

# Evaluation of the Demonstration Sites in the ConnectEd Network

Submitted to: James Irvine Foundation



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# Executive Summary

## Multiple Pathways:

### The ConnectEd Network of Schools

It should be common sense: guiding young people to a successful future should mean preparing them for both college and careers, not just one or the other. But California schools, like most others in the nation, too often have treated academic and technical studies as an either/or proposition. This dichotomy has not served students or society well. Far too many students are dropping out of school, and many others earn a diploma without truly mastering the knowledge and skills necessary for life after high school.

One promising strategy for engaging students in learning that prepares them for several options after graduation is the multiple pathways approach. Multiple pathways are comprehensive programs of study that connect classroom learning with applications in the real world outside school. Pathways integrate rigorous academic instruction with demanding technical curricula and work-based learning. This study shows that this approach does, indeed, show promise for being an effective approach to enhancing the engagement and learning of students, while also preparing them effectively for a wide range of careers. The potential of this approach warrants additional research attention, since the propensity of high school students to disengage and to feel disconnected from school is so well known.

In California, the James Irvine Foundation created ConnectEd: The California Center for College and Career to promote multiple pathways that link to the state's 15 major industry sectors. ConnectEd works on several levels to:

- Design multiple pathways and curricula;
- Provide policy analysis and advocacy to advance multiple pathways; and
- Promote school improvement through professional development and related activities.

The ConnectEd Network of Schools, a demonstration project supported by Irvine, plays a critical role in expanding student options through multiple pathways and illuminating how pathways work and what they can accomplish. The Network consists of 16 sites spread across the state that vary significantly in structure, ranging from small autonomous schools to Regional Occupational Programs (ROPs) serving

several districts, and including a charter school and a program run by a nonprofit organization.

Network schools have diverse populations, and most are located in low-income areas. They enrolled a slightly higher concentration of African-American and Asian students than did the average California high school in 2007–08, and the student population was divided nearly equally among males and females. All operate some form of multiple pathways program that integrates career and technical education (CTE) with academic studies. The oldest program goes back to 1970, and the newest began in 2006. Ten of the programs have been in existence since 2000.

## Evaluating the ConnectEd Network Sites

ConnectEd has made a strong commitment to rigorous evaluation of multiple pathways since its inception. A major objective of the Network sites is to provide data on a set of core indicators of student outcomes to document the effectiveness of multiple pathways. Undertaken during the 2007–08 school year, with follow-up ongoing in 2008–09, this evaluation of Network sites sought to answer these questions:

- What is the evidence that multiple pathways produce greater student engagement, improved achievement, and higher rates of school completion than do more conventional high school programs?
- What is the impact of the pathways approach on student attitudes, behaviors, “soft skills,” motivation, awareness of career options, and workplace readiness?
- What key program variables characterize implementation of pathways at each site?
- How well have sites implemented pathways, according to a rubric defining the key pathways features thought to contribute to improved student outcomes?
- What other variables (e.g., factors related to students and teachers) influence implementation?
- What are the relationships between student outcomes and fidelity of implementation of key features?
- What major implementation themes emerge that are important to understanding whether and how pathways influence student outcomes?

A full description of the evaluation methods is contained in Appendices A–C of the report. The following sections summarize the findings of the evaluation.

## Student Outcomes

### *Indicator Data: Achievement*

Researchers analyzed student-level data from the Network sites to examine a variety of indicators, including test scores on the California Standards Tests (CSTs) and the California High School Exit Exam (CAHSEE). In one set of analyses, they compared the results for the Network as a whole to the state and disaggregated the results for race/ethnicity. They found that:

- Network students were more likely than other California students to pass the CAHSEE on their first attempt in 10<sup>th</sup> grade. Pass rates were higher for Network students in both English language arts and mathematics, regardless of race or ethnicity.
- On the CSTs, end-of-course exams given in grades 9, 10, and 11, Network students performed similarly to other students statewide, with several exceptions and some variation by grade level.
- On the English CSTs, White and Asian Network students performed less well than their counterparts statewide in all three grades, while African-American and Hispanic students outperformed their state peers.
- On the science CSTs, Network students' performance was similar to statewide performance in biology, earth science, and life science. In chemistry and physics, Network students fared less well than their state peers.
- Network students of all ethnicities outperformed their state peers in earth science, and African-American and Hispanic Network students also outperformed them in life science. Asian and White Network students in grade 10 outperformed their peers in biology as well.
- In history, Hispanic and White Network students outperformed their state peers in U.S. history, but not world history. African-American Network students outperformed their counterparts in world history, but not U.S. history.
- Notably, in mathematics, the only Network students to outperform their state peers were Hispanics in algebra 1 (grades 9 and 10) and African Americans in algebra 2 (grade 10).
- At Network sites, 96 percent of 9<sup>th</sup>-graders, 90 percent of 10<sup>th</sup>-graders, and 98 percent of 11<sup>th</sup>-graders had sufficient credits to be promoted to the next grade and were on track for an on-time graduation.

- On average across the sites, 92 percent of 9<sup>th</sup>-graders, 81 percent of 10<sup>th</sup>-graders, and 73 percent of 11<sup>th</sup>-graders expected to re-enroll in the pathways program the following year. Five of the 12 sites providing data for all three grade levels predicted that 100 percent of their students would continue enrollment in the pathways program from one year to the next.
- Overall attendance rates for Network students were higher than national attendance rates, just over 94 percent compared to 92 percent.
- Of the approximately 2,300 Network seniors in 2007–08, 98 percent graduated and, on average, 35 percent had met the entrance requirements (a-g courses) for admission to the University of California/California State University postsecondary systems. This average masks the fact, however, that 10 of the 15 have rates higher than the state 2007–08 average of 36 percent, and four sites have rates higher than 90 percent.
- At the nine Network sites able to report their seniors' plans for after graduation, 38 percent planned to attend a 4-year college and 49 percent a 2-year college. Five percent planned to enter military service, 4 percent the labor force, and 3 percent an apprenticeship or technical training program.

While these analyses resulted in some positive and interesting findings—even though they were certainly not consistently positive across all subject areas and all grade levels—calculating averages for the Network or comparing the Network to the state as a whole provided a limited view. In order to assess how much the analyses for the Network as a whole might be masking individual site results that would provide another perspective on student learning outcomes, additional analyses were conducted. In these analyses, results for individual sites were compared, and sites were compared to their local settings. The site-by-site analyses revealed a number of positive results for certain sites and on certain of the indicators. The site-by-setting comparisons tended to show more positive results, apparently as a result of comparing to their local setting (school or district), rather than to the state as a whole.

### ***Qualitative Data: Student Learning, Attitudes, and Behavior***

To examine Network students' attitudes, behaviors and skills, awareness of career options, and readiness for work or college, researchers conducted interviews and focus groups with district and school administrators, teachers, and students. Network students and teachers said they believed that student attitudes were much more positive when compared with other programs they had been in or taught in. Students

appreciated the freedom to make choices about their studies, demonstrated self-confidence and motivation, and worked well together in the close-knit programs. Network students and teachers also noted that students discovered the career areas that interested them and adopted an attitude of professionalism toward their work. Most—but not all—Network sites offer off-site work-based learning experiences to make students aware of options in a given industry area. Students enjoyed these experiences and felt they had “a head start” on others entering the field.

Students learn the skills necessary for their chosen field, as well as general workplace skills, often in facilities designed to resemble actual work settings (i.e., medical office, design studio, etc.). They generally understand the expectations adult professionals in the field will have for them. Pathways programs tend to teach presentation, communication, and other workplace skills explicitly and offer assignments designed to build skills in teamwork, research, problem solving, processing, and time management.

Network students tended to internalize the “college-going culture” fostered by the programs, and some changed their educational plans as a result of changing their employment goals.

## Program Implementation

Based on qualitative data gathered during Network site visits, review of documentation, and the coding of data according to the ConnectEd rubric, researchers identified the following variables that characterize and potentially influence the implementation of the multiple pathways approach.

### *Program Structure*

The structure or format of these programs varies enormously, and the size of the student body at Network sites ranges from a low of 19 to more than 1,200. Four are small autonomous high schools that have great flexibility in several important areas: scheduling, setting graduation requirements, designing course sequences, and developing budgets. They typically limit the number of pathways offered, however, and may have difficulty providing the advanced classes and extracurricular activities offered by comprehensive high schools. Five are academies within larger schools. These programs can provide a supportive community and integrated coursework, while benefitting from the resources available in larger schools. Challenges include recruiting students and teachers, scheduling, and providing time for teacher collaboration.

Two sites are Regional Occupation Programs. In other sites, ROPs are partners with Network schools, but few belong to the Network themselves. ROPs, in general, have considerable latitude in CTE programming and can offer students work-based learning opportunities, but they may struggle to offer rigorous academic study. Two sites offer elective course sequences or a sequence of elective CTE courses open to all students—in these cases using the Project Lead the Way program. Generally there is little integration, however, between technical and academic classes and fewer opportunities for students to develop a sense of community and long-term relationships as is possible in smaller, more self-contained programs.

Two Network schools can be considered outliers because they differ substantially from the rest. One is a nonprofit organization that provides an off-site project-based course and internship/mentor program to students from 18 high schools. The other offers a half-day program to 11<sup>th</sup>- and 12<sup>th</sup>-graders that provides credit for English, social studies and science, and CTE courses. These programs can reach students from many schools and provide specific advantages, but they also find that coordinating with students' home high schools can be difficult.

### ***Coordination, Scheduling, Leadership, and Other Factors***

Coordination with home high schools was uneven, with some programs keeping in close communication with students' home high schools, while others felt that they operated independently without much communication with students' regular schools. Network sites and home schools coordinated in areas such as curriculum, counseling, recruitment, and attendance.

Coordination with local and regional postsecondary institutions occurred through both formal articulation agreements and informal arrangements. The most common arrangement allows students to obtain both high school and college credits for some courses offered either at the high school or at the college. Some Network schools have arranged for free or reduced tuition for college courses, and some colleges will allow Network students to skip introductory courses. Students and teachers note that such arrangements are helpful in preparing students for the reality of college life.

Scheduling was one of the biggest challenges for Network schools, which reported difficulties with assigning teachers to classes, accommodating students' requirements and electives, and providing sufficient time for teachers to plan together. The latter was especially challenging. Eight sites provided some form of planning time, but others were not able to do so. Teachers reported working together informally during buy-back days, at lunch, via email, or when car-pooling.

Most sites reported that their districts were supportive of their programs. They received guidance and assistance from district leaders, support for specific initiatives (such as creating an academy), and professional development relevant to the program. The few sites that felt their districts were not supportive generally cited a lack of understanding of the alternative approaches and a scarcity of resources. Most sites also demonstrated strong leadership from the program director and principal, and many teachers attributed their program's success to ongoing and supportive leadership.

Though most sites recognize the need for parent involvement, few have it. Parents are generally willing to attend “showcase events” and parent education nights, but are not otherwise involved.

Most sites indicate they would like a facility that resembles and is equipped as a workplace. Some have new facilities designed to meet their needs, while other sites have had to adapt to environments not designed for their programs. A common challenge across sites is the establishment, equipping, and maintenance of facilities that suit program goals and operations.

All sites value having and using technology as a critical component of their programs, and they experience the same challenges as other schools in keeping their technology up-to-date. Most sites are coping with aging computers and equipment and struggling to find the resources for upgrading.

Transportation issues vary by program, but seem to present one of the greatest barriers to program implementation. These can be especially challenging for programs where students spend a great deal of time in workplaces not close to the school. In large districts, students must travel considerable distances both to the Network site and then to the work site.

### ***Curriculum and Instruction***

Curriculum and instruction vary widely between and within Network sites. High-quality cross-curricular projects and units prevail in some sites, while in others the integration of academic and technical content occurs mainly through individual teacher initiative. The lack of a dedicated student and teacher cohort is one obstacle to integrating academic and technical studies. Program staff and administrators feel hampered by the master schedule and inability to keep pathways students in a cohort. Math is the biggest hurdle in creating a cohort for pathways students. Because students are placed by skill level—or can choose to take various math courses in different years—sites struggle, often finding innovative ways, to incorporate math into pathways programs.

The challenge of integrating curriculum is evident in most sites, though many have very good examples of integrated projects that provide opportunities for students to apply their academic knowledge to interesting and engaging work-based learning projects. Another obstacle, however, is finding time and support/guidance for teachers to do the work of planning integrated curriculum.

Most of the sites evidenced less than a consistently high level of rigor—across their curriculum—needed for high levels of academic learning. In some cases, this is because the ability level of students who enroll is so varied—and often so low—that it is necessary to provide extensive support to help them be successful. In other cases, the instructors are missing simple opportunities to inject rigorous academic content into CTE tasks. Most sites are still working toward true integration of rigorous academic and technically demanding content.

Classroom observations rated sites highest overall for classroom management (planning, clear expectations, established routines, etc.) and climate (mutual respect, active student engagement, teacher feedback, etc.). The lowest ratings were related to integration (connections among disciplines, references to outside learning, differentiated instruction, etc.)

### ***Work-Based Learning***

Sites seek to offer a variety of work-based learning opportunities (internships, job shadowing, mentoring), but the availability of these is spotty. Site staff agree that work-based learning is valuable for many reasons, but that it is difficult to find the time and resources to build relationships with industry partners. Other challenges to implementing work-based learning include some students' need to maintain jobs, matching student interests with learning opportunities, and ensuring that these opportunities provide meaningful experience and training.

### ***Support Services and Intervention***

School counselors play many roles at Network sites, and they can personalize their work with students to a greater degree than their counterparts in traditional high schools, though not all Network sites have dedicated counselors for program students. Some counselors noted that they can provide more academic and career counseling services because they spend much less time dealing with discipline referrals than they do in traditional high schools. Many adults within the programs, as well as those who observed the programs and students, also commented on the mature behavior of the students.



For pathways programs in larger schools, the quality of the counseling depends on the counselors' understanding of CTE and the Network program. Two intervention approaches to assist struggling students were most common in Network sites: tutoring and offering credit-recovery courses.

### **Recruitment**

Some sites have extensive recruitment efforts, and others do not recruit at all. In the latter case, this occurs primarily because the demand for places in the program exceeds enrollment capacity. Those who do recruit often involve current pathways students and their work in these efforts. Several programs noted that recruiting female students is a major challenge.

### **Teacher Background**

Network teachers have a range of experience in teaching, but no common patterns of experience were evident. Many program administrators indicated that a teacher's willingness to collaborate or belief in the integrated approach was a significant factor in hiring decisions. Some programs have provided teachers with specific training in curriculum integration, while most offer more general professional development for all teachers, such as teaching literacy.

## **Implementation Factors Related to Student Outcomes**

Researchers examined how well the programs aligned with the dimensions of a fidelity rubric developed by ConnectEd to identify desirable features of multiple pathway programs. It should be noted, however, that the sites were not selected using this rubric, nor were the sites directed initially to strive to align their programs in this way. Along the way they have been asked to use the rubric to pursue improvements to their programs. Sites were rated on the rubric on the degree to which they implemented 18 factors considered important to multiple pathways programs. These ratings were then compared with a ranking of sites based on a combination of achievement indicators. Researchers found no direct relationship between high scores on the fidelity rubric and high scores on the success index. When sites were grouped by structure into "academy-like" and "non-academy-like," the academy-like sites had a higher score on the success index. Researchers concluded that the fidelity rubric worked well in scoring some, but not other, types of programs and needed modification to become a useful measurement tool.

## Significant Influences on Implementation and Outcomes

The review and analysis of both quantitative and qualitative data identified several factors that seemed to have the strongest influence on program implementation and outcomes.

The first factor clearly was the relationships among students and between students and teachers. Students across the sites consistently said that they valued pathways programs because of the strong positive relationships they have with staff and each other. Among students at all sites, this feeling of connectedness translated into strong motivation, high levels of engagement, and a mature attitude toward education and their future.

