance program must visit the extra-help room in lieu of study hall. When more intensive help is needed, students visit the room for two periods a day. Other students are identified for the extra-help room based on faculty and guidance staff recommendations. Still others participate at their discretion. “If students are struggling with the math in a particular assignment, they are able to go into this special room, work with a math teacher, and get the help they need,” Brunn said.

Struggling students who cannot be scheduled into the extra-help class can take online courses for credit recovery or for advancement. The online courses originate at **Butler Technology and Career Development Schools** (Butler Tech), a *HSTW* site in Hamilton, Ohio. Students work at their own pace to complete courses. They participate in a special online class during which teachers answer questions and sustain

students’ motivation to learn. Another way THS students benefit from the school’s ties with Butler Tech is through a career-based intervention program. Students take online courses in class and spend the remainder of the school day working off campus. Some students recover nearly two years of high school in one year. “Butler Tech really works wonders in motivating students and helping them see the value of a high school education,” Brunn said.

Freshman Academy

A new freshman academy provides a team of teachers to focus on the needs of incoming high school students. “We believe the freshman academy will reduce the need for ninth-graders to visit the extra-help room,” Brunn said. “The result will be more space in the extra-help room for upperclassmen.” In addition, school administrators and teachers look at several data sources to determine if incoming freshmen will need extra help and time to improve their reading skills.

The Senior Year

To strengthen the senior year and to prepare students for college and careers, THS has added college-prep mathematics and science courses to allow seniors to complete four years in each subject and to give seniors access to the higher-level concepts that colleges and employers will expect them to know. The additional courses are Algebra III, environmental science, botany, biotechnology and anatomy/physiology. THS already offered honors and Advanced Placement (AP) courses in pre-calculus, calculus, Chemistry I and II, and physics.

To help each student find a niche that will motivate him or her, THS sends some 50 to 60 juniors and seniors to Butler Tech each year to pursue their particular talents, interests and goals. The tech school is actually three centers in one — a health occupations academy; a veterinary and equine science program in the Natural Science Center; and a comprehensive CT high school that offers career areas such as law enforcement, fire and rescue, culinary arts, early childhood

development and automotive specialties. Students participate in work-based learning in their career areas during and after school. Students from THS who choose to attend Butler Tech graduate from THS.

“Teachers in our career development division meet one-on-one with students and also provide online programs to help them choose a career path that will match their interests and goals,” said Principal **Lisa Tuttle-Huff** of the veterinary and equine sciences programs at Butler Tech. “Our coordinator for at-risk students helps teachers know how to supply what these students need to be ready for future education and a career.”

College Courses

To get a head start on college, approximately 20 college-ready THS students per semester participate in the Post Secondary Enrollment Options (PSEO) program that allows Ohio high school students to earn high school and college credit for graduation through college courses. The Talawanda School District developed a partnership with the Miami University campuses at Oxford and Hamilton and with the Ohio Department of Education to give students this opportunity.

The many student interventions at THS have contributed to its 91 percent graduation rate in 2006 and 98 percent in 2007.¹⁹



The many student interventions at THS have contributed to its 91 percent graduation rate in 2006 and 98 percent in 2007.

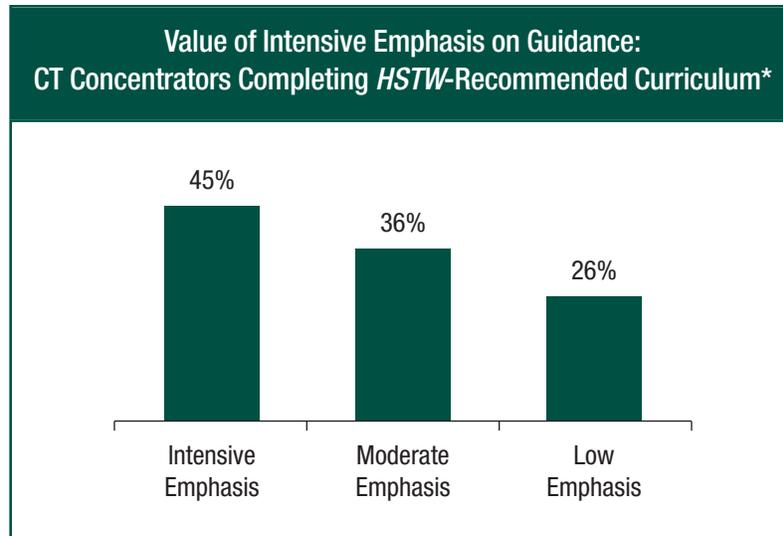
Fifty-three percent of CT concentrators at THS, compared with 33 percent of students at other *HSTW* sites, reported school and classroom practices that indicate a strong student support system.²⁰ When students receive this level of assistance, they are positioned for success. In fact, 91 percent of CT concentrators who had the benefit of intensive extra help at THS met the *HSTW* college- and career-readiness goal in reading and 88 percent met the readiness goal in mathematics.

Condition 6. Connect every student to an adult adviser or mentor who has the time and skills to provide guidance and support.

A strong guidance and advisement system assists students in planning career-focused programs of study and preparing for college and careers. **Such a system does not happen by accident. It is a purposeful process that allows students to investigate, explore and reflect on their unique talents and interests.** It helps students discover what gives them the most satisfaction and aids them in setting education and career goals in anticipation of a rewarding career.

Students benefit when they are connected with an adult adviser or mentor for needed assistance and support. The proof is in the numbers. Forty-five percent of CT concentrators who experienced an intensive emphasis on guidance and advisement and had a strong relationship with an adult adviser completed at least two parts of the *HSTW*-recommended curriculum along with a CT concentration. (See Figure 13.) In contrast, only 26 percent of students who reported experiences reflecting little emphasis on guidance completed two or three parts of the curriculum.

FIGURE 13



Source: 2008 *HSTW* Assessment

* Percentages based on completing two to three parts of the curriculum.

