SRI INTERNATIONAL

Taking Stock of the California Linked Learning District Initiative

Seventh-Year Evaluation Report

November 2016
PREPARED FOR THE JAMES IRVINE FOUNDATION

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Prepared by:
SRI International
Center for Education Policy

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Executive Summary

Since 2006, The James Irvine Foundation has invested more than $100 million in Linked Learning, a promising approach to transforming education in California. In 2009, the Foundation launched the California Linked Learning District Initiative ("the initiative") to demonstrate this approach in nine school districts. The multiyear evaluation of this large initiative has a twofold purpose: to document the work and distill lessons from districts that are applying Linked Learning systemically and to measure the effect of this comprehensive implementation on student outcomes.

About Linked Learning

Rejecting the outmoded and usually inequitable separation of students into vocational and academic tracks, Linked Learning pathways are designed to integrate four core components throughout the student experience:

- Rigorous academics that prepare students to succeed in college.
- Career technical education courses in sequence, emphasizing real-world applications of academic learning.
- Work-based learning that provides exposure to real-world workplaces and teaches the professional skills needed to thrive in a career.
- Comprehensive support services to address the individual needs of all students, ensuring equity of access, opportunity, and success.

Linked Learning pathways are organized around industry-sector themes and can take the form of stand-alone small schools or academies within larger comprehensive high schools. Ideally, the industry theme is woven into lessons taught by teachers who collaborate across subject areas with input from working professionals, and reinforced by work-based learning with real employers. If possible, pathway students in every grade have their own course section for each of their classes—math, English, social studies, and a career technical education course—to allow teachers to implement integrated, cross-discipline projects and increasingly in-depth work-based learning experiences.

Certified Linked Learning pathways have successfully undergone an external review process managed by ConnectEd: The California Center for College and Careers or by NAF (previously the National Academy Foundation), a national network of college and career academies, based on indicators of pathway quality. Certification indicates that a pathway has attained a certain level of fidelity to the four core components of Linked Learning.

The Linked Learning District Initiative

Through the California Linked Learning District Initiative, the Foundation supported nine districts in developing systems of career pathways that are available to all high school students. A total of 46 pathways were certified across the nine districts as of July 2016.

The initiative is a vehicle for enhancing Linked Learning, determining what makes it successful at a systemic level, and demonstrating its viability as a comprehensive approach for high school reform.

Participating Districts

Antioch Unified
Long Beach Unified
Los Angeles Unified
Montebello Unified
Oakland Unified
Pasadena Unified
Porterville Unified
Sacramento City Unified
West Contra Costa Unified

The nine districts participating in the Linked Learning District Initiative varied in size, from slightly over 5,000 high school students to over 185,000 high school students, and represented a variety of geographic regions across California. All had a high proportion of disadvantaged students and below-average student achievement. More than three-quarters of the high school students in each district were nonwhite, and more than half were socioeconomically disadvantaged.

About This Evaluation

SRI International has conducted a rigorous, multimethod evaluation of the initiative in each year of its implementation, conducting interviews with district administrators, partners, stakeholders, pathway teachers, and students; administering surveys to students both in high school and 1 year after graduation; and collecting administrative data on students' high school academic outcomes and initial postsecondary enrollment. We have followed three cohorts of students: the class of 2013 in four districts and the classes of 2014 and 2015 in all nine districts.

SRI's seventh annual evaluation report on the progress of the California Linked Learning District Initiative differs from previous evaluation reports in that it is designed to be comprehensive and summative, rather than focusing on new developments in the initiative or policy context. With 2013–14 marking the final year of Foundation funding for the initiative, this report provides updated findings on student engagement and achievement outcomes, including initial enrollment and persistence in postsecondary education. In addition, this report provides final lessons learned from the experiences of the initiative districts; their successes and challenges with Linked Learning systems implementation over the past 7 years; and their plans for expanding and sustaining Linked Learning while maintaining pathway quality and fidelity to the Linked Learning approach. This will be the final multimethod annual report on the California Linked Learning District Initiative, however we will provide updated postsecondary education results in fall 2017 for the three cohorts included in this evaluation.

Linked Learning Outcomes

A central goal of the initiative was to increase student engagement, develop the knowledge, skills, and dispositions that would allow students to succeed in school and work, and ultimately improve high school academic outcomes, graduation rates, and successful transitions to a full range of postsecondary education opportunities, particularly for low-income and disadvantaged youth. In this report, we provide end-of-high-school and initial postsecondary outcomes for certified pathway students in all nine districts and all three cohorts in our evaluation. We also present results from student surveys measuring students' perceptions of their growth in high school and their experiences transitioning to postsecondary endeavors. We pay particular attention to issues of access and equity, in terms of how closely the demographic composition of certified pathways reflected their districts as a whole, and how students in specific subgroups—students with low prior achievement, those with high prior achievement, English learners, and African American, Latino, and female students—performed, compared with similar students in traditional high schools. Finally, we present outcomes for students in noncertified pathways, a diverse group of programs identified by districts as pathways that have not yet been Linked Learning certified, compared with those of students in traditional high schools. The purpose of this analysis was to examine whether a career theme alone, without the additional quality assurance process indicated by certification, was enough to result in improved student outcomes.

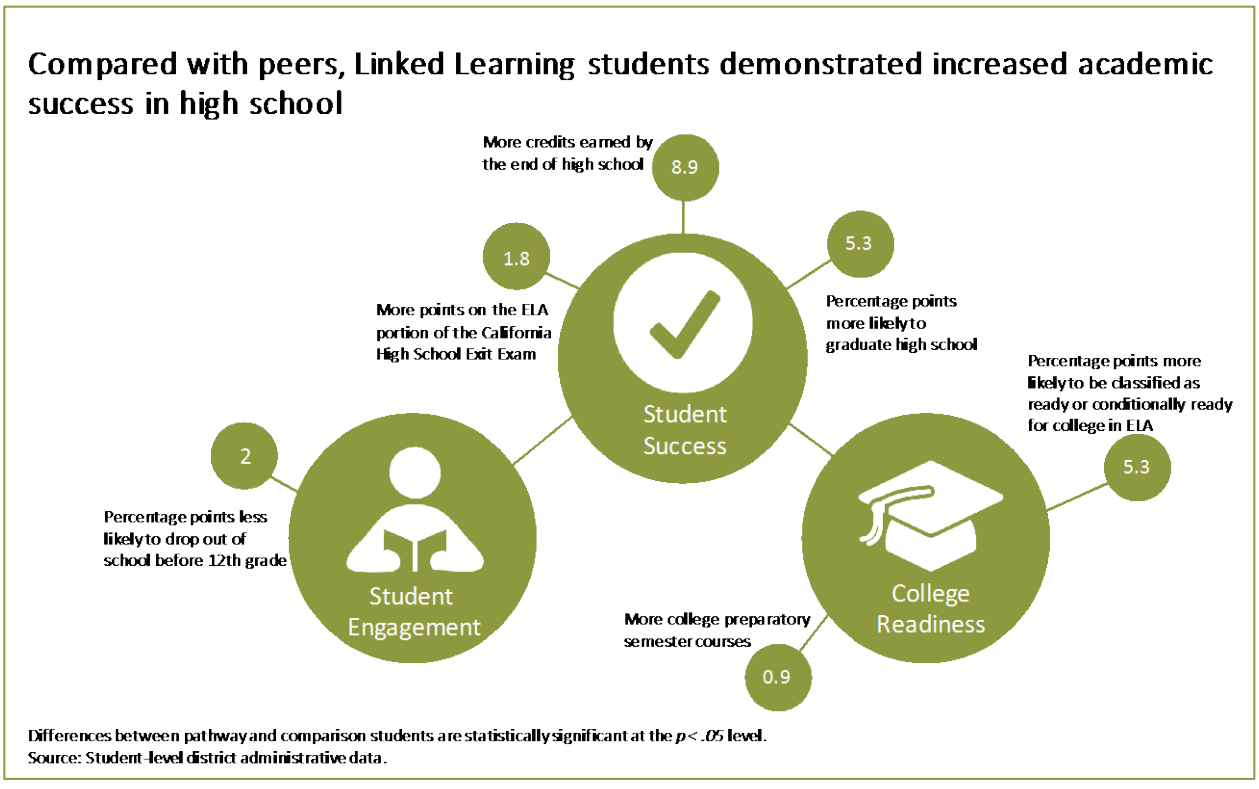
College and Career Readiness

The first set of outcomes we present are indicators of students' success in high school, as well as their impression of the skills they gained from participating in Linked Learning.

Academic Outcomes

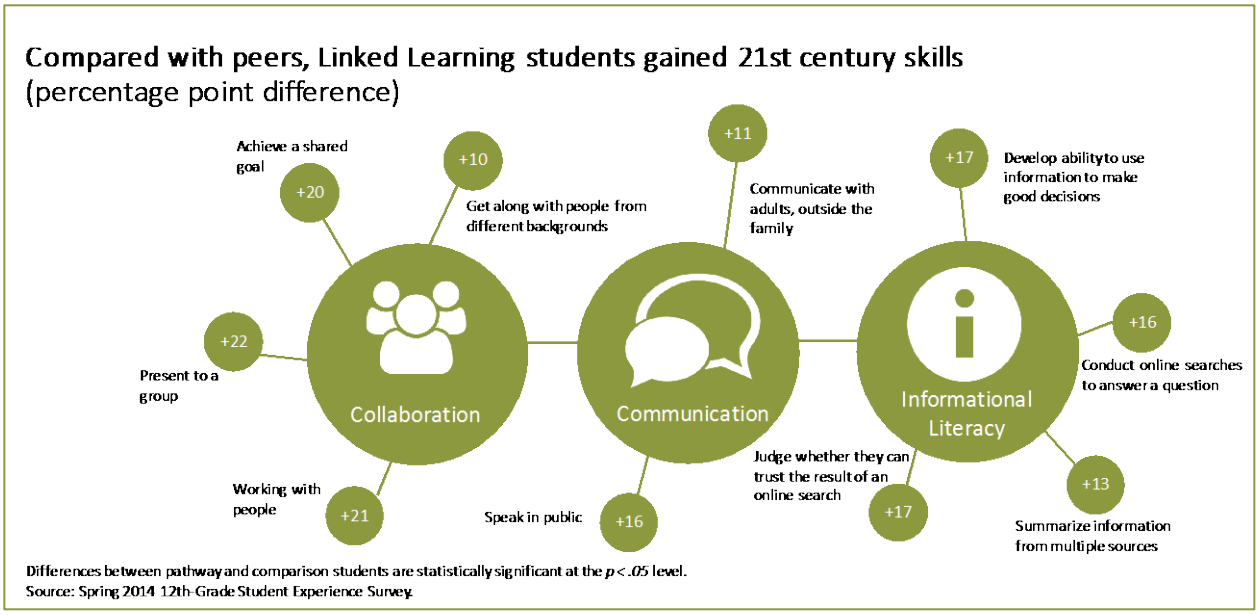
We have consistently found that the Linked Learning approach did make a difference for high school students, leading to decreased dropout rates, higher graduation rates, and more credits earned for students in certified pathways. For context, the size of effect of Linked Learning is equivalent to approximately one-third of the state achievement gap between African American and white students in graduation, and equivalent to nearly one-half of a semester of coursework in credits earned.

Our findings on certified pathway students' college readiness are more mixed. Students in certified Linked Learning pathways completed slightly more of the college preparatory courses required to be eligible for a California public 4-year institution, compared with traditional high school students, and were equally likely to complete the full complement of requirements. With the addition of the class of 2015, we also found that certified pathway students and their peers in traditional high schools earned similar college-admission GPAs. In light of our finding that certified pathways retained students who otherwise might have left high school prior to senior year and were unlikely to pursue the full college preparatory curriculum, this evidence that certified pathways were doing at least as well helping students complete the college preparatory course requirements is promising. Finally, we found that certified pathway students were more likely to be classified as ready or conditionally ready for college in English language arts (ELA) on the Early Assessment Program exam, exempting them from remediation at the majority of California's postsecondary institutions, and outperformed similar peers in traditional high schools on the ELA California High School Exit Exam. However, for other student engagement and school success measures, including daily attendance, course failures, ELA California Standards Test scores, and Math California High School Exit Exam, the two groups did not differ.



Student Perceptions

On our survey of 12th-graders, certified pathway students were more likely than comparison students to report that high school helped them develop key 21st century skills, such as communication, collaboration, and informational literacy. Further, pathway students were more likely to report that their high school experiences improved their self-management skills and sense of self-efficacy, as well as their knowledge of expectations for professional behavior and their ability to create a job application letter or resume.



Postsecondary Transitions

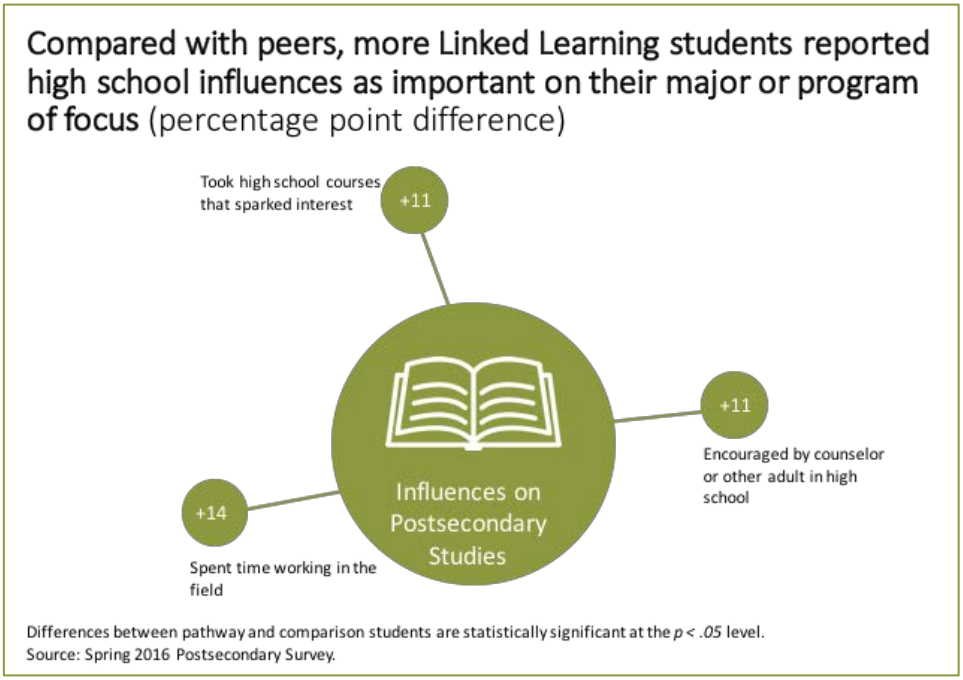
For the first time this year, we were able to track all three cohorts of students through their first year after high school to see whether these early indicators of college readiness translated into better labor market outcomes or smoother transitions to college.

College Enrollment and Persistence

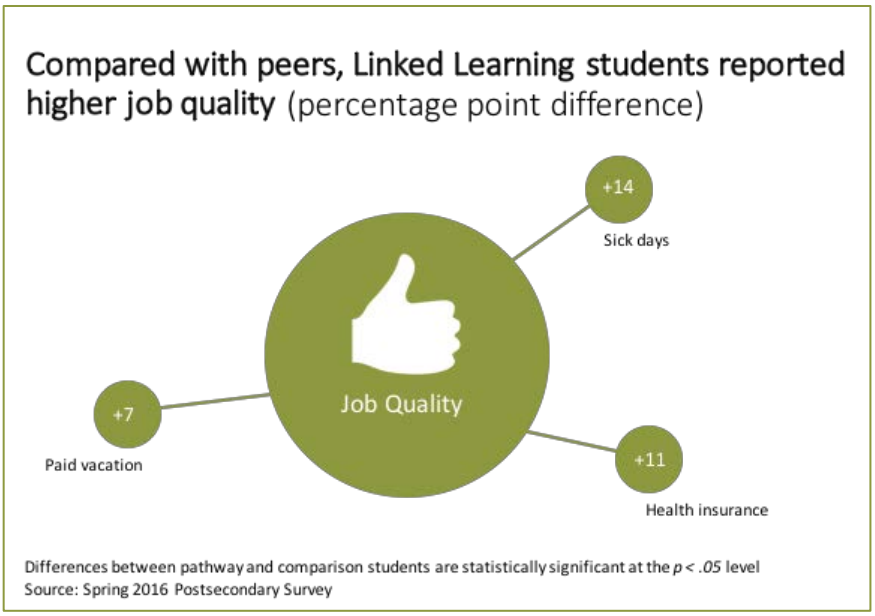
Certified and noncertified pathway students were as likely as similar peers in a traditional high school to enroll in college. Conditional on enrollment in any postsecondary institution, pathway students were also equally likely to enroll in a 4-year college and to persist in school to a second year, compared with similar peers who attended traditional high school programs. Although the finding for enrollment in a 4-year college is not significant in the overall sample, it is significant and positive for some student subgroups, as discussed below under “Access and Equity.”

Postsecondary Experiences

In addition, the postsecondary survey allowed us to explore students’ transition to postsecondary education in more depth. When they rated factors influencing their choice of major, pathway students were more likely than comparison students to identify as important courses taken in high school, encouragement of a counselor or other adult at their high school, and spending time in a work setting where people worked in the field of their major.



Immediately after high school, the skills gained by Linked Learning students translated into jobs better than those of their peers, as indicated by benefits such as paid vacation, sick leave, and health insurance. These results are based on a survey of former Linked Learning and nonpathway students in three of the initiative districts conducted in spring 2016 following their 12th-grade year. Pathway students, however, reported jobs that had similar levels of autonomy and that demanded similarly complex skills (such as communication and problem solving) as those reported by their peers. Further, pathway students did not report greater time management, goal setting, responsibility for work quality, or initiative in seeking help when struggling than their peers. These similarities between pathway and comparison students could be due to the timing of the survey; previous studies suggest that some of the benefits of pathway participation may not be initially visible and may instead accrue over time.



Although educators have traditionally viewed transition supports as largely the purview of postsecondary institutions, Linked Learning pathways—with their emphasis on preparing students for college and career and their focus on student supports—are well positioned to connect students to available transitional supports. However, we found no evidence that pathway students experienced stronger college transition supports than comparison students did. Pathway students reported similar ability to navigate the college financial aid process, were slightly less likely to report having participated in new-student orientation (91% versus 96%), and were

equally likely to report participating in other activities to support transitions, such as summer preparation programs, counseling, student support groups, or summer programs, at their postsecondary institutions. Finally, pathway and comparison students were equally likely to report enrolling in developmental (remedial) courses in college.

Access and Equity

The Linked Learning approach strives to provide all students with equitable access and opportunities for full participation in a variety of high-quality career-themed pathways—regardless of race, class, prior achievement, or special learning needs. To evaluate access and equity, we examined districts' choice and recruitment policies, assessed the degree to which pathways were representative of their districts' high school student populations, analyzed student persistence in pathways, and compared academic outcomes for Linked Learning student subgroups with those of similar peers in traditional high school settings.

Enrollment and Persistence

In addition to providing leadership, common vision, and support for implementation of the initiative, district offices are also responsible for the recruitment and assignment policies whereby students are informed of and enroll in pathways. In examining these policies, we found:

- Districts that achieved the most accessible pathway enrollment systems combined a required open-choice policy (all eighth-graders went through a high school choice process in which they could access most or all pathway options in the district) with centralized outreach and recruitment practices (the district organized recruitment for all pathways, ensuring a level of consistency).
- Three districts achieved representative enrollment in certified pathways, reflecting the challenge in realizing equity in a choice-based system.

Enrolling students in pathways is only the first step in ensuring equitable access—we also examined whether students remained in the *same* certified pathway they initially enrolled in as an indicator of whether they received the support needed to succeed. We found:

- Overall, more than half (68%) of students who were enrolled in certified pathways remained in their initial pathways through 12th grade.
- English learners, special education students, and students with low prior achievement were less likely than the average student to persist in their initial pathways.

Subgroup Academic Outcomes

For our analysis of academic outcomes by student subgroup—African Americans, Latinos, females, English learners, and students with low prior achievement—we examined each outcome presented earlier. We found:

- On average, students who entered certified pathways with low prior achievement were 5.1 percentage points less likely to drop out, were 8.5 percentage points more likely to graduate, and accumulated 15.5 more credits and 1.7 more college preparatory requirements than similar peers in traditional high school programs. Although students with low prior achievement in certified pathways were equally likely to enroll in a postsecondary institution as similar peers, when they did enroll in a college, they were 6.4 percentage points more likely to enroll in a 4-year institution.

- On average, English learners in certified pathways earned 11.7 more credits—equivalent to more than two courses—and one more college prep requirement than similar peers in traditional high school programs.
- On average, African American students in certified pathways earned 15.2 more credits—roughly three courses—than African American students in traditional high schools. Among African Americans who enrolled in a postsecondary institution, certified pathway students were 12.4 percentage points more likely to enroll in a 4-year college than their peers.
- Findings for female and Latino students mirrored the overall results for students in certified pathways—most likely because female and Latino students accounted for 50% and 58%, respectively, of the total student sample.

These results confirmed that the overall positive or neutral effects of pathway participation are not masking negative effects for specific subgroups. The observed effectiveness of Linked Learning for students entering high school with low academic skills is consistent with the thesis that pathways' prescribed course of study may be particularly beneficial for disadvantaged students who otherwise might find themselves tracked into lower level classes and who may find the real-world relevance and smaller community provided by a certified pathway key to thriving in school. Similarly, African American students and those with low prior achievement in certified pathways—groups that are traditionally underrepresented in higher education—may have enrolled in 4-year colleges more frequently than their peers because of the additional support offered by the pathway small learning communities. Given the greater complexities and challenges of enrolling in a 4-year college as opposed to a 2-year college, the additional supports from teachers, guidance counselors, and pathway staff may have been particularly beneficial to students who otherwise might have opted for a 2-year institution.

On the other hand, these findings suggest that African American and English learner students may not have experienced the full academic benefits of participating in a certified pathway. Interviews with high school counselors indicated that scheduling conflicts with required language classes often prevented English learners from participating fully in a pathway's course sequence, tempering the effect of pathway enrollment on outcomes for these students.

Noncertified Pathways

Noncertified pathway programs typically share some important features with the certified pathways, such as a small cohort and career theme, but vary in their implementation of the full Linked Learning approach. With the inclusion of the class of 2015, this year for the first time we found that noncertified pathway students were 2.0 percentage points less likely to drop out before 12th grade, compared with similar peers in traditional high schools. We saw no other statistically significant differences between noncertified pathway students and similar peers in traditional high schools for any other outcomes compared. The decreased dropout rate for noncertified pathway students with the addition of the more recent class of 2015 may reflect the investment in a districtwide system of pathways. Throughout the course of the grant, all nine districts pushed to extend the Linked Learning approach to new pathways, build up the weaker pathways, and eliminate pathways that may not have had the structure, staff, or student interest to function at a high level.

Key Strategies

As Linked Learning expands to more and more districts in California, the successes and challenges of the nine initiative districts implementing Linked Learning systems over the past 7 years are highly instructive for districts that are just beginning to engage with or scale up Linked Learning. Over the course

of the evaluation, we asked district and school administrators, pathway leads, coaches, and technical assistance providers to reflect on what is needed to make Linked Learning successful. Drawing on their responses, as well as our own analyses of successful approaches and ongoing challenges, we have distilled a set of key strategies that support implementation of Linked Learning for both school districts and pathways.

For School Districts

- ✓ A **common vision** for Linked Learning and collective buy-in for the goals of the initiative, shared by educators across the district and at every level; in particular, the superintendent, executive cabinet, and school board must be **visible and public champions** of the effort.
- ✓ **Leadership** for Linked Learning, including a **dedicated Linked Learning director** with cabinet-level positional authority, supervisory authority over high school principals, and the support of a **cross-district Linked Learning leadership team** with representatives of many district offices (including offices of human resources and curriculum and instruction), as well as principals and pathway leads.
- ✓ **Attention to equity**, including the distribution and location of pathways and the policies and recruitment practices that influence student preferences and access to pathways.
- ✓ **Staff and structures to support work-based learning** so the responsibility of providing work-based learning opportunities that are allocated equitably to students does not fall solely to pathway leads and teachers.
- ✓ **Favorable human resources policies** to recruit and retain pathway teachers and allow for the development of experienced, collaborative pathway teaching teams.
- ✓ A **broad-based coalition** of regional industry partners, civic leaders (e.g., Chamber of Commerce, mayor), and local postsecondary institutions to support work-based learning, to smooth transitions to postsecondary education, and to sustain Linked Learning.
- ✓ A **continuous improvement process** that is valuable to district staff and pathway teachers and ensures fidelity to the Linked Learning approach.

For Pathways

- ✓ **Strong and active leadership from principals** who understand the core Linked Learning components and oversee the creation of **master schedules** that support (1) regular collaborative planning time for pathway staff and (2) “pure” student cohorts that spend all or almost all of their school day moving through pathway classes together.
- ✓ **Sufficient time and support for pathway leads** to fulfill their responsibilities (e.g., additional release time and administrative support) are essential for making the position sustainable.
- ✓ **An engaged team of teachers** who come together as a community of practice to develop integrated curriculum, deliver high-quality instruction, and support students.
- ✓ **Active pathway-level advisory boards**, working alongside engaged pathway leads and staff, are essential in helping pathways develop curriculum, assess student performance, and identify work-based learning opportunities.

External technical assistance from ConnectEd in the form of district- and pathway-level coaching was a critical support for initiative districts in implementing these key strategies. District-level coaching initially focused on building relationships, spreading the foundational knowledge of Linked Learning, getting key leaders on board, helping shift educators’ mindsets to align priorities and supports with Linked Learning, and helping district staff examine and confront traditional leadership structures and district practices. At

the start of the initiative, ConnectEd also provided pathway-level coaching; however, as districts became more familiar with the Linked Learning approach, many transitioned to developing a cadre of internal pathway coaches, often veteran pathway teachers who were trained to take on the coaching role by ConnectEd. Whether internal or external, pathway coaches can help teachers make the instructional shifts necessary to truly implement a rigorous, integrated academic and technical curriculum with aligned work-based learning experiences. Effective coaching must be tailored to a pathway's specific needs (e.g., master scheduling, development of integrated projects, leadership skills to facilitate a generative community of practice among pathway teachers).

Looking Ahead

With the ending of Foundation support, the majority of districts have shifted their focus from increasing the quantity of pathways to strengthening Linked Learning implementation in existing pathways by establishing systems to assess pathway quality and strengthening structures to support pathway teams. Districts recognized that by establishing high-quality pathways that produce results they could build a body of evidence to communicate how Linked Learning prepares students for college and career, fueling both student demand and teacher support for Linked Learning.

Even without ambitious pathway expansion goals, districts had to think creatively about how to continue the work of deepening Linked Learning implementation and sustaining high-quality pathways. Implementing Linked Learning with fidelity requires dedicated district-level staff members, release time for pathway leads and teachers to collaborate on integrated projects, coaching to build teachers' capacity to make the necessary instructional shifts, and support for developing and administering work-based learning opportunities. By 2015–16, districts found that to continue support for these key Linked Learning scaffolds, they could not rely solely on internal resources but needed to strategically leverage regional partnerships to support work-based learning and college and career preparation, draw on new state funding aligned with the goals of Linked Learning, and use state and district accountability systems to further elevate Linked Learning as a central district priority.

As state and Foundation funding have pushed the development of regional consortia to support college and career pathways, districts were able to capitalize on these funding opportunities and regional partnerships to help sustain Linked Learning. Districts strategically combined new state grants aligned with the goals of Linked Learning with general funds to deepen Linked Learning implementation and sustain high-quality pathways. Districts also leveraged the regional partnerships that were catalyzed by these new funding sources, particularly to expand work-based learning opportunities and dual-enrollment offerings through local community colleges. Regional systems hold promise for supporting and sustaining Linked Learning district implementation, but only insofar as they themselves are sustained. As funding for the regional work ends, the sustainability of these partnerships will depend on partner organizations' adopting the consortia mission as part of their goals and creating standard operating procedures for working with one another.

Attaining sustainability, however, requires more than finding the necessary resources; it requires a shift such that knowledge and authority for the reform are transferred from the external reform agent to teachers, schools, and districts so that the reform can become self-generative. By design, the initiative's focus on building district systems attempted to ensure that this shift took place, and our evaluation has identified a number of strategies associated with more successful institutionalization of Linked Learning, including the communication of a common vision and creation of a cross-district leadership team to ensure that Linked Learning is codified in district priorities, such as a graduate profile defining the skills and competencies for high school graduates. As California shifts some control for school accountability to districts and broadens its state school accountability system to include multiple measures of college and

career readiness, another strategy for institutionalizing Linked Learning is to use state and district accountability systems to further elevate Linked Learning as a central district priority.

Some districts have incorporated Linked Learning into their evaluations for high school principals, and all nine districts have included Linked Learning as a strategy in their local district accountability plans. These plans, reviewed by county offices of education, codify district goals, strategies for meeting these goals, and metrics for measuring progress toward achieving them. At the state level, California's new school accountability system is broadening to encompass a multimeasure College and Career Indicator that is likely to include career technical education (CTE) pathway completion, in addition to measures districts are already required to address in their local plans, such as completion of college preparatory or advanced coursework or college readiness assessment scores. The inclusion of a CTE metric is encouraging for sustaining Linked Learning, but districts can take it a step further by specifying metrics in their local accountability plans related to completion of both CTE coursework *and* college readiness, capturing the integration of academic and career-based learning that defines the Linked Learning approach.

Chapter 1: Introduction

SRI International presents its seventh annual evaluation report on the progress of the California Linked Learning District Initiative ("the initiative"). With 2013–14 marking the final year of The James Irvine Foundation's funding for the initiative, this report provides updated findings on student engagement and achievement outcomes, including initial enrollment and persistence in postsecondary education. In addition, this report provides final lessons learned from the experiences of the initiative districts, their successes and challenges with Linked Learning systems implementation over the past 7 years, and their plans for expanding and sustaining Linked Learning while maintaining pathway quality and fidelity to the Linked Learning approach without Foundation funding.

About Linked Learning and the District Initiative

Between 2006 and 2015, the Foundation made significant investments in Linked Learning, a promising approach to transforming education in California. Linked Learning integrates rigorous academics with real-world experiences to provide high school students with a personally relevant, engaging education that prepares them for college and career.

Core Components of the Linked Learning Approach

The Linked Learning approach calls for the close integration of four core components:

Rigorous academics that prepare students to succeed in college.

Career technical education courses in sequence, emphasizing real-world applications of academic learning.

Work-based learning that provides exposure to real-world workplaces and teaches the professional skills needed to thrive in a career.

Comprehensive support services to address the individual needs of all students, ensuring equity of access, opportunity, and success.

The Linked Learning approach builds on the more than three decades of experience gained by California schools that combine academic and technical content to raise student achievement. The objectives are to improve high school graduation rates and increase successful transitions to a full range of postsecondary education opportunities, particularly for low-income and disadvantaged youth. Linked Learning is delivered through career pathways, comprehensive programs of study that connect learning in the classroom with real-world applications outside school.

In 2009, The James Irvine Foundation launched the California Linked Learning District Initiative, a demonstration of Linked Learning in nine California school districts. ConnectEd: The California Center for College and Career, established by the Foundation in 2006, served as the primary intermediary and technical assistance provider. Through ConnectEd, the Foundation provided funding to support the nine demonstration districts in developing systems of career pathways available to all their high school students, with student choice driving pathway enrollment. The initiative served as a vehicle for the Foundation and its partners to develop and refine the Linked Learning approach, to determine what makes Linked Learning successful at a systemic level, and to demonstrate the viability of Linked Learning as a comprehensive approach for high school reform.

Districts Participating in the Linked Learning District Initiative

Antioch Unified
Long Beach Unified
Los Angeles Unified
Montebello Unified
Oakland Unified
Pasadena Unified
Porterville Unified
Sacramento City Unified
West Contra Costa Unified

District Selection

In 2008, ConnectEd released a request for proposals to identify districts interested in implementing Linked Learning. After receiving 30 proposals, ConnectEd awarded 10 planning grants of $125,000, using four selection criteria:

- Districtwide high school enrollment of at least 5,000 students and capacity to offer six to eight pathways.
- At least 30% of total student enrollment eligible for free or reduced-price lunch.
- A demonstrated track record implementing career pathways and evidence of existing capacity on which to develop a larger system of multiple pathways.
- Statewide geographic representation.

The grants enabled districts to conduct in-depth needs and capacity assessments and develop implementation plans. In June 2009, after reviewing each district's implementation plan and considering the district leadership and structures in place to develop and support Linked Learning pathways, ConnectEd awarded 2-year implementation grants averaging $1,150,000 to 6 of the 10 districts: Antioch Unified, Long Beach Unified, Pasadena Unified, Porterville Unified, Sacramento City Unified, and West Contra Costa Unified. In March 2010, ConnectEd awarded implementation grants to three more districts: Los Angeles Unified,[1] Montebello Unified, and Oakland Unified. Implementation grants to these nine districts continued through the 2013–14 school year.

The nine districts participating in the Linked Learning District Initiative varied in size, from slightly over 5,000 high school students to over 185,000 high school students, and represented a variety of geographic regions across California. All had a high proportion of disadvantaged students and below-average student achievement as measured by California's Academic Performance Index (API), ranging from 715 to 784 compared with a statewide average of 790 (California Department of Education, n.d.).[2] More than three-quarters of the high school students in each district were nonwhite, and more than half were socioeconomically disadvantaged, with district poverty rates ranging from 63% to 85%.[3] Exhibit 1-1 summarizes student demographic and achievement data for the nine districts.

[1] The initial Linked Learning grant was made to Local District 4 in Los Angeles Unified, but the district restructured beginning with the 2012–13 school year, dissolving the local district structures. At that time, Linked Learning became a full districtwide initiative.

[2] 2012 Base API.

[3] Based on the percentage of students who qualified for free or reduced-price meals in 2015–16.

Exhibit 1-1
Demographic and Achievement Profile of Linked Learning Districts, 2015–16

District	High School Enrollment[a]	Minority[b]	English Learner (%)	Poverty[c]	Graduation Rate		CAHSEE Pass Rate[d] (%)				Certified Pathways[e]
					2013–14	2014–15	2014 Math	2014 ELA	2015 Math	2015 ELA	2014-2015
Antioch Unified	5,620	82	10	68	77	84	75	78	76	82	4
Long Beach Unified	24,495	87	23	66	81	84	85	80	85	83	6
Los Angeles Unified[f]	189,565	90	26	79	70	72	80	78	80	79	7
Montebello Unified	9,630	99	32	85	88	87	80	78	81	82	0
Oakland Unified	12,922	90	32	74	61	63	69	63	69	69	5
Pasadena Unified	5,448	82	19	63	81	82	82	78	80	82	5
Porterville Unified	6,419	87	28	81	84	87	81	76	80	78	8
Sacramento City Unified	13,060	82	22	64	85	80	80	77	80	79	5
West Contra Costa Unified	8,915	92	20	70	78	85	72	72	73	75	5

Source: Adapted from California Department of Education (2016c). *Student Poverty FRPM Data* [Data file]. Retrieved from http://www.cde.ca.gov/ds/sd/sd/filessp.asp; California Department of Education (n.d.). *Dataquest* [Data file]. Retrieved from http://data1.cde.ca.gov/dataquest/.

[a] Includes enrollment at charter and noncharter schools classified by CDE as high schools (public) and continuation high schools with active/pending status.

[b] Percentage of all students who did not identify as "White, not Hispanic," including students whose ethnic designation was listed as "not reported."

[c] Based on the percentage of students who qualified for free or reduced-price meals in 2015–16 in the whole district (not just high school students).

[d] The California High School Exit Examination (CAHSEE) passing rates were based on the March exam date for 10th-grade students for 2013–14 and 2014–15 for all districts except Pasadena, Porterville, Oakland, West Contra Costa, and Long Beach. CAHSEE passing rates for Pasadena, Porterville, Oakland, and West Contra Costa were based on a February exam date for 10th-grade students for 2013–14 and 2014–15. CAHSEE passing rates for Long Beach were averaged between the February and March exams.

[e] Updated 2014–15 data for certified pathways. Includes pathways certified by ConnectEd and NAF (previously the National Academy Foundation).

[f] Profile is for all Los Angeles Unified. The initial Linked Learning grant was made to Local District 4, but the district restructured beginning with the 2012–13 school year, dissolving the local district structures. Linked Learning is now a full districtwide initiative.

Technical Assistance

To ensure district implementation support, the Foundation funded multiple organizations to provide extensive technical assistance to the nine districts over the life of their grants. In the role of primary intermediary organization and technical assistance provider, ConnectEd articulated a vision for the Linked Learning approach, oversaw the district grantees, and provided implementation supports that included employment of district and pathway coaches and the coordination of professional development and other initiative events. In addition to ConnectEd, numerous other partners have supported the initiative over the years, including SCOPE, the Center for Powerful Public Schools (formerly the Los Angeles Small Schools Center), NAF (formerly the National Academy Foundation), the College and Career Academy Support Network (CCASN), and The Education Trust–West.

The range of district implementation plans and the variation in district readiness required tailored coaching and technical assistance provided through an array of professional development formats that promoted cross-site knowledge sharing and capacity building. These formats included:

- **Guidance from district and pathway coaches**—District coaches met regularly with the Linked Learning director in each district. They provided an outside perspective and focused on building relationships, spreading the foundational knowledge of Linked Learning, shifting mindsets to align priorities and supports with Linked Learning, and getting key leaders on board. District coaching remained an external support throughout the initiative, but districts were able to move to internal pathway coaching in the later years by having ConnectEd train their staffs.

- **District and pathway leadership development summer institutes**—Between 2010 and 2014, district leaders and pathway teachers attended summer institutes hosted by ConnectEd and the Stanford Center for Opportunity Policy in Education (SCOPE), where they learned from experts in systems change and had the opportunity to work together on Linked Learning planning, as well as learn from their colleagues in other initiative districts and schools.

- **District residencies**—These residencies provided additional opportunities for Linked Learning staff to learn from one another during the school year through site visits to other districts and schools and guided discussion on topics of interest or need (e.g., master scheduling). Establishing communities of practice enabled Linked Learning leaders to work together to identify common challenges and collaborate on finding effective solutions. ConnectEd organized residencies between 2010 and 2014 for initiative districts and then, in 2015, opened them up to a broader range of school districts implementing Linked Learning.

ConnectEd and its partners also developed tools and resources to help pathway and district leaders understand Linked Learning and to support continuous improvement:

- **Needs and Capacity Assessment Tool**—The Needs and Capacity Assessment Tool was intended to help districts take a systematic approach to conducting a comprehensive assessment of their current capacity and future needs related to the design, implementation, and sustainability of a system of Linked Learning pathways. The assessment was designed to be an iterative process that involves information gathering, awareness building, public engagement, and the development of a shared understanding of Linked Learning among a broad group of stakeholders (ConnectEd, n.d.-a).

- **Online Pathway Tool for Improvement and Certification (OPTIC)**—OPTIC is an online tool designed to help pathway teams and administrators self-assess, reflect upon, and view their pathways' progress in relationship to the seven essential elements of a high-quality Linked Learning pathway. Pathway teams can use the tool to develop action plans for continuous improvement, access resources in ConnectEd's Pathway Toolkit, and collect evidence regarding their progress toward certification (ConnectEd, n.d.-c).

Linked Learning's Essential Elements for Pathway Quality

- **Student outcomes-driven practice.** Pathway teams are focused on students' progress on "achieving measurable and consequential learning outcomes."
- **Equity, access, and achievement.** An equity-focused pathway reflects "the strength and diversity" of its community.
- **Program of study.** The program of study coordinates and sequences student learning experiences in a way that integrates rigorous academic and technical core curricula.
- **Learning and teaching.** Students engage in project-based learning that is "outcomes-focused, rigorous, relevant, and collaborative."
- **Work-based learning.** Students participate in a continuum of work-based learning to help them "master and demonstrate academic, technical, and 21st Century skills."
- **Personalized student support.** Pathway teachers tailor learning experiences according to individuals' needs and students receive support from the pathway community.
- **Pathway leadership and partnerships.** Pathway staff, school and district leaders, and partners "assure conditions are in place to establish and sustain pathway quality."

- **Work-Based Learning Continuum**—The purpose of the Work-Based Learning Continuum was to describe the ideal sequence of work-based learning experiences, beginning with career awareness and exploration to support learning about work, followed by career preparation through a broad range of practicum and internship experiences, and culminating in intensive career training experiences. The continuum emphasized that work-based learning experiences should be coordinated and sequenced, as well as connected to pathway coursework (ConnectEd, n.d.-e).

Certification

With support from the Foundation, ConnectEd and its partners—CCASN, the National Career Academy Coalition (NCAC), NAF, and Education Trust-West—developed guidance for certifying pathways. In 2010, ConnectEd began to certify the quality of individual career pathways along the dimensions of design, engaged learning, system support, and evaluation and accountability. ConnectEd used the certification process to establish and support examples of programs that implemented Linked Learning with high quality and fidelity, whether as part of the district initiative or as individual schools or programs outside the initiative. Beginning with the 2012–13 school year, ConnectEd also officially recognized certification through NAF—which supports a national network of career-focused academies—for Linked Learning pathways. As a result, districts and pathways were able to choose which certification process to go through; across the nine initiative districts, half of the 10 pathways certified in the 2012–13 school year were certified through NAF. Within the initiative, only Long Beach had a pathway go through the certification process early enough to be considered certified as of the 2009-10 school year, and ConnectEd certified an additional 15 pathways in the 2010–11 school year (Exhibit 1-2).

Exhibit 1-2
Cumulative Number of Linked Learning Pathways Meeting Certification Criteria, by School Year

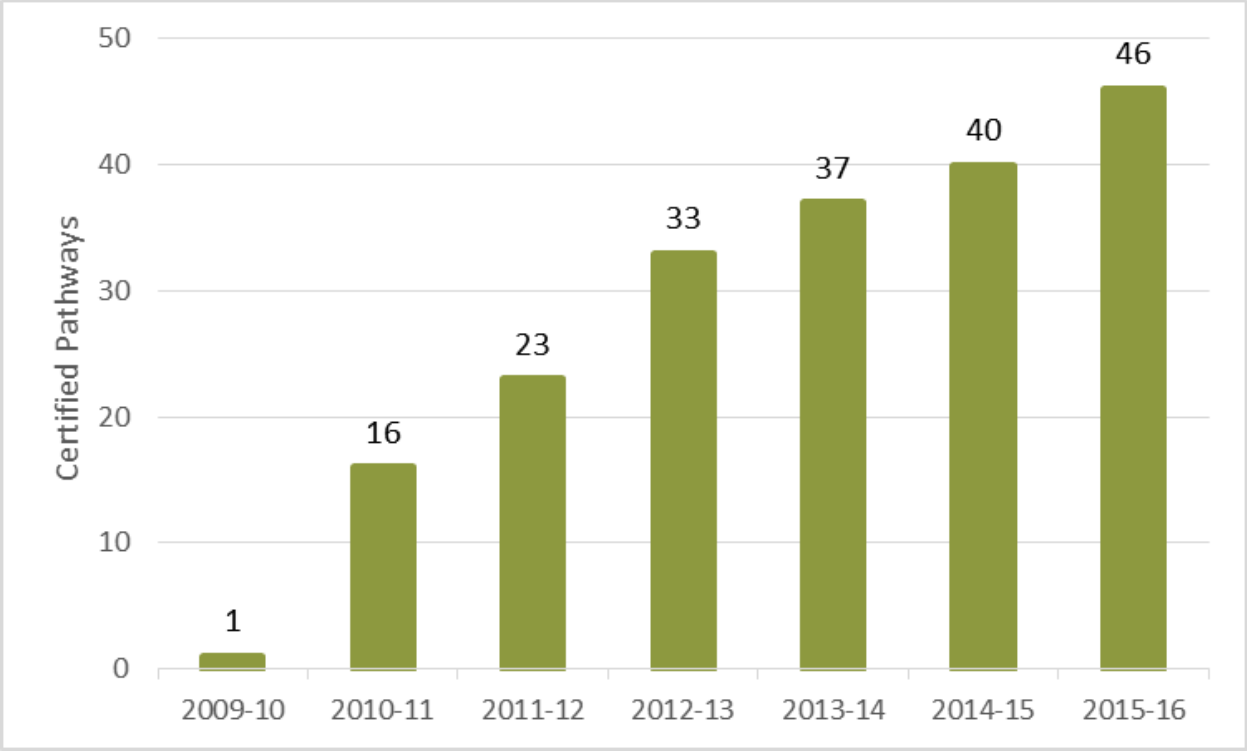


Exhibit 1-3 lists the 46 pathways certified as of July 2016 in the nine initiative districts. Pathways had to be certified as of 2012–13 or earlier to be classified as certified in at least one cohort of the quantitative analysis; 33 pathways met this criterion.