The second factor was staffing and teacher quality. In many cases, sites had assembled teams of teachers with high levels of expertise and commitment who collaborated well on developing curriculum and in monitoring student progress and working to ensure their success. The teachers who were interviewed commented frequently on the high level of satisfaction and professionalism associated with teaching in these programs. However, site administrators often found it difficult to determine in interviews if teacher candidates were truly committed to and capable of the collaborative work essential to pathways programs, and they also found it difficult to find teachers with both solid academic and technical expertise. Thus it was clear that factors associated with staffing and teacher quality heavily influenced the quality of the program.

Integrated instruction was the third factor. While most sites had made significant efforts to integrate academic and technical content, with considerable success in some cases, they also found it challenging to attain true and extensive integration. Sites also had differing interpretations of the concept of integration. They found it easier to integrate some academic areas than others; integrating math was particularly problematic.

A fourth factor was whether sites had meaningfully integrated work-based learning opportunities. Sites reported numerous barriers to establishing and sustaining such opportunities, especially the time needed to identify and arrange for such experiences. However, in cases where sites had been able to make them an integral part of the program, it was clear that there were greater benefits for students.

Costs of implementing multiple pathways programs was the fifth factor. Though an in-depth examination of costs was beyond the purview of this study, researchers learned some things about the associated costs. Network sites agreed that, without

federal Perkins funds, funds provided through the California Partnership Academy and the ROPs, and grants, they would not be able to operate. Nevertheless, their commitment to the programs was clearly evident in their unstinting efforts to seek the funding needed for the various ongoing and periodic costs. Significant costs are related to building or retrofitting facilities; obtaining and upgrading technology and equipment; and securing specialized supplies and consumables. Time—as always in schools—is a significant cost as well. Apart from instruction, time must be allocated for staff to work together to develop curriculum and plan integrated projects, as well as to develop and oversee work-based learning opportunities.

## Conclusion

Overall, this study shows that the results on student achievement outcomes for those participating in these programs indicate positive effects of the program on a number of indicators of student learning for the Network as a whole and for particular sites or subject areas. The school reform literature notes that it is not easy to demonstrate positive effects on achievement—particularly at the high school level—so these results should not be taken lightly. In addition, while these programs vary significantly in format and structure, in size and industry sector with which they are aligned, the students and teachers in them consistently report strong positive outcomes for students in terms of learning, attitudes, and behaviors, and strong positive outcomes for teachers and administrators in their experiences with collaboration on curriculum and instruction and in their feelings of professionalism and efficacy.

In a study of high school reform models, Quint (2006) notes that the movement of high school reform to the top of the policy agenda was precipitated by rapidly-growing concern about high dropout rates and low academic achievement, particularly among disadvantaged young people. The “message” from this synthesis study was that “structural changes to improve *personalization* and *instructional improvement* are the twin pillars of high school reform” (p. iii). This evaluation study shows that the ConnectEd Network sites provide good models of how to initiate the construction of those pillars.



## Introduction

California's high schools face a major and difficult challenge: how to engage young people in the serious learning that can ensure lasting success in further education, career, and the civic life of our state. The magnitude and severity of the problem are well known; far too many students are dropping out of high school, and many others earn a diploma without having mastered the knowledge and skill needed to succeed in postsecondary education and the world of work.

There are no simple solutions to this problem, no one right way. One promising strategy, however, is the multiple pathways approach—comprehensive programs of study that connect classroom learning with real-world applications outside school. Pathways integrate rigorous academic instruction with demanding technical curriculum and work-based learning—all set in the context of one of California's 15 major industry sectors. These sectors include the arts, media, and entertainment; biomedical and health sciences; building and environmental design; engineering; information technology; law and government; and 10 others.<sup>1</sup>

In April 2006, the James Irvine Foundation created ConnectEd: The California Center for College and Career to promote innovative practice, policy, and research to better define and expand multiple pathways in California's high schools. ConnectEd defines the multiple pathways approach based on four guiding principles and four components, as follows.

### Guiding Principles of Pathways

Multiple pathways:

**Prepare students for postsecondary education *and* career.** A pathway must always address both objectives. Acknowledging that career success depends on postsecondary education and a formal credential, ConnectEd staff affirm that a pathways approach cannot reflect separate programs for different groups of students.

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<sup>1</sup> For a thorough description of multiple pathways, as well as summaries of relevant research and key policy issues affecting expansion of pathways in California, see *Expanding Pathways: Transforming High School Education in California*, January 2008, *High School Education in California*, January 2008, available at [www.ConnectEdCalifornia.org](http://www.ConnectEdCalifornia.org).

**Connect academics to real-world applications.** Implementing a pathways approach means altering how core academic subjects are taught. Students master core subjects through applying them in the real world.

**Lead to the full range of postsecondary opportunities.** Pathways are designed to prepare students for all the options they might pursue after graduation from high school. Each pathway is tied to a particular industry theme that can engage any student, regardless of prior academic achievement.

**Improve student achievement.** Pathways are designed to produce higher academic and technical achievement, higher rates of high school completion, more successful transitions to postsecondary education and careers, and greater attainment of formal postsecondary credentials. They are also designed to support the development of students' critical-thinking and problem-solving, communication, and collaboration skills.

## Core Components of Pathways

Multiple pathways provide:

**Rigorous academic study** that prepares students for success in community colleges, universities, and other postsecondary programs.

**Demanding technical education** that teaches concrete knowledge and skills to prepare youth for high-skill, high-wage employment through an emphasis on real-world applications that bring their academic and technical learning to life.

**Work-based learning opportunities** that enable students to learn through authentic experiences—internships, virtual apprenticeships, and school-based enterprises.

**Support services** that include counseling and supplemental instruction that may be needed to ensure students' success.

ConnectEd describes its mission as supporting “the development of multiple pathways by which California’s young people can complete high school, enroll in postsecondary education, attain a formal credential, and embark on lasting success in the world of work, civic affairs, and family life.” The staff pursues this mission through three major programs of work: (1) pathways design and curriculum development, (2) policy analysis and advocacy, and (3) school improvement through professional development and related activities. Helping to integrate all three of these programs is the ConnectEd Network of Schools, a group of 16 “demonstration” sites selected to develop an understanding of what pathways can accomplish and how they do it.

## The Network of Demonstration Sites

The ConnectEd Network sites have an established track record in designing and implementing multiple pathways. The Network plays a critical role in advancing ConnectEd's overall mission to advocate for multiple pathways and expand student options in high schools throughout the state. For policymakers, educators, industry leaders, and community stakeholders, there is no substitute for seeing and directly experiencing multiple pathways at work in real schools.

Network sites work closely with ConnectEd staff engaged in curriculum development and other aspects of multiple pathway design. For example, Health Professions High School in Sacramento has collaborated with ConnectEd staff in developing a series of integrated units for biomedical and health science and creating an integrated curriculum planning guide. Other sites work with ConnectEd staff on curriculum for engineering; the arts, media, and entertainment; and law and government. Curricula produced through these efforts are shared throughout the Network, as well as with other schools in California planning or already operating pathways in related industry sectors.

To these ends, therefore, the Network has three primary objectives:

- Showcasing effective, well-designed examples of multiple pathways;
- Providing credible evidence of effectiveness on a core set of student outcome indicators; and
- Building a “learning community” that supports program improvement throughout the Network and among other schools engaged in multiple pathways.

To help build the Network, the James Irvine Foundation enabled ConnectEd to make a series of planning and implementation grants for program improvement to 16 California schools that had already demonstrated considerable experience in offering students one or more industry-focused pathways. To be selected, these demonstration sites had to meet a number of site selection criteria with respect to student and district demographics, curriculum, instruction, organization, and school climate (see Exhibit 1).

Creation of the Network proceeded in two stages. An initial grant, made to MPR Associates before the founding of ConnectEd and subsequently transferred to ConnectEd, called for identifying and selecting six demonstration sites. A second grant made directly to ConnectEd called for adding up to 12 more sites. As of April 2008, there were 16 sites in the Network.

**Exhibit 1. Site selection pre-screening criteria**

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*Student and District Characteristics*

1. Minority students are more than 40 percent of the student population.
2. A range of existing Career/Technical Education (CTE) offerings is already available.
3. Geographic locations in total will create a network representative of the diverse regions of the state.

*Curriculum*

1. The technical and academic curriculum are aligned with state standards, frameworks, and instructional material.
2. CTE assessments are aligned with state standards, frameworks, and instructional material.
3. Staff are committed to using CTE courses as a vehicle for students to obtain a–g credit.
4. CTE courses incorporate a focus on high-level communications skills.
5. CTE courses are designed to prepare students to begin technical majors at the University of California or California State University.
6. CTE courses enable students to develop interdisciplinary knowledge through structured work on authentic problems.
7. Curriculum development is tied to labor market trends and the needs/interests of relevant local employers.

*Instruction*

1. Technical education and academic instruction are coordinated.
2. Teacher professional development aims to build expertise across sectors (i.e., technical knowledge for academic teachers, academic expertise for technical teachers).
3. Teachers have experience using project- and problem-based instructional approaches.
4. Work-based learning is coordinated with classroom instruction.
5. School leaders and teachers seek input outside the school on ways to improve the CTE program.

*Organization*

1. Efforts are made to help grade 9 students make successful transitions to grade 10.
2. Academic support, financial aid counseling, college prep, career advising, and personal counseling are an integral part of the program.
3. Alternative scheduling is used to improve delivery of CTE and academic courses.
4. School leaders and teachers use data to support instructional and operational decisions.
5. The learning environment is configured to support student achievement.

*School Climate*

1. School and program leadership is strong.
  2. The teaching staff is highly dedicated and motivated.
  3. Strong student motivation and engagement are evident.
  4. The school takes an entrepreneurial approach to building partnerships, securing adequate funding, and ensuring sustainability.
  5. Parents are active participants in the program.
- 

The structure of the Network sites varies significantly. They range from small autonomous schools to academies to Regional Occupational Programs (ROPs), and each program brings a distinct set of challenges and opportunities. While the variation makes it difficult to generalize about the effects of the pathways approach, it also provides an opportunity to explore how the guiding principles and core

components play out in different contexts. In selecting the sites, ConnectEd staff sought to find those that reflected the core components and high quality of implementation that best represents multiple pathways programs.

Staff also wanted sites serving predominantly high-poverty students, that is, with a significant proportion of Title I students, and sites with programs open to all students. In addition, they sought balanced geographic and industry sector representation. They used a combination of applications, panel review, and site visits to identify the sites invited to join the Network.

As illustrated in Exhibit 2 and noted above, the Network sites vary in their structure, as well as in their career area focus, available resources, size, and length of operation. Four are California Partnership Academies with a specific set of requirements to meet. Each must be established as a “school within a school” with classes limited to academy students only. Students must have a mentor from the business community during the 11<sup>th</sup> grade and an internship or paid job related to the academy’s occupational field or work experience to improve employment skills during 11<sup>th</sup> or 12<sup>th</sup> grade. Two other sites are also career academies within host schools, but they do not have funding and are not certified through the California Partnership Academy program.

Five sites are small autonomous high schools, each of them with a specific focus. These sites have the greatest flexibility in terms of scheduling, requirements, and course sequences. They typically offer one pathway, such as the health sciences or the arts.

Two sites are Regional Occupation Programs or Centers (ROPs) and typically offer work-based learning opportunities to students at multiple high schools. At two other sites, elective course sequences or a sequence of elective CTE courses are open to all students, based on the Project Lead the Way model. Two Network schools are outliers that differ substantially from the others. One is focused on architecture and provides off-site project-based course and internship/mentor opportunities to students from 18 high schools. The other is a half-day program that draws 11<sup>th</sup>- and 12<sup>th</sup>-grade students from two school districts and provides labs in 14 areas such as forensics research, biomedicine, robotics and electronics, and law and order and policy (see Exhibit 2). A map of the sites showing their geographic distribution is displayed in Exhibit 3.



**Exhibit 2. The ConnectEd Network of Schools—April 2008**

<b>ConnectEd Sites</b>	<b>Abbreviations used in figures</b>	<b>Program structure</b>	<b>Number of students served</b>	<b>Grade levels</b>
Build San Francisco, San Francisco	Build SF	Internship/mentoring program and project-based course	19	9, 11, 12
Building Industry Technology Academy, Anaheim	BITA	ROP	155	9–12
Center for Advanced Research and Technology, Clovis	CART	Shared-time facility serving 11th and 12th graders from local high schools	1,195	11–12
Construction Technology Academy, San Diego	CTA	Small autonomous HS	448	9–12
East San Gabriel Valley Regional Occupational Program and Center, West Covina	ESGVROP	ROP/C	1,241	12
Health Careers Academy, Palmdale	HCA—Palmdale	Career academy, school-within-a-school	486	9–12
Health Careers Academy, Placerville	HCA—Placerville	Career academy	164	9–12
Health Professions High School, Sacramento	HPHS	Small autonomous HS	400	9–11
Information Systems Academy, Lancaster	ISA	Career academy	167	9–12
Laguna Creek Manufacturing Production Technology Academy, Elk Grove	MPTA	California Partnership Academy	147	9–12
Life Academy of Health and Bioscience, Oakland	Life Acad	Small autonomous HS; California Partnership Academy	239	9–12
Oakland School for the Arts, Oakland	OSA	Small autonomous HS; charter school	194	9–12
Project Lead the Way Pre-Engineering Academy, Barstow	PLTW—Barstow	Course sequence; working toward career academy	49	9–12
Project Lead the Way Pre-Engineering Program, Lancaster	PLTW—Lancaster	Course sequence; working toward career academy	67	9–12
School of Digital Media and Design, San Diego	DMD	Small autonomous HS	421	9–12
Space, Technology, and Robotic Systems Academy, Lompoc	STaRS	California Partnership Academy	109	9–12