Schools need to create a new type of guidance and advisement system — one that is based on a guidance curriculum and involves teachers, students and parents in reviewing programs of study and college and career options. Counselors, leaders and teachers need to see guidance in a new context to prepare more students for further education and productive careers.

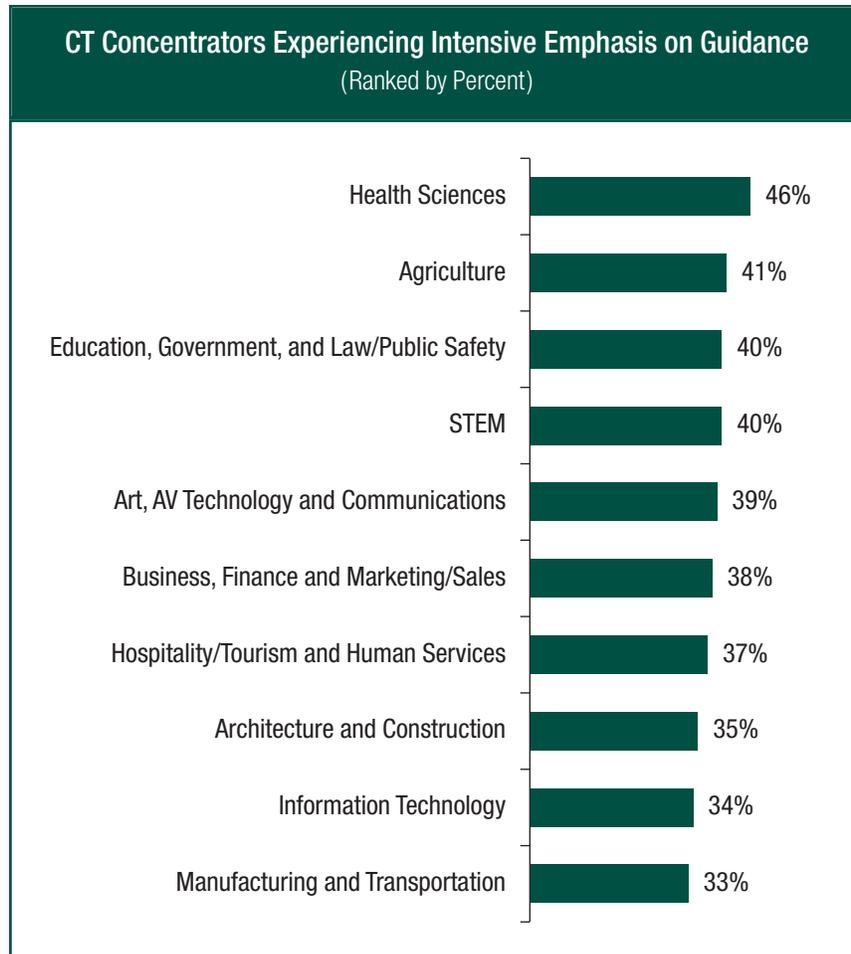
Students' perceived emphasis on guidance varied across career fields. (See Figure 14.) For instance, 46 percent of CT concentrators in the health sciences area reported school and classroom experiences suggesting a strong guidance and advisement system. In contrast, 33 percent of students in manufacturing and transportation, 34 percent in information technology, and 35 percent in architecture and construction — the three career areas with the highest percentages of male students — indicated they had access to effective guidance and advisement. Male students often miss out on taking the right academic courses and often are not given the assistance they need to understand that a career-focused program of study with rigorous academic content will open vistas of opportunity.

Intensive Emphasis on Guidance and Advisement

When students experience at least seven of eight indicators of a good guidance system, the school has placed intensive emphasis on providing high-quality guidance for all students. Students at these schools report:

- They met **at least once a year** with a teacher or a guidance counselor to review the sequence of courses they planned to take throughout high school.
- They received the most help in planning a high school program of study by the end of grade nine.
- Before and during high school, they talked to parents, step-parents or other adults in the family **at least once a year** about planning a four-year program of study.
- A teacher or a counselor talked to them individually about their plans for a career or further education after high school.
- They spoke with or visited someone in a career that they hoped to enter.
- Someone from a college talked to them about postsecondary education.
- They and/or their parents received information or assistance from someone at school about selecting or applying to a college.
- They had an adult mentor or adviser who worked with them throughout four years of high school.

FIGURE 14



Source: 2008 *HSTW* Assessment

HSTW Assessment data reveal that the emphasis on guidance varies not only across career fields, but also across demographic groups. Male CT concentrators and those from low-SES backgrounds are less likely to have access to intensive guidance. (See Table 7.) Only 36 percent of males, compared with 41 percent of females, had the benefit of intensive guidance services. This fact suggests that many schools undervalue the talents of some male CT students and too often fail to help male CT students realize their potential. Thirty-three percent of low-SES students received intensive guidance, compared with 42 percent of students from moderate- to high-SES backgrounds.

TABLE 7

Level of Emphasis on Guidance: Demographics of CT Concentrators			
Demographics	Percentages of Students Receiving Guidance		
	Intensive Emphasis on Guidance	Moderate Emphasis on Guidance	Low Emphasis on Guidance
Socioeconomic Status*			
Low	33%**	61%	6%
Moderate to High	42	54	4
Race/Ethnicity			
Minority	38%**	58%	4%
Non-minority	38	56	6
Gender			
Male	36%**	58%	6%
Female	41	56	4

Source: 2008 *HSTW* Assessment

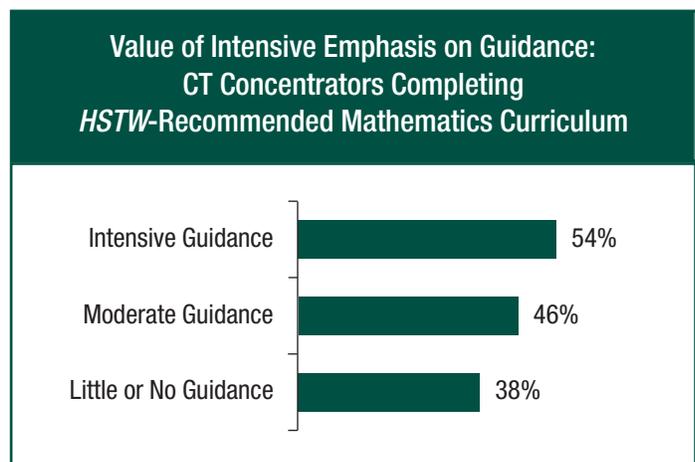
Row percentages may not total 100 percent due to rounding.