Exhibit 1-3
Linked Learning Pathways Meeting Certification Criteria as of 2015–16

District	Certified Pathways	School Type[a]	Initial Certification Year
Antioch Unified	Health Science and Medical Technology at Dozier-Libbey Medical High School	Small school	2010–11
	Engineering and Designing Green Environments	SLC[b]	2012–13
	Law & Justice Academy	SLC[c]	2012–13
	Media/Tech Academy	SLC[b]	2015–16
Long Beach Unified	Architecture, Construction and Engineering Academy	SLC[c]	2009–10
	California Academy of Mathematics and Science	Small school[d]	2010–11
	Community of Musicians, Performers, Artists, and Social Scientists	SLC	2010–11
	PEACE Academy	SLC	2010–11
	Media and Communications	SLC	2012–13
	Pacific Rim Business Academy	SLC[c]	2013–14
Los Angeles Unified	Los Angeles High School of the Arts	Small school	2011–12
	Los Angeles School of Global Studies	SLC	2011–12
	New Media Academy	SLC[c]	2012–13
	STEM Academy of Hollywood	Small school[b]	2013–14
	School of Business and Tourism	SLC[c]	2014–15
	School for the Visual Arts and Humanities	SLC	2014–15
	Academy of Finance	SLC[c]	2015–16
	School of History and Dramatic Arts	Small school	2015–16
Oakland Unified	Life Academy of Health and Bioscience	Small school[c]	2010–11
	Media College Preparatory	Small school[c]	2010–11
	Education Academy	SLC[c]	2011–12
	Computer Science & Technology Academy	SLC[c]	2014–15
	Environmental Science Academy	SLC[c]	2015–16
Pasadena Unified	Arts, Entertainment, and Media Academy	SLCb[c]	2010–11
	Business and Entrepreneurship Academy	SLCb[c]	2010–11
	Creative Arts, Media and Design Academy	SLC[b]	2010–11
	Engineering and Environmental Science Academy	SLC[b]	2012–13
	Health Academy	SLC[b,c]	2013–14

Exhibit 1-3
Linked Learning Pathways Meeting Certification Criteria as of 2015–16 (concluded)

District	Certified Pathways	School Type[a]	Intial Certification Year
Porterville Unified	Partnership Academy of Business/Academy of Finance	SLC[b,c]	2010–11
	Engineering Academy	SLC[b]	2010–11
	Multimedia Technology Academy	SLC[b,c]	2011–12
	Partnership Academy of Health Sciences and Careers	SLC[b,c]	2011–12
	Academy of Performing Arts	SLC	2011–12
	Academy of Digital Design and Communication	SLC[b]	2012–13
	Alternative Energy Resource Occupations Academy	SLC[b,c]	2013–14
	Environmental Science Academy	SLC[b]	2015–16
Sacramento City Unified	Health Professions High School	Small school[b,d]	2010–11
	New Technology High School	Small school	2010–11
	Johnson Corporate Business Academy	SLC[b,c]	2012–13
	The Met	Small school	2012–13
	School of Engineering and Sciences	Small school[b]	2012–13
West Contra Costa Unified	Multimedia Academy	SLC[c]	2010–11
	Law Academy	SLC[c]	2010–11
	Engineering Partnership Academy	SLC[c]	2011–12
	Health Academy	SLC[c]	2012–13
	Information Technology Academy	SLC[c]	2015–16

Source: ConnectEd, personal communication, July 2016. Montebello had no certified pathways.

Note: We included only pathways certified as of 2012–13 or earlier in at least one cohort of the quantitative analyses in the report.

[a] SLC refers to a small learning community within a comprehensive high school, not necessarily supported by a federal Smaller Learning Communities program grant. Small school refers to a small stand-alone school.

[b] Pathway is supported by NAF.

[c] Pathway is a California Partnership Academy (CPA).

[d] Magnet school.

This evaluation focused primarily on certified pathways but also included noncertified pathways in analyses and data collection. We defined noncertified pathways broadly as any program that was flagged by a district as a pathway but that had not yet been certified as a Linked Learning pathway. These programs typically shared some important features with the certified pathways, such as a small cohort and career theme, but varied in their implementation of the full Linked Learning approach. In this report, we use the term *pathway* to refer broadly to pathways in all stages of development.

Implementation Timeline: From District Initiative to Regional Expansion

Since the launch of the initiative in 2009, Linked Learning has gained momentum among K–12 and postsecondary educators, policymakers, and business leaders as a promising approach for preparing all students for college, career, and life. This momentum was catalyzed by a strategic decision by the Foundation in 2008 to establish the Linked Learning Alliance, an advocacy organization charged with coordinating efforts to expand access to Linked Learning in California through coalition building among policymakers, educators, industry, and community organizations. The Linked Learning Alliance was able to build political support for state policy and funding beyond what any one district could hope to achieve.

As the popularity of Linked Learning grew, California began to allocate funding for the expansion of career pathway programs across the state, with an emphasis on building regional partnerships between K–12 districts, postsecondary institutions, and industry (Exhibit 1-4). Starting in 2014, the Foundation also shifted from a district-focused strategy to a regional approach for advancing and scaling Linked Learning by funding "Regional Hubs of Excellence." Although Foundation funding for the district initiative continued through the 2013–14 school year, the funding opportunities available for regional expansion began to increasingly influence Linked Learning implementation in the nine initiative districts, particularly with the state's $500 million investment in the California Career Pathways Trust (CCPT) grants beginning in 2014. As a result, we have conceptualized Linked Learning implementation in two phases: during the first phase (2006 to 2013), Foundation funding and ConnectEd-managed technical assistance shaped implementation of Linked Learning in initiative districts; during the second phase (2014 to 2016) the number of districts in California implementing Linked Learning increased, and even within the initiative districts, implementation was increasingly shaped by the regional, cross-sector emphasis of the new funding sources.

Funding Opportunities for Regional Expansion

Linked Learning Pilot Districts: In 2013, 20 pilot districts each received an $80,000 grant and the state dedicated $400,000 for pilotwide activities. The Foundation also funded ConnectEd to provide technical assistance for the pilot districts.

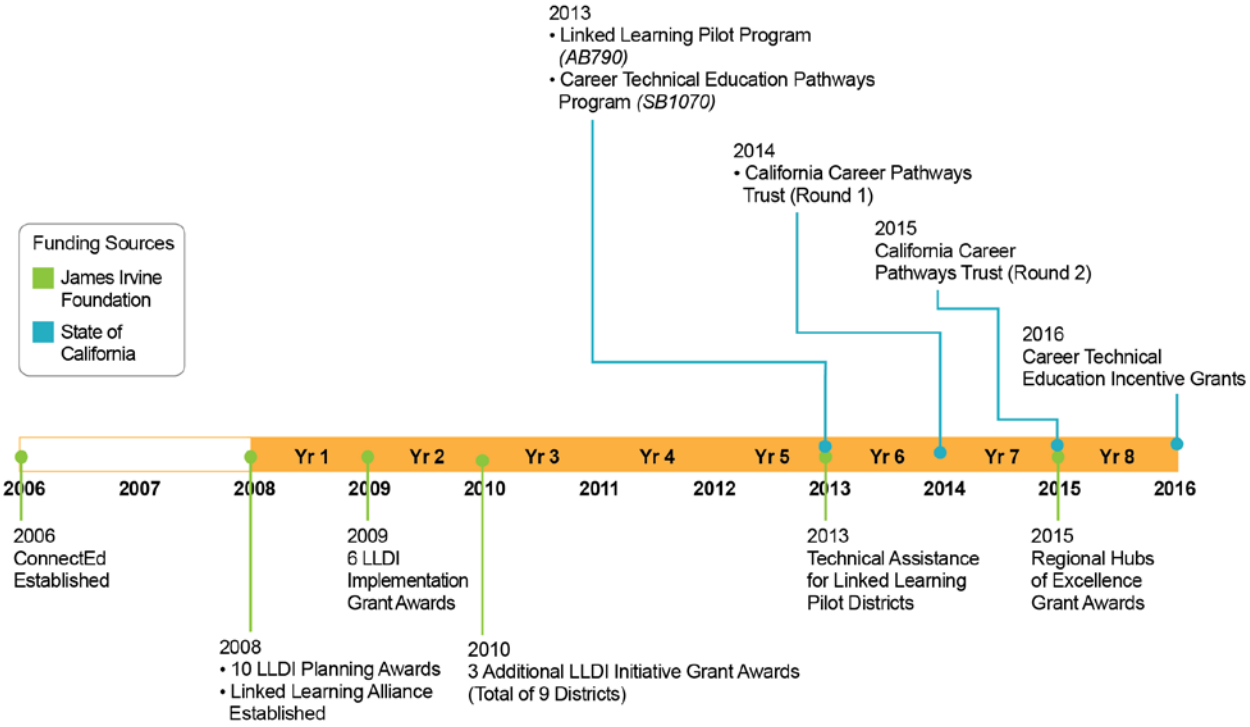
Career Technical Education Pathways Program: Initiated in 2013, this program required the Chancellor of the California Community Colleges and the Superintendent of Public Instruction to assist economic and workforce regional development centers and consortia, community colleges, middle schools, high schools, and regional occupational programs (ROPs) in improving linkages and career technical education pathways between high schools and community colleges, expand work-based learning, and promote industry–education partnerships.

Irvine Regional Planning and Implementation Grants: In 2013, the Foundation provided seven major California regions with planning grants to build regional commitment and identify a consortium of partners—including postsecondary, workforce, and community partners—to create a self-sustaining regional infrastructure for advancing and scaling Linked Learning. In 2015, the Foundation awarded regional implementation grants to a subset of planning grant recipients. Four initiative districts were included in funded regions: Long Beach, Oakland, Porterville, and West Contra Costa. Each grantee received approximately $750,000 to support and scale broad adoption of the Linked Learning approach through the establishment of Regional Hubs of Excellence.

California Career Pathways Trust (CCPT) Fund: The CCPT provided state grant funding of $250 million in 2014 and $250 million in 2015 to create sustained career pathway programs that link business entities, K–12 schools, community organizations, and postsecondary institutions to prepare students for the 21st century workplace. CCPT grants supported the development of work-based learning infrastructure, innovative regional partnerships for career pathway support, and the expansion of career pathway programs into postsecondary institutions.

The CCPT grants, awarded in 2014 and 2015, were the most influential of the new funding sources. All nine initiative districts were part of consortia that won CCPT Round 1 grants, and two (Pasadena and Porterville) also won Round 2 grants. The CCPT grants constituted a significant increase in the resources available for the initiative districts.[4] These grants provided funds to develop regional infrastructures for increasing student access to high-quality work-based learning opportunities and smoothing educational transitions for students by aligning and articulating career-themed pathways with community colleges. Although the CCPT grants were part of a suite of state funding opportunities targeting regional expansion that also included the Linked Learning Pilot Districts and the Career Technical Education Pathways program, they were by far the most important for shaping Linked Learning implementation in initiative districts because of the size of the grants and the coverage of all nine districts. In 2016, the Career Technical Education Incentive Grants provided another infusion of funding from the state, albeit not focused primarily on the development of regional partnerships.

Exhibit 1-4
Linked Learning Implementation Timeline (2006–2016)



Note: This graphic illustrates Years 1–8 of the Linked Learning District Initiative (LLDI); however, the SRI evaluation of the initiative was lagged by 1 year. Thus, 2016 was the seventh year of the SRI evaluation but the eighth year of initiative districts' participation in Linked Learning. Foundation funding to initiative districts concluded in 2013–14.

[4] In addition to CCPT, Los Angeles also won a $7 million federal Youth CareerConnect (YCC) grant to build out new career academies and enlist the support of multiple organizations to provide work-based learning opportunities to students. YCC was a joint initiative of the U.S. Departments of Labor and Education; the YCC program awarded grants in 2014 to support partnerships of districts, institutions of higher education, workforce investment systems, and employers to "enhance instruction and deliver real-world learning opportunities for students."

This seventh annual evaluation report focuses on the systems developed to support Linked Learning within the nine districts, but discusses the implications of regional systems building on Linked Learning implementation and sustainability in these districts. We examine the progress of the regional approach in furthering two areas of Linked Learning that have been underdeveloped in the district initiative: work-based learning and postsecondary transitions. We also discuss the challenges that districts have confronted in building successful regional partnerships with a wide range of stakeholders.

Evaluation Activities

In 2009, the Foundation commissioned the Center for Education Policy at SRI International to conduct a rigorous multiyear evaluation of the initiative. Over the following 7 years, SRI assessed the nine districts' implementation of Linked Learning pathways and analyzed outcomes for students participating in them. We used a multimethod research design that includes qualitative and quantitative data collection and analysis. The following key research questions guided this evaluation:

- How are districts supporting the development and improvement of the core Linked Learning components (academic, technical, work-based learning, and student supports)?
- How sustainable is the Linked Learning approach for districts, and what evidence indicates that districts will remain committed to Linked Learning as their primary strategy for high school reform? What factors support or impede sustainability?
- What are the educational experiences and outcomes for students participating in pathways, and how do they compare with those of nonpathway students?
- How do pathway graduates experience the transition to postsecondary education and careers, and how do their outcomes compare with those of nonpathway graduates?

This year's evaluation report draws on four sources of data:

(1) Interviews with ConnectEd coaches and with key district and school personnel, interviews with administrative and student support staff members from community colleges with large concentrations of Linked Learning graduates in four of the nine districts, and focus groups with Linked Learning graduates in their first year at these same colleges. This qualitative data collection focused on more developed pathways: those that were certified, nearing certification, and/or involved in regional grant activities.

(2) Data from surveys of former Linked Learning students and a matched comparison sample from three districts—Oakland, Los Angeles, and Pasadena—conducted in spring 2016 following students' 12th-grade year. We also draw on data from a survey of 12th-graders in certified pathways across the initiative from the 2013–14 school year.

(3) Student demographic and achievement data from the districts that enabled us to examine initial pathway enrollment patterns and compare engagement and achievement outcomes of students in certified pathways and students in noncertified pathways with those of their peers in traditional high school programs.[5]

[5] Data for all districts except Los Angeles came through a third party, the Institute for Evidence-Based Change. Providing all the specific data elements needed for the analysis posed a challenge for the districts, which often house data elements in different systems. Districts have had to develop systems for flagging and tracking pathway students and for reporting data elements not previously captured, such as pathway enrollment. Note that Montebello did not have any certified pathways during the evaluation period.

(4) National Student Clearinghouse data that allowed us to compare initial postsecondary enrollment and persistence outcomes of students in certified pathways and students in noncertified pathways with those of their peers in traditional high school programs.

In addition, this report draws on and references data collected earlier in the evaluation, such as surveys of high school students, focus groups with pathway students, and 7 years of interviews with district leaders and pathway teachers.

Report Overview

This report differs from previous evaluation reports in that it is designed to be comprehensive and summative, rather than highlighting new developments in the initiative or policy context. Part I of the report focuses on Linked Learning implementation and draws primarily on our analysis of the evaluation qualitative data. Chapter 2 discusses the lessons learned from the implementation of district systems and structures for supporting Linked Learning, including the importance of attention to access and equity. Chapter 3 provides an update on the four core components of Linked Learning: rigorous academics, integrated career technical education, work-based learning, and student supports. Chapter 4 provides an update on districts' plans for expanding and sustaining Linked Learning and the influence of new funding sources. Part II of the report presents Linked Learning outcomes, drawing on our analysis of student demographic and achievement data, as well as student surveys. Chapter 5 compares high school achievement and initial postsecondary enrollment and persistence outcomes of pathway students with those of their nonpathway peers. In Chapter 6, we describe pathway students' perspectives on their development of a variety of skills and competencies as a result of their pathway experiences and their experiences transitioning to college or careers. The report's final chapter summarizes the key findings from this seventh year of the study and includes implications for the regional expansion of the Linked Learning approach.

Part I: Linked Learning Implementation

Before examining how Linked Learning is impacting student outcomes—students' high school success, their postsecondary plans, and the skills students believe they have gained—we provide an overview of Linked Learning implementation in the nine districts, identifying key strategies and providing an assessment of the status of the four Linked Learning core components. What were the central successes and challenges districts encountered in implementing systems of pathways? What policies and practices did districts establish to support the access and equity goals of Linked Learning? To what extent have districts developed the four core components of rigorous academics integrated with a core sequence of technical courses, work-based learning opportunities, and adequate student supports? And finally, how are districts planning to sustain Linked Learning and maintain districtwide systems of support for existing and new pathways?

In Part I, we address these questions by drawing on 7 years of site visit data, including document analysis and interviews with district administrators, pathway teachers, coaches, and technical assistance providers. We provide an update on implementation of both district systems and core pathway components, through the lens of the key implementation strategies we distilled from this qualitative data collection. We provide summaries of pathway enrollment and persistence data to provide a snapshot of how well districts met the equity goals of Linked Learning in terms of access to pathways for several early cohorts of Linked Learning students. The final chapter of this first part of the report examines the sustainability of the approach, examining how districts approached pathway quality and expansion and continued funding for the approach, and includes an analysis of Local Control Accountability Plans (LCAPs) to assess the extent to which Linked Learning was codified as a central approach to high school reform in each district.

Key Implementation Strategies

Throughout Chapters 2 and 3, we use special call-out boxes such as this to highlight key district and pathway implementation strategies. SRI researchers distilled these strategies from those identified by district and school administrators, pathway leads, coaches, and technical assistance providers over 7 years of interviews, as well as our own analyses of successful approaches and ongoing challenges. These strategies are intended to help districts and schools new to the Linked Learning approach benefit from the experiences of the initiative districts.

Chapter 2: District Systems

Key Findings

- Optimal implementation of Linked Learning required strong district leadership and a widely shared vision and commitment to the Linked Learning approach.
- Developing and sustaining high-quality Linked Learning pathways required a district-led continuous improvement process. The most successful systems applied certification criteria for quality assessment and used the results to provide targeted supports to pathways.
- District leaders recognized that broadening the support base for Linked Learning to include industry partners, postsecondary institutions, civic leaders, and community groups was critical to realizing pathways' full potential.
- To achieve equitable enrollment in pathways, districts must be intentional about the distribution and location of pathways, as well as the policies and recruitment practices that influence student preferences and access to pathways. Districts that achieved the most accessible pathway enrollment systems combined a required open-choice policy with centralized outreach and recruitment practices.

Designed to overcome the challenges inherent in having individual schools or pathways reform the high school experience, the Linked Learning District Initiative focused on the establishment of district systems to support and sustain multiple Linked Learning pathways. District systems are important because full realization of the Linked Learning approach requires a coherent set of instructional and human resources policies to develop and retain engaged teams of pathway teachers, an infrastructure to support work-based learning, and student enrollment and recruitment practices to make pathways accessible to all students. This chapter looks back at the experiences of the nine districts to highlight emerging strategies and ongoing challenges that can inform other districts implementing a system of pathways. The chapter examines how districts have developed supportive structures for Linked Learning, including the key district implementation strategies that interview respondents identified over the course of the evaluation, such as district leadership, vision, and effective communication. We then discuss districts' efforts to make their pathways more accessible and equitable through open-choice policies and centralized recruitment practices.

District Leadership

The success of any K–12 educational reform depends on solid and committed district leadership to maintain political will and marshal necessary resources. Most important for Linked Learning implementation are high-level district leaders who champion the work and can articulate a clear vision, set concrete goals, and develop a coherent set of strategies to guide the implementation process. In addition, it is structurally important to have both a dedicated Linked Learning director with the authority and time to oversee implementation, and a cross-district Linked Learning leadership team with representatives from many different offices (including offices of human resources and curriculum and instruction). It is also crucial for district leaders to establish a system to ensure fidelity to the Linked Learning approach and support a continuous improvement process for pathways. Finally, to reap the full benefits of the Linked Learning approach, district leaders must broaden support for Linked Learning by forging partnerships with local businesses, postsecondary institutions, and community groups.

Districts that achieved the broadest buy-in for Linked Learning communicated a widely shared vision and commitment to the Linked Learning approach and established concrete goals and actionable strategies.

The adoption of Linked Learning as the central approach to high school within a district depends on changing the perceptions of a wide range of stakeholders, including students and parents. Stakeholders must move beyond traditional notions of vocational education as a track for low-performing students and embrace a vision of applied learning in high school through integrated academic and career technical education.

Key Implementation Strategy: Common Vision

Educators across the district and at every level must have ***common vision*** for Linked Learning and understand, buy into, and explicitly support implementation; in particular, the superintendent, executive cabinet, and school board must be ***visible and public champions*** of the effort.

Districts are best positioned to achieve districtwide buy-in and commitment to Linked Learning when their superintendents and school boards vigorously champion the initiative and effectively communicate to all stakeholders that Linked Learning is the district priority for secondary school reform. In initiative districts, some superintendents were much more visible champions of Linked Learning than others—they served as active spokespersons, publicly speaking about Linked Learning at every opportunity; they aligned Linked Learning with other district priorities (e.g., the Common Core State Standards); and they regularly participated in Linked Learning professional development events convened by ConnectEd across the state. It is in the districts with the most active and visible superintendent support that we observed the greatest broad support and buy-in for Linked Learning systemwide and the most progress with implementation. For example, Porterville Unified School District achieved strong implementation by making an early commitment to a clearly defined plan for a districtwide Linked Learning system and by maintaining consistent and highly visible support for that plan from the superintendent and other key district staff. On the other hand, some districts struggled with high levels of turnover within the district leadership team. In one district with a new superintendent, a staff member noted that there was “a lack of shared vision across the senior leadership for what we're trying to do. They say they are behind pathways, but their actions suggest that they are really dismantling systems that we're building just as fast as we build them.”

In addition to top-level leadership support, initiative districts also demonstrated the importance of having a clear communication plan at the start of implementation. One high-level district administrator described the effort involved in building this common vision: “Communicate relentlessly. If you think someone got it, say it again, put it in writing, put it on the website.” The strongest communication plans coalesced around concrete goals and actionable strategies for turning the goals into reality. One effective strategy that ConnectEd promoted was to develop a graduate profile aligned with the goals of Linked Learning. As defined by ConnectEd, the graduate profile is “a set of student learning outcomes that identify what all graduates should know and be able to do to be prepared for college, career, and civic participation” (Stearns, 2012). One Linked Learning director explained that “[The graduate profile] has been our compass. It really has served the purpose with serving K–8, the entire district, so it’s something that we use constantly with regard to assessment, accountability, around all the work we’re doing with Linked Learning, with college and career readiness, and the standards.”

By the end of the initiative, six of the nine districts had developed graduate profiles aligned with Linked Learning and two others were in the process of doing so. The ninth district did not have an aligned graduate profile, but it did have a college and career framework that listed the types and frequency of

work-based learning opportunities, college exploration and preparation activities, and dual-enrollment opportunities that students should experience throughout the year for grades 6–12.

Successful adoption of Linked Learning required a dedicated Linked Learning director, with high-level positional authority, and a cross-district Linked Learning Leadership team.

Key Implementation Strategy: Leadership

Successful adoption of Linked Learning requires:

- A ***dedicated Linked Learning director*** with high-level (i.e., cabinet) positional authority, supervisory authority over high school principals, and a support team.
- A ***cross-district Linked Learning leadership team*** with representatives of many district offices (including offices of human resources and curriculum and instruction), as well as principals and pathway leads.

Often, district leaders must analyze and adjust lines of authority, decisionmaking, and communication to accommodate information flow and clarify roles and responsibilities to facilitate the implementation of new initiatives. All nine districts created a Linked Learning director role (although they did not always use that title) so someone would have the time and authority necessary to oversee implementation of the initiative. However, the nine Linked Learning directors were positioned differently in their respective districts' organizational hierarchies. Linked Learning directors who had the most influence over the initiative either were in a position to participate in high-level planning and decisionmaking or had direct access to high-level decisionmakers. Moreover, Linked Learning directors found it easier to be effective when they had line authority over high school principals. In districts where they did not, getting all principals of comprehensive high schools to embrace the full Linked Learning visions proved challenging. This structuring of the Linked Learning director position was not the norm everywhere. It took multiple attempts for some initiative districts to situate Linked Learning appropriately within the district organizational structure, and others were still grappling with the question of where it fit best by the end of the evaluation. In the early years of the initiative, ConnectEd district coaches played a crucial role in helping district staff examine and confront leadership structures and district practices that impeded systems development.

Key Implementation Strategy: Human Resources Policies

Successful Linked Learning implementation requires ***favorable human resources policies*** to recruit and retain pathway teachers and allow for the development of experienced, collaborative pathway teaching teams.

A further consideration is the need for the Linked Learning director to have a district team that can support the implementation of Linked Learning pathway components (e.g., work-based learning, curriculum development, student supports). The most successful initiative districts established a cross-district Linked Learning leadership team with representatives of many district offices (including offices of human resources and curriculum and instruction), as well as principals and pathway leads. For example, in Long Beach, the Linked Learning director led implementation with support from a leadership team that included high school principals and an executive team that met monthly and included the Deputy Superintendent of Schools, the Superintendent of Education Services, the Assistant Superintendent of Middle Schools, and the Assistant Superintendent of High Schools. The district Linked Learning office also had staff housed at each high school, providing a direct link to school staff. By contrast, other districts offset the lack of a leadership team by giving the Linked Learning director optimal positioning and authority. For example, in Montebello the Linked Learning director was also the Director of Secondary Education, and as such had influence over both instruction and the high school principals.

Establishing a cross-district leadership team is important for two reasons: first, it creates distributed ownership of Linked Learning in the district, protecting the sustainability of the initiative from leadership transitions; second, by bringing offices of curriculum and instruction and human resources into the leadership team, districts are more likely to advance a set of coherent and mutually supportive policies. For example, successful Linked Learning implementation requires human resources policies that allow pathways to recruit and retain pathway teachers and allow for the development of experienced, collaborative pathway teaching teams. For initiative districts, this was particularly important during the 2010 budget crisis, when career technical education teachers, vital to Linked Learning pathways, were particularly vulnerable to layoffs. In Pasadena, the school board was able to pass a resolution permitting the district to deviate from terminating certificated employees in order of seniority, which allowed them to protect trained pathway teachers from layoffs.

In addition to supportive human resources policies, alignment of district priorities around curriculum and instruction with Linked Learning is key to successful implementation of the approach. The adoption of the Common Core standards in the midst of the initiative provided a proof point for the importance of this type of instructional alignment. The goals of Linked Learning and the objectives of the Common Core standards are mutually supportive; they both emphasize real-world integration and application of academic and technical skills and knowledge, higher-order thinking skills, and student assessment through authentic demonstrations of learning (Rustique & Stam, 2013). In districts where the curriculum and instruction department sent a clear message that Linked Learning was the way to teach the Common Core standards in high school, teachers were more likely to understand this alignment. However, in other districts the Common Core standards were implemented in parallel to Linked Learning with separate (and sometimes competing) professional development opportunities. According to the Linked Learning director of one such district:

> I think there's still some misunderstanding in our Teaching and Learning Department about the power of Linked Learning. Where they are so focused on Common Core, and Common Core their way, that they don't always totally get—“Oh, this is how you can contextualize. Oh, this is how you could get kids cooperating in groups.”

When the Common Core standards were implemented in parallel to Linked Learning, some teachers reported feeling that state standardized testing was a barrier to integration. They felt pressure to cover the academic content in their courses and felt that they could not devote instructional time to technical content. As a result, integration of career themes and work-based learning experiences often occurred solely in career technical courses. However, when implemented well, integration should not require teachers to add content; rather, teachers should use technical skills and applications to contextualize the academic content.

Developing and sustaining high-quality Linked Learning pathways required a district-led continuous improvement process. The most successful systems applied certification criteria for quality assessment and used the results to provide targeted supports to pathways.

In the early years of the initiative, districts used the external ConnectEd certification process to move pathways closer to meeting Linked Learning’s Essential Elements for Pathway Quality. In the later years, some districts shifted to implementing an internal continuous improvement process for all pathways (certified and noncertified).

By 2015–16, four districts required all pathways, regardless of certification status, to assess their quality and fidelity to the Linked Learning approach using either ConnectEd’s Online Pathway Tool for

Improvement and Certification (OPTIC) or the NAF self-assessment framework. An additional district did not require pathway assessments but made both tools available to all pathways.

Key Implementation Strategy: Continuous Improvement

Districts need to ensure fidelity to the Linked Learning approach and support a continuous improvement process for pathways that is valuable to district staff and pathway teachers.

Districts used assessment tools to support continuous improvement, specify areas in need of support, and identify pathways' progress with Linked Learning implementation. For example, Sacramento tied district support to the use of the OPTIC tool as an incentive for pathways to go through a process of reflection and improvement. To receive funding or coaching support, the district required that pathways complete an action plan or self-assessment using OPTIC. In Long Beach, district leaders surveyed pathway leads about their progress with each of the seven Essential Elements for Pathway Quality at the beginning of the 2014–15 year (ConnectEd, n.d.-c). The district then used the results to target pathway-level supports to the two elements on which the least amount of progress had been made. Interviews with pathway leads and district staff across the districts suggested that most found the self-assessment helpful in identifying the pathway's status in the Linked Learning implementation process and reported value in having a centralized districtwide assessment system to evaluate quality. One principal reflected on the value of the self-assessment:

> To the extent there are objective and valuable ideas of what a quality program consists of and to the extent that you can verify that those things exist, I think it's useful. I think that in the absence of such effort, the quality of the program could get lost in schoolwide accreditation concerns. Whether you are a certified model or distinguished pathway seems like a work in progress…. Having some kind of a mechanism or leverage to ask teachers to be attentive to these program quality criteria, it's useful. It's another way to keep us focused on the development of the academy.

Despite the overall benefits of pathway self-assessment, district leaders encountered some difficulties in implementing quality assessment systems. Pathway teachers in some districts viewed the assessment as compliance driven rather than focused on improvement. For example, pathway leads in one district found that although the structure of the assessment process was beneficial, communication from the district about quality review was overly directive. Leads indicated that they would have preferred a more collaborative process as they worked to identify areas for improvement. One pathway lead in the district stated:

> I think that the structure has a whole lot of aspects to it that can be really good for kids.... But I also feel like, as a teacher in an academy right now, a lot of teachers feel like we're in a punitive position all the time—you're sort of like, "I hope I don't get in trouble."

Overall, districts' experiences with implementing quality assessment systems were positive. Districts that experienced the most success emphasized that the purpose of the system was to promote quality rather than accountability. Successful districts also used the assessment results to provide targeted supports to pathway teams.

District leaders recognized that broadening the support base for Linked Learning to include industry partners, postsecondary institutions, civic leaders, and community groups was critical to realizing pathways' full potential.

Key Implementation Strategy: Broad-Based Coalition

A coalition of **regional industry partners**, **civic leaders** (e.g., Chamber of Commerce, mayor), and local **postsecondary institutions** is crucial for developing industry partnerships, supporting work-based learning, smoothing transitions to postsecondary education, and sustaining Linked Learning.

In addition to creating supportive internal policies and structures, districts need to engage successfully with a wide range of external partners to ensure that students' high school experiences are authentically preparing them for both college and careers. In the beginning of the initiative, ConnectEd encouraged districts to form their own broad-based coalitions (BBCs) of key stakeholder groups (e.g., postsecondary institutions, business and civic organizations, community-based organizations, advocacy groups). During the planning and early implementation stages of the initiative, district Linked Learning leaders directed their outreach efforts toward a range of stakeholders in the district and the community to lay the groundwork for Linked Learning. However, most districts did not maintain the ongoing dialogue necessary to generate and sustain buy-in, particularly as changes in district personnel occurred. As a result, BBCs were underdeveloped in most districts in the early years of the initiative. Then, as discussed in Chapter 1, new state and Foundation funding opportunities in the later years of the initiative facilitated the creation of regional consortia of key stakeholder groups (e.g., K–12 school districts, postsecondary institutions, business and civic organizations), catalyzing the external engagement component of the Linked Learning approach. For districts in the initiative, the new funding provided the opportunity to develop broader support for pathways and improve two of the elements where Linked Learning implementation had lagged—work-based learning systems and postsecondary transitions. However, the regional consortia also created new challenges, such as creating a regional identity, finding the right coalition leadership, and developing a common language across diverse organizations and sectors. We discuss the regional consortia's influence on the sustainability of the initiative in Chapter 4.

Access and Equity

In addition to providing leadership, common vision, and support for implementation of the initiative, the district office is also responsible for the assignment policies whereby students enroll in pathways. Student choice of pathway is a fundamental principle of Linked Learning as it helps to ensure that pathway career themes are relevant to students' interests. Thus, it is important for districts to have open high school choice systems so all students have access to all pathways. However, according to ConnectEd's Essential Elements for Pathway Quality, accessibility is not the only determinant of equity (ConnectEd, n.d.-c). ConnectEd also highlights the need for pathways to reflect "diversity and strengths" of their communities. In other words, pathways ideally should be both accessible to *and* demographically representative of each district's full high school population.

Key Implementation Element: Attention to Equity

To achieve equitable enrollment in pathways, districts must be intentional about the distribution and location of pathways, as well as the policies and recruitment practices that influence student preferences and access to pathways.

In many district contexts, open-choice policies alone will be insufficient to accomplish the goal of representative pathway enrollments. Research indicates that low-income and minority students generally choose their neighborhood schools because of convenience, tradition, a desire to be with other students with similar backgrounds, and lack of transportation to other district

public schools (Makris, 2015; Nathanson, Corcoran, & Baker-Smith, 2013; Saparito & Lareau, 1999; Weiher & Tedin, 2002), implying that, absent any other intervention, school enrollment based purely on student choice will reflect patterns of residential segregation. Indeed, research on small learning communities and charter schools suggests that choice-based reforms, if executed poorly, can exacerbate educational inequality by stratifying students by race, class, or prior academic achievement within schools (in the case of small learning communities) (Lee & Ready, 2007) or among schools (in the case of charter schools) (Booker, Zimmer, & Buddin, 2005; Clotfelter, Ladd, & Vigdor, 2013; Frankenberg, Siegel-Hawley, & Wang, 2011). To achieve representative pathway enrollments, districts need to go beyond instituting open-choice policies and actively work to reduce the barriers that students from diverse backgrounds confront when making school choices.

Districts that achieved the most accessible pathway enrollment systems combined a required open-choice policy with centralized outreach and recruitment practices.

By the time of our final data collection in 2015–16, seven districts—Antioch, Oakland, Long Beach, Montebello, Sacramento, Porterville, and Pasadena—had instituted choice policies where students could select pathways at any high school in the district. However, not all choice policies are created equal. Most of these districts instituted choice systems that allowed interested students to opt out of their default high school option and choose another school or pathway in the district. Although technically all students have a choice in this type of system, only students who are both informed of their choices and sufficiently motivated to make a change will take advantage. On the other hand, two of these districts—Antioch and Pasadena—required all eighth-graders to apply for a pathway or high school to attend in ninth grade. In Antioch, district staff reached out repeatedly to parents to try to ensure that all eighth-graders submitted applications. An additional district, Oakland, required all eighth-graders to select a high school. Because Oakland pathways began in 10th grade, however, students may have selected a high school without full consideration of the pathway options it afforded. In all three of these districts, students who joined the district late or did not submit an application for any other reason defaulted to their neighborhood schools and, in the case of schools with wall-to-wall pathways, were assigned to a pathway.

Further, although Long Beach had an open-choice system, the district had a cadre of 25 Specialized Secondary Programs, including 16 pathways, which admitted students on the basis of an academic index consisting of grades and test scores. Because these pathways had entrance criteria, we do not consider them to be open access. All interested students could apply to the remaining 32 pathways in the district, with preferences given to neighborhood students. The result of this system was that students who didn't attend a specialized program typically attended their neighborhood high schools. Choice was also constrained in the geographically vast district of Los Angeles, where students were allowed to choose schools and pathways only within smaller, defined geographic zones. Finally, West Contra Costa allowed students who were interested in a pathway theme that was not available at their local high school to transfer to another school, but in spring 2016 the district was only beginning to plan to publicize this option and did not plan to provide transportation to facilitate high school transfers.

In any choice system, access to information is also an important determinant of equity. Thus, recruitment efforts are also key to understanding students' pathway enrollment patterns. Recruitment efforts can ensure that students are aware of their pathway options and may also help shape students' preferences, encouraging them to break out of an expected career path or neighborhood school option by exposing them to new opportunities. Five districts—Pasadena, Antioch, Porterville, Montebello, and Sacramento—drove the recruitment efforts centrally. In these districts, pathways were generally involved to some degree in the district-driven recruitment efforts, but most marketing and recruitment efforts were centralized at the district level. Other districts provided some information about pathway options in high school choice materials but allowed individual pathways to drive a majority of the middle school recruitment and marketing efforts. This approach generally resulted in uneven recruitment efforts across

pathways, with some pathways conducting direct outreach at middle schools and others taking a more passive approach to recruitment. The difference between district-driven and pathway-driven recruitment efforts is perhaps best exemplified by the fact that district-driven recruitment always included some type of centralized recruitment fair in which eighth-graders and their parents received information about all pathway options. In pathway-driven recruitment, students and parents were more likely to learn about pathways one at a time. At the beginning of the initiative, Sacramento had pathway-driven recruitment, but by the end, the district had started to offer a pathway showcase and to limit the outreach individual pathways could conduct in middle schools because of concerns that some pathways were selectively recruiting from more advantaged middle schools.

Finally, in addition to structuring an open high school and pathway choice process and ensuring equitable access to information, districts can also take steps to reduce the logistical barriers, such as transportation, that disadvantaged students face in choosing a pathway outside of their neighborhoods. Districts can address this problem either by strategically locating pathways across the district or by providing transportation. For example, instead of prioritizing districtwide choice, Long Beach focused on making a robust selection of pathway options available within each school. Providing transportation was a largely underutilized equity strategy in nearly all districts, but certain isolated examples are worth noting. Porterville provided transportation to make its pathway options accessible to all students, and Montebello, recognizing this as a major barrier for its student population, planned to begin offering transportation to its only wall-to-wall pathway campus in 2016–17.

Three districts achieved representative enrollment in certified pathways, reflecting the challenge in realizing equity in a choice-based system.

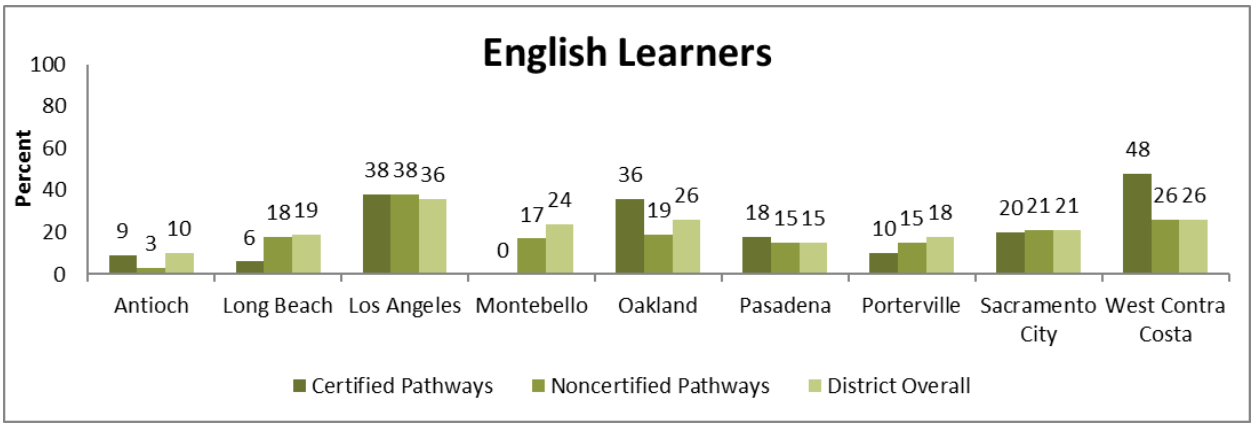
We also compared the demographic composition of students enrolled in pathways, both certified and noncertified, with those of high school students in the district overall. This analysis of the degree to which certified pathways reflected the diversity of the high school student body in each district revealed that equitable enrollment in pathways is difficult to achieve.[6] In only three districts—Los Angeles, Pasadena, and Sacramento—did certified pathways enroll both English learners and special education students at close to representative rates (Exhibit 2-1).

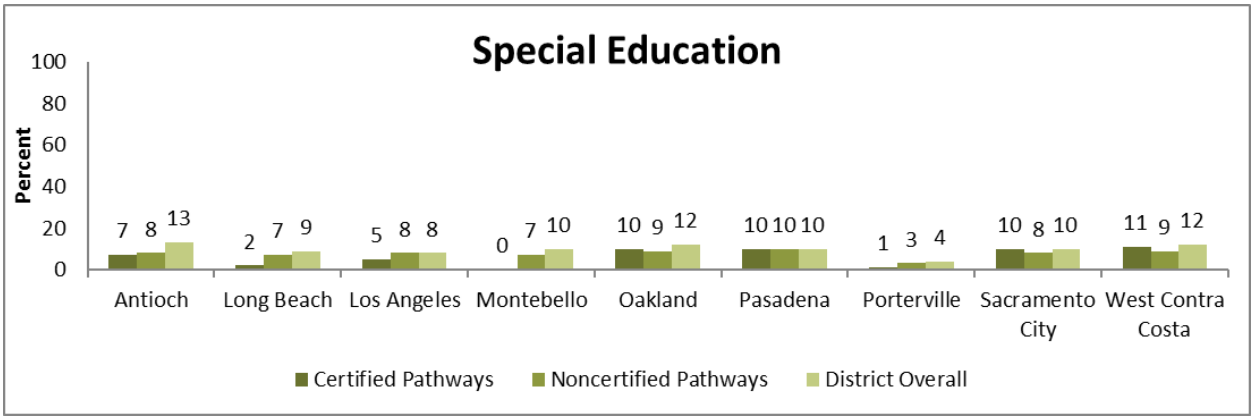
In considering these enrollment patterns, it is important to note that these numbers reflect the demographic distribution of students in pathways for the cohorts of students followed in this study only, the classes of 2014–15.[7] As such, the latest cohort of students included made their high school choices and began their freshman year in fall 2011. Therefore, any changes in enrollment patterns resulting from the later policy shifts that initiative districts implemented to improve access to pathways (e.g., Antioch's moving to a required choice system, several districts' improving their middle school outreach practices) are not reflected in these numbers.

[6] We included a similar analysis in the sixth-year evaluation report. We include this update to provide a final description of enrollment for the cohorts in our sample aligned with the cohorts and pathways examined in Chapter 6, including the addition of one certified pathway in Los Angeles.

[7] The analysis also included the class of 2013 in Antioch, Long Beach, Porterville, and Pasadena.

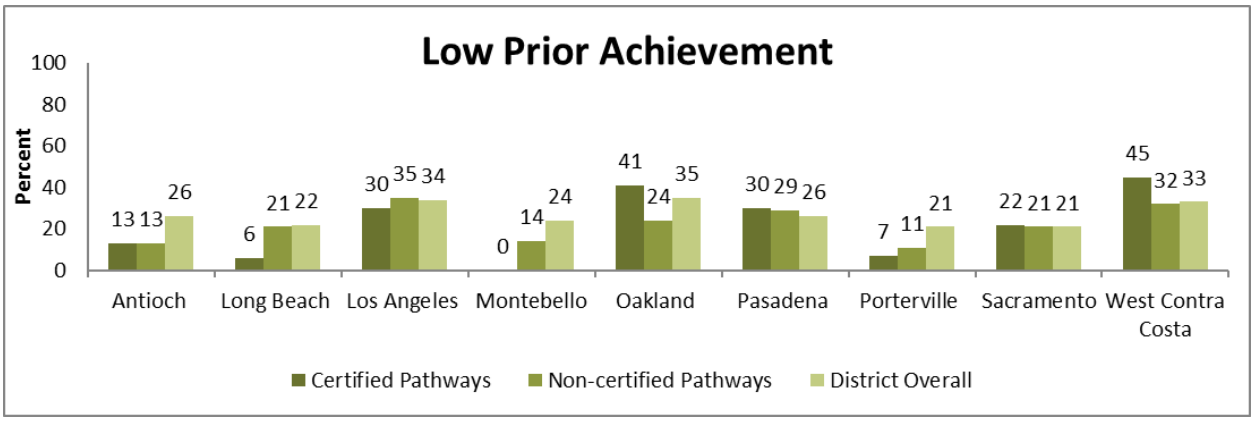
Exhibit 2-1
Enrollment, by Student Subgroup

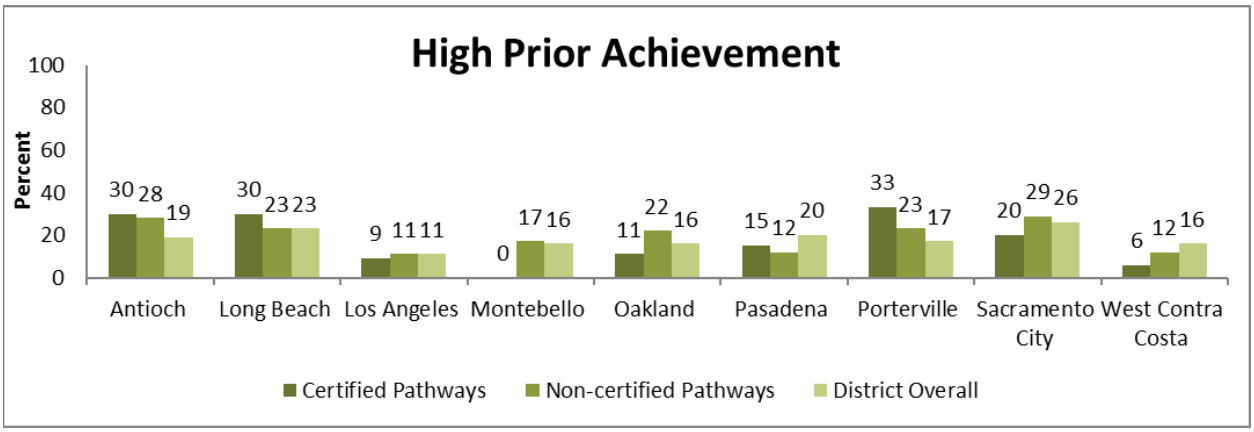




We also looked at these enrollment patterns for evidence that certified pathways were accessible to students with low prior achievement and attractive to those with high prior achievement (Exhibit 2-2). In districts where students with low prior achievement were underrepresented in certified pathways, students with high prior achievement tended to be overrepresented, and vice versa. Underrepresentation of students with low prior achievement can indicate the existence of pathway entrance criteria, as in Long Beach, whereas overrepresentation of students with low prior achievement raises concerns that pathways serve as a track of low-achieving students in a district. Again, only in Los Angeles, Pasadena, and Sacramento did certified pathways enroll students with low prior achievement at close to representative rates. In Oakland and West Contra Costa, students with low prior achievement and English Learners were overrepresented in certified pathways, in part reflecting the demographics of the schools that housed these pathways. In West Contra Costa, certified pathways were concentrated in the districts' high schools that served a more economically disadvantaged student body, and the district was less successful establishing pathways in the more affluent parts of the district. In Oakland, despite the districtwide choice policy, students selected high school in eighth grade but didn't select their pathway program until ninth grade, when they were already committed to a high school.