**Exhibit 3. Map of demonstration sites in California**

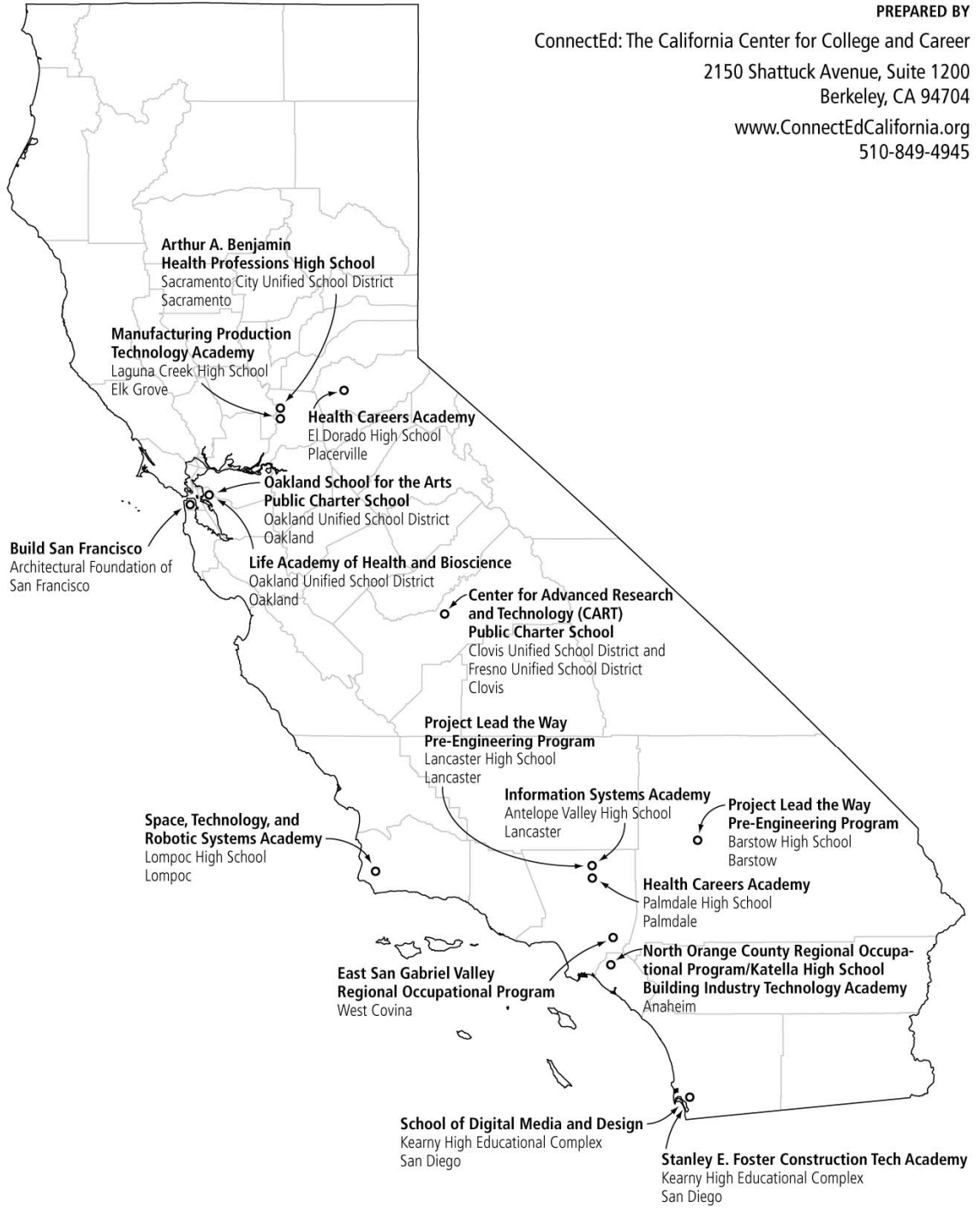


# Demonstration Sites in California

August 2008

PREPARED BY

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### *Number of Student Participants*

The size of the student body within each program ranges from a small group of 19 served by Build SF to more than 1,200 seniors served by East San Gabriel Valley ROP. In 2007–08, a large proportion of the students (42 percent) were seniors, reflecting the inclusion of the large number of seniors served by East San Gabriel Valley ROP and the Center for Advanced Research and Technology, which serves only 11<sup>th</sup>- and 12<sup>th</sup>-graders. Without these two sites, the distribution of students across grade levels in Network sites would be more balanced, with 28 percent freshmen, 31 percent sophomores, 23 percent juniors, and 18 percent seniors. Grade distributions for each site are displayed in Exhibit 4.

**Exhibit 4. Enrollment and grade distribution in the ConnectEd Network of Schools**

School	Number of students	Percentage of students in grade			
		9	10	11	12
Total	5,501	16	18	25	42
Build San Francisco	19	26	0	21	53
Building Industry Technology Academy	155	14	30	28	27
Center for Advanced Research and Technology	1,195	0	0	56	44
Construction Technology Academy	448	31	31	20	18
East San Gabriel Valley ROP	1,241	0	0	0	100
Health Careers Academy–Palmdale	486	24	41	22	14
Health Careers Academy–Placerville	164	14	44	19	23
Health Professions High School	400	42	29	29	0
Information Systems Academy	167	19	36	19	26
Life Academy of Health and Bioscience	239	25	27	26	23
Manufacturing Production Technology Academy	147	36	29	18	18
Oakland School for the Arts	194	23	26	23	28
Project Lead the Way–Barstow	49	22	22	39	16
Project Lead the Way–Lancaster	67	15	25	39	21
School of Digital Media and Design	421	31	29	21	19
Space, Technology, and Robotic Systems Academy	109	36	26	21	17





## Evaluation Study

Evaluation has been an important aspect of building the ConnectEd Network. As noted previously, a central objective of the Network is providing data on a set of core indicators of student outcomes that can be used to document the effectiveness of the multiple pathways approach. This information—when combined with other research on career academies, integration of academic and technical curriculum, project-based learning, and work-based learning—is essential to providing policymakers and other stakeholders with evidence that the multiple pathways approach is effective in engaging young people, raising student achievement, generating high graduation rates, and increasing the number of high school graduates who make a successful transition to postsecondary education and career.

Through the Network, ConnectEd seeks to identify, support, and showcase robust, effective examples of the multiple pathways approach—comprehensive programs of academic and technical study organized around major industry sectors that prepare students for success in both college and career. As a condition of support, each grantee must participate in a coordinated program of evaluation designed both to help them implement their individual initiatives and to inform ConnectEd and the larger education community in California about the effectiveness of various multiple pathways approaches.

Evaluation during the 2007–08 school year (based on indicator data from the 2006–07 school year) focused on a central objective: collecting data on a core set of indicators related to student outcomes. MPR staff collected, analyzed, and reported these data for each of the initial six sites selected under the first grant, as well as two additional sites that were part of the second round of grants. Evaluation during the 2008–09 school year began in June 2008 and included all 16 current sites. As with the first-year assessment, the evaluation for the follow-up year included collecting data from the sites on a set of common core indicators of student outcomes (using data from 2007–08). Additionally, the evaluation expanded its focus to include an examination of how each site implemented essential features of multiple pathways.

There are important limits on evaluation in the Network. Presently, there are only 16 Network sites. These were not selected randomly, and within sites, students choose to participate in pathway programs. Therefore, it is not possible to draw the kinds of causal conclusions that can result from evaluation based on experimental design and random assignment of schools and students.

Additionally, because of the small number of sites (as well as a selection process that intentionally selected a range of approaches to multiple pathways—i.e., theme-based schools, schools-within-schools, ROPs, shared-time half-day programs, etc.), it is not possible statistically to try to isolate the correlation between specific program characteristics and student outcomes. Strictly speaking, it would be inappropriate to use the Network sites as the basis for an assessment of “best practices,” seeking to unpack the effects of various multiple pathways components, such as curriculum integration, work-based learning, block scheduling, support services, school leadership, targeted professional development, and others.

What the evaluation does provide is (1) documentation of the academic performance of students participating in pathways at each site, using a set of core indicators and (2) information about the fidelity of implementation in each site to various components of multiple pathways. It also provides information on cross-cutting themes or patterns.

The evaluation has three goals: (1) to collect data documenting the implementation and impact of the grantees’ models; (2) to assist grant recipients in improving their individual initiatives; and (3) to assist ConnectEd in creating a larger “learning community” building a reliable knowledge base for promoting academically and technically challenging career and technical education (CTE) programs elsewhere in California and across the country.

Because the evaluation is currently limited to a small number of sites, it should be considered exploratory. Nevertheless, the evaluation can reasonably be expected to accomplish the following objectives:

- Provide evidence of the impact of the grantees’ programs on student learning and achievement and on students’ attitudes and learning behavior (through teacher reports) that could be considered indicative of the potential of such programs;
- Provide evidence that participation in these programs develops students’ awareness of real-world career experiences and opportunities and encourages them to pursue further postsecondary education;
- Provide evidence for the impact of these programs on teacher pedagogical practice and on the culture of schools and other organizations implementing such programs;
- Collect descriptive data on the implementation of the program—planning, delivery models, participants, instructional practices, and partnerships; and
- Collect data that can be translated into specific recommendations for improving the design/implementation of the programs.

Primary audiences for the evaluation include the James Irvine Foundation, ConnectEd staff, and the sites themselves. In keeping with the goals of better defining the key attributes of multiple pathways and documenting their effectiveness, the Foundation wants to learn what features deemed critical to the effective implementation of multiple pathways are evident in the demonstration sites and the extent to which multiple pathways produce better learning outcomes than those achieved by more traditional high schools. ConnectEd staff will use the results to identify areas of strength and weakness for the Network sites and, thereby, identify targets for technical assistance. Technical assistance will be provided to grantees to assist them with planning and implementing effective program innovations—providing or brokering technical assistance in such areas as needs assessment, strategic planning, program and curriculum development, professional development, assessment, and accountability and evaluation. Grantees will benefit—as research shows any educational entity does—from using data to understand the strengths and weaknesses of their programs and identify ways to modify their approach to ameliorate any weaknesses.

A secondary audience for the evaluation includes the larger educational community in California, especially policymakers and practitioners striving to establish effective multiple pathways programs. While the number of sites in the Network is currently very small, precluding generalization of the findings to all sites implementing the approach advocated, much can be learned from exploring the strategies used in these sites to establish an effective program. The very fact that the sites differ so much in terms of grade levels served, content focus, and program structure afforded the opportunity to conduct an implementation study to explore and identify features that may be common to all or many of the sites. This work also will be important in identifying promising practices that (1) can be explored further in follow-up studies of increased rigor and (2) can be discussed among multiple pathways practitioners and policymakers.

## Evaluation Questions

Evaluation staff paid attention to three critical issues: (1) clarifying the key questions that the evaluation seeks to answer, (2) identifying appropriate evaluation methods, and (3) defining key program variables and quantifiable measures of student outcomes that can be tracked reliably over the course of the grant and beyond. The evaluation was tailored somewhat to the specifics of each site in terms of its structure, content, student selection procedures, and the availability of data on the specified indicators, but overall the evaluation sought answers to the following key questions:

- What is the evidence that pathways, as implemented in these 16 sites, produce greater student engagement, higher achievement, and higher rates of high school completion than do more conventional approaches to high school education? What is the reported impact of the program on student attitudes, behaviors, career skills, motivation, awareness of career options, and workplace readiness?
- What are key program variables that characterize the implementation approach at each site, and how well aligned is implementation at the sites with features of effective multiple pathway programs?
- What other variables influence implementation, e.g., factors related to students and teachers?
- What are the apparent relationships between student outcomes and fidelity of implementation to the key features?
- What major themes affecting implementation emerged that are important to a clearer understanding of whether and how pathways influence student outcomes?

The logic model and data request tools, methods, and data collection instruments used in the evaluation are presented and described in detail in Appendices A–C .

## Organization of the Findings

The next section of the report is organized according to the research questions identified above. The first part presents findings related to the impact of the program (1) on student achievement, grade-to-grade retention, and high school completion and (2) on student attitudes, behaviors, 21<sup>st</sup>-century learning, awareness of career options, and workplace readiness. The second part reports findings related to implementation. It provides descriptive information regarding program variables characterizing the Network sites and includes results showing how well sites have implemented the pathways approach based on a rubric developed for this purpose. It also presents a discussion of results from linking implementation factors to student outcomes and explicates key factors that seemed to affect implementation. These factors were identified through a comprehensive analysis of the qualitative data, debriefings among research team members, and review of the documents collected before and during site visits.





## Findings Related to Student Outcomes

### What Is the Impact of the Multiple Pathways Approach on Student Achievement, Student Attitudes, and Career Skills and Awareness?

This section compares the 5,501 high school students served by the 16 Network sites with students throughout the state of California. As noted in the introduction, the sites within the ConnectEd Network vary significantly in structure, content focus, resources, size, and length of operation. Later sections of this report describe how variations affect implementation of the multiple pathways approach. These variations also may be associated with student achievement, but because of the small number of sites and, for the most part, small number of students taking any particular achievement exam, it was difficult to tease out relationships between student achievement and program variables. We did, however, explore some associations between implementation and achievement indicators using indices of implementation and success.

This section presents the results of three types of comparative analyses. The data are first presented comparing the overall performance of students in the Network sites with statewide performance of students on a set of achievement indicators, controlled for race/ethnicity. The disaggregation of data was important for learning how the performance of students from certain racial/ethnic groups compared with the performance of these groups statewide. That is, we wanted to know to what extent these programs are closing the achievement gap between racial/ethnic groups.

For each subject area, we also present the data disaggregated by individual sites. The overall analysis tended to mask some differences among sites that were important to highlight. Through discussions about the data with each site, we were able to elucidate some of these differences in performance and some potential reasons for them. These observations are integrated in the discussion of results.

Finally, we present site-to-setting comparison analyses through which we compared the results for individual sites with a relevant comparison group, for example, the school as a whole or the district. The differences between site and comparison group results on each of the performance indicators are presented as individual tables (see Appendix E) and synthesized in Exhibit 20 later in this report.

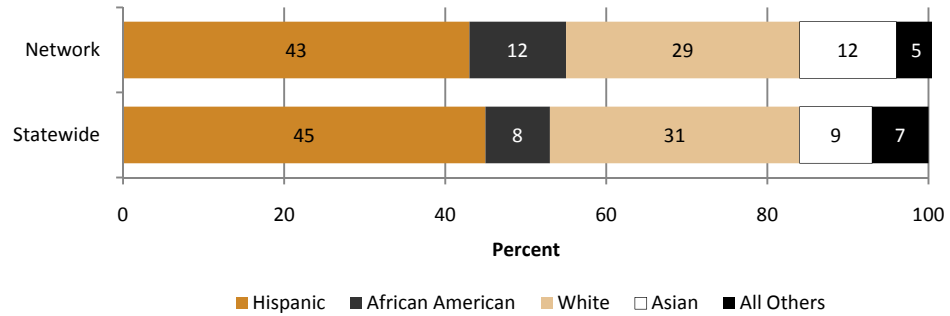
## Results from Analyses of Indicator Data

To answer the first part of this evaluation question, the researchers requested that each site send student-level data related to as many indicators as possible. We began the collection of indicator data by sending a letter to all sites along with a template for site personnel to use in organizing their data (see Appendix A). The results presented below are based on the aggregated data on common elements. Outcomes assessed included whether 10<sup>th</sup>-graders passed the California High School Exit Exam (CAHSEE), scores on the California Standards Tests (CSTs), promotion to the next grade level, whether the students were expected to continue in the particular program, and attendance. We also report 12<sup>th</sup>-graders' graduation rates, whether seniors were eligible for UC/CSU admission (based on completion of all a-g course requirements), and postsecondary plans. Contextual variables included 2007–08 grade level, gender, and race/ethnicity. Several other data elements were requested but not used in the analyses. In some cases, sites did not have data on grade-to-grade promotion, or they may have had cumulative grade point averages (GPAs) rather than one-year GPAs. Most—but not all—sites were able to send data on seniors' postsecondary plans, but information about what students actually do after graduation is rare.

Statewide CAHSEE and CST scores were obtained from the California Department of Education's DataQuest website (<http://data1.cde.ca.gov/dataquest>). This website provides overall test score results (including proficiency levels by grade), as well as test score results disaggregated by race/ethnicity and by gender.

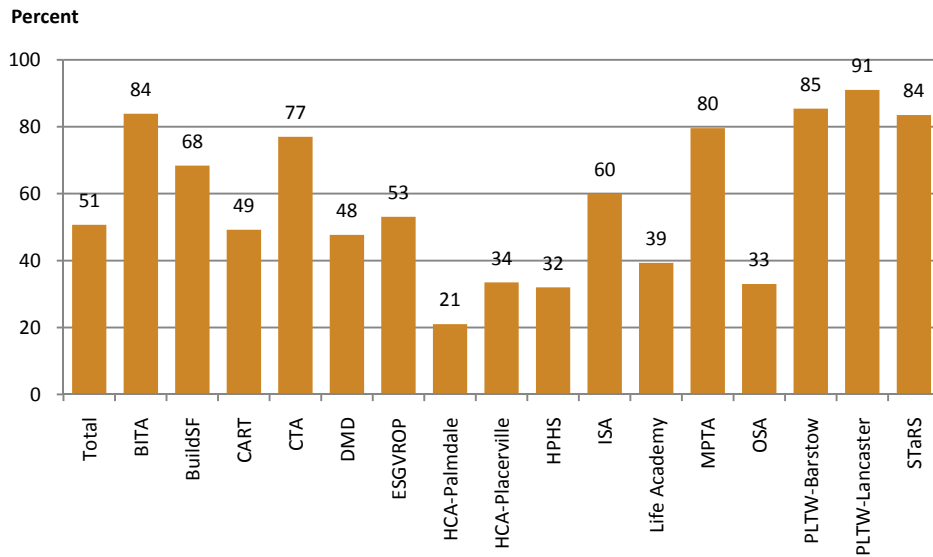
ConnectEd Sites enrolled slightly higher concentrations of African-American and Asian students than did the average California high school. In the ConnectEd Network, 12 percent of all students were African American, versus 8 percent statewide; 12 percent were Asian, versus 9 percent statewide. Statewide, 45 and 31 percent of high school students were Hispanic or White, respectively, compared with 43 and 29 percent of students in the ConnectEd sites (Exhibit 5). The racial/ethnic distributions varied greatly by site, with a Hispanic population at or over 70 percent at three sites and an African-American population over 15 percent at four other sites.