* Parental education serves as a proxy for students' socioeconomic status (SES). A student who has at least one parent who has completed at least some college is classified as having a moderate to high SES. Conversely, if neither parent has pursued any postsecondary education, the student is classified as having a low SES.

** The differences between the distributions of level of emphasis on guidance in student subgroups are significant at the .01 level ($p < .01$).

Mathematics is the foundation of many CT fields. Therefore, school guidance and advisement systems should encourage CT concentrators to take high-level mathematics courses. Evidence clearly links the quality of guidance with the percentages of CT students completing the *HSTW*-recommended mathematics curriculum, including Algebra I, geometry and Algebra II. (See Figure 15.) When students had the benefit of intensive guidance, 54 percent completed the recommended mathematics curriculum. Only 38 percent of students who experienced little or no emphasis on guidance completed the recommended math courses.

FIGURE 15

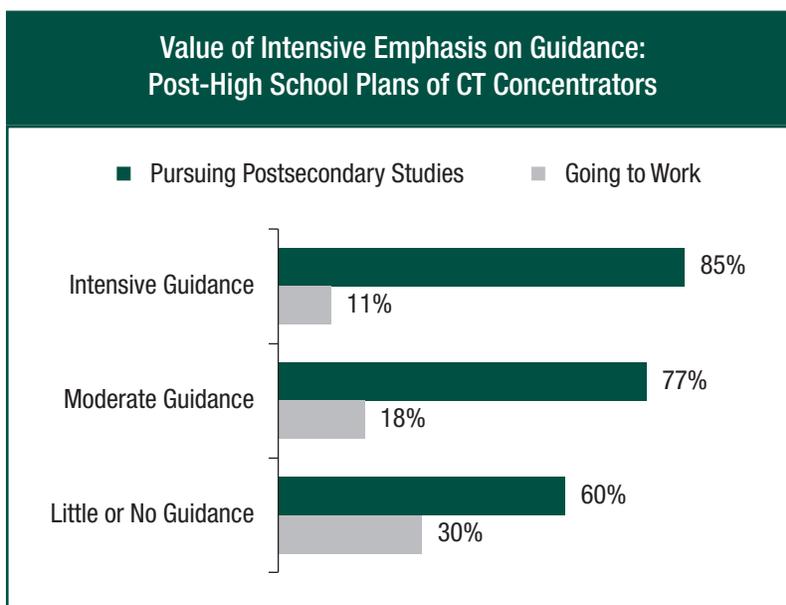


Source: 2008 *HSTW* Assessment

Guidance is also closely linked with students' post-high school goals. Eighty-five percent of CT concentrators with intensive guidance experiences reported that they would enter some form of postsecondary studies after graduation. (See Figure 16.) Some students planned to continue learning in an apprenticeship. Others expected to take courses at a technical school. Still others intended to enroll in a two- or four-year college.

Unfortunately, CT concentrators who planned to join the work force or the military immediately after high school were more likely to experience a low to moderate emphasis guidance. These students need a guidance and advisement system that can help them see the importance of completing a strong academic foundation to prepare for college, for advanced career training or for earning an industry credential — before they graduate or shortly thereafter.

FIGURE 16



Source: 2008 *HSTW* Assessment

Strong guidance is essential if schools are to help more students enroll in postsecondary studies and be successful in future endeavors. Students are more likely to succeed if counselors, teachers and parents join in helping them set post-high school goals, design a program of study aligned with those goals, review progress annually and adjust the plan as needed.

The challenge for schools is to redesign guidance and advisement to be curriculum-based and to involve the entire faculty in helping students examine their assets in the context of opportunities, complete a challenging program of study aligned with career interests, and better understand the effort required to reach their education and life goals.

Promising Practices: Two High Schools Use Guidance and Advisement to Raise Achievement

Two schools in the *High Schools That Work* network have had noteworthy success in using guidance and advisement to give students a sense of belonging, goals for the future, plans for reaching their goals and the determination to succeed. The schools' approaches differ, but the results are the same: More students complete high school with the knowledge and skills to compete successfully in college and a career.

Classroom Guidance Lessons at Valley Tech

Guidance counselors visit classrooms to deliver guidance lessons tailored for students at each grade level at **Blackstone Valley Regional Vocational Technical High School (Valley Tech)** in Upton, Massachusetts. Valley Tech enrolls 1,100 students from 13 communities.

Counselors have at least 30 opportunities across four years of high school to make contact with students:

- **Freshmen** take the Harrington-O'Shea interest inventory for help in choosing career courses and setting long-term career goals.
- **Sophomores** study goal setting, employment application procedures and labor laws. They use a variety of resources for finding the right career and education and training options.
- **Juniors** prepare for college by doing research and participating in the Valley Tech college fair. They register for the SAT and become familiar with college application procedures. These students sharpen their interview skills and complete a unit on work ethics.
- **Seniors** review transcripts, prepare college applications, investigate scholarships and hear guest speakers from postsecondary education and business. Counselors emphasize preparation for independent living.