Exhibit 2-2
Enrollment, by Prior Achievement Level





Although district choice policies and recruitment practices are important, student preferences were hard for districts to influence. In the second-year evaluation report, we described how large percentages of pathway students cited school safety (89%) and academic reputation (88%) as important reasons for selecting their high schools, followed by the special theme or focus that they offered (83%) and convenience of location (78%).[8] We also found that students self-segregated by pathway career theme and academic reputation. For example, the fifth-year evaluation report presented evidence that students sort by gender: Engineering pathways across the initiative enrolled disproportionately high numbers of boys, whereas health pathways enrolled disproportionately high numbers of girls. In addition, pathway reputation can serve as a deterrent to enrollment, either because the pathway is viewed as a vocational track (in the case of a transportation pathway) or because a reputation for being academically demanding attracts high-achieving students (Guha et al., 2014). These findings underscore the complexity of student choice.

[8] These findings were based on a survey of pathway students in six districts: Antioch, Long Beach, Pasadena, Porterville, Sacramento, and West Contra Costa.

Conclusion

In this chapter, we have described some lessons learned from the experiences of nine diverse districts implementing systems of Linked Learning pathways over the last 7 years. These districts achieved varying success in terms of their leadership functions and realization of an accessible and equitable system of pathways, but their progress and challenges offer insights to other districts considering or just beginning to implement a system of Linked Learning pathways.

From this initiative, we know that districts cannot achieve system change without bringing all stakeholders, within and outside the system, on board with Linked Learning. District leaders need to be front and center in the implementation process, actively championing Linked Learning to broaden the support base, align key district policies and practices, and remove structural barriers to implementation. Effective teamwork requires that key stakeholders have a shared, clear vision for change, a coherent set of strategies to guide the change process, and a system for supporting continuous improvement. District leaders need to build their staffs' capacity, which means providing necessary supports to increase educators' skills to do their jobs and holding them accountable if they do not. Finally, district leaders need to approach their student assignment system with intentionality to ensure that their pathways are accessible to all students. Districts must take active steps to make pathways attractive to students of diverse backgrounds and reduce the barriers that disadvantaged students confront when making high school choices.

Chapter 3: Linked Learning Core Components

Key Findings

- Integrated projects were a central strategy for connecting the academic and technical curricula. Pathways were more likely to implement high-quality integrated projects in districts that provided formal guidance and support for this integration.
- School leaders were crucial to the success of Linked learning, because they control the systems and structures, such as the master schedule and teaching assignments, that facilitate teacher collaboration and integrated instruction.
- To consistently offer intensive work-based learning opportunities such as internships to pathway students in the upper grades, pathways needed assistance forging connections to industry partners, matching students with opportunities, and linking these experiences to the pathway curriculum. Pathway teachers lacked the time, skills, and (in some cases) connections to take on all these functions.
- Pathways provided support for students through strong relationships with teachers and peers, fostered by pathways' small size and dedicated teaching staff. Students with special needs, such as special education students, English learners, and students with low prior achievement, may require targeted academic support to succeed in the untracked (or less tracked) pathway curriculum.

Over the 7 years of the evaluation, we have documented districts' progress establishing systems to support the core components of Linked Learning: rigorous academic coursework integrated with a sequence of career technical courses, work-based learning, and student supports. In Chapter 2, we described the systems needed at the district level to support strong and equitable pathways. In this chapter, we consider the extent to which districts realized these systemic pathway supports by examining pathways' progress in implementing the core Linked Learning components, the challenges they faced, and the promising strategies that emerged. Throughout, we highlight the structures and supports that need to be in place at the school level to facilitate successful implementation of Linked Learning.

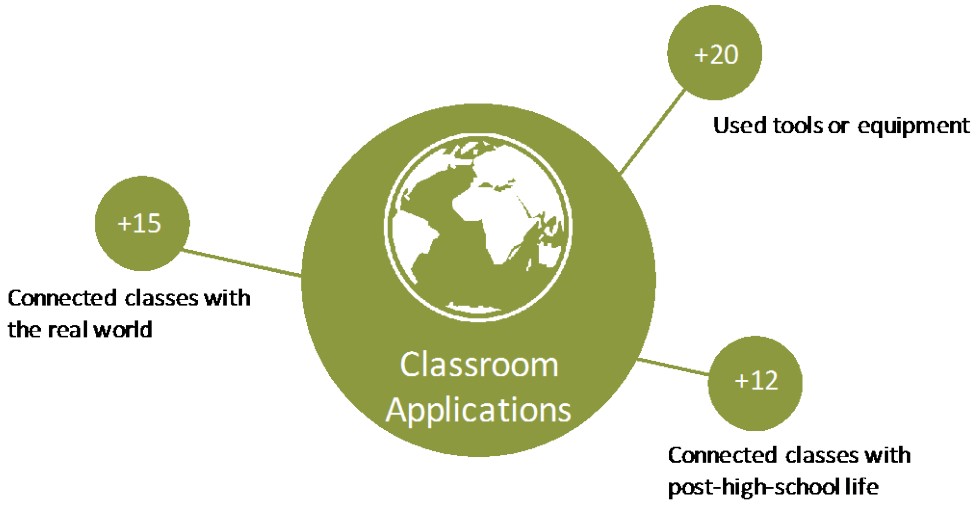
Rigorous, Integrated Academic and Career Technical Instruction

The Linked Learning approach calls for pathway teachers to implement a rigorous academic and technical course of study that prepares students to successfully pursue a range of postsecondary options, including career tracks and continued education. As a result, pathway teachers are tasked with making connections across the academic and technical curricula in ways that integrate theoretical knowledge and real-world applications (ConnectEd, n.d.-b). Over the 7 years of the evaluation, we found that pathway teachers' efforts to implement an integrated curriculum occurred largely through integrated projects, in which multidisciplinary teams collaborated to plan and present lessons organized around a central, career-themed issue or problem (ConnectEd, n.d.-d).

In the fifth-year evaluation report, we described, on the basis of a survey of 12th-graders across the nine districts, how certified pathway students were more likely than comparison students to report receiving relevant instruction that linked real-life applications to theoretical knowledge. We also found that greater percentages of pathway students than comparison students reported that a teacher explained how what they learned in class could be applied to what they might do after they finished high school (70% versus 58%), asked them to use tools or equipment (69% versus 49%), and discussed how to apply what they

were learning in class to the real world (66% versus 51%) about once a month or more often (Exhibit 3-1). However, teachers and district administrators reported in interviews that the rigor and degree of integration in pathway instruction varied greatly by pathway, and that the full potential of the Linked Learning approach had not been realized in many pathways.

Exhibit 3-1
Pathway Students Reported More Applied Learning in Their Courses Than Comparison Students



Differences between pathway and comparison students are statistically significant at the $p < .05$ level. Numbers are percentage point differences between pathway and comparison students.

Source: Spring 2014 12th-Grade Student Experience Survey (Guha et al., 2014).

In this section, we discuss the extent to which pathways were successful with implementing rigorous and integrated instruction and the district supports associated with implementing high-quality instruction.

The inclusion of high-quality integrated projects appeared to be associated with the level of formal guidance and support provided by districts for this integration.

Although the majority of pathway students reported experiencing instruction that explicitly linked academic content to real-world applications, teachers and district administrators indicated that the extent to which instruction was rigorous and integrated varied from pathway to pathway. For example, in 2015–16, district administrators in one district reported that, although the district's pathways had a higher degree of integration than the rest of the district, many pathways had room for improvement: "I feel like there are these islands of amazing instruction [but]…There is a big leap that needs to happen toward a more project-based learning approach that's more integrated across content area." Notably, the level of integration also varied by district. Respondents in one district indicated that few, if any, pathways had been successful in integrating the academic and career technical content. In contrast, pathway staff in Porterville were more consistently successful in implementing an integrated curriculum than staff in other districts, in part because of the district's commitment to dedicated common planning time, frequent communication with pathway staff, and robust support systems for pathway teachers. These centralized supports enabled pathway staff across the district to integrate the academic and technical curricula with greater consistency.

In an effort to gauge the extent of integration across pathways, we analyzed integrated projects in the sixth year of the evaluation. Specifically, we gathered information on integrated projects to examine whether pathways across the nine districts were able to meet ConnectEd's criteria for effective integrated projects. We asked pathway leads to provide evidence of the extent to which projects met the following criteria: (1) content was integrated across subjects, (2) students participated in industry-specific authentic tasks, and (3) student learning was tied to broader school, work, or personal goals. We then evaluated whether projects were integrated across at least three subject areas, included work-based learning, and used common assessment rubrics across subjects.

On the basis of the certified and advanced noncertified pathways we visited in spring 2015, this analysis revealed an association of pathway teachers' implementation of integrated projects with guidelines provided by districts regarding these projects, as well as with the supports pathway teams received for developing integrated projects, using common rubrics to assess student learning, and integrating work-based learning. The following district strategies facilitated strong integrated projects:

- **Guidelines regarding the number of subjects—**The extent to which projects were integrated across subjects was associated with district guidelines for the optimal number of subjects to integrate. For example, West Contra Costa required all pathways to implement one project (per semester, per grade) that integrated two academic core content areas with a career technical course and embedded work-based learning opportunities for students. Long Beach and Pasadena also disseminated clear district guidelines for integrated projects. In these three districts, six of the seven pathways for which we reviewed projects implemented projects that were integrated across at least three subjects.
- **Supports for developing integrated projects—**Pathway teams' success in integrating across subjects also appeared to be associated with the supports they received for developing integrated projects. Los Angeles and Oakland created strong teams of external technical assistance providers supporting pathway teachers with curriculum and instruction, and five of the six pathways we visited across both districts implemented projects that integrated three subjects. Similarly, pathway project examples from Porterville had strong integration across four subjects. Porterville teachers in the district's NAF-certified pathways benefited from the support they received from NAF, which provided pathways with predeveloped course curriculum, projects, and assessment rubrics.
- **Professional development on use of common assessment rubrics—**Although most pathway projects had defined student learning goals, few used common assessments across subjects to evaluate students' performance. To measure student learning, teachers in most pathways used subject-specific rubrics for the integrated project rather than a common assessment rubric; in fact, most pathway leads did not know how their colleagues in other subjects were assessing the integrated project. Half the pathway teams that did use common assessments had received technical assistance to develop rubrics, suggesting that pathway staff may benefit from professional development on this topic.
- **Strong external partnerships to support work-based learning—**Inclusion of work-based learning in integrated projects appeared to be more prominent in pathways with strong work-based learning support from advisory boards and industry experts. Porterville, a district that provided pathway staff with strong district-level work-based learning supports, was the only district in which all visited pathways implemented an integrated project that included work-based learning. The Linked Learning leadership team in Porterville also implemented guidelines requiring that all students in Linked Learning have three core work-based learning experiences before graduation.

To implement rigorous, integrated instruction, pathways needed an engaged team of teachers who worked together to plan across subjects and a master schedule that facilitated collaboration time and dedicated pathway classes.

Key Implementation Element: Team of Teachers

Pathways must comprise an engaged ***team of teachers*** who come together as a community of practice to develop integrated curriculum, deliver high-quality instruction, and support students.

Successful pathways relied on an engaged team of teachers willing to abandon traditional approaches to instruction and devote valuable planning time to integration. Personnel turnover within pathways and lack of staff buy-in presented challenges for high-quality integration, impeding the development and refinement of integrated projects from year to year. As the percentage of high school teachers assigned to pathways grew in districts moving toward wall-to-wall pathways, districts could no longer staff pathways only with teachers who volunteered to teach in these programs, and the level of engagement of teachers across pathway teams suffered. One principal noted, "The idea of teachers voluntarily coming together is kind of a pipe dream. If you're a wall-to-wall [pathway] urban school, they're not volunteering." In pathways that experienced high personnel turnover, lesson plans for integrated projects and in-depth knowledge of the pathway curriculum disappeared when veteran teachers left the pathway. In one district with particularly high levels of teacher turnover, brand new teachers were asked to assume the role of pathway lead for lack of other options. Without the benefit of veteran pathway teachers with experience integrating the curriculum, new teachers struggled to make meaningful connections across content areas. One veteran pathway teacher reflected on the importance of continuity of teachers to the success of a pathway: "I would love to see the system not depend on personnel but don't think that can happen."

Teachers also need time to work together to integrate instruction across subjects effectively. Protected planning time in the master schedule enables pathway staff to plan integrated, cross-curricular projects; create common assessments; discuss curricular connections to industry themes; incorporate work-based learning experiences into instruction; and organize supports for individual students. When school master schedules failed to provide regular collaboration time through common planning periods or release days, pathway teachers struggled to create connections across the academic and technical curricula within the pathway course of study. Pathway teams in all districts reported lacking sufficient structured collaboration time to plan with colleagues.

Key Implementation Element: Master Schedules

Schools need ***master schedules*** that support: (1) regular collaborative planning time for pathway staff and (2) "pure" student cohorts that spend all or almost all of their school day moving through pathway classes together.

The master schedule also determines whether pathway students are grouped in dedicated pathway classes, allowing for implementation of an integrated technical and academic curriculum. Ideally, "pure" student cohorts move through the pathway course of study together, allowing teachers to implement multidisciplinary integrated projects and integrate work-based learning experiences into instruction. In practice, pathway staff reported that students often took courses outside the pathway, especially in the higher grades. Our analyses of transcript data in two districts, summarized in the fifth-year evaluation report, supported these reports. We found that certified pathway students typically took the same courses in English, social science, and technical subjects, while course-taking diverged in math and science; the math curriculum in high school is often highly structured and sequenced, leaving little room for flexibility.

We also found that students' coursework in the higher grades became increasingly fragmented; some higher-achieving students opted out of pathway courses during their junior and senior years to take Advanced Placement (AP) or honors classes, and some pathways provided more course-taking flexibility to students in the upper grades (Guha et al., 2014). Our interview data suggest that as districts formed postsecondary partnerships with local community college districts through the regional work, dual-enrollment courses became more common, providing an advanced coursework option as part of the pathway program of study.

Leadership was critical to the success of Linked Learning. School leaders controlled the structures that can facilitate or hinder curricular integration, and pathway leads influenced how pathway teachers used their collaboration time.

School leaders determine the degree to which Linked Learning is prioritized in the master schedule that dictates whether pathway teams have time to meet and plan together and whether pathway students are grouped into pure course sections. They also control which teachers are assigned to pathways from year to year and have some discretion in determining the resources available to pathways. As such, the support of principals and other school administrators is crucial to the implementation of Linked Learning pathways. To foster principal engagement with Linked Learning, principals were encouraged to participate in the summer institutes, and ConnectEd contracted with the University of California, San Diego, to offer principal coaching, but unless Linked Learning was well integrated into the districts' priorities for high schools, including criteria for principal evaluations, districts did not achieve consistent support and engagement for Linked Learning across school sites. A number of districts did build Linked Learning into their principal accountability systems, as discussed in Chapter 4.

Key Implementation Element: Principal Leadership

School leader investment in Linked Learning is essential to implementation because pathways require active ***principal leadership*** and support. Districts must get principals on board early, support them in implementation through coaching and technical assistance, and hold them accountable.

Key Implementation Element: Support for Pathway Leads

Pathway leads play a critical and too often underappreciated role in school-level pathway implementation. Providing them with greater time to fulfill their responsibilities (e.g., additional release time) and with administrative support is essential for making the position sustainable.

Pathway leadership was equally important. Even when districts or schools provided pathway teachers with protected release time or instructional supports, staff reported that supports were sometimes co-opted by administrative or logistical issues. For example, one district instituted regular pathway lead meetings in 2014–15, with the goal of providing leads with a forum for collaborative problem solving and sharing of best practices. In practice, however, pathway leads reported that the meetings often focused on resolving administrative and reporting issues, Similarly, in 2015–16, another district hired pathway coaches to work with leads in an effort to improve the degree of integration and the rigor of instruction, yet leads reported that their coaching time frequently focused on budget planning. The difficulty of effectively fostering a generative community of practice underscores the demands placed on the pathway lead teachers and the need to provide both administrative and coaching support for this role.

Work-Based Learning

ConnectEd's work-based learning continuum outlines a sequence of work-based learning experiences, beginning with career awareness (guest speakers or field trips) and exploration (job shadows or mentoring) and moving on to career preparation (internships and integrated projects that involve interactions with professionals) and training (apprenticeships or on-the-job training). Ideally, all Linked Learning students participate in career awareness and exploration experiences in the early years of high school to learn about potential career paths and have access to opportunities at the higher end of the continuum by the end of high school. This sequence of increasingly intensive work-based learning opportunities helps students connect what they are learning in the classroom to the skills and knowledge needed in a particular industry sector.

In practice, however, work-based learning experiences, particularly at the higher end of the continuum, are very difficult to provide for large numbers of students at scale (Visher & Stern, 2015). Because no district was able to systematically document the frequency and quality of work-based learning experiences accessed by students, we base findings on student access to work-based learning opportunities in the initiative on interview and survey evidence. In almost all districts, guest speakers and field trips were the most commonly offered work-based learning opportunities, but districts struggled to consistently offer a full range of high-quality work-based learning opportunities in all pathways, particularly the more intensive experiences for students in the 11th and 12th grades. Thus, in the 2013–14 school year, 12th-grade certified pathway students most frequently reported that they had participated in activities on the earlier end of the work-based learning continuum (career awareness and career exploration), including listening to guest speakers and participating in community service while in high school. Only a third of 12th-grade pathway students, however, reported having participated in an internship (Guha et al., 2014).

Throughout the evaluation, we found that pathways appeared to provide work-based learning opportunities across the full continuum more consistently when districts provided strong, centralized staff or structures for work-based learning. In this section, we discuss both the challenges and some of the promising strategies that emerged to support pathways in offering more intensive work-based learning experiences and connecting these experiences to students' pathway coursework. For purposes of this discussion, we divide the infrastructure and systems needed to support work-based learning into three groups: (1) support for building relationships with industry to create work-based learning experiences, (2) systems to match these opportunities with pathway students and to track participation, and (3) integration of the experiences with the pathway curriculum. We conclude by discussing the challenges districts faced in providing equitable access to the more intensive work-based learning experiences, such as internships, particularly for low-income and low-achieving students.

Several districts devised promising strategies to foster ties to industry by establishing work-based learning intermediaries and strengthening pathway advisory boards.

Connection to industry must be fostered at the district or regional level so that work-based learning opportunities do not depend on the individual connections of pathway teachers, a strategy that is unlikely to lead to equitable or consistent access to work-based learning across pathways in a district. As discussed in Chapter 2, the districts by and large did not sustain early efforts to establish broad-based coalitions of industry and civic partners in support of Linked Learning, but the state's investment in regional partnerships though the CCPT reinvigorated this work. In the early years of the initiative, we found that the quality and frequency of opportunities often depended on the pathway leads' ability to create personal connections with industry partners. Although certain pathways were able to establish strong partnerships with industry contacts that led to consistent availability of work-based learning

experiences, the success of one pathway did not necessarily lead to strong partnerships districtwide. For example, a health pathway lead in one district established a strong partnership with an administrator at a local hospital, resulting in a wealth of work-based learning opportunities for students in that pathway. However, Linked Learning leaders in the district did not establish systems to translate this partnership's success to other organizations or other industry sectors.

To systematize the process of securing industry partners, some districts implemented district-level work-based learning structures or hired staff. The Linked Learning team in Oakland hired a Workforce and Economic Development Coordinator to engage with industry partners in the region and identify potential work-based learning opportunities. Some districts, like Long Beach and West Contra Costa, used their CCPT funds to hire intermediary organizations whose staff conducted outreach to potential industry partners throughout the region. Pasadena hired external organizations or individuals with industry connections, including the Pasadena Chamber of Commerce, to serve as Pathway Industry Connections. These intermediaries worked to establish relationships between pathways and industries and helped pathways create effective advisory boards. In pathways with strong advisory boards, board members were able to help identify potential partners through existing connections and knowledge of regional industry. As a result, variation in the effectiveness of advisory boards could reinforce uneven access to work-based learning opportunities across pathways. To establish more consistency and reduce fragmentation, West Contra Costa planned to merge individual pathway advisory boards within sectors; each consolidated advisory board would have a "sector navigator" who would be responsible for reaching out to industry partners.

Pathway teachers required logistical and administrative support to provide consistent and equitable access to work-based learning experiences, particularly at the more intensive end of the work-based learning continuum.

In addition to forging high-level connections with industry partners, creating work-based learning opportunities involves a myriad of logistics to transform these relationships into concrete experiences for students. Particularly at the higher end of the continuum, work-based learning experiences required a significant amount of paperwork and organization of logistics, including liability agreements and arranging for transportation. Pathway teams consistently reported lacking the time to address these responsibilities. As one pathway teacher noted, "It should NOT be falling on teachers to find these work-based learning opportunities. [It] should not be falling on them to find industry contacts…it is a full-time job in itself."

Key Implementation Element: Support for Work-Based Learning

For pathways to provide adequate work-based learning opportunities that are equitably allocated to students, districts must invest in ***staff and structures to support work-based learning*** so the responsibility does not fall solely to pathway leads and teachers.

In districts that hired staff to support work-based learning, this administrative support helped pathways increase the quality and frequency of work-based learning experiences. For example, district-level career technical education (CTE) specialists in Oakland communicated with industry partners to organize work-based learning experiences, thus removing this responsibility from pathway leads' plates. Pathway leads and district administrators viewed their work as a critical link between identifying industry partners and executing work-based learning experiences. Some districts and pathways found ways to provide administrative and logistical support for organizing work-based learning opportunities at the school site. In some Sacramento pathways, on-site work-based learning coordinators assisted teachers with organizing logistics and tracking work-based learning data throughout the school year. As an alternative strategy to increase capacity to support work-based learning at the school site, some districts experimented with

partially releasing pathway teachers during the school day to increase their capacity to focus on work-based learning. In Pasadena, the work-based learning intermediaries took responsibility for developing specific opportunities. Each of these intermediaries had grade-level goals for the number of different types of work-based learning opportunities they would create (e.g., guest speakers, career exploration visits, summer internships). By clearly defining these targets, district administrators in Pasadena reported that their pathways were able to consistently offer students work-based learning experiences throughout the full continuum. Most districts used CCPT grants to hire or augment staff to support work-based learning districtwide. Eight of the nine districts used CCPT funds to hire one or more staff members to assist pathway teams with creating work-based learning opportunities and managing relevant logistics. For example, in Sacramento, the CCPT grant funded 60% of the district work-based learning coordinator's time and, in partnership with Elk Grove, funded 10 new work-based learning staff members to support pathways in the two districts; similarly, Los Angeles was able to hire 10 work-based learning coordinators through its CCPT grant funds.

Several districts struggled with sustaining the work-based learning positions, either because they were funded through grants or because they were co-opted by other priorities. As funding for the district initiative wound down, Antioch eliminated its two work-based learning coordinator positions. These staff members had supported pathway teams with identifying potential industry partners and organizing logistics. Los Angeles initiated plans to phase out its district-level work-based learning coordinators and build capacity for work-based learning responsibilities at each school site. In Pasadena, the plan was that the two organizations developing work-based learning opportunities for the district's pathways would receive CCPT funds for 2 years to establish structures and mechanisms to create work-based learning opportunities for students; after 2 years, the organizations would continue to provide the district with support but fund the work-based learning coordination activities with internal funds. By 2015–16, leadership turnover and subsequent reorganization at the central office in Oakland resulted in the elimination of the district's CTE specialist position. These staff, who had worked with pathway staff to organize work-based learning opportunities, were transferred to a new office with new responsibilities that did not include work-based learning. District administrators reported that, without the CTE specialists, the work-based learning system became disjointed: "It's just fragmented because we don't have the boots on the ground in all of our school sites…. It's a crucial part of the work we do." Because of this loss of support, internship opportunities went unfilled because there was no one to reach out to the right pathway teachers or to help students navigate the application process. For example, one district administrator described how a technology company approached the district: "'We want 40 Oakland Unified School District children. We will pay them for a 6-week internship in downtown San Francisco. Apply by such and such a date.' Five children applied." Most high schools in Oakland planned to restore the CTE specialist positions at their school sites through new funding from a bond measure.

As a supplement to personnel, pathway leads in a handful of districts reported how district guidelines and formalized procedures helped improve access to work-based learning experiences. Some districts created or initiated work on industry partner handbooks that lay out the processes and guidelines for hosting work-based learning experiences, or adopted curriculum that included guides for employers, such as the Exploring College and Career Options (ECCO) program in Oakland and Pasadena. In addition, pathways benefited from district-level guidelines around the number and types of work-based learning opportunities students should experience. For example, district administrators in Porterville required that all students in Linked Learning pathways have three core work-based learning experiences to complete the pathway: a mentor conference in 10th grade, mock interviews in 11th grade, and an internship in 12th grade. Similarly, Pasadena required that all students complete 60 hours of work-based learning or community service in order to graduate. In both districts, the requirements provided useful guidance

around expectations for work-based learning, and both districts also provided centralized supports (e.g., work-based learning coordinators) to help pathway leads meet these requirements.

Districts also explored strategies to efficiently expand work-based learning opportunities that relied less on personnel by leveraging technology. Two districts purchased software to streamline work-based learning processes; Sacramento adopted LaunchPath, a platform that connects students to internship opportunities, while sites in Long Beach and Sacramento have used Nepris, an online tool that allows guest speakers to "visit" classrooms virtually. Similarly, a health pathway in Oakland used grant funding to create virtual internship experiences. These virtual platforms may be a promising strategy to increase the frequency and quality of work-based learning opportunities in regions dominated by small businesses or in districts that struggle with transporting students to industry partners. One regional partnership used CCPT funds to develop a homegrown database for tracking companies interested in working with schools. However, according to one work-based learning intermediary, the tool was not widely adopted because it was rolled out too early without clear guidelines on how contacts could be shared or protected.

Some districts also attempted to establish systems for tracking participation in work-based learning, but these systems relied on teachers or other staff to input data, and we did not hear examples of how these data, when available, were being used strategically to identify gaps or monitor equity. Without systematic data on the quality or frequency of work-based learning experiences, pathway leads had limited information with which to make strategic decisions around future work-based learning opportunities. Porterville tracked participation in one core work-based learning experience for each grade level from 10th through 12th grade in its student information system, but the process for compiling and inputting these data at the school site was cumbersome. In districts that implemented systems to track the frequency of work-based learning experiences, pathway leads were also often tasked with inputting data. Because of time constraints, pathway staff were unable to use existing data tracking systems effectively. Although no district was able to implement data tracking systems that documented both frequency and quality of work-based learning systems, such systems, ideally integrated in the districts' student information systems as in Porterville, will be critical to improving work-based learning opportunities in the future. To ensure that all students have access to high-quality work-based learning, pathway leads and district administrators will need systemic data on how often students are accessing each type of opportunity and what they are learning from their experiences.

Although district systems to support teachers in linking students' work-based learning experiences to their pathway coursework were underdeveloped across the nine districts, a few promising strategies emerged.

The final area where district systems can support work-based learning is by supporting pathway teachers in learning how to integrate these experiences into the pathway program of study. Integration is important because work-based learning experiences can make the curriculum more compelling to students by demonstrating the relevance of skills students learn in schools. For example, in an education pathway, students had to draw on what they learned in their education psychology course to plan, teach, and implement a lesson at an elementary school in their district. In addition, the theory motivating the service-learning movement suggests that students are more likely to crystallize these experiences into new competencies if they have opportunities to reflect on and articulate what they have learned (Celio, Durlak, & Dymnicki, 2011). Across the nine districts, systems

Key Implementation Element: Pathway-Level Advisory Boards

Strong ***pathway-level advisory boards***, working alongside engaged pathway leads and staff, are essential in helping pathways develop curriculum, assess student performance, and identify work-based learning opportunities.

to support integration of work-based learning into the pathway curriculum remained underdeveloped by 2015–16, but promising strategies fell into two main categories: district guidelines and supports, and strategic use of pathway advisory boards.

District supports for integrated instruction included curricula, guidelines, professional development, and coaching. In Long Beach and Oakland, supports for integration took the form of curricula on which teachers could draw. Oakland participated in an evaluation of the expansion of the ECCO program, and Pasadena also adopted the program. ECCO was designed to increase districts' capacity to offer opportunities to students to learn about their career and postsecondary education options, including teacher resources and lesson plans (Visher, Altuna, & Safran, 2013). Similarly, some pathways in West Contra Costa adopted Y-Plan, which provides a toolkit for teachers and civic leaders to implement projects addressing problems in students' communities. In Long Beach, district administrators hired industry partners to create curricula for career readiness courses that aim to prepare students for internships. The Linked Learning office in Long Beach also provided pathway teachers with professional development on work-based learning integration and, as in Oakland and Sacramento, organized teacher externships to deepen educators' understanding of the pathway industry theme. However, district administrators noted that teachers continued to struggle to think past guest speakers and internships. Some districts, like Porterville and Oakland, provided instructional coaches to help pathway teams implement a rigorous, integrated curriculum.

In addition to identifying partners, strong advisory boards helped pathways authentically integrate work-based learning into the curriculum. Pathway teachers typically did not have in-depth industry knowledge, so advisory board members were well positioned to assist teachers with making connections to industry. For example, advisory boards provided input on integrated projects and assessments and assisted teachers with creating authentic connections to industry-related skills and content knowledge. However, many pathways struggled to establish advisory boards that helped pathway teachers make connections across the academic and technical curricula. Consequently, some districts began providing pathway leads with specific supports to strengthen their advisory boards. Beginning in 2015–16, the Long Beach work-based learning coordinator provided technical assistance to pathways, helping them to establish advisory boards and better use their expertise. Work-based learning staff in Sacramento and Pasadena also began helping pathway leads with convening and engaging advisory boards.

Low-income and low-performing students faced particular challenges to participating in more intensive work-based learning opportunities, suggesting the need for targeted supports to allow these students to participate fully in pathways.

District administrators and pathway staff encountered challenges to equitably offering internships to all pathway students because of a variety of barriers outside the control of districts and schools. First, financial barriers often prevented lower-income students from accessing internships, as districts struggled to provide paid internships to all students. In Oakland, funds available to support the implementation of ECCO meant that pathway students in the district had more consistent access to paid summer internships, but industry partners could not meet the demand for paid internships among all pathway students in the nine districts. Pathway staff reported that many students chose to work a paid job during the summer rather than participate in unpaid internships. This finding is consistent with the evaluation of the ECCO program pilot, which found that across four pilot academies (none in the initiative), although nearly all juniors were interested in participating in a summer internship, only half of them reported that they wanted to or could, citing reasons for nonparticipation such as family obligations or summer jobs (Visher, Altuna, & Safran, 2013). Second, some students who had failed courses were required to enroll in summer school to recover credits, effectively preventing participation in summer internships. Finally,

undocumented students experienced challenges to accessing work-based learning opportunities that required work permits, often the higher-level experiences like internships.

These barriers to participation in a core element of the Linked Learning approach point to the need for targeted student supports for struggling pathway students. Just as pathway leads needed supports to establish effective work-based learning systems, pathway students needed supports to successfully meet the additional curricular demands of pathways. In the next section, we discuss the extent to which pathways across the nine districts were able to establish personalized supports for pathway students.

Student Supports

Linked Learning calls for detracking high schools such that all students have access to rigorous, college preparatory coursework. Students with special needs or those who enter high school with low academic skills may require extra support to succeed in pathways, compared with a more traditional high school environment where they might have been tracked into courses with lower academic demands. To address this need, Linked Learning also calls for support services "to ensure students the greatest chance of success in a rigorous pathway program of study" to supplement the personalized attention to students facilitated by small learning communities (ConnectEd, n.d.-a, p. 15). During our 7 years evaluating the initiative, our examination of student supports focused on district-level provision or coordination of student support services specifically designed to meet the needs of students in pathways (Adelman et al., 2010, p. 54). This focus stemmed from a vision for Linked Learning that includes counseling and supplemental instruction to ensure student success in a rigorous academic curriculum (Saunders & Chrisman, 2008). By and large, however, districts in the initiative left it to school sites to provide any supplemental services targeting pathway students, including English learners and special education students, and relied on the close relationships between teachers and students facilitated by pathways to provide academic, social, and emotional support for pathway students.

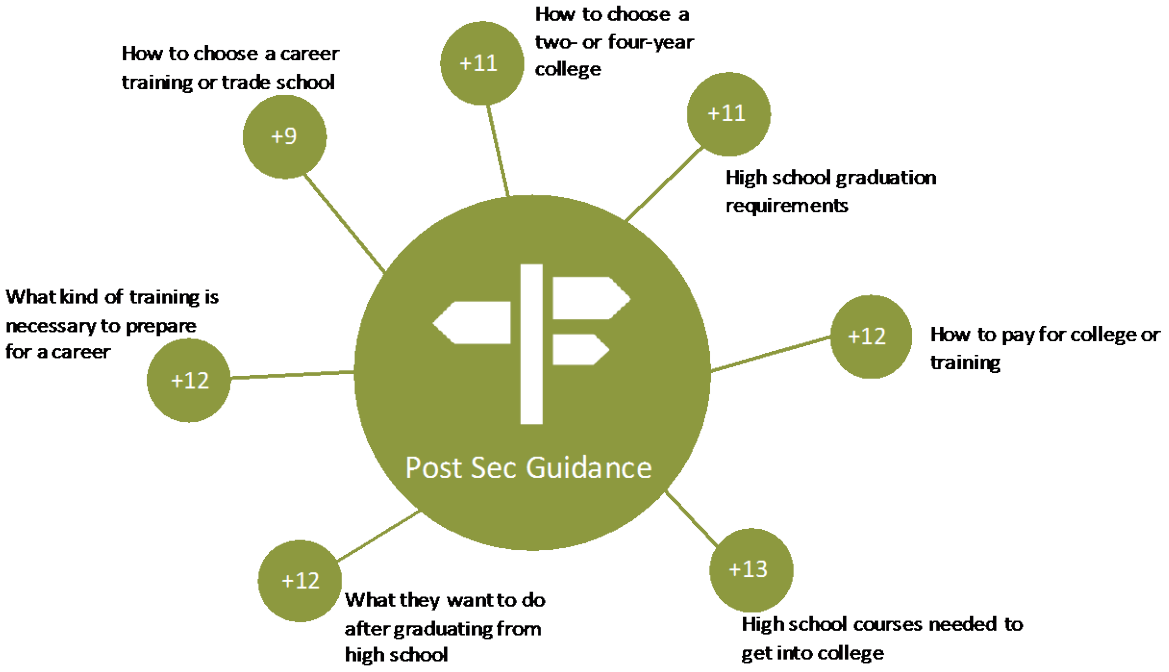
This reliance on the small, more personal nature of pathways to support students is not without a basis in research. The academic research on small schools is reasonably consistent: small schools perform better on outcomes that are social or affective in nature, such as isolation, alienation, or social engagement (Chambers, 1981; Fowler & Walberg, 1991; Newmann, 1981). Studies have also found that students in small schools are more likely to participate in school activities, are more satisfied with school, have lower dropout rates, and have higher attendance rates (Lindsay, 1982; Pittman & Haughwout, 1987; Gladden, 1998; Lee & Burkam, 2003). When large schools are divided into small learning communities or schools within schools, however, these benefits are realized only if the restructuring is implemented with careful attention to factors such as student groupings, overall school coherence, and staff relations (Rawyid, 1996); otherwise, the shift to small schools or learning communities can have a detrimental impact on student achievement and engagement and can increase stratification, as discussed in Chapter 2 (Lee & Smith, 1997). This literature suggests that the additional supports afforded by the pathway small learning communities are more affective in nature. However, English learners, special education students, and students who enter pathways with low academic skills may require additional targeted academic supports to meet the academic expectations of pathways.

Linked Learning pathways provided greater support for students through strong relationships with teachers and peers, fostered by pathways' small size and dedicated teaching staff.

Across the 7 years of the initiative's implementation, we found little evidence of districts' establishing systematic supports for pathway students. The exception was Porterville, where the district assigned pathway-specific counselors and the Linked Learning office coordinated an array of academic supports, such as tutoring. We did, however, find evidence for greater support offered by teachers within Linked Learning pathways. For example, our survey of 12th-graders in 2014 showed that students in certified

pathways, compared with their nonpathway peers, reported receiving more guidance from school staff to plan for the future and to understand the requirements necessary to reach their postsecondary goals. Pathway students were more likely than comparison students to report that they were getting "a lot" of help to understand high school graduation requirements (79% versus 68%), the high school courses needed to get into college (64% versus 51%), how to choose a 2- or 4-year college (55% versus 44%), how to pay for college or training (49% versus 37%), what they wanted to do after they graduated from high school (47% versus 35%), what kind of education or training is needed to prepare for a possible career (44% versus 32%), and how to choose a career training or trade school (31% versus 23%) (Exhibit 3-2).

Exhibit 3-2
Pathway Students Reported More Guidance from School Staff Regarding Postsecondary Goals



Differences between pathway and comparison students are statistically significant at the $p < .05$ level. Numbers are percentage point differences between pathway and comparison students.

Source: Spring 2014 12th-Grade Student Experience Survey (Guha et al., 2014).

Across the nine districts, a number of pathway teachers described how pathway teaching teams coordinated to support students. Teachers stressed how accessible they were to students. One teacher in a stand-alone pathway school described how the pathway teachers function: "We're able to give them a lot of support that they would not get in larger schools.... As I said, we have the afterschool program that goes until 6:00 five days a week…if a kid manages to slip through the cracks around here—it's because they really worked at it." Another teacher described how the peer support and high teacher expectations facilitated by the pathway helped engage students: "At least at our school it's the cohorting…they are together all the time and by the time I get them as juniors, they are basically a big family group…. The second is that they have much more confidence than my other students that their teachers are on their team, but also that they believe in them." In West Contra Costa, pathway teachers supported struggling

students by collaborating with other pathway staff to organize interventions. Much of the support for English learners and special education students there, however, came from school-level services that were not pathway specific.

We also heard about specific interventions to aid struggling students. One strategy was devoting staff time to intervening with struggling students. A principal in Sacramento described the benefits they saw from having teachers devote time to interventions. “One of her prep periods, she calls in kids with attendance or behavior issues, or failing grades, it’s the one-on-one, it's the work teachers do as well, but it's really targeted and takes load off teachers. She sets up all the SST, parent teacher conference…. Our suspensions dropped from 48% to 11% the last couple of years.” Finally, a few pathway teachers described structured student success plans or academic self-reflection as strategies to support struggling students. Although promising, these strategies reinforce the affective supports offered to pathway students but do not address specific academic needs of struggling students for pathway success.

Relying on small learning communities to support students may not be sufficient for students with low prior achievement or students with unique educational needs, such as special education students and English learners.

The vision of Linked Learning is that the default pathway curriculum consists of college preparatory courses, though Linked Learning pathways may offer some AP or honors courses for a subset of students. This undifferentiated structure has the potential to benefit low-achieving and special needs students the most—because these are precisely the students who are most likely to be tracked into the least rigorous courses in comprehensive high schools—but only if sufficient supports are provided to help them succeed. We examined the percentages of students who remained in their initial certified or noncertified pathway through the beginning of 12th grade, those who moved to a new pathway, and those who stayed within the district but left their pathway.[9] We also examined persistence for students with high prior achievement to explore whether the rigor of the pathway curriculum met their needs. If pathway courses were insufficiently rigorous, high achieving students might have chosen to transfer out to increase their access to AP or honors classes. This analysis does not address the question whether English learners, special education students, and students with low or high prior achievement were better served by pathways than by traditional high school programs; that question is addressed in Chapter 5, which presents outcomes for students by pathway type (certified, noncertified, traditional high school) based on their original pathway enrollment, overall and for subgroups of students. Nor does it address whether certified pathways were serving students better than noncertified pathways, because these analyses do not simultaneously adjust for all the students’ background characteristics available, as we do in Chapter 5. Instead, the analyses below provide context for the outcomes in Chapter 5 by showing the percentages of students who originally enrolled in each program type who remained in the pathways through the end of high school, and whether student subgroups in need of greater support persisted at lower than average rates.

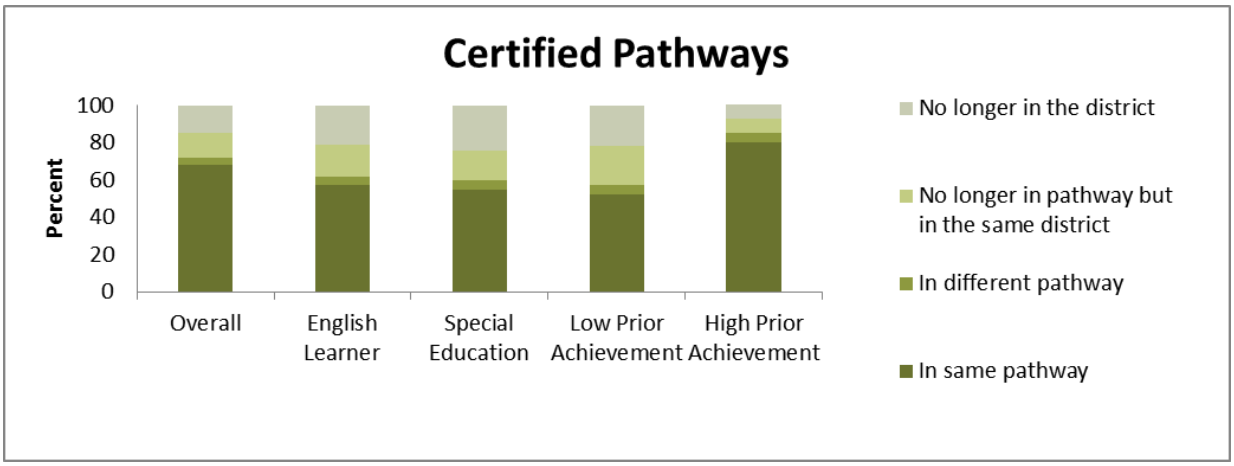
Overall, we found that more than half of students who were enrolled in certified and noncertified pathways remained in their initial pathways through 12th grade (Exhibit 3-3). This percentage was lower for the diverse group of noncertified pathways (55%) than it was for certified pathways (68%). Only a small percentage of students who initially enrolled in a pathway transferred to another pathway by 12th grade (4% of students who started in certified pathways and 8% of students who started in noncertified pathways). Higher percentages of students remained enrolled in school but not in a pathway (13% of students who started in certified pathways and 17% of students who started in noncertified pathways).

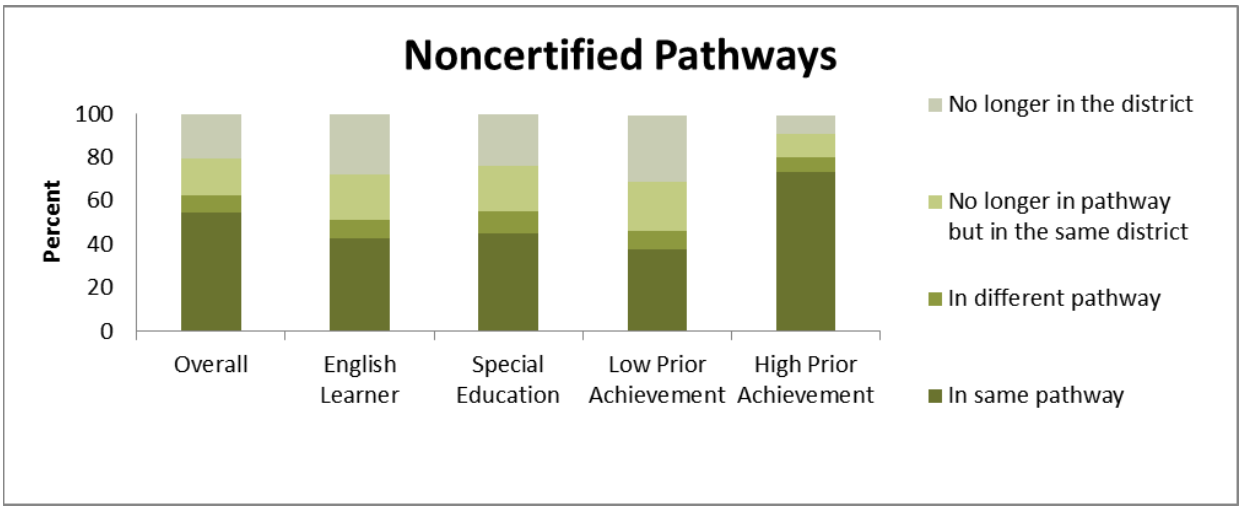
[9] This analysis builds on persistence rates to 11th grade presented in the sixth-year evaluation report, and includes additional pathways and schools in Los Angeles to be consistent with the rest of the report.

