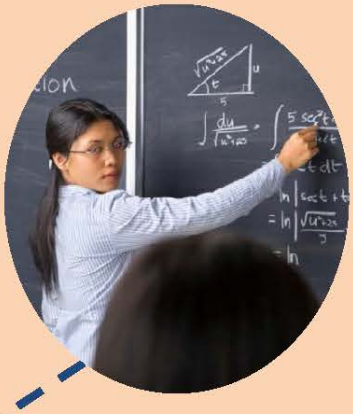
Taking Stock of the California Linked Learning District Initiative

Fourth-Year Evaluation Report



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Contents

Exhibits

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Executive Summary

This is SRI International's fourth annual evaluation report on the progress of the California Linked Learning District Initiative ("the initiative"). This report provides data on student engagement and achievement outcomes from eight of the nine districts participating in the initiative. In addition, the report offers lessons from the experiences of all nine districts; their successes and challenges with Linked Learning systems implementation over the past four years are highly instructive for districts that are just beginning to engage with or scale up Linked Learning. Given the planned expansion of Linked Learning into many more California districts through the state's new AB 790 Linked Learning Pilot Program, this is an appropriate time to reflect on what has been learned about creating systems of pathways.

KEY FINDINGS ON STUDENT OUTCOMES

Compared with similar peers, students in certified pathways make significantly more progress toward graduation each year.

Linked Learning aims to increase student engagement in school and ultimately improve high school graduation rates and increase successful transitions to a full range of postsecondary education opportunities, particularly for low-income and disadvantaged youth. We examined early indicators of pathway students' engagement in school, their progress toward high school graduation and college eligibility, and their gains in knowledge, statistically adjusting for their background characteristics and prior achievement. We highlight the 9th- and 10th-grade findings for which we could analyze the largest number of districts and cohorts, providing us with greater confidence in the findings.[1]

Our findings show that, compared with similar peers, students in certified pathways make significantly more progress toward graduation each year, though these differences in student behavior do not seem to lead to higher scores on standardized tests of English language arts and mathematics content knowledge. The most notable differences between pathway students and similar peers in their district are in the number of high school credits accumulated.

Engagement in School

Perhaps the most significant way Linked Learning differs from the traditional high school model is that it makes school more relevant for students. The core components of a Linked Learning pathway have the potential to increase students' engagement in school. We used two measures to assess student engagement: attendance and retention within the district. In five of eight districts, we found some evidence that students in certified pathways are more engaged than similar peers. Specifically:

- **Pathway students are as much as 7 percentage points more likely than similar peers to remain in the same district** through the 11th grade, indicating that pathways may be more likely to engage students such that they are motivated to remain in school.

[1] Student outcomes findings are based on data available from eight of the nine districts involved in the initiative. One district did not have any certified pathways at the time of analysis.

Success in School

Even if students are regularly attending school, they cannot progress through high school and toward college or career without successfully completing the necessary coursework. We examined students' progress toward high school graduation, as measured by course failures and credits accumulated. We also assessed students' progress toward college eligibility, as measured by completion of the coursework necessary to enter the California State University or University of California systems.

We found that students enrolled in certified pathways are making greater progress toward high school graduation than similar peers in 9th and 10th grade. These differences are meaningful because the average student in each district accumulated about 55 credits (roughly 25% of the credits needed to graduate) in each of these grades. Extra credits in these early grades may provide pathway students with a buffer against later failures.

- **9th-grade pathway students earn significantly more credits** than similar peers in all six districts with four-year pathways, ranging from 3.4 to 12.7 more credits.
- **10th-grade pathway students also do well on credit accumulation** (see exhibit). In seven of eight districts, they earn more credits than similar peers, ranging from 2.2 to 11 more credits.[2]
- **10th-grade pathway students in four of seven districts are 6-17 percentage points more likely than similar peers to be on track to complete the a-g courses** required for admission to California's public universities.[3]

Additional Credits Earned by 10th Grade Pathway Students Compared with Similar Peers

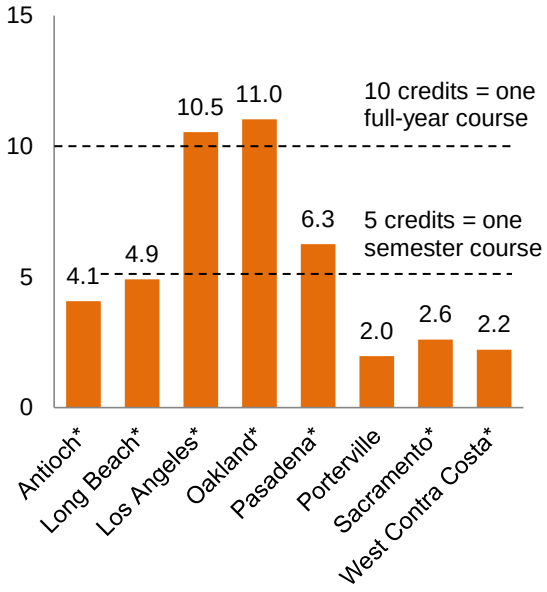

Exhibit Reads: 10th-grade pathway students in Antioch earn an estimated 4.1 more credits than the average student in the district.

Source: District-provided student data.

*Difference between pathway and district students is statistically significant at $p < .05$.

On balance, higher credit accumulation and a higher likelihood of being on track to complete college entrance requirements indicate that 9th- and 10th-grade students in certified Linked Learning pathways are making steadier and more significant progress toward high school graduation and college eligibility than their peers, with greater credit accumulation standing out as a particularly powerful finding.

[2] The estimate of the difference between the number of credits earned by pathway and comparison students for Porterville is not statistically significant.

[3] We did not have data to create an a-g on-track indicator for Sacramento. The estimates of the difference between the probability of being on track to complete the a-g requirements at the end of 10th grade by pathway and comparison students for Los Angeles, Oakland, and Porterville are not statistically significant.

Perceptions of Skills Gained

The success of Linked Learning pathways can be assessed in part through the academic gains referenced above. Also relevant, although more difficult to measure, are the 21st century skills and productive behaviors that students may gain from their pathway experiences. Recent research has focused on the importance of academic mindsets such as a sense of belonging, self-efficacy, a belief that ability and competence grow with effort, and perceived value and relevance of academic tasks for meeting future goals in predicting the perseverance and academic behaviors leading to student success in school (Farrington et al., 2012).

Although these mindsets are influenced and determined by many factors outside school, we asked 11th-graders to report on the extent to which they felt high school had helped them improve a range of skills and behaviors. In our student survey, pathway students were more likely than comparison students to report that high school has helped them:

- Improve their ability to work in a group to achieve a shared goal (62% versus 39%), to work with people in a professional setting (56% versus 33%), to make a public presentation or perform in front of a group (51% versus 31%), and to communicate with adults (40% versus 29%).

- Improve their ability to use information to make good decisions (64% versus 52%), conduct online searches to answer a question (57% versus 43%), summarize information from multiple sources (50% versus 38%), and judge whether they can trust the results of an online search (42% versus 26%).

- Develop productive mindsets such as seeing the benefits of doing well in school (65% versus 54%) and believing that they can learn something really hard if they try (58% versus 47%) or reach their goals with enough effort (66% versus 54%).

- Improve their knowledge of expectations for professional behavior (65% versus 51%), as well as their ability to create a job application letter or resume (40% versus 22%).

Regardless of whether all pathway students experience high school with a specific career goal in mind, equipping students with broadly applicable 21st century skills while nurturing productive behaviors may better engage students during high school and ultimately lead to their long-term postsecondary success.

KEY LESSONS FROM THE DISTRICT INITIATIVE

The nine districts' experiences directly inform a set of elements that are essential for Linked Learning implementation, including critical district structures, policies, and practices; necessary pathway components; and aligned external technical assistance, partnerships, and networking opportunities. Based on four years of evaluation research, we offer a set of essential elements for Linked Learning that can inform current and future districts' efforts to develop and sustain a system of pathways.

Essential District Structures, Policies, and Practices

During the 2012–13 academic year, we asked district and school administrators, pathway leads, coaches, and technical assistance providers to reflect on the systems, practices, and organizational structures that districts need to support and sustain a system of Linked Learning pathways. Respondents identified the following district-level elements as essential:

- A **common vision** for Linked Learning and collective buy-in for the goals of the initiative, including an explicit focus on student equity
- A comprehensive **communication plan** for sharing the vision
- Key leaders, including the superintendent, executive cabinet, and school board, who serve as **visible and public champions** of the effort and **actively demonstrate their commitment** by enacting supportive district and board policies, setting and enforcing expectations for educators, creating and improving data systems, and marshaling funds (e.g., for professional development and training, release time, work-based learning staff, instructional materials, technology)
- The presence of a **dedicated Linked Learning director** with the appropriate resources and positional authority to oversee implementation
- The active participation of a broadly representative **cross-district Linked Learning leadership team**.

Over the past four years, we have observed that implementation of Linked Learning systems is strongest in districts where top leadership support for the work has been consistent and broadly visible to all stakeholders and where districts have been willing to confront and change long-established norms and structures. Most important, a key lesson from the initiative is that districts must make structural and instructional shifts for successful implementation, and work on both elements must begin early on.

Essential Components of Linked Learning Pathways

Although Linked Learning is a district-level initiative and many issues that affect pathways require district-level policies and structures, the day-to-day experiences and interactions of pathway students and staff ultimately define Linked Learning. Respondents identified several essential elements at the school and pathway levels:

- Integrated academic and technical **coursework that is authentic and sufficiently rigorous** to achieve desired student outcomes
- **Work-based learning experiences that are well aligned** with the pathway theme and **sequenced** over time
- **Strong and active support from school leaders** who understand the core Linked Learning components
- **Pathway leads with sufficient time and/or support** to fulfill their instructional and administrative responsibilities
- A **team of pathway teachers who are committed to Linked Learning and voluntarily come together as a community of practice** to develop integrated curriculum, deliver high-quality instruction, and support students
- A **supportive master schedule** that allows for "pure" student cohorts that spend all or almost all of their school day moving through classes together and regular collaborative planning time for pathway staff
- **Active pathway-level advisory boards**, working alongside pathway leads and staff, that support curriculum development, assess student performance, and identify work-based learning opportunities.

Essential External Supports

As districts and pathways work to implement Linked Learning, they stand to benefit substantially from the knowledge, expertise, and previous experience of external partners. Essential external supports include the following:

- **District-level coaching** initially focused on building relationships, helping with planning, spreading the foundational knowledge of Linked Learning, getting key leaders on board, helping shift educators' mindsets to align priorities and supports with Linked Learning, helping district staff examine and confront traditional leadership structures and district practices that may impede systems development, and engaging a broad-based coalition
- **Pathway-level coaching**, either external or internal, that is tailored to a pathway's specific needs, as well as **technical assistance** on specific implementation issues (e.g., master scheduling, development of integrated projects)
- Partnerships with external business and community groups through district-level **broad-based coalitions** that can garner ongoing support and resources for work-based learning and sustain Linked Learning in the long term
- **Networking opportunities** within and across districts, especially when these opportunities allow time for individual pathway or district teams to collaborate and plan.

LOOKING AHEAD

As a major 21st century redesign of high schools with far-reaching implications for how a given district does business, Linked Learning can succeed and be sustained as a district-level initiative only when it is positioned and supported as a long-term priority. From our four years of evaluation, we have learned that a systemic approach requires tremendous up-front support from and planning by high-level district leaders who create and communicate a vision for Linked Learning, foster stakeholder buy-in, and establish supportive staffing, policies, and structures *before* shifting focus to the many details of pathway implementation. District coaching is especially important in these crucial early stages because coaches can draw on their previous experiences to help district staff identify the appropriate goals, strategies, and messages.

As soon as districts do begin to address pathway-level implementation, successful implementation demands that they attend to the instructional components of Linked Learning as early and as intensively as possible. While focusing on pathway structures (e.g., work-based learning) can be tempting, it is vital for stakeholders to keep in mind that structures by themselves are not sufficient to help students master academic content, the linchpin to improving student outcomes. Teachers need substantial time and training to develop, scaffold, and deliver high-quality, rigorous college- and career-preparatory curriculum; teachers' needs can become lost in the shuffle if not prioritized. To this end and in today's broader educational context, districts and technical assistance providers should take every opportunity to point out and leverage the synergies between Linked Learning-aligned instructional practices and the Common Core State Standards as teachers receive training to implement the new standards.

For districts just beginning to engage with Linked Learning, such as those participating in the AB 790 Linked Learning pilot, perhaps the most important lesson is to plan and prepare for a long-term commitment to changing how stakeholders think about secondary education and how they operate or engage with high schools. Building collective buy-in and creating Linked Learning-aligned structures and instructional practices requires patience—beginning with major investments

of time and energy to create and communicate a clear Linked Learning vision and message—but pays dividends in terms of smooth implementation and sustainability.

For districts continuing with Linked Learning, an important lesson from the initiative is that large-scale reform is a continuous improvement process. The essential elements outlined in this report and in ConnectEd's district framework can provide reference points to re-assess district progress as a whole, looking beyond individual pathway certification as a metric of success with Linked Learning. Districts that are several years into Linked Learning implementation can still benefit from taking the time to examine whether and where there are areas to refine their efforts—for example, by refocusing a district's common vision for Linked Learning, tightening a communication plan, or solidifying district policies and structures.

For funders, technical assistance providers, and the field more broadly, there is a critical take-away: Although Linked Learning takes years of time, money, and sustained effort to implement fully as a district initiative, there are early indicators that can signal a district's trajectory toward long-term success and sustainability. Our evaluation has confirmed that the elements The James Irvine Foundation and ConnectEd identified early on when selecting the nine districts to participate in the initiative—e.g. evidence of support from the district's board, superintendents, and principals; aligned district policies and practices—are indeed among the most essential. Funders and partners can assess a district's progress in the early years toward developing the vision, communication, leadership structures, policies, and other conditions for successful Linked Learning implementation based on lessons learned from the district initiative. They can then use this information to provide guidance to the districts they are supporting and make informed decisions about continued investment.

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The team evaluating the Linked Learning District Initiative has been carefully documenting implementation of systems of pathways in six districts for four years and in another three districts for three years. Reflecting on the progress made by the nine districts involved in the initiative, we find that two districts have pursued a particularly successful implementation trajectory since the first year. These two districts are very different, but each has taken the resources offered through the initiative and successfully adapted them to its particular context, gradually building an identifiable system of Linked Learning pathways district-wide. A third district had a rocky start, and in Year 2 we would have predicted that successful systemic reform seemed unlikely there. Now, in Year 4, this district has made policy and staffing changes that turned its implementation story around. The key lesson from these three sites is that as Linked Learning expands, the implementation context will be different in each district, but the possibility of success will always be present, particularly if districts that are just beginning to implement Linked Learning pay attention to the lessons learned by their predecessors.

Chapter 1: Introduction

This is SRI International's fourth annual evaluation report on the progress of the California Linked Learning District Initiative ("the initiative"). This report provides new data on student engagement and achievement outcomes from eight of the nine districts participating in the initiative. In addition, the report offers lessons from the experiences of all nine districts; their successes and challenges with Linked Learning systems implementation over the past four years are highly instructive for districts that are just beginning to engage with or scale up Linked Learning. Given the planned expansion of Linked Learning into many more California districts through the state's new AB 790 Linked Learning Pilot Program, this is an appropriate time to reflect on what has been learned about creating systems of pathways.[4] This report draws on the rich data SRI International has collected over the past four years to assess progress and challenges with Linked Learning implementation, to examine student outcomes associated with Linked Learning participation, and to distill key lessons learned.

About Linked Learning and the District Initiative

Since 2006, The James Irvine Foundation ("the Foundation") has been making a significant investment 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, wholly engaging experience and open them to college and career opportunities they never imagined.

The Linked Learning approach builds on the more than four 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

Core Components of the Linked Learning Approach

Linked Learning combines four elements designed to support student success:

Rigorous academics *– An academic core that includes college preparatory English, mathematics, science, history and foreign language courses for all students.*

Real-world technical skills *– A challenging career-based component of three or more courses to help students gain the knowledge and skills that can give them a head start on a successful career.*

Work-based learning *– A series of work-based learning opportunities that begin with mentoring and job shadowing and evolve into intensive internships, school-based enterprises or virtual apprenticeships.*

Personalized support *– Services including counseling and supplemental instruction in reading, writing and mathematics that help students master academic and technical learning.*

[4] The Linked Learning Pilot Program was authorized by Assembly Bill 790 (Furutani), passed by the California State Legislature in 2011. The program, managed by the California Department of Education, involves 63 local educational agencies.

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

connect learning in the classroom with real-world applications outside school.

In 2009, the 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, is the primary intermediary and technical assistance provider. Numerous other partners support the initiative, including the Stanford Center for Opportunity Policy in Education, the Los Angeles Small Schools Center, National Academy Foundation, the Career Academy Support Network, and The Education Trust—West.

The Foundation is supporting the nine demonstration districts in developing systems of career pathways that are available to all high school students, with students selecting their pathway. The initiative serves 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.

In this fourth annual evaluation report, we look back at the development of Linked Learning systems in the nine districts and examine their experiences to assess the initiative's progress toward reaching its systems- and student-level goals. The lessons learned from these nine districts can inform other districts that are beginning to implement Linked Learning.