**Exhibit 5. Racial/ethnic distribution of students in the Network and statewide, 2007–08**



Similar to the state overall, males and females were approximately half of the population; in ConnectEd sites and in the state, males represent 51 percent of high school students. These distributions vary by site: 11 of the 16 sites have at least a two-thirds majority of one gender (Exhibit 6).

**Exhibit 6. Percentage of male students at Network sites, 2007–08**



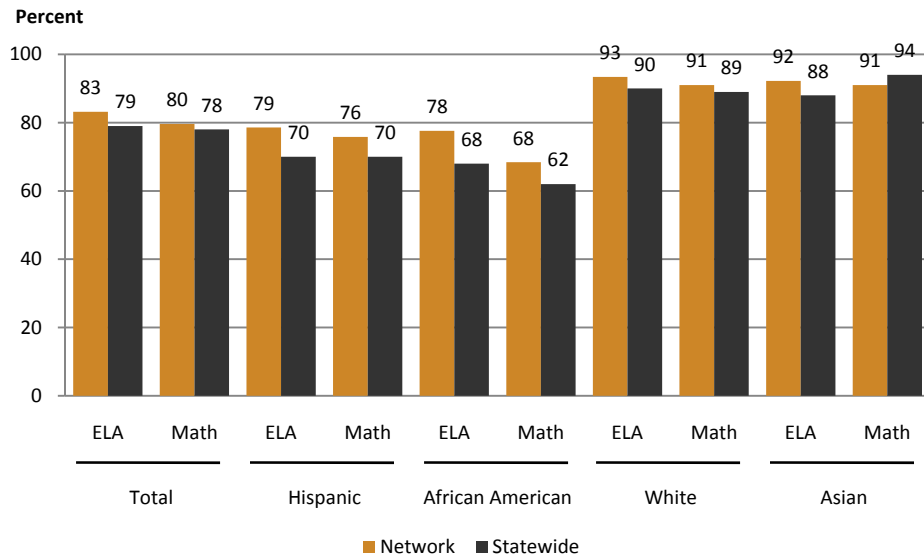
The primary analyses of student achievement consist of a set of comparisons, by race/ethnicity and grade level, to students statewide. The state comparisons are presented in the subsections below, followed immediately within each subject area by a display of the proportion of students at each site reaching proficiency. These site-by-site presentations do not take into account race/ethnicity or student grade level

because of the relatively small number of students at each site taking each test. At the end of the section, more detailed site-to-setting comparisons have been made. The local comparisons include those for each site at levels appropriate to the site. For sites that are programs within schools, we made comparisons to the school as a whole and to the district. For sites that are schools themselves, we compared them to their home district. East San Gabriel Valley ROP students are not represented in the sections on student achievement, because their data focused on the seniors involved in work-based learning activities, and seniors do not take the exams of interest.

### ***Success on the California High School Exit Exam (CAHSEE)***

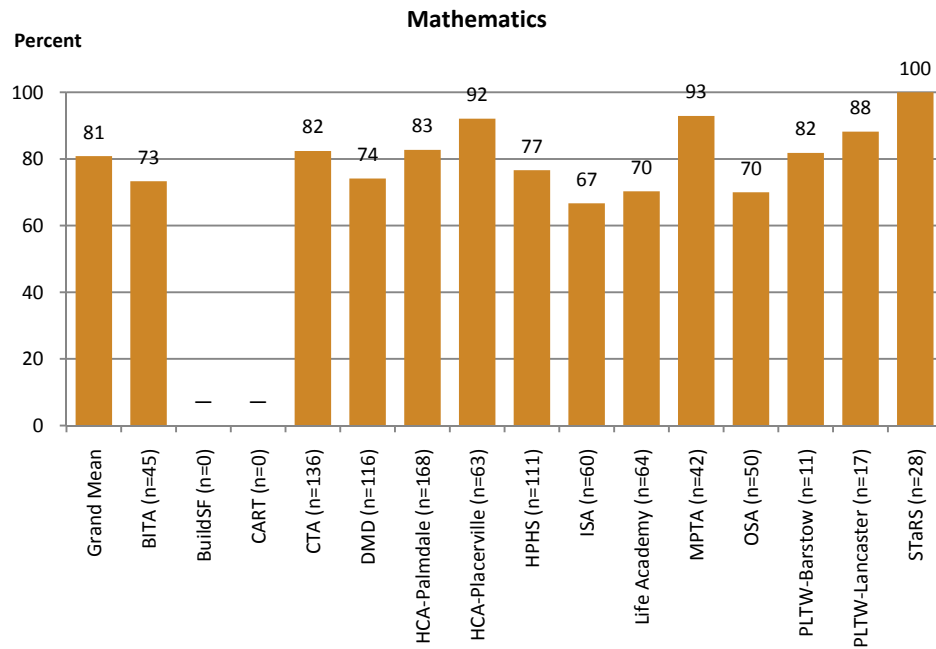
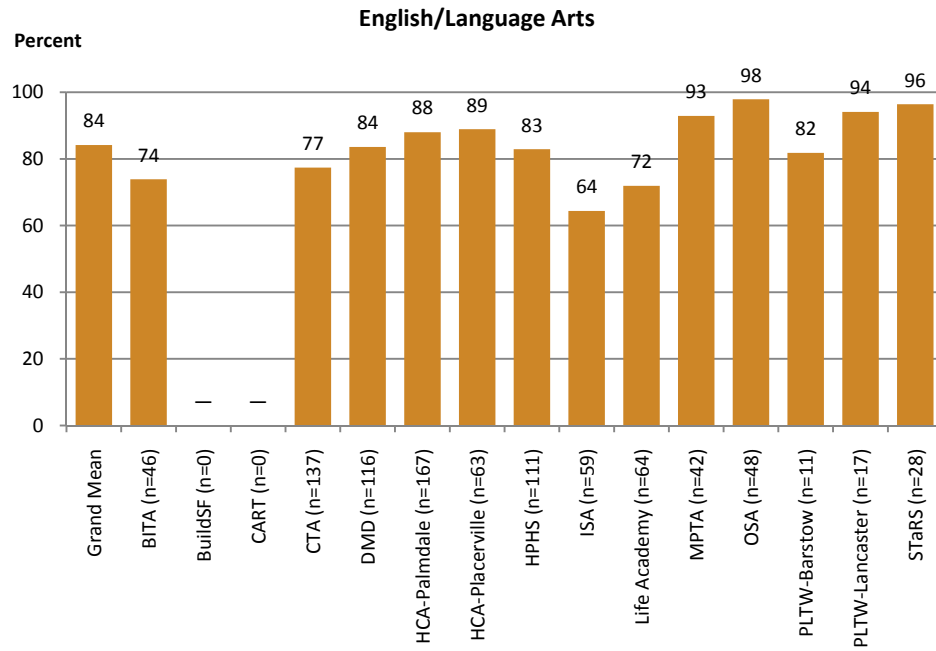
It is noteworthy that students enrolled in multiple pathways in the Network sites were more likely to pass the CAHSEE on their first attempt in 10<sup>th</sup> grade than were high school students generally. On the English Language Arts assessment, 83 percent of Network sophomores passed the exam, compared with 79 percent of sophomores statewide. Pass rates within Network sites were 79 percent for Hispanics and 78 percent for African-American students, compared with 70 and 68 percent for their counterparts statewide. Similar patterns are evident for the mathematics assessment: 80 percent of Network sophomores passed the exam, compared with 78 percent of sophomores statewide. Pass rates within Network sites were 76 percent for Hispanics and 68 percent for African-American students, compared with 70 and 62 percent for their counterparts statewide (Exhibit 7).

**Exhibit 7. CAHSEE pass rates in English language arts and mathematics of 2007–08 10th-graders, by race/ethnicity**



Tenth-grade CAHSEE pass rates at each of the 13 sites serving 10<sup>th</sup>-graders are generally similar to one another. Nine Network sites had English pass rates over the state average of 79 percent, and four of those sites had pass rates over 90 percent. Similarly, seven Network sites had mathematics pass rates over the state average of 78 percent, and three of those sites had pass rates over 90 percent (Exhibit 8).

**Exhibit 8. CAHSEE pass rates in English language arts and mathematics of 2007–08 10th-graders, by site**

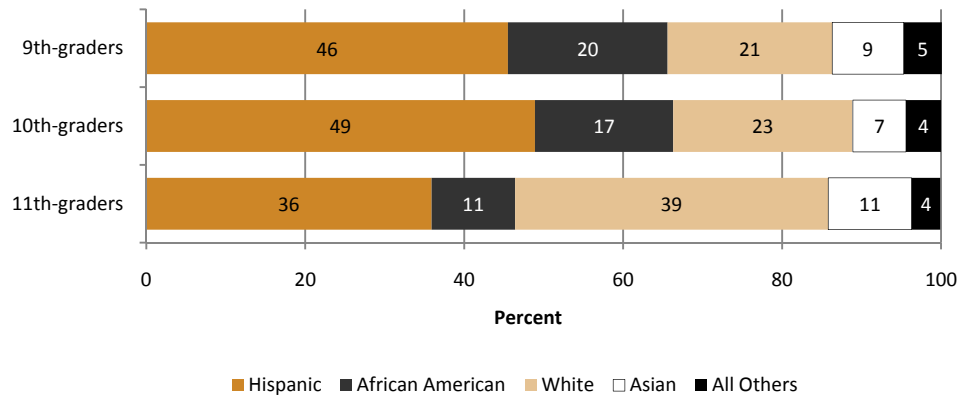


— Not available.

### Proficiency on the California Standards Tests (CSTs)

At the high school level, the CSTs reflect end-of-course exams taken by students after they complete a specific subject area course. (Only students in grades 9, 10, and 11 take the CSTs; therefore, no seniors are represented in the following section.) With the exception of English 9, 10, and 11, the grade level during which students enroll in any specific course varies. To place the following sections in context of the racial/ethnic breakdown among student participants within Network pathways in the 2007–08 school year, Exhibit 9 presents the racial/ethnic distribution for grades 9, 10, and 11. Hispanic students comprise the largest proportion of students in the Network pathways in grades 9 and 10, followed by African-American and White students whose proportions are similar. In grade 11, White students comprise the largest proportion of students, followed by Hispanics and then by African-American and Asian students. This change in distribution across grade levels signals nothing more than the addition of 667 11<sup>th</sup>-graders from the Center for Advanced Research and Technology (CART), the majority of whom are White. Without CART’s 11<sup>th</sup>-graders, the 11<sup>th</sup>-grade racial/ethnic distribution of the Network would be similar to that at the 9<sup>th</sup> grade (46 percent Hispanic, 18 percent African American, 22 percent White, 8 percent Asian, and 6 percent other).

**Exhibit 9. Racial/ethnic distribution of students in the Network sites, by grade level, 2007–08**



Like many educators throughout the state, administrators and teachers at several Network sites expressed concern that student scores on the CSTs do not indicate students’ true knowledge because students do not consider them to be high-stakes assessments—as compared with the CAHSEE. Although policymakers and the public use CST results to make judgments about schools and their success, they

generally have no consequences for individual students. According to many state educators, the difference between students' performance on the English CSTs and the 10<sup>th</sup>-grade CAHSEE reflects not only the level of the exams, but also the consequences attached to passing (or failing) the CAHSEE. This possible explanation for student performance on the CSTs was confirmed by many of the program directors in the Network. "The simple answer is 'it (CAHSEE) matters,'" noted one director when asked about the discrepancy between CAHSEE and CST performance. "We have to make it (CSTs) mean something. They don't care about it." Another noted that a principal at the home school was "floating a proposal" to make high school graduation contingent on a student reaching proficiency on the CSTs.

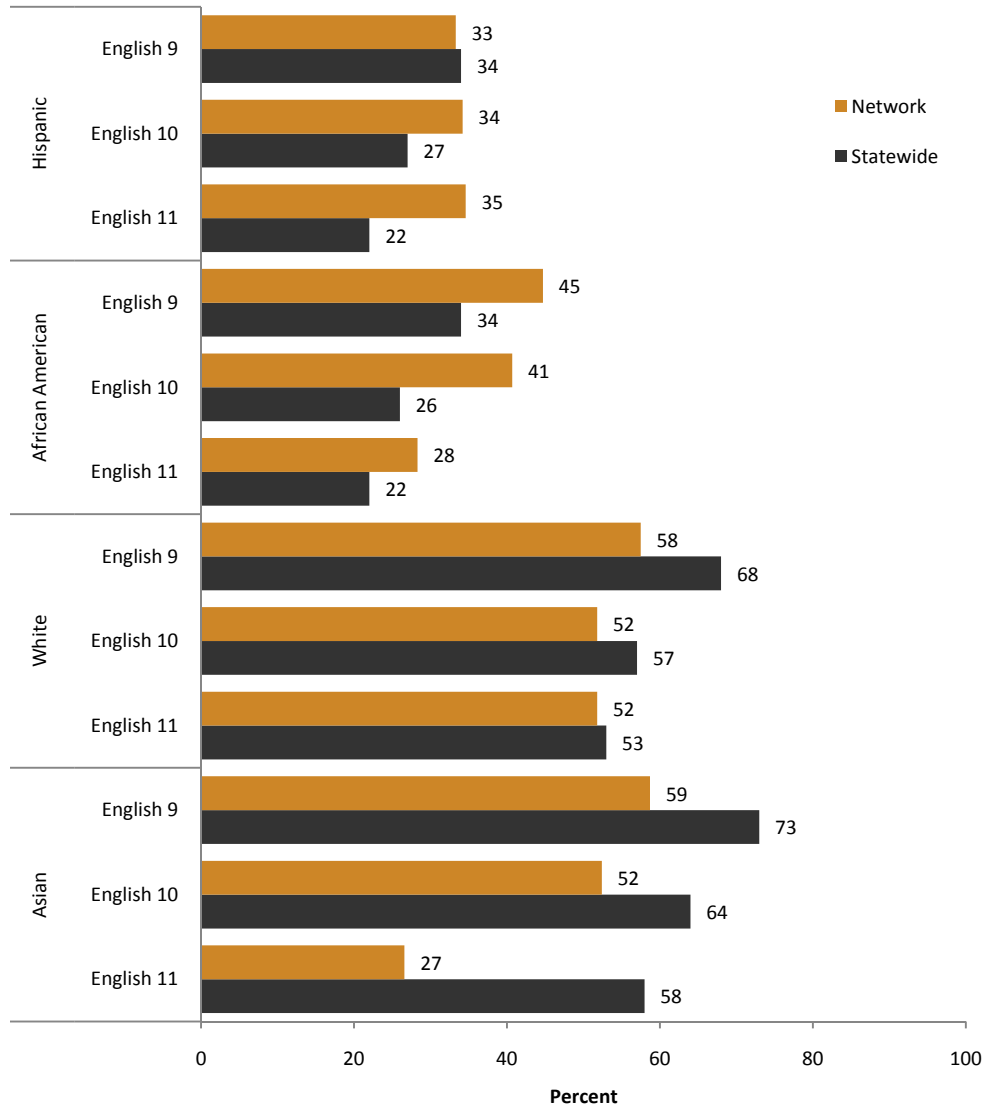
Although there is no compelling reason to assume that students in Network sites would try any less or more than students statewide, an argument could be made that students in sites that include year-end performance exhibitions as part of their curricula are more focused on doing well in those exhibitions than on the state CSTs.