Finally, 15% of students who started in certified pathways, and 21% of those who started in noncertified pathways had left the district before 12th grade, either transferring to another district or dropping out of school.

Across both certified and noncertified pathways, however, English learners, special education students, and students with low prior achievement were less likely than the average student to persist in their initial pathways. For certified pathways, the persistence rates for these student subgroups lagged more than 10 percentage points below average, from 52% of students with low prior achievement to 57% of English learners. The gap was similar for students who started in noncertified pathways, with persistence rates ranging from 38% for students with low prior achievement to 45% for special education students. Although these vulnerable student populations had higher than average dropout rates, the gaps suggest that, across the nine districts, pathways struggled to engage and support these students. This is not to say that these student subgroups underperformed their counterparts in traditional high schools (a topic we discuss in Chapter 5), only that they were less likely to persist in pathways than students not in need of special supports. In particular, these populations may need more flexibility in scheduling to be able to enroll in core pathway courses and specialized supports to succeed in the rigorous pathway curriculum. The majority of students with high prior achievement remained in pathways through the 12th grade (80% of students who started in certified pathways and 73% of those in noncertified pathways).

Exhibit 3-3
Students Persisting in Original Pathway Through 12th Grade





Pathway teachers identified course failure as a primary barrier to pathway completion, as well as students' lack of interest in the pathway theme.

In addition to students' lack of interest in the pathway theme or the desire for more flexibility in their coursework, pathway teachers identified low academic performance as the main factor that led to students' leaving pathways. Respondents from all nine districts (though not all pathways within the districts) noted that some students leave because they find the academic expectations of the pathway too rigorous, and respondents from six districts specifically mentioned course failure as a barrier to pathway completion. Students who fall behind in their credits may not be able to enroll in the pathway course of study with their cohort. One pathway teacher explained how failing a core course can quickly lead to students' falling out of the pathway: "It starts to affect their electives; then you know the first thing that goes is going to be the CTE classes. And if they're not taking the CTE classes, then effectively, they're not part of the Academy anymore." In another district, we heard that counselors have become increasingly proactive about sending students behind in their credits to continuation high schools, also leading to pathway attrition for low-achieving students. Many of these issues are exacerbated for English learners and special education students, who often have special support classes that interfere with their ability to enroll in the full pathway program of study, and for students with low prior achievement, who are more likely to fail courses.

Two pathway teachers described strategies to keep students who had failed classes in pathways. One teacher in Oakland noted that in his pathway, teachers were alert to opportunities for students to recover credits, including summer options. They also tried to make sure that all students, including those who had failed classes, enrolled in pathway CTE courses, at least until their senior year when some did need to give up their CTE classes to make up credits. He hoped that his school's plan to move to an eight-period day would further facilitate the ability of students with course failures to stay in the pathway. Another teacher in Sacramento described how an online credit recovery option allowed students to stay and graduate from the pathway rather than transferring to a continuation school.

We did hear about efforts on the part of pathways to find ways to meet students' academic needs, and these promising strategies suggest ways districts might structure targeted academic supports for pathway students. For example, in Los Angeles, schools that received Youth CareerConnect grant funds used a portion of that funding to provide mentoring and tutoring. One pathway lead described how they have integrated general and special education courses that are co-taught by a special education teacher, who can modify curriculum or provide accommodations according to students' needs. She described the benefits she saw from this approach: "I feel [it's] important to have heterogeneous mix of students...it is good to have some honors kids, some [special education] kids, and the mixing is what provides everyone an ability to learn how to communicate and extend their learning." This approach aligns with the vision for integrated student supports outlined by a 2016 brief on defining integrated supports for Linked Learning pathways from Stanford's John Gardner Center for Youth and Families (Ruiz de Velasco, Newman, & Borsato, 2016). The brief calls for integrated supports that are offered to help unify a coherent pathway program rather than discrete, disconnected services. The integrated supports approach also stresses the importance of adapting programs and services on the basis of local circumstances, such as available resources, populations, opportunities, and challenges, to increase effectiveness.

Conclusion

Given the competing pressures on districts and high schools, Linked Learning requires strong leadership at multiple levels. Chapter 2 outlined the leadership structures necessary at the district level; in this chapter, we examined leadership and structures specific to school sites. In particular, school leader

support for Linked Learning is critical, because school leaders control the structures and resources that facilitate or impede dedicated pathway classes for students and teacher collaboration. Moreover, realization of the distinctive aspects of Linked Learning (integrated instruction that leverages career technical and academic content as well as work-based learning) depends on pathway leads to provide leadership and facilitation of a community of practice. The pathway lead position is not sustainable without district and school support structures, because one release period is not enough for pathway leads to take care of the administrative, budgeting, and reporting needs for pathways; facilitate work-based learning opportunities; and provide intellectual leadership for a community of practice.

The components of Linked Learning work together to support a more equitable vision than the traditional, academically tracked comprehensive high school. However, having a rigorous curriculum that is also detracked can mitigate the role of school in perpetuating social stratification only if low-achieving students and students with special needs have extra support to be successful; otherwise, these students are more likely than their peers to leave pathways or participate only in portions of the full pathway experience. Although the majority of districts in the initiative left it to pathways and schools to manage student supports, we nonetheless found evidence that these students fared better in Linked Learning pathways than they would have in traditional high school, as discussed in Chapter 5.

Chapter 4: Sustaining a System of Pathways

Key Findings

- As districts considered whether to expand pathway options, they considered the success with which existing pathways hit enrollment targets and the extent to which students and the community demanded new pathway options.
- Regardless of plans for pathway expansion, districts largely turned their attention away from purely increasing the number of pathways to establishing and maintaining *high-quality* pathways.
- Districts strategically combined grants related to the goals of Linked Learning with general funds to sustain pathways.
- Districts took steps to incorporate Linked Learning in district accountability structures, such as principal evaluations and Local Control Accountability Plans, further weaving Linked Learning into districts' long-term plans.
- Districts leveraged regional partnerships to build and sustain work-based learning. For many districts, however, these partnerships continued to be a work in progress as some regions worked to figure out the optimal size and structure of their consortia.

At the beginning of the Linked Learning initiative, districts focused on establishing new pathways in response to the push for pathway expansion from the Foundation, communicated through ConnectEd. Over the course of the initiative, as districts faced enrollment challenges, teacher turnover, and financial strain, they came to recognize that the sustainability of Linked Learning required attention to many factors beyond the quantity of pathways. Most districts shifted to a focus on continuous improvement over expansion, attending to the quality of existing pathways by establishing systems to assess pathway quality and strengthening structures to support pathway teams with attention to fidelity to the Linked Learning approach. In addition, districts became more intentional about creating communication strategies to attract and enroll students to meet enrollment targets and recruit engaged staff to fill pathway positions.

With the ending of Foundation support, districts had to think creatively about finding resources to deepen Linked Learning implementation and sustain high-quality pathways. Implementing Linked Learning with fidelity requires districts to demonstrate commitment to the initiative and provide adequate support to pathways (as highlighted in Chapters 2 and 3). Districts found that to best support and sustain pathways they could not rely solely on internal resources, but instead needed to strategically leverage both internal and external resources. Thus, by 2015–16, districts were drawing on new state funding aligned with the goals of Linked Learning, using state and district accountability systems to further elevate Linked Learning as a central district priority, and leveraging regional partnerships to support work-based learning and college and career preparation. In this chapter, we provide an overview of district plans for pathway institutionalization and continued growth.

Pathway Expansion

When districts adopted Linked Learning, the Foundation and ConnectEd were focused on increasing the number of pathways in each district. Over the course of the initiative, districts slowed down the creation of new pathways for a variety of reasons, including the need to prioritize student enrollment in existing pathway options and to better engage the community in identifying pathway themes aligned with

community interests. Districts facing pathway underenrollment took steps to communicate better to parents, students, community members, and nonpathway teachers how Linked Learning prepares students for college and career success in an effort to increase interest in pathways. In addition, most districts started to invest more resources and energy into establishing internal systems to assure pathway quality in the absence of funding and support from the Foundation and ConnectEd.

As districts considered whether to expand pathway options, they considered the success with which existing pathways hit enrollment targets and the extent to which students and the community demanded new pathway options.

Student interest and enrollment in Linked Learning pathways have been fundamental drivers of pathway sustainability: for a pathway to be viable, it must attract student cohorts of a sufficient size to justify the creation of dedicated pathway courses. Thus, districts have been balancing the creation of new pathways tailored to meet student interest with ensuring that existing pathways continue to enroll enough students. Although not all districts planned to expand pathways, they were all attentive to enrollment in existing pathways. On the basis of the status of student enrollment in existing pathways and district priorities for pathway expansion, we divided the nine districts into three groups at the time of our spring 2016 data collection: those that (1) continued to establish new pathways, (2) concentrated on increasing enrollment in existing pathways, or (3) focused on maintaining enrollment in existing pathways.

Establishing new pathways. Four districts (Los Angeles, Oakland, Porterville, West Contra Costa) had explicit plans for increasing the number of pathways. Each district had a slightly different approach to expansion: Oakland set an ambitious goal of establishing wall-to-wall pathways in high schools across the district by 2020, whereas Los Angeles, Porterville, and West Contra Costa concentrated on establishing new pathway options without a targeted focus on creating wall-to-wall pathways. In fact, Porterville initially envisioned wall-to-wall pathways in the district but backed off from that effort because of resistance from community members who expressed interested in retaining some traditional high school programs.

New Pathway Teams Show Commitment to Linked Learning in Los Angeles

In Los Angeles, district staff emphasized quality from the very beginning stages of developing a new pathway. Thirty-nine teams applied to create a Linked Learning pathway during the 2015–16 school year, but only 11 were selected to go through the district's yearlong onboarding process. The onboarding process included professional development for new pathway teachers on the components of Linked Learning and strategies for creating a successful pathway. In addition, the district asked new pathways to sign a Memorandum of Understanding, committing to implementing the core elements of Linked Learning.

In approaching expansion, some districts began paying greater attention to communication with key stakeholders, including students, parents, community members, and nonpathway staff, to ensure adequate interest in new pathway options. In 2015–16, West Contra Costa closed a pathway because of underenrollment, possibly due to lack of community and student interest in the pathway theme and misconceptions about the rigor of pathways generally. This event spurred district staff to start paying greater attention to the types of pathways it established to ensure that new options met the local labor market needs and community interests. Los Angeles planned to expand pathways to middle and elementary schools to build broader understanding of and involvement in Linked Learning earlier in students' academic careers and developed a unique process for identifying new high school pathway teams. Oakland set an ambitious goal of having 80% of students enrolled in pathways by 2020. This move toward wall-to-wall pathways demonstrated the district's strong commitment to the Linked Learning approach. At the same time, rapid scaling created challenges in ensuring the quality of new and growing pathways. Having the goal of going wall-to-wall requires that a large number of school-level staff be quickly oriented to the Linked Learning approach, underscoring the

importance of strong communication to build new pathway teachers' engagement and intensive capacity building to ensure that new pathway teams understand and can implement the core components of Linked Learning.

Increasing enrollment in existing pathways. By 2015–16, Montebello and Pasadena had some undersubscribed pathways with cohorts too small to support dedicated pathway classes in the master schedule. As a result, staff in both districts turned their attention to bolstering interest and enrollment in existing pathways rather than creating new pathways. In Montebello, the district's goal of having 50% of students in pathways also drove their efforts to make sure all pathways were fully enrolled.

To increase enrollment, district and school staff in Montebello and Pasadena focused on communication and use of promotional materials to build support for pathways and dispel misconceptions about Linked Learning. For example, in Montebello The Applied Technology Campus created a promotional video to inform eighth-grade parents and students of the school's academic program and extracurricular activities and to dispel the misunderstanding that the school did not have a prom. District staff in both Montebello and Pasadena have also organized an eighth-grade pathway fair to inform parents and students about pathway options. During 2015–16, district staff in Montebello also began targeted communication to middle school staff about Linked Learning pathways because they found middle school teachers were central in coaching students about their high school options.

Maintaining enrollment in existing pathways. By 2015–16, Long Beach had saturated the district with its existing 42 Linked Learning pathways and did not plan to expand further. Although Long Beach staff were not concerned about underenrollment in existing pathways, the district did plan to continue actively recruiting students to ensure that all students have the opportunity to enroll in a pathway and that pathways reflect the diversity of the student population. In Sacramento, Linked Learning leadership intended to focus on maintaining the current number of pathways by attending more intentionally to the quality of pathways as a strategy to maintain enrollment.

In Antioch, the district staff did not have plans to expand pathways in the district's traditional high schools, but they were exploring the possibility of establishing new pathways at continuation high schools. In the short term, the new Linked Learning director planned to prioritize building a more distributive leadership structure to garner broad support for Linked Learning. Although the motivations differed in Long Beach, Sacramento, and Antioch, all three districts were focused predominantly on maintaining enrollment numbers in their existing pathways.

To meet pathway staffing needs in the face of teacher turnover and pathway expansion, some districts developed strategies to recruit and engage teachers to work in Linked Learning pathways.

When the initiative began, many districts and schools were able to rely on teams of enthusiastic teachers coming together voluntarily to build a pathway. As existing pathways confronted staff turnover and pathway expansion, creating greater demand for pathway teachers, districts and schools looked to broaden the base of teachers knowledgeable about and committed to Linked Learning. Recruiting for pathways can be challenging because pathway teachers have responsibilities beyond those of traditional high school teachers, such as collaborating to develop and implement integrated projects and connecting work-based learning opportunities to the pathway curriculum. In one district, pathway teachers voiced concerns about their colleagues' lack of interest in joining pathways because of the additional time demands of teaching in a Linked Learning pathway. The challenges of staffing pathways are exacerbated in districts that have high teacher turnover. For example, in West Contra Costa one principal closed a pathway because of high pathway teacher turnover and difficulty filling the open positions. In response to these challenges, some districts started to develop creative strategies for staffing pathways. In Los Angeles, for example, the small pilot schools developed a different contract for pathway teachers, in

which the teachers committed to additional pathway work and the district committed to providing those teachers with extra paid professional development days. Life Academy in Oakland started implementing a similar system to recruit and incentivize teachers to join the pathway.

In addition to finding committed teachers, some districts also began to develop systems and supports to help integrate new pathway staff. Linked Learning relies on pathway teachers' abilities to implement effective technical and academic integrated projects and embed work-based learning in the pathway program. The burden of planning and executing pathway curriculum is particularly acute for new pathway teachers, who must simultaneously learn about Linked Learning and develop new lessons aligned with the pathway theme. Building pathway teachers' knowledge and skills to develop integrated projects and work-based learning opportunities aligned with pathway curriculum takes time, and existing pathway staff bear the burden of both orienting new staff and fostering their investment in the pathway. To better support pathway teachers, Long Beach leveraged its district-level Instructional Leadership Team to provide guidance to pathway teachers. This team focused pathway support on the seven essential Linked Learning elements to ensure that instructional shifts were taking place in the classroom (ConnectEd, n.d.-c). In addition, Los Angeles district staff began to think through how to maintain the district personnel needed to support pathway teams. A district administrator emphasized that Linked Learning coach positions relied on grant funding, so sustaining beyond these grants required the district to think creatively about how to embed the Linked Learning–specific needs into the coaching offered through the district's curriculum and instruction office. Porterville addressed the challenge of integrating new teachers by training veteran pathway teachers as internal coaches.

Districts recognized the need to both bolster teacher interest in Linked Learning pathways and provide supports necessary to build pathway teachers' skills and knowledge for teaching in a pathway. This need for a systematic approach to fostering teacher investment in Linked Learning will continue to be essential as districts grow pathways and continue to face teacher turnover.

Regardless of plans for pathway expansion, districts largely turned their attention away from purely increasing the number of pathways to establishing and maintaining *high-quality* pathways.

Districts recognized that implementing Linked Learning with fidelity is critical to ensuring that students are prepared for college and career. Thus, districts paid greater attention to the quality with which pathway teams implemented their programs. By 2015–16, four districts had put in place internal pathway assessment processes to guide continuous improvement in all pathways (certified and noncertified), and two districts continued to use the formal certification process to drive the development of noncertified pathways. A quality review process can help drive sustainability through identifying targeted supports that help pathways improve areas of weakness, creating more pathways that implement Linked Learning with fidelity and establishing a base of evidence to support future funding for Linked Learning pathways.

Internal pathway assessment. Four districts (Antioch, Long Beach, Pasadena, Sacramento) leveraged the OPTIC tool or NAF certification as a self-assessment tool. In Long Beach, for example, the district required all pathways to engage in a self-study process using the OPTIC tool or NAF certification to target coaching assistance and professional development. District staff used the evidence gathered to identify common needs and required pathways to develop action plans to improve pathway quality. In Pasadena and Sacramento, pathways created an action plan based on the NAF self-assessment framework and the OPTIC tool, respectively, to drive continuous improvement and help the Linked Learning team identify how they could best support pathway teams.

Los Angeles staff created their own self-assessment process that aligned with the district's teaching and learning framework. The teaching and learning framework defined how district schools were evaluated and was used by local district directors to evaluate the schools in their region. The Linked Learning team

crosswalked the district's teaching and learning framework with ConnectEd's behaviors of learning and teaching (BLT), and made tweaks to align the framework more closely with the BLT.

External certification process. Porterville and West Contra Costa drew on NAF's and ConnectEd's formal certification process, respectively, to drive the development of noncertified pathways. To support pathways through the certification process, Porterville hired an outside consultant who worked with pathways to collect their documentation and provided feedback as they prepared to submit everything for certification. West Contra Costa had a district-developed self-assessment process during the 2014–15 school year but backed away from using it because of pathway teams' perceptions of the process as being too compliance driven. Instead, West Contra Costa returned to using the certification process alone to assess quality, but because external certification has the perception of being a summative process, the district may reinstate a continuous improvement process for all pathways in the future.

In thinking about the sustainability of pathways, all pathways (certified and noncertified) can benefit from a continuous quality review process. High-quality pathways that show positive results for students are key for leveraging future financial resources to support the Linked Learning approach.

Funding to Sustain Linked Learning Pathways

As districts looked ahead to maintaining pathway quality and, in some cases, expanding pathway offerings, they considered the costs associated with sustaining a high-quality system of Linked Learning pathways. To adequately support pathway teams, districts must fund release time for pathway leads and teachers to collaborate on integrated projects, provide coaching to build teachers' capacity to make the necessary instructional shifts, and offer support for developing and administering work-based learning opportunities. In addition, as detailed in Chapter 2, successful implementation of Linked Learning requires dedicated district-level staff members to communicate a clear vision for Linked Learning, ensure integration of Linked Learning into other key district policies and priorities, and facilitate pathway self-assessments. With the end of Foundation funding, districts were creative in using different sources of funding to cover these costs and ensure that pathways received the supports necessary to implement high-quality pathway programs.

Districts strategically combined grants related to the goals of Linked Learning with general funds to sustain pathways.

Districts explored a range of strategies to fund the costs associated with Linked Learning. Porterville planned to support Linked Learning with permanent general funds, and the other eight districts planned to leverage a combination of general funds and grants to cover Linked Learning's diverse expenditures. Although districts were successful in securing general funds for key district staff positions, such as the Linked Learning director, and some Linked Learning expenses, such as communication materials and field trips, their ability to dedicate general funds for pathway lead release time, coaching, and work-based learning coordinators was more limited. By 2015–16, districts needed to budget for significant costs associated with increasing retirement fund rates, causing district personnel expenses to increase. Further, district administrators in three districts mentioned budgetary concerns related to declining student enrollment. Finally, the long-term stability of state general funding for districts remained uncertain beyond 2018. Districts in California benefited from the state funding guarantee for K–14 schools combined with the temporary income tax increases voters authorized in 2012 with the passage of Proposition 30.[10] With the scheduled conclusion of Proposition 30 in 2018 and no clear commitment that legislators or voters will

[10] Proposition 98, approved by California voters in 1988, amended the California State Constitution to establish a minimum level of general funding the state must allocate to K–14 schools.

act to extend the tax, the future robustness of the state budget and public funding for districts remained uncertain.

Given this tenuous funding environment, districts continued to pursue additional grant funding that complemented state and local funding in support of Linked Learning activities. A key consideration in relying on grant funds is that the allowable uses or priorities associated with grants do not always align with the most pressing district needs. For example, six districts won CTE Incentive Grants in 2016, and another two districts will receive a portion of CTE Incentive Grant funding through their county office of education. Although the grant awards have been quite large (Los Angeles received $32 million), the grant funding was very restrictive. One district administrator said:

> We're rich in CTE money and we're poor in general funds…. This year I was asking for several hundred thousand dollars more than what we had last year for the College and Career Readiness department, and I was getting "No, no, no…and in fact we are looking at cutting our budget," and I go "You can't fund college and career readiness just on career money because the career money has strings attached to it."

Sacramento offered an example of how to navigate grant restrictions by using a braided funding approach, in which the district aligned different funding streams with different activities to fund all aspects of Linked Learning. By using CTE Incentive Grant funds to support the CTE teachers' time and other funds to support the academic teachers' time, the district overcame prescriptive grant restrictions to provide key pathway support services, such as integrated academic and CTE teacher professional development opportunities. Sacramento also recently won a California Endowment grant focused on its health pathways. This use of braided funding, however, raises a concern about whether grant restrictions could lead to inconsistent pathway access to resources. This concern is not new for districts; CCPT grants required districts to focus on pathways that were aligned with regional economic needs, limiting the use of that funding to particular pathways. Unless districts are intentional about braiding together funding in a way that ensures equity across pathways, funding restrictions could lead to uneven support for pathways.

Creatively leveraging restricted grant funds to meet districts' needs may be an effective strategy for funding Linked Learning, but this approach can also add substantial administrative burden. One district successfully won a wide range and number of grants aligned with Linked Learning but struggled with managing the multiple reporting requirements. Much of the burden of planning, budgeting, and reporting fell on the shoulders of pathway leads and coaches, reducing their ability to provide instructional leadership and support. When braiding together multiple funding sources, strong leadership is required to ensure that the district is intentionally pursuing and accepting well-aligned funding opportunities and that the added administrative burden does not fall on pathway teams. Nonetheless, there is a clear promise in using a diverse set of funding sources to sustain Linked Learning.

Accountability Systems

Although ensuring adequate funding is critical to sustaining the Linked Learning approach, it is also important that Linked Learning be integrated into districts' accountability systems. Whether accountability is compliance-oriented or focused on continuous improvement, the policies, systems, and expectations built into accountability frameworks can shape and drive the day-to-day work of schools and districts. Although many schools have taken meaningful steps to institute policies and a culture to support pathways, school leaders have relied on their counterparts in the district office to provide them with clear expectations and supports to achieve the district's vision for Linked Learning implementation. As districts look to codify their commitment to Linked Learning for the long term, district leaders have the opportunity

to take advantage of recent evolutions in California's accountability system to align success metrics with Linked Learning as a strategy to institutionalize the approach.

Principals were the lynchpin for translating district commitment to Linked Learning into practice at the school level by creating the systems and conditions necessary to sustain pathways.

As discussed in Chapter 3, principals play a crucial role in setting the tone for how Linked Learning implementation will occur at the school level. Principals have final authority on the design of the master schedule, determining whether pathway teams have common planning time and pathway students are grouped in dedicated classes. The extent to which principals prioritize the complex scheduling needs of pathways in the design of the master schedule reflects their commitment to Linked Learning.

Several district leaders incorporated Linked Learning–related goals into their existing principal accountability frameworks to ensure principal support for pathways. In some districts, principals received guidance on how to support Linked Learning systems and culture through their supervisory or professional learning relationship with the district office. For example, the Linked Learning director in Pasadena was also the Assistant Superintendent for Secondary Education, serving as the supervisor of high school principals and allowing her to work closely with them to prioritize Linked Learning. Although the Linked Learning directors do not supervise principals in Long Beach and West Contra Costa, the directors in these two districts have successfully collaborated with district leaders of secondary education to integrate Linked Learning into principals' performance goals and evaluation rubrics. These districts leveraged existing accountability structures and relationships between principals and the district office in support of Linked Learning.

Even with strong principal leadership and the support of district supervisors, it is inevitable that school leaders will leave; the average principal tenure in California is 3.1 years (U.S. Department of Education, 2012). Several districts took steps to mitigate the loss of momentum for Linked Learning resulting from this turnover. In Long Beach and Porterville, the Linked Learning director included high school principals in monthly leadership meetings. These meetings helped to ensure that new and experienced principals alike were briefed on the district's overall message and expectations regarding Linked Learning implementation. They also provided an opportunity for new principals to build a network they could draw on as they learned how to support the unique needs of pathways. Pasadena, Porterville, and West Contra Costa took steps to establish communities of practice for principals to provide them with peer support. Not only did these communities of practice provide principals a place to collaboratively address issues, they also created an additional line of communication between principals and district staff. Setting up this type of regular opportunity to communicate with principals could be particularly valuable in districts where Linked Learning is not explicitly embedded in principal oversight.

Districts took steps to incorporate Linked Learning in new district accountability structures, such as Local Control Accountability Plans, further weaving Linked Learning into districts' long-term plans.

With the implementation of the Local Control Funding Formula (LCFF) in 2014, California dramatically shifted its approach to how the state funds districts and holds them accountable for meeting the needs of all students. As part of LCFF, the state requires districts to develop a 3-year Local Control Accountability Plan (LCAP) that identifies districts' goals, strategies for meeting these goals, and metrics for measuring progress toward achieving them. Districts develop their LCAPs in consultation with stakeholders such as teachers, administrators, staff, students, families, and community partners; once completed, the plans are submitted to the local county office of education for review and approval. Plans must be revised each year, offering districts and stakeholders an opportunity to adjust and revise plans on a regular basis.

The structure of the LCAP presented districts with an opportunity to position Linked Learning as an essential strategy for advancing district goals. All the districts in the initiative have included Linked Learning in their 2015–18 LCAPs, and three districts included Linked Learning-related metrics under goals related to academic achievement. Porterville and Sacramento committed to an outcome metric related to pathway enrollment growth, and Long Beach committed to increasing the number of certified pathways. As districts consider annual revisions to their LCAPs in the 2016–17 academic year and beyond, they have the opportunity to more intentionally embed Linked Learning as the lead strategy for college and career readiness.

California's new state accountability system represents another opportunity for districts to weave Linked Learning into their accountability plans. The state's accountability dashboard will involve several key indicators, including a College and Career Indicator that is likely to include metrics on completion of a CTE pathway and dual enrollment, in addition to measures districts are already required to address in the LCAP, such as a-g completion, Early Assessment Program (EAP) scores, and Advanced Placement (AP) or International Baccalaureate (IB) scores. County offices of education will use the indicators defined in the new accountability framework to assess district progress toward advancing their LCAP strategies. As districts prepare for their annual LCAP reviews in 2016–17, they could highlight how Linked Learning supports a-g and CTE pathway completion and thus justify the budgetary investment in Linked Learning as a college and career readiness strategy.

Regional Partnerships

The Linked Learning approach calls for K–12 to partner with both industry and community colleges to create meaningful work-based learning opportunities for students, align expectations for student learning, and smooth transitions to postsecondary education. Prior to the initiative, most real-world learning opportunities, dual-enrollment offerings, and college transition supports were developed at the school level and relied heavily on individual teachers' or administrators' relationships with industry partners and postsecondary institutions. As discussed in Chapter 3, partnerships that rely on personal relationships are tenuous because they can fall apart quickly if the primary contact leaves the organization. Through regional partnerships, districts have tried to create *systems* for work-based learning and postsecondary partnerships that minimize burden on pathway leads and decrease reliance on individual relationships.

As discussed in Chapter 1, the CCPT grants offered several incentives for collaboration among the districts and their regional partners. In particular, the CCPT funds provided a catalyst for district, business, and community leaders to work together to develop student skills and increase educational attainment, with the aim of improving local economies. Although building a strong network of regional partnerships continued to be a work in progress, a few of these partnerships showed promise for creating sustainable systems at the district level to provide students with high-quality work-based learning opportunities and adequate support for postsecondary transition. Leveraging these regional partnerships can help to create the systems and processes necessary to build relationships that are sustained over time, so students continue to receive the supports they need for success in college and career.

Districts leveraged regional partnerships to build and sustain work-based learning. For many districts, however, these partnerships continued to be a work in progress as some regions worked to figure out the optimal size and structure of their consortia.

By 2015–16, all nine districts had begun to rely on regional partnerships to build the external infrastructure and relationships needed to elevate work-based learning from a patchwork of individual relationships to a sustainable system. For example, Long Beach had longstanding partnerships with its postsecondary institutions and the mayor's office through the Long Beach College Promise, but it

struggled to create an independent, broad-based coalition to expand work-based learning opportunities. The regional work helped Long Beach anchor work-based learning through an intermediary organization, so it could draw on the resources of many organizations through one point of contact. Similarly, Los Angeles planned to offer some work-based learning opportunities through its intermediary partners so that these opportunities would not be affected by shifts in district staffing or priorities.

Relationship building can be challenging in geographically large regions. For example, The East Bay Consortium received a CCPT grant to create a regional group that included the region between West Contra Costa and Hayward. When the regional work began, the group met as a whole but soon realized the need to break into subregional nodes—smaller teams of districts, organizations, and community colleges in close proximity—because facilitating decisionmaking in such a large group was unwieldy. The subregional nodes helped create more practical and sustainable partnerships more closely tied to local needs. However, according to a district administrator, there was a downside to narrowing the regional participation: "I feel like, although I don't know any other way we could have done it, we have lost some of what was kind of keeping it very interesting for everybody, which was talking to people in West Contra Costa all the way down to Hayward about what they are learning." The experiences of this consortium suggest tradeoffs of the regional approach: narrower participation may make it easier to establish and maintain relations and agreement on key goals; alternatively, having a broader set of participants could lead to more opportunities for rich communities of practice. In addition, employers typically do not care about district boundaries, and a regional approach provides one central point of entry to all districts in the region.

Although the regional work continues to be a work in progress, creating sustainable partnerships with industry not reliant on personal relationships was a central strategy for easing the burden on pathway teams of developing work-based learning opportunities.

Regional partnerships helped some districts build more systematic processes for offering dual-enrollment courses, career exploration activities, and college transition supports.

In addition to developing work-based learning systems, another goal of CCPT regional activities was to bring secondary and postsecondary partners (primarily community colleges) together to work on reducing the barriers to students' transitions from high school to college. Postsecondary partnerships helped districts develop systems and processes to increase dual-enrollment course offerings, provide career exploration activities, and improve transitional supports. As with the industry partnerships, these district-level systems and processes help build sustainability by identifying central points of contact within K–12 districts and community colleges and creating institutional, rather than individual, relationships.

By 2015–16, all nine districts were developing articulation agreements with their postsecondary partners and creating dual-enrollment courses that enabled Linked Learning students to earn college credits with no tuition costs while still in high school. Dual enrollment is considered to have numerous advantages for low-income and underrepresented students in higher education (a subgroup targeted by Linked Learning): dual-enrolled students are more likely to transition to a 4-year college (rather than a 2-year college), are less likely to take basic skills courses in college, and are more likely to persist in postsecondary education than comparison students (e.g., Hughes et al., 2012). Dual-enrollment courses expanded considerably in the nine initiative districts through regional collaborations. In Pasadena, for example, the number of students who were taking college-level courses grew from 89 in 2013–14 to 321 in 2014–15. West Contra Costa established a standard process for creating dual-enrollment courses through their main contact at Contra Costa College, who is heavily involved in the regional work. By contrast, Los Angeles had to work with each department within its partner colleges separately, making the

process of establishing articulation agreements, concurrent enrollment, and dual enrollment challenging and dependent on individual contacts in each department.

Although a major focus of the regional work with postsecondary institutions was on expanding dual-enrollment offerings, some districts also used these partnerships to improve students' exposure to college and career exploration and transitional supports. For example, Montebello's CCPT grant provided the district with resources to expand its relationship with the local community college (East Los Angeles Community College) to engage middle school students in college and career exploration. Through these efforts, the college hosted an all-day STEM exploration day for students at two targeted middle schools. West Contra Costa began discussions with Contra Costa College about offering a course on college success strategies at the high school level. In addition, through its partnership with Contra Costa College, the district improved communication between counselors at the college and high school levels, resulting in better communication to students about the college enrollment process.

Although nearly all initiative districts made progress in building relationships with postsecondary partners and increasing their dual-enrollment offerings, by 2015–16 some regions were more successful at having institutionalized their partnerships than others. With the final years of CCPT funding on the horizon, it will be important for all partners to invest in creating standard operating procedures for working with one another and building the partnerships into their organizations' respective missions and visions so that continued progress does not depend on individual staff members on either side.

Conclusion

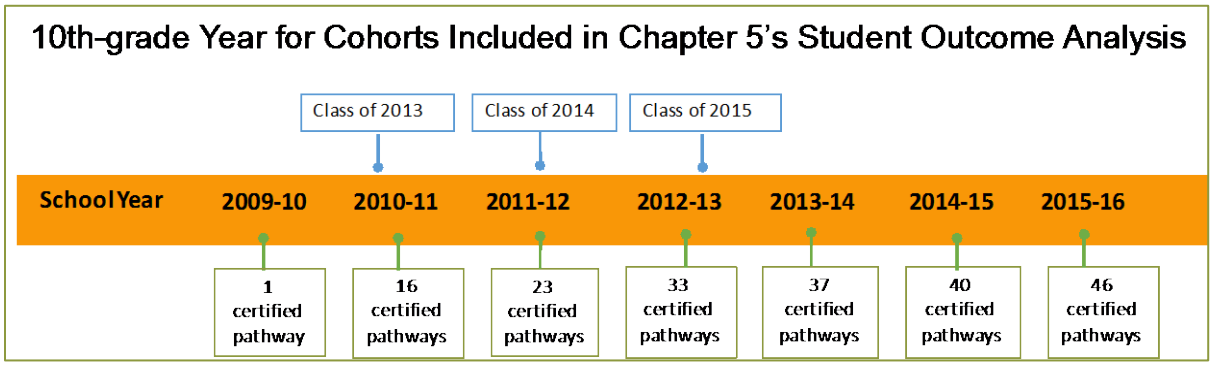
As districts looked to support, sustain, and grow pathways, their focus shifted from increasing the quantity of pathways to strengthening pathway quality. Districts recognized that by establishing high-quality pathways that produce results, they could build a body of evidence to communicate how Linked Learning prepares students for college and career, fueling both student demand and teacher support for Linked Learning. However, providing the supports needed to establish and sustain high-quality pathways takes resources. Faced with the end of Foundation funding, districts creatively braided internal and external funding sources, leveraged existing accountability structures, and developed regional partnerships to support and sustain high-quality pathways. Although regional partnerships in some places succeeded in building institutional relationships and systems where before there were only ad hoc individual relationships, partners will need to commit to maintaining the progress and relationships when CCPT funding ends. Moreover, as discussed in Chapter 3, some of the progress in developing regional partnerships and systems, particularly in the area of work-based learning, came as a result of new grant-funded staff positions, such as work-based learning coordinators, who removed some of the burden of cultivating these opportunities from pathway teams. Sustaining progress in this area may hinge on finding alternative strategies for maintaining these positions when grant funding ends. As districts look to sustainability, they must continue to build support and enthusiasm for pathways among all interested parties: students, families, staff, community, industry, postsecondary partners, and policymakers at all levels of governance. The ultimate sustainability goal is for pathways to become the norm in secondary education.

Part II: Linked Learning Outcomes

The Linked Learning approach is designed to prepare all students for college and career success by engaging struggling students who may not view high school as valuable or directly relevant for their future success while deepening the educational experiences of those who do. The integration of a career theme and work-based learning experience can make traditional academic content more directly relevant to students' lives and future goals. The small cohorts and student supports are designed to help students feel more connected to their school community. Part II of this report examines whether these experiences resulted in improved outcomes for Linked Learning students, compared with their district peers. How do pathway students' end-of-high-school and early postsecondary outcomes compare with those of nonpathway students? How do pathway graduates experience the transition to postsecondary education and careers? What do they report about how their Linked Learning experiences influenced their postsecondary plans?

In Part II, we address these questions through our analysis of student demographic and achievement data from the nine initiative districts, as well as a 12th-grade survey and a postsecondary survey. Chapter 5 presents end-of-high-school outcomes for all three of the cohorts in our quantitative analysis, including 4-year graduation, dropout, credit accumulation, college-admission GPA, and completion of the college preparatory course requirements for admission to California's public 4-year universities. For the first time in this report, we are able to also report on early postsecondary enrollment and persistence into a second year of college. The number of certified pathways included in the student outcome analysis in Chapter 5 increases with each cohort, because we included only pathways certified as of each cohort's 10th-grade year. As a result, these cohorts include

- 10 pathways certified by 2010–11 from the four districts analyzed for the class of 2013;[11]
- all 23 pathways certified by 2011–12 across the nine districts for the class of 2014;
- all 33 pathways certified by 2012–13 across the nine districts for the class of 2015.



Chapter 6 presents students' perception of their skills gained through pathways and their postsecondary activities, based on two student surveys; these analyses do not capture perceived outcomes or activities for students in noncertified pathways. The analysis of the spring 2014 high school survey data in this chapter encompasses 12th-graders from all 33 pathways certified by 2012–13. The analysis of the spring 2016 postsecondary survey in this chapter includes students from the 13 pathways in Los Angeles, Oakland, and Pasadena certified by 2012–13. These students were recruited in spring 2015 during their 12th-grade year.

[11] We analyze student outcomes for the class of 2013 in four districts: Antioch, Long Beach, Pasadena, and Porterville.

Chapter 5: College-Ready High School Graduates

Key Findings

- Certified pathway students were less likely to drop out of high school and more likely to earn a high school diploma than similar peers in traditional high school programs.
- Certified pathway students earned more credits and successfully completed more college preparatory course requirements than similar peers in traditional high schools.
- Certified pathway students were as likely as similar students from traditional high school programs to enroll in a 2- or 4-year postsecondary institution.
- Students with low prior achievement who enrolled in a certified pathway were less likely to drop out, completed more credits and college preparatory course requirements, and had higher college-admission grade point averages, compared with similar students in traditional high schools. Conditional on enrollment in postsecondary education, certified pathway graduates with low prior achievement were more likely to enroll in a 4-year, as opposed to a 2-year, institution.
- Noncertified pathway students were less likely to drop out of high school than similar peers in traditional high school programs. Noncertified pathway students completed similar numbers of credits and college preparatory course requirements and were as likely as similar students from traditional high school programs to enroll in a 2- or 4-year postsecondary institution.

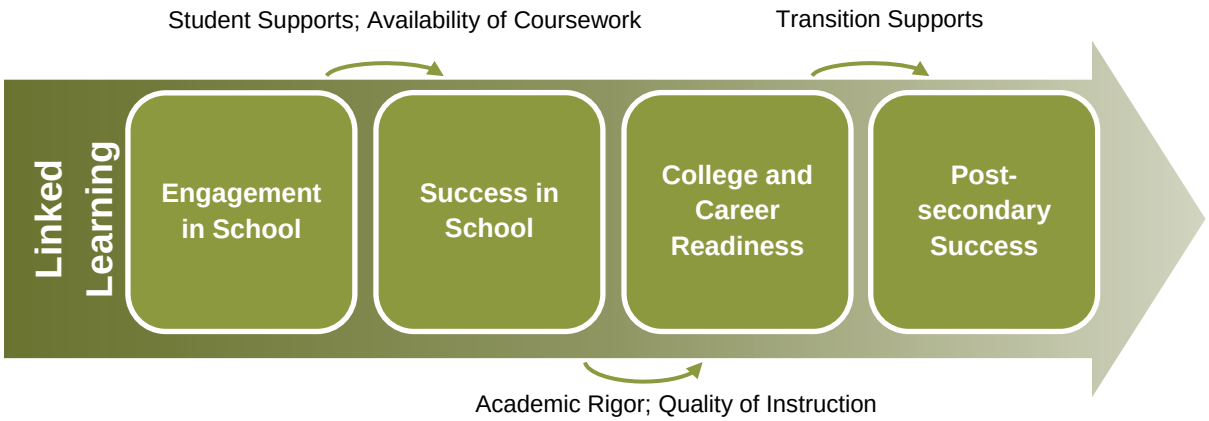
Introduction

In previous chapters, we described the efforts of the nine initiative districts to maintain the quality of their Linked Learning pathways as Foundation funding ends and to ensure that pathways are accessible to and supportive of all students, regardless of their demographic characteristics or prior achievement. The goal of both these efforts is to create engaging and academically rigorous Linked Learning pathways that support all students to be successful in high school and ultimately to graduate ready for both college and career. In this chapter, we examine the extent to which pathways were achieving this goal, overall and for different subgroups of students (women, English learners, African Americans, Latinos, students with low prior achievement, and students with high prior achievement).

Exhibit 5-1 provides a framework for examining how enrollment in a Linked Learning pathway may lead to college- and career-ready graduates. First, the core components of a Linked Learning pathway—rigorous academic coursework integrated with a sequence of career technical courses, work-based learning, and student supports—are designed to increase students' engagement in school beyond what traditional high school models can achieve. In addition to increasing student engagement, the structured nature of a pathway course of study can influence students' course-taking behavior and course completion. Linked Learning is designed to provide students with a default set of classes that meet high school graduation and college entrance requirements. Such a prescribed curriculum is an example of a "constrained curriculum" that could lead students to enroll in a higher number and a more rigorous set of classes than they might otherwise choose from a "cafeteria-style" curriculum (Lee, Croninger, & Smith, 1997; Powell, Farrar, & Cohen, 1985). With the right set of classes and appropriate supports, engaged students should develop measurable academic knowledge and be able to graduate from high school intellectually ready

for college and careers.[12] Moreover, the 21st century skills developed through project- and work-based learning, and study skills developed through student supports and rigorous academic curriculum, should prepare students for postsecondary success in college or the workforce.

Exhibit 5-1
How Linked Learning Affects Students' College and Career Readiness



In this year's report, we are able for the first time to provide 12th-grade outcomes—including graduation—for students in all nine districts and all three cohorts of students in our evaluation, including the class of 2015. In previous reports, we were able to look only at cumulative high school outcomes for students in our class of 2013 and class of 2014 cohorts. This year, with complete high school data for all cohorts and with the Linked Learning evaluation in its final year, we examined cumulative high school outcomes to provide a summary of the impact the Linked Learning approach had on students in high school. We place a particular emphasis on indicators that affect students' college eligibility or signal college readiness. Moreover, we were able to collect postsecondary enrollment data for all of our cohorts for the first time this year, as well as 1-year postsecondary persistence data for the classes of 2013 and 2014. These data allow us to examine the impact of the Linked Learning approach on college attainment and persistence, a key goal of the Linked Learning initiative. Also for the first time in this report, we provide estimates of impacts on students with high prior achievement (defined as achieving advanced proficiency on the ELA California Standards Test [CST] prior to entering the pathway or starting a traditional high school program) in our analysis of student subgroups. Finally, we updated the graduation data to indicate graduation within 4 years. The sidebar summarizes the outcomes we have examined over the course of this evaluation; more detail is provided in the technical appendix.[13]

Overall, we found that the Linked Learning approach did make a difference for high school students, leading to decreased dropout rates and higher graduation rates in certified pathways. These findings build on and extend those presented in previous reports, where we reported that certified pathway students completed more credits and remained in their districts longer than similar students in traditional high school programs. In addition, pathway students scored higher on the California High School Exit Exam

[12] Although the conceptual framework includes college and career readiness, in this chapter we rely on school district administrative data, which include only measures of college readiness. We discuss career readiness in Chapter 6.

[13] In addition to these new outcomes and analyses, we received updated course data from Oakland and Sacramento City school districts, which allowed us to include more districts in our analysis of college-admission GPA, credit accumulation, and college preparatory requirement outcomes. We also added longitudinal data from two new high schools in Los Angeles school district, in order to align the students analyzed in this chapter with the students analyzed in our high school survey sample in Chapter 6.

(CAHSEE) in English language arts (ELA) than their peers, although the two groups did not differ on daily attendance, number of course failures, or performance on the Math CAHSEE (Guha et al., 2014).

Findings regarding college preparation were more mixed. Students in certified Linked Learning pathways, compared with traditional high school students, completed slightly more of the college preparatory courses (a–g requirements) needed to be eligible for California public 4-year postsecondary institutions and were equally likely to complete the full complement of requirements. With the addition of the class of 2015, unlike in the sixth-year report, we found that certified pathway students and their peers in traditional high schools earned similar college-admission GPAs, a key component of eligibility for admission at California's public 4-year universities. In light of our finding that certified pathways retained students who otherwise might have left high school prior to senior year and were unlikely to pursue the full college preparatory curriculum, this evidence that certified pathways were doing at least as well supporting students to fulfill the a–g requirements is promising. Finally, in past years, we reported that certified pathway students were more likely to be classified as ready or conditionally ready for college in ELA on the EAP exam but performed similarly on the ELA California Standards Test (CST), compared with similar students in traditional high school programs (Guha et al., 2014; Warner et al., 2015).