Status of the District Initiative

The nine districts participating in the Linked Learning District Initiative vary in size, from close to 14,000 to more than 650,000 students, and represent a variety of geographic regions across California. All have a high proportion of disadvantaged students. Collectively, the nine districts serve more than 315,000 high school students, or 16% of the roughly 2 million high school students enrolled in California public schools. All have 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.[5] More than three-quarters of the students in each of these districts are nonwhite, and over half are socioeconomically disadvantaged, with poverty rates ranging from 60% to 81%.[6] Exhibit 1-1 summarizes student demographic and achievement data for the nine districts.

[5] 2012 Base API. The source for all demographic and achievement data cited here is the California Department of Education.

[6] Based on the percentage of students who qualified for free or reduced-priced meals in 2010–11.

Exhibit 1-1
Demographic and Achievement Profile of Linked Learning Districts, 2012–13

District	High School Enrollment[a]	Minority[b] (%)	English Language Learner (%)	Poverty[c] (%)	Graduation Rate (%)		CAHSEE Pass Rate[d] (%)				Certified Pathways	
					2011	2012	2012 Math	2012 ELA	2013 Math	2013 ELA	Number	Percentage Enrolled[e]
Antioch Unified	6,132	80	3	60	74	75	78	81	78	82	3	21
Long Beach Unified	26,521	85	4	70	78	80	84	81	82	79	5	10
Los Angeles Unified[f]	201,015	91	5	77	65	67	70	69	79	79	3	1
Montebello Unified	10,408	98	6	76	81	80	76	75	75	78	0	0
Oakland Unified	12,045	91	5	81	58	59	42	39	50	42	3	5
Pasadena Unified	5,807	84	3	68	76	79	82	83	77	80	4	25
Porterville Unified	6,206	85	6	80	78	80	81	80	77	74	6	22
Sacramento Unified	13,283	81	4	71	75	80	83	81	76	73	5	11
West Contra Costa Unified	8,464	89	6	66	77	76	70	75	73	72	4	10

Source: California Department of Education (CDE).

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

b Percentage of all students who do not identify as "White, not Hispanic," including students whose ethnic designation is listed as "not reported."

c Based on the percentage of students who qualified for free or reduced-priced meals in 2012–13.

d The California High School Exit Examination (CAHSEE) passing rates are based on the March exam date for 10th-grade students for 2011–12 and 2012–13 for all districts except Porterville and West Contra Costa. CAHSEE passing rates for Porterville and West Contra Costa are based on a February exam date for 10th-grade students for 2011–12 and 2012–13. ELA is English language arts.

e Percentage of high school students in the district enrolled in certified pathways. According to a communication with ConnectEd (August 12, 2013), the majority of the enrollment data are from 2011–12.

f Profile is for all of LAUSD. 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 district-wide initiative.

In 2010, ConnectEd developed and began using a tool and process to certify the quality of individual career pathways along the dimensions of design, engaged learning, system support, and evaluation and accountability. ConnectEd and the Linked Learning partners are using the certification process to establish and support examples of programs that implement Linked Learning with high quality and fidelity, either those that are part of the district initiative or individual schools or programs outside of the initiative. Exhibit 1-2 lists the 33 pathways ConnectEd had certified as of July 2013 in the nine districts.

Exhibit 1-2
Linked Learning Pathways Meeting Certification Criteria as of 2012–13

District	Certified Pathways	School Types[a]	Certification Year	Pathway Enrollment
Antioch Unified	Health Science and Medical Technology at Dozier-Libbey Medical High School	Small school	2010–11	499
	Engineering and Designing Green Environments (EDGE)	SLC[b]	2012–13	337
	Law & Justice Academy	SLC[c]	2012–13	292
Long Beach Unified	Architecture, Construction and Engineering Academy (ACE)	SLC[c]	2009–10	245
	California Academy of Mathematics and Science	Small school	2010–11	642
	Community of Musicians, Performers, Artists, and Social Scientists (COMPASS)	SLC	2010–11	680
	PEACE Academy	SLC	2010–11	780
	Media and Communication	SLC	2012–13	289
Los Angeles Unified	Los Angeles High School of the Arts	Small school	2011–12	380
	Los Angeles School of Global Studies	SLC	2011–12	360
	New Media Academy	SLC	2012–13	450
Oakland Unified	Life Academy of Health and Bioscience	Small school[c]	2010–11	189
	Media College Preparatory	Small school[c]	2010–11	263
	Education Academy	SLC[c]	2011–12	108
Pasadena Unified	Arts, Entertainment and Media Academy	SLC[c]	2010–11	487
	Business and Entrepreneurship Academy	SLC[c]	2010–11	383
	Creative Arts, Media, and Design Academy	SLC	2010–11	236
	Engineering and Environmental Science Academy	SLC[b]	2012–13	332

Exhibit 1-2
Linked Learning Pathways Meeting Certification Criteria as of 2012–13 (concluded)

District	Certified Pathways	School Types[a]	Certification Year	Pathway Enrollment
Porterville Unified	Partnership Academy of Business	SLC[b,c]	2010–11	203
	Engineering Academy	SLC[b]	2010–11	228
	Multimedia Technology Academy	SLC[b,c]	2011–12	219
	Partnership Academy of Health Science	SLC[b,c]	2011–12	250
	Performing Arts Academy	SLC	2011–12	250
	Digital Communication and Design Academy	SLC[b]	2012–13	128
Sacramento Unified	Health Professions High School	Small school[d]	2010–11	467
	New Technology High School	Small school	2010–11	304
	Johnson Corporate Business Academy (JCBA)	SLC[b,c]	2012–13	261
	The MET	Small school	2012–13	255
	School of Engineering and Sciences	Small school[b]	2012–13	184
West Contra Costa Unified	Multimedia Academy	SLC[c]	2010–11	313
	Law Academy	SLC[c]	2010–11	206
	Engineering Academy	SLC[b,c]	2011–12	182
	Health Academy	SLC[c]	2012–13	196

Source: Communication from ConnectEd (July 15, 2013). Enrollment data are from 2011–12 except for pathways certified in 2012–13. There are no certified pathways in Montebello.

[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 the National Academy Foundation (NAF).

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

[d] Magnet school.

Fourth-Year Evaluation Activities

In 2009, the Foundation commissioned the Center for Education Policy at SRI to conduct a rigorous multiyear evaluation of the initiative. SRI is assessing the nine districts' implementation of the Linked Learning pathways and analyzing outcomes for students participating in them. SRI is using a multimethod research design that includes qualitative and quantitative data collection and analysis. The following key research questions guide the evaluation:

- What structures, policies, and supports facilitate the implementation and institutionalization of a districtwide system of high-quality pathways, and what challenges do districts face in implementing such systems?
- How do districts support the implementation of pathways, and what challenges do pathways face in implementation?
- What are the educational experiences and outcomes for students participating in pathways?

This evaluation report draws on three sources of data:

1. Qualitative data, including telephone interviews with ConnectEd coaches and Linked Learning technical assistance providers, and annual site visits to the nine districts that include interviews with key district and school staff, focus groups with pathway leads, and focus groups with primarily 11th-grade pathway students.

2. Annual student surveys that provide information on students' experiences in high school as well as their aspirations and goals, including a survey administered in spring 2013 of 11th-graders in certified pathways and comparison students.[7]

3. Student demographic and achievement data provided by eight of the districts that enable us to compare student engagement and achievement outcomes metrics for students in certified pathways with their peers.[8]

Appendix A provides detail about the data sources and analysis in this report.

Report Overview

We begin in Chapter 2 by describing the progress the nine districts have made in developing a system of Linked Learning pathways, noting their efforts to build capacity to sustain the reforms long-term. In Chapter 3, we turn to the progress pathways have made in developing the core Linked Learning components. Chapter 4 discusses the staffing and structures at the school and pathway levels that have supported or impeded the implementation of Linked Learning. Moving from the development of Linked Learning at the district and pathway levels, in Chapter 5 we describe pathway students' perspectives on their development of a variety of skills and competencies, and in Chapter 6 we compare engagement and achievement for pathway students and their peers. The final chapter distills the findings from four years of evaluating the initiative to offer a set of essential elements for districts initiating or expanding a system of Linked Learning pathways.

[7] In spring 2013 we surveyed 11th-graders in all pathways certified as of the 2011–12 school year, as well as comparison students in eight of the nine districts. Because Montebello did not have any certified pathways as of the 2011–12 school year, we surveyed students in the four most advanced pathways there but did not survey comparison students; we do not include the responses of Montebello pathway students with those of students from certified pathways.

[8] Data for all districts except Los Angeles came through a third party, the Institute for Evidence-Based Change. Montebello did not have any certified pathways as of the 2012–13 school year, so Montebello data are not included in this portion of the analysis. Providing all the specific data elements needed for the analysis also posed a challenge for the districts, which often house data elements in different systems. Districts are developing systems for flagging and tracking pathway students and for reporting data elements not previously captured, such as pathway enrollment.

Chapter 2: District Systems and Capacity Building

Key Findings

- Implementation of a system of Linked Learning pathways is strongest in districts where top leadership support has been consistent and broadly visible to all stakeholders. Some district superintendents have been visible and public champions of Linked Learning, while schools boards remain a largely untapped resource in most districts.
- Districts that have achieved the broadest buy-in for Linked Learning have communicated a widely-shared vision and commitment to the approach and established concrete goals and actionable strategies.
- By providing the Linked Learning director with high-level authority or direct access to decisionmakers and surrounding the director with a supportive team, districts have been able to ensure Linked Learning remains a key district priority that receives consistent attention.
- Districts that have made the most progress aligning leadership and systems to Linked Learning have been willing to confront and change long-established organizational norms and structures and have created accountability for Linked Learning implementation.
- District coaches have played a crucial role in helping district staff examine and confront leadership structures and district practices that impede systems development.
- Districts are realizing that successful and equitable implementation of a system of Linked Learning pathways requires early, close, and systemwide attention to instructional as well as structural changes.
- To expand the support base for Linked Learning, districts have developed comprehensive communications plans, distributed leadership structures, and/or broad-based coalitions of stakeholders.

During the past four years, the nine districts in the Linked Learning District Initiative have made substantial progress in developing Linked Learning systems. Several districts have high-level leaders who champion Linked Learning and have made the approach the centerpiece of their high school reform efforts; have increased internal capacity for supporting pathway development by hiring Linked Learning-dedicated staff; and have begun the task of changing instructional practice. Districts that have recently adopted the Linked Learning approach and are in the early stages of developing districtwide systems of pathways have much to learn from the pioneering experiences of these nine diverse districts.

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. This chapter examines how districts have developed supportive structures for Linked Learning, such as district leadership, vision, and effective communication. We then discuss district efforts to sustain Linked Learning by developing internal capacity and distributed leadership, as well as external support from industry and community partners.

Active 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 (both the superintendent and the school board) 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. Early in the process, districts benefit greatly from leaders who are willing to examine existing administrative and leadership structures that might impede systematic implementation, and who are able to attend simultaneously to instructional and structural reforms that are key to the Linked Learning approach.

Implementation of a system of Linked Learning pathways is strongest in districts where top leadership support has been consistent and broadly visible to all stakeholders. Some district superintendents have been visible champions of Linked Learning, while school boards remain a largely untapped resource in most districts.

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. Each district in the Linked Learning District Initiative was chosen to receive an implementation grant because of foundational work the district could build on, such as isolated California Partnership Academies (CPAs) or small learning communities (SLCs) that could be developed into Linked Learning pathways. Over time, Linked Learning has become more central to each district's high school reform efforts in part because of the support and involvement of key leaders, particularly district superintendents. In this initiative, some superintendents have been much more visible champions of Linked Learning than others—they serve as active spokespersons, publicly speaking about Linked Learning at every opportunity; they have aligned Linked Learning with other district priorities (e.g., the Common Core State Standards); and they regularly participate in Linked Learning professional development events. It is in the districts with the most active and visible superintendent support that we observe the greatest support and buy-in for Linked Learning systemwide and the most progress with implementation.

In a few districts, turnover at the superintendent level has slowed buy-in as the new leaders learn about Linked Learning and determine how it fits in with other priorities. Yet superintendent turnover also can be an opportunity to focus attention on Linked Learning. In Los Angeles, for example, the hiring of a new superintendent in 2011 and recent district reorganization have helped create conditions to prioritize Linked Learning. Linked Learning is now emphasized in major communications and fundraising efforts, and the Linked Learning director now has better access to key decisionmakers.

While some superintendents have been active in promoting Linked Learning, school boards have been a largely untapped resource in nearly all districts. The primary technical assistance providers (ConnectEd and the Stanford Center for Opportunity Policy in Education) tried to engage superintendents as champions of the initiative, but school board engagement has been less of a focus of coaching and professional development. The experience of the nine districts has shown that *both*

the superintendent and the school board should be active participants at the outset of the initiative because of their joint ability to enact supportive policies, approve resources, and signal leadership support (e.g., set expectations for educators' roles and responsibilities for implementing Linked Learning, create targets for student enrollment in pathways).

Certain isolated examples of school board activism are worth noting. For example, in West Contra Costa, two school board members participated in a steering committee tasked with educating community members about Linked Learning. The school board members deliver updates about Linked Learning as a standing agenda item for board meetings—an action that has increased awareness of Linked Learning as a key district initiative. The two school board members have also attended many Linked Learning-related activities, such as ConnectEd's district leadership series, and have made it publicly known that they support the initiative. In this way, engaged school board members who are active supporters of Linked Learning can increase visibility for the initiative in the community and keep the full school board informed about Linked Learning implementation progress and key successes, actions that support long-term sustainability of the initiative.

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

A key objective of the initiative is for district and school leaders to develop a shared vision among educators and the community that positions Linked Learning as the primary strategy for transforming secondary education. However, a clear vision for change needs to coalesce around concrete goals and actionable strategies for turning the goals into reality. It has taken the nine districts several years to specify long-term goals for Linked Learning (e.g., 50% of students enrolled in a high-quality Linked Learning pathway in five years) and to develop an aligned and comprehensive set of strategies that guide implementation.

ConnectEd, as the central technical assistance provider for the initiative, has been keenly aware that districts need concrete ways to make Linked Learning a reality. One effective strategy has been to promote the graduate profile as a critical element of a shared vision 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, 2012a). All nine districts are in various stages of developing and finalizing a districtwide graduate profile. In several districts, graduate profiles serve as a vehicle for stimulating discussions among educators and sometimes the broader community. In Antioch, for example, work on the graduate profile at the November 2011 ConnectEd district residency helped one district administrator see that the work the Linked Learning director was taking on was much bigger than Linked Learning pathways—it involved K–12 education and secondary instruction—and has huge implications for the district and community as a whole. Since then, communication among district administrators and the Linked Learning director has been more purposeful. The graduate profile in Porterville started as a way for pathways or high schools to describe what graduates would look like, but now has become a guide for student development from kindergarten through grade 12. In Porterville, development of the profile included a broad array of stakeholders; rubrics based on the graduate profile have been developed for student assessment at all grade levels.

The Long Beach school board set a goal of having 90% of the district's SLCs certified as Linked Learning pathways by 2016. This sent a strong message to school staff that Linked Learning was a district priority.

Setting actionable goals as district policy can signal commitment to Linked Learning in a very public

way. For example, in June 2011 the Long Beach school board adopted a new five-year strategic plan that set a goal of having 90% of the district's SLCs certified as Linked Learning pathways by 2016. This goal sent a strong message to school staff that Linked Learning was a district priority and that all high schools were to include Linked Learning pathways. Similarly, the Montebello school board demonstrated its support for Linked Learning by adopting a resolution during the 2011–12 school year stating that 50% of all high school students would be in a pathway program by 2015–16. In both cases, the actions of the school board offered credence to the administration's commitment to support Linked Learning over the long term. The impact of the board's actions was especially pronounced in Long Beach, where district administrators instituted and actively monitor a process for moving schools toward achieving the pathway certification target set by the board. School staff in Long Beach complete an assessment of their pathway against 10 essential Linked Learning criteria identified by the district (a subset of ConnectEd's certification criteria) and develop an action plan to meet these criteria. District staff regularly track progress and identify ways they can support pathways in reaching certification. Reinforcement of the strategic plan goal is providing traction to move 40 pathways toward certification.

Establishing clear goals and a process for ensuring that staff meet those goals is one way districts can support change. Another is the ability to identify and willingness to remove obstacles to implementation progress.

By providing the Linked Learning director with high-level authority or direct access to decisionmakers and surrounding the director with a supportive team, districts have been able to ensure Linked Learning remains a key district priority that receives consistent attention.

Lines of authority, decisionmaking, and communication often must be analyzed and adjusted to accommodate information flow and clarify roles and responsibilities to facilitate the implementation of new initiatives. A question that emerged for some districts was where to place the leadership and staff for the Linked Learning initiative within the district organizational hierarchy. A district administrator commented,

> *It's kind of like whatever people are champions of this work, they need to be positioned in the district in the right places so that they have access and entry into the different constituencies. …How do you give people position so they can work with other leaders? Who's the leader? That's one of the key challenges with any kind of program. Figuring out where do you place it and figuring out who they need to be working with... .*

Linked Learning directors who have had the most influence over and effectiveness with the initiative have either been in a position to participate in high-level planning and decisionmaking or have had direct access to high-level decisionmakers. This structuring of the Linked Learning director position has not been the norm everywhere. Problems in appropriately situating Linked Learning can take time to resolve, and it has taken some districts multiple attempts to find the right home for the initiative.