To prepare for teaching the 30 lessons, counselors seek support from other teachers, adopt effective instructional methods and use computers and visual aids to make the content more engaging. Valley Tech counselor **Penny Downs** says planning for classroom guidance lessons involves the following activities:

- Collect data to determine the needs of students by recording the reasons they seek help in the guidance office.
- Develop a classroom program to address students' needs and promote the mission of the school.



“The opportunity to present guidance lessons in the classroom accelerates contact with students and produces useful information, enabling counselors to guide and advise students and their parents about further education and careers.”

Penny Downs

Blackstone Valley Regional Vocational Technical High School

- Collaborate with administrators and staff to offer useful, high-quality lessons.
- Develop a strategic plan before entering the classroom. Begin as a pilot program and build up the lessons over time.
- Use specific teaching strategies such as stating the purpose of the guidance lesson and making connections with students' lives. One way to introduce a topic is to ask students to answer questions on the topic by using blue essay books to create a journal.
- Use books and Internet resources to frame and strengthen the lessons. Resources include *Evidence-Based School Counseling* by Hatch, Carey and Dimmitt; the Hatching Results Web site at www.hatchingresults.com; and The Center for Excellence in School Counseling and Leadership (CESCaL) at www.cescal.org.

“Counselors find that the opportunity to present guidance lessons in the classroom accelerates contact with students and produces useful information, enabling counselors to guide and advise students and their parents about further education and careers,” Downs said.

The high school completion rate at Valley Tech is more than 95 percent. Increasing percentages of students are applying for college, and both students and parents are more satisfied with the services they are receiving from school counselors.

High School 101 at Fort Mill High School

All freshmen enroll in *High School 101*— a required course that incorporates orientation, habits of success, and guidance and advisement — at **Fort Mill High School** in Fort Mill, South Carolina. This comprehensive high school has about 1,400 students.

Academic and career planning is a major focus of the semester-long course. Teachers work closely with students to develop four-year individual graduation plans, incorporating rigorous academic classes and interest-specific career/technical studies. Students tour the various “career-cluster” programs on campus before registering for the 10th grade. The changes helped drive percentage of seniors who completed a sequence of four career/technical courses from zero in 2001 to 31 percent in 2008. The emphasis on career exploration helps students contemplate goals for the future and select a program of study to achieve the goals.

High School 101 (HS101) consists of eight units covering an array of topics to help students make successful transitions from the middle grades to high school and from high school to further education and careers. School officials believe the course has contributed to increasing the school’s graduation rate from 66 percent in 2003 to 91 percent in 2008. Freshman failure rates, especially in mathematics and science, have declined since the course became the cornerstone of the ninth-grade experience.

The five essential ingredients of the *HS101* course are:

- **Support from the Administration** — The support of district and school leaders is vital to provide money for supplies, the teaching staff and visibility for the program in the community. Administrators promote the program in newsletters, at freshman orientations, at school board meetings and in conversations with parents and community leaders.
- **The Right Teaching Staff** — *HS101* has its own department of three teachers, chosen for their enthusiasm, nurturing personality, and knowledge and commitment to academic areas. Teachers constantly share lessons, activities and resources. They also brainstorm, research and plan new topics for the curriculum.

- **Heterogeneous Groups of Students** — Ninth-graders from all achievement levels learn together. Teachers differentiate instruction and work to help struggling students find success. *HS101* teaches the life skill of understanding and accepting people.
- **Action-Oriented Curriculum** — Teachers use technology, collaboration, projects, activities, field trips and guest speakers to help students develop good study skills, positive personal qualities and high school awareness. Students often work in teams to complete assignments.
- **Coordination with Other Classes** — The knowledge and skills that students gain in *HS101* are reinforced in other classes. In fact, all ninth-grade teachers expect students to use the organizational skills they learn in *HS101*. Teachers from *HS101* and a computer class have developed joint projects, including asking students to write resumes in *HS101* that they type and format in computer class. Students also read common books for English and *HS101*.

The eight *HS101* units are: 1) orientation to high school; 2) learning styles; 3) study skills; 4) goal setting; 5) academic planning; 6) employability skills; 7) financial planning; and 8) comprehensive health.

“Over the years, the curriculum has evolved to meet the changing needs of students as they enter high school,” Assistant Principal **Charity Young** said. “During the summer, we spend three workdays developing and modifying the curriculum. We look at topics that might be outdated or less beneficial and find new activities on the Internet, in books and from other resources to help students become college- and career-ready.”

For example, the school recently added a formal unit on alcohol and drug prevention to the curriculum. Teachers encourage students to participate in school clubs, cultural events and service-learning projects that combine academic and CT knowledge and skills.