### **English Proficiency**

With the exception of English 9, English test performance of students in the Network was similar to those of students statewide: Network students reached proficient or advanced levels on the English 9, 10, and 11 CSTs at rates of 44, 42, and 40 percent, respectively, while students statewide had rates of 49, 41, and 37 percent (see Appendix D). However, disaggregation by race/ethnicity reveals differences. For English 10 and 11, the proportions of Hispanic students performing at a proficient or advanced level were 7 or more percentage points higher than Hispanic students statewide (34 versus 27 percent and 35 versus 22 percent). The proportions of African-American students performing at a proficient or advanced level on the English exams were between 6 and 15 percentage points higher than African-American students statewide (45 percent versus 34 percent, 41 percent versus 26 percent, and 28 percent versus 22 percent, respectively, for English 9, 10, and 11). White and Asian students participating in the Network pathways did not reach levels of proficiency or above on the English CSTs at the rates of their statewide counterparts (see Exhibit 10).

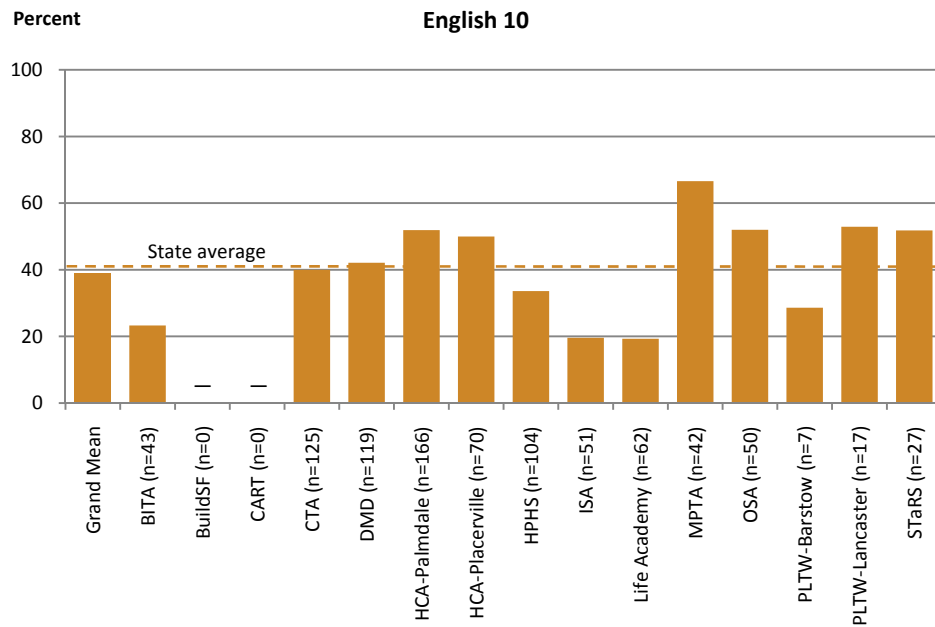
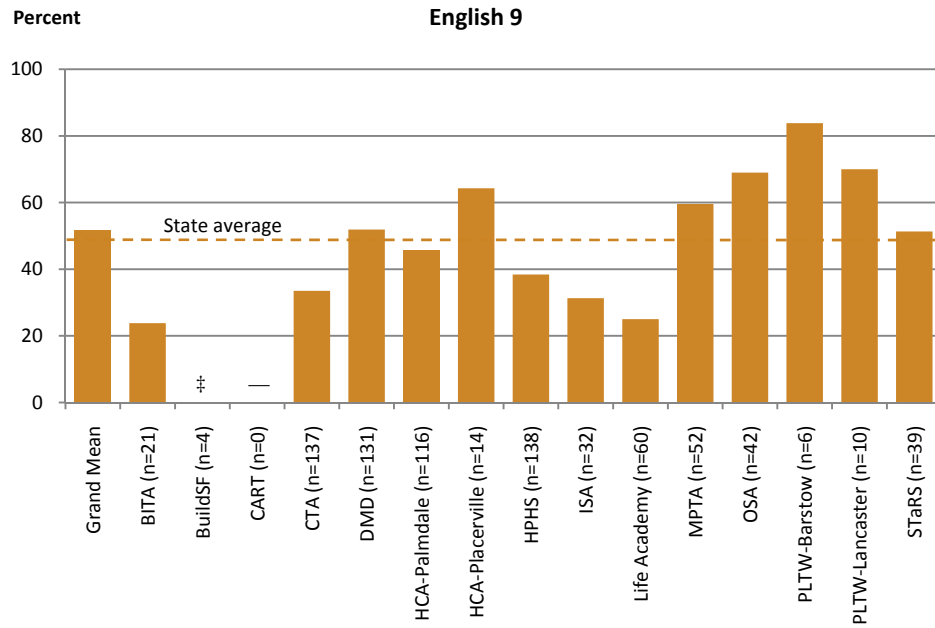


**Exhibit 10. Percentage of students scoring at proficient or advanced levels on English CSTs, by race/ethnicity and grade level, 2007–08**



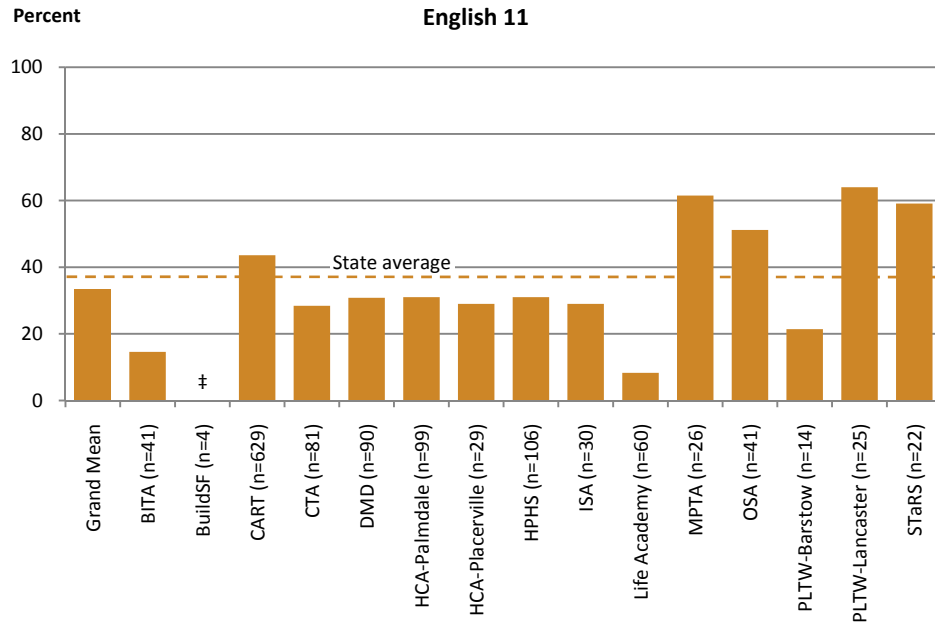
The proportions of students who reached proficient or advanced levels on the English CSTs varied widely by site. For the English 9 CST, eight sites had higher proportions of students reaching those proficiency levels than did the state overall; this number decreased to seven for the English 10 CST, and decreased further to five for the English 11 CST. Exhibit 11 presents these results on a site-by-site basis; the horizontal lines indicate the percentage of students statewide who reached a proficient or advanced level.

**Exhibit 11. Percentage of students scoring at proficient or advanced levels on English CSTs, by site, 2007–08**



See notes at end of exhibit.

**Exhibit 11. Percentage of students scoring at proficient or advanced levels on English CSTs, by site, 2007–08—Continued**



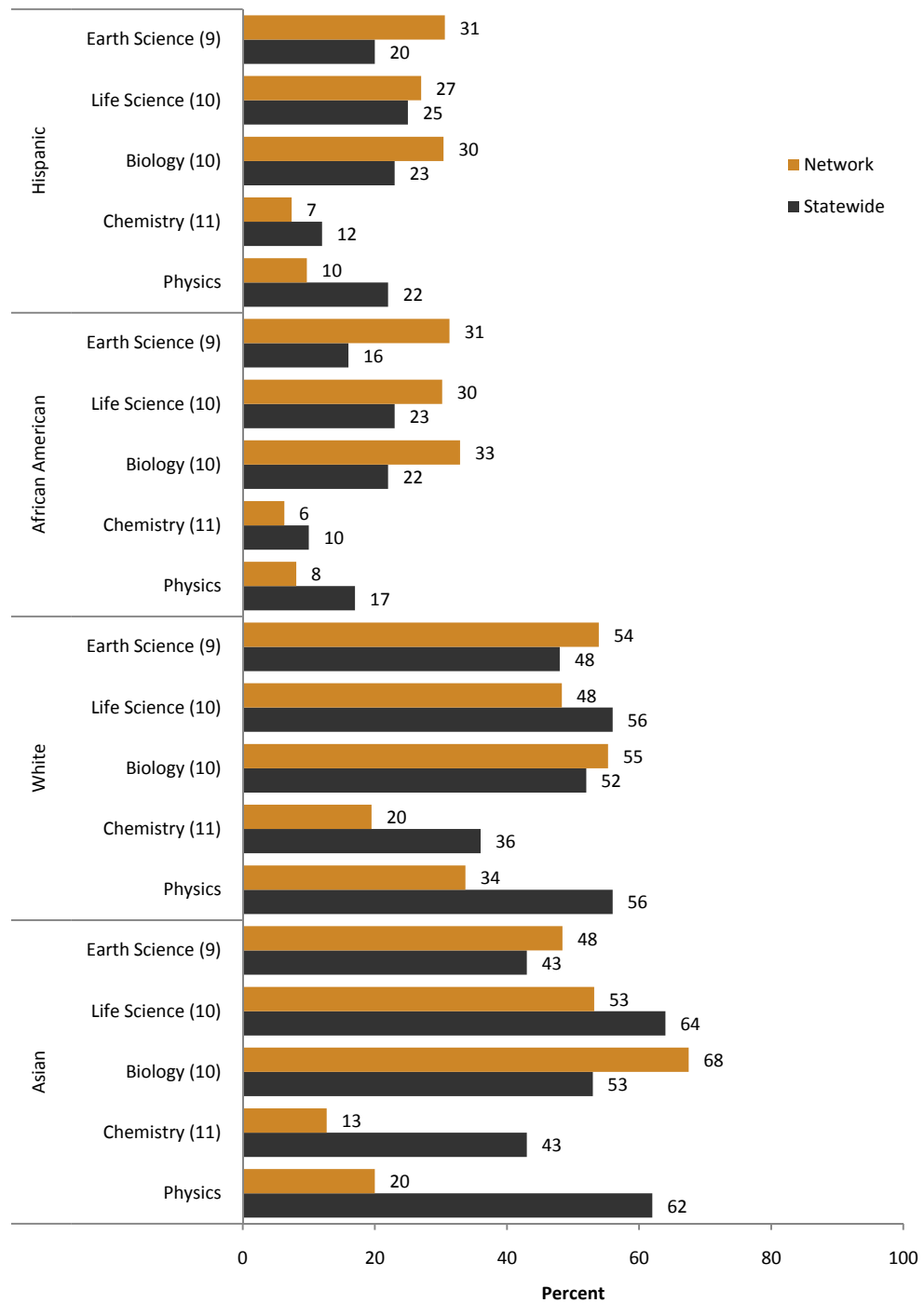
— Not available.

† Data were suppressed. (Too few cases for a reliable estimate.)

**Science Proficiency**

Network and statewide student performance rates on the science CSTs were similar (within 5 percentage points) for biology, earth science, and life science (38 versus 42 percent, 34 versus 29 percent, and 35 versus 40 percent, respectively, reaching the proficient or advanced levels) (see Appendix D). When disaggregated by race/ethnicity and grade level, differences between students at Network sites and students statewide are apparent in science, depending upon the specific subject test. For example, students of all race/ethnicities at Network sites outperformed their statewide counterparts in earth science (when taken in grade 9), with greater proportions reaching proficient or advanced levels. Hispanic and African-American students at Network sites also outperformed their statewide counterparts in life science, with greater proportions reaching proficient or advanced levels (27 versus 25 percent and 30 versus 23 percent, respectively). The same is not true for White and Asian students. Only when comparing students in grade 10 did students at Network sites outperform their state counterparts in biology. Finally, students at Network sites fared poorly in chemistry and in physics compared with their state counterparts (Exhibit 12). Not all comparisons are presented in the Exhibit; readers interested in other comparisons should review Appendix D.

**Exhibit 12. Percentage of students scoring at proficient or advanced levels on science CSTs, by race/ethnicity and grade level, 2007–08**



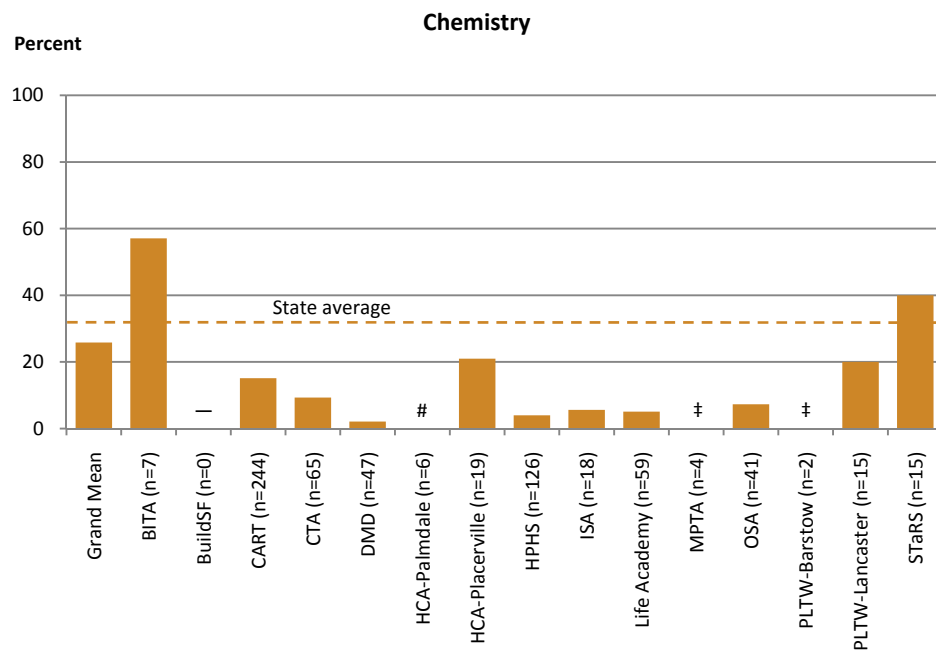
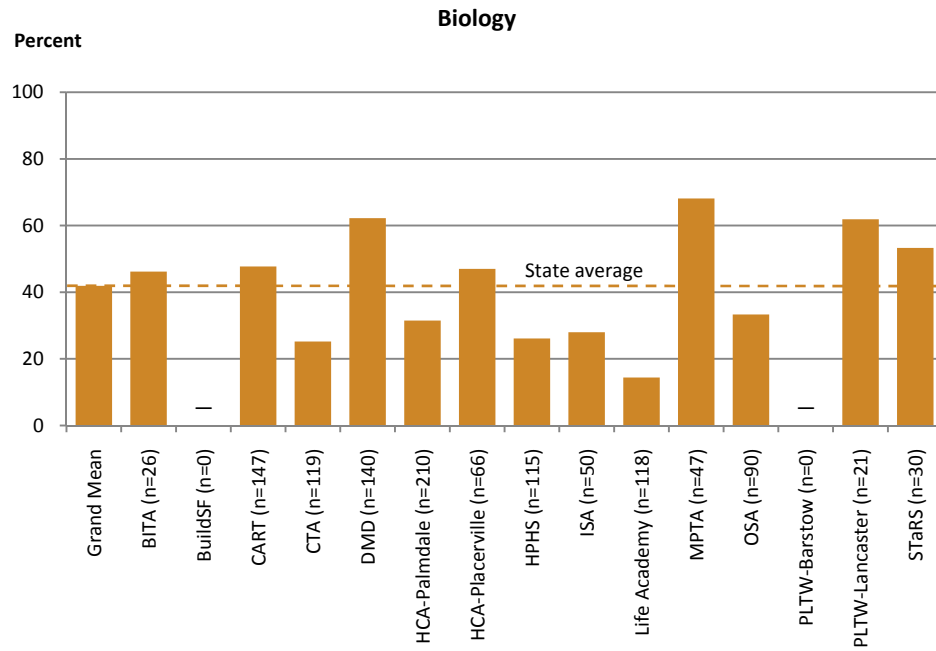
Note: Although many students took biology in grades 9 and 11, the majority of students in ConnectEd sites did so in grade 10. Only those results are presented here.