A further consideration is the need for a dedicated Linked Learning director with a district team who can support the implementation of Linked Learning pathway components (e.g., work-based learning, curriculum development, student supports). This is especially important during the early years of implementation to carry out the district's Linked Learning plan. Even smaller districts have staff members, such as internal or pathway coaches and work-based learning coordinators, who work under the Linked Learning director and are dedicated primarily to supporting the initiative.

Districts that have made the most progress aligning leadership and systems to Linked Learning have been willing to confront and change long-established organizational norms and structures and have created accountability for Linked Learning implementation.

Truly transforming secondary education to improve teaching and learning means changing the usual way districts conduct business. Taking a systems approach to developing and implementing pathways challenges a number of traditions and expectations that, even after four years, both district and school staffs are still learning to navigate. Beyond establishing the positional authority of the Linked Learning director, norms and structures that require examination include principal accountability mechanisms and the district's history of school autonomy.

In comprehensive high schools that contain pathways, school leaders have been best positioned to support pathways when they have the same understanding of, vision for, and commitment to Linked Learning as district leaders. Districts have worked on achieving principals' buy-in by developing their conceptual understanding of Linked Learning and providing them with technical assistance on implementation. In several districts, principals' buy-in has been strengthened by including them on the district leadership team, providing professional development on how to implement Linked Learning components, and holding them accountable for the quality of Linked Learning implementation in their schools (e.g., replacing principals who are not sufficiently supportive of Linked Learning).

Further, research has shown that the successful implementation of reform hinges on a delicate balance between centralized and decentralized control (Marsh, 2000). To facilitate implementation of Linked Learning pathways, district leaders have had to consider traditional relationships between the district office and its high schools. Districts in the initiative have sometimes experienced difficulty in finding the appropriate balance between accountability and autonomy of pathway programs. One reason for this imbalance is a strong tradition of school autonomy in some districts; efforts to bring schools into alignment with a Linked Learning systems approach have sometimes been at odds with the autonomy that these schools had in the past (e.g., for curriculum, staffing, professional development). At the same time, if district staff have not yet established a comprehensive set of strategies to support the implementation of Linked Learning pathways, school staff can feel as if the district is not holding up its end of the implementation process and may even resent the changes they are being asked to make. Ongoing communication with school staff is one way that district staff members have tried to address the transition to greater school-level accountability for pathway implementation. The importance of creating transparency through communication is explored in more depth later in this chapter.

Linked Learning leaders frequently mentioned the importance of their coaches' facilitation roles and discussed the value of coaches' ability as outsiders to get people to consider a different perspective.

District coaches have played a crucial role in helping district staff examine and confront leadership structures and district practices that impede systems development.

When people are inured to organizational norms and structures, an outsider's perspective can help identify roadblocks to change. ConnectEd district coaches have played this role in the initiative. District coaches have focused on building relationships across entities, spreading the foundational knowledge of Linked Learning among district leaders, shifting educators' mindsets to align priorities and supports with Linked Learning, and getting educators on board (e.g., staff from different departments, new superintendents). District staff value their district coaches for being

"sounding boards" and "reflective partners" and for helping to push them to the next level. As a district administrator reflected,

> *I think without ConnectEd, our level of implementation and how we sustain the program would not be the same. I don't know that we would have continued to grow in the manner that we have. The guidance they provide is just key and I'm grateful.*

Similarly, an administrator in another district characterized the district coach as a "thought partner…[who] pushes us to [do] things that we are not good at or we haven't thought of." Linked Learning leaders frequently mentioned the importance of their coaches' facilitation roles and discussed the value of coaches' ability as outsiders to get people to consider a different perspective. Feedback from district leaders indicates that district coaching has proved absolutely critical to help accelerate the work of developing a Linked Learning system.

Districts are realizing that successful and equitable implementation of a system of Linked Learning pathways requires early, close, and systemwide attention to instructional as well as structural changes.

Linked Learning calls for new ways of teaching to engage students and prepare them for college and careers through its four core components. While changing the learning experience for students is at the heart of this initiative, district leaders did not begin to address instruction at the outset. Four years into implementation, districts are still working to integrate an interdisciplinary and rigorous Linked Learning-aligned instructional approach into daily instruction. They have learned that they need to address structural and instructional change in tandem rather than sequentially.

Further, districts are recognizing that when they place primary responsibility on pathway staff for addressing issues related to teaching, learning, student assessment, and student outcomes, they increase the risk of creating inequities across pathways and schools. To avoid the tendency to view changing curriculum and instruction as primarily a school- and pathway-level responsibility, district leaders and technical assistance providers have found that they need to focus on the key role that district staff play in ensuring the quality of teaching and learning across pathways In the Linked Learning initiative, technical assistance activities did not initially address instructional issues; these became much more of a focus in the third year of implementation. Reflecting on this history, one technical assistance provider commented,

Districts are recognizing that when they place primary responsibility on pathway staff for addressing issues related to teaching, learning, student assessment, and student outcomes, they increase the risk of creating inequities across pathways and schools.

> *I do think we need to be more intentional about starting with changes in instructional strategies first and backing into the structures. It's kind of a chicken and egg thing in that you can't do one thing without the other. But if there is no purpose for the structure change, then it's hard to get it to happen.*

Broadening the Support Base for Linked Learning

The sustainability of any education reform requires that people understand what the reform is trying to accomplish and that the end result reflects the beliefs and values of participants and the larger community. District leaders' efforts to implement Linked Learning can be enhanced and strengthened by effectively engaging stakeholders across the system and within the community through a comprehensive communication plan and a distributed leadership structure. The ConnectEd *Framework for Developing a System of Linked Learning Pathways* (Stearns, 2012b) calls for a

clear communication plan and the use of consistent language by district, community, and school site leaders to articulate their vision of Linked Learning—a step that has great value but requires considerable attention. Districts have also found that removing organizational and policy barriers to Linked Learning implementation was much easier if the Linked Learning leadership team included representatives from a broad range of departments.

During the early years of the initiative, districts did not create formal communication plans and structures, but have since learned that such efforts are necessary to achieve transparency and widespread buy-in for Linked Learning.

Montebello implemented and continues to refine a strong messaging and communications strategy targeted to a wide range of stakeholders, with a particular emphasis on informing parents, students, and teachers.

During the planning and early implementation stages of the initiative, district Linked Learning leaders directed their outreach efforts toward a broad base 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 personnel occurred. Specifically, districts did not create adequate communication structures for regularly engaging with and involving site leaders, teachers, or outside stakeholders in Linked Learning decisions; clarifying individuals' responsibilities for Linked Learning; or providing frequent progress updates to key stakeholders. Over the course of the initiative, district leaders have realized that mastering communications with a broad range of stakeholders requires a well-thought-out communication strategy or plan.

As an example of doing it right, Montebello implemented and continues to refine a strong messaging and communications strategy targeted to a wide range of stakeholders, with a particular emphasis on informing parents, students, and teachers.

- Early on, district leaders undertook a variety of public relations and communications efforts to educate stakeholders about Linked Learning and to inform them about the district's shift in its educational approach for high school students.
- District staff worked with a communications consultant to develop a flyer to inform K–12 teachers about Linked Learning with the hope that, over time, knowledge and buy-in would grow as pathways expanded. More recently, the district collaborated with a marketing company on an advertising campaign that includes a variety of talking points and media tailored to different stakeholder groups.
- The pathways director maintains standing agenda items for multiple meetings with district and school staff.
- To inform students and parents about pathway options, the district uses an extensive array of media and outreach strategies that boost pathway recruitment every year.

In 2012–13, the Foundation hired a private communication firm to support districts with branding and communication strategies. Early indications are that districts are pleased with the content and utility of the communication materials and training they have received. For example, the communications firm conducted a presentation with district staff in Oakland on Linked Learning messaging. The staff learned how to do "elevator speeches" about Linked Learning, and according to a Linked Learning staff member, the communication firm "got everybody on the same page about what we should be saying." Administrators stated that they wished they had these materials early in the initiative.

Districts that adopted a distributed leadership structure across key departments have achieved more staff buy-in and made more progress on Linked Learning implementation.

Systems change is complex and requires leadership participation from all the major departments within the district. According to research on effective districts, a systemwide, comprehensive approach for reaching district goals entails expanding leadership to encompass the superintendent, principals, teacher leaders, and other administrators at the district and school levels (Marsh et al., 2005; Snipes, Doolittle, & Herlihy, 2002; Supovitz, 2006; Togneri & Anderson, 2003). At the district level, for Linked Learning to be viewed as something more than just another reform, it should be the priority of and championed by all district offices. Linked Learning cannot be the responsibility of just one individual such as the Linked Learning director (as important as that role is); nor can it be siloed within a single department. The Linked Learning director and team are essential in moving the work forward, but they cannot be the only staff advancing implementation. Sustainability and buy-in are achieved through distributed leadership of Linked Learning.

The Long Beach Linked Learning leadership team includes members representing curriculum and instruction, CTE, professional development, student support services, education technology, human resources, middle schools, principals, work-based learning, AVID, and research and evaluation.

Some districts in the initiative have long-standing collaborative administrative cultures that facilitate distributed leadership. For example, communication among Long Beach stakeholder groups follows the district's distributive leadership approach that deemphasizes traditional hierarchy in favor of a more inclusive model. The Long Beach Linked Learning leadership team includes members representing curriculum and instruction, Career Technical Education (CTE), professional development, student support services (counseling, special education), education technology, human resources, middle schools, principals, work-based learning, AVID (Advancement through Individual Determination), and research and evaluation. In addition, the project director for the initiative is the project director for the district's SLC initiative, which established wall-to-wall SLCs in all but one of the district's high schools. An executive team, which includes members of the superintendent's cabinet, works with the project director to maintain alignment among all high-priority district initiatives. At the school level, pathway leadership teams provide a mechanism for including school staff in the reform effort by establishing school structures, policies, and instructional practices to implement Linked Learning elements.

Other districts have had to work hard to create effective leadership structures, and these structures continue to evolve. The experiences of one district offer a caution about the dangers of making Linked Learning implementation the primary responsibility of a single person. In this district, efforts to expand leadership to other districts administrators have not been successful in large part because some administrators have not fully bought in to the Linked Learning approach. Pathway leads expressed concern that the Linked Learning director is the only district leader who really understands Linked Learning and that if the director were to leave the district, Linked Learning would not be easy to sustain.

Experience has shown that a broad-based Linked Learning leadership team can also facilitate the removal of structural barriers that can derail Linked Learning implementation goals. A case in point involves student choice policies and practices and their impact on enabling all students to make an informed and equitable choice among pathways. Districts' pathway recruitment, choice, and enrollment practices must be aligned with Linked Learning goals; district staff who oversee these policies must understand how they impact student enrollment in pathways. For example, we

observed that without a districtwide choice system that governs how students select and enroll in pathways, students who do not actively make a choice are assigned to a neighborhood school or another school with available space that may not have pathways or pathways of interest to them. If the office that oversees district choice policies does not actively engage in pathway recruitment activities, the information students receive about each pathway can be inconsistent. District transportation policies also affect the accessibility of pathways—without reliable transportation, districtwide choice of pathways cannot be operationalized.

District human resource policies and practices offer another example—hiring and layoff protection policies need to prioritize Linked Learning staff, particularly at the pathway level, because the stability of school and pathway staffing threatens the progress of pathway development. Several districts in the initiative have sought ways to protect pathway staff from layoffs because of their particular expertise and knowledge of Linked Learning. In Pasadena, Linked Learning staff worked with the human resources department to come up with a pathway lead job description that enabled one school to hire back its pathway lead. The school board adopted a resolution sought by the Pasadena superintendent and Linked Learning office to retain school staff for whom a significant investment (a minimum of 25 hours) had been made in Linked Learning professional development.

Growth and Sustainability of Pathways

In addition to the support of multiple departments within the district, Linked Learning sustainability requires widespread stakeholder understanding and commitment beyond the school system. Districts in the initiative were encouraged to develop a broad-based coalition (BBC) of key stakeholder groups (e.g., postsecondary institutions, business and civic organizations, community-based organizations, advocacy groups) that would develop and maintain a vision for Linked Learning, dedicate resources to further the vision, create an infrastructure to support work-based learning opportunities, and sustain Linked Learning. While all districts have engaged external partners in their Linked Learning efforts to some degree, most have been slow to develop their BBCs. Establishing a BBC as ConnectEd envisioned—to utilize the expertise, influence, and contributions of a full range of local and regional partners to ensure both the resources and the will to sustain the initiative—has not been a priority during the early years of the initiative. With a gradual understanding of the role that a BBC can play in sustaining and advancing their Linked Learning work, districts now appear to be in a better position to effectively engage a BBC.

In addition to sustaining the progress made to date, district staff are also considering how to develop more pathways. The prospect of increasing the number of pathways raises considerations about district capacity and pathway growth strategies.

The establishment of a BCC was not a top priority for districts during the early years of the initiative, but districts now are better positioned to effectively engage and utilize external stakeholders.

Linked Learning directors agreed that a BBC is essential for sustaining the initiative and ensuring work-based learning opportunities for students, although it may be less essential during the early phases of implementation. The work of developing a BBC is largely unfamiliar to districts, and most were unable to establish an independent BBC and purposefully engage that BBC in the work. Unlike pathway-level partnerships and advisory boards, BBCs require districts to engage partners at a systems level rather than a pathway level. BBC partners should share in the vision, commitment, responsibility, and accountability for sustaining a districtwide initiative. Pathway advisory groups—

Linked Learning directors agreed that a BBC is essential for sustaining the initiative and ensuring work-based learning opportunities for students.

composed of members related to the pathway industry area of focus—assist individual pathways in a more hands-on manner (e.g., contributing to curriculum development, finding internships, assessing student work).

Districts tried forming new groups or repurposing existing groups to create a BBC, but meetings functioned largely as a forum for briefing stakeholders on Linked Learning progress rather than as a collaborative process for sustaining the growth of pathways. Some districts struggled to bring in higher level representatives from business and civic groups, given the presence of multiple advisory groups in other education and/or economic development initiatives. Over time, districts benefited from the assistance of external providers to create a BBC. Two examples illustrate the value of external support to figure out the function and structure of the BBC and the value of opportunities to observe how other districts engage their community stakeholders.

With the assistance of ConnectEd, Porterville recently configured its P8 Council as a very business-friendly structure (e.g., following strict guidelines for agenda and meeting procedures that conform to business practice). A representative (business partner) from each pathway advisory council sits on the P8 Council so that the role of business and other community partners can be closely coordinated at the district level. Together, the P8 Council, pathway advisory boards, and work-based learning coordinators have been strong advocates for expanding work-based learning opportunities for Linked Learning students. A study tour to the Academies of Nashville, organized by ConnectEd in November 2010, was reportedly effective in getting school board members, civic leaders, and Linked Learning leadership team members to understand the intersection of school reform, public engagement, and economic development and that everyone needed to play a part.

While some districts have suffered from a lack of local resources to draw on for their BBC, others have not been able to effectively leverage the numerous business and community organizations interested in partnering with and supporting Linked Learning. For example, Los Angeles is just beginning to develop a strategy to make the best possible use of local business and community resources through a process it calls "asset mapping." The intent is that each industry sector will eventually have its own industry council chaired by a key liaison who would act as a support system and resource center whenever a school wants or needs council support. The industry liaison and council members would serve as a clearinghouse by reaching out to their connections to see who is willing to offer assistance.

Districts are still determining out how to expand the number of pathways and adequately sustain them over time.

In the past four years, districts have increased the number of pathways—some slowly, others with ambitious growth targets. The expansion of pathways presents districts with a number of choices:

1. Should districts modify existing programs (e.g., repurpose CPAs or National Academy Foundation [NAF] academies) or develop new pathways?
2. Should districts create small career-themed high schools or launch pathways in comprehensive high schools?
3. Should comprehensive high schools house a few pathways or go wall to wall?
4. How closely should pathways adhere to the ConnectEd certification criteria?

Each choice presents both benefits and pitfalls, and no clear consensus is apparent among participants on the best approach. For example, in districts with existing CPAs, NAF academies, or other high school reform models such as SLCs or small, autonomous high schools, explicit communication about how the Linked Learning approach aligns with these existing models is very important to address school staff concerns about losing funding from the sponsoring agency or

about Linked Learning disrupting the progress or success of the current program. Some district staff reported they preferred starting a pathway without any prior history as an SLC, CPA, or NAF academy.

An issue that has sparked some debate is how closely pathways should adhere to the Linked Learning approach as defined in ConnectEd's certification criteria. For example, Antioch has adopted a "big tent" approach to Linked Learning pathway expansion that includes SLCs and at least one academy that do not meet basic Linked Learning pathway criteria among its open-access options for students entering high school. On the other hand, Porterville sticks very closely to ConnectEd's definition of a high-quality Linked Learning pathway. Porterville's system is supported and sustained through strong centralized control of implementation by the district Linked Learning office. The district support system is a key element in the rapid progress and expansion of Porterville's nine open-access pathways and certification of seven pathways. A coherent and consistent vision of Linked Learning at all levels within Porterville has created a commitment to the Linked Learning approach and the continued expansion of pathways that align with the Linked Learning certification criteria.

District expansion plans also raise the issue of capacity—the ability of district staff to support an increasing number of pathways with a wide array of needs. In previous reports, we described district efforts to increase capacity by adding Linked Learning staff or increasing the proportion of time that staff are assigned to Linked Learning activities. One area where districts clearly need to offer pathways support is work-based learning. Respondents agreed that coordinating work-based learning cannot be the sole responsibility of pathway leads and teachers. Districts have offered support by hiring staff, hosting industry summits, and using other strategies to build relationships with business. For example, districts have created work-based learning coordinator positions at the district and/or school levels to build relationships with industry partners and help cultivate work-based learning experiences for pathways. Districts have structured the work-based learning coordinator position in different ways and have experienced varying success. Despite these activities, however, over four years this core component of Linked Learning remains underdeveloped, and districts continue to require assistance in understanding how to support work-based learning in pathways.