Outcomes Past and Present

Over the course of the evaluation, we have examined a range of academic outcomes for each stage of our conceptual framework. For outcomes not reported on this year, we indicate which annual report provides final results.

Engagement in School

- Dropout
- Attendance (final results available in fifth-year report)

Success in School

- Graduation (updated in this report to reflect a 4-year graduation rate)
- Credit accumulation
- Course failures (final results available in fifth-year report)
- Math and ELA California High School Exit Exam (administered in 10th grade; final results available in fifth-year report)

College Readiness

- Completion of college preparatory coursework (a-g requirements)
- College-admission GPA
- English language arts (ELA) California Standards Test (administered through 2012–13; final results available in fifth-year report)
- CSU's ELA Early Assessment Program (EAP) exam (administered in 11th grade; final results available in sixth-year report)

Postsecondary Success

- Initial postsecondary enrollment
- Enrollment in 4-year college
- Persistence to second year (fall-to-fall)

With this year's addition of postsecondary enrollment and persistence data, we were able to follow these college preparedness results into our cohorts' first years of college. Certified pathway students were as likely as similar peers in traditional high schools to enroll in college. Conditional on enrollment in any postsecondary institution, certified pathway students were also equally likely to enroll in a 4-year college and to persist in school to a second year, compared with similar peers who attended traditional high school programs. Although the finding for enrollment in a 4-year college is not significant in the overall sample, it is significant and positive for two of the subgroups we analyzed, students with low prior achievement and African American students (see the "Findings by Student Subgroup" section below).[14] Among the subgroups of students analyzed, students in certified pathways did at least as well as similar

[14] In the overall sample, among those who enrolled in any postsecondary institution, the impact of participation in a certified pathway on 4-year enrollment is positive but not statistically significant.

peers in traditional high schools on all outcomes. The positive results for certified pathway students generally held for women, Latino students, and students with low prior achievement.

With the addition of the more recent class of 2015, we also saw decreased dropout rates for noncertified pathway students for the first time, a development that may reflect the investment in a districtwide system of pathways. Throughout the course of the grant, all nine districts pushed to extend the Linked Learning approach to new pathways, build up the weaker pathways, and eliminate pathways that may not have had the structure, staff, or student interest to function at a high level. We found that students of all subgroups generally had similar outcomes in noncertified pathways and traditional high schools, with the exception that reduced dropout rates for students in noncertified pathways held for African American and female students in these pathways.

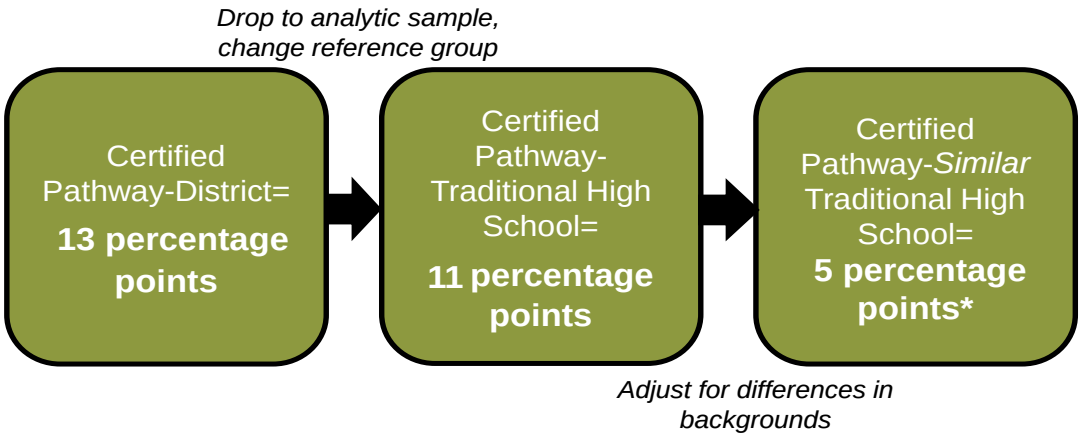
We discuss the data and methods used in this analysis in the text box below. We then present the results of our analyses for students in certified pathways, compared with similar peers in traditional high schools. Next, to understand the effect of pathway participation for students in different subgroups, we provide estimates of the effects of pathway participation for subgroup students enrolled in certified pathways, compared with peers in the same subgroup enrolled in traditional high schools. Finally, we present the results for students in noncertified pathways, compared with those of similar peers in traditional high school programs, among all students and within subgroups.

Methods and Data

Data. As in previous reports, we followed the class of 2013 in four districts—Antioch, Long Beach, Pasadena, and Porterville—and the classes of 2014 and 2015 in all nine districts. Data available varied by district and class (see the appendix for data availability by outcome measure). When we examined course-related outcomes, we excluded dropouts to disentangle the effects of Linked Learning on dropping out from any effects the approach has on outcomes that can be measured only for students who remained in school.

Calculation of differences. Findings presented in this chapter may differ from those generated from publicly available data. The graphic below depicts our approach to calculating the differences provided in this report, using the estimated differences in graduation data as an example. We begin by presenting the descriptive difference between the graduation rate of certified pathway students and the overall district graduation rate, unadjusted for any difference in students' characteristics. Descriptively, certified pathway students were 13 percentage points more likely than the district average to graduate in 4 years. The graphic then displays the two major steps in our analytic approach. In the first step, we changed the reference group from the district to traditional high schools and dropped students without prior achievement data (i.e., standardized test scores the year before the pathway begins). In the second step, we adjusted for differences in student background. Ultimately, we used a multilevel model to compare pathway students with students in traditional high schools who had similar demographic characteristics and prior achievement within the same district. After these analytic steps, the estimated difference in graduation rates decreased from 13 to 5 percentage points. See the appendix for more detail on our methods.

Calculation of Graduation Rate Results



Classification of students by pathway. As in previous reports, we determined enrollment on the basis of students' initial pathway choice in 9th or 10th grade, depending on the initial grade level served by the pathway. If students subsequently left the pathway or switched to a different academic program, they remained classified on the basis of their initial enrollment. This approach ensured that any positive findings for pathways did not result because these programs culled struggling students. As discussed in Chapter 3, we know that 68% of certified pathway students and 55% of noncertified pathway students remained in their initial pathways through the beginning of 12th grade, and these retention rates were lower for English learners, special education students, and students with low prior achievement. Retention rates within pathways were higher for students with high prior achievement.

Postsecondary Sample. The analyses of postsecondary enrollment and persistence are limited to students who were in the same district in 12th grade as they were when their pathway began. Students who dropped out or left their initial district were excluded from these analyses.

Findings for All Certified Pathway Students

In this section, we compare outcomes for students who enrolled in certified pathways with those of students enrolled in traditional high school programs.[15] We use certification by the end of a student's 10th-grade year as an indication that students enrolled in a pathway that fully implemented the Linked Learning approach.[16]

Interpretation of Results

Throughout this chapter, we compare the outcomes of students in pathways with those of similar peers in traditional high school programs. When we make these comparisons, we are able to say whether or not the differences in outcomes between the group of interest (e.g., all students in certified pathways) and similar peers in traditional high school programs are statistically significant (i.e., large enough that they are unlikely to have arisen by chance). We also compare the differences between noncertified pathway students and similar peers in traditional high schools. We run both of these sets of analyses for those students in each subgroup of interest (e.g., English learners). However, we do not formally or statistically compare these estimated differences; the point of reference is always the traditional high school population. We *do not*, therefore, compare the sizes of impact between

- Students in certified and noncertified pathways
- All students and students in a particular subgroup.

Finally, our analyses can neither shed light on nor adjust for ways that any unobserved characteristics, such as motivation or parental support, differ between pathway and traditional high school students.

We began the analysis by asking whether, when fully implemented, the Linked Learning approach provided experiences to all students that made them more likely to graduate from high school ready for college. Below, we first discuss whether participation in a Linked Learning certified pathway was associated with higher rates of 4-year high school completion. We then discuss whether participation in a certified pathway was associated with college readiness, postsecondary enrollment, and postsecondary persistence for students who remained in high school through 12th grade.

High school dropout and graduation. We have consistently found in previous years of the evaluation that students who enrolled in certified pathways were more likely to remain enrolled in their districts than similar peers in traditional high school programs. Given our previous findings about the positive effect of pathway participation on retention in the district, we would expect students who were enrolled in certified pathways to be less likely to drop out of high school and possibly more likely to graduate from high school than similar peers.

On average, certified pathway students were 2.0 percentage points less likely to drop out of high school and 5.3 percentage points more likely to graduate from high school compared with similar students in traditional high school programs.

[15] We consider a pathway to be certified for a cohort if certification occurred by the end of the cohort's 10th-grade year. Montebello had no certified pathways.

[16] For the class of 2013, 10 pathways were certified by the end of the 2009–10 school year in Antioch, Long Beach, Pasadena, and Porterville school districts, which are the four districts we track for this cohort. For the class of 2014, 23 pathways were certified by the end of the 2010–11 school year across all nine districts, and for the class of 2015, 33 pathways were certified by the end of the 2011–12 school year across all nine districts.

We used the following definitions of high school dropout and graduation:

- **Dropout**—We classified students as high school dropouts if they were not enrolled in school through their 12th-grade year.[17]
- **Graduation**—We classified students as having graduated from high school if they earned a traditional high school diploma within 4 years of beginning high school. In other words, these students needed to remain in school through the 12th grade and to complete all graduation requirements (i.e., all necessary credits and any additional requirements, as set by each district).[18]

Students in certified pathways were less likely to drop out of high school and more likely to earn a high school diploma than similar peers in traditional high school programs.

On average, students in certified pathways were 2.0 percentage points less likely to drop out of high school and 5.3 percentage points more likely to earn a high school diploma than similar students in traditional high school programs. These two findings are closely related in that students must remain in school to earn a high school diploma. For context, 12% of students in our entire analytic sample dropped out of high school, while 74% went on to graduate.[19] Further, the 5.3 percentage point increase in 4-year graduation rate is roughly equivalent in size to one-third of California's gap in graduation rates between African American and white students.[20]

Over the 7-year evaluation, we have consistently found through surveys and focus groups that Linked Learning students reported higher levels of engagement in and relevance of school and received more advising and guidance from their teachers. These positive findings on high school dropout and graduation may indicate that stronger relationships with school staff and a greater sense of engagement and relevance translate to students' remaining in school and earning a high school diploma. We next discuss whether students who participated in certified pathways were more successful in their coursework than similar peers.

Credit accumulation, completion of college preparatory requirements, and college-admission GPA.[21] If students who enrolled in certified pathways were more likely to complete high

[17] Students who, according to district records, completed the high school curricular program or graduated from high school were not considered to have dropped out, regardless of whether they left the district before their 12th-grade year. Students who transferred to other schools outside the district were excluded from the analysis.

[18] This definition of high school graduation is consistent with the U.S. Department of Education's definition, including the requirement that students graduate within 4 years of attending high school. Note that using this definition, students who did not earn a traditional high school diploma, including those who passed the General Education Development test, are not considered graduates. However, in line with current policy, we include students in all cohorts as having graduated if they completed high school curricular requirements but did not pass the CAHSEE. Finally, we excluded from the analysis students who transferred to other schools outside the district.

[19] The remaining 14% of our analytic sample are not counted as graduates or dropouts for a variety of reasons. These reasons broadly include: (1) transfers to schools outside of one of the initiative districts, a private school in California, or schools outside of California; (2) graduation without earning a diploma in 4 years, such as earning a 5-year diploma, a GED, or a special education certificate; and (3) other reasons, such as medical absences.

[20] African American students in the class of 2015 in California were 17.2 percentage points less likely than their white classmates to graduate with their cohort (California Department of Education, 2016d).

[21] The lack of standardization in grading across academic programs makes GPA a problematic outcome measure when comparing students in different academic programs (U.S. Department of Education, 2013). We therefore recommend not interpreting any estimated impact of Linked Learning on student GPA as a measure of academic success or noncognitive skill (as suggested in Farrington et al., 2012). However, student GPA impacts eligibility for UC and CSU admission without regard to academic program; we therefore interpret analyses of the impact of Linked Learning on GPA in light of this role.

school than similar peers in traditional high school programs, they also may have experienced greater academic success in high school. For this year of the evaluation, we focused on cumulative high school outcomes—credit accumulation, completing college preparatory requirements, and college-admission GPA—that are consequential for completion of high school and admission to a California public 4-year university in the UC or CSU system. These outcomes capture student academic success throughout 4 years of high school, as well as preparedness for college at the conclusion of high school. We limit the analysis of course-taking outcomes to students who remain in the district through the 12th grade, so these outcomes should be thought of as the results of the additional work students complete in 4 years of high school, not the results of staying in school as opposed to dropping out. We define these outcomes as follows:

- **Credit accumulation**—This was defined as the number of course credits passed through the end of students' 12th-grade year. In California, students are required to complete 220 credits to be eligible to graduate from high school.
- **Completion of college preparatory course requirements**—To be admitted to a public 4-year university in California, students must complete a set number of designated college preparatory courses across academic subjects and earn a grade of C or better in each course—these courses are collectively referred to as the *a–g requirements*. We defined this outcome in two ways. We looked at the number of a–g requirements completed to determine the extent to which certified pathway students were making greater progress toward meeting those requirements, and then at whether students completed all a–g requirements.[22]

On average, certified pathway students completed 8.9 more credits—almost two more courses—than similar students in traditional high school programs.

- **College-admission GPA**—A student's GPA in the 10th- through 11th-grade a–g courses has important implications for admission to California's 4-year public universities. Students must earn at least a 3.0 GPA to be eligible for the UC system. Students qualify for admission to the CSU system with a GPA of 3.0 or higher and are ineligible for admission with a GPA below 2.0.[23] The eligibility of students with GPAs between 2.0 and 3.0 depends on ACT or SAT scores. Our calculation of GPA closely mirrors the CSU system's formula to calculate high school GPA for applicants.[24]

We were not able to use the course files from one of the eight districts with certified pathways, so this analysis is based on students in certified pathways from seven of the districts in the initiative.[25]

[22] See the appendix for the list of a–g requirements.

[23] For a full CSU eligibility index, see https://secure.csumentor.edu/planning/high_school/cal_residents.asp.

[24] In calculating applicants' high school GPA, the CSU system assigns additional points to honors courses, up to eight semester courses. Because we cannot identify honors courses in our data, we did not weight them in our calculation of GPA. For this reason, we also did not calculate differences in eligibility based on meeting a particular GPA threshold.

[25] Since the sixth-year report, Oakland and Sacramento submitted updated course data and are now included in the analyses. Students from Antioch are not included in the analyses of credit accumulation or a–g completion; Montebello has not participated in pathway certification.

Over the 4 years of high school, students in certified pathways accumulated more credits than similar peers in traditional high school programs.

Consistent with findings in previous years of the evaluation, students who enrolled in certified pathways accumulated, on average, 8.9 more credits than similar peers in traditional high school programs—equivalent to nearly two more courses over the 4 years of high school.[26] Students must complete 44 courses to be eligible to graduate from high school; thus, a two-course difference represents nearly one-half of a semester of coursework.

Certified pathway students completed more college preparatory courses during high school, compared with similar students in traditional high school programs, and were equally likely to complete the full suite of a-g requirements.

We estimate that, on average, certified pathway students completed 0.9 more a–g semester courses than similar peers in traditional high schools, indicating progress toward college-readiness by certified pathway students. For context, the California State University system requires 15 units (equivalent to 30 semester courses) for admission.

To better understand what may drive differences in a–g completion, we also estimated the differences between certified pathway students and traditional high school students in completing the overall a–g requirements and each of the individual letter requirements. Given the small difference in average number of requirements met, it is unsurprising that, overall, certified pathway students and traditional high school students completed the full suite of a–g requirements at similar rates. Of the individual subject requirements, certified pathway students were 9.2 percentage points more likely than their peers in traditional high school to complete the math ("c") requirement; completion of all other subject requirements was similar between pathway and traditional high school students. In our analytic sample overall, 39% of students completed the math requirement.

On average, certified pathway students completed roughly an additional a–g requirement more than similar students in traditional high school programs. These differences appear to be driven by the completion of more math classes by certified pathway students.

In interpreting this finding, it is important to consider that pathway students have the demands of completing a career technical course sequence in high school in addition to the more traditional academic curriculum. We found no evidence, therefore, that these additional requirements were interfering with pathway students' completion of the a–g requirements. In addition, the findings regarding a–g completion should be considered in conjunction with the finding that certified pathway students were 2.0 percentage points less likely to drop out of high school relative to their peers in traditional high school. Together, these findings suggest that certified pathways were doing at least as well helping students complete the a–g requirements even as they retained students who otherwise might have left high school prior to senior year and were unlikely to pursue the full college preparatory curriculum.

Although a–g completion data provide valuable information on students' academic readiness for college, they do not tell us conclusively whether a pathway's course of study meets a–g requirements. Qualitative data suggest that most pathways provided students with access to some of the a–g approved classes needed to fulfill the course requirement through the pathway program of study. However, over the course of the evaluation, teachers reported that the lack of a foreign language course was a barrier to pathway

[26] Previous evaluations typically provided larger estimated differences for each grade level from 9th through 11th grades. The difference in size of this year's estimate compared with that of previous years is probably due to the exclusion of students who dropped out before 12th grade.

students' completing 4-year college entrance requirements within their pathway program of study. Consequently, to fulfill the a–g course requirement, pathway students may have to complete some required courses outside the pathway, missing out on the full pathway experience.

Pathway staff also reported that the lack of a–g approved pathway CTE courses was a barrier to pathway students' completing the a-g requirements. Districts have been responding to this deficiency by revisiting pathway courses of study and revamping CTE courses to meet a–g standards by working with the county office of education, the College and Career Academy Support Network, or the UC Curriculum Integration program. According to the California Department of Education (2014), the number of a–g approved courses in the state has been climbing steadily since it began tracking in 2000. However, getting approval is only the first step; another obstacle to offering a–g approved classes mentioned in qualitative data was the ability of districts to find the appropriate CTE staff to teach career-themed a–g approved courses. Districts struggled with shortages of qualified CTE teachers, and getting individuals fully credentialed as a Designated Subjects CTE teacher can be a lengthy process for staff who have not come through a teacher credential program. In 2015–16, some districts used funds from their Career Technical Education Incentive Grants to support pathway teachers in getting their CTE credential.

Certified pathway students earned college-admission GPAs comparable to those of similar peers in traditional high school programs.

In last year's report, we found that, on average, certified pathway students had college-admission GPAs that were 0.14 point higher than those of similar students in traditional high school programs. This year, with revised course files from two districts and the addition of new schools in Los Angeles, we find that certified pathway students completed more a–g requirements than similar peers while earning equally high grades in these courses.

College Enrollment and Persistence. As discussed in Chapter 3, pathway students reported getting more school support than comparison students to understand high school graduation and college enrollment processes and procedures. For the first time, this report provides information on student enrollment and persistence in 2- and 4-year colleges, using data from the National Student Clearinghouse; data were available only for those students who remained in school through the 12th grade.[27] We define these outcomes as follows:

- **Initial enrollment**—This was defined as enrolling in a 2- or 4-year college in the fall semester (August 1–December 31) during the calendar year the student's cohort graduated (e.g., fall 2013 for a student in the class of 2013). We have these data for all three cohorts.
- **Enrollment in a 4-year college**—This analysis was limited to students who enrolled in a postsecondary institution and examined whether these students were more likely to enroll in a 4-year college than a 2-year college. We have these data for all three cohorts.
- **Persistence to second year**—This analysis was also limited to students who initially enrolled in a postsecondary institution. We consider students to have persisted if they initially enrolled in a 2-year or 4-year college and also enrolled in a 2- or 4-year college the following (second year) fall semester, and to not have persisted if they were not enrolled in the following fall semester. The postsecondary institution in the second year of enrollment does not have to be the same as the

[27] To compensate for missing data on students who attended institutions that do not provide data to researchers under the Family Educational Rights and Privacy Act (FERPA), we supplemented data from the National Student Clearinghouse (NSC) with community college data from the Chancellor's Office Management Information System (COMIS) for some students. See the appendix for details.

institution in the first year for a student to be considered as persisting in college. We have these data for the 2013 and 2014 cohorts.[28]

Certified pathway and similar traditional high school students had comparable patterns of postsecondary enrollment and persistence.

In our overall analytic sample (including both pathway and traditional high school students), 57% of students enrolled in college. Of those who enrolled, 45% attended a 4-year institution and 77% persisted to a second year. Certified pathway students were as likely as similar peers in traditional high schools to enroll in college. Conditional on enrollment in any postsecondary institution, certified pathway students were also equally likely to enroll in a 4-year college and to persist in school to a second year, compared with similar peers who attended traditional high school programs. Considered in conjunction with the findings above, these results allay several common concerns about career-themed pathways. First, the career preparation pathway students that engage in does not "track" students out of a rigorous college prep curriculum. Second, the greater exposure to career opportunities does not distract students from furthering their education after high school. Finally, certified Linked Learning pathways matched the postsecondary enrollment rate of traditional high school programs even as they retained more students who might otherwise have dropped out and were unlikely to pursue postsecondary education. We next turn our attention to findings on these outcomes for subgroups of students enrolled in certified pathways.

Findings in Certified Pathways by Student Subgroup

The results presented in the preceding section indicate that students in certified pathways were less likely to drop out and more likely to graduate from high school than similar peers in traditional high schools. Students in certified pathways also earned more credits and completed more college preparatory requirements than similar peers in traditional high schools. Participation in a pathway, however, may not be equally effective for all students. Ethically, it is important to verify that the overall positive or neutral effects of pathway participation are not masking negative effects for specific student subgroups. Analyzing results by subgroup is particularly important when evaluating initiatives that create multiple small learning communities (such as Linked Learning pathways), because the literature suggests that this type of reform, if implemented poorly, can exacerbate educational inequality by increasing the stratification among pathways by race, class, gender, or prior academic achievement (Lee & Ready, 2007). When fully implemented, however, pathways may offer particular advantages for some traditionally underserved groups.

Theoretically, subgroup results may not replicate overall results for two reasons. First, pathway enrollment may differentially affect students in subgroups. This differential impact can be either positive or negative, depending on the subgroup. For example, the literature suggests that pathways' prescribed course of study may be particularly beneficial for disadvantaged students, who otherwise might find themselves tracked into lower level classes in a traditional high school setting (Fowler & Walberg, 1991; Howley & Howley, 2004; Lee & Smith, 1997; McMillen, 2004). These students may also find the real-world relevance and greater structure and supports provided by a certified pathway key to thriving in school. On the other hand, students who need specialized supports may not thrive in pathways that are unable to offer them. For example, high school counselors have reported that English learners' scheduling conflicts due to required language classes can prevent these students from fully participating in a pathway's course sequence. This inability to participate fully in the course sequence with pathway peers—including the interdisciplinary projects offered across these classes—may temper the effect of pathway enrollment on outcomes for these students.

[28] See the appendix for details.

The second reason that subgroup results may not replicate overall results is that if subgroup students are clustered in certain pathways, any estimated impacts for the subgroups may also reflect the quality of the pathways serving these students. If students in disadvantaged subgroups are more likely to select lower quality pathways, for example, they could systematically receive lower quality instruction than they would in a traditional high school setting. Moreover, we know from the fifth-year report that female students enrolled disproportionately in health pathways and were less likely to enroll in engineering pathways. As a result, any systematic differences in pathway quality between health and engineering pathways could change outcomes for female students.

To address these concerns, we analyzed the impacts of pathway participation for student subgroups of interest, namely, African Americans, Latinos, English learners, students with low prior achievement, and students with high prior achievement.[29] In addition, given the finding in the fifth-year report that women tend to select different pathway themes than their male peers, we included female students as an additional subgroup.[30]

As discussed in the "Interpretation of Results" box, above, we do not directly compare the size of subgroup effects with overall effects, but we do highlight cases where the direction of subgroup results differed from overall results. We present subgroup findings for students in certified pathways in this section, and we include the results for students in noncertified pathways in the "Findings for Noncertified Pathway Students" section, below. Exhibit 5-2 summarizes the statistical significance and direction of these subgroup results for students in certified pathways.

Overall, we found that the Linked Learning approach had a strong, positive impact on the students who entered high school with poor academic skills. Not all the positive effects of enrolling in a Linked Learning pathway, however, held for African American students, English learners, and students with high prior achievement. The results for Latinos and female students—groups that comprised half or more of the study population—largely replicated the overall results. We next present the findings for each subgroup in greater detail.

[29] We limited the sample to students in the subgroup of interest and then compared outcomes for certified pathway students with those of traditional high school students for similar students in the subgroup. Some districts and certified pathways are excluded from analyses presented in this section because they did not have enough students in a particular subgroup.

[30] Although both special education and low socioeconomic status students are also of interest in this initiative, we chose not to run separate analyses for either group. Special education students constituted 8% of our analytic sample. This sample size was too small to conduct a separate analysis using the same methods as elsewhere in this chapter. Low socioeconomic status students accounted for a majority of our sample (79%), and results therefore closely mirror those of the overall sample.

Exhibit 5-2
Summary of Statistical Significance and Direction of All Subgroup Certified Pathway Analyses

	Low Prior Achievement	High Prior Achievement	English Learner	African American	Latino	Female
High School Completion						
Dropout[a]	+	o	o	o	+	+
Graduation	+	o	o	o	+	+
Course Outcomes						
Credits Earned	+	o	+	+	+	+
Number of College Preparatory Requirements	+	o	+	o	+	+
Completion of College Preparatory Requirements		o	o	o	o	o
College Preparatory GPA	o	o	o	o	o	o
Postsecondary Education						
Postsecondary Enrollment	o	o	o	o	o	o
4-Year College Enrollment	+	o	o	+	o	o
Postsecondary Persistence	o	o		o	o	o

Note: "+" indicates a statistically significant and positive finding; "-" indicates a statistically significant and negative finding; "o" indicates a null finding; and a blank indicates a result could not be estimated.

[a] A positive finding for dropout ("+") means that students were less likely to drop out.

Students with low prior achievement. For the initiative to reduce the achievement gap within district schools, impacts of Linked Learning must be felt most dramatically by students with low prior achievement. We defined low prior achievement as receiving a below basic or far below basic proficiency level designation on the ELA CST exam before entering the pathway or traditional high school program. Approximately one-quarter of students in the sample met this definition upon entering high school.

Participation in a certified pathway had a strong impact on outcomes for students with low prior achievement, compared with similar peers in traditional high school programs.

Findings for certified pathway students with low prior achievement largely mirrored positive outcomes for all students. On average, certified pathway students with low prior achievement were 5.1 percentage points less likely to drop out and 9.4 percentage points more likely to graduate from high school than similar peers in traditional high schools. Further, these students accumulated 15.4 more credits and 1.7 more college preparatory requirements than similar peers in traditional high school programs. They also had GPAs that were 0.10 points higher than similar peers in traditional high school programs, but these results were estimated

On average, students with low prior achievement in certified pathways were 5.1 percentage points less likely to drop out and 9.4 percentage points more likely to graduate from high school than similar peers in traditional high school programs.

imprecisely enough that they may have arisen by chance.[31] Although students with low prior achievement in certified pathways were equally likely to enroll in a postsecondary institution as their similar peers, when they did enroll in a college, they were 6.4 percentage points more likely to enroll in a 4-year institution. However, these students were no more likely to persist in college than their peers from traditional high schools. On the whole, the sizes of these differences indicate that participation in a certified pathway had a meaningful impact on outcomes for students with low prior achievement.

Results for students with low prior achievement, although promising overall, showed some room for improvement when serving these students. Because of the small number of students with low prior achievement who completed the full set of college preparatory requirements in either pathway or traditional high school settings, we were unable to estimate any differences on these outcomes, a technical barrier that points to the real-world difficulty of preparing these students to graduate ready for college. Additionally, students with low prior achievement from certified pathways were equally likely as their peers from traditional high schools to enroll and persist in a postsecondary institution.

Taken together, this year's findings suggest that participation in a certified pathway may lead to a number of benefits for students with low prior achievement—a subgroup for whom the Linked Learning approach may be particularly well suited. As discussed, these are students who—absent the prescribed pathway course of study—may find themselves tracked into lower level classes in a traditional high school setting and thus experience a more rigorous and engaging education as a result of enrolling in a pathway.

Students with high prior achievement. Although improving the outcomes for students with low prior achievement is critical to narrowing the achievement gap, this goal should not be achieved at the expense of students at the highest end of prior achievement. We defined high prior achievement as receiving an advanced proficiency level designation on the ELA CST exam before entering the pathway or traditional high school program. Approximately 20% of students in the sample met this definition upon entering high school. In this seventh-year report, we analyze the effect of pathway participation on these students for the first time.

Students with high prior achievement who participated in certified pathways performed equally well as similar peers in traditional high school programs.

We found that students with high prior achievement who enrolled in certified pathways were 2.5 percentage points more likely to graduate within 4 years, compared with similar peers in traditional high schools, though these results were estimated with enough uncertainty that they may have arisen by chance. In interpreting these findings, it is important to consider that these high-achieving students were already performing well in traditional school programs. We found no other differences between outcomes for students with high prior achievement in certified pathways and their peers in traditional high school programs.

English learner students. We know from interviews with college counselors that scheduling English learners into the full pathway course sequence can be a challenge, given additional curricular demands on these students (e.g., English language development support), potentially limiting the extent to which these students fully engaged with the Linked Learning approach. For the purposes of these analyses, we classified students as English learners on the basis of their eighth-grade designation. English learners constituted approximately 21% of the analytic sample. Although pathways in all districts enrolled English

[31] In this report, we use the standard $p < .05$ threshold to determine statistical significance. Under this standard, these results and all others we describe as "estimated imprecisely enough that they may have arisen by chance" would be considered marginally significant at $p < .10$.

learners, they represented more than one-third of certified pathway enrollment in West Contra Costa, Los Angeles, and Oakland.

On average, English learner students in certified pathways earned 11.7 more credits—equivalent to more than two courses—and one more college prep requirement than similar peers in traditional high school programs.

English learner students in certified pathways earned more credits and completed more college preparatory requirements than similar peers in traditional high school programs; however, no other outcome was statistically significant for this subgroup.

On average, English learner students in certified pathways earned 11.7 more credits—equivalent to more than two additional courses— and completed one more college prep requirement than similar peers in traditional high school programs. These students were also 3.2 percentage points less likely to drop out and 7.6 percentage points more likely to graduate than their peers, but these results were estimated imprecisely enough that they may have arisen by chance.

Further, English learners in certified pathways were 5.5 percentage points less likely to enroll in a postsecondary institution than similar students in traditional high schools, but these results were estimated imprecisely enough that they may have arisen by chance. However, among students who enrolled in a postsecondary institution immediately after high school, English learners in certified pathways were 7.6 percentage points more likely to enroll in a 4-year college than similar students in traditional high schools, but these results were also estimated imprecisely enough that they may have arisen by chance. Because of the small number of English learner students who persisted in a postsecondary institution, we were unable to estimate any differences on this outcome, a technical barrier that points to the challenge of keeping these students in college. We found no other observable effects of pathway participation on student outcomes for English learners in certified pathways.

These findings suggest that the postsecondary transition may be a particular point of concern for English Learners. The lower rates of postsecondary enrollment, qualitative reports of difficulty scheduling these students for the necessary coursework, and lower rates of persistence for these students within pathways (see Chapter 3) together suggest that meeting the needs of English learners within pathways should be a top priority for districts.

African American students. Given that Linked Learning aims to increase equity by graduating college- and career-ready students, it is of particular importance that this initiative serve African American students, who face the lowest high school graduation rate in California (California Department of Education, 2016d). African American students comprised approximately 15% of the overall sample.

African American students in certified pathways earned more credits than those in traditional high school programs.

On average, African American students in certified pathways earned 15.2 more credits—roughly three courses— than African American students in traditional high schools.

We observed few effects of pathway participation on outcomes for African American students. On average, African American students in certified pathways earned 15.2 more credits—roughly three courses—than African American students in traditional high school programs. They also accumulated one more college prep requirement and were 5.7 percentage points more likely to graduate than their peers, but these results were estimated imprecisely enough that they may have arisen by chance. They were equally likely to enroll and persist in a postsecondary institution as similar students who attended traditional high schools, but

those who did enroll in a postsecondary institution were 12.4 percentage points more likely to enroll in a 4-year college than their peers. There were no other observable effects of certified pathway participation on outcomes for African Americans.

Latino students. Latino students in the class of 2015 in California were 9.5 percentage points less likely than their white classmates to graduate with their cohort (California Department of Education, 2016d). Latino students compose the largest racial or ethnic group in the nine initiative districts, representing 58% of students in the sample. Approximately one-third of the Latino population is classified as English learners.

On average, Latino students in certified pathways were 2.6 percentage points less likely to drop out and 5.9 percentage points more likely to graduate, and they accumulated 11.7 more credits and 0.9 more college preparatory requirements than similar peers in traditional high school programs.

Findings for Latino students in certified pathways mirrored the findings from the overall student sample—probably because Latino students constituted the majority of the sample. On average, Latino students in certified pathways were 2.6 percentage points less likely to drop out and 5.9 percentage points more likely to graduate than similar peers. They also earned 11.7 more credits and accumulated 0.9 more college preparatory requirements than their counterparts in traditional high schools. Latino students in certified pathways had GPAs that were 0.09 point higher than those of similar peers, but these results were estimated imprecisely enough that they may have arisen by chance. As in the overall sample, there were no impacts on college attendance for Latino students in certified pathways.

Female students. Findings for female students mirrored overall results—probably because female students constituted half of all students in the sample and were evenly distributed across districts.

On average, female students in certified pathways were 2.9 percentage points less likely to drop out, were 5.8 percentage points more likely to graduate, and accumulated 8.9 more credits and 0.7 more a-g requirements than female students in traditional high schools.

On average, female students in certified pathways were 2.9 percentage points less likely to drop out, were 5.8 percentage points more likely to graduate, and accumulated 8.9 more credits and 0.7 more a-g requirements than female students in traditional high schools. Female students in certified pathways earned similar GPAs and enrolled in postsecondary institutions at similar rates as their counterparts in traditional high schools. Given that female students enroll in different career-themed pathways than their male peers, the fact that these results mirror those of the overall population provides evidence that neither gender nor pathway theme interferes with the positive benefits of pathway participation.

We next turn to outcomes for students in noncertified pathways to understand whether these findings hold for students in career-themed pathways with a wide range of adherence to the full Linked Learning approach.

Findings for Noncertified Pathway Students

As state, federal, and Foundation funding for regional expansion of the Linked Learning approach encourages the development of new pathways beyond the nine initiative districts, it is especially important to understand whether the approach must be implemented with fidelity to achieve optimal results or whether creating career-themed pathways of any quality will be effective. To answer this question, we separately assessed student outcomes for noncertified pathways in comparison with those of similar peers in traditional high schools.

During our site visits and interviews, we observed a wide range of pathway quality within the districts. Some noncertified pathways emphasized continuous improvement and fidelity to the Linked Learning approach, whereas others had little in common with Linked Learning certified pathways save a career theme. Over time, however, we observed efforts by district staff to create a districtwide system of high-quality pathways, investing in the quality of some pathways while eliminating pathways they felt were unlikely to develop to an acceptable level of fidelity to the Linked Learning approach.

In this section, we ask whether career-themed pathways with a range of quality graduate college-ready students more frequently than traditional high schools. To answer this question, we estimated differences between noncertified pathway students and similar traditional high school students for all outcomes described above: dropout, graduation, credit accumulation, college preparatory course requirement completion, college-admission GPA, and postsecondary enrollment and persistence. We provide the results for students in noncertified pathways overall and then within each of the subgroups identified in the preceding section.[32]

Identification of Noncertified Pathways

For this analysis, we included any career-themed pathways identified by districts as "noncertified pathways."

Interviews with district staff indicated that pathways in this category cover a wide range of adherence to the Linked Learning approach. Some pathways were themed in name only, whereas others were nearing certification. We believe this wide range of adherence to the Linked Learning approach translates to a wide range in the quality of noncertified pathways within the districts. However, over the course of the district initiative, we also found that districts worked to support developing pathways toward closer alignment with the Linked Learning approach, investing in training, staff, and other resources shared by both certified and noncertified pathways. They also worked to curate the available offerings, eliminating pathways with low student interest or weak fidelity to the approach, and developing new, robust pathways.

In the sixth-year report, we found that students who participated in noncertified pathways generally fared no worse than similar peers in traditional high school programs, but participation in a noncertified pathway did not result in improved outcomes for students on any of our measures: there were no statistically significant differences in outcomes for students in noncertified pathways, compared with those of students in traditional high schools. We took this finding to indicate that, although the certification process itself may not be imperative for a pathway to improve student outcomes, the pathway designation alone was inadequate to achieve positive effects on student outcomes. Certification indicates that a pathway has certain structures in place (e.g., work-based learning systems, course sequencing). When these

[32] Among students included in our analytic sample, 38 noncertified pathways were represented in the class of 2013, 105 in the class of 2014, and 97 in the class of 2015.

structures are in place and with the greater retention of students in certified pathways, we observed positive effects of pathway participation on high school graduation and college eligibility.

This year, with the inclusion of the graduating class of 2015, we found that noncertified pathway students were 2.0 percentage points less likely to drop out before 12th grade. [33] We also found that noncertified pathway students were 2.9 percentage points more likely to graduate, compared with similar peers in traditional high schools, though this result was estimated imprecisely enough that it may have arisen by chance. As with last year's report, we did not find statistically significant differences between noncertified pathway students and similar peers in traditional high schools for any other outcomes compared—including number of credits earned and college preparatory requirements completed, for which we saw positive outcomes for certified pathways (see the appendix for full results). What these findings suggest is that the impacts on dropout may be driven by characteristics that certified and noncertified pathways have in common (e.g., small learning communities, career focus). As discussed in Chapter 3, these common features of pathways may be more likely to influence affective, engagement-related outcomes, such as dropout and graduation, than the knowledge gains and college readiness outcomes. These findings may also be driven by the high quality of some pathways that had not yet completed the certification process (as noted elsewhere, Montebello had not sent any pathways through certification). Overall, these more promising results from noncertified pathways probably reflect efforts by districts to increase the quality of noncertified pathways throughout the districts' systems.

Among our subgroups of interest, we found benefits of noncertified pathways only for female and African American students. Given that females represent half of the overall sample, it is no surprise that the positive effects on dropout seen among noncertified students overall also accrue to females in noncertified pathways.

African American students were the only other group for which we found any significant differences on dropout and graduation for noncertified pathway students. On average, African American students in noncertified pathways were 5.7 percentage points less likely to drop out and 8.7 percentage points more likely to graduate than similar peers. There were no other statistically significant findings for African Americans in noncertified pathways. Although the literature on small learning communities suggests that disadvantaged students may benefit from more personalized school settings with a more prescribed course of study, neither extant research nor our qualitative findings point clearly to a reason why noncertified pathways might be more effective for African American students than for other subgroups. We are left with the possibility that African American students may be enrolling in the districts' higher quality noncertified pathways.

For Latino students in noncertified pathways, we did not observe the impact on rates of dropout and graduation that we saw in the overall results for noncertified pathways. However, in contrast to the overall sample, Latino students in noncertified pathways who had enrolled in a postsecondary institution immediately after graduation were 3.7 percentage points less likely to persist in a postsecondary institution than their peers, but these results were estimated imprecisely enough that they may have arisen by chance. There were no other statistically significant findings for any other subgroups in noncertified pathways.

[33] We believe these findings are driven by the class of 2015 data, not the change in the CAHSEE requirement. When running results restricting graduation to only those students who passed the CAHSEE, we still saw positive results for graduation in noncertified pathways.

Conclusion

In this chapter, we examined whether the Linked Learning approach graduates college-ready students. Overall, we found that Linked Learning certified and noncertified pathway students were less likely to drop out and more likely to graduate than similar students in traditional high school programs. Increasing the graduation rate of pathway students is a critical initiative accomplishment, given recent economic trend data indicating that high school graduates earn approximately 60% more than high school dropouts (U.S. Census Bureau, 2009). Although increasing graduation rates is a necessary first step to positively affecting the life chances of the students served, it is also important that Linked Learning graduates be adequately prepared to transition to college or careers. With regard to college readiness, certified Linked Learning pathways appear to be achieving more mixed results. Although they earned more credits, Linked Learning students were not more likely than similar students in traditional high schools to complete the full suite of college preparatory course requirements for public 4-year colleges and universities in California (though they did complete an additional 0.8 college preparatory requirements, moving them closer to completing the full suite). Finally, certified pathway students had college-admission GPAs similar to those of students in traditional high schools.

With the inclusion of the class of 2015, we see that students in noncertified pathways were also less likely to drop out than similar peers in traditional high school programs. This promising finding may reflect the work of district staff over the course of the initiative to invest in a system of pathways and move developing pathways closer to certification. Nonetheless, the other positive findings for certified Linked Learning pathways, such as college preparatory requirements, do not hold for noncertified pathways. Given recent state efforts to expand the Linked Learning approach, it will be important for new districts implementing Linked Learning pathways to attend to quality. Incorporating only the shallowest elements of the approach will not provide students with the same benefits provided to those enrolled in certified pathways. In other words, a small learning community with a career focus may be sufficient to engage students, helping them remain in school longer, but without fidelity to the core components of Linked Learning, it may be insufficient to support students in realizing the full academic benefits of attending a certified pathway.

Our analysis of student subgroups indicates that the Linked Learning approach is having a strong impact on the students who enter high school with poor academic skills. These students may find the real-world relevance, increased personalization, and prescribed course of study provided by a certified pathway to be helpful. This finding is of particular interest, given the Foundation's focus on improving the outcomes of disadvantaged and underserved student populations. We also note that this strategy is not only appropriate for low-achieving students: students with high prior achievement perform equally well in pathways as their peers in traditional high school programs.

Findings from postsecondary enrollment and persistence are new to this year's report. Overall, we find that Linked Learning students and similar traditional high school students enrolled and persisted in postsecondary education at comparable rates. We do, however, find that two traditionally underserved subgroups—students with low prior achievement and African American students—were more likely to enroll in a 4-year college than in a 2-year college when graduating from a Linked Learning certified pathway. One reason traditionally underserved students in certified pathways may have enrolled in 4-year colleges more frequently is the additional support offered by the pathway small learning communities. As discussed in Chapter 3, students in certified pathways reported receiving more guidance from school staff to understand issues that commonly inhibit 4-year college enrollment, such as how to choose a 2- or 4-year college, how to pay for college, and which high school courses are needed to get into college. Given the greater complexities and challenges of enrolling in a 4-year college as opposed to a 2-year college, the additional supports from teachers, guidance counselors, and pathway staff may be

particularly beneficial to students who otherwise may opt for a 2-year institution. These findings suggest that certified pathways may be particularly effective for traditionally underserved subgroups who, in a traditional high school program, would have still graduated and enrolled in a postsecondary institution, but who may not have had the knowledge or guidance needed to enroll in a 4-year college.

Chapter 6: Perceptions of College and Career Readiness

Key Findings

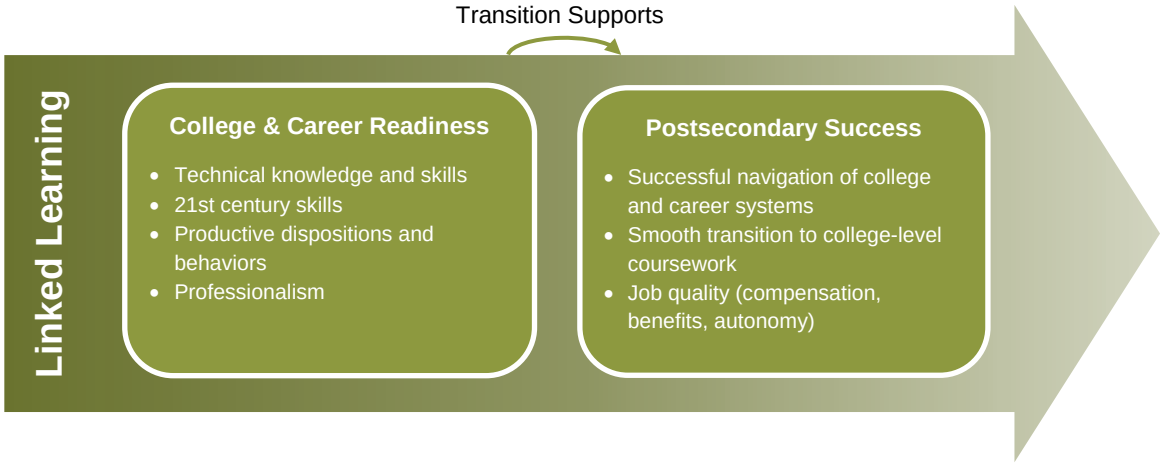
- Linked Learning students reported that their pathway experiences helped them develop skills needed for success after high school, including 21st century skills, productive dispositions and behaviors, and professionalism.
- College-going pathway and comparison students reported similar experiences with college transition support systems and navigating financial aid.
- College-going pathway students rated high school influences as more important to their choice of postsecondary goals and plans than comparison students. However, they were less likely to have declared a major after 1 year.
- College-going pathway and comparison students' placement in remedial coursework did not indicate differences in academic readiness for college-level reading, writing, and mathematics.
- Among survey respondents who had jobs, pathway students were more likely than comparison students to have help from a working professional in finding a job and were more likely to have a job with good benefits. However, there were no differences in level of compensation, job complexity, or autonomy between pathway and comparison students.
- Pathway and comparison students reported similar ability to manage time, set goals, and take responsibility for the quality of their work on the job and at school.