Exhibit 13 presents site-by-site results of student performance on selected science exams. As mentioned previously, the site-by-site presentation of CST proficiency levels cannot take into account differences by racial/ethnic category or by grade level because of the low numbers of students taking each test at each site. In fact, only seven sites provided CST data for earth science and nine sites provided data for life science, and eight sites provided data for physics. There are several reasons for the lack of data: a few sites do not serve grades 9 and 10, when earth science and life science CSTs are usually taken. Students typically take physics courses in grade 12, when they do not take statewide exams. We also learned from discussions with site directors that some schools and some of these sites are not offering physics at all. Although Exhibit 13 presents site-by-site results for biology and chemistry, these averages should be interpreted with caution because of the low numbers of students taking each exam in several of the sites.

For the biology CST, seven of 15 sites had higher proportions of students reaching a proficient or advanced level than did the state overall. For the chemistry CST, four sites had higher proportions of students reaching those proficiency levels than did the state overall. Two sites that performed quite well in biology (one in both biology and chemistry) made interesting points when asked about their results. The director from the Building Industry Technology Academy noted that the instructor makes a very conscious effort to incorporate biology and chemistry, working with the chemistry teacher, for example, to incorporate content related to polymers and similar topics. The principal and coach from the School for Digital Media and Design emphasized the fact that biology is a “reading science,” and they provide a lot of instructional support for students through their Strategies for Literacy Independence (SLIC) program. They believe that this support has made a difference in students’ performance in biology and other areas.

Although not shown in Exhibit 13, five of seven sites outperformed the state in the earth science, and five of nine sites outperformed the state in life science CSTs; only three of seven sites did so in physics. An interesting side note on physics is that San Diego Unified School District offers a 9<sup>th</sup>-grade physics class called Active Physics. Although it is merely conceptual or exploratory in nature and not at the level of rigor of the state standards, students who take it in grade 9 are required to take the CST in physics.

**Exhibit 13. Percentage of students scoring at proficient or advanced levels on selected science CSTs, by site, 2007–08**



— Not available.

# Rounds to zero.

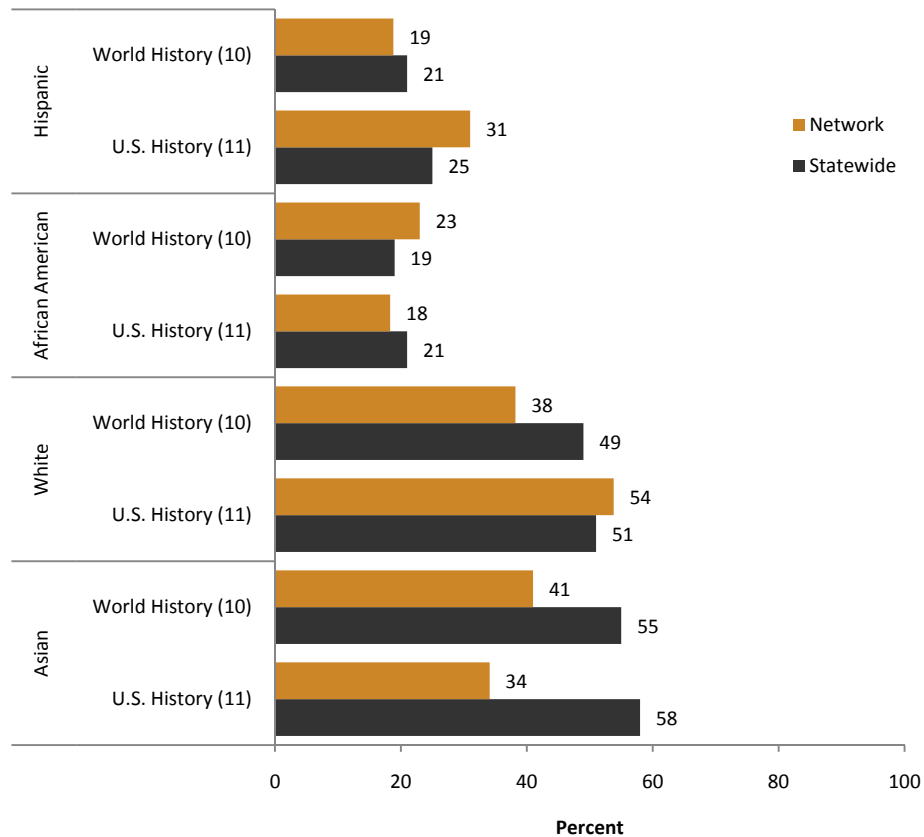
†Data were suppressed. (Too few cases for a reliable estimate.)

**History Proficiency**

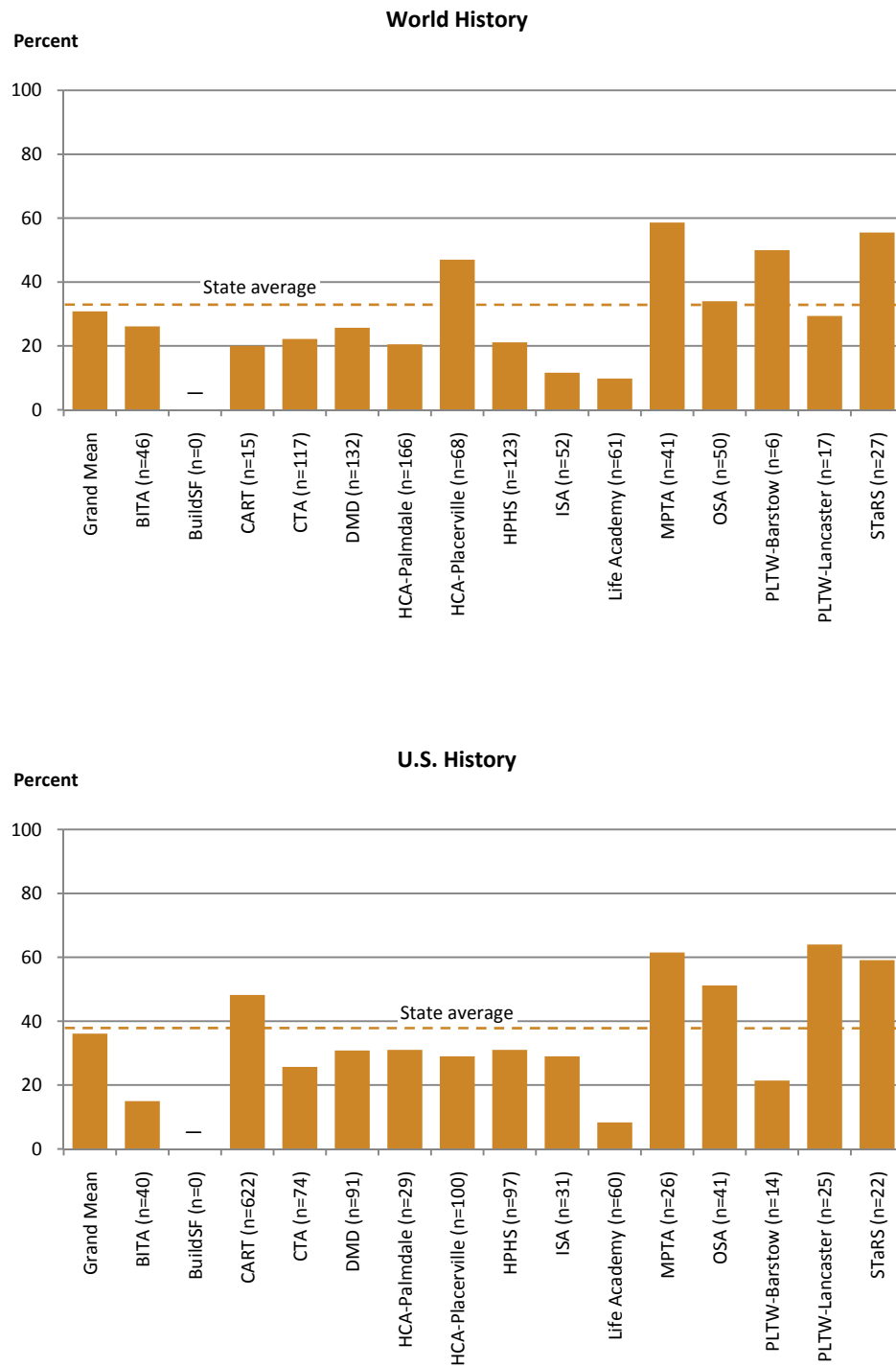
Student performance in history, as measured by scores on the CSTs, presents a mixed picture. Hispanic and White students at Network sites outperformed their statewide counterparts in U.S. history, but not in world history. The opposite was true of African-American students at Network sites, who outperformed their counterparts in world history, but not in U.S. history. Asian students in Network sites did not perform as well as their statewide counterparts on either exam (Exhibit 14).

On the world history CST, five sites had higher proportions of students reaching proficient or advanced levels than did the state with a rate of 33 percent overall. Similarly, five sites had higher proportions of students reaching those proficiency levels on the U.S. history CST than did the state overall (Exhibit 15).

**Exhibit 14. Percentage of students scoring at proficient or advanced levels on history CSTs, by race/ethnicity and grade level, 2007–08**



**Exhibit 15. Percentage of students scoring at proficient or advanced levels on selected history CSTs, by site, 2007–08**



— Not available.



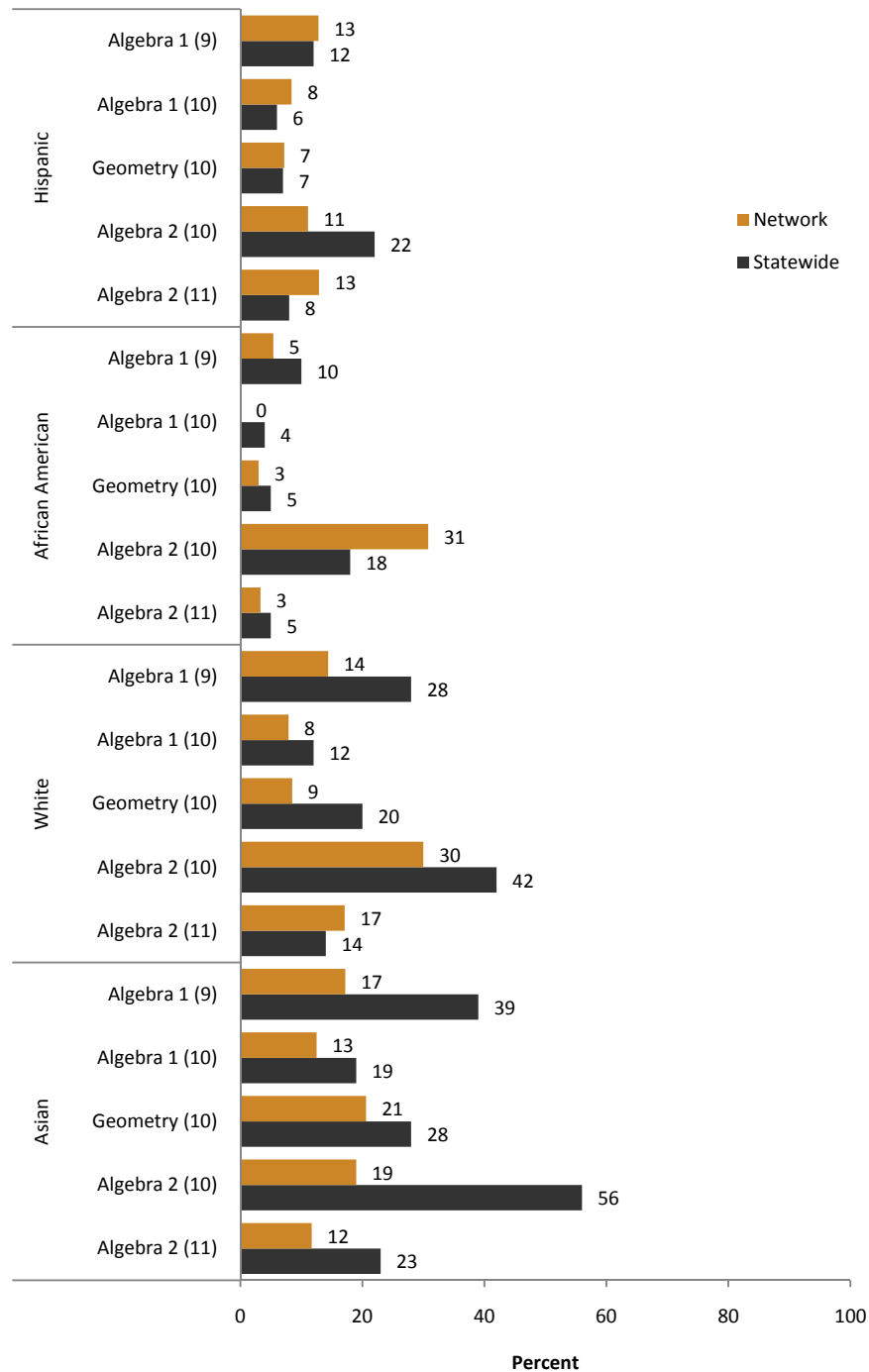
### **Mathematics Proficiency**

Finally, it is clear that regardless of race/ethnicity and grade level, the mathematics achievement of students at Network sites leaves much to be desired, as it does statewide (Exhibit 16). Conversations throughout our visits indicated that mathematics classes are very difficult to incorporate into the pathways' integrated curriculum. Students are at many different levels when they enroll in pathways, so it is not only difficult to keep them together as a group in a mathematics class, but also difficult to include mathematics teachers in the pathway instructional team. As one administrator said, "When you're not on the team, you tend to return to using traditional approaches." Some educators felt that mathematics instruction itself was a barrier: teachers could not develop reasonable and practical applications of the mathematical concepts that students were studying in their chosen industry, or they noted that they did integrate the math that was relevant to the industry, but that was not necessarily the math reflected in the state standards.

For the algebra 1 CST, five sites had higher proportions of students reaching proficient or advanced levels than did the state overall; this number decreased to three sites for the geometry CST and remained at three sites for the algebra 2 CST. Exhibit 17 presents these results site by site; however, caution should be exercised when interpreting data from several sites, which had few students who took each exam.