As the number of pathways has grown, districts have learned that they must differentiate their support.

In addition, as the number of pathways has grown, districts have learned that they must differentiate their support or find ways to target that support (based on readiness or needs assessment criteria). As described, Long Beach created an assessment tool based on the Linked Learning certification criteria to identify pathway needs and target coaching support, as well as identify pathways with similar needs where the district can offer support. Los Angeles has many CPAs and other SLCs within the district that are interested in becoming Linked Learning pathways. The district decided it needed a process for determining readiness for Linked Learning implementation to identify which programs should receive the district's support. To help determine readiness, district Linked Learning staff conduct half-day visits to potential pathways, which include classroom observations; observations of teacher planning time, including an exercise where teachers are given a sample assignment to plan and asked to incorporate the proposed pathway theme; and discussions with teachers and the principal.

Technical assistance providers also learned through pathway staff feedback that pathways required differentiated support. The Advanced Pathway Performance Assessment System project (APPA) was launched in 2012 as a two-year effort to engage a select group of certified Linked Learning pathways in more effectively and systematically measuring student knowledge and skills. As part of

APPA, pathways build on their work to date and learn about, plan, and begin to implement authentic performance-based assessment systems that include common outcomes-aligned rubrics and performance tasks and a culminate in student demonstration of learning and skill. The participating pathways learn together as a networked cohort, benefiting from each other's learning and innovation. Pathways receive technical assistance, new tools, and professional development as they work to build a cohesive, aligned system of performance assessment. Participating pathway staff reported they gained valuable knowledge from this advanced work. Seeing the advantage of this type of differentiated support, some districts expanded the APPA training to additional pathways.

Implications

In this chapter, we have described some lessons learned from the experiences of nine diverse districts implementing a system of Linked Learning pathways over the last four years. These districts achieved varied success in terms of their leadership functions, but their progress and ongoing challenges offer insights to other districts considering or just beginning to implement a system of Linked Learning pathways. A better understanding of key implementation issues is fundamental to developing an appropriate strategy. Many of the lessons learned from the initiative thus far mirror effective drivers of whole system reform outlined by Michael Fullan (2011)—for example, inspiring collective work or teamwork, generating the motivation to improve, engaging educators in continuous improvement of instruction and learning, and building capacity on a broad scale.

From this initiative, we know that districts cannot achieve system change without bringing all stakeholders, both 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 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 monitoring progress and making the necessary adjustments. District leaders need to build their staff's capacity, which means providing necessary supports to increase educators' skills to do their jobs and holding them accountable if they do not. Finally, districts need to bring together a variety of perspectives to gain a richer understanding of Linked Learning goals and how they might be achieved within their local context. Developing a BBC can facilitate industry partnerships, support work-based learning, and ensure timely access to resources. But this is neither easy nor familiar work for districts; districts should reach out to outside experts to assist in this kind of task.

Chapter 3: Core Pathway Components

Key Findings

- Many pathways have successfully developed integrated academic and technical curricula and continue to work toward curricular rigor.
- Pathways continue to make progress with performance-based assessments, which typically connect to projects and help students understand the most important components of what they are learning.
- Pathway staff recognize that work-based learning comes in many forms and try to provide students with a variety of experiences. In many cases, work-based learning experiences do not yet directly connect to classroom instruction.
- Most districts have not yet developed strategies and policies to ensure equitable student access to all pathways options, nor have they determined how to provide targeted support for special students populations that allows these students to fully participate in the pathway program of study.

Linked Learning seeks to change the ways teachers and students interact in high school classrooms, thereby driving improvements in student outcomes. Linked Learning emphasizes four core components—rigorous academics, real-world experiences, work-based learning, and personalized supports—that are central for building high-quality pathway programs that engage students and keep them in school. In this chapter, we discuss the progress that pathways in the Linked Learning District Initiative have made in developing these core components. We first describe ongoing efforts to develop a high-quality curriculum that integrates rigorous academics with technical coursework and to improve instructional practice. Then we examine progress in providing authentic work-based learning opportunities. In the last part of the chapter, we look at the supports available to students in pathways, including individualized academic and social supports as well as guidance for students' postsecondary plans. Each section begins with a description of pathway accomplishments, followed by challenges pathways have encountered, and ends with an analysis of how pathways can address the challenges.

Curriculum, Instruction, and Assessment

During the first two years of the initiative, districts and schools primarily concentrated on setting up the structural elements for Linked Learning implementation. We observed a major shift in the initiative's focus toward curriculum, instruction, and assessment during the 2011–12 school year. In interviews during the 2012–13 school year, pathway teachers continued to report increased familiarity with pathway curriculum, instruction, and assessments. However, the rigor of integrated

The rigor of integrated academic and technical curricula and the quality of instructional practice continue to vary.

academic and technical curricula and the quality of instructional practice continue to vary by pathway across the nine Linked Learning districts. Interviews with coaches, school leaders, and pathway staff suggest that this variation stems from differences in teachers' expertise and willingness to develop authentic, high-quality curriculum, as well as variation in the time that teachers have available to work with colleagues.

Many pathways have successfully developed integrated academic and technical curricula and continue to work toward curricular rigor.

Many pathways that we visited have developed interdisciplinary projects across two or three subject areas, and some have made good headway in developing one to two interdisciplinary projects per grade level. During focus groups, students across pathways spoke positively about their experiences with integrated projects. For example, in a health pathway, focus group students animatedly spoke about their big 10th-grade project: They had read *Slaughterhouse Five* in their English class while learning about mental health conditions in their science class. In a culminating project, the students had to diagnose a character and defend their diagnosis. The large majority of projects tend to stand alone, serving as a way for students to learn new information from multiple angles but often not drawing on previous coursework or building toward subsequent coursework or project work.

Further, the development of a *rigorous* curriculum coupled with *high-quality* instruction has varied widely among pathways both within and across districts. On the student survey, when asked how often at least one of their teachers challenged them to understand difficult topics, 62% of pathway students reported they were frequently challenged. Still, the challenging work that students are experiencing may not be rigorous enough to prepare them for high-skill, high-wage employment. This year, some pathway coaches were particularly concerned that the projects do not go deep enough to foster the higher order thinking skills that students need to prepare for college and for many careers. An internal coach reflected, "We have some phenomenal teams and teachers, but getting them to raise their own bar and self-reflect—that we should do better. We need to focus on outcomes and backwards plan and really create the kind of environment that truly changes education for kids."

> *We have some phenomenal teams and teachers, but getting them to raise their own bar and self-reflect – that we should do better. We need to focus on outcomes and backwards plan and really create the kind of environment that truly changes education for kids.*
>
> *–Internal coach*

Across the nine Linked Learning districts and pathways, district and school staff cited three major challenges pathways face in developing a rigorous, integrated curriculum: limited teacher expertise, lack of willingness to participate in developing integrated curriculum, and shortage of time to work with colleagues. In the next chapter, we discuss in depth the structures needed to support teachers with curriculum development.

Pathways continue to make progress with performance-based assessments, which typically connect to projects and help students understand the most important components of what they are learning.

In our Year 3 evaluation report (Guha et al., 2012), we noted that pathway teachers in a number of pathways were beginning to develop and use performance-based assessments of student learning. These assessments provide students the opportunity to demonstrate deep content learning and apply newly acquired skills through authentic products and performances. The performance-based assessments typically are aligned with each pathway's integrated projects. During focus groups, students described examples of their teachers walking them through rubrics aligned to the assessments to help them understand the components of the rubric, the objectives of the project, and individual and group roles and responsibilities. These rubrics are designed to address skills as well

as content, and students reported appreciating being assessed on academic proficiency and professional skills (e.g., oral presentation skills, professional language). Students also stated that the rubrics increased transparency in grading, allowing them to better understand the skills and content that were most important to master and increasing their investment in the work.

Pathway teachers are continuing to develop performance-based assessments, but these assessments are not yet widely used or consistently aligned with pathway outcomes (i.e., pathway-specific academic goals for students). As with integrating curriculum, aligning assessment tools with student learning outcomes requires support from coaches or administrators to build teacher expertise and common planning time. In the next chapter, we discuss the structures required to support teachers in developing performance-based assessments.

Work-Based Learning

Work-based learning is the Linked Learning component designed to provide all pathway students with high-quality, real-world learning experiences that are well coordinated and sequenced. It is work-based learning that brings authenticity to the pathway curriculum. As a curriculum and instruction specialist stated, work-based learning is what makes Linked Learning unique: "You can be doing project-based learning and not doing Linked Learning. What makes it Linked Learning is industry involvement, industry theme, and associated work-based learning." Pathways are still working to develop well-coordinated and planned work-based learning opportunities that align with and are integrated into pathway curriculum.

Pathway staff recognize that work-based learning comes in many forms and try to provide students with a variety of experiences. In many cases, work-based learning experiences do not yet directly connect to classroom instruction.

Over the past four years, pathway staff have formed a better understanding that work-based learning encompasses a broad range of activities—beyond internships—that can provide students with viable experiences that prepare them for careers. Several pathways have developed and organized work-based learning opportunities that closely align with the pathway theme and generally build on one another from grade to grade (i.e., from guest speakers and mentors in the lower grades to internships in the upper grades). This year, the vast majority of pathway students (89%) reported engaging in at least one work-based learning experience. Higher participation of pathway students relative to comparison students in work-based learning suggests that as pathway students enter the upper grades, they are taking greater advantage of work-based learning experiences and/or that pathways in most districts are offering more of these opportunities. In addition, pathway students were more likely than comparison students to report feeling satisfied or very satisfied with their work-based learning experiences (58% versus 41%).

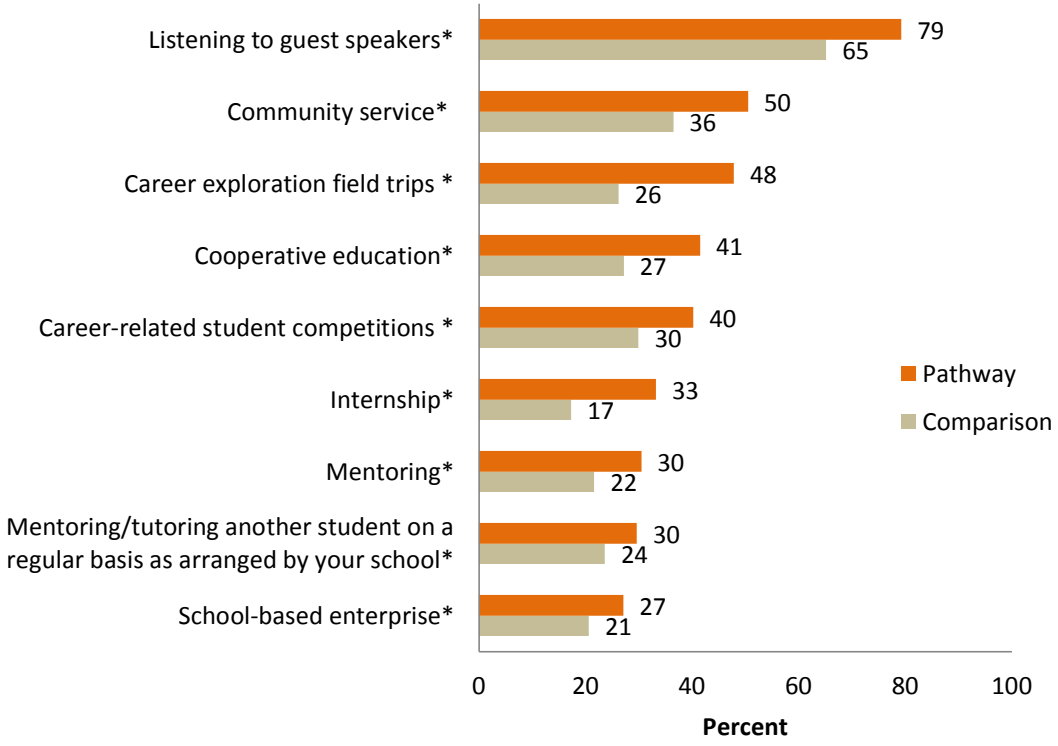
> *The vast majority of pathway students (89%) reported engaging in at least one work-based learning experience.*

As Exhibit 3-1 illustrates, 11th-grade students most frequently reported engaging in activities on the earlier end of the work-based learning continuum. In addition, pathway students were more likely than comparison students to report listening to guest speakers (79% versus 65%), performing community service (50% versus 36%), and conducting career exploration field trips (48% versus 26%).[9] The contrast between pathway and comparison students in their rates of work-based learning

[9] Pathway students differed significantly from non-pathway comparison students in their responses to these items, suggesting that pathway students are experiencing more work-based learning opportunities than non-pathway students. See the Appendix for details about survey analysis methods.

participation is not as great as might be expected, likely because some of these activities are widespread in traditional high schools. Furthermore, participation in more intensive workplace placements (e.g., internships) may increase as survey respondents advance toward 12th grade and/or as more resources can be allocated to pursuing development of industry relationships.

Exhibit 3-1
Pathway Students Participating in Work-Based Learning Activities



*Difference between pathway and comparison students is statitiscally significant at $p < 0.05$.
Source: Spring 2013 11th Grade Student Experience Survey.

These results are consistent with what we heard from school and district respondents. In most pathways, work-based learning experiences continue to be loosely tied to the pathway theme and not generally integrated with the pathway curriculum. Most pathway leads and teachers do not have the time or skills to foster industry relationships. As a result, instead of cultivating a sequence of coordinated, cohesive work-based learning activities, teachers typically take advantage of ad hoc opportunities as they present themselves.

To better integrate work-based learning with pathway curriculum, pathway teachers require support not only in finding work-based learning opportunities, but also in *how* to embed them into the academic and technical curriculum. For example, Oakland adopted Exploring College and Career Options (ECCO), a promising curriculum developed by MDRC and Bloom Associates to support career exploration visits, college knowledge and readiness, and internships between junior and senior year or during senior year with the intention of helping students make connections between these experiences and what they are learning in the classroom.

Some pathways that have been successful in developing well-integrated work-based learning experiences have worked closely with their advisory boards:

- A law academy developed a crime scene investigation unit in which students role-played to investigate a crime and put the accused on trial. Throughout the process, advisory board members and industry partners reviewed students' technical writing, attended the mock trial, and provided general guidance. Students participating in this unit received authentic feedback, and their experiences with industry professionals related directly to their academic and technical curriculum.

- Similarly, a student in a media pathway described a recent film project involving collaboration with professional writers on film scripts. As this student explained, "We had a group of professional writers come in and help us with our scripts that we worked on throughout the semester. We sent them our scripts and they sent us feedback - format, how to put it into action, dialogue…. We learned how their job works, what they do, and how to be good at our jobs when we do them."

> *We had a group of professional writers come in and help us with our scripts that we worked on throughout the semester. We sent them our scripts and they sent us feedback…. We learned how their job works, what they do, and how to be good at our jobs when we do them.*
>
> *–Student in a media pathway*

Pathway teachers also frequently reported that they need greater support to help them make industry connections and find the right work-based learning opportunities for their students. These teachers typically do not have sufficient time to do the legwork in developing relationships with industry partners, locating work-based learning opportunities, scheduling and setting up the experiences, and following up with site supervisors and students. Districts have poured resources into creating work-based learning coordinators at the district level and/or school level. In smaller districts, such as Antioch and Porterville, the district coordinator may be able to provide more extensive support in finding work-based learning opportunities because the number of pathways is relatively manageable. In larger districts, such as Oakland and Los Angeles, it can be difficult for one individual to provide the necessary support pathway teachers because that person must have knowledge of diverse industry sectors and the availability to work with numerous pathways. Realistically, an individual district-level coordinator cannot be expected to engage in these detailed and time-consuming efforts on behalf of many pathways at once while also developing broader district-level work-based learning structures and systems.

Student Supports

Equitable pathway enrollment for all students and access to pathway curriculum are paramount to the Linked Learning approach. However, few pathways explicitly provide academic supports for students with special learning needs, and postsecondary guidance varies widely across pathways. As we reported in Year 3 (Guha et al., 2012), although pathways may be open to special education students, English language learners, and low-performing students in principle, participation rates in certified pathways by those students are still relatively low in some districts. Most pathways do not have targeted practices and policies to improve access and support for all students.