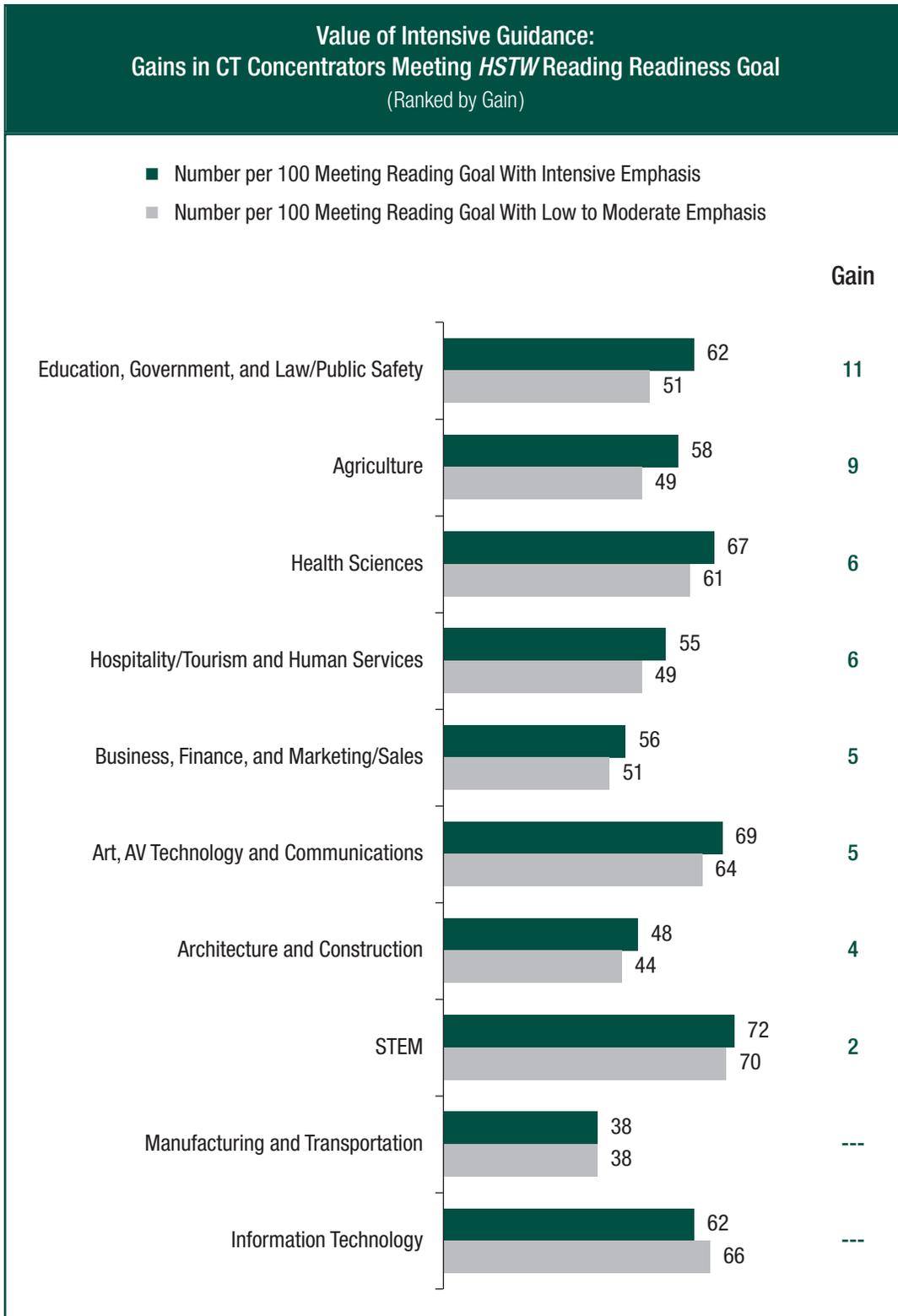
Professional development is designed to prepare *HS101* teachers to expand and enliven the curriculum. Teachers attend the annual *HSTW* Summer Staff Development Conference and enroll in school-based sessions on themes such as cooperative learning and student engagement. During one professional development activity, teachers visited model ninth-grade programs, studied the characteristics of ninth-graders and helped develop programs of interest and benefit to freshman students.

HS101 teachers serve as mentors to help students adjust to every aspect of high school. During all four years of high school, students seek support from *HS101* teachers on personal and academic problems. The teachers contact a counselor, an assistant principal or a classroom teacher as necessary to assist students.

Recently, the course began enrolling about 50 students per year who enter Fort Mill High as juniors and seniors. These older students need as much guidance as ninth-graders as they learn about their new school. Emphasis is placed on adapting to an unfamiliar environment, making friends, applying to college, seeking scholarships and taking next steps toward college and a career.

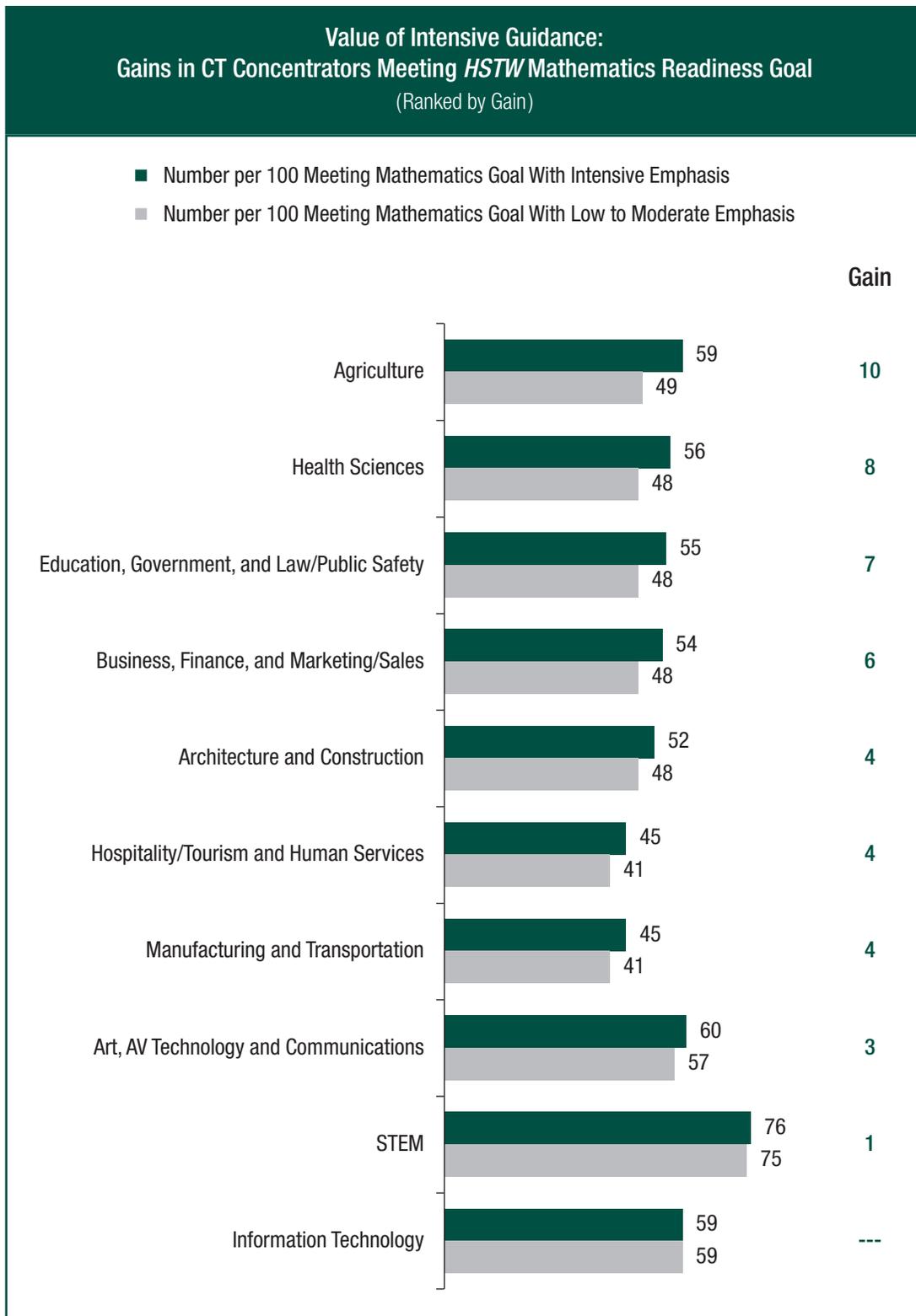
Guidance is associated with higher student achievement. More CT concentrators in nearly all career areas met the *HSTW* readiness goals in both reading and mathematics when they experienced intensive guidance. For example, of every 100 students in agriculture, nine more who experienced strong guidance met the readiness goal for reading and 10 more met the goal for mathematics than students who did not have strong guidance experiences. (See Figures 17 and 18.) In health sciences, six more students met the reading readiness goal and eight more met the readiness goal for mathematics with intensive guidance.