The preceding chapter used administrative data to examine the impact of Linked Learning pathways on high school indicators of college readiness and initial postsecondary enrollment and persistence. In this chapter, we draw on high school student survey and interview data to examine additional indicators of college and career readiness that are not well captured by administrative data. We look specifically at whether students perceived that their pathway experience helped them to develop a range of skills and competencies, including the 21st century skills, productive dispositions and behaviors, and professionalism that they would need after high school. We then use postsecondary student survey data (administered 1 year after high school graduation) to explore the initial signs of a successful transition to postsecondary education, including college and career navigation skills, transition to college-level coursework, and initial job quality (for employed students). These early self-reported indicators of postsecondary success help to flesh out the bare-bones metrics of initial college enrollment and persistence.

In Chapter 5, we presented a conceptual framework for how Linked Learning affects students' college and career readiness beginning with engagement and success in high school and leading first to college readiness and knowledge gains, and eventually to postsecondary success. Exhibit 6-1 homes in on the latter two stages of this framework, detailing first the types of knowledge, skills, and competencies that comprise college readiness and then highlighting the early indicators of postsecondary success captured by our postsecondary survey. This framework is based on ConnectEd's Linked Learning College and Career Readiness (LLCCR) framework, which lays out the range of skills and competencies Linked Learning aims to develop (ConnectEd, 2012). Although there is no consensus in the field on a definition

of college and career readiness at present, the domains of learning defined by the LLCCR framework are consistent with recent research on the competencies needed for success in the 21st century (Farrington et al., 2012; Nagaoka et al., 2015; Pellegrino & Hilton, 2012).

Exhibit 6-1
How Linked Learning Affects Students' College and Career Readiness



The core components of the Linked Learning approach (rigorous academic coursework integrated with a sequence of career technical courses, work-based learning, and student supports), as well as personalized learning in a pathway small learning community, are intended to enable pathway participants to acquire the knowledge, skills, and dispositions necessary for success in college, career, and life. When the core components of the Linked Learning approach are implemented as intended, pathways expand both the academic content and the learning contexts that students experience in high school.

The Linked Learning approach's relationship to the range of knowledge, skills, and competencies expected for college and career readiness can be summarized as follows:

- **Technical knowledge and skills**—The rigorous academics and career-themed classroom learning components of the Linked Learning approach are designed to support learning of career technical content knowledge in addition to core academic subject content knowledge. Work-based learning experiences provide students with the opportunity to develop hands-on skills through real-world activities, which may include using or creating industry-specific tools and materials. Because the relevant technical knowledge and skills are different for different career pathways, we do not focus on this dimension of college readiness on our student survey. However, as we reported in the fifth-year evaluation report, students interviewed felt that their work-based learning experiences provided authentic exposure to professional standards and technical skills relevant to a variety of careers (Guha et al., 2014).

- **21st century skills**—Today's students need 21st century skills to succeed in any postsecondary endeavor. The LLCCR framework defines these skills as "the range of cross-cutting cognitive processes and applications of knowledge needed to succeed in postsecondary education and future careers" (ConnectEd, 2012). For example, given the globalized economy and current immigration trends, students must be prepared to communicate and collaborate with peers and colleagues of diverse cultures, religions, and other backgrounds. Facing increasingly easy access to an overabundance of electronic information, students need to become savvy and informed

consumers of data. Through project-based learning, performance assessment, and the opportunity to interact with adults in workplace contexts and situations, the Linked Learning approach provides students with experiences to develop their communication and collaboration skills and their informational literacy.

- **Productive dispositions and behaviors**—The Linked Learning approach is designed to foster development of academic mindsets, such as personal accountability and self-efficacy, through the personalized supports of the pathway small learning community and through interactions with adults in workplace settings. The project-based learning, performance assessment, and work-based learning features of the Linked Learning approach also broaden opportunities and contexts for students to develop self-management skills, such as goal setting, time management, and persistence.

- **Professionalism**—Linked Learning pathways are designed to expose students to a range of possible careers within an industry theme and to provide opportunities for students to develop skills that can help them navigate the professional world, including learning expectations for professional behaviors and how to assemble job application materials.

If the Linked Learning approach is implemented as intended and students develop the technical knowledge and skills, 21st century skills, productive dispositions and behaviors, and professionalism discussed above, they should experience a smoother transition to college and career. To augment our findings on initial postsecondary enrollment and persistence, presented in Chapter 5, we surveyed pathway and nonpathway graduates about the following early indicators of postsecondary success:

- **Successful navigation of college and career systems**—The Linked Learning approach is designed to provide pathway students with opportunities and supports to develop college and career navigation skills, such as understanding and completing financial aid forms, that will give them access to the career pathways they want to pursue. Moreover, the Linked Learning approach is intended to help students clarify educational and career goals so they enter postsecondary education with a clear sense of what they want out of their investment of time and money.

- **Smooth transitions to college-level coursework**—Core academic content knowledge and skills in subject areas such as mathematics, reading, and writing are key to college readiness. Placement in developmental (remedial) reading, writing, or mathematics can delay credit accumulation in college and too often derails college completion (Bailey, Jeong, & Cho, 2009; Complete College America, 2012; Fulton et al., 2014). The Linked Learning approach is designed to include rigorous academics and personalized supports to help all students succeed academically and prepare them for college-level coursework.

- **Job quality**—Though not all high school graduates work during the year following graduation—some dedicate their full attention to college or do not seek or find employment—for those who do, we can assess indicators of job quality, including compensation, benefits, and level of autonomy. We also explored the complexity of skills graduates' jobs required, such as solving problems, coming up with possible solutions, or working in groups to achieve a shared goal.

In this chapter, we first draw on our 2014 survey of 12th-graders to demonstrate the extent to which Linked Learning students differed from comparison students with respect to college and career readiness. Next, we look at new data from our spring 2016 postsecondary survey to explore whether participation in

pathways has translated into differences between former pathway and comparison students in their successful transition to work or school. Throughout, we incorporate findings from student focus groups.

College and Career Readiness: High School Student Perspectives

As described above, the core components of the Linked Learning approach are designed to prepare all students for both college and career. Throughout the evaluation, SRI has sought to capture students' perceptions of their experiences in a Linked Learning pathway through student surveys and interviews. Data from our 2014 high school survey and student focus groups suggested that Linked Learning students thought their high school experiences provided them with the knowledge, skills, and productive dispositions necessary for success after high school (Guha et al., 2014).[34] We provide a summary of these findings below.

High School Experience Survey Methods

Administration. In spring 2014, the research team surveyed 12th-grade pathway and comparison students in all nine Linked Learning districts.

Focus. The survey provided an update on students' sources of support and advising, the skills they perceived to have gained in high school, their experiences with work-based learning and integrated instruction, and their postsecondary plans as well as their sense of preparation for college or career.

Sample. We surveyed 12th-graders in all pathways across the nine districts that were certified as of the 2012–13 school year. Montebello had no certified pathways as of the 2012–13 school year, so we surveyed 12th-graders there in the four pathways the district identified as being most developed. We sampled comparison students not enrolled in career pathways (or, in a few cases, enrolled in undeveloped pathways) from the same school where the numbers of students not enrolled in pathways were sufficient. Otherwise, the team selected comparison schools on the basis of their similarity to the size, achievement level, and demographics of the pathway schools.

Response rate. The response rates for pathway and comparison students were 86% and 82%, respectively, for an overall response rate of 84%.

(See Guha et al., 2014, for additional information.)

Pathway students reported that their high school experiences helped them develop 21st century skills, such as communication, collaboration, and informational literacy.

Interpersonal skills, such as communicating, collaborating, and working with people from diverse backgrounds, and informational literacy skills, such as information management and media literacy, are key 21st century competencies within the LLCCR framework. The Linked Learning approach is designed to support development of these skills through project-based learning and work-based learning. High school survey data suggest that Linked Learning pathways provided more support for the development of these interpersonal and informational literacy skills than traditional high schools. Students in pathways were more likely than comparison students to credit their high school experience with improving important interpersonal skills, such as communication and collaboration (Exhibit 6-2). In addition, pathway students were more likely than comparison students to report that their high school experiences improved their ability to act as intelligent consumers of information (Exhibit 6-2; Guha et al., 2014).

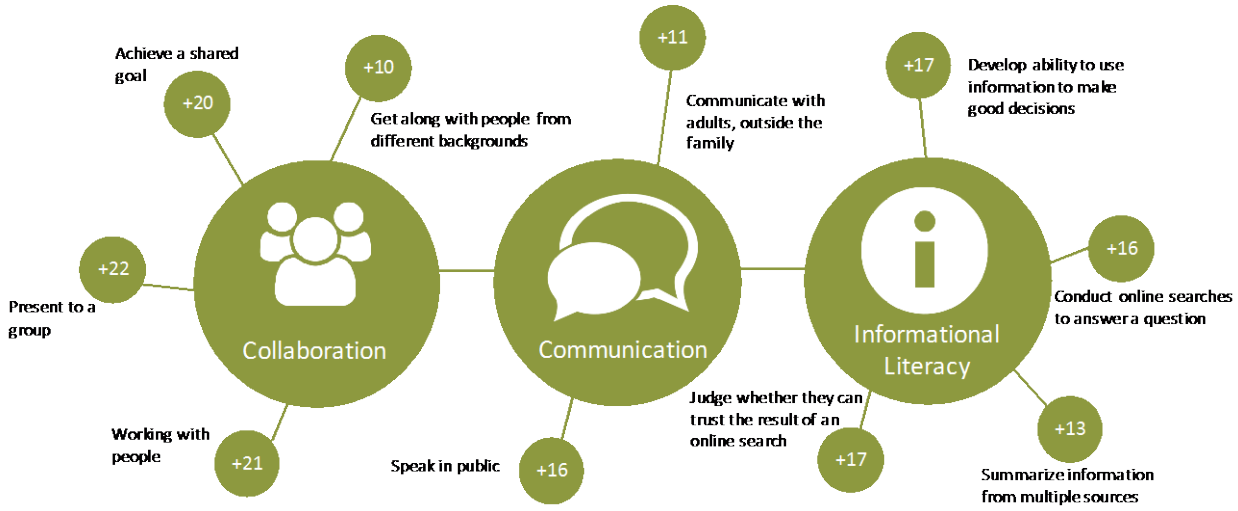
Consistent with survey findings, data from student focus groups illustrate how their pathway experience taught them to get along with people from different backgrounds—a skill that will be critical in any

[34] Findings from our 2014 survey were largely consistent with findings from our 11th-grade student experience survey and 2013 focus groups (see Guha et al., 2014).

postsecondary environment. For example, a student in a health pathway shared, “The main thing [I took away] is that there are a lot of different kinds of people in the world that you would have to [help], even if they say they don’t need [help].” Another 12th-grade pathway student similarly noted, “One thing you really learn is that you are going to meet [people] that you don’t work very well with, but [you learn] to cooperate with [difficult] people” (Guha et al., 2014).

Students across several districts credited work-based learning experiences, particularly making presentations to peers or industry representatives, with helping them develop public speaking and communication skills. For example, a student in an engineering pathway noted, “We had at least one large presentation every year. The most memorable one was during freshman year. [We presented to several] professional engineers…. By sophomore year we were already used to presenting in front of people” (Guha et al., 2014).

Exhibit 6-2
Pathway Students Were More Likely Than Peers to Report Improved Collaboration, Communication, and Informational Literacy Skills



Differences between pathway and comparison students are statistically significant at the $p < .05$ level. Numbers are percentage point differences between pathway and comparison students.

Source: Spring 2014 12th-Grade Student Experience Survey (Guha et al., 2014).

Pathway students reported that high school helped them develop productive dispositions and behaviors.

The personalization of learning in pathway small learning communities and work-based learning experiences provide students with opportunities to develop productive dispositions and behaviors that are not available to nonpathway students. In our 12th-grade survey, we asked students to report on the extent to which high school helped them improve skills and behaviors related to strong academic mindsets. Pathway students were more likely than comparison students to report that their high school experiences improved their self-management skills and sense of self-efficacy (Exhibit 6-3; Guha et al., 2014).

Pathway students noted how their pathway experiences helped them learn to succeed or grow as leaders through effort and perseverance. For example, a student from a performing arts pathway described planning to apply lessons in patience and perseverance in order to find success after graduation:

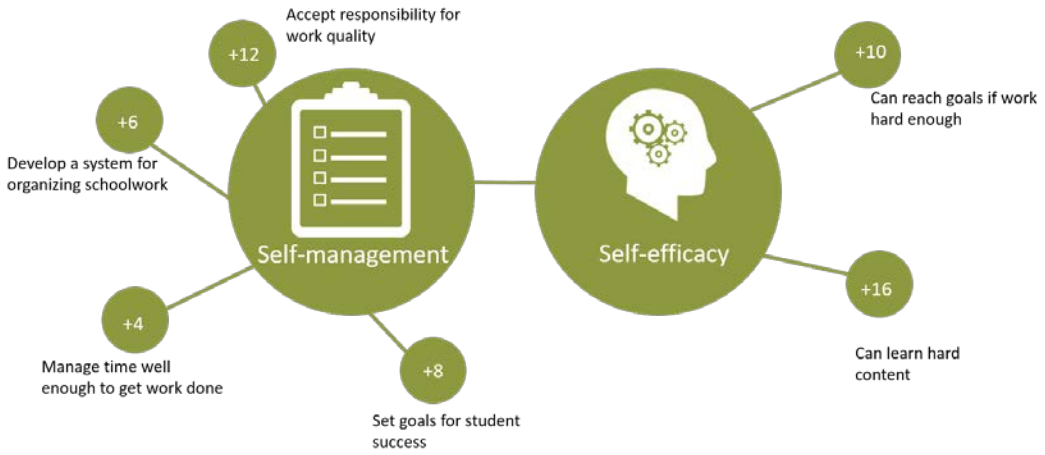
> I feel like a lot of people who are in theater, they want [success] now, and I think one thing I've kept in mind through all these experiences is to be good at managing your time and to be patient. If you have a craft, work on it, go to school for it, and refine it to the point where no one can tell you anything about it. And then go out and say, 'Hey, you know, I can do this (Guha et al., 2014).

Pathway students also reported how their academic experiences taught them organizational and time management skills that will serve them well in college. For example, a student in an education pathway shared, "The Ed academy helped me be more organized. I do feel prepared for college.... How we have to get organized for our teaching helped me organize my binder or backpack...prepare materials, what you have to teach to students."

Another student in a culinary arts and hospitality pathway noted how he appreciated the efficiency achieved with effective time management:

> I feel very prepared for college, compared to freshman year. [Before I was] just procrastinating all the time.... Now I get my work done ahead of time.... When you learn to manage your time, you get more time to do the things you want to do.

Exhibit 6-3
Pathway Students Were More Likely Than Peers to Report Gaining Productive Dispositions and Behaviors



Differences between pathway and comparison students are statistically significant at the $p < .05$ level. Numbers are percentage point differences between pathway and comparison students.

Source: Spring 2014 12th-Grade Student Experience Survey (Guha et al., 2014).

Pathway students reported that high school helped them develop professionalism, including learning expectations for professional behaviors and how to assemble job application materials.

Consistent with the expectation that work-based learning experiences can help students develop an understanding and ability to navigate employment systems, pathway students surveyed in 12th grade were more likely than comparison students to report that high school had improved their knowledge of expectations for professional behavior, as well as their ability to create a job application letter or resume (Guha et al., 2014).

Exhibit 6-4
Pathway Students Were More Likely Than Peers to Report Developing Professionalism

Differences between pathway and comparison students are statistically significant at the $p < .05$ level. Numbers are percentage point differences between pathway and comparison students.

Source: Spring 2014 12th-Grade Student Experience Survey (Guha et al., 2014).

Focus group interviews with high school pathway students illustrated the potential benefits of the Linked Learning experience in developing professionalism. In these interviews, pathway students described internship preparation activities that taught them expectations for professional behaviors (Guha et al., 2014). One student in a law academy described how he applied the skills and knowledge gained from his professional behaviors class throughout his internship:

> My internship was an opportunity for me to put into practice what I've been told to do…told to go in there, look confident, shake hands…. [The] confidence, [knowledge of] dress, attire, punctuality…[I] don't feel I would have gotten [these things] had it not been for the law academy" (Guha et al., 2014).

Pathway students we interviewed also described participating in activities that helped them understand the employment process and develop applicable skills. For example, an 11th-grade student in Porterville described a 2-day work-based learning experience that involved preparing a resume, receiving job skills training, and participating in a mock job interview conducted by actual employers as "good for [preparing]…. [As a result] we know what we need to do" (Guha et al., 2014).

Pathway students also described how they gained exposure to particular industries and professions through their work-based learning experiences, which helped them better understand and home in on their career interests. For example, a student in a health pathway explained the benefit of being able to explore her interests before enrolling in college:

> The benefit is you get to do everything ahead of time. We get to do patient care, which you can't do unless you're licensed, but since we're in the [academy] we get to help out. You get to see if that's really what you want (Guha et al., 2014).

As evidenced in this section, participation in Linked Learning pathways provided an advantage in gaining knowledge, skills, productive dispositions and behaviors, and professionalism consistent with the LLCCR framework. In the following section, we consider evidence from the postsecondary survey in discussing whether such benefits translated into smoother postsecondary transitions for pathway students relative to comparison students.

Postsecondary Transition Experience: Former Pathway and Nonpathway Student Perspectives

As noted above, the primary aim of Linked Learning is to better prepare all students for college and career. As Linked Learning students move beyond high school, we expect to see evidence that their pathway experiences translate into improved transitions and postsecondary experiences. In the preceding chapter, we presented findings on college-going rates among Linked Learning pathway graduates. In this chapter, our focus is on early indications of successful transition to postsecondary studies, training, or employment. To understand how early postsecondary experiences for pathway and comparison students might differ, we surveyed students from three districts 1 year out of high school in spring 2016. The survey asked students about their initial experiences navigating college and careers, including their goals and plans. For respondents enrolled in college, we asked about financial aid, their transition to college, and whether they had taken any remedial courses. For employed respondents, we asked about whether they received any support from a working professional to find their job, as well as their compensation, benefits, and autonomy. Finally, for both groups we followed up on the productive dispositions of self-efficacy and self-management to see whether the positive effects on these important mindsets translated from high school to the less structured, more anonymous contexts of work and postsecondary institutions.

Postsecondary Experience Survey Methods

Administration. In spring 2015, SRI recruited 12th-grade pathway and matched comparison students in three districts: Oakland Unified, Pasadena Unified, and Los Angeles Unified. We administered the survey to the recruited sample (i.e., the students who signed up at the recruitment sessions) 1 year later, in spring 2016.

Focus. The survey asked students about educational and career goals and plans, recent employment, influence of high school experiences on post-high-school goals and plans, financial aid and transition to college, and self-efficacy and self-management.

Sample. We sampled 12th-grade students from all certified pathways in the three districts. Students were eligible to be in the comparison group if they were not part of a certified Linked Learning pathway. We created a comparison sample by using propensity score matching based on demographic characteristics and prior achievement.

Survey Response Rate. We surveyed 996 students. Of those surveyed, 74% of pathway students and 59% of nonpathway students responded, for an overall response rate of 63%.

Respondent Characteristics. Overall, our survey respondents (both pathway and comparison) were more likely to be white, classified as gifted and talented, and less likely to be special education students than the full sample. The majority of respondents (84%) reported being enrolled in postsecondary education or training (a 2-year college, technical/trade school program, or 4-year college or university), which was higher than the 53% college enrollment rate we estimated by using administrative data. Although the survey results thus do not represent the typical pathway student, the demographic characteristics and college-going rates were similar between pathway and comparison groups, so the average differences between pathway and comparison students' responses to the survey can still be interpreted as resulting from pathway participation, at least for this higher-achieving group of pathway students.

Survey Analysis. To account for differences between the pathway and comparison students in demographic and prior achievement characteristics, We used propensity score weighting. We calculated the probability that each comparison student would have received the treatment (i.e., enrolled in a pathway) based on demographic characteristics and prior achievement, and then used those probabilities to create the weights for the analysis; we also controlled for the demographic characteristics and prior achievement in the logistic regression used to estimate each survey outcome. Together, the weighting and regression approach account for any observable differences between pathway and comparison students. However, as with our outcome analysis in Chapter 5, we cannot adjust for how any unobserved characteristics, such as motivation or parental support, differed between pathway and comparison students. For Los Angeles, we were unable to link survey records to administrative data and consequently were limited to matching the initial sample and adjusting for the background characteristics captured in the survey.

Reporting. The differences between pathway and comparison students in this section represent the difference in the predicted probability of selecting the outcome for the average respondent (in terms of demographics and prior achievement). We convert these probabilities to percentages for consistency with the high school survey reporting.

See the appendix for additional detail on the survey methods.

College-going pathway and comparison students reported similar experiences navigating college systems such as transition supports and the financial aid process.

On the basis of their high school Linked Learning pathway experience, we might expect that pathway students would better understand and be more equipped to take advantage of support systems for the college transition than nonpathway students. For all students entering college, particularly for low-income college students, counseling and transitional supports can improve postsecondary success (Tierney et al., 2009; Belasco, 2013). Participation in transition activities, such as summer bridge programs and courses targeting first-year students, can help support students as they move into new academic and social environments (Venezia, Kirst, & Antonio, 2003). Although transition supports may be perceived as largely the purview of postsecondary institutions, Linked Learning pathways—with their emphasis on preparing students for college and career and their focus on student supports—are well positioned to connect students to these transitional supports. In fact, as discussed in Chapter 4, the Linked Learning districts were supported in efforts to build connections with postsecondary institutions by initiatives such as the California Community College Linked Learning Initiative (CCCLLI) and the California College and Career Pathways Trust (CCPT) grants.[35] However, the postsecondary survey found no evidence that pathway students experienced stronger college transition supports than comparison students. Indeed, pathway students were slightly less likely to report having participated in new-student orientation (91% versus 96%) and equally likely to report participating in other activities, such as summer preparation programs, counseling, student support groups, or summer programs at their postsecondary institutions to support transitions. In addition, both groups were equally likely to report starting classes at their postsecondary institutions on time in the fall following high school.

Understanding and successfully completing the college financial aid application process is another important college navigation skill identified in the LLCCR framework. Research has shown that awareness of financial aid assistance and the ability to successfully navigate the process of obtaining financial aid for college are key components of college success (Bettinger et al., 2012; George-Jackson & Gast, 2015). The challenges with navigating the process of obtaining financial aid were described by one college student:

> The first semester I didn't get my financial aid money…. I would always go up to the financial aid department, and ask them, “Oh…, I haven't received anything….” They would tell me… “You forgot to do this, you forgot to do that,” but they wouldn’t tell me all in one day. So, I would always have to…come back and forth…. It was already in the next semester of classes and I still didn’t receive my money.

On this point, our postsecondary survey did not indicate that pathway students possessed any advantage relative to comparison students in navigating the college financial aid process or obtaining financial aid for college. Finally, pathway and comparison students were equally likely to report that they found the costs of attending college to be manageable.

[35] Beginning in 2012, the Foundation funded six California Community College Linked Learning Initiative grants. Facilitated by the Career Ladders Project, CCCLLI was designed to serve as a demonstration of extending Linked Learning pathways from high school into college. For each grant, the Career Ladders Project chose a community college to serve as the hub for CCCLLI model development and implementation. Hub colleges were responsible for partnering with other community colleges and a local Linked Learning K–12 district or pathway to work together to improve support systems for students’ transitions to postsecondary education.

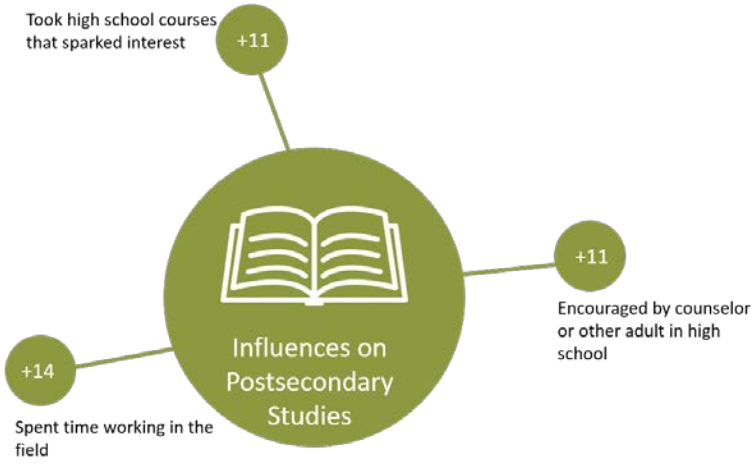
College-going pathway students, compared with comparison students, rated high school influences as more important to their choice of postsecondary goals and plans. However, they were less likely to have declared a major after 1 year.

Another dimension of successfully navigating college systems is having clear career goals and understanding the educational pathway that leads to a chosen career. The ability to make informed choices about college and program of study can support college retention and completion (Belasco, 2013; Venezia, Kirst, & Antonio, 2003). If Linked Learning is implemented as intended, pathway students should have an advantage in identifying a career goal and selecting an appropriate educational program thanks to increased opportunities to interact with working adults and to develop relationships with teachers who are knowledgeable about career options and educational pathways to careers. The integration of work-based learning and career themes within Linked Learning pathways aims to support students' career exploration by allowing students to see themselves in professions and helping them understand the educational and training needs of those careers. To understand how the pathway experience might influence students' postsecondary goals and plans, we asked students about their major and program focus and about factors influencing their choices. Evidence to support this expected benefit of Linked Learning was mixed. We found that pathway students were less likely than comparison students to have declared a major or program focus (72% versus 81%) but were equally likely, if they had not declared, to have an idea of their major or focus. Among the respondents (not necessarily enrolled in college) who knew what job they wanted, pathway students were less likely to know the starting salary for this career (57% versus 67%).

On the positive side, when they rated factors influencing their choice of major, pathway students were more likely than comparison students to identify as important courses taken in high school, encouragement of a counselor or other adult at their high school, and spending time in a work setting where people worked in the field of their major (Exhibit 6-5). The role that internships can play in exposing students to professional role models and careers is illustrated by the experience of one former pathway student, now in college:

> I went to this…internship and I got it because of my high school, and it was in this gym…. My boss, she was studying…biology to become a physical therapist…. She really inspired me…. She used to work in this gym for Pilates, and I was always there for the summer, so it kind of grabbed my attention.

Exhibit 6-5
Pathway Students in College Rated the Importance of High School Influences on Choice of Major More Highly Than Peers



Differences between pathway and comparison students are statistically significant at the $p < .05$ level. Numbers are percentage point differences between pathway and comparison students.

Source: Spring 2016 Postsecondary Survey.

College-going pathway and comparison students' placement in remedial coursework did not indicate differences in academic readiness for college-level reading, writing, and mathematics.

For college-going students, a key indicator of early postsecondary success is how smoothly students transition to college-level coursework. A strong determinant of the success of this transition is whether students can demonstrate the core academic content knowledge and skills in mathematics, reading, and writing necessary to place out of remedial coursework. Linked Learning pathways are designed to include rigorous academics and personalized supports to prepare all students for college-level coursework. However, as discussed in Chapter 5, our findings regarding college readiness and knowledge gains have been mixed. For example, although certified pathway students were more likely to be classified as ready or conditionally ready for college in ELA on the EAP exam and outperformed similar peers in traditional high schools on the ELA CAHSEE, their performance was similar to their peers' on other tests of ELA and mathematics content knowledge (ELA CST scores, Math CAHSEE). Evidence from our postsecondary survey is similarly ambivalent; we find no significant differences between pathway and comparison students' reported participation in remedial courses (developmental reading, math, or writing). Both pathway and nonpathway students, on average, reported taking approximately 1.5 developmental courses during their first year in college.[36]

[36] SRI will be conducting a more rigorous and representative analysis of Linked Learning and comparison students' community college remediation rates, credit accumulation, and completion of college-level courses in future years that draws directly on student coursetaking data.

Among survey respondents who had jobs, pathway students were more likely than comparison students to have had help from a working professional in finding a job and were more likely to have a job with good benefits.

For employed graduates, an early indicator of postsecondary success is initial job quality, including compensation, benefits, and level of autonomy or skill complexity. Pathway students, regardless of whether they were in college or not, were less likely to be employed than comparison students (34% versus 43%). Among respondents who were employed, pathway students were more likely to report receiving help in obtaining a job, specifically from a working professional whom they met in high school. Also, pathway students were more likely to report having jobs that offered sick days, paid vacation, and health insurance (Exhibit 6-6). We found no differences in the compensation pathway students received, the complexity of skills used on the job (e.g., collaborating, problem solving) or the level of autonomy in decisionmaking as part of respondents' jobs. In interpreting these findings, it is important to consider that these students were only 1 year out of high school, so although it is helpful to understand pathway graduates' early workforce experiences, it is far too early to assess the overall labor market outcomes of participation in a Linked Learning pathway.

Exhibit 6-6
Pathway Students Reported Higher Job Quality Than Peers

Differences between pathway and comparison students are statistically significant at the $p < .05$ level. Numbers are percentage point differences between pathway and comparison students.

Source: Spring 2016 Postsecondary Survey.

College-going and employed pathway and comparison students reported similar ability to manage time well, set goals, and take responsibility for the quality of their work on the job and at school.

The LLCCR framework recognizes that beyond high school, young adults must take on more responsibility for their own learning and success in college and career. For this reason, the LLCCR framework includes self-efficacy and self-management skills such as goal setting, persistence, and self-direction. Former pathway students interviewed discussed how the additional freedom in college required more responsibility on their part. One student noted how in college "you have more freedom, you gotta be more responsible [for] organizing your work, keeping everything on track." As noted above and in earlier reports, we found that pathway students were more likely than comparison students to see their high school experience as helping them develop productive dispositions and behaviors. Although pathway

students felt more confident than comparison students, a few district administrators and pathway teachers wondered whether they had been "sheltering" students or "hand holding" too much. In particular, pathway staff described a tension between providing sufficient supports to help students succeed academically in high school and helping students develop the independence and behavioral attributes that would equip them to succeed in postsecondary education (Guha et al., 2014). We followed up on these important characteristics in the postsecondary survey to see whether the positive effects translated from high school to the less structured contexts of work and postsecondary institutions. We found that these differences in high school did not translate into differences in students' time management, goal setting, responsibility for work quality, or likelihood of seeking help when struggling. We also did not find any differences between pathway and nonpathway students' reports of productive behaviors, such as proactively seeking out support and help when struggling academically. One possible explanation for the similarities between these groups is that pathway students were moving from relatively sheltered small learning communities to the more anonymous contexts of college and work and therefore may have experienced a more jarring transition.

Conclusion

In many ways, evidence from our surveys and interviews with high school students confirm the potential for the Linked Learning experience to support student development of key elements of college and career readiness. High school students reported that their Linked Learning experience helped them develop 21st century knowledge and skills, productive dispositions and behaviors, and professionalism. The postsecondary survey results show a more limited impact of the pathway experience on students' initial transition to work or schooling 1 year out of high school. For example, the evidence of increased professionalism in the high school survey results did not immediately translate into better jobs, in terms of complexity of skills used or pay received. However, former Linked Learning students were more likely to have jobs with benefits. The lack of widespread postsecondary differences between pathway and comparison students could be due to the respondent pool or the timing of the survey. First, we know from our analysis of high school course outcomes presented in Chapter 5 that low-achieving and disadvantaged student subgroups more consistently reaped the benefits of Linked Learning, but these students were less likely to respond to the survey, potentially attenuating the effect of Linked Learning. Second, some of the advantages of the Linked Learning pathway experience reported by students may not be evident the first year after high school. A rigorous study of career academies by MDRC found that participation in career academies had no impacts on early labor market outcomes but had significant impacts on earnings and hours worked 8 years after scheduled high school graduation (Kemple, 2001; Kemple & Willner, 2008). The results of the MDRC study suggest that some of the benefits of pathway participation may not be visible initially and may instead accrue over time.

Chapter 7: Conclusion

Over the course of 7 years evaluating the Linked Learning District Initiative, we have tracked the implementation of Linked Learning in the nine initiative districts to better understand the complexity of effecting change at systems and pathway levels. In addition, we have analyzed students' high school record data linked to college enrollment data and postsecondary survey data to estimate the effect of participating in Linked Learning on student success, both in high school and beyond. In this concluding chapter of our comprehensive seventh-year report, we summarize the benefits of Linked Learning for students and share our reflections on implementation for the benefit of districts that are just beginning to embark on Linked Learning.

Benefits of Linked Learning

Through our analysis of three cohorts of students enrolled in certified pathways, we found that the Linked Learning approach did make a difference for high school students, particularly for vulnerable student populations such as those with low levels of prior achievement. On average, students in certified pathways were 2.0 percentage points less likely to drop out of high school and 5.3 percentage points more likely to earn a high school diploma than similar students in traditional high school programs. For context, the 5.3 percentage point increase in 4-year graduation rate is roughly equivalent in size to one-third of California's gap in graduation rates between African American and white students. Certified pathway students also completed more credits and scored higher on the California High School Exit Exam (CAHSEE) in English language arts (ELA) than similar students in traditional high school programs, although the two groups did not differ on daily attendance, number of course failures, or performance on the Math CAHSEE (Guha et al., 2014).

Findings regarding college preparation were mixed. Students in certified Linked Learning pathways completed slightly more of the college preparatory courses (a–g requirements) needed to be eligible for California public 4-year postsecondary institutions, but were similar to their peers in traditional high schools on other components of eligibility for admission to these universities: they were equally likely to complete the full complement of a–g requirements and earned similar college-admission GPAs. In light of our finding that certified pathways retained students who otherwise might have left high school prior to senior year and were unlikely to pursue the full college preparatory curriculum, this evidence that certified pathways were doing at least as well supporting students in fulfilling the a–g requirements is promising. Further, certified pathway students were more likely to be classified as ready or conditionally ready for college in ELA on the EAP exam but performed similarly on the ELA California Standards Test (CST), compared with similar students in traditional high school programs (Guha et al., 2014; Warner et al., 2015).

These positive or neutral effects do not mask negative effects for specific student populations, either for vulnerable student groups or for students with high prior achievement who historically have not been targeted by career-technical education programs. Among the subgroups of students analyzed—students with low prior achievement or high prior achievement, English learners, and African American, Latino, and female students—those in certified pathways did at least as well as similar peers in traditional high schools on all high school and end-of-high-school outcomes. Further, the positive results for certified pathway students generally held for women, Latino students, and students with low prior achievement. Notably, Linked Learning pathways improved outcomes for students with low prior achievement, without harming the outcomes of students with high prior achievement.

We were also able to examine whether any of the indicators of college and career preparedness translated into improved postsecondary outcomes for Linked Learning students. We found that certified pathway students were as likely as similar peers in traditional high schools to enroll in college. Conditional on enrollment in any postsecondary institution, certified pathway students were also equally likely to enroll in a 4-year college and to persist in school to a second year, compared with similar peers who attended traditional high school programs. Although our analyses of pathway students' transition to their immediate post-high-school endeavors suggest that these gains may not immediately translate into greater postsecondary success, there is some cause for optimism. Just 1 year out of high school, we saw evidence that pathway students were more likely than their nonpathway peers to obtain jobs with benefits such as vacation and sick leave. Moreover, Linked Learning did appear to increase the rates at which certain student subgroups—students with low prior achievement and African American students—enroll in 4-year colleges. It is important to note that these are early postsecondary findings and the full impact of Linked Learning on participants' college and career success will not be known for several years. We will provide updated postsecondary education results for the three cohorts included in this report in fall 2017.

Reflections on Implementation

In Chapters 2 and 3 of this report, we summarized the progress of initiative districts in implementing the core components of Linked Learning and highlighted the key implementations strategies that emerged over the course of the evaluation.

The Importance of District Systems

Early in the initiative, ConnectEd articulated a vision for a system of Linked Learning pathways that went beyond individual, isolated pathways sprinkled across a district (ConnectEd, 2014). This vision for a system of pathways went beyond the imperative to provide choice for students. ConnectEd aimed to establish Linked Learning as the central approach to high school reform in the districts. For Linked Learning to take root, district priorities for curriculum and instruction must be aligned with the approach, and every department that touches on secondary school instruction must take some responsibility for implementation. ConnectEd emphasized the need for district infrastructure to support pathways: "Multiple pathways need to be a central focus of district policy and structured institutional support, not the haphazard result of initiatives by a few dedicated teachers or a visionary school principal" (ConnectEd, n.d.-a).

Our 7-year evaluation of Linked Learning implementation confirmed that aligning district systems to support the core components of the approach is challenging but crucial to building a successful network of pathways. Chapters 2 and 3 of this report describe the key strategies for Linked Learning at the district and pathway levels. Such alignment is crucial for any reform, but the Linked Learning approach presents a particular challenge in that it requires educators to rethink the way teaching is structured. In the traditional structure of our public school system, teachers are afforded little time to collaborate and work largely in isolation, interacting primarily with their students (Scholastic & the Bill & Melinda Gates Foundation, 2012). Further, high school faculty are grouped in departments by academic discipline, and the planning time teachers have available is traditionally with other teachers in their department. Rather than designing individual courses to teach content aligned with a set of grade- and discipline-specific standards, Linked Learning envisions a team of pathway teachers who work together to help students develop a broader set of skills over the course of their high school career that ideally are articulated in the district's graduate profile. This is a fundamental rethinking of teaching, and for that reason it is challenging for individual pathways or schools to enact on their own.

This is a big shift for schools and districts, because it requires that both professional development and the school day itself be structured to allow time for teachers to work together both within and across disciplines. Fortunately, it is a shift consistent with the Common Core State Standards, and we did see districts capitalize on this alignment to advance Linked Learning. In addition, we saw evidence that districts with formal guidance on integration did succeed in achieving more consistent implementation of integrated projects. But a more fully integrated curriculum, with coordinated units across multiple subjects taught through the lens of a career theme, was beyond what all but the most developed pathways could offer. Although we have seen consistent benefits to pathway students on outcomes such as credits earned and graduation that signal greater engagement with school, learning gains (as measured by standardized test scores) were less consistent. This finding suggests that pathway teachers in the nine districts have not been able to fully realize these instructional shifts. In Chapter 3, we described the numerous barriers to teacher collaboration for integrated instruction, in the form of both structural barriers (e.g., teacher turnover, lack of collaboration time) and impediments to authentic collaboration (administrative demands on collaboration time).

Throughout the initiative, districts and teachers were asked to think in new ways about how and what to teach. ConnectEd provided tools and coaching to facilitate these shifts, several of which were designed to promote reflection and self-assessment at the district and pathway levels. ConnectEd district and pathway coaches encouraged teachers and administrators to reflect on their practice, the barriers to realizing Linked Learning, and the possibilities for overcoming them. Pathway certification teams interviewed district administrators and pathway teachers about their progress toward the certification criteria. ConnectEd's OPTIC was designed to provide a tool to structure this reflection, with a central repository to assemble artifacts representing pathway instruction. Although districts may have only begun to realize the instructional shifts demanded by the Linked Learning approach, we posit that one lasting change from the initiative was a recognition of the value of reflection on the part of Linked Learning teachers and district leaders. At the end of the evaluation, with the shape of the future formal certification process uncertain, we found districts such as Porterville and Long Beach embracing this reflection in the form of formal continuous improvement processes for all pathways. Institutionalizing some form of reflection and continuous improvement will be key to maintaining quality as Linked Learning expands through the state.

Building Regional Partnerships

As originally postulated, the Linked Learning approach involves multiple core components—integrated academic and technical curriculum and instruction, enhanced student supports, and work-based learning—supported by a broad-based coalition of stakeholder groups. Not surprisingly, the initiative districts tended to home in on the components most closely related to their core business: teaching and learning and the structural aspects of where teaching and learning take place. As we have documented in this report, it has taken time and an infusion of new resources for the initiative districts to turn their attention to the components that are farther from their comfort zone.

The idea of multiple stakeholders' coming together to form a coalition to support a system of Linked Learning pathways was part of ConnectEd's vision to ensure both resources and strong advocates to sustain the initiative. As discussed in Chapter 2, districts struggled to establish broad-based coalitions to support Linked Learning at the beginning of the initiative for a variety of reasons—lack of experience setting goals for such a diverse group of partners, lack of financial and human resources to mobilize coalition efforts, and the need to focus on other priorities. Over time, the focus on developing regional consortia superseded the development of local coalitions. Companies interested in developing a prepared workforce to fill their labor market needs are not constrained by school district boundaries. Similarly, community college districts typically serve students matriculating from a range of K–12 school districts in

the region. In addition, as more and more districts embrace Linked Learning, it makes sense to think about forming partnerships regionally to avoid duplication of effort. As one district work-based learning coordinator put it: "…we need to figure out how to communicate regionally so that we are not asking the same large employers multiple times for the same thing. We are annoying them sometimes." As discussed in Chapter 4, starting in 2013–14 state and Foundation funding spurred these regional efforts and generated some progress for work-based learning and dual enrollment.

Even with this funding, however, progress in building these regional partnerships was slow, and some district staff were concerned that they would not be able to demonstrate significant progress by the end of the CCPT grant period. In the words of one district staff member: "I think we thought we would be further along. Everything just…it takes a lot of time. And having thoughtful, meaningful, purposeful experiences or pathways or curriculum takes a lot of time. Three years is a short deadline." The shift to a regional approach has created its own set of challenges for districts as partners worked to create a regional identity, find the right coalition leadership, and develop a common language. Partnership formation theories suggest that successful partnerships need several key leaders with the relationships, skills, and dispositions to build bridges between organizations (Amey, Eddy, & Campbell, 2010; Bloom & Dees, 2008; Moore et al., 2015). The experiences of the nine districts as they engaged in regional partnership formation confirmed the importance of this leadership role. The capacity of lead organizations varied, however, and not all of them had staff with the skills and dispositions needed to bring together disparate parties to work toward shared goals.

Several districts were involved in regional partnerships where an intermediary organization took on the leadership role, with responsibilities such as engaging industry, building capacity for partnerships, bridging the work of multiple organizations, or providing operational support to develop work-based learning opportunities and connect them to pathways. In some places, intermediaries were helpful, and in others they failed to live up to even their basic mission. For example, two initiative districts were involved in regional consortia where the intermediaries failed to engage the promised industry partners, hampering the development of work-based learning opportunities for students. One of these districts turned back to pathway-level advisory boards to develop and sustain work-based learning opportunities.

Initiative districts in regional consortia struggled with the balance between the vision for Linked Learning developed through the initiative and the expectations and capacity of other districts in the region. This tension created stress for leaders in some of the nine districts, who were concerned about dilution of the Linked Learning brand and frustrated by the slow implementation pace. Because new districts sometimes lagged behind with regard to pathway quality and implementation of district systems, consortia did not always operate at a level that could push the work in initiative districts forward. For example, the development of work-based learning infrastructure at the regional level was generally not well connected to the work that initiative pathways and districts were doing to integrate work-based learning into the pathway curriculum. We question whether work-based learning can be optimally implemented if these opportunities are developed at a regional level with little support for districts and pathways to coherently integrate these experiences into teaching and learning. Ultimately, it will be the job of pathway teachers to disrupt the traditional segregation of academic and career technical education instruction and ensure that Linked Learning does not become a disconnected series of guest speakers, field trips, and job shadows. Some possible approaches to developing this linkage include strengthening communication between pathway leads and work-based learning intermediaries, providing instructional coaching for pathways, and providing teachers with externships so they can experience an industry firsthand. In addition, some districts have adopted programs such as ECCO or electronic tools such as Nepris to facilitate the integration of work-based learning experiences.

One other factor may have contributed to the slow pace of regional partnership development. Unlike the district initiative, the regional work has not benefited from intensive technical assistance. Our interviews with district staff and technical assistance providers suggest that CCPT technical assistance work has been minimal in initiative districts and was just getting under way in 2015–16. Going forward, selected regional partnerships in California will receive technical assistance from Jobs for the Future (JFF). JFF has been funded to select three to five CCPT case study sites for intensive technical assistance to identify different regional models. In addition, JFF will provide technical assistance to the Foundation-funded Regional Hubs of Excellence.

The original ConnectEd call for districts to establish broad-based coalitions in support of Linked Learning proved to be too much for districts to handle in combination with all the changes associated with their core mission of delivering high-quality curriculum and instruction to students. Now, 7 years into implementation, the value of a regional approach to strengthening the work-based learning and curriculum integration aspects of Linked Learning is becoming clear to both potential employers and educators. This second stage of development could easily take another 7 years.

Supportive State Policy

The Irvine Foundation made a large and concerted investment to promote Linked Learning as the most promising approach to high school reform in California, with nine districts serving as the demonstration of what the approach can accomplish at a systemic level. Today, the concept of pathways has achieved statewide recognition as a viable strategy in secondary education, but its future is now dependent on a coherent set of state policies to support Linked Learning's essential elements.

From the beginning of the initiative, ConnectEd's certification rubrics have provided the most comprehensive definition of the Linked Learning approach. With the shift of certification from ConnectEd to the Linked Learning Alliance, Linked Learning directors expressed uncertainty about what the codified version of Linked Learning will look like moving forward. With the myriad of state and Foundation funds available for career pathways and CTE in California since 2014, educators and local partners are confused about exactly what approach for high school reform these funders and the many Linked Learning partners are promoting. This confusion is exacerbated by the priorities advanced by state grant initiatives related to career pathways and career technical education.