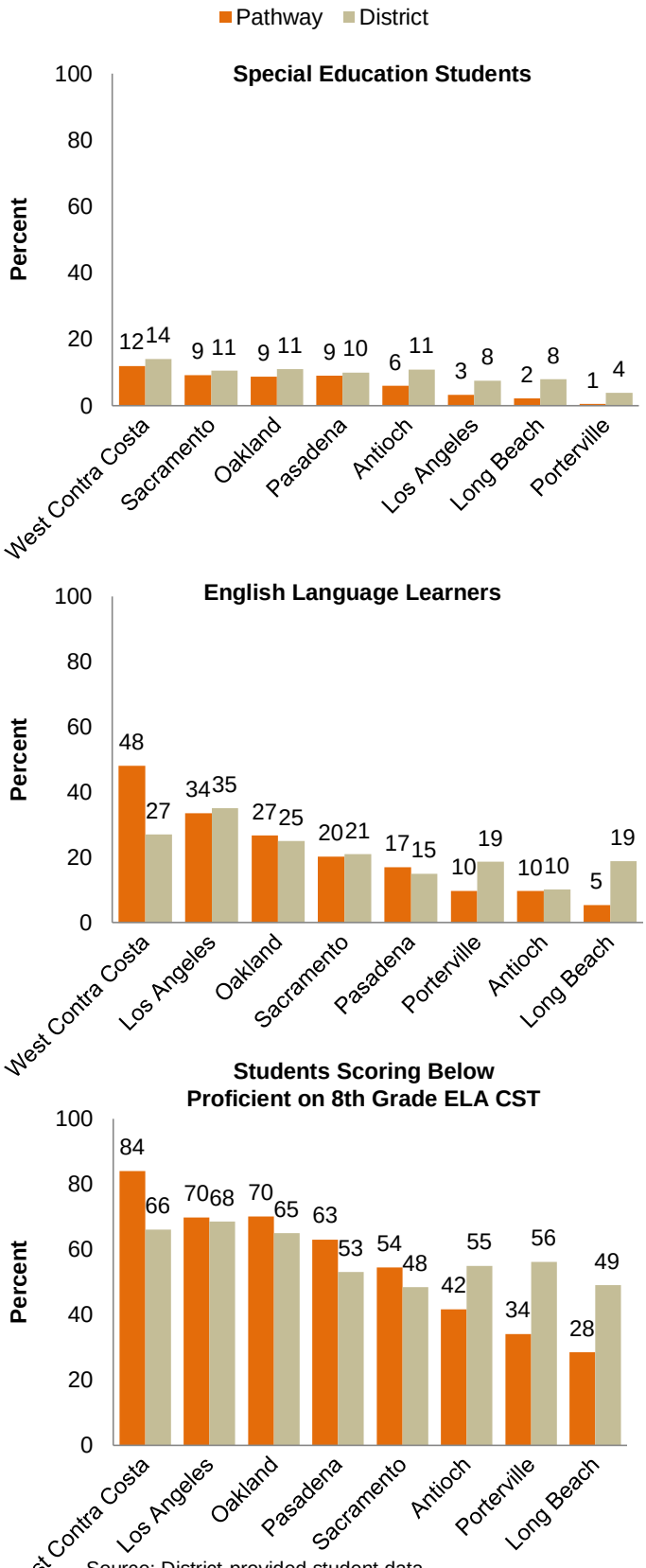
Most districts have not yet developed strategies and policies to ensure equitable student access to all pathway options, nor have they determined how to provide targeted support for special students populations that allows these students to fully participate in the pathway program of study.

Linked Learning pathways across districts have made substantial progress in creating environments where students report feeling supported by teachers and their peers. In some districts, however, certified pathways continue to enroll disproportionately low numbers of English language learners, special education students, and students performing below grade level than the district as a whole.

Districts have different choice and recruitment policies that may lead to variation in the demographics of students who enroll in pathways. Exhibit 3-2 shows the percentage of special education students, English language learners, and students who entered high school academically behind (as measured by the 8th-grade CST exam) enrolled in certified pathways and the districtwide proportions of those students from the same grade levels.

On average, certified pathways in Long Beach, Porterville, and Antioch consistently enrolled a lower percentage of special education students, English language learners, and academically behind students than the district as a whole. In contrast, certified pathways in Oakland, Pasadena, Los Angeles, and Sacramento enrolled about the same percentage of English language learners and students who entered high school behind academically as the district, while those in West Contra Costa enrolled a significantly higher proportion than the district as a whole. With the exception of Los Angeles, certified pathways in these five districts also enrolled a comparable percentage of special education students.

Exhibit 3-2
Proportion of Students in Special Populations



Source: District-provided student data.
Note: Montebello had no certified pathways at the time of analysis, so its data are not included.

In Los Angeles, data includes only high schools that were in Local District 4 and are now in the innovation subdistrict.

Pathway choice and recruitment policies are one possible explanation for these differences. Antioch, Porterville, and Long Beach have open access to pathways and formal recruitment structures at the district level, so high-achieving students from across the district may be self-selecting into pathways. In contrast, students in Los Angeles, Oakland, Sacramento, and West Contra Costa have a narrower range of choices. Self-selection may be less likely in these districts because students either cannot choose a school outside their neighborhood or are not informed of the options available to them. The exception to this trend is Pasadena, which has formal recruitment practices but whose certified pathways enroll approximately the same percentage of special education students and English language learners and a larger percentage of students who entered high school behind academically than the district as a whole. This phenomenon is likely due to Pasadena's efforts to develop pathways in lower-performing schools with large populations of students from these demographics.

Another possible explanation for the differences between districts is that these student populations do not enroll because certified pathways in Long Beach, Porterville, Antioch, and Los Angeles (in the case of special education) may not be meeting their needs. These enrollment numbers do not tell us whether students with special needs are receiving the right supports once they enter a pathway.

Notably, some schools and pathways have acknowledged that they must explicitly address the needs of special student populations. For example, at a large comprehensive high school in Pasadena, a flexible schedule (due to an eight-period day) has enabled special populations to take their required classes while also accessing the pathway program of study. At other schools where the capacity to provide supplemental services and instruction to meet special learning needs is limited, such as a small theme-based school in Antioch, staff place special education students and English language learners in college preparatory classes and provide modified instruction.

Few pathways and schools have been successful thus far in providing special student populations with all the supports called for in the Linked Learning approach.

Although these are promising steps forward, few pathways and schools have been successful thus far in providing special student populations with all the supports called for in the Linked Learning approach. Small schools in particular struggle to provide targeted supports to special student populations because of limited capacity. Similarly, pathway programs often do not have the resources to provide students with all required classes within the pathway program, making it increasingly important that comprehensive high schools provide flexible scheduling to allow students to take required courses in addition to a full pathway curriculum, while maintaining student cohort purity (i.e., pathway students participate as a cohort in the academic and technical courses that are part of the program of study) as much as possible. While pathways across school settings are not explicitly excluding special populations of students, the overall lack of student supports could deter these students from selecting a pathway program.

In most districts, pathway teachers play a more active role than guidance counselors in providing pathway students with postsecondary guidance.

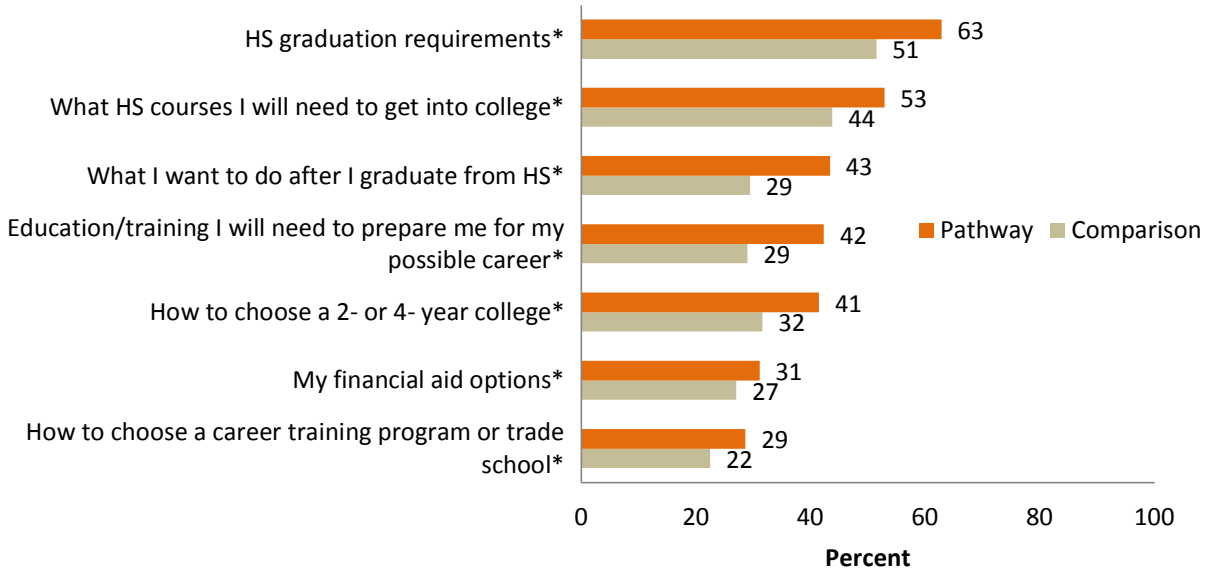
Opportunities for students to gain college and career knowledge and receive personalized college and career planning advice vary across Linked Learning pathways. One source of variation is the pathways' staffing structures and counselor-to-student ratios. With widespread budget cuts over the last four years, counseling capacity across districts has decreased, making it more difficult for schools to provide frequent postsecondary guidance to all students. Counselors cannot necessarily provide personalized college and career advice while also focusing on scheduling, dropout prevention, discipline, social/emotional issues, and other core responsibilities. The result is that

counselors typically provide 11th- and 12th-grade students with more frequent and targeted support regarding postsecondary plans and focus less on lower grade students.

Because counselors are largely unable to provide enough postsecondary guidance due to competing responsibilities, pathway teachers are playing a more active role. In some districts, we heard that pathway teachers are beginning to embed strong study skills and college knowledge into their pathway curriculum. For example, in Long Beach one pathway lead said that CTE teachers have been encouraged to push college and career readiness. Partners from outside the school are also helping to support counseling in some pathways. For example, in districts with strong community college ties such as West Contra Costa, Long Beach, and Sacramento, pathways have established links with local community colleges to help prepare students for college.

Student survey data echo the finding from student focus groups about the prevalence of postsecondary guidance from teachers. Pathway students were more likely than comparison students to report that their teachers provided personalized supports regarding postsecondary plans. As Exhibit 3-3 illustrates, a greater percentage of pathway students than comparison students reported that their teachers helped them understand the requirements necessary to graduate from high school (63% versus 51%), attend college (53% versus 44%), and/or attain their desired careers (42% versus 29%). Student focus group data also confirmed pathway teachers' central role in providing postsecondary guidance. In a pathway in West Contra Costa, an 11th-grade student highlighted her teachers' support, saying, "[The] majority of my teachers ask me… 'What do you want to be?' I feel like I can come to most of my teachers…'If you need [a recommendation] letter just come to me, I'll help you with anything.'"

Exhibit 3-3
Postsecondary Plans and Requirements That Teachers Helped Students Understand



*Difference between pathway and comparison students is statitiscally significant at $p < .05$.
Source: Spring 2013 11th Grade Student Experience Survey.

Generally, counselors' and teachers' ability to provide students with industry-specific guidance varies depending on their knowledge of the industry sector. In addition, in high schools with college and career offices or external providers such as EAOP (the University of California Early Academic Outreach Program), AVID, Cal-SOAP (California Student Opportunity and Access Program), or GEAR UP (Gaining Early Awareness and Readiness for Undergraduate Programs), counselors from

the college and career office or personnel affiliated with the programs provide postsecondary guidance to all students (pathway and non-pathway) and are not necessarily aware of specific pathway programs. Clarity about who supports students with postsecondary planning and more targeted professional development and coaching for those individuals could help pathways better support students.

Implications

Over the last four years, pathways have achieved varied success in developing rigorous curriculum with aligned work-based learning experiences and strong academic and postsecondary supports. Across districts, district and school respondents pointed to limited teacher expertise, lack of willingness to participate in developing integrated curriculum or work-based learning opportunities, and shortage of time to work with colleagues as major barriers to developing a strong, integrated curriculum with aligned work-based learning opportunities. In addition, pathways have also had varying success in providing all students with academic supports and postsecondary guidance. School structures, such as flexible schedules that allow students to take required courses in addition to pathway classes, and clarity about the role of counselors and other educators in providing postsecondary guidance could help create stronger student supports.

As districts continue to expand pathways and as new districts begin to develop pathways, thinking strategically about the school structures and supports necessary for facilitating strong pathway programs is essential. Pathway teams drive changes in student outcomes. For students to experience Linked Learning as intended and build their skills for college and career, pathway teams need expertise and supportive school structures to develop a strong pathway program that fulfills the Linked Learning vision. In the next chapter, we discuss in more detail the school staffing and structures central to building pathway programs that have a rigorous integrated curriculum with aligned work-based learning experiences and strong academic and postsecondary supports.

Chapter 4: School Staffing and Structures

Key Findings

- Districts have been working to build school leaders' understanding of and investment in Linked Learning but have struggled to engage all school leaders.
- Pathway leads need more dedicated time and support to fulfill their multiple responsibilities, which include managing pathway operations, supporting pathway teachers with integrating curriculum, and organizing work-based learning opportunities.
- Staff turnover has made it challenging for many pathway teams to develop the strong community of practice that is essential for a high-quality pathway program.
- Comprehensive high schools are still working to develop master schedules that allow for pure pathway student cohorts and pathway teacher collaboration time.
- The most effective advisory boards have helped pathways develop curricula, assess student performance, and identify work-based learning opportunities.
- Pathway coaches have helped teachers build expertise in the four Linked Learning components.
- Principal coaching has received mixed reviews: the content has not always been specific to Linked Learning, and some principals have not engaged with coaches.

It has become increasingly clear over the past four years that school-level factors are key to the overall success of the Linked Learning District Initiative. Linked Learning sets a high bar for college and career readiness, and pathways aim to support students in reaching that bar through rigorous integrated curriculum with well-aligned work-based learning and strong student supports. Therefore, school factors that influence pathway development play an instrumental role in pathways' success. In this chapter, we discuss the school staffing and school structures necessary for building a strong pathway program of study. Within each section we highlight the importance of each component and discuss the major challenges schools and pathways have faced to date.

School Staffing

School leaders, pathway leads, and pathway staff are central to Linked Learning implementation since they are the ones who develop and implement pathway programs with students. Understanding variation in their involvement in Linked Learning and the areas in which they

require additional help provides valuable insight into the kinds of support needed for successful Linked Learning implementation.

Districts have been working to build school leaders' understanding of and investment in Linked Learning but have struggled to engage all school leaders.

School leader (e.g., principal and assistant principal) investment in Linked learning is essential for Linked Learning implementation because school leaders control the structures (i.e., master schedules supportive of common planning time and cohort purity) needed to sustain successful pathways. In general, principals who do not have a strong understanding of Linked Learning and do not implement the structural changes needed for the approach to succeed are mostly located in comprehensive high schools (either with wall-to-wall pathways or with a few pathways). Unlike principals of small schools who oversee one pathway program, principals of comprehensive high schools often oversee multiple school improvement initiatives, and a pathway or two serve only a fraction of the total student body they are responsible for. As result, these principals are less likely to prioritize Linked Learning implementation.

Districts encountering the most challenges with principal buy-in are those where principals are not held accountable for implementing Linked Learning.

Districts encountering the most challenges with principal buy-in are those where principals are not held accountable for implementing Linked Learning. For example, West Contra Costa struggled with gaining principal buy-in at the beginning of the Linked Learning initiative but made great strides in garnering principal support after including Linked Learning implementation as part of the principal evaluation system and making it a clear district directive. This year, we noted that three districts that do not have Linked Learning as part of their principal evaluation systems continued to face particular challenges in building their comprehensive high school principals' support. A principal coach in one of these districts reported that "All principals are attuned to the political consequences [of making significant school changes such as implementing wall-to-wall pathways or changing the master schedule] and are nervous to rock the boat," so they may be cautious in implementing new reform initiatives such as Linked Learning.

Principals face pressure from the community, from different district offices, and from their school staff. Therefore, to prioritize Linked Learning, they must believe in its goals, have the support needed to build facilitating structures, and see implementation as part of their job responsibilities.

Pathway leads need more dedicated time and support to fulfill their multiple responsibilities, which include managing pathway operations, supporting pathway teachers with integrating curriculum, and organizing work-based learning opportunities.

Pathway leads juggle multiple demands, including leading their team in developing integrated curriculum, attending monthly pathway leads meetings, and coordinating work-based learning opportunities. Many also have part- or full-time teaching loads. In interviews, pathway leads reported that they had assumed more and more responsibilities over the last four years of the initiative. For example, in one district, the two internal coaches are also pathway leads. In two other districts, we spoke to pathway leads who also fulfill the work-based learning coordinator position at their schools, and each expressed difficulty in balancing these added responsibilities with their pathway lead role. Pathway leads also reported that they spend a significant portion of their preparation time performing clerical duties, such as setting up field trips, completing expense reports, and filling out paperwork, such as grant reports. These administrative duties can often take away from the more substantive aspects of the pathway lead role, for example, building team rapport, connecting with industry partners to develop work-based learning opportunities, and meeting with pathway teachers to support their curriculum planning and instruction.

The number of preparation periods pathway leads receive varies by district and pathway. Typically, CPA-funded pathways receive an additional preparation period as stipulated by the grant; in other pathway structures, pathway leads receive the same standard number of preparation periods as all teachers. One pathway lead stated, "Time is not adequate. I believe in Linked Learning…I think it is dynamic and wonderful and completely unsustainable as set up right now. Everything suffers all the time…." When we asked another pathway lead if one period a day of release time was adequate, he answered no at first. However, he subsequently added, "Let me back up. It could be adequate if there were a clerk. If there isn't a clerk, leads would need three or four periods a day."