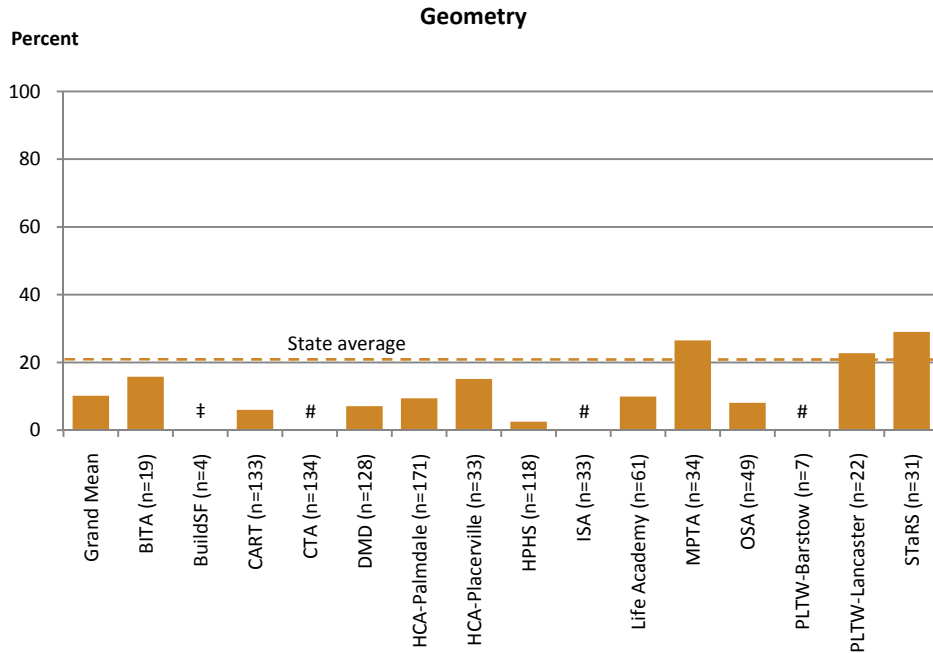
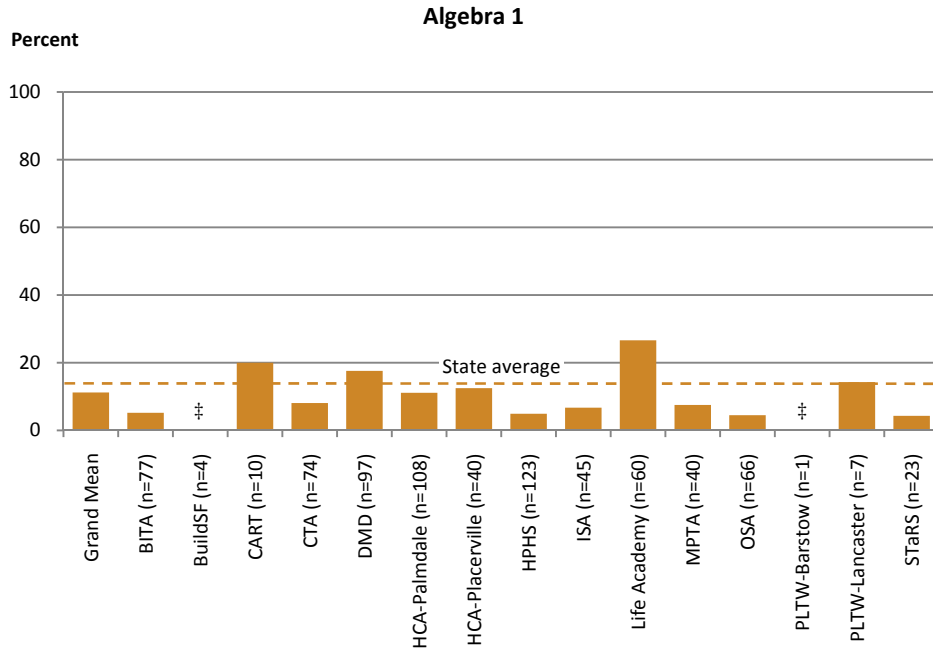
Discussions with program designers and staff revealed some interesting strategies that sites have been adopting to meet the math challenge. Recognizing that students are coming into their programs with a range of abilities, they are striving to meet the needs of students in a variety of ways. The principal at Life Academy, for example, noted that they have decided to require four years of math, so students who enter the 9<sup>th</sup> grade take algebra 1 even if they have taken it before. The principal at East San Gabriel Valley ROP reported on the implementation of a new algebra course for their students. The director at Health Career Academy–Placerville also noted that they have a first-period "math recovery class." The director at Oakland School for the Arts also reported that they have made a significant investment in math, changing their scheduling to include blocks of math. In all of these cases, they reported that they are starting to see increases in math performance, both on the CSTs and on local assessments.

**Exhibit 16. Percentage of students scoring at proficient or advanced levels on mathematics CSTs, by race/ethnicity and grade level, 2007–08**



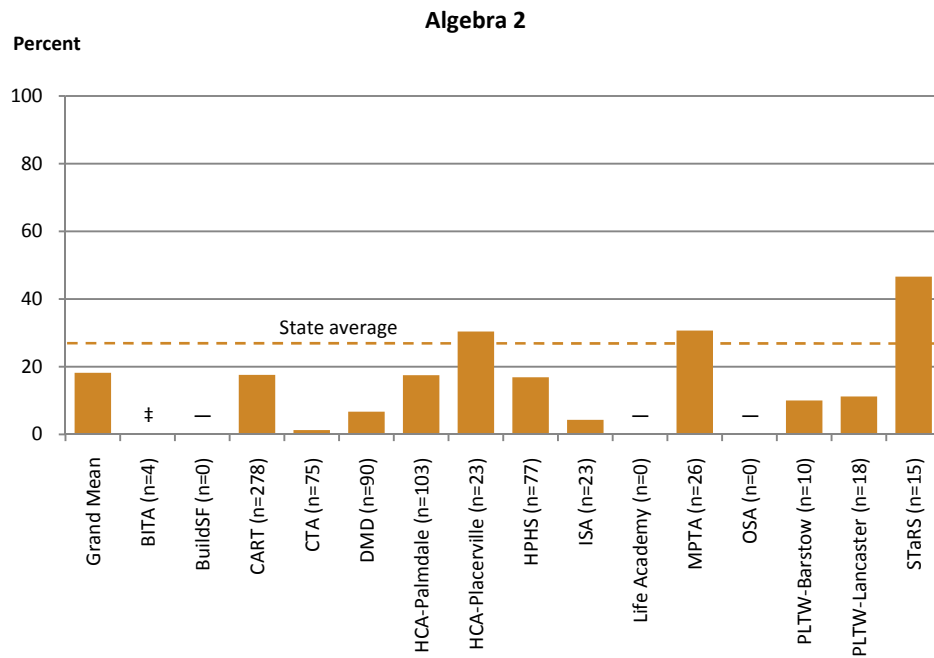
Note: Although many students took geometry in 9<sup>th</sup> and 11<sup>th</sup> grade, the majority of students in ConnectEd sites did so while in the 10<sup>th</sup> grade. Only those results are presented here.

**Exhibit 17. Percentage of students scoring at proficient or advanced levels on selected mathematics CSTs, by site, 2007–08**



See notes at end of exhibit.

**Exhibit 17. Percentage of students scoring at proficient or advanced levels on selected mathematics CSTs, by site, 2007–08—Continued**



— Not available.

# Rounds to zero.

‡ Data were suppressed. (Too few cases for a reliable estimate.)

### **Grade-to-Grade Promotion, Continuation, and Attendance Rates**

Network sites provided data on whether or not their students had obtained enough credits to be on track for an on-time four-year graduation. Overall, 96 percent of 9<sup>th</sup>-graders, 90 percent of 10<sup>th</sup>-graders, and 98 percent of 11<sup>th</sup>-graders obtained the necessary credit to be promoted to the next grade and to be on-track for graduation (see Appendix D). Most sites (nine of the 13 able to provide data for all three grade levels) indicated that 100 percent of their students at all three grade levels were on-track for graduation, while promotion rates at two sites fell below 95 percent for all three grades.

Sites also provided data reflecting whether their students would continue within the pathways program over the next school year. On average, 92 percent of 9<sup>th</sup>-graders, 81 percent of 10<sup>th</sup>-graders, and 73 percent of 11<sup>th</sup>-graders expected to enroll in the same program during the 2008–09 school year. Calculating this “continuation” statistic without the Center for Advanced Research and Technology raises the overall percentage of students continuing in their multiple pathways programs from 11<sup>th</sup> to

12<sup>th</sup> grade to 90 percent. Looking at this indicator on a site level, five of the 12 sites providing data for all three grade levels predicted that 100 percent of their students would continue their enrollment in the pathways program from spring of one year to fall of the next.

The Center for Advanced Research and Technology (CART), which enrolls only 11<sup>th</sup>- and 12<sup>th</sup>-grade students from numerous schools throughout two districts, suffered from attrition between the students' junior and senior years; only 57 percent of their juniors were expected to enroll as seniors. Although juniors are welcome to continue their education at CART, the Center does not necessarily expect them to continue as seniors. In fact, for some programs (or labs), no second year exists; a student would have to select a related lab (e.g., choosing to study forensics after completing a year of law if interested in the larger field of legal studies). For other programs, a second year does exist, offering more advanced laboratory work and more independent study. CART enrolls both juniors and seniors for a one-year experience. Information Systems Academy in Antelope Valley (28, 43, and 86 percent of 9<sup>th</sup>-, 10<sup>th</sup>-, and 11<sup>th</sup>-graders, respectively, were expected to continue), Health Careers Academy–Placerville (26, 47, and 45 percent of 9<sup>th</sup>-, 10<sup>th</sup>-, and 11<sup>th</sup>-graders, respectively) and Health Careers Academy–Palmdale (96, 55, and 66 percent) also seemed to be vulnerable to students not continuing within those programs.

The overall attendance rates for Network students were quite high—just over 94 percent. By comparison to a commonly-cited national attendance rate of 92 percent, this 2 percent difference represents the equivalent of attending an additional four days of school in a 180-day school year. Network 9<sup>th</sup>- and 10<sup>th</sup>-graders averaged a 95 percent attendance rate, while 11<sup>th</sup>- and 12<sup>th</sup>-graders averaged a 94 percent attendance rate. Looking at attendance rates by site (instead of an overall rate based on all students), the 9<sup>th</sup>-grade attendance rate ranged from 92 to 98 percent, the 10<sup>th</sup>-grade rate ranged from 91 to 98 percent, the 11<sup>th</sup>-grade rate ranged from 86 to 97 percent, and the 12<sup>th</sup>-grade rate ranged from 87 to 98 percent. A few programs—especially those outside of the home high school—reported that students who generally did not want to go to their regular school program would show up for the Network pathway courses.

California does not report an overall attendance rate to use as a comparison, and we know that states that do report an average daily attendance rate (ADA) often are simply providing general headcounts, rather than a calculated ADA. But we also know that for some schools in urban areas where similar groups of students would be enrolled as are in the ConnectEd sites, the rates are often much lower.

### *Graduation, Eligibility for UC/CSU, and Postsecondary Plans*

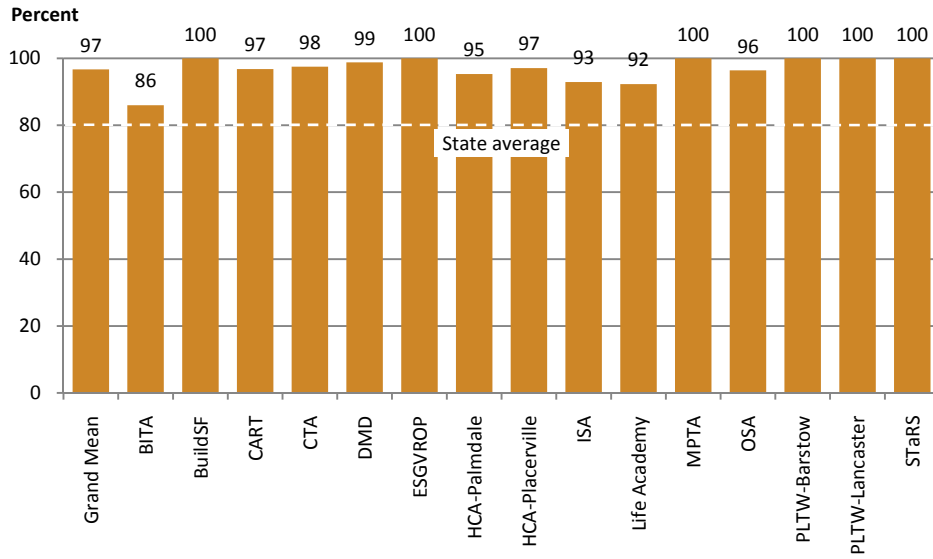
Of the approximately 2,300 2007–08 seniors within the Network sites, 98 percent graduated (obtaining sufficient credit and having passed the CAHSEE) (see Appendix D). In addition, 35 percent had fulfilled the UC/CSU a-g course requirements for entrance into those postsecondary systems. Without including the 1,241 seniors at East San Gabriel Valley ROP—whose students in this evaluation are seniors participating in work-based learning activities and less likely to have 4-year college plans—the percentage of seniors fulfilling a-g requirements rose to 52 percent. The latest available statistics statewide show that 36 percent of 2006–07 California seniors met the a-g requirements.

On a site-by-site basis, six of the 15 sites with seniors reported a graduation rate of 100 percent, with six additional sites reporting a rate between 95 and 99 percent (Exhibit 18)—a noteworthy finding when compared to the state average of 80 percent.

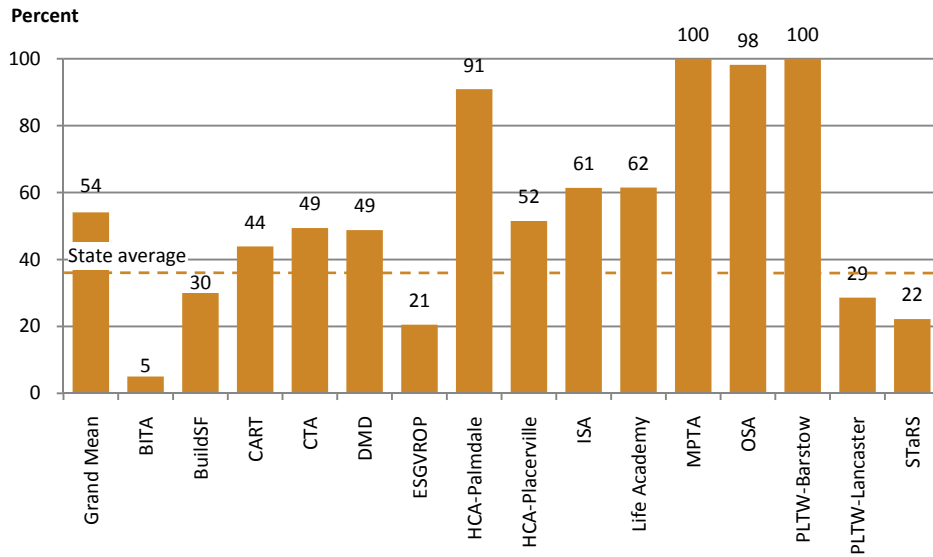
The fulfillment of a-g requirements is also a notable finding among this set of indicators. Four of the 15 sites indicated that 90 percent or more of their seniors who graduated had fulfilled the a-g requirements, seven show a fulfillment rate greater than 50 percent, and 10 of 15 have a rate greater than 44 percent. Five sites reported fulfillment rates of 30 percent or less. Some of the five sites that had rates lower than the state average include populations that are much less likely to complete a-g requirements (Exhibit 19). The overall site average—the mean of the 15 sites' averages, instead of the mean of 2,300 students across sites—was 54 percent. This is quite a bit higher than the state average of 36 percent.