One distinctive component of Linked Learning pathways is the integration of academics and career technical education, so that all students have the opportunity to take both a college preparatory curriculum and a CTE sequence. Although the California Department of Education's *Standards for Career Readiness* begin with the ability to "Apply appropriate technical skills and academic knowledge…," most of the efforts listed in the Career Readiness Initiative 2015 focus on CTE without any mention of rigorous academics (California Department of Education, 2016a). For example, although the request for applications for the second-round CCPT grants described pathways as integrating academic and career-based education, none of the 13 reporting categories for local education agencies in the 2015 competition focused on this type of integration (California Department of Education, 2016b). Similarly, the California Career Technical Incentive Grant—designed to encourage development and maintenance of CTE programs during the implementation of the local control funding formula—provided more than $11 million across five of the initiative districts (Long Beach, Oakland, Pasadena, Porterville, and West Contra Costa) plus $7.7 million to the Contra Costa Office of Education that should benefit Antioch. The goals for these funds, as articulated in the authorizing legislation, focus on the establishment and maintenance of CTE programs, with no mention of the integration of academic and CTE courses (California Department of Education, 2015). This sole focus on CTE led some stakeholders to express concern that these funds

could move districts away from an integrated Linked Learning approach and back to a CTE model that promotes stratification in ways that limit opportunity for many low-income youth.

As discussed in Chapter 6, districts' LCAPs represent an opportunity for them to solidify their commitment to Linked Learning, and all districts have included Linked Learning as a strategy in their LCAPs. One Linked Learning stakeholder, however, argued that Linked Learning must be part of the accountability metrics to ensure commitment to the approach, a step taken by only three districts:

> My concern is that the LCAPs aren't incorporating specific language about pathways or pathway outcomes and that does not bode well for sustainability as [Irvine Foundation] funding is now over. There will be a residue of energy, resources, changes at the district level…. But without that funding to bring people together and to keep this vision in people's minds, the deluge of other funding and the press of regular business is going to eventually erode the commitment to Linked Learning unless the LCAPs have language in them that incorporates the Linked Learning concepts by reference to either pathway participation, pathway completion, or metrics related to college and career readiness.

Although the state's required LCAP metrics did not include any measure of CTE course completion, this omission is likely to be rectified by California's new accountability system to evaluate and rate schools, slated to replace the retired Academic Performance Index in fall 2017. This system will use a dashboard that includes multiple indicators of school performance rather than a single-indicator approach. The proposed College and Career Readiness Indicator for high schools includes completion of a CTE pathway as one of the metrics. To fully commit to Linked Learning, districts will need to go a step further, including setting targets for the percentages of students who complete the a-g requirements, who complete CTE course sequences, and who complete both as a way to fully harness the power of accountability to drive the implementation of Linked Learning.

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The heart of the Linked Learning approach is making high school relevant for students by integrating a career theme and real-world industry experiences into academic instruction. Accomplishing this type of cross-disciplinary, cross-sector integration requires a fundamental transformation of teaching and learning. Teachers cannot make this shift alone but need support from their schools, districts, regions, and state: school structures must shift to accommodate the primacy of pathway teams; districts must provide support for teacher capacity building and coordinate with regional partners to provide work-based learning opportunities and smooth postsecondary transitions; and the state must establish an accountability framework that values the integration of CTE and academic tracks. As Linked Learning continues to expand, the Linked Learning Alliance will need to play a pivotal role in keeping the lines of communication open among all levels of the system and engage them to support teachers and students.

References

Adelman, N., Greene, L., Guha, R., Lopez-Torkos, A., Mitchell, N., Padilla, C., Park, C., & Stites, R. (2010). *Evaluation of the California Linked Learning District Initiative. First-year report.* Menlo Park, CA: SRI International.

Amey, M. J., Eddy, P. L., & Campbell, T. (2010). Crossing boundaries: Creating partnerships to promote educational transitions. *Community College Review*, *37*(4), 333–347.

Bailey, T., Jeong, D. W., & Cho, S. (2009). *Referral, enrollment, and completion in developmental education sequences in community colleges. CCRC Working Paper No. 15*. New York: Community College Research Center, Teachers College, Columbia University.

Belasco, A. S. (2013). Creating college opportunity: School counselors and their influence on postsecondary enrollment. *Research in Higher Education, 54(*7), 781–804.

Bettinger, E. P., Long, B. T., Oreopoulos, P., & Sanbonmatsu, L. (2012). The role of application assistance and information in college decisions: Results from the H&R Block FAFSA experiment. *Quarterly Journal of Economics*, *127*(3), 1205–1242.

Bloom, P., & Dees, J. G. (2008, Winter). Cultivate your ecosystem. *Stanford Social Innovation Review*, 47–53.

Booker, K., Zimmer, R., & Buddin, R. (2005). *The effects of charter schools on school peer composition*. Santa Monica, CA: RAND Corporation. Retrieved from http://www.rand.org/pubs/working_papers/WR306.html.

California Department of Education. (n.d.). *Dataquest* [Data file]. Retrieved from http://data1.cde.ca.gov/dataquest/.

California Department of Education. (2014). California High School Career Technical Education Courses Meeting University of California “a-g” Admission Requirements for 2013–14. Retrieved from http://www.cde.ca.gov/ci/gs/ps/documents/approvedctecourses2012-13.doc.

California Department of Education. (2015). Career Technical Incentive Grant Program. Retrieved from http://www.cde.ca.gov/fg/fo/r17/cteig15ins.asp.

California Department of Education. (2016a). Career Readiness Initiative 2015. Retrieved from http://www.cde.ca.gov/eo/in/cr/index.asp.

California Department of Education. (2016b). Request for Applications, California Career Pathways Trust Implementation Grant. Retrieved from http://www.cde.ca.gov/fg/fo/r17/ccpt1rfa.asp.

California Department of Education. (2016c). Student Poverty FRPM Data [Data file]. Retrieved from http://www.cde.ca.gov/ds/sd/sd/filessp.asp.

California Department of Education. (2016d). State Schools Chief Tom Torlakson reports new record high school graduation rate and sixth consecutive year of an increase. Retrieved from http://www.cde.ca.gov/nr/ne/yr16/yr16rel38.asp.

Celio, C., Durlak, J., & Dymnicki, A. (2011). A meta-analysis of the impact of service-learning on students. *Journal of Experiential Education*, *34*(2), 164–181.

Chambers, J. G. (1981). An analysis of school size under a voucher system. *Educational Evaluation and Policy Analysis*, *3*, 29–40.

Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2013). *Racial and economic diversity in North Carolina’s schools: An update*. Durham, NC: Duke Sanford School of Public Policy.

Complete College America. (2012). *Remediation: Higher education’s bridge to nowhere*. Indianapolis, IN: Complete College America. Retrieved from http://completecollege.org/docs/CCA-Remediation-final.pdf.

ConnectEd: The California Center for College and Career. (n.d.-a). *Capacity and Needs Assessment Tool.* Unpublished manuscript.

ConnectEd: The California Center for College and Career. (n.d.-b). *Linked Learning frequently asked questions*. Retrieved from http://connectedcalifornia.org/downloads/LL_Frequently_Asked_Questions_web.pdf.

ConnectEd: The California Center for College and Career. (n.d.-c). *Pathway quality review, continuous improvement, and certification process.* Retrieved from http://www.connectedcalifornia.org/22.

ConnectEd: The California Center for College and Career. (n.d.-d). *What is a multidisciplinary integrated curriculum*? Retrieved from http://connectedcalifornia.org/downloads/LL_What_is_Multidisciplinary_Integrated_Curriculum_v2.pdf.

ConnectEd: The California Center for College and Career. (n.d.-e). *Work-Based Learning Continuum.* Retrieved from https://connectedstudios.org/url-zvlwjKfwKlRqX3P7h-1fUaLqZX4Ww5GZSbdZZEUP.

ConnectEd: The California Center for College and Career. (2012). *College and career readiness: What do we mean? A proposed framework*. Retrieved from http://www.ccrscenter.org/sites/default/files/CACRFramework_V1-1_2012_0126.pdf.

ConnectEd: The California Center for College and Career. (2014). *Framework for developing a system of Linked Learning pathways.* Retrieved from http://connectedcalifornia.org/direct/files/resources/District%20Framework%20for%20System%20of%20Pathways%202014.pdf.

Farrington, C. A., Roderick, M., Allensworth, E. A., Nagaoka, J., Johnson, D. W., Keyes, T. S., & Beechum, N. (2012). *Teaching adolescents to become learners: The role of noncognitive factors in academic performance–A critical literature review*. Chicago: Consortium on Chicago School Research.

Fowler, W. J., Jr., & Walberg, H. J. (1991). School size, characteristics, and outcomes. *Educational Evaluation and Policy Analysis*, *13*(2), 189–202.

Frankenberg, E., Siegel-Hawley, G., & Wang, J. (2011). Choice without equity: Charter school segregation. *Education Policy Analysis Archives*, *19*(1). Retrieved from http://epaa.asu.edu/ojs/article/view/779.

Fulton, M., Gianneschi, M., Blanco, C., & DeMaria, P. (2014). *Developmental strategies for college readiness and success*. Denver, CA: Education Commission of the States. Retrieved from http://www.ecs.org/docs/DevEdStrategies.pdf.

George-Jackson, C., & Gast, M. J. (2015). Addressing information gaps: Disparities in financial awareness and preparedness on the road to college. *Journal of Student Financial Aid*, *44*(3), 3.

Gladden, R. (1998). The small school movement: A review of the literature. In Fine, M., & Somerville, J. I. (Eds.), *Small schools, big imaginations: A creative look at urban public schools* (pp. 113–137). Chicago: Cross City Campaign for Urban School Reform.

Guha, R., Adelman, N., Arshan, N., Bland, J., Caspary, K., Padilla, C., Patel, D., Tse, V., Black, A., & Biscocho, F. (2014). *Taking stock of the California Linked Learning District Initiative: Fourth-year evaluation report*. Menlo Park, CA: SRI International.

Howley, C. B., & Howley, A. A. (2004). *Education policy analysis archives: School size and the influence of socioeconomic status on student achievement: Confronting the threat of size bias in national data sets.* Tempe, AZ: College of Education, Arizona State University. Retrieved from http://epaa.asu.edu/ojs/article/view/207.

Hughes, K. L., Rodriguez, O., Edwards, L., & Belfield, C. (2012). *Broadening the benefits of dual enrollment: Reaching underachieving and underrepresented students with career-focused programs*. New York: Community College Research Center, Teachers College, Columbia University.

Kemple, J. (2001). *Career academies: Impacts on students' initial transitions to postsecondary education and employment*. New York: MDRC.

Kemple, J., & Willner, C. (2008). *Career academies: Long-term impacts on labor market outcomes, educational attainment, and transitions to adulthood*. New York: MDRC.

Lee, V., & Burkam, D. (2003). Dropping out of high school: The role of school organization and structure. *American Educational Research Journal, 40*(2), 353–393. Retrieved from http://www.jstor.org/stable/3699393.

Lee, V. E., Croninger, R. G., & Smith, J. B. (1997). Course-taking, equity, and mathematics learning: Testing the constrained curriculum hypothesis in U.S. secondary schools. *Educational Evaluation and Policy Analysis, 19*(2), 99–121.

Lee, V. E., & Ready, D. D. (2007). *Schools-within-schools: Possibilities and pitfalls of high school reform*. New York: Teachers College Press.

Lee, V. E., & Smith, J. (1997). High school size: Which works best and for whom? *Educational Evaluation and Policy Analysis*, *19*(3), 205–227.

Lindsay, P. (1982, Spring). The effect of high school size on student participation, satisfaction, and attendance. *Educational Evaluation and Policy Analysis*, *4*(1), 57–65.

Makris, M. (2015). Public housing and school choice in a gentrified city: Youth experiences of uneven opportunity. *Palgrave Studies in Urban Education.* Retrieved from http://www.palgrave.com/page/detail/public-housing-and-school-choice-in-a-gentrified-city-molly-vollman-makris/?isb=9781137429155.

McMillen, B. J. (2004). School size, achievement and achievement gaps. *Education Policy Analysis Archives*, *12*, 58.

Moore, C., Venezia, A., Lewis, J., & Lefkovitz, B. (2015). *Organizing for success: California's Regional Education Partnerships*. Sacramento, CA: Education Insights Center, Sacramento State University.

Nagaoka, J., Farrington, C. A., Ehrlich, S. B., & Heath, R. D. (2015). *Foundations for young adult success: A developmental framework*. Chicago: University of Chicago.

Nathanson, L., Corcoran, S., & Baker-Smith, C. (2013). *High school choice in New York City: A report on the school choices and placements of low-achieving students*. New York: Research Alliance for New York City Schools. Retrieved from http://steinhardt.nyu.edu/research_alliance/publications/hs_choice_low_achieving_students.

Newmann, F. M. (1981). Reducing student alienation in high schools: Implications of theory. *Harvard Educational Review, 51*(4), 546.

Pellegrino, J. W., & Hilton, M. L. (2012). *Education for life and work: Developing transferable knowledge and skills in the 21st century.* Washington, DC: The National Academies Press.

Pittman, R., & Haughwout, P. (1987). Influence of high school size on dropout rate. *Educational Evaluation and Policy Analysis, 9*(4), 337–343. Retrieved from http://www.jstor.org/stable/1163772.

Powell, F. C., Farrar, E., & Cohen, D. K. (1985). *The shopping mall high school: Winners and losers in the educational marketplac*e. Boston, MA: Houghton Mifflin.

Raywid, M. A. (1996). *Taking stock: The movement to create mini-schools, schools-within-schools, and separate small schools.* Urban Diversity Series, 108. New York: Teachers College, Columbia University.

Ruiz de Velasco, J., Newman, E., & Borsato, G. (2016). *Equitable access by design: A conceptual framework for integrated student supports within Linked Learning pathways*. Palo Alto, CA: Stanford University, John W. Gardner Center for Youth and Their Communities.

Rustique, E., & Stam, B. (2013). *The Linked Learning advantage: Using Linked Learning to implement the Common Core State Standards*. Retrieved from https://edpolicy.stanford.edu/sites/default/files/publications/linked-learning-advantage-using-linked-learning-implement-common-core-state-standards_5.pdf.

Saparito, S., & Lareau, A. (1999). School selection as a process: The multiple dimensions of race in framing educational choice. *Social problems.* Retrieved from http://socpro.oxfordjournals.org/content/46/3/418.article-info.

Saunders, M., & Chrisman, C. A. (2008). *Multiple pathways: 21st century high schools that prepare all students for college, career and civic participation*. Boulder, CO, and Tempe, AZ: Education and the Public Interest Center & Education Policy Research Unit. Retrieved from http://epicpolicy.org/publication/multiple-pathways.

Scholastic & The Bill & Melinda Gates Foundation. (2012). *Primary sources: 2012. America's teachers on the teaching profession*. Retrieved from https://www.scholastic.com/primarysources/pdfs/Gates2012_full.pdf.

Stearns, Richard. (2012). *Leading high school transformation for college and career success*. Retrieved from http://connectedcalifornia.org/direct/files/resources/LeadingHSTransformation_2012_0925.pdf.

Tierney, W. G., Bailey, T., Constantine, J., Finkelstein, N., & Hurd, N. F. (2009). *Helping students navigate the path to college: What high schools can do: A practice guide* (NCEE #2009-4066). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from http://ies.ed.gov/ncee/wwc/publications/practiceguides/.

U.S. Census Bureau. (2009). *Educational attainment*. Retrieved from http://www.census.gov/hhes/socdemo/education/.

U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. (2012*). Schools and Staffing Survey (SASS), Public school principal data file, 2011–12.* Retrieved from http://nces.ed.gov/surveys/sass/tables/sass1112_2013313_p1s_006.asp.

U.S. Department of Education, Institute of Education Sciences. (2013, March). *What Works Clearinghouse: Procedures and standards handbook* (Version 3.0). Retrieved from http://whatworks.ed.gov.

Venezia, A., Kirst, M. W., & Antonio, A. (2003). *Betraying the college dream: How disconnected K-12 and postsecondary education systems undermine student aspirations.* Palo Alto, CA: Stanford University. Retrieved from http://web.stanford.edu/group/bridgeproject/publications.html.

Visher, M., Altuna, J., & Safran, S. (2013). *Making it happen: How career academies can build college and career exploration programs*. Oakland, CA: MDRC.

Visher, M., & Stern, D. (2015). *New pathways to careers and college: Examples, evidence, and prospects*. Oakland, CA: MDRC. Retrieved from http://www.mdrc.org/sites/default/files/New_Pathways.pdf.

Warner, M., Caspary, K., Arshan, N., Stites, R., Padilla, C., Park, C., Patel, D., Wolf, B., Astudillo, S., Harless, E., Ammah-Tagoe, N., McCracken, M., & Adelman, N. (2015). *Taking stock of the California Linked Learning District Initiative. Sixth-year evaluation report.* Menlo Park, CA: SRI International. Retrieved from https://www.sri.com/sites/default/files/publications/yr6linkedlearningevalreportdec2015.pdf.

Weiher, G. R., & Tedin, K. L. (2002). Does choice lead to racially distinctive schools? Charter schools and household preferences. *Journal of Policy Analysis and Management, 21*, 79–92. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/pam.1041/abstract.

Appendix: Research Methods

The Center for Education Policy at SRI International was contracted by The James Irvine Foundation to evaluate the Linked Learning District Initiative. In this multiyear study, SRI has examined district-level implementation of the Linked Learning system and assessed student outcomes associated with district participation in the initiative. SRI has used a multimethod research design that includes qualitative and quantitative data collection and analysis. Described here are the data collection methods and analytic approach used in the seventh-year evaluation report.

Qualitative Data Collection and Analysis

To understand the progression of the Linked Learning District Initiative and to gather information on students' experiences in career pathways, SRI researchers conducted a range of qualitative data collection activities in all nine districts that received implementation grants from ConnectEd in 2009 or 2010. The qualitative data collection consisted of observations of Linked Learning events that district and pathway staff attended; reviews of district documents and news stories, as available; telephone interviews; and district site visits that included interviews and student focus groups.

Observations of ConnectEd- and Linked Learning Alliance–hosted events. SRI research team members attended selected ConnectEd- and Linked Learning Alliance–hosted events that district teams also attended. These were the February 2016 Linked Learning Convention and the April 2016 Linked Learning Alliance Policy Convening. Researchers took notes on these meetings and talked informally with district and pathway staff.

Document and news review. The research team examined available district Linked Learning documents and monitored local news for stories to support understanding of state and district contexts.

Phone interviews and site visits. The research team conducted individual phone interviews in fall 2015 and site visits in spring 2016 to follow district implementation in all nine districts. The interview topics were key elements of Linked Learning implementation, access and equity, work-based learning, rigorous integrated instruction, transition to postsecondary education, and sustainability and expansion. We developed semistructured interview protocols covering these topics or a subset of these topics for key respondent categories (e.g., Linked Learning director, pathway lead). We tailored the protocols to each respondent's role type and experience with Linked Learning. Interviewers took notes and audio-recorded interviews for use during analysis.

In fall 2015, SRI research team members interviewed Linked Learning directors in all nine districts by phone, as well as seven key stakeholders from ConnectEd, the Linked Learning Alliance, NAF, Jobs for the Future, and the College and Career Academy Support Network (CCASN). In spring 2016, we conducted site visits to the nine districts. During these visits, we interviewed Linked Learning directors, external district and pathway coaches from ConnectEd or other organizations, other partners, and district personnel who could speak to Linked Learning implementation. We interviewed primarily district staff involved in work-based learning and pathway curriculum and instruction. In consultation with the Linked Learning director from each district, we selected up to three pathways to visit with a focus on academic and career-based learning, work-based learning, and essential pathway elements. A team of two or three researchers visited each of these pathways. For each pathway, we targeted school leaders; pathway leaders, typically the pathway lead; one other pathway teacher; and sometimes additional staff, such as school-level work-based learning (WBL) coordinators. To provide context for interpreting postsecondary student outcomes and survey data, we also interviewed students from a sample of three local community colleges that enrolled Linked Learning graduates. The purpose was to better understand Linked Learning graduates' transition between high school and postsecondary education and their early college experiences. As part of our site visits, we interviewed a selected group of postsecondary staff, including student support personnel and administrative staff.

In total, SRI researchers interviewed 193 individuals in the spring 2016 data collection. Exhibit A-1 contains more detailed information about the interviews.

Exhibit A-1
Number of Interview and Focus Group Respondents, by Type, Spring 2016

Respondent Type	Number
District staff	54
Industry/business partners	12
External coaches	3
Internal coaches	9
School administrators	25
Pathway leads	27
Pathway teachers (non-leads)	42
Postsecondary representatives	9
Postsecondary students	10
School-level WBL coordinators	2
Total	193

Each site visit team completed a structured debriefing guide aligned with the study's research questions. During and after the period when interviews were conducted, the entire research team assembled to compare, contrast, and synthesize findings across interviewees; to identify overarching themes and initial hypotheses; to determine how these findings related to the quantitative data; and to refine analyses and assertions before writing this report.

Extant-Data Collection and Analysis

SRI researchers obtained extant data for all nine districts in the Linked Learning District Initiative. We used these data for two purposes: (1) to examine equitable enrollment and persistence in pathways and (2) to estimate the impact of pathways on student-level indicators of postsecondary readiness and enrollment. In this section, we provide detail to support the enrollment and persistence analyses presented in Chapters 2 and 3 and the analysis of college-ready graduates' outcomes presented in Chapter 5. We first describe the data sources and elements used in both analyses and provide general background information on the pathways and districts. Next, we describe the sampling, variables, and analytic approach to support the analyses of enrollment and persistence and of college-ready graduates. For the analysis of college-ready graduates, we provide the results for all students and our subgroups of interest in both certified and noncertified pathways.

Context and Data Sources

The research team received student-level demographic, standardized test performance, graduation, course outcome, and high school program enrollment data from a third party, the Institute for Evidence-Based Change (IEBC). The research team requested 7th- through 12th-grade data for the class of 2013 (students who started ninth grade in the 2009–10 school year) in Antioch, Long Beach, Pasadena, and Porterville and for the classes of 2014 and 2015 (students who began high school in 2010–11 and 2011–12, respectively) in all nine districts. In Los Angeles, the analytic sample included the high schools that were originally in Local District 4 and ended up in the innovation subdistrict after district reorganization. It also included students from two additional schools—Los Angeles Senior High School and Hollywood High School—in order to align the analytic sample of college-ready graduates with the high school survey sample.

In addition to high school data described above, IEBC also provided SRI with postsecondary enrollment data from the National Student Clearinghouse (NSC). SRI researchers requested postsecondary enrollment data for the same districts and cohorts that we tracked in the high school data. We received NSC data from 2013–14, 2014–15, and 2015–16. To compensate for missing data for students who attended institutions that do not provide data to researchers under the Family Educational Rights and Privacy Act (FERPA), we supplemented the NSC data with community college data from the Chancellor's Office Management Information System (COMIS) for some students. We describe this process in more detail in the "Methods for Analysis of College-Ready Graduates" section. We received COMIS data from 2013–14 and 2014–15.

High School and Pathway Sample and Classification

Each Linked Learning district provides students with a variety of academic options for school and pathway enrollment, including certified pathways, noncertified pathways, traditional high schools, alternative schools, and charter schools.

To describe the academic options, we classified all high school programs in each district into one of the following program types:

- **Certified pathways**—Because pathways develop over time, we considered a student to be enrolled in a certified pathway if the pathway was certified before the end of that student's 10th-grade year. This classification means that students enrolled in the same pathway in different cohorts may be considered to be enrolled in different pathway types. We considered pathways to be certified on the basis of Linked Learning's classification and thus included those certified by NAF in the 2012–13 school year.[37] Exhibit A-2 shows the certified pathways in each district in all extant data analyses.
- **Noncertified pathways**—We considered any program that districts flagged as a pathway without the certified classification to be a noncertified pathway. These programs typically shared some important features with the certified pathways (e.g., small cohort, career theme) but varied in how closely they aligned with or aimed to replicate the full Linked Learning approach. This category included pathways deemed in progress toward certification.
- **Alternative and continuation schools**—We classified schools for struggling students (e.g., credit recovery programs) or students with special needs (e.g., special education) into one group. For the enrollment and persistence analyses, we included these students in the overall district category. We excluded such alternative and continuation schools from our analysis of college-ready graduates.
- **Nonpathway at wall-to-wall schools**—Several districts have at least one high school where all students should be assigned a pathway designation (these schools are commonly referred to as "wall-to-wall schools") but not all the students in the school had a flag identifying their pathway. We designated any students at these wall-to-wall schools without a pathway flag as "nonpathway at wall-to-wall schools." For the enrollment and persistence analyses, we included these students in the overall district category. We excluded these students from our analysis of college-ready graduates.
- **Schools outside district control**—We excluded any schools deemed out of district control (e.g., home school programs, independent charter schools) from all extant-data analyses.[38]

[37] The 2012–13 school year was the first year in which ConnectEd accepted NAF certification in lieu of ConnectEd's certification process. This year corresponds with the year the class of 2015 (our final cohort) was enrolled in the 10th grade, making it the last year during which certification affected the classification of any students in our sample.

[38] Some charter schools (e.g., New Technology High, The Met in Sacramento) were created by district school boards and are considered dependent charter schools. These schools are included in all analyses.

- **Traditional high schools**—We classified all other academic programs as "traditional high school" programs. This group serves as the primary reference group in our analysis of college-ready graduates.

We assigned students to a particular pathway or school on the basis of their 9th- or 10th-grade enrollment, depending on the lowest grade level served by certified pathways in the district. In Antioch, Los Angeles, Montebello, Sacramento, and Porterville, certified pathways began in ninth grade. In Oakland and West Contra Costa, pathways began in 10th grade. Several Long Beach and Pasadena pathways began in 10th grade, and a single pathway began in 10th grade in Montebello and Pasadena.[39] Montebello chose not to send any pathways through the certification process and therefore did not contain any certified pathways.

Exhibit A-2 lists all certified pathways included in the analysis, by district. The column "First Cohort Certified" lists the first class of students for whom we classified the pathway as certified. We consider this class and all subsequent classes as having attended a certified pathway in all extant-data analyses.

Exhibit A-2
Certified Pathways Included in Extant-Data Analyses, by District

District	High School (HS)	Certified Pathway	First Cohort Certified
Antioch			
	Dozier-Libbey Medical HS	Health Science and Medical Technology	Class of 2013
	Deer Valley HS	Law and Justice	Class of 2015
	Antioch HS	Engineering and Designing Green Environments (EDGE)	Class of 2015
Long Beach			
	California Academy of Math and Science	Engineering and BioScience	Class of 2013
	Jordan HS	Architecture, Construction, and Engineering Academy (ACE)	Class of 2013
	Jordan HS	Jordan Media and Communications (JMAC)	Class of 2015
	Millikan HS	Community of Musicians, Performers, Artists, and Social Scientists (COMPASS)	Class of 2013
	Millikan HS	PEACE Academy	Class of 2013
Los Angeles			
	Robert F. Kennedy Community Schools Complex	Los Angeles High School for the Arts (LAHSA)	Class of 2014
	Miguel Contreras Learning Complex	Los Angeles School of Global Studies	Class of 2014
Oakland			
	Life Academy	Life Academy of Health and Bioscience	Class of 2014
	Media College Preparatory	Media Academy	Class of 2014
	Skyline HS	Education Academy	Class of 2014

[39] In Long Beach during the years these data capture, two high schools enrolled the majority of students in freshman academies, intentionally giving them a year of high school before choosing a pathway. We assigned students from these two high schools who began a pathway in their 10th-grade year into their 10th-grade pathway.

Exhibit A-2
Certified Pathways Included in Extant-Data Analyses, by District (concluded)

District	High School (HS)	Certified Pathway	First Cohort Certified
Pasadena			
	John Muir HS	Arts, Entertainment, and Media[a]	Class of 2013
	John Muir HS	Business and Entrepreneurship Academy	Class of 2013
	John Muir HS	Engineering and Environmental Science Academy	Class of 2015
	Pasadena HS	Creative Arts, Media, and Design Academy	Class of 2013
Porterville			
	Granite Hills HS	Digital Communication and Design	Class of 2015
	Harmony Magnet	Engineering Academy[b]	Class of 2013
	Harmony Magnet	Performing Arts Academy[b]	Class of 2014
	Monache HS	Multimedia Technology Academy	Class of 2014
	Porterville HS	Partnership Academy of Business	Class of 2013
	Porterville HS	Partnership Academy of Health Sciences	Class of 2014
Sacramento			
A. A. Benjamin Health Professions HS		Health Professions	Class of 2014
Hiram W. Johnson HS		Business Corporate Academy	Class of 2015
New Technology HS		School of Design	Class of 2014
School of Engineering and Sciences		Engineering and Science	Class of 2015
The Met		Learning Through Internship	Class of 2015
West Contra Costa			
	Richmond HS	Engineering Academy	Class of 2014
	Richmond HS	Law Academy	Class of 2014
	Richmond HS	Multimedia Academy	Class of 2014
	De Anza HS	Health Academy	Class of 2015

[a] Includes students enrolled in the Graphic Communications pathway.

[b] Pathway flags were unavailable for Harmony Magnet for the 2010–11 and 2011–12 school years. Both pathways are modeled jointly in these two school years.

Data Elements

Exhibits A-3 and A-4 list all the variables included in the extant-data analyses, including descriptions of how each variable was calculated.

Exhibit A-3
Data Elements for Analyses of Enrollment and Persistence and of College-Ready Graduates

Variable	Description
Student Demographics	
Female	Equal to 1 if student was female; equal to 0 if student was male.
Low socioeconomic status (SES)	Equal to 1 if student was part of the National School Lunch Program or parents' education level was not higher than high school graduate; equal to 0 if student was not part of the National School Lunch Program and parents' education level was higher than high school graduate and the value was nonmissing.
White	Equal to 1 if student was white, non-Latino; equal to 0 if student was not white and the value was nonmissing.
Latino	Equal to 1 if student was Latino; equal to 0 if student was not Latino and the value was nonmissing.
African American	Equal to 1 if student was African American, non-Latino; equal to 0 if student was not African American and the value was nonmissing.
Asian	Equal to 1 if student was Asian, non-Latino; equal to 0 if student was not Asian and the value was nonmissing.
Other race/ethnicity	Equal to 1 if student was American Indian, Alaska Native, or ethnicity unknown; equal to 0 if student's ethnicity was known and was not American Indian or Alaska Native.
Low prior achievement	Equal to 1 if student scored below basic or far below basic on the English Language Arts (ELA) California Standards Test (CST) before start of pathway or traditional high school program; equal to 0 if student scored basic or higher.
High prior achievement	Equal to 1 if student scored advanced on the English Language Arts (ELA) California Standards Test (CST) before start of pathway or traditional high school program; equal to 0 if student scored proficient or lower.
Gifted and talented	Equal to 1 if student was gifted and talented; equal to 0 if student was not gifted and talented and the value was nonmissing.
Special education	Equal to 1 if student was in special education; equal to 0 if the student was not in special education and the value was nonmissing.
English learner	Equal to 1 if student was classified as an English learner; equal to 0 if student was not classified as an English learner and the value was nonmissing.
Reclassified fluent English proficient	Equal to 1 if student was reclassified as proficient in English; equal to 0 if student was not reclassified as proficient in English and the value was nonmissing.
Initial fluent English proficient	Equal to 1 if student had a home language other than English but was initially classified as proficient in English; equal to 0 if student was not initially classified as proficient in English and the value was nonmissing.
English only	Equal to 1 if student had English as the only home language; equal to 0 if student did not have English as the only home language and the value was nonmissing.
Student Cohort Variables	
Class of 2013	A student in the 9th grade for the first time in the 2009–10 school year (class of 2013 if graduated on time)
Class of 2014	A student in the 9th grade for the first time in the 2010–11 school year (class of 2014 if graduated on time)
Class of 2015	A student in the 9th grade for the first time in the 2011–12 school year (class of 2015 if graduated on time)
Pathway started in 10th grade	Equal to 1 if student's pathway or traditional high school program started in 10th grade; equal to 0 if student's pathway or traditional high school program started in 9th grade.

Exhibit A-4
Data Elements for High School and Postsecondary Outcome Analysis

Variable	Description
Student Achievement	
ELA CST	ELA CST score taken before start of pathway or traditional high school program.
Timing of ELA CST	Equal to 1 if student had nonmissing value on ELA CST 2 years before start of pathway or traditional high school program and had missing value on ELA CST 1 year before start of pathway or traditional high school program; equal to 0 if student had nonmissing value on ELA CST 1 year before start of pathway or traditional high school program or had missing values on ELA CST 1 and 2 years before start of pathway or traditional high school program.
Math CST	Math CST score taken before start of pathway or traditional high school program.
Timing of Math CST	Equal to 1 if student had nonmissing value on Math CST 2 years before start of pathway or traditional high school program and had missing value on Math CST 1 year before start of pathway or traditional high school program; equal to 0 if student had nonmissing value on Math CST 1 year before start of pathway or traditional high school program or had missing values on Math CST 1 and 2 years before start of pathway or traditional high school program.
Math CST: Grade-Level Math	Equal to 1 if student took the 7th-grade-level Math CST before start of pathway or traditional high school program; equal to 0 if student did not take 7th-grade-level Math CST and the value was nonmissing.
Math CST: General Math	Equal to 1 if student took the 8th- or 9th-grade General Math CST; equal to 0 if student did not take 8th- or 9th-grade General Math CST and the value was nonmissing.
Math CST: Algebra I	Equal to 1 if student took the Algebra I CST; equal to 0 if student did not take Algebra I CST and the value was nonmissing.
Math CST: Geometry	Equal to 1 if student took the Geometry CST; equal to 0 if student did not take the Geometry CST and the value was nonmissing.
Math CST: Algebra II	Equal to 1 if student took the Algebra II CST; equal to 0 if student did not take the Algebra II CST and the value was nonmissing.
Math CST: Unknown	Equal to 1 if Math CST taken was missing for student; equal to 0 if student's Math CST taken was nonmissing.
Outcomes	
GPA	Grade point average according to CSU system's formula to calculate high school GPA for applicants, which was based only on student's grades in a–g courses taken in the 10th and 11th grades. Does not allocate additional points if student successfully completed honors courses. Calculated only for students who did not drop out.
Credits accumulated	Sum of credits for all classes in which student received a passing grade through the student's 12th-grade year. Calculated only for students who did not drop out.

Exhibit A-4
Data Elements for High School and Postsecondary Outcome Analysis (continued)

Variable	Description
Completion of “a” course requirement	Equal to 1 if, by the end of 12th grade, student earned a C or higher in four semester courses of history/social science; equal to 0 if this requirement was not met. Calculated only for students who did not drop out.
Completion of “b” course requirement	Equal to 1 if, by the end of 12th grade, student earned a C or higher in eight semester courses of English; equal to 0 if this requirement was not met. Calculated only for students who did not drop out.
Completion of “c” course requirement	Equal to 1 if, by the end of 12th grade, student earned a C or higher in six semester courses of math; equal to 0 if this requirement was not met. Calculated only for students who did not drop out.
Completion of “d” course requirement	Equal to 1 if, by the end of 12th grade, student earned a C or higher in four semester courses of laboratory science; equal to 0 if this requirement was not met. Calculated only for students who did not drop out.
Completion of “e” course requirement	Equal to 1 if, by the end of 12th grade, student earned a C or higher in four semester courses of a language other than English. Bilingual students were not required to complete four semester courses of a language other than English. We could not identify bilingual students in the data and assumed that the number of bilingual students did not systematically differ for certified pathway, noncertified pathway, and traditional high school students. Equal to 0 if this requirement was not met. Calculated only for students who did not drop out.
Completion of “f” course requirement	Equal to 1 if, by the end of 12th grade, student earned a C or higher in two semester courses each of visual and performing arts; equal to 0 if this requirement was not met. Calculated only for students who did not drop out.
Completion of “g” course requirement	Equal to 1 if, by the end of 12th grade, student earned a C or higher in two semester courses of a college-prep elective (i.e., a “g” course or an “a–f” course beyond those necessary to meet those requirements); equal to 0 if this requirement was not met. Calculated only for students who did not drop out.
Completion of a–g course requirements	Equal to 1 if, by the end of 12th grade, student earned a C or higher in the following numbers of courses: eight semester courses of English (b); six semester courses of math (c); four semester courses each of history/social science (a), laboratory science (d), and language other than English (e); and two semester courses each of visual and performing arts (f) and a college-prep elective (g). Equal to 0 if these requirements were not met. Calculated only for students who did not drop out.
Number of a–g semester courses completed	Number of a–g semester courses completed with a grade of C or higher; we did not count courses above the number required for admission to a 4-year university (e.g., more than two semesters of “g” courses). We also excluded a–g courses taken in middle school because we lacked consistent course data for grades before 9th grade; however, if middle school students took math standardized tests in subjects more advanced than Algebra I (e.g., Geometry or Algebra II), we assumed that they successfully completed two semester courses of math while in middle school. Calculated only for students who did not drop out.
Dropout	Equal to 1 if student dropped out before 12th grade; equal to 0 if student did not drop out before 12th grade; missing if student transferred out of a Linked Learning district or left district for a reason not related to dropout (e.g., illness).
Graduation	Equal to 1 if student received a standard high school diploma in 4 years; equal to 0 if student did not receive a standard high school diploma in 4 years and the value was nonmissing; missing if student transferred out of a Linked Learning district or left district for any other reason.

Exhibit A-4
Data Elements for High School and Postsecondary Outcome Analysis (concluded)

Variable	Description
Postsecondary enrollment	Equal to 1 if student enrolled in a 2-year or 4-year postsecondary institution in the fall (August 1–December 31) after student's cohort graduated from high school; equal to 0 if student had no record of enrollment in a 2-year or 4-year postsecondary institution during that semester. Calculated only for students who were in the same district in 12th grade as they were when their pathway began.
4-Year College enrollment	Equal to 1 if student enrolled in a 4-year postsecondary institution in the fall (August 1–December 31) after student's cohort graduated from high school; equal to 0 if student enrolled in a 2-year postsecondary institution during that semester; missing if student had no record of enrollment in a 2-year or 4-year postsecondary institution during that semester. Calculated only for students with a value of 1 for the postsecondary enrollment variable.
Postsecondary persistence	Equal to 1 if student initially enrolled in a postsecondary institution in the fall (August 1–December 31) after student's cohort graduated from high school and also enrolled in the following fall semester; equal to 0 if student was initially enrolled but not subsequently enrolled in the following (second-year) fall semester. The postsecondary institution in the second year of enrollment did not have to be the same as the institution in the first year for a student to be considered as persisting in college. The student did not have to be enrolled in the spring semester between fall semesters to be considered as persisting in college. Calculated only for students with a value of 1 for the postsecondary enrollment variable.

Methods for Analysis of Enrollment and Persistence

In Chapters 2 and 3, we presented the results of two descriptive analyses to identify patterns in students' entry into and persistence in pathways. Below, we describe the sample and analytic approach for each of these analyses.

Pathway Enrollment

The pathway enrollment analysis explored differences in students' entry into pathways on the basis of student demographic characteristics and prior achievement. The analytic sample included students enrolled in the following types of high school programs (as defined above): certified pathways, noncertified pathways, traditional high schools, alternative or continuation schools, and nonpathway students at wall-to-wall high schools.[40]

In Chapter 2, we presented the rates of enrollment of subgroup students (i.e., special education, English learner, students with low prior achievement, and students with high prior achievement) in certified and noncertified pathways, compared with the percentage of each subgroup in the district population. These results were displayed in Exhibit 2-1. Exhibit A-5 provides the numbers of students enrolled in pathways, by subgroup used to calculate the percentages in Exhibit 2-1. Each "District total" row presents all nonmissing values of students in certified pathways, noncertified pathways, and the district overall (including students in traditional high schools and alternative/continuation schools, and nonpathway students in wall-to-wall high schools). For example, in Antioch special education students made up 13% of the overall population (591 out of 4,683 students) but only 7% of the students in certified pathways (53 out of 745).

[40] The analytic sample for the enrollment and persistence analyses differed from that of the analysis of college-ready graduates' outcomes described below. The enrollment and persistence analysis included students from a broader range of high school programs, students who were missing prior achievement data used in the outcome analysis, and students in pathways with fewer than 20 students. These students were excluded from the outcome analysis.

Exhibit A-5
Enrollment of Special Student Populations, by District

	Special Education			English Learners			Low Prior Achievement[a]			High Prior Achievement[b]		
	Certified Pathways	Noncertified Pathways	District Overall	Certified Pathways	Noncertified Pathways	District Overall	Certified Pathways	Noncertified Pathways	District Overall	Certified Pathways	Noncertified Pathways	District Overall
Antioch												
n in subgroup	53	34	591	67	13	485	89	47	1,043	196	101	771
District total	745	412	4,683	745	412	4,682	660	359	4,014	660	359	4,014
Long Beach												
n in subgroup	45	875	1,786	106	2,381	3,755	86	2,516	3,907	430	2,694	4,178
District total	1,880	12,885	20,092	1,880	12,885	20,091	1,424	11,869	17,870	1,424	11,869	17,871
Los Angeles												
n in subgroup	27	411	737	197	1,945	3,217	140	1,583	2,665	42	478	871
District total	515	5,165	8,956	513	5,153	8,932	461	4,479	7,754	461	4,479	7,754
Montebello												
n in subgroup	0	30	489	0	76	1,209	0	59	1,058	0	71	721
District total	0	442	5,014	0	442	5,011	0	424	4,384	0	424	4,384
Oakland												
n in subgroup	42	152	560	144	327	1,185	154	389	1,450	43	350	657
District total	403	1,685	4,636	403	1,685	4,636	376	1,588	4,121	376	1,588	4,121
Pasadena												
n in subgroup	106	31	434	186	49	639	277	88	928	138	35	737
District total	1,047	324	4,145	1,047	324	4,144	935	299	3,631	935	299	3,631
Porterville												
n in subgroup	8	13	205	86	70	840	26	32	459	127	66	383
District total	862	479	4,621	862	479	4,621	381	283	2,199	381	283	2,199
Sacramento												
n in subgroup	52	71	621	108	191	1,252	94	151	1,087	88	203	1,321
District total	529	896	5,976	529	896	5,976	437	703	5,064	437	703	5,064
West Contra Costa												
n in subgroup	55	128	478	246	365	999	217	419	1,161	28	165	561
District total	509	1,422	3,846	509	1,422	3,845	478	1,329	3,525	478	1,329	3,525

Note: Initial enrollment data presented above will not align perfectly with initial enrollment results in Exhibit A-6 showing pathway persistence through grade 12 because of students whose 12th-grade status was uncertain in the data.

*N*s vary within districts for different subgroups because of missing data. Across all districts, district data were missing special education status for 184 students (0.3% of observations), English learner status for 215 students (0.4% of observations), and prior achievement scores needed to derive the low prior achievement indicator for 9,591 students (15.4% of observations). Montebello had no certified pathways during the study period.

[a] Equal to 1 if student scored below basic or far below basic on the English Language Arts (ELA) California Standards Test (CST) before start of pathway or traditional high school program; equal to 0 if student scored basic or higher.

[b] Equal to 1 if student scored advanced on the English Language Arts (ELA) California Standards Test (CST) before start of pathway or traditional high school program; equal to 0 if student scored basic or higher.

Persistence Within Pathways

In Chapter 3, we explored the extent to which students who initially enrolled in certified and noncertified pathways remained in the same pathways through the beginning of 12th grade. The analytic sample for the persistence analysis included the same high school programs as the enrollment sample.

We classified students who initially enrolled in certified or noncertified pathways in 9th or 10th grade into four persistence categories on the basis of their enrollment at the beginning of 12th grade. These categories are:

- **No longer in the district:** Students were considered no longer in the district if they had missing values for 12th-grade ELA CST, 12th-grade GPA, and 12th-grade school or pathway enrollment.
- **No longer in a pathway but in the same district:** The student remained in the district but moved to a traditional high school or other nonpathway high school program.
- **In a different pathway:** The student remained in the district but moved to a different pathway (either certified or noncertified).
- **In same pathway:** The student remained in the district from 9th to 12th grade and in the same pathway in which he/she initially enrolled.

In Exhibit 3-3, we presented the percentages of certified and noncertified pathway students, overall and by four subgroups (special education, English learner, students with low and high prior achievement), that fell into the persistence categories defined above. Exhibit A-6 presents the number of students across districts who persisted through 12th grade, overall among those who initially enrolled in pathways and by subgroup. To calculate the percentage of students in a given persistence category within each row of certified or noncertified pathway students, divide the number of students in that persistence category by the initial enrollment. For example, 4,394 of 6,462 students who initially enrolled in a certified pathway remained in this pathway through the beginning of 12th grade (68% of these students).

Exhibit A-6
Persistence to the 12th Grade, Overall and by Subgroup

	Initial Enrollment	No Longer in the District	No Longer in a Pathway But in the Same District	In a Different Pathway	In Same Pathway
	N	*N*	*N*	*N*	*N*
Overall					
Certified	6,462	967	834	267	4,394
Noncertified	23,401	4,848	3,921	1,861	12,771
Special education					
Certified	387	93	63	20	211
Noncertified	1,723	416	364	175	768
English learner					
Certified	1,128	240	189	52	647
Noncertified	5,300	1,487	1,112	442	2,259
Low prior achievement[a]					
Certified	1,066	233	229	55	549
Noncertified	5,186	1,557	1,217	431	1,981
High prior achievement[a]					
Certified	1,089	88	82	50	869
Noncertified	4,112	342	466	294	3,010

Note: Some pathway students are captured in multiple subgroup rows (e.g., a student can be an English learner and designated special education), and some pathway students were not in any of the listed subgroups, so the subgroup rows will not sum to the "Overall" rows at the top.