FIGURE 17



Source: 2008 *HSTW* Assessment

FIGURE 18



Source: 2008 *HSTW* Assessment

Career fields showing little or no increase in the number of students meeting the readiness goals with intensive guidance also had some of the lowest rates of students experiencing intensive guidance. For example, just 34 percent of CT concentrators in information technology experienced an intensive emphasis on guidance and, as a whole, information technology

showed no gain in the number of students per 100 meeting the readiness goals in reading and mathematics. In contrast, 46 percent of CT concentrators in health sciences received strong guidance, and the career field showed a gain of six more students per 100 meeting the readiness goal in reading and eight more per 100 meeting the math readiness goal. (See Table 8.)

TABLE 8

CT Concentrators Experiencing Intensive Emphasis on Guidance				
Career Area	All CT Concentrators	Minority	Low SES*	Male
All CT concentrators	38%	38%**	33%**	36%**
Agriculture	41	42	34**	39**
Architecture and Construction	35	36	31**	35
Art, AV Technology and Communications	39	37	32**	36**
Business, Finance, and Marketing/Sales	38	38	33**	37**
Education, Government, and Law/Public Safety	40	39	35**	35**
Health Sciences	46	44	42**	43
Hospitality/Tourism and Human Services	37	36**	33**	37
Information Technology	34	36	31	33
Manufacturing and Transportation	33	31	29**	33
STEM	40	38	31**	38

Source: 2008 HSTW Assessment

* Parental education serves as a proxy for students' socioeconomic status (SES). A student who has at least one parent who has completed at least some college is classified as having a moderate to high SES. Conversely, if neither parent has pursued any postsecondary education, the student is classified as having a low SES.

** The differences between the distributions of level of emphasis on guidance in student subgroups are significant at the .01 level ($p < .01$).

The emphasis on guidance varied across demographic groups and career areas, but overall, minority students, economically disadvantaged students and male students received less emphasis on guidance. In every career area except information technology, students from low-SES backgrounds were less likely than other students to experience intensive guidance.

Students need more individual attention to help them choose programs of study and set education and career goals based on interests rather than past achievements. Advisers and mentors should guide students in career exploration and help them obtain the support to succeed. Unfortunately, nearly two-thirds of CT concentrators failed to receive intensive guidance and advisement. **Too often, counselors focus on the 30 percent of students planning to enter a four-year college or university while neglecting the other 70 percent, including many students that could be first-generation college-goers.** These students and their parents may have little understanding of the knowledge and skills needed for various career fields and how best to prepare for them.

Conclusions

The evidence is clear. High school students with a college-preparatory academic foundation *and* a career focus filled with real-world learning experiences more often are on a path to success. Many research studies show the impact of college-prep courses on academic achievement. This study offers evidence that when schools join college-prep academic courses with career-focused courses involving relevant, hands-on learning, more students can meet college-readiness standards. Students are more likely to remain in high school and earn a diploma if their studies are connected to their interests, talents and goals beyond high school.