Distributing responsibilities across the pathway team could help spread burden for pathway development from the pathway lead to other pathway staff. To respond to these challenges, some districts are thinking creatively about supporting pathway leads. Porterville uses CPA funds to hire administrative assistants in pathways that have the state CPA designation. Oakland has district-level CTE specialists, classified staff assigned to support pathways, and some schools are thinking about moving to a pathway co-lead model to provide additional support for pathway responsibilities. Providing the right structures and supports could help decrease the burden on pathway leads and give them the time needed to focus on more vital activities, such as integrating curriculum and organizing work-based learning experiences.

Staff turnover has made it challenging for many pathway teams to develop the strong community of practice that is essential for a high-quality pathway program.

Across pathways, respondents cited teacher buy-in and collaboration as a necessity for building a rigorous integrated curriculum with aligned work-based learning opportunities. To build teacher investment, pathways require stable staff (i.e., little turnover) from year to year and teachers who are willing to collaborate with one another on the development of the pathway program. For example, the most advanced pathways, such as those participating in the Advanced Pathway Performance Assessment System project (APPA), have relatively stable pathway teams with teachers who are invested in Linked Learning. In one APPA pathway, a teacher shared that his team has been fairly stable over the years and that the English teacher, social studies teacher, and career-technical teacher are highly invested in Linked Learning and have worked together to develop rigorous integrated units. In contrast, a pathway lead in another district voiced frustration with his pathway team's stability: "Everyone comes up with an awesome idea, but then next year someone may not be in it. [The] biggest obstacle we have is consistency in teachers." To address these staffing difficulties, some districts, such as Pasadena, have created policies to skip pathway teachers during layoffs (see Chapter 2), and others, such as Porterville and West Contra Costa, are developing pathway manuals to help quickly build new staff members' knowledge of and investment in Linked Learning.

In addition to staff stability, pathway teachers must be willing to collaborate with colleagues in a community of practice. Building an integrated academic and technical curriculum with aligned work-based learning opportunities requires strong communication among the pathway team. Across pathways, respondents shared that common planning time is essential for building a strong pathway program, and for that time to be useful, pathway teachers must be willing to collaborate with one another.

School Structures

Schools are best equipped to support successful pathway development when they have aligned structures and systems. As previously noted, school leaders and pathway staff are the key drivers of Linked Learning implementation. They should be willing to build school systems and policies that accommodate Linked Learning such as supportive master schedules, strong advisory boards, and coaching support.

Comprehensive high schools are still working to develop master schedules that allow for pure pathway student cohorts and pathway teacher collaboration time.

Across pathways, respondents reported that a master schedule supportive of cohort purity and collaborative planning time is essential for Linked Learning implementation. To develop a high-quality pathway program, teachers require time and space to work together. In addition, for students to experience a true Linked Learning pathway, master schedules must allow for pure student cohorts that move from class to class together. Many schools with Linked Learning pathways have made substantial progress in making supportive master schedules. In addition, ConnectEd has provided technical assistance for high schools struggling with master schedules.

However, pathways continue to struggle with the logistical challenges of scheduling, particularly in comprehensive high schools where some students are in pathways and others are not. In addition, scheduling students in Advanced Placement classes, special education classes, and English language development classes poses additional challenges for achieving cohort purity and allowing for common planning time. A supportive master schedule is a critical foundational structure needed for strong pathway development. Without a schedule that allows for common planning, teachers do not have the time and space to build a pathway program together, and students do not experience Linked Learning as a cohort.

The most effective advisory boards have helped pathways develop curricula, assess student performance, and identify work-based learning opportunities.

Pathway teachers typically do not have the level of industry knowledge of advisory board members and thus value opportunities to collaborate with these board members to incorporate real-world applications of the pathway theme into their instruction. Speaking to the value of advisory boards, one Linked Learning director explained, "If you bring industry partners in and they are participants in the activity, it becomes a work-based learning opportunity…. You have made it real." In particular, advisory boards are well equipped to help pathways develop curriculum that is aligned with workplace expectations, assess student performance on real-world tasks against industry standards, and access internships, job shadows, and other career exposure opportunities for students.

Several pathways with particularly active and engaged advisory boards illustrate how industry partners can help pathways connect their instruction to the real world. For example, Antioch's Dozier-Libbey Medical High School has engaged with the local healthcare industry through their advisory board since before the school became a certified pathway. School and pathway leaders consulted with board members to ensure that their curriculum was aligned with the workplace expectations in the medical field. Advisory boards serving several technology-related pathways in Oakland have provided internships for students at local technology companies. In pathways across several districts, pathway advisory board members have evaluated students' work on a culminating product and provided direct, industry-relevant feedback. Without this direct access to industry expertise, it would have been more challenging for teachers in these pathways to authentically relate their instruction to career pathways.

Pathway coaches have helped teachers build expertise in the four Linked Learning components.

Building pathway lead and pathway staff knowledge about how to develop a rigorous integrated curriculum and strong student supports is key to building high-quality pathway programs. Over the past four years, ConnectEd and districts have invested resources in providing coaching and professional development for pathway leads and pathway staff. When the initiative began in 2009, districts relied solely on external ConnectEd coaches to support pathway-level Linked Learning

implementation. Over the past four years, districts have shifted resources to building internal coaching capacity. Internal coaches are typically more familiar with the pathway program and district context and can provide more tailored support.

Lack of teacher expertise in Linked Learning is a major challenge for pathway staff in developing a rigorous, integrated academic and technical curriculum with aligned work-based learning experiences. To address this gap, pathway leads and teachers are participating in district-led professional development and receiving coaching from both internal and external pathway coaches, most commonly on Linked Learning and the Common Core State Standards. This coaching support is valuable for building pathway knowledge of curriculum integration. Pathways reported positive experiences with the support they received. In a district where external coaching has been particularly valuable, a pathway lead said, "[What] made those external resources so valuable to us is that they didn't come in with their own outside eyes and their own agendas to inform our work…what they did is they actually got in the passenger's seat and learned our language."

> *[What] made those external resources so valuable to us is that [the external coaches] didn't come in with their own outside eyes and their own agendas to inform our work…what they did is they actually got in the passenger's seat and learned our language.*
>
> *–Pathway lead*

However, the stability of external pathway coaches from year to year and the alignment between external and internal coaches who support pathways continue to be problems in some districts. Some districts have had a new external pathway coach every year since the start of the initiative. In addition, coordination between different technical assistance providers (i.e., ConnectEd, NAF, New Teacher Center) can be complicated. As one pathway lead told us, "We have had to decide: Which master do we serve? How do we placate them all?" In addition, internal pathway coaching has been difficult in districts where internal coach roles are part time. For example, this year in Oakland, the internal pathway coaches were also pathway leads and full-time teachers, so their capacity to coach other pathways was limited. Establishing a stable coaching staff with time to support teachers is central for building pathway capacity for integrating curriculum, aligning work-based learning to curriculum, and providing personalized student supports.

Principal coaching has received mixed reviews: the content has not always been specific to Linked Learning, and some principals have not engaged with coaches.

To address the need for school leader support, all nine districts have focused efforts on strengthening principals' understanding of and investment in Linked Learning**.** During the 2011–12 school year, ConnectEd addressed principal support by bringing in coaches from the University of San Diego. That particular coaching received mixed reviews from principals, however, because the content was not specific to Linked Learning. Subsequent principal coaching similarly has received mixed reviews. For example, in Porterville principal coaching has been a great success; the principals we spoke with during the 2012–13 school year said they appreciated the tailored support. Yet in another district that has experienced particular difficultly with getting principals to support the initiative, the external principal coach redirected his efforts when he realized that "Principals in [this district] do not want anything to do with any principal coaching." In response, ConnectEd is creating a plan for coaching principals as a cohort, with a focus on their role in supporting Linked Learning.

Implications

In this chapter, we have described the essential school staffing and structures needed to support pathways in achieving Linked Learning's core components. Given that school leadership and pathway staff are key drivers of pathway program implementation, building school leader and pathway staff investment in Linked Learning is important. In particular, a supportive school leader who creates structures to support pathway teams is foundational for a strong pathway program. School leaders are responsible for establishing such key structures as hiring policies supportive of building pathway teams with teachers invested in Linked Learning and generating master schedules that provide common planning time for the teams to establish strong communities of practice. In addition, pathways require support in building the core components for Linked Learning. Active advisory boards that help pathway teams establish work-based learning experiences aligned with curriculum and coaches who support pathway teams in developing rigorous integrated curriculum and performance-based assessments are essential for building teacher capacity and expertise.

As new districts take on Linked Learning and the nine Linked Learning District Initiative districts continue to build a network of pathways, they will need to be mindful of how they engage school leaders and pathway teams. School-level support (i.e., supportive master schedule, strong advisory boards, coaching) is necessary for creating the environment in which a pathway program operates. With the right structures and systems, pathway teams can have the appropriate supports to develop the four core elements of Linked Learning. An important consideration for understanding pathway success with implementing Linked Learning's core components is the student perspective. In the next chapter, we report students' perceptions of how well they are being prepared for college and career.

Chapter 5: Perceptions of Skills Gained in Pathways

Key Findings

- Pathway students reported that their high school experiences have helped them develop 21st century skills such as communication and collaboration.
- Pathway students reported that their high school experiences have helped them develop the productive dispositions and behaviors conducive to engagement and success in school and postsecondary endeavors.
- Pathway students believed that their high school experience helped them learn technical skills and professional standards relevant to specific career interests.
- Pathway students have been learning about the range of potential careers available in the industry sector and are being equipped to pursue their interests through support with the job selection, interview, and application process.

In previous chapters, we reported on pathway students' experiences with the Linked Learning core components of rigorous and integrated academic and technical curriculum, work-based learning, and student supports. Together, these experiences have the potential to improve students' readiness for college and career in terms of traditional academic achievement and the variety of overlapping skills they need to enter and succeed in postsecondary education or the workplace. This chapter examines whether pathway students themselves perceive that high school has helped them develop a broader range of skills than those included in traditional achievement measures. These skills and knowledge, aligned with the Linked Learning College and Career Readiness Framework (ConnectEd, 2012), are

- 21st century skills and productive dispositions
- Technical knowledge and skills
- Career navigation skills.

We draw on surveys of pathway and comparison students, highlighting findings from our recent survey of 11th-graders in certified pathways, as well as interviews and student focus groups, to report on staff and student perceptions of these skills gained through students' pathway experiences.

21st Century Skills and Productive Dispositions

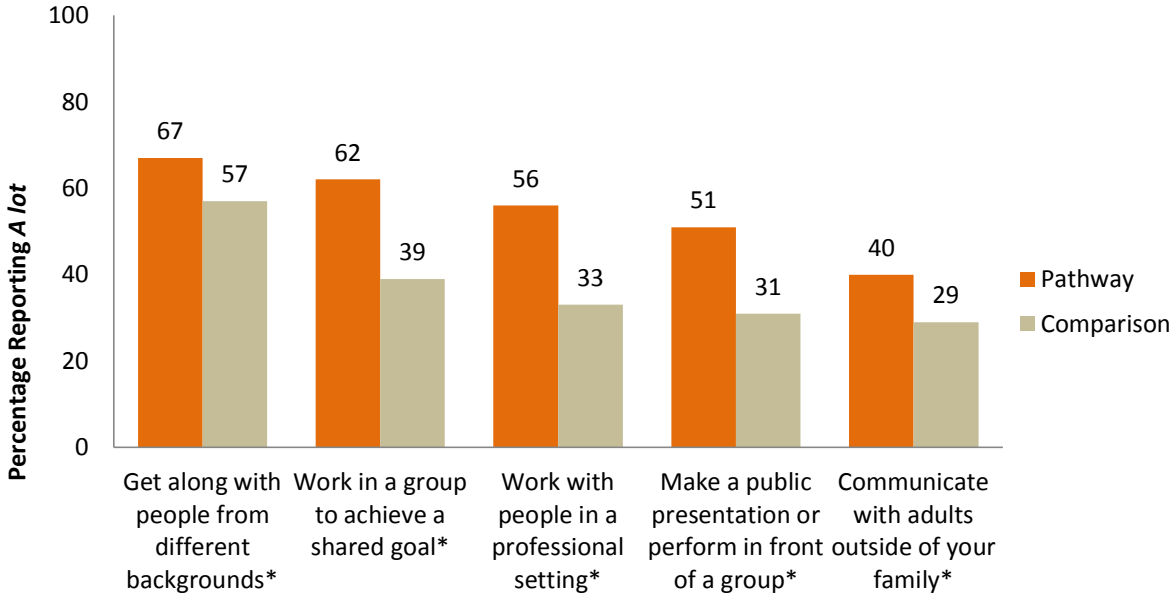
Immigration patterns and economic globalization mean that students must be prepared to communicate and collaborate with peers and coworkers of diverse cultures, religious backgrounds, and other orientations. Furthermore, given the plethora of and easy access to electronic information, students need to become informed and savvy consumers of data. Today's students need 21st century skills, defined in the Linked Learning College and Career Readiness Framework as "the range of cross-cutting cognitive processes and applications of knowledge needed to succeed in postsecondary

education and future careers" (ConnectEd, 2012). Students also need productive dispositions and behaviors, such as self-efficacy and self-management, to succeed in life after high school.

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

Consistent with findings from previous years, pathway students were more likely than comparison students to report that high school had helped them develop the skills necessary to interact effectively with people from different backgrounds or in professional settings, to collaborate in a group, and to present information to an audience (see Exhibit 5-1).[10]

Exhibit 5-1
Students Reporting Improvements in Communication, Presentation, and Collaboration Skills



*Difference between pathway and comparison students is statistically significant at $p < .05$.

Source: Spring 2013 11th Grade Student Experience Survey.

The greatest reported contrasts between pathway and comparison students with respect to collaboration and presentation skills were in Antioch and Sacramento.[11] Pathway and comparison student reports in Antioch differed by 40 percentage points or more when it came to working in a group to achieve a shared goal (78% versus 38%), working in a professional setting (76% versus 35%), and delivering a presentation (71% versus 28%). Similarly, in Sacramento pathway and comparison students' reports differed by 35 percentage points or more in the same three skill areas. These contrasts in Antioch and Sacramento could be partly attributed to the fact that the pathway sample in these two districts largely included students enrolled in small stand-alone high schools. In

[10] Throughout this chapter, we report on the percentage of pathway and comparison students who responded that high school had helped them A lot in each area. The other response options were Somewhat, A little, Not at all, and Don't know, so the percentages we report represent the highest category.

[11] Although this chapter focuses on the Linked Learning Initiative across all the districts, in some cases we highlight districts that stood out on particular survey items.

contrast to traditional comprehensive high school settings, these schools are smaller and entirely focused on a single industry theme. Their environments may facilitate teachers' abilities to implement the types of authentic performance-based assessments and work-based learning experiences that require students to use interpersonal and public speaking skills in project-based learning activities, internships, or presentations to industry professionals.

Pathway students from other districts commented on the value of their acquired 21st century skills, particularly on how working in groups or on work-based learning activities helped them develop valuable collaboration and presentation skills that will serve them well in college and the workplace.

- **Collaboration:** A greater proportion of pathway than comparison students reported that their teachers regularly asked them to work on projects with other students (55% versus 43%). We also heard from students in focus groups about the value they found in projects. For example, a student in an engineering pathway explained, "Group projects…are good for just working with people you don't normally work with." A pathway peer concurred: "If you have that one person in your group that doesn't do anything, it's kind of harder…but [it] also prepares you for the world…because you're not going to be able to work with everybody you like." Students in a media pathway explained how their frequent interactions developed their interpersonal skills, saying, "We cooperate more, feed off each other, say what's on our minds," and "There may be disagreements, but we manage not to fight…we always see each other. It feels like a family. It's a daily thing."
- **Public Speaking:** A student in an engineering pathway acknowledged that school provided opportunities to develop presentation skills that will prove useful in the future, saying, "We do a lot of projects here so it helps us more with public speaking and giving presentations, which I know we'll have to do a lot more of as we get older." Similarly, a student in a performing arts pathway described opportunities to develop presentation skills in multiple classes, reflecting, "Our first semester we worked on a project…we had to present in the theatre. It was really good because we got to present to professionals and we got feedback. In my history class we practiced how to present…also in English class…like a film pitch." She also mentioned presenting at a pathway recruitment event where she had to answer parents' questions. A third student in an architecture pathway described learning public speaking skills in class, "So when we get a job, we're not afraid to talk in front of a group of people."

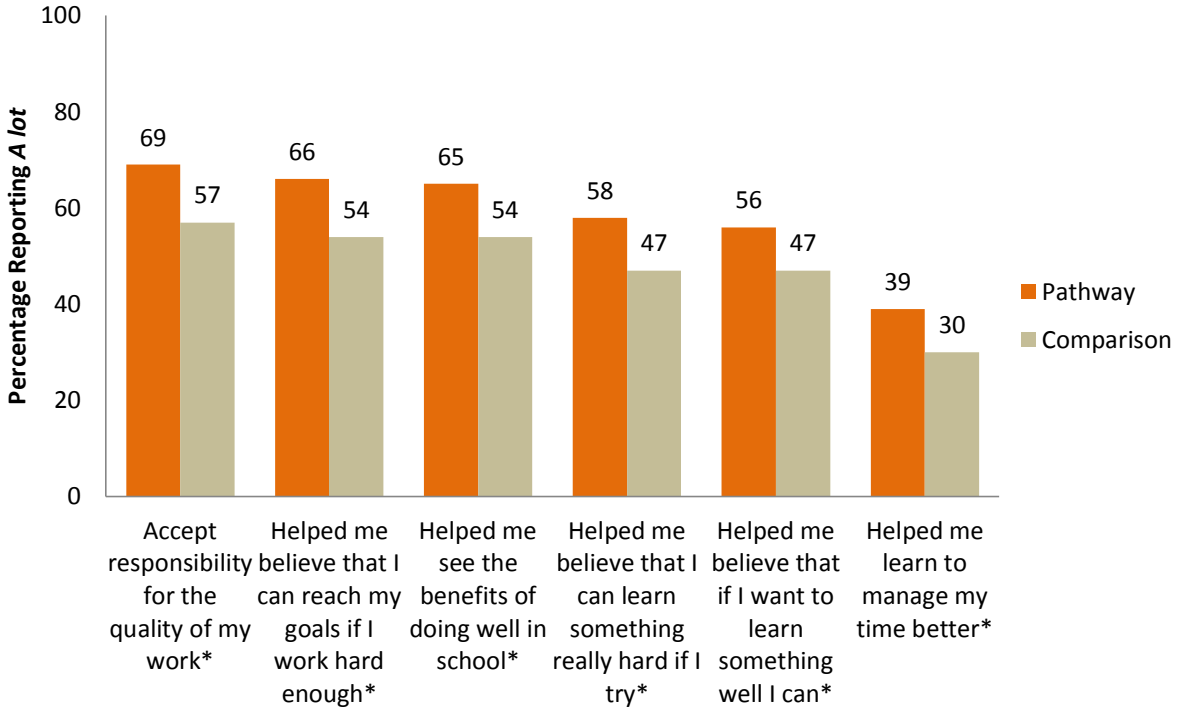
> *[W]e do a lot of projects here so it helps us more with public speaking and giving presentations, which I know we'll have to do a lot more of as we get older.*
>
> *– Student in an engineering pathway*

Pathway students also reported that their high school experiences improved their ability to act as intelligent consumers of information. For example, they were more likely than comparison students to report that their high school experiences helped them develop their ability to use information to make good decisions (64% versus 52%), conduct online searches to answer a question (57% versus 43%), summarize information from multiple sources (50% versus 38%), and judge whether they can trust the results of an online search (42% versus 26%).

Pathway students reported that high school helped them develop the productive dispositions and behaviors conducive to engagement and success in school and postsecondary endeavors.

Recent research has addressed the importance of academic mindsets—such as a sense of belonging, self-efficacy, a belief that ability and competence grow with effort, and perceived value and relevance of academic tasks for meeting future goals—in predicting the perseverance and academic behaviors leading to student success in school (Farrington et al., 2012). Although these mindsets are influenced and determined by many factors outside school, we asked 11th-graders to report on the extent to which they felt high school had helped them improve related skills and behaviors. Pathway students were more likely than comparison students to report that their high school experiences improved their sense of self-efficacy and self-management skills (see Exhibit 5-2), reflecting a pathway culture of high expectations.

Exhibit 5-2
Students Reporting Improvements in Productive Dispositions and Behaviors



*Difference between pathway and comparison students is statistically significant at $p < .05$.
Source: Spring 2013 11th Grade Student Experience Survey.

When asked about their advice for new students who were considering joining a pathway, students in focus groups gave responses that demonstrated that their pathway experiences had increased their sense of personal accountability, capacity for self-management, and belief that working hard in school will pay off.

- **Personal accountability:** Pathway students described how their school developed their sense of personal accountability by forbidding late work submissions, "So that kind of gives us the opportunity to be responsible," or by forgoing bells to mark their daily schedule, "So we have to be responsible for our timing."

- **Time management:** Students in a media pathway emphasized the importance of time management. One student explained, "They leave us a lot of homework sometimes, so we have to think about how to share our time with each subject. How to focus on the most important elements and due dates." A fellow student cautioned, "Don't slack off— because you'll leave things until the last minute and it'll affect your grade."
- **Value of effort and hard work:** A student in a health pathway shared this realization: "You get as much out of [the pathway] as you put into it… If you wanted to do something, you can do it."

Regardless of whether all pathway students experience high school with a specific career goal in mind, equipping students with broadly applicable 21st century skills while nurturing productive behaviors may better engage students during high school and ultimately lead to their long-term postsecondary success.

Technical Knowledge and Skills

Although pathways have continued to vary in the extent to which they have been able to implement integrated curriculum and a progression of meaningful work-based learning experiences, they still provide students with opportunities to learn technical content and skills through real-world industry-themed activities.

Pathway students believed that their high school experience helped them learn technical skills and professional standards relevant to specific career industries.

Pathway students were more likely than comparison students to report that their teachers asked them monthly or more frequently to use tools or equipment, such as computers or machinery, that they might use in a job (55% versus 42%). Similarly, pathway students were more likely than comparison students to report that they used tools or equipment in work-based learning activities most or all of the time (46% versus 35%). Students who participated in the focus groups also spoke at length about developing industry-specific skills and knowledge that aligned closely with the potential demands of their desired careers.

- A student in a performing arts pathway described how working with a local theater company gave authentic exposure to the industry in that "They had a playwright and professional actor, and they worked with students and they're collaborating in writing, acting, doing the tech. So they're showing how it would be in real life and explaining the details of it." A fellow student in this pathway commented, "The stuff here is hands on. You don't just write a report on a book. Like our [stage] set, we get [to use] power tools… It helps us understand how things work and not just writing a report on tools or something."

> *The stuff here is hands on. You don't just write a report on a book. Like our [stage] set, we get [to use] power tools… it helps us understand how things work and not just writing a report on tools or something.*
>
> *–Student in a performing arts pathway*

- A student in an engineering pathway reported that using design software in engineering class is "really helping me in understanding how to make two-dimensional, three-dimensional drawings…so that's helping me in being a game designer."
- A business academy student characterized his participation in an extracurricular tax preparation program as "pretty much job practice, training." He explained, "It's pretty fun. [I get a] lot of customer service experience. I do three to five tax preparations every Saturday.

We had to learn the basics and we had to take an ethics test…to know what's right, wrong, and what we can't do. And what to do if we have questions."

While those students who develop their career aspirations early in high school may potentially benefit the most from pathway activities that develop technical knowledge and industry-specific skills, such experiences offer the opportunity for all students to deeply engage in their decisionmaking about postsecondary plans and career options. For example, a student in a health pathway credited the authentic industry exposure she had during her internship with increasing her desire to become a biomedical engineer. Before her internship, she had "only heard about what a biomedical engineer does," whereas engaging in her rotation made her "happy because I got to see what they do."

Career Navigation Skills

Besides equipping students with 21st century skills and knowledge for postsecondary success, pathways continued to provide students with opportunities to learn how to gain entry to and navigate through the professional world.

Pathway students have been learning about the range of potential careers available in the industry sector and are being equipped to pursue their interests through support with the job selection, interview, and application process.

Consistent with last year's findings, pathway students surveyed this year were more likely than comparison students to report that high school has improved their knowledge of expectations for professional behavior (65% versus 51%), as well as their ability to create a job application letter or resume (40% versus 22%). Pathway students who participated in focus groups illustrated how they have been acquiring and applying related skills.

Pathway students surveyed this year were more likely than comparison students to report that high school has improved their knowledge of expectations for professional behavior, as well as their ability to create a job application letter or resume.

- **Career exposure and research skills:** Pathway students described career exposure and research activities that broadened their understanding of relevant career options or helped them to narrow their focus toward specific interests. For example, a student in a health pathway described, "We wrote down three careers we were interested in. We tried to find someone who worked in that profession…emailed the person back and forth…to gain insight into…[their] career. We wrote a reflection, a summary of the whole experience of talking to the person and what we learned." Many of the students in this focus group also acknowledged how their pathway experience exposed them to health careers beyond those of a doctor or nurse (e.g., scientist, engineer, public health worker). A student in a performing arts pathway mentioned a career day when "You found out about jobs you never knew about," while a student in a computer technology pathway credited his animation internship for helping him figure out his professional interests and related opportunities.
- **Comfort with the job application process:** Pathway students continued to grow more comfortable with various components of the job application process. Students in a health pathway described learning how to write compelling personal statements, create resumes, solicit recommendation letters, and communicate effectively during job interviews. Students in another health pathway described learning how to dress, what time to arrive, and what to say through practice job interviews.

Pathways continue to integrate college and career navigation into classwork and work-based learning experiences, as they recognize that piquing students' career interests is most productive when they simultaneously equip students with the skills, knowledge, and dispositions they will need to succeed in their postsecondary pursuits.

Postsecondary Plans

As we have seen, pathway students were more likely than comparison students to report that high school helped them improve a variety of skills applicable to their postsecondary plans. Consistent with the findings on skills, pathway students also were more likely than comparison students to perceive that high school would prepare them for the career of their choice (79% versus 69%) and for college (92% versus 87%). Pathway students also reported high college aspiration rates, as we discuss next.

Pathway students were more likely than comparison students to perceive that high school would prepare them for the career of their choice and for college.

Almost all pathway and comparison students planned to complete a two-year college, four-year college, and/or graduate school program.

According to our survey findings, nearly all pathway and comparison students planned to attend a two-year college, four-year college, and/or graduate school, although this percentage was slightly greater for pathway students (95% versus 92%). Smaller percentages of pathway and comparison students reported plans to attend a technical or trade school (37% and 38%). Approximately half of pathway students indicated that their pathway experience had helped them know that they wanted to continue their education beyond high school. Not all students, however, connected their postsecondary education plans with their ultimate career goals. In fact, less than half of pathway students reported that high school had helped them figure out what career they wanted (30% versus 20% of comparison students) or to identify the education needed to attain that career (42% versus 28% of comparison students). Data from focus groups indicated that students had varying motivations for aspiring to attend college, with financial and career-driven motivations both evident.

- **Financial:** A student in a performing arts pathway said that she wanted to attend a four-year college because "I don't want to work for minimum wage." Similarly, a student in a business pathway said, "You can't get a well-paid job without going to college. You'd probably be flipping burgers."
- **Career-driven:** Students in a health pathway had already identified which undergraduate majors they were interested in pursuing in order to achieve their specific professional goals, such as enrolling in an engineering, biology, chemistry, psychology, premed, or business undergraduate program. A student in a STEM (science, technology, engineering, and mathematics) pathway explained how she was originally planning to pursue nursing "because [it required] less education and time in college," but her pathway teachers helped her realize, "I can strive for more. Teachers here help me build confidence to be a surgeon [which requires an] eight-year education."

Although statistically significant, the magnitude of the difference between percentages of pathway and comparison students who planned to attend college or graduate school was small, perhaps because a growing number of youths are recognizing the value of a college education, and schools across the country have integrated college readiness for all students into their goals. Furthermore, college aspirations on their own are not the strongest driver of college enrollment and graduation.

For example, recent research has found that in multiple school districts serving large numbers of low-income students such as the Boston Public Schools, Fulton County Schools, and Chicago Public Schools, as many as 1 in 5 high school graduates failed to enroll in college in the fall (Castleman, Page, & Schooley, 2013). Researchers termed this phenomenon the summer "melt," which most greatly affects students of low socioeconomic status. While college aspirations are promising, college enrollment and persistence are harder to realize and may necessitate their own set of unique supports.

Implications

Districts have made significant efforts to engage students in completing high school and pursuing college and career plans. Consistent with evaluation findings from previous years, pathway students continue to credit their high school experience with equipping them with the 21st century knowledge and skills, productive dispositions and behaviors, technical knowledge and skills, and career navigation skills to help them succeed in a broad range of postsecondary options. The vast majority of pathway students also aspire to attend college. However, it remains to be seen how many pathway students' college-going aspirations manifest into actual college enrollment, persistence, and gainful employment.

Pathways emphasize not only student preparation for entry to a specific industry, but also opportunities to learn broadly applicable skills and behaviors that can attract and retain diverse student populations including those from low socioeconomic backgrounds. The extent to which these approaches can engage students in school, where traditional academic instruction has not always succeeded, can begin to establish a foundation and enthusiasm for continuous learning. Ultimately, district efforts to support all their alumni in attaining postsecondary success will require a more systematic, longer term approach, particularly as more Linked Learning graduates enter higher education and the workforce.

Chapter 6: Student Engagement and Achievement

Key Findings

- Students in certified Linked Learning pathways compare favorably with similar peers (students in the same district with similar demographics and prior achievement) on measures of engagement and school success in 9th, 10th, and 11th grades, although results vary by district.
- In five of eight districts, pathway students show greater engagement than similar peers on at least one measure.
- Pathway students tend to make substantially more progress toward high school graduation and college eligibility than similar peers. The sizes of differences on these measures indicate that Linked Learning has the potential for a meaningful impact on long-term student educational attainment.
- Comparisons of student performance on tests of English language arts and mathematics content knowledge provide mixed findings.

In preceding chapters, we learned about the district and pathway structures that shape the Linked Learning student experience and discussed ways in which pathway students might be more college and career ready than comparison students. This chapter delves into the academic achievement of students in certified Linked Learning pathways, comparing them with students in the same district who have similar demographics and prior school achievement.

Our findings show that, compared with similar peers, students in certified pathways may be more engaged and make significantly more progress toward graduation each year, though these differences in student behavior do not seem to lead to higher scores on standardized tests of English language arts and mathematics content knowledge. The most notable differences between pathway students and similar peers in their district are in credit accumulation. Certified pathway students accumulated more credits in the 9th grade than similar peers in all six districts with four-year pathways. In one district, 10th-grade students in certified pathways gained an average of 11 more credits—the equivalent of two semester courses—than similar peers.

College readiness comparisons provide positive but somewhat inconsistent results, with pathway students in five of eight districts more likely to be on track to complete college eligibility requirements than similar peers. Where pathway students do outperform peers, however, the differences can be stark. In one district, the average pathway student was 17 percentage points more likely to be on track to complete college requirements than similar peers.

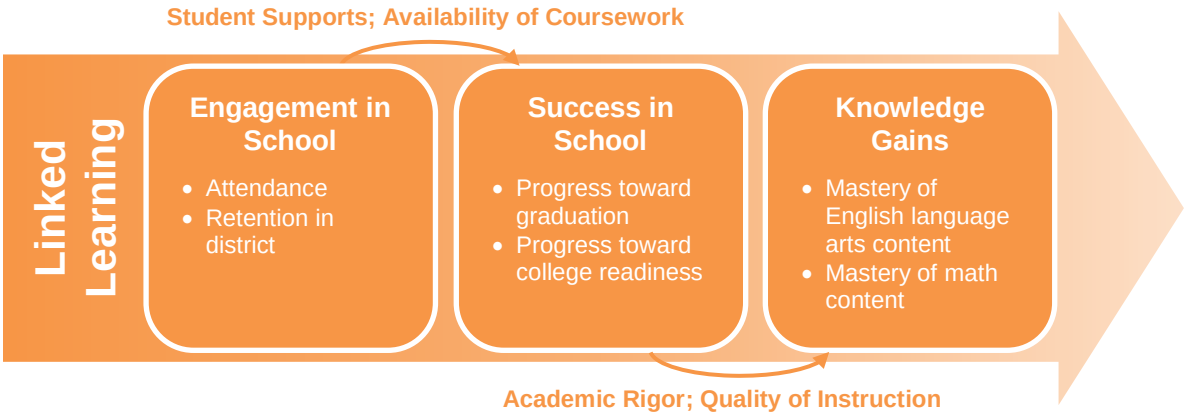
While these findings suggest that pathways may have some effect on student engagement and achievement, they also highlight areas for growth. Many of the positive findings, including completion of college eligibility requirements and measures of student engagement, are inconsistent across districts and grades. Additionally, differences between pathway students and similar peers on standardized test scores are mixed across districts, suggesting that students' greater school

success does not translate into higher scores on these measures of achievement. We explore these findings below.

How Pathways May Affect Academic Achievement

In Exhibit 6-1, we offer a framework for examining how enrollment in a Linked Learning pathway may affect academic achievement. We consider three related categories of outcomes: engagement in school, success in school, and knowledge gains. These outcomes may naturally feed back into one another: Succeeding in school and gaining knowledge could change students' dispositions toward education, thus leading to greater engagement. In our framework for this chapter, however, we estimate these outcomes separately and discuss them in terms of how tightly aligned they are with the Linked Learning approach.

Exhibit 6-1
Framework for How Linked Learning Affects Student Academic Achievement



- **Engagement in school:** Perhaps the most significant way Linked Learning differs from the traditional high school model is that it makes school more relevant for students. Several of the fundamental elements of a Linked Learning pathway—including work-based learning, project-based learning, industry themes, and student supports—have the potential to increase students' engagement in school beyond what traditional high school models can achieve. As discussed in earlier chapters, Linked Learning educators have made significant progress in putting these structures in place over the last four years. Thus, if we are able to measure this outcome effectively, we would expect to see significantly greater engagement for students in certified pathways.
- **Success in school:** Once the basic structures are in place and students are engaged in a pathway, pathways can influence students' course-taking behavior and course completion. Pathway students are generally given 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 students 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 be able to make steady progress toward high school graduation and college eligibility. However, as noted in prior chapters, many pathways still have room to grow in providing academic supports for

students. For example, many pathways find it challenging to meet differentiated student needs that require scheduling remedial or advanced coursework alongside pathway classes. As a result, although we may expect positive findings related to students' school success in Linked Learning pathways, these effects potentially could be tempered by the limited supports available to students.