[a] Low prior achievement is defined as scoring below basic on the ELA CST; High prior achievement is scoring advanced.

Methods for Analysis of College-Ready Graduates

In Chapter 5, we analyzed the high school and postsecondary outcomes of students in certified and noncertified pathways, compared with peers with similar demographic characteristics and prior achievement in traditional high school programs. In this section of the appendix, we provide context to the results and implications presented in the full report. We describe how we determined the analytic sample for our analysis of college-ready graduates, including how the data available to us affected which outcomes we analyzed for students in each cohort and district. We then provide descriptive information on the student demographic, achievement, and outcome variables that were part of our high school and postsecondary outcome analysis. Last, we detail the analysis methods and provide complete results for all students and those in our subgroups of interest in both certified and noncertified pathways.

Choosing and Defining Outcomes

In this report, we focused on cumulative indicators of high school success and college readiness: credit accumulation, college-admission GPA, completion of college-preparatory requirements, dropout, and graduation. We also examined postsecondary enrollment and persistence. All cohorts were included for each of the outcomes, except for postsecondary persistence, which excluded the class of 2015 because data were not available.

Relative to past reports, we eliminated a number of outcomes. Two outcomes ceased to provide any new data for our cohorts after the fifth-year report: the ELA CST was administered only through the 2012–13 school year, and the Math and ELA California High School Exit Exam (CAHSEE) was administered in 10th grade. Two other outcomes were eliminated after the fifth-year report, absences and course failures, which we had found to be uninformative. In the fifth year of the evaluation, we found no statistically significant differences between certified pathway students and similar peers in traditional high school programs for either outcome, most likely in part because of the lack of variation in these outcome variables. In the sixth-year report, we finished reporting on another outcome, the California State University (CSU) ELA Early Assessment Program (EAP) exam, which is administered in 11th grade.

This year, we also added some data that we did not have in the past, allowing us to include more students in our analysis of various outcomes. For the first time, 12th-grade outcomes (dropout, graduation, credits, and a-g requirements) were available for the class of 2015. In addition, we received data for all high school outcomes for students from two new schools in Los Angeles, Los Angeles Senior High School and Hollywood High School. These two schools were added to our sample in order to align the analytic sample of college-ready graduates with the high school survey sample. Finally, we received updated course data from Oakland and Sacramento City school districts, which allowed us to include these districts in our analysis of college-prep GPA, credit accumulation, and a-g requirement outcomes.

The outcome variables are presented above in Exhibit A-4. Exhibit A-7 shows the cohorts we were missing data for in each district, by outcome variable. Shading indicates that the data were missing by design: we did not request data for the 2013 cohort from Los Angeles, Montebello, Oakland, Sacramento, or West Contra Costa. A solid dot indicates that we received these data but were unable to use them because they were not of sufficient quality.

Exhibit A-7
Data Availability for Analysis of College-Ready High School Graduates

Variable	Graduation Cohort	Antioch	Long Beach	Los Angeles	Montebello	Oakland	Pasadena	Porterville	Sacramento	West Contra Costa
Dropout	2013	✓	✓				✓	✓		
	2014	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2015	✓	✓	✓	✓	✓	✓	✓	✓	✓
Graduation	2013	✓	✓				✓	✓		
	2014	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2015	✓	✓	✓	✓	✓	✓	✓	✓	✓
Credits	2013	●	✓				✓	✓		
	2014	●	✓	✓	✓	✓	✓	✓	✓	✓
	2015	●	✓	✓	✓	✓	✓	✓	✓	✓
a–g Courses/ Completion	2013	●	✓				✓	✓		
	2014	●	✓	✓	✓	✓	✓	✓	✓	✓
	2015	●	✓	✓	✓	✓	✓	✓	✓	✓
GPA	2013	●	✓				✓	✓		
	2014	●	✓	✓	✓	✓	✓	✓	✓	✓
	2015	●	✓	✓	✓	✓	✓	✓	✓	✓
Postsecondary Enrollment	2013	✓	✓				✓	✓		
	2014	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2015	✓	✓	✓	✓	✓	✓	✓	✓	✓
4-Year College Enrollment	2013	✓	✓				✓	✓		
	2014	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2015	✓	✓	✓	✓	✓	✓	✓	✓	✓
Postsecondary Persistence	2013	✓	✓				✓	✓		
	2014	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2015									

KEY	
●	Data unreliable
	Data unavailable or not yet available
✓	Data included in analysis

Analytic Sample

We took a number of steps to make the student-level data received from the nine Linked Learning districts usable for our analysis. We determined the analytic sample for each model on the basis of the number of cases with nonmissing values for all covariates (student demographic, cohort, and achievement data) and outcome variables required for that model. The analytic sample therefore varied across outcomes, even for students within the same district. To create the analytic sample, we made the following exclusions:

- Students with missing values for our covariates were excluded. Approximately 17% of students in the final sample were excluded because of missing covariates, mainly missing prior achievement data.[41]
- Given our intent-to-treat analytic approach (see "Analysis Methods" section below), we excluded students who were not enrolled in one of the nine districts the year their pathway or traditional high school program began.
- We excluded students in alternative or continuation schools because their high school experiences were not comparable to those of students in pathways or traditional high school programs.
- For purposes of model convergence, we excluded a small number of students who, before enrolling in a pathway or traditional high school, took a Math CST exam that 10 or fewer students overall had taken.

In addition, to minimize data errors, we implemented a number of additional cleaning steps:

- We excluded students in wall-to-wall schools with no pathway designation.
- We excluded students in any programs with fewer than 20 students in the analytic sample (after making the exclusions described above), because we deemed these programs too small to estimate an accurate outcome while controlling for all necessary variables. Note that we did not make this exclusion for the subgroup analyses, where we consider analyses to be exploratory, and eliminating pathways with small numbers of subgroup students would have excluded enough pathways to limit the generalizability of some findings.

For the postsecondary outcomes, the analytic sample was limited to students who were in the same districts in 12th grade as they were when their pathways began. Students who dropped out or left their initial district were excluded from this analysis. We defined postsecondary enrollment and persistence as follows:

- We classified a student as having enrolled in a postsecondary institution if the student had an enrollment record in the NSC data in the fall semester (August 1–December 31) during the calendar year the student's cohort graduated (e.g., fall 2013 for a student in the class of 2013).
- We supplemented enrollment data from the NSC with data from the COMIS when NSC data were missing for students.[42] If a student had an NSC enrollment record in a given semester, the NSC record took precedence over a COMIS enrollment record in that semester.
- For instances where a student had an enrollment record at both a 2-year and a 4-year institution during our defined enrollment period, we designated students as enrolled in the 4-year institution.

[41] Districts were able to provide middle school data for only those students who attended middle school within the district. This limitation excluded approximately half the students in Porterville, which has several feeder elementary districts.

[42] The COMIS data included the following community college districts: Cerritos, Glendale, Kern, Long Beach, Peralta, Santa Monica, Sequoias, Solano, and West Hills.

- Postsecondary persistence is defined as fall-to-fall persistence; the student did not have to be enrolled in the spring semester between fall semesters to be considered as persisting in college. The postsecondary institution in the second year of enrollment did not have to be the same as the institution in the first year for a student to be considered as persisting in college.

Descriptive Statistics

Exhibits A-8 through A-11 display descriptive statistics for students in certified pathways, noncertified pathways, and traditional high school programs. These tables present the sample sizes, means, and standard deviations (for continuous variables) or percentages (for dichotomous variables) for all students in all districts who were included in the analytic sample for any outcome analysis. We provide these overall descriptive statistics to allow for an understanding of how the characteristics of students who enrolled in certified pathways might differ from those of students in noncertified pathways or traditional high school programs. The tables show student demographics, student achievement data, and outcome data, respectively. Note that sample sizes vary both between and within tables because of the variation in available data between districts and cohorts, so we provide the number of students in each program type in the first table only. We provide the number of students included in each analysis in the outcome tables.

Exhibit A-8
Demographics and Cohort Variables

	Overall	Certified Pathway	Noncertified Pathway	Traditional High School
n	47,538	5,061	20,831	21,646
Female	49.6%	51.5%	50.4%	48.4%
Low SES	78.7%	78.1%	78.3%	79.3%
White	12.4%	14.8%	10.0%	14.2%
Latino	58.5%	60.7%	59.1%	57.4%
African American	14.7%	14.2%	15.0%	14.4%
Asian	13.7%	9.4%	15.4%	13.0%
Other Race/Ethnicity	0.8%	0.9%	0.5%	0.9%
Gifted and Talented	3.3%	2.3%	2.6%	4.2%
Low Prior Achievement	24.5%	20.5%	24.4%	25.7%
Special Education	8.1%	6.3%	7.1%	9.5%
Reclassified Fluent English Proficient	26.8%	27.4%	27.2%	26.2%
Initial Fluent English Proficient	8.0%	8.5%	8.1%	7.7%
English Only	44.4%	45.0%	41.9%	46.7%
English Learner	20.8%	19.1%	22.7%	19.4%
Class of 2013	18.1%	19.0%	21.0%	15.1%
Class of 2014	41.5%	33.8%	40.2%	44.6%
Class of 2015	40.3%	47.2%	38.7%	40.3%
Pathway Starts in 10th Grade	18.6%	23.5%	23.4%	12.9%

Exhibit A-9
Prior Achievement Test Descriptive Statistics, by Grade[a]

	Overall	Certified Pathway	Noncertified Pathway	Traditional High School
7th Grade				
ELA CST	326	336	327	325
SD	(55)	(56)	(53)	(56)
Math CST	325	340	325	323
SD	(61)	(61)	(60)	(61)
8th Grade				
ELA CST	348	356	348	346
SD	(61)	(57)	(61)	(61)
Math CST	342	346	348	337
SD	(70)	(69)	(72)	(69)
9th Grade				
ELA CST	332	333	332	333
SD	(59)	(55)	(57)	(65)
Math CST	297	300	298	293
SD	(56)	(58)	(54)	(58)

[a] Sample size differs by cell.

Exhibit A-10
Prior Achievement Test Descriptive Statistics, by Type and Period[a]

	Overall	Certified Pathway	Noncertified Pathway	Traditional High School
Prior Math Test Type				
Math CST: Grade-Level Math	4.5%	2.9%	3.2%	6.0%
Math CST: General Math	33.3%	24.2%	32.7%	36.0%
Math CST: Algebra I	52.7%	63.4%	54.2%	48.8%
Math CST: Geometry	8.6%	9.0%	8.8%	8.3%
Math CST: Algebra II	0.9%	0.4%	1.0%	0.9%
Prior Test Period				
Math CST 2 Years Before Pathway Start	4.7%	2.9%	3.3%	6.5%
ELA CST 2 Years Before Pathway Start	4.8%	2.8%	3.4%	6.7%

[a] Sample size differs by cell.

Exhibit A-11
Outcome Descriptive Statistics[a]

		Overall	Certified Pathway	Noncertified Pathway	Traditional High School
Dropout	Mean	12%	9%	12%	13%
Graduation	Mean	74%	79%	76%	71%
Credits Earned	Mean	220	230	219	218
	SD	(48)	(55)	(48)	(46)
GPA	Mean	1.99	2.0	2.0	1.96
	SD	(0.82)	(0.79)	(0.80)	(0.84)
Completion of “a” Course Requirement	Mean	74%	78%	76%	70%
Completion of “b” Course Requirement	Mean	38%	39%	40%	36%
Completion of “c” Course Requirement	Mean	39%	43%	40%	38%
Completion of “d” Course Requirement	Mean	62%	65%	59%	63%
Completion of “e” Course Requirement	Mean	56%	54%	54%	58%
Completion of “f” Course Requirement	Mean	80%	81%	82%	77%
Completion of “g” Course Requirement	Mean	63%	65%	67%	57%
Completion of all a–g Course Requirements	Mean	28%	28%	30%	25%
Number of a–g Semester Courses	Mean	22.6	23.3	22.8	22.3
Postsecondary Enrollment	Mean	57%	57%	60%	54%
4-Year College Enrollment[b]	Mean	45%	47%	44%	46%
Postsecondary Persistence[c]	Mean	77%	79%	77%	78%

[a] Sample size differs by cell. See regression tables below for sample size for each cell.

[b] Conditional on attending any postsecondary institution.

[c] Conditional on attending any postsecondary institution the previous fall.

Analysis Methods

We used statistical controls to compare outcomes for certified and noncertified pathway students with those of students who attended traditional high schools, had similar demographic characteristics and prior achievement, and were enrolled in the same district. We could not control for unobserved and unmeasured characteristics of students, however, such as motivation and parental support. Our analyses therefore can neither shed light on nor adjust for ways these unobserved characteristics may differ between pathway and traditional high school students. For this reason, we cannot conclusively determine whether pathway participation improved high school outcomes for students.

As in previous years of the evaluation, we estimated an intent-to-treat effect and classified students as participating in a pathway if they were enrolled in it in the first year the pathway was offered (in either the 9th or 10th grade); for students in traditional high school programs, their program classification was based on their school enrollment in the same academic year.

To estimate the differences between pathway students and similar peers in traditional high schools on continuous outcome variables (i.e., number of a–g course requirements completed, GPA, and credit accumulation), we used a hierarchical linear model with random effects at the student and pathway levels. We used a vector of indicators for the student's district and cohort to control for fixed effects of each district and cohort. Outcome *Y* for student *i* in pathway *j* is given as

$$Y_{ij} = \beta + (\mathbf{PW_{ij}})\boldsymbol{\pi} + (\boldsymbol{X_{ij}} - \bar{\boldsymbol{X}})\boldsymbol{\zeta} + \alpha_j + \varepsilon_{ij}$$

where:

Y_{ij} = outcome *Y* for student *i* in pathway *j*.

$\mathrm{PW_{ij}}$ = vector of dummies representing pathway classification (certified pathway and noncertified pathway, with traditional high schools omitted as reference).

X_{ij} = vector of covariates, including district and cohort fixed effects and student prior achievement and demographics. Prior achievement variables consisted of the student's Math and ELA CST scores from the year before entering the pathway,[43] a vector of dummies indicating the Math CST exam taken,[44] and an indicator for the pathway beginning in the 10th grade. Demographic variables consisted of a series of indicators for student gender, ethnicity, English language proficiency, special education status, gifted and talented status, and low socioeconomic status. All variables were grand-mean centered.

α_j= pathway random effect.

ε_{ij}= student random effect.

The π coefficients therefore provided the estimate of the difference between pathway students (in each certified and noncertified category) and traditional high school students, controlling for all variables captured by X_{ij}.

Because all covariates were grand-mean centered, our estimates predicted differences for an "average" student in the sample. We predicted models using a continuous outcome variable by using Stata 14's *mixed* command. For models predicting binary outcomes (high school graduation, dropping out of high

[43] We controlled for achievement 1 year before the pathway or high school start, and to minimize the number of students excluded from the analyses, we used achievement 2 years before the pathway or high school start when achievement in the prior year was missing; our models accounted for this difference.

[44] Seven students in the analytic sample who took an unknown math exam, five students who took the Summative High School Math CST exam, three students who took the Integrated Math I exam, and one student who took the Integrated Math II exam were dropped from the analysis because fewer than 10 students took either exam type. With so few students taking these four types of exams, they were not representative of the analytic sample and prevented convergence of the maximum-likelihood estimator.

school, completion of all a–g course requirements, and all postsecondary outcomes) we used the *meqrlogit* command. For logistic models, we transformed the estimates into probabilities to present in the main report but provide untransformed results in these appendix tables. We use the standard $p < .05$ threshold to determine statistical significance throughout this report; however, in Exhibits A-12 through A-25, we also note estimates that are marginally significant at $p < .10$.

Results for Certified and Noncertified Pathways for All Students

Exhibits A-12 and A-13 present all estimates for certified and noncertified pathways for all students, along with their significance levels, the associated standard errors, and sample sizes at both student and academic program levels.

Exhibit A-12
Binary Outcomes for Certified and Noncertified Pathway Students

	Certified		Noncertified	
Dropout				
Point Estimate[a]	-0.24	*	-0.24	*
SE	0.12		0.10	
Student *n*	44,503		44,503	
School and Pathway *n*	183		183	
Graduation				
Point Estimate[a]	0.32	**	0.17	~
SE	0.11		0.09	
Student *n*	45,266		45,266	
School and Pathway *n*	183		183	
Completion of a–g Requirements				
Point Estimate[a]	0.22		0.01	
SE	0.20		0.18	
Student *n*	31,116		31,116	
School and Pathway *n*	174		174	
Postsecondary Enrollment				
Point Estimate[a]	-0.02		0.09	
SE	0.09		0.07	
Student *n*	37,214		37,214	
School and Pathway *n*	183		183	
4-Year College Enrollment				
Point Estimate[a]	0.16		-0.13	
SE	0.14		0.11	
Student *n*	21,267		21,267	
School and Pathway *n*	183		183	
Postsecondary Persistence				
Point Estimate[a]	-0.02		-0.05	
SE	0.14		0.11	
Student *n*	13,598		13,598	
School and Pathway *n*	169		169	

~$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

[a] Point estimates are presented in logits to allow for comparisons with standard errors of these estimates.

Exhibit A-13
Continuous Outcomes for Certified and Noncertified Pathway Students

	Certified		Noncertified
Credits Accumulated			
Point Estimate	8.90	**	3.56
SE	2.80		2.48
Student *n*	30,983		30,983
School and Pathway *n*	174		174
Number of a–g Semester Courses Completed			
Point Estimate	0.85	*	0.26
SE	0.35		0.29
Student *n*	31,116		31,116
School and Pathway *n*	174		174
GPA			
Point Estimate	0.07		-0.01
SE	0.05		0.04
Student *n*	31,013		31,013
School and Pathway *n*	174		174

*~p < .10; *p < .05; **p < .01; ***p < .001*

Results for Subgroups in Certified and Noncertified Pathways

Exhibits A-14 through A-25 present all estimates for subgroup students' outcomes in certified and noncertified pathways. We analyzed outcomes separately for students with low prior achievement, students with high prior achievement, English learners, African Americans, Latinos, and females. For these analyses, we limited the sample used in the overall outcome estimates to those students in the subgroup of interest. Results can therefore be thought of as outcomes for subgroup students in certified and noncertified pathways relative to outcomes for similar students of the same subgroup who attended traditional high schools. All certified and noncertified pathway estimates are presented, along with their significance levels, the associated standard errors, and the sample sizes at both student and pathway levels.

Exhibit A-14
Binary Outcomes for Certified and Noncertified Pathways for Students With Low Prior Achievement[a]

	Certified		Noncertified
Dropout			
Point Estimate[b]	-0.40	**	-0.17
SE	0.15		0.11
Student *n*	10,469		10,469
School and Pathway *n*	179		179
Graduation			
Point Estimate[b]	0.38	**	0.16
SE	0.13		0.10
Student *n*	10,805		10,805
School and Pathway *n*	179		179
Postsecondary Enrollment			
Point Estimate[b]	0.07		0.13
SE	0.13		0.10
Student *n*	7,765		7,765
School and Pathway *n*	179		179
4-Year College Enrollment			
Point Estimate[b]	0.56	**	0.20
SE	0.22		0.18
Student *n*	2,683		2,683
School and Pathway *n*	169		169
Postsecondary Persistence			
Point Estimate[b]	-0.09		-0.07
SE	0.22		0.16
Student *n*	1,756		1,756
School and Pathway *n*	150		150

~$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

[a] Because of the small number of students with low prior achievement who completed the full set of a-g requirements in either pathway or traditional high school settings, we were unable to estimate any differences on this outcome.

[b] Point estimates are presented in logits to allow for comparisons with standard errors of these estimates.

Exhibit A-15
Continuous Outcomes for Certified and Noncertified Pathways for Students With Low Prior Achievement

	Certified		Noncertified
Credits Accumulated			
Point Estimate	15.44	***	3.73
SE	3.94		3.13
Student *n*	5,614		5,614
School and Pathway *n*	166		166
Number of a–g Semester Courses Completed			
Point Estimate	1.65	**	0.65
SE	0.56		0.44
Student *n*	5,713		5,713
School and Pathway *n*	167		167
GPA			
Point Estimate	0.10	~	0.02
SE	0.05		0.04
Student *n*	5,628		5,628
School and Pathway *n*	167		167

~$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

Exhibit A-16
Binary Outcomes for Certified and Noncertified Pathways for Students With High Prior Achievement

	Certified		Noncertified
Dropout			
Point Estimate[a]	-0.31		-0.19
SE	0.21		0.17
Student *n*	9,296		9,296
School and Pathway *n*	180		180
Graduation			
Point Estimate[a]	0.32	~	0.13
SE	0.19		0.15
Student *n*	9,359		9,359
School and Pathway *n*	180		180
Completion of a–g Requirements			
Point Estimate[a]	-0.01		0.10
SE	0.27		0.22
Student *n*	7,702		7,702
School and Pathway *n*	170		170
Postsecondary Enrollment			
Point Estimate[a]	-0.11		-0.03
SE	0.11		0.09
Student *n*	8,570		8,570
School and Pathway *n*	179		179
4-Year College Enrollment			
Point Estimate[a]	0.05		-0.07
SE	0.19		0.16
Student *n*	6,539		6,539
School and Pathway *n*	173		173
Postsecondary Persistence			
Point Estimate[a]	0.13		-0.06
SE	0.20		0.16
Student *n*	4,088		4,088
School and Pathway *n*	150		150

*~p < .10; *p* < .05; **p* < .01; ***p* < .001

[a] Point estimates are presented in logits to allow for comparisons with standard errors of these estimates.

Exhibit A-17
Continuous Outcomes for Certified and Noncertified Pathways for Students With High Prior Achievement

	Certified	Noncertified	
Credits Accumulated			
Point Estimate	5.23	1.45	
SE	3.75	3.26	
Student *n*	7,700	7,700	
School and Pathway *n*	170	170	
Number of a–g Semester Courses Completed			
Point Estimate	0.17	-0.25	
SE	0.34	0.28	
Student *n*	7,702	7,702	
School and Pathway *n*	170	170	
GPA			
Point Estimate	0.00	-0.08	~
SE	0.06	0.05	
Student *n*	7,699	7,699	
School and Pathway *n*	170	170	

~$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

Exhibit A-18
Binary Outcomes for Certified and Noncertified Pathways for English Learners[a]

	Certified		Noncertified
Dropout			
Point Estimate[b]	-0.31	~	-0.08
SE	0.17		0.13
Student *n*	8,938		8,938
School and Pathway *n*	179		179.00
Graduation			
Point Estimate[b]	0.17		-0.05
SE	0.14		0.11
Student *n*	9,139		9,139
School and Pathway *n*	179		179
Completion of a–g Requirements			
Point Estimate[b]	0.08		0.08
SE	0.28		0.22
Student *n*	5,627		5,627
School and Pathway *n*	166		166
Postsecondary Enrollment			
Point Estimate[b]	-0.24	~	0.03
SE	0.12		0.09
Student *n*	6,975		6,975
School and Pathway *n*	175		175
4-Year College Enrollment			
Point Estimate[b]	0.44	~	0.12
SE	0.23		0.18
Student *n*	2,770		2,770
School and Pathway *n*	160		160

~$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

[a] Because of the small number of English learners who persisted in college in either pathway or traditional high school settings, we were unable to estimate any differences on this outcome.

[b] Point estimates are presented in logits to allow for comparisons with standard errors of these estimates.

Exhibit A-19
Continuous Outcomes for Certified and Noncertified Pathways for English Learners

	Certified		Noncertified
Credits Accumulated			
Point Estimate	11.70	**	3.26
SE	3.58		2.83
Student *n*	5,561		5,561
School and Pathway *n*	165		165
Number of a–g Semester Courses Completed			
Point Estimate	1.03	*	0.57
SE	0.51		0.40
Student *n*	5,627		5,627
School and Pathway *n*	166		166
GPA			
Point Estimate	0.03		0.01
SE	0.05		0.04
Student *n*	5,569		5,569
School and Pathway *n*	166		166

~$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

Exhibit A-20
Binary Outcomes for Certified and Noncertified Pathways for African American Students

	Certified		Noncertified	
Dropout				
Point Estimate[a]	-0.15		-0.45	**
SE	0.18		0.15	
Student *n*	6,514		6,514	
School and Pathway *n*	161		161	
Graduation				
Point Estimate[a]	0.26	~	0.40	**
SE	0.15		0.12	
Student *n*	6,792		6,792	
School and Pathway *n*	161		161	
Completion of a–g Requirements				
Point Estimate[a]	0.37		0.10	
SE	0.28		0.22	
Student *n*	4,001		4,001	
School and Pathway *n*	142		142	
Postsecondary Enrollment				
Point Estimate[a]	0.05		0.12	
SE	0.11		0.08	
Student *n*	5,134		5,134	
School and Pathway *n*	155		155	
4-Year College Enrollment				
Point Estimate[a]	0.52	**	0.14	
SE	0.18		0.14	
Student *n*	2,874		2,874	
School and Pathway *n*	146		146	
Postsecondary Persistence				
Point Estimate[a]	0.27		0.12	
SE	0.21		0.14	
Student *n*	1,921		1,921	
School and Pathway *n*	131		131	

~$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

[a] Point estimates are presented in logits to allow for comparisons with standard errors of these estimates.

Exhibit A-21
Continuous Outcomes for Certified and Noncertified Pathways for African American Students

	Certified		Noncertified
Credits Accumulated			
Point Estimate	15.16	***	5.22
SE	4.37		3.56
Student *n*	3,970		3,970
School and Pathway *n*	142		142
Number of a–g Semester Courses Completed			
Point Estimate	0.98	~	0.26
SE	0.57		0.46
Student *n*	4,001		4,001
School and Pathway *n*	142		142
GPA			
Point Estimate	0.03		-0.02
SE	0.06		0.05
Student *n*	3,981		3,981
School and Pathway *n*	142		142

~$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

Exhibit A-22
Binary Outcomes for Certified and Noncertified Pathways for Latino Students

	Certified		Noncertified	
Dropout				
Point Estimate[a]	-0.35	*	-0.18	
SE	0.14		0.11	
Student *n*	25,767		25,767	
School and Pathway *n*	183		183.00	
Graduation				
Point Estimate[a]	0.36	**	0.06	
SE	0.12		0.10	
Student *n*	25,960		25,960	
School and Pathway *n*	183		183	
Completion of a–g Requirements				
Point Estimate[a]	0.26		0.00	
SE	0.22		0.19	
Student *n*	17,985		17,985	
School and Pathway *n*	172		172	
Postsecondary Enrollment				
Point Estimate[a]	-0.12		-0.01	
SE	0.10		0.08	
Student *n*	21,284		21,284	
School and Pathway *n*	183		183	
4-Year College Enrollment				
Point Estimate[a]	0.24		-0.17	
SE	0.16		0.14	
Student *n*	11,126		11,126	
School and Pathway *n*	180		180	
Postsecondary Persistence				
Point Estimate[a]	-0.12		-0.21	~
SE	0.14		0.12	
Student *n*	7,028		7,028	
School and Pathway *n*	165		165	

~$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

[a] Point estimates are presented in logits to allow for comparisons with standard errors of these estimates.

Exhibit A-23
Continuous Outcomes for Certified and Noncertified Pathways for Latino Students

	Certified		Noncertified
Credits Accumulated			
Point Estimate	11.66	***	2.95
SE	3.03		2.61
Student *n*	17,900		17,900
School and Pathway *n*	172		172
Number of a–g Semester Courses Completed			
Point Estimate	0.90	*	-0.09
SE	0.39		0.32
Student *n*	17,985		17,985
School and Pathway *n*	172		172
GPA			
Point Estimate	0.09	~	-0.02
SE	0.05		0.04
Student *n*	17,912		17,912
School and Pathway *n*	172		172

~$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

Exhibit A-24
Binary Outcomes for Certified and Noncertified Pathways for Female Students

	Certified		Noncertified	
Dropout				
Point Estimate[a]	-0.36	*	-0.32	**
SE	0.14		0.11	
Student *n*	22,245		22,245	
School and Pathway *n*	183		183	
Graduation				
Point Estimate[a]	0.39	**	0.28	**
SE	0.12		0.10	
Student *n*	22,533		22,533	
School and Pathway *n*	182		182	
Completion of a–g Requirements				
Point Estimate[a]	0.10		-0.05	
SE	0.22		0.19	
Student *n*	15,955		15,955	
School and Pathway *n*	173		173	
Postsecondary Enrollment				
Point Estimate[a]	-0.09		0.07	
SE	0.09		0.08	
Student *n*	18,852		18,852	
School and Pathway *n*	183		183	
4-Year College Enrollment				
Point Estimate[a]	0.25		-0.13	
SE	0.15		0.12	
Student *n*	11,674		11,674	
School and Pathway *n*	183		183	
Postsecondary Persistence				
Point Estimate[a]	-0.15		-0.03	
SE	0.17		0.13	
Student *n*	7,446		7,446	
School and Pathway *n*	166		166	

~$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

[a] Point estimates are presented in logits to allow for comparisons with standard errors of these estimates.

Exhibit A-25
Continuous Outcomes for Certified and Noncertified Pathways for Female Students

	Certified		Noncertified
Credits Accumulated			
Point Estimate	8.92	**	2.43
SE	3.11		2.69
Student *n*	15,898		15,898
School and Pathway *n*	173		173
Number of a–g Semester Courses Completed			
Point Estimate	0.73	*	0.07
SE	0.35		0.28
Student *n*	15,955		15,955
School and Pathway *n*	173		173
GPA			
Point Estimate	0.04		-0.05
SE	0.05		0.04
Student *n*	15,921		15,921
School and Pathway *n*	173		173

*~p < .10; *p* < .05; **p* < .01; ***p* < .001

Postsecondary Survey Data and Analysis Methods

In spring 2016, the research team surveyed pathway and comparison students 10 months out of high school to provide information on students' educational and career goals and plans, recent employment, influence of high school experiences on post-high-school goals and plans, financial aid and transition to college. and self-efficacy and initiative. In this section, we provide details about the sample and response rates for the survey, followed by summaries of the results for survey items included in Chapter 5 of the full report.

Survey Sample

For the spring 2016 survey, we sampled pathway and comparison students in three Linked Learning districts who were in their last year of high school in the 2014–15 school year. The districts in our sample were Oakland Unified School Distric, Los Angeles Unified School District, and Pasadena Unified School District (Exhibit A-26). The sample included students who were in certified pathways in high school and a comparison group of students who never participated in a certified pathway in high school. The certified pathway sample differs from the extant-data-analysis sample described above because it excludes students who did not remain in one pathway or school for their 10th- through 12th-grade year. Thus, the extant-data analysis is an intent-to-treat analysis, and the survey analysis is a treatment-on-the-treated analysis.

Pathway Sample. We included all 10 pathways in the 3 districts certified as of the 2012–13 school year. We sampled all 12th-graders in these pathways who had been enrolled in the pathway from 10th- through 12th-grade years. These criteria ensured that the sample comprised students who participated in the same pathway for 3 years.

Comparison Sample. We sampled comparison students from high schools that housed the pathways. In addition, the research team selected additional comparison schools on the basis of their similarity to the sizes, achievement levels, and demographics of the pathway schools. We avoided charter schools and schools with special themes.

We used propensity score matching with replacement to select up to 600 pathway and comparison students total per district. Students were eligible to be part of the comparison sample if they did not participate in a pathway at any time during high school.

Exhibit A-26
Pathways Sampled, by District

District	Pathways Sampled
Los Angeles	Los Angeles High School of the Arts
	Los Angeles School of Global Studies
	New Media Academy
Oakland	Education Academy
	Life Academy of Health and Bioscience
	Media College Preparatory
Pasadena	Arts, Entertainment, and Media Academy
	Business and Entrepreneurship Academy
	Creative Arts, Media and Design Academy
	Engineering and Environmental Science Academy

Note: All pathways were certified as of the 2012–13 school year.

Recruitment Strategies. After identifying the survey sample, SRI researchers held recruitment sessions at high schools with sampled students in spring 2015. The purpose of the recruitment sessions was to invite students to sign up for the the survey and to collect their contact information so that we could survey them a year later. We also hoped to increase the survey response rate by introducing ourselves and the research project to the students in person. SRI provided snacks and a small monetary incentive for students to attend the recruitment session and sign up for the survey.[45] Overall, we were able to recruit 86% of the original pathway sample and 72% of the original comparison sample (Exhibit A-27). We refer to this sample as our recruited sample.

[45] Students received $10 for providing their contact information (address, phone, email), $5 for confirming their email address, $5 for following us on Facebook, and $5 for following us on Twitter.

Exhibit A-27
Sample Sizes: Original Sample vs. Recruited Sample, by District

	Pathway		Comparison	
	Sample *n*	Recruited *n*	Sample *n*	Recruited *n*
Los Angeles	161	143 (89%)	430	245 (57%)
Oakland	111	89 (80%)	333	264 (79%)
Pasadena	149	133 (89%)	412	343 (83%)
Overall	421	365 (87%)	1,175	852 (73%)

Survey Administration

In March 2016, SRI researchers administered an online survey to our recruited sample. After 2 months of follow-up, we achieved a response rate of 63% of the original sample and 80% of the recruited sample (Exhibit A-28).

Exhibit A-28
Response Rates: Original Sample vs. Recruited Sample, by District

	Respondents	% Recruited Complete	% Original Complete
Pasadena	415	87%	76%
Oakland	260	68%	60%
Los Angeles	321	83%	53%
Overall Pathway	315	83%	74%
Overall Comparison	681	78%	59%
Overall Total	996	80%	63%

To examine the representativeness of our survey data, we looked at the differences between our original sample and our respondents by comparing the means of the two groups on various demographic characteristics. We found that respondents (both pathway and comparison) were more likely to be white and classified as gifted and talented, had higher average prior achievement scores, and were less likely to be classified as special education than the original sample (Exhibit A-29). Although the survey results do not represent the typical pathway student, differential response rates for some subgroups were similar across pathway and comparison students. In addition, as discussed in the next section, we account for remaining imbalances between pathway and comparison respondents on these observed background characteristics by applying propensity score weights.

Exhibit A-29
Survey Sample Composition

	Pathway		Comparison	
	Initial Sample	Respondents	Initial Sample	Respondents
Female	55%	61%	50%	53%
Latino	74%	79%	65%	62%
Native American	<1%	2%	<1%	4%
Asian	4%	5%	9%	15%
African American	18%	16%	19%	19%
Pacific Islander	1%	3%	<1%	2%
White	3%	14%	6%	21%
Special Education[a]	11%	4%	11%	2%
Gifted and Talented[a]	12%	14%	22%	28%
English Learner[a]	16%	12%	9%	6%
Mean ELA Score[a]	340	351	356	366
Mean Math Score[a]	345	363	361	380

Note: This analysis does not include the propensity weights applied in the final analyses; all means are unweighted.

[a] Special education, gifted and talented, English learner, and test score means do not include data from Los Angeles alumni because we could not link student data from Los Angeles to their surveys; only race/ethnicity means include data from Los Angeles pathway and comparison students.

Survey Analysis

To account for demographic and prior achievement differences between the pathway and comparison students in Oakland and Pasadena, we used propensity score weighting. We calculated the probability that each comparison student would have received the treatment (i.e., enrolled in a pathway) on the basis of demographic characteristics and prior achievement, and then used those probabilities to create the weights for the analysis. The standardized mean differences between pathway and comparison respondents in each district are shown in Exhibit A-30. We also controlled for the demographic characteristics and prior achievement in the regression used to estimate each survey outcome. Together, the weighting and regression approach account for any observable differences between pathway and comparison students. However, as with our outcome analysis in Chapter 5, we cannot adjust for how any unobserved characteristics, such as motivation or parental support, differed between pathway and comparison students. Further, as described above, the survey respondents were different on certain demographic characteristics from the original sample. Therefore, we cannot generalize the survey findings to apply to all pathway students.

For Los Angeles we were unable to link survey records to administrative data; consequently, we were limited to matching the initial sample and adjusting for the background characteristics captured in the survey.

Exhibit A-30
Covariate Balance:
Standardized Mean Differences Between Pathway and Comparison Respondents

	Pasadena[a]	Oakland	Los Angeles
Female	0.05	0.05	<.01
Latino	0.06	-0.05	0.04
Native American	0.03	-0.04	-0.01
Asian	-0.02	0.07	-0.01
African American	-0.04	0.01	-0.05
Pacific Islander	-0.03	-0.11	-0.02
White	<.01	0.04	0.02
Special Education[b]	–	-0.06	–
Gifted and Talented[b]	0.01	0.05	–
English Learner[b]	0.01	-0.16	–
ELA Score[b]	0.03	0.08	–
Math Score[b]	0.04	-0.08	–
Parent - No High School	0.02	0.02	<.01
Parent - High School Graduate	0.05	0.04	-0.01
Parent - Some College	-0.03	0.04	0.02
Parent – Associate's	-0.08	-0.01	0.00
Parent - Bachelor's	0.01	<.01	0.01
Parent - Graduate Degree	-0.01	0.01	<.01

[a] Because there were no pathway students in Pasadena who qualified for special education, we dropped 13 comparison students who qualified for special education.

[b] Because we were unable to link survey responses from Los Angeles to administrative student-level data from the district, we were unable to check for covariate balance on the items that we did not collect directly from the survey. Therefore, for Los Angeles, the mean standardized difference scores are missing for special education, gifted and talented, English learner, and test scores.

To estimate the differences between pathway students and similar peers, we used ordinary least squares regression (for continuous variables, e.g., Likert scales) or logistic regression (for binary variables, e.g., yes/no), with the propensity weights applied. We used a dummy variable for the student's district to control for fixed effects of each district and calculated clustered standard errors. Outcome *Y* for student *i* is given as

$$Y_i = \beta + (\mathbf{PW_i})\boldsymbol{\pi} + (\boldsymbol{X_i} - \bar{\boldsymbol{X}})\boldsymbol{\zeta} + \varepsilon_i$$

where:

Y_i = outcome *Y* for student *i*.

$\mathrm{PW_i}$ = dummy variable representing certified pathway classification.

X_i = vector of covariates, including district fixed effects and gender, race/ethnicity, and parental education for all districts. In Pasadena and Oakland, this also includes student's Math and ELA CST scores from the year before entering the pathway, as well as English language proficiency, special education status, and gifted and talented status; these variable were imputed for Los Angeles by using the mean from the original sample from that district. All variables were grand-mean centered.

The π coefficient therefore provided the estimate of the difference between pathway students and comparison students, controlling for all variables captured by X_i.

Because all covariates were grand-mean centered, our estimates predicted differences for an "average" student in the sample. We predicted models using a continuous outcome variable by using Stata 14's *regress* command. For models predicting binary outcomes (e.g., yes/no survey questions), we used the *logit* command. For logistic models, we transformed the estimates into probabilities to present in the main report but provide untransformed results in these appendix tables. We use the standard $p < .05$ threshold to determine statistical significance throughout this report; however, in Exhibits A-31 through A-44, we also note estimates that are marginally significant at $p < .10$.

Survey Results for Pathway Students

Exhibits A-31 through A-44 present all estimates for pathway students, along with their significance levels, the associated standard errors, and sample sizes at the student level.

Binary Outcomes for Pathway and Comparison Students

Exhibit A-31
Postsecondary Program

Enrollment in a 2- or 4-year program	**Pathway**
Point Estimate[a]	-0.06
SE	0.19
n	983

Exhibit A-32
Current Employment

Paid job?	**Pathway**	
Point Estimate[a]	-0.42	***
SE	0.13	
n	981	

~*p* < .10; *p < .05; **p < .01; ***p < .001

[a] Point estimates are presented in logits to allow for comparisons with standard errors of these estimates.

Exhibit A-33
Help With Obtaining Current Employment

Someone at HS helped me find job	**Pathway**	
Point Estimate[a]	0.20	
SE	0.34	
n	372	

Working professional helped me find job	**Pathway**	
Point Estimate[a]	1.33	**
SE	0.48	
n	338	

~*p* < .10; *p < .05; **p < .01; ***p < .001

[a] Point estimates are presented in logits to allow for comparisons with standard errors of these estimates.

Exhibit A-34
Benefits of Current Employment

Paid vacation	**Pathway**	
Point Estimate[a]	0.51	*
SE	0.26	
n	387	
Sick days	**Pathway**	
Point Estimate[a]	0.57	
SE	0.15	
n	388	
Health insurance	**Pathway**	
Point Estimate[a]	0.53	*
SE	0.22	
n	387	

~*p* < *.10;* **p* < .05; ***p* < .01; ****p* < .001

[a] Point estimates are presented in logits to allow for comparisons with standard errors of these estimates.

Exhibit A-35
College Transition Supports and Enrollment Status

New-student orientation	**Pathway**	
Point Estimate[a]	-0.77	***
SE	0.21	
n	821	
Summer program	**Pathway**	
Point Estimate[a]	0.19	
SE	0.15	
n	776	
Counseling from an adult	**Pathway**	
Point Estimate[a]	0.01	
SE	0.16	
n	790	
Student support groups	**Pathway**	
Point Estimate[a]	0.06	
SE	0.11	
n	770	

~*p* < *.10;* **p* < .05; ***p* < .01; ****p* < .001

[a] Point estimates are presented in logits to allow for comparisons with standard errors of these estimates.

Exhibit A-36
College Costs and Major or Program Focus

Out-of-pocket costs manageable?	**Pathway**	
Point Estimate[a]	-0.20	
SE	0.20	
n	821	
Declared major or program focus?	**Pathway**	
Point Estimate[a]	-0.50	**
SE	0.16	
n	825	
Idea about major or program focus?	**Pathway**	
Point Estimate[a]	0.50	
SE	0.44	
n	198	

*~p < .10; *p < .05; **p < .01; ***p < .001

[a] Point estimates are presented in logits to allow for comparisons with standard errors of these estimates.

Exhibit A-37
Choice of Major or Program Focus

High school courses sparked interest	**Pathway**	
Point Estimate[a]	0.51	**
SE	0.19	
n	772	
Counselor or other adult at school encouraged me	**Pathway**	
Point Estimate[a]	0.56	*
SE	0.24	
n	769	
Worked in field-related settings	**Pathway**	
Point Estimate[a]	0.61	**
SE	0.22	
n	771	

*~p < .10; *p < .05; **p < .01; ***p < .001

[a] Point estimates are presented in logits to allow for comparisons with standard errors of these estimates.

Continuous Outcomes for Pathway and Comparison Students

Exhibit A-38
Financial Aid

Financial aid challenging?	**Pathway**	
Point Estimate	0.14	~
SE	0.08	
n	790	

~*p* < .10; **p* < .05; ***p* < .01; ****p* < .001

Exhibit A-39
Remedial Courses Taken by Pathway Students

Math remedial course	**Pathway**
Point Estimate	0.01
SE	0.05
n	817

Reading remedial course	**Pathway**
Point Estimate	0.05
SE	0.07
n	803

Writing remedial course	**Pathway**
Point Estimate	0.06
SE	0.08
n	809

~*p* < .10; **p* < .05; ***p* < .01; ****p* < .001

Exhibit A-40
Current Employment: Job Autonomy and Complexity

Communicate with customers or the public	**Pathway**
Point Estimate	-0.34
SE	0.21
n	388
Make a presentation	**Pathway**
Point Estimate	-0.08
SE	0.22
n	388
Work in a group to achieve a shared goal	**Pathway**
Point Estimate	-0.02
SE	0.21
n	388
Contribute to reports or other written documents	**Pathway**
Point Estimate	0.19
SE	0.15
n	387
Summarize information from multiple sources	**Pathway**
Point Estimate	0.19
SE	0.16
n	386
Solve problems or develop possible solutions	**Pathway**
Point Estimate	0.01
SE	0.16
n	388
Use numbers to describe, analyze, or solve problems	**Pathway**
Point Estimate	0.10
SE	0.29
n	386

~$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

Exhibit A-41
Current Employment: Self Management

Manage my time well enough to complete all of my work	**Pathway**
Point Estimate	0.10
SE	0.11
n	388

Set goals for doing well at my job	**Pathway**
Point Estimate	0.15
SE	0.10
n	388

Take responsibility for the quality of my work or job performance	**Pathway**
Point Estimate	-0.04
SE	0.07
n	389

~*p* < .10; **p* < .05; ***p* < .01; ****p* < .001

Exhibit A-42
Current Employment: Initiative in Seeking Help

Ask my supervisor for help	**Pathway**
Point Estimate	0.08
SE	0.15
n	389

Ask my co-workers for help	**Pathway**
Point Estimate	0.00
SE	0.15
n	388

~*p* < .10; **p* < .05; ***p* < .01; ****p* < .001

Exhibit A-43
Role in Current Employment

Role in current job	**Pathway**
Point Estimate	-0.11
SE	0.09
n	388

~*p* < .10; **p* < .05; ***p* < .01; ****p* < .001

Exhibit A-44
Pay of Current Employment

Pay per hour	**Pathway**
Point Estimate	-0.27
SE	0.33
n	364

~*p* < .10; **p* < .05; ***p* < .01; ****p* < .001