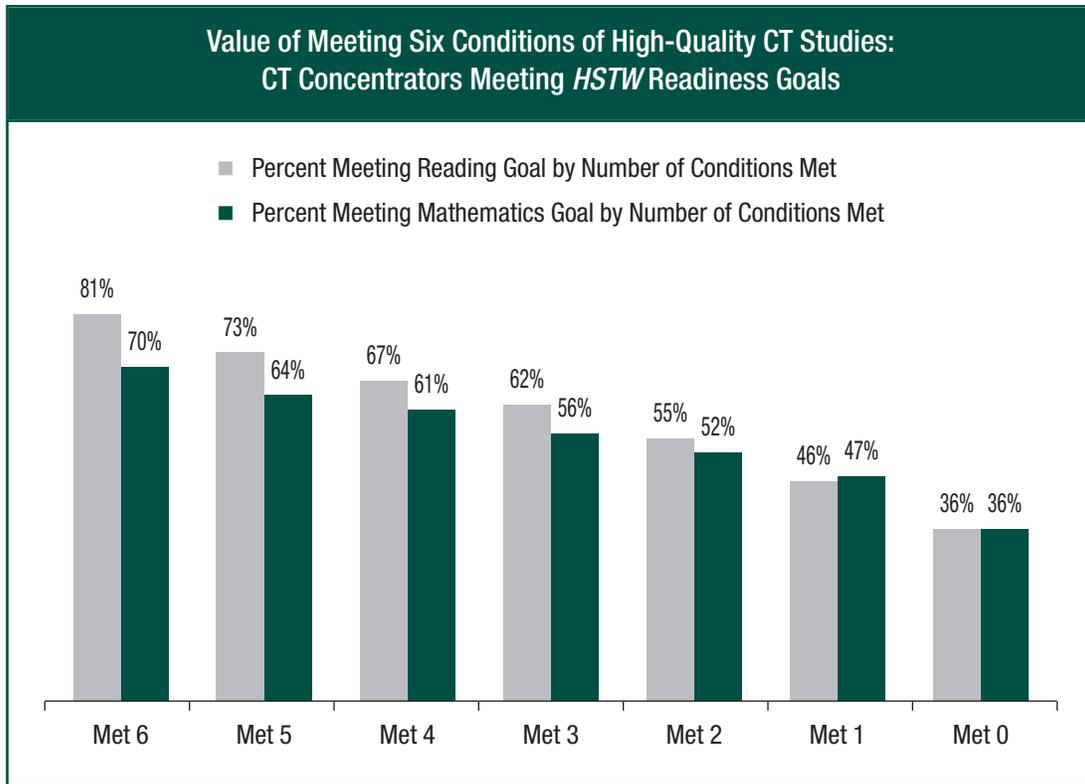
Career-focused education is a powerful way to help students find a niche in school. Regardless of how a school is structured, it can design programs of study around broad career themes to connect secondary and postsecondary studies and to lead students to some type of postsecondary credential — an apprenticeship, industry certification, associate’s degree, bachelor’s degree or higher.

The key to positive outcomes for more students is to create high schools that address the six conditions described in this report in a quality manner. These conditions can raise academic achievement and contribute to student success. The report provides evidence that more students learn at a higher level and meet college- and career-readiness standards when they complete a CT program of study that:

- includes a rigorous academic core curriculum — four college-preparatory English courses; four mathematics courses, including Algebra I, geometry, Algebra II and above; and three courses each in college-preparatory science and social studies — taught by faculty committed to creating engaging and relevant learning experiences.
- embeds academic standards for reading, writing and mathematics into the CT curriculum and engages students in applying academic concepts in authentic activities, problems and projects.
- engages students in intellectual assignments requiring the use of 21st-century skills, including critical thinking and problem solving, oral and written communication, teamwork and collaboration, timely quality work and use of technology.
- operates within a school structure in which academic and CT teachers work together to maintain high expectations for all students in all classrooms.
- provides extra-help opportunities in a timely manner and in a climate and context that will build the confidence of students to make the effort to meet college- and career-readiness standards.
- provides school- and community-based experiences enabling students to investigate, explore and reflect on career and educational goals and to adjust the goals as they gain new insights and self-assurance. These experiences should include a mentor/adviser to work with students during all four years of high school, to help set post-high school goals, to develop an educational plan for achieving the goals and to support students in reaching the goals.

When CT students encounter these six conditions, they are much more likely to become college- and career-ready and graduate from high school. Eighty-one percent of students who experienced these six conditions met the *HSTW* reading readiness goal, compared with 36 percent of students experiencing none of the conditions. (See Figure 19.) The trend is similar for mathematics. Seventy percent of students experiencing the six conditions met the mathematics readiness goal, compared with 36 percent of students experiencing none of the conditions.

FIGURE 19



Source: 2008 *HSTW* Assessment

States, Districts and Schools Can Take Action to Promote Powerful Learning

State leaders and policy-makers are faced with formidable challenges to involve everyone in raising the achievement and future prospects of students inclined to drift through school, opt out of school or lose enthusiasm for education. Many students are assigned to academic courses that do little to prepare them for work or further study, while some students take career/technical courses that demand too little and fail to connect to career interests or the labor market.

Students enrolled in CT courses have unique strengths and are capable of learning if they have access to experiences that enable them to succeed. Schools will not improve unless teachers are willing to help students meet higher standards in academic and career studies. The process is simple: **Establish a school mission to prepare more students for college, career training and a good job, and engage the faculty and the community in a joint effort to succeed.**

School and teacher leaders will need to overcome the focus on deficits and commit to teaching students to grade-level and college-readiness standards. Too many schools are satisfied preparing students to meet minimum standards and assigning boring work that causes a downward spiral in enthusiasm and interest the longer students remain in school. Most students can do higher-level work if assignments interest them and are related to their career goals. The excitement of hands-on learning can motivate students to overcome their academic weaknesses. Schools must make greater use of project- and problem-based learning. Students need opportunities to delve into their areas of interest and to discover that they can handle complex assignments with real-life components and consequences.

School leaders have an obligation to help parents and community leaders understand the changes that need to take place in teaching and learning to keep students interested in learning at a higher level. When parents are involved in helping students make educational and career decisions, they gain a better understanding of their children's talents and how to accelerate their children's achievement.