- **Knowledge gains*:*** If pathway students successfully complete college preparatory courses, they should be developing measurable academic knowledge. However, instructional quality and academic rigor determine the extent to which school success leads to knowledge gains. To date, implementing the basic structures of the Linked Learning approach (e.g., work-based learning, integrated curriculum) has stretched the capacity of teachers and administrators. As a result, very few certified pathways have had an explicit focus on improving instructional quality and academic rigor, as described in Chapter 3. We may thus expect only small differences in knowledge gains between pathway students and similar peers in their district.

Here, we present the results of our analyses comparing students in certified Linked Learning pathways with similar peers in their district on measures of engagement, success in school, and knowledge gains.

Methods and Data

Students in certified pathways are those we might expect to have different academic achievement from the average student in some districts—as detailed in chapter 3, students in three districts are higher achieving than the district average in middle school, as well as less likely to be English language learners or special education students. In this chapter, we use statistical controls that enable us to compare pathway students with others in the district who are similar before entering the pathway in terms of both demographic characteristics and achievement before entering high school. What we cannot control for, however, are unobserved and unmeasured characteristics of students, such as motivation and parental support. Our models therefore can neither shed light on nor adjust for ways these unobserved characteristics may differ between pathway and non-pathway students other than those captured by prior achievement.

The models in this chapter use extant district data to estimate the extent to which outcomes for students enrolling in a certified pathway differ from the district mean, controlling for students' demographics and middle school achievement. Note that this comparison differs from student survey data, where we compare pathway students to a group of students at the same or similar schools who are not enrolled in certified pathways. For the sake of readability, we will refer to the estimations in this chapter as the predicted results for pathway students, as compared with similar non-pathway students. This phrasing is a reasonable approximation of the estimates, as 76% to 92% of students in our analyses from each district are non-pathway students. Our estimates, if anything, are more conservative than this language would suggest, as the district means include some pathway students.

We present results for eight districts. In Los Angeles, the analytic sample includes only the high schools that were originally in Local District 4 and ended up in the innovation subdistrict after district reorganization, while the entire district is in the analytic sample for the rest. For Long Beach, Pasadena, and Porterville, we provide results of analyses on students scheduled to graduate in 2013, 2014, and 2015. In Antioch, we have data on those students scheduled to graduate in 2013 and 2014. In Sacramento and Los Angeles, we have data on those students scheduled to graduate in 2014 and 2015. In Oakland and West Contra Costa, where certified pathways begin in the 10th grade, we have data on those students scheduled to graduate in 2014. We exclude Montebello for lack of certified pathways as of the 2011–12 school year, the most recent for which data are available.

The results presented in this chapter summarize the findings by presenting only the *direction* of statistically significant results—those where differences between pathway students and comparison students are large enough that they are unlikely to have arisen by chance. The numerical estimates and all supporting information are provided in the technical supplement to this report (Arshan et. al., 2014). Note that sample sizes vary by each of the outcomes we examine for several reasons, most notably district enrollment and number of cohorts represented in the analysis. These sample sizes vary from as high as 15,416 in Long Beach on the number of 9th-grade course failures (a number that represented three cohorts of students in the largest of these district) to as low as 433 on Porterville's 11th grade EAP exam (representing only a single cohort of students).

Engagement in School

In this chapter, we use two measurements of student engagement.

- **Attendance:** We expect students who feel engaged will be less prone to miss school unnecessarily than those who do not see school as a priority. Fewer days absent for students enrolled in certified pathways may therefore indicate a greater level of engagement.
- **Disruptions to educational progress:** We use retention within the district as a measure of disruptions in a student's education. Students may leave the district for several reasons. Some of these reasons, such as parental financial difficulties or job transfers, are beyond easy control of either students or their parents; these reasons should not systematically differ between pathway and non-pathway students. However, pathway enrollment may affect other reasons for leaving the district, such as dropping out or choosing to seek a better educational environment. Higher likelihood of retention within the district indicates that pathway students experience fewer disruptions to their educational progress than similar peers in their district.

Student Outcomes Tables

The tables in this chapter are meant to present the most salient results of our analysis in an easily readable way. Rather than display numerical regression estimates, the tables show whether or not those estimates indicate a desirable or undesirable association between the outcome and enrollment in a certified linked learning pathway. For more detailed results, see the text or technical supplement (Arshan et al., 2014).

In five of eight districts, there is some evidence that students in certified pathways are more engaged than similar peers.

In three of the five districts where we were able to estimate attendance, we see promising signs that students miss fewer days of school when enrolled in a certified pathway (Exhibit 6-2). On average, 10th-grade pathway students in Long Beach missed about half a day of school less per year than similar peers in 2011–12, while the differences in Oakland and Los Angeles were more than two days. For comparison, the average 10th-grader in these districts was absent for about seven days in the 2011–12 school year.

Exhibit 6-2
Student Engagement in School

		Antioch	Long Beach	Los Angeles	Oakland	Pasadena	Porterville	Sacramento	West Contra Costa
Better Attendance[a]	*During 9th Grade*		+	+				○	
	During 10th Grade		+	+	+			○	○
	During 11th Grade		○						
Higher Likelihood of Remaining in District	*Through 10th Grade*	+	○	○		○	○	○	
	Through 11th Grade		+			○	+		

KEY:

+ Positive and statistically significant association with enrollment in a certified pathway

\- Negative and statistically significant association with enrollment in a certified pathway

○ No statistically significant association

No certified pathways in the district for the cohorts studied

Data requested but unavailable

Source: District-provided student data.

[a] Our measurement of attendance was number of absences. A desirable attendance outcome being fewer absences, our estimates for certified pathways are negative for districts with a + for this outcome. For example, the estimated number of days absent in Long Beach is significantly lower than that of similar peers, so Long Beach has a + for this outcome.

Exhibit Reads: The estimated number of days absent in Long Beach for 9th–graders in certified pathways is significantly lower than that for similar peers in their district, as denoted by the plus sign to indicate greater attendance for students in certified pathways.

We see a positive indication of retention within the district from either 9th to 10th or 9th to 11th grade in three of the six districts with four-year pathways, although the results were not always consistent across grade levels. Where these findings were statistically significant, certified pathway students were between 3 and 7 percentage points more likely than similar peers to remain in the same district from the 9th grade. These findings indicate that pathways may be more likely to engage students so that they are motivated to remain in school. Higher retention through the 11th grade in two of the three districts for which we can analyze these results is an especially promising finding, as older students are more prone to drop out.

Overall, these results are less consistent than we might expect given the high potential of Linked Learning structures to affect student engagement. One explanation is that the available measures do not fully capture how engaged students feel in school.[12] In four of the districts, the results indicate that pathway students, on average, spend more time in the districts' schools, which could lead to greater success in school and more substantial knowledge gains. To look for evidence that engagement translates into success in the classroom, we next turn to indicators of students' academic progress.

[12] As mentioned above, retention in district is only a proxy for dropping out; measuring actual dropout rates might lead to different results. Moreover, roughly 50% of students had zero absences, so it is reasonable to expect that many of the absences we observed are due to illness or other uncontrollable factors.

Success in School

Even if students are regularly attending school, they cannot progress through high school and toward college or career without successfully completing the necessary coursework. We examined the following indicators of student success in school:

- **Progress toward high school graduation:** Fewer course failures and greater number of credits accumulated in each grade indicate successful progression through high school. These measures are strongly associated with students' likelihood of graduating from high school.[13]
- **Progress toward college eligibility:** We examined the extent to which students in certified pathways complete the coursework necessary to enter the University of California or California State University systems.[14] Both four-year college systems in California require that students complete a set number of courses across academic subjects and earn a grade of C or better (these courses are collectively referred to as the *a-g requirements*). Given the importance of the a-g requirements for California high school students, we asked whether an average student in each district was more likely to complete the grade-level recommended – coursework if enrolled in a certified pathway.

Students enrolled in certified pathways are making greater progress toward high school graduation than similar peers, particularly in 9th and 10th grade.

Exhibit 6-3 presents estimates of credit accumulation and course failures. These measures paint a fairly strong and consistent picture that Linked Learning students are successfully progressing through high school, with greater credit accumulation standing out as a particularly powerful finding.

[13] The Consortium on Chicago School Research found that students in Chicago Public Schools who earned at least 25% of the credits necessary for high school graduation and failed no more than a single semester of an academic core course by the end of their freshman year of high school were 3.5 times more likely to graduate from high school than those who did not (Allensworth & Easton, 2005).

[14] We use the grade-level classes suggested by the University of California's Transcript Evaluation Service to determine what coursework students should have completed by the end of each grade. At the end of 9th grade, this means two semesters each of an English (b) and math (c) class and four other semesters of a-g–approved classes. At the end of 10th grade, being a-g on track requires completion of four semesters of English, four semesters of math, and six other a-g approved semesters. At the end of 11th grade, being a-g on track requires completion of six semesters each of English (b) and a math (c) classes, two semesters each of history/social science (a), laboratory science (d), and language other than English (e) classes, as well as four additional a-g–approved classes. Students must earn a grade of C or higher in each semester for the class to count toward a-g completion. Our a-g on track indicator does not include courses above the number required for UC admission (e.g., more than two semesters of "g" courses). We also exclude a-g courses taken in middle school because we lack consistent course data for grades prior to the 9th. We assume that students who consistently take math CSTs beyond Algebra I (i.e., Geometry, Algebra II) have successfully completed two semesters of math (c) curriculum in middle school.

Exhibit 6-3
Progress Toward High School Graduation

		Antioch	Long Beach	Los Angeles	Oakland	Pasadena	Porterville	Sacramento	West Contra Costa
More Credits Earned	*During 9th Grade*	+	+	+		+	+	+	
	During 10th Grade	+	+	+	+	+	○	+	+
	During 11th Grade		+			+	○		
Fewer Courses Failed	*During 9th Grade*	-	+	○		○	+	○	
	During 10th Grade	○	○	+	○	○	+	○	○
	During 11th Grade		○			○	○		

KEY:

+	Positive and statistically significant association with enrollment in a certified pathway	-	Negative and statistically significant association with enrollment in a certified pathway
○	No statistically significant association		No certified pathways in the district for the cohorts studied
	Data requested but unavailable		

Source: District-provided student data.

Exhibit Reads: The estimated number of credits earned in Antioch for 9th-graders in certified pathways was significantly greater than that for similar peers.

In all eight districts, Linked Learning students earned more credits than similar students in their district during at least one grade (Exhibit 6-4). Ninth-grade students in certified pathways earned significantly more credits in all six districts with four-year pathways, ranging from 3.4 to 12.7 more credits. Tenth-grade pathway students also did well on credit accumulation in most districts. In the seven districts where the difference between pathway tenth-graders and similar peers was statistically significant, pathway students earned between 2.2 and 11 more credits. For comparison, the average student in each district accumulated about 55 credits (roughly 25% of the credits needed to graduate) each year in these grades. Extra credits in early grades may provide pathway students with a buffer against later failures, thereby preventing them from falling off track toward graduation.

Exhibit 6-4
Difference in Number of Credits Earned Between 9th- and 10th-Grade Pathway Students and Similar Peers

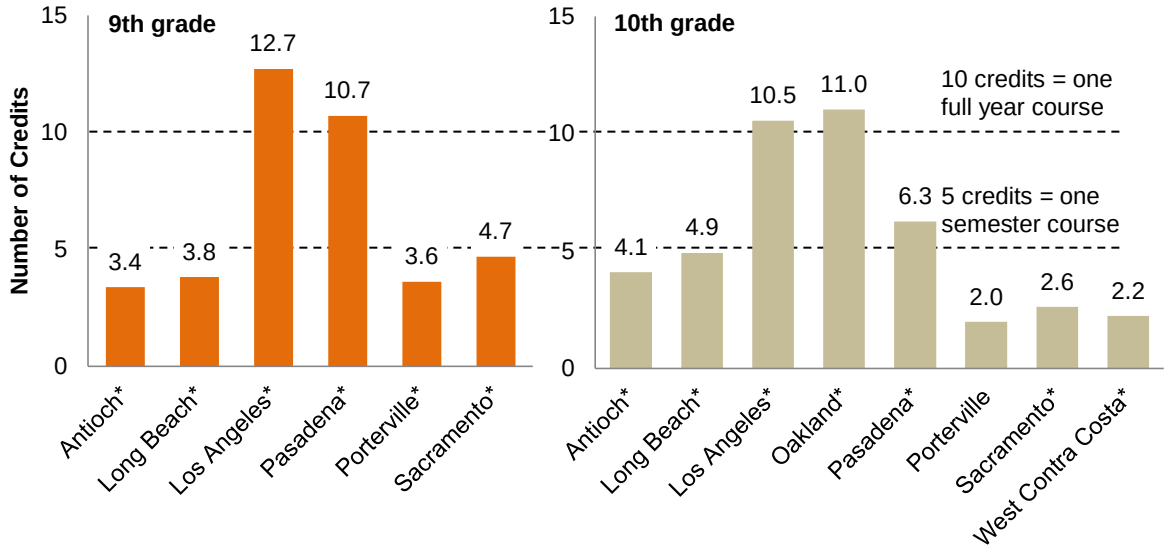


Exhibit Reads: 9th-grade pathway students in Antioch earn an estimated 3.4 more credits than the average student in the district.

Source: District-provided student data

*Difference between pathway and district students is statistically significant at $p < .05$.

In addition, in two of the six districts with four-year pathways, pathway freshmen failed fewer courses than similar peers. In Antioch, students in certified pathways were more likely to fail classes; until the 2012–13 school year, one certified pathway had a "no D" policy, which may have increased the number of failures. In Porterville and Los Angeles, 10th-grade certified pathway students failed fewer classes than similar peers.

Overall, higher numbers of credits earned and lower numbers of courses failed indicate that students in Linked Learning pathways are making greater progress toward high school graduation each year than similar peers. We next consider to what degree they are also progressing toward college eligibility.

There is some evidence that students in certified pathways are more likely than similar peers to be on track to complete the a-g requirements.

Pathway students in some districts seem to be making greater progress toward college eligibility—as measured by completion of a-g courses—than similar students in their district, particularly early on in their high school careers. Exhibit 6-5 shows that in five of the eight districts, pathway students are more likely to be on track than similar peers in the 9th or 10th grade.

Exhibit 6-5
Progress Toward College Eligibility

		Antioch	Long Beach	Los Angeles	Oakland	Pasadena	Porterville	Sacramento	West Contra Costa
Higher Likelihood of Being on Track to Meet the a-g Requirements	*Through 9th Grade*	+	+	+		+	○	○	
	Through 10th Grade	+	+	○	○	+	○		+
	Through 11th Grade		○			○	○		

KEY:

+ Positive and statistically significant association with enrollment in a certified pathway

\- Negative and statistically significant association with enrollment in a certified pathway

○ No statistically significant association

No certified pathways in the district for the cohorts studied

Data requested but unavailable

Source: District-provided student data.

Exhibit Reads: The estimated likelihood of being on track to complete a-g requirements in Antioch for 9th-graders in certified pathways was significantly greater than that of similar peers.

[a] The statistical models were unable to include one of Long Beach's four certified pathways in the a-g analysis for the class of 2013, as this group lacked variation in the outcome variable. As the class of 2013 was the only cohort for which we have 11th- grade data, this pathway was excluded from the 11th-grade a-g on track analysis.

[b] Because of data limitations, we were not able to conduct the 10th-grade a-g on track analysis in Sacramento.

In 9th-grade, pathway students in the three districts for which we have significant results are between 4 and 17 percentage points more likely to be on track to complete the a-g requirements. Tenth-grade pathway students in four of the seven districts for which we had data on this outcome are statistically significantly more likely to be on track to complete the a-g requirements. The differences ranged from 6 to 17 percentage points. Exhibit 6-6 shows the magnitude of the difference between 10th-grade students in certified pathways and similar peers on this measure.

These are promising findings, since a-g completion is an important step for students who wish to attend a public university in California. However, between 62% and 84% of 9th- graders were not on track to be eligible for enrollment at a California public university in the six districts for which we analyzed these data,

Exhibit 6-6
Likelihood of Being on Track to Complete a-g Requirements at the End of 10th Grade

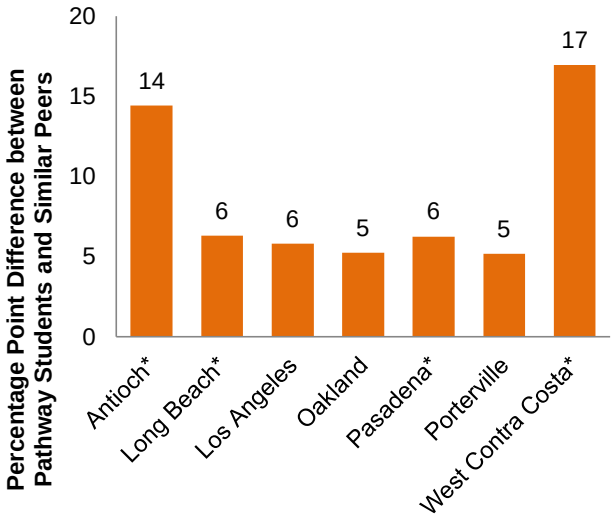


Exhibit Reads: 10th-grade pathway students in Antioch are 14 percentage points more likely than the similar peers to be on track to complete the a-g requirements.

Source: District-provided student data.

*Difference between pathway and district students is statistically significant at $p < .05$.

indicating that there is still progress to be made. Moreover, the insignificant results for 11th-graders suggest that more work is needed to ensure that early gains translate to meaningful long-term outcomes.

Overall, higher credit accumulation, lower