We discussed reasons for the high rates of fulfilling the a-g requirements with those sites having such results. Staff at each of these sites indicated that they had paid serious attention to the need for students to complete such courses, including it in the design of their program to make sure the majority of their courses met a-g requirements. One site also noted that staff monitored student course taking quite carefully, serving as counselors to the students and making sure they were scheduled for the classes they needed to fulfill these requirements, even keeping in touch over the summer to make sure that was the case. Another site, free to set its own graduation requirements, set those requirements so that they matched the requirements for UC/CSU eligibility. At the other end of the spectrum, one of the sites with a low percentage of students meeting UC/CSU requirements stated that they attracted and served a large proportion of students with special education needs; although they served these students well in getting them to graduate, getting them prepared for admission to UC/CSU institutions was a greater challenge.

**Exhibit 18. Percentage of graduating seniors, by site, 2007–08**



**Exhibit 19. Percentage of graduating seniors meeting a-g requirements, by site, 2007–08**



Among the seniors within the nine Network sites able to provide information regarding their seniors' plans after graduation, 38 percent planned to attend a 4-year college and 49 percent planned to attend a 2-year college (see Appendix D). Five percent planned to enter military service, 4 percent intended to go directly into the labor force, and 3 percent reported plans to enroll in an apprenticeship or technical training program.

### ***Site-to-Setting Comparisons***

In addition to comparing students within the Network sites to their statewide counterparts, we also compared participating students at each site to other student groups. Students from programs located within a larger school (Building Industry Technology Academy, Health Careers Academy–Placerville, Health Careers Academy–Palmdale, Information Systems Academy, Manufacturing Production Technology Academy, Project Lead the Way–Barstow, Project Lead the Way–Lancaster, and Space, Technology, and Robotic Systems Academy) were compared on a site-by-site basis to students within their home high schools. Other sites, being whole schools themselves or drawing from numerous schools (Center for Advanced Research and Technology, Construction Tech Academy, Digital Media Design, Health Professions High School, Life Academy, and Oakland School for the Arts), were compared to their districts. East San Gabriel Valley ROP was not included in this set of comparisons, as their seniors come from seven different districts and, being seniors, did not take the CSTs in 2007–08. Build SF is not included in comparisons of CAHSEE and CST scores because the very low number of students in the program makes their statistics unreliable.

Our first set of site-to-setting comparisons explored whether the students taking advantage of the multiple pathways approach were similar to students in the surrounding environments. We examined race/ethnicity of their students (condensed for this examination to White and non-White) and 9<sup>th</sup>-grade English CSTs for their “entering” classes. Student composition at five of the sites was similar to the comparison groups' composition, nine sites had proportionately more White students than their surrounding comparison groups, and one program enrolled proportionally more non-White students than their comparison groups. Note that these differences can still be small, but represent differences of at least 5 percentage points. On the English 9 CST, students at five of the sites outperformed their counterparts (meaning that a greater percentage of the Network students reached proficiency or above than did students in the comparison group). Student



performance at three sites was similar to the comparison groups' performance, and students at three sites fared less well than their counterparts.<sup>2</sup> Of the five sites where entering Network students outperformed the comparison groups, four were programs within a home high school and had proportionally more White students than their comparison groups (Exhibit 20).

Our second set of site-to-setting comparisons involved student performance on the CAHSEE and CSTs. Although we would have liked to have disaggregated these site comparisons by race/ethnicity and grade level, as we did for the previous sections on student test performance, the number of students at each site taking each exam did not support reliable disaggregated statistics. So, the following discussion is based on all program students at each site taking each CST, compared to their identified school or district counterparts. Again, the differences may be small but are at least 5 percentage points or more.

With one exception, all of the Network sites enrolling 10<sup>th</sup>-graders had similar or higher 10<sup>th</sup>-grade CAHSEE pass rates on both the English and mathematics sections than their school or district counterparts. Of the 12 sites with sufficient numbers of students taking the English CSTs to make comparisons, five outperformed their schools or districts on at least two of the three exams, and four performed just as well as their counterparts. Three did not perform as well, having lower proportions of students reaching proficiency or above on at least two of the three exams.

On the four mathematics CSTs (algebra 1, geometry, algebra 2, and summative mathematics), only two sites performed better than their comparison groups on at least two of the tests; six sites performed less well than their counterparts on at least two of the tests.

Performance on the five science CSTs (biology, chemistry, physics, earth science, and life science) is a bit difficult to assess, because not all tests are taken. However, students at three sites outperformed their counterparts on three of the five exams, while students at three sites underperformed their counterparts.

The remaining sites present a mixed picture. Students at five sites performed better than their counterparts on world history, while students at three sites performed less well than their counterparts. In U.S. history, however, students at four Network sites performed better than their comparison counterparts, while in six sites they performed less well than their counterparts.

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<sup>2</sup> Some sites are not included in this comparison either because they do not enroll 9<sup>th</sup>-graders, because the number of students was too small, or because they did not have data.

Looking across a single row of Exhibit 20 provides a sense of how a single site compares to its school or district counterpart. Using the fifth row—the School of Digital Media and Design (DMD)—as an example, the second column indicates that we are comparing DMD to its surrounding district. The double-headed arrows in the next two columns indicate that DMD’s student body is similar to the district in terms of race/ethnicity (White versus non-White students) and in terms of 9<sup>th</sup>-graders’ performance on the English 9 CST. DMD students performed better than their counterparts on the English/language arts portion of the CAHSEE and similarly on the mathematics portion (in the 10<sup>th</sup> grade). The symbols in the English CSTs column indicate that DMD’s students perform similarly to district students on the English 9 and 10 CSTs, and outperform their counterparts on the English 11 CST. Continuing on, the mathematics CST column presents the mathematics CSTs in their typical order: algebra 1, geometry, algebra 2, and summative mathematics. DMD students perform less well than their district counterparts in all but algebra 1. Continuing on to the science CSTs column, DMD students performed better than their counterparts in biology and less well in chemistry. Too few DMD students took the chemistry CST to make a comparison. DMD students performed better than their district counterparts on the earth and life science CSTs. They did less well than their counterparts in both world and U.S. history. DMD students outperformed their district counterparts in both graduation rate and the proportion of students graduating having fulfilled a-g course requirements. Finally, the last column indicates that the number of students served at DMD totaled 421 in 2007–08.

Typically, student performance in a pathways program is better than that of their comparison group on some indicators and worse on others. However, four sites (Project Lead the Way–Barstow, Project Lead the Way–Lancaster, Manufacturing Production Technology Academy, and Space, Technology, and Robotic Systems Academy) consistently performed as well as or better than their school counterparts.

**Exhibit 20. Site-to-school or site-to-district comparisons, by site, 2007–08**

Site program:	compared to...	Race (White vs. non-White)	English 9 CST	10th grade CAHSEE	English CSTs	Mathematics CSTs	Science CSTs	History CSTs	Graduation and a-g fulfillment <sup>1</sup>	Number of students in 2008
<b>BITA</b>	school	>	▼	↔▼	▼▼▼	↔▼≈	▲≈▼▼	↔▼	↔▼	155
<b>BuildSF</b>	district	↔	—	—	—	—	—	—	↔▼	19
<b>CART<sup>2</sup></b>	2 districts	> / >	—	—	≈ ≈ ↔ / ≈ ≈ ▲	≈ ▼▼▼▼ / ≈ ▼▼▼▼	▼▼▼▼ ≈ ≈ / ▲▼▼▼ ≈ ≈	≈ ▼ / ≈ ▲	▲▲ / ▲↔	1195
<b>CTA</b>	district	<	▼	↔▲	▼↔▼	↔▼▼▼	▼▼▼▼ ≈ ≈	▼▼	▲▲	448
<b>DMD</b>	district	↔	↔	▲↔	↔↔▲	▲▼▼▼	▲▼≈▲▲	▼▼	▲▲	421
<b>ESGVROP</b>	—	—	—	—	—	—	—	—	—	1241
<b>HCA-Placerville</b>	school	>	↔	↔↔	↔▼▼	▼▼↔≈	▼▼≈▼↔	↔▼	▲▲	164
<b>HCA-Palmdale</b>	school	↔	▲	▲▲	▲▲▲	↔↔▲▲	▲≈≈≈↔	▲▼	▲▲	486
<b>HPHS</b>	district	↔	▼	▲↔	▼↔↔	▼▼▼▼	▼▼▼≈▼	▼↔	—	400
<b>ISA</b>	school	>	▲	▲▲	▲↔↔	↔↔↔≈	▲↔≈▲≈	↔↔	▲▲	167
<b>Life Academy</b>	district	↔	↔	▲▲	↔↔▼	▲↔≈▼	▼▼≈≈▲	↔▼	▲▲	239
<b>MPTA</b>	school	>	↔	▲▲	↔▲▲	▼▲▼↔	▲▲▼▲▲	▲▲	▲▲	147
<b>OSA</b>	district	>	▲	▲▲	▲▲▲	↔↔≈▼	▲▼≈≈▲	▲▲	▲▲	194
<b>PLTW-Barstow</b>	school	>	≈	▲▲	≈≈▲	≈≈↔≈	≈≈↔≈≈	≈↔	▲▲	49
<b>PLTW-Lancaster</b>	school	>	▲	▲▲	▲▲▲	≈▲↔≈	▲↔≈≈≈	▲▲	▲↔	67
<b>STaRS</b>	school	>	▲	▲▲	▲▲▲	↔▲▲≈	▲▲≈▲▲	▲▲	▲↔	109

<sup>1</sup> School and district graduation and fulfillment rates are from the 2006–07 school year; rates for 2007–08 are not available as of January 15, 2009.

<sup>2</sup> CART has two sets of symbols for each indicator; CART students from Fresno were compared to students within the Fresno Unified School District, while CART students from Clovis were compared to students within the Clovis Unified School District.

**Legend:**

- > (right-facing arrow): proportionally more White students—by at least 5 percentage points—than comparison group.
- < (left-facing arrow): proportionally fewer White students—by at least 5 percentage points—than comparison group.
- ↔ (horizontal arrow): similar to comparison group.
- ▲ (up-pointing triangle): performing better—by at least 5 percentage points—than comparison group.
- ▼ (down-pointing triangle): performing less well—by at least 5 percentage points—than comparison group.
- ≈ (wavy lines): no comparison made because of no or low number of students.

**Caveats**

It is important to acknowledge with all the data presented here on achievement indicators that there are serious limitations to the conclusions that one can draw because of the lack of appropriate benchmarks. The comparisons that one can make each present their own set of dilemmas. Perhaps most importantly, it is critical to acknowledge that the number of students associated with each outcome indicator (whether overall or by site) affects the averages that are calculated. We have tried not to either overstate or understate the results and to emphasize the point that they seem

indicative of positive outcomes for this approach and clearly express the need for continued research.

## Results on Student Outcomes from Qualitative Data

### *Student Attitudes*

Students and teachers at Network sites believed that the attitudes of students had changed for the better. These changes cannot be wholly ascribed to pathways and their effect on students, but many felt that the personalization, focus, and “future viewpoint” of the multiple pathways programs had much to do with student growth. Students choose to be in these programs and, after exposure to several options, choose their specialties. Because their future is of their own making, they are motivated and interested in the material, the lessons, and their performance. A few students said that the freedom to make choices and the trust in their ability to make good decisions resulted in recognition by teachers that they were responsible in following through on assignments without constant instruction. In the few cases where some type of certification is available, students felt special as a result of receiving that certification. One student who had received CPR certification gave CPR to a gentleman who had been shot in his neighborhood, keeping him alive until the paramedics showed up on the scene. Even those without such heroic stories to relate have grown in ways that are impressive. Most of the people we talked to saw growth: the students were friendlier to one another, less likely to argue and fight as a result of the close-knit community they had developed, more likely to work well together and pull their own weight, more confident, and more likely to feel empowered by their intellect and skill. As one instructor put it, “Students believe in themselves and have self-confidence; they have a different attitude about their place in the world. Instead of squashing creativity and individual thinking, we allow and even encourage it. The kids know they have a voice and that they are capable of changing things they don’t agree with.” The students themselves acknowledge what a difference these programs have made; many are able to compare their experiences with those of their peers in their neighborhoods or in the “rest” of the school. One young woman told us, “This school changed our lives. It matures you. It focuses you on staying in school.”

### ***Behaviors and Skills***

The changes in attitude carry over into changes in behavior and attainment of skills that will serve students well after high school graduation. Instructors and students mostly mentioned that students discovered the industry area in which they wanted to focus; that students found a reason to care—about others, about their work, and about their own future—and an ability and willingness to act upon that discovery. An instructor at one of the health pathways programs said, “Kids in the Academy carry themselves differently. Once they put on their green scrubs, there’s a different level of professionalism and respect.” For some students with a home high school, the pathway program is a totally different experience than what they encounter at their home school. Whoever they are perceived to be in that school, the cliques they belong to, the groups they join—that baggage does not follow them into the pathways program. Sometimes, their “pathways persona” follows them back. For example, in one program, students wear the uniform required by the pathway program when they return to their regular high school.

Most pathways programs strive explicitly to teach skills students need to succeed in the 21st-century workplace. Presentation skills, of both content and self and in both formal and informal settings, seemed to be emphasized. Certainly, in our visits and interviews with students, we found pathways students to be confident, well spoken, and able to voice their opinions in a reasoned manner. Besides reinforcing academic competency and technical skill, many pathways assignments are designed to build presentation, teamwork, research, problem-solving, processing, and time management skills. Several Network pathways required a capstone presentation at the end of each year, with different (and increasingly wider) public audiences. Good measurement of these skills, however, remains elusive.

### **Awareness of Career Options**

Most—but not all—Network sites involve students in off-site work-based learning experiences, ranging from periodic job shadows to long-term internships. Students learn about the variety of opportunities within industry areas, and these experiences sometimes confirm and challenge their expectations and future employment goals. All the students we spoke with enjoyed these opportunities to be in the field and understood the experience they were gaining. One student said, “Some people go into trades not knowing what’s involved; we know, by just being high school students in this program what to expect—we have a head start on others.” Students in internships (as opposed to job shadows) learn how to use the latest tools of the trade as well; although few pathways programs have the latest equipment for their

field, generally the businesses in which students work have more up-to-date equipment, tools, and computer programs.

The extent to which industry professionals are involved in on-site experiences varies widely throughout the Network sites. Some teachers are reluctant to give up class time for speakers from a college or business, while others encourage community professionals to visit their sites, talk, and answer students' questions. A few teachers, scattered throughout the Network, involve professionals in instruction, such as a hospital administrator exposing students to the Health Insurance Portability and Accountability Act (HIPAA) guidelines and requirements.

### **Workplace Readiness**

Awareness of career options and the building of career skills, such as communication, teamwork, and problem-solving, are included thoughtfully in the curriculum, as the Network sites strive to prepare students for both college and career. Certainly, students learn the necessary skills of the industry: the vocabulary and jargon, how to use tools and equipment, relevant safety issues, techniques required of employees, and technologies used. Beyond those specifics—which vary according to the industry involved—more general workplace skills are also taught and emphasized.

Many of the physical facilities are set up to emulate professional settings, whether a medical office, a laboratory, or a design studio. Students dress professionally for class presentations, talk about professionalism in class, and generally are informed of the expectations that adult professionals will have of them. The relationships between teachers and students, although personal, also take on a professional tone, with students given responsibility for completing work, asking questions, and exhibiting appropriate behavior.

These factors pay off as students go to actual workplaces for their job shadows or internships. One industry partner described the program he worked with as “phenomenal,” noting that the students have the appropriate background and some training, and that “they’re good kids who work hard and learn a lot.” He compared them favorably to older interns from other programs, particularly with respect to their motivation.

As the students prepare for and complete workplace experiences, many extend their goal from high school graduation to pursuing further education. As one staff member put it, “The program gives kids some hope and motivation for college. Kids come in with no real hope for the future, no interests, thinking how they don’t know how to do anything, and this teaches them real skills and shows them they can succeed.” A few pathways match students with mentors (Space, Technology, and Robotic Systems Academy; Center for Advanced Research and Technology; Manufacturing























































































