Actions States, School Districts and Schools Can Take to Prepare More Students for College and Careers

- 1. Create career-focused programs of study in high-demand, high-skill fields, leading to employer certification, an associate's degree or a bachelor's degree.** Keep options open for more students by preparing students for further study and gainful employment. States can develop challenging programs of study in emerging career fields, redesign outdated CT programs and adopt nationally recognized curricula that blend academic and CT studies.
- 2. Create structures and partnerships to connect academic learning to further study and the workplace and to recognize the different ways that academic learning can occur.** Effective school structures offer a range of options to blend academic and career/technical studies. These structures provide opportunities to: 1) apply heads-on learning in hands-on assignments, taught by well-trained and well-qualified teachers, and use classroom assessments to verify mastery of academic and technical content; 2) offer strong job-shadowing, internship and work-based learning opportunities to allow students to sample their career interests; and 3) encourage academic and CT teachers to plan and work together. Smaller high schools can create career academies in which academic and CT teachers collaborate to teach 60 to 75 students in each academy. Large high schools can organize into career-focused small learning communities of 300 to 400 students each. Some school districts may decide to offer a "choice" technical high school that allows eighth-graders to select a high school that blends a college-preparatory academic core with a CT focus.

Other districts may give greater access to shared-time career centers and community and technical colleges that provide specialized preparation in high-demand, high-skill fields.

- 3. Align CT curricula to college- and career-readiness standards.** States can build capacity to assist schools in identifying essential standards in reading, writing, mathematics and science to ensure post-high school success. Schools can design course syllabi, create authentic assignments and develop assessments to measure students' mastery of academic and technical content. This approach requires an investment in professional development to help academic and CT teachers understand the standards, how to use them in the curriculum and how to engage students in mastery.
- 4. Design CT courses with embedded academic standards that will fulfill academic and CT credits required for high school graduation.** Hybrid courses blend academic and CT studies and require students to apply academic knowledge and skills to solve problems in a broad career field. In such courses, at least one academic and one CT teacher work together to develop a course syllabus that incorporates examples of authentic assignments and assessments that link with college- and career-readiness standards. States and school districts need policies on the criteria and the process to allow hybrid courses to substitute for academic credits required for high school graduation. Such courses must be challenging enough to prepare more students to meet college-readiness standards.

5. **Prepare CT teachers to develop intellectually engaging assignments around real-world problems and to understand how to help students gain greater depth of knowledge from assignments.** CT teachers need to know how to draw upon the expertise of business and industry partners to create workplace scenarios involving multi-step problems, to develop assignments around those scenarios, to create rubrics and scoring guides defining quality work, and to design assessments that measure students' mastery of academic and technical standards. Career/technical courses must require students to do substantial reading and writing, solve problems, do lab work, use analytical thinking as well as factual content, and exhibit speaking and listening skills.
6. **Provide extra help, time and ongoing support for students to meet standards and to make a successful transition to the next level.** High schools can form partnerships with feeder middle grades schools to align the middle grades curriculum to rigorous standards so that ninth-graders will be ready for challenging high school courses. This action entails redesigning the freshman year to help at-risk students overcome academic deficiencies and explore education and career options. School leaders must convince students and teachers that success is the goal, that students can meet higher standards and that teachers and counselors can help students reach grade-level and course standards.
7. **Eliminate disparities in the quality of school and classroom experiences to increase achievement of all groups of students and accelerate their progress toward post-high school goals.** School leaders and teachers need to evaluate school and classroom practices and instructional methods continually to pinpoint actions that do not work and to implement strategies leading to higher performance by all groups of students. Adequate resources will be needed to ensure equitable access to engaging

instruction and meaningful support for all students, especially for those at risk of failing or dropping out of school.

8. **Allow CT concentrators to demonstrate mastery of state academic standards in subjects other than reading, writing and mathematics by passing alternative assessments, including rigorous, state-approved employer certification exams.** States should set these criteria:

- The examination is standardized, knowledge-based, independently graded and available nationally.
- The exam provides a recognized credential related to employers' requirements.
- Results are available immediately.
- Cut scores exist that have been set by employers.

States should support districts in giving the state-approved alternative exams to CT students in grade 12 and in paying the examination fees. States also need to require CT teachers to pass the exams and provide summer institutes to sharpen teachers' knowledge and skills before taking the exams.

9. **Create a system of guidance and advisement to support students in completing programs of study customized to their unique talents, interests and abilities.** A solid guidance system: 1) provides opportunities for students to investigate, explore and reflect upon their strengths; 2) helps students connect academic and CT studies and provides school- and community-based learning experiences to show the meaning and purpose of a high school education; 3) provides an adult adviser or mentor to assist students throughout high school; and 4) develops crucial skills such as how to learn, how to relate to others and how to plan for college and a career.

The best high schools equip students with academic skills for continued learning beyond graduation and allow students to discover their own unique talents. They create a school community in which leaders and teachers believe in students and guide them to realize their potential. Such schools also create a positively charged learning environment with numerous opportunities for students to explore new topics and to express enthusiasm and optimism for their studies.

Schools that link intellectually demanding CT programs to broader high school reform under the conditions described in this report can change the image of American high schools. They can ensure that more students graduate from high school and that more graduates are prepared for college and careers.

Endnotes

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- 14 Based on an interview with James Evans, superintendent of Lee County Schools, and Jerry Hollan, principal of Lee County Area Technology Center, conducted July 10, 2008, at the 22nd Annual *HSTW* Staff Development Conference in Nashville, Tennessee.
- 15 A special analysis using partial correlations was conducted to confirm that the gains in the percentages of CT concentrators meeting the readiness goals were related to the types of classroom practices. When holding constant the factors of parental education, race/ethnicity and the number of parts of the curriculum completed, results of this analysis indicate that assessment scores in reading and mathematics are positively correlated with the level of emphasis on integrating academic content and skills into CT courses.
- 16 Linda Grim participated in *Literacy Across the Curriculum* workshops designed for *Technology Centers That Work*, a program of the Southern Regional Education Board. The professional development was delivered in three sessions: Oct. 9-10, 2007, Jan. 24, 2008 and April 23, 2008.
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- 18 Based on an interview with Vicki Brunn, principal of Talawanda High School, conducted July 10, 2008, at the 22nd Annual *HSTW* Staff Development Conference in Nashville, Tennessee.
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- 20 2008 *High Schools That Work* Assessment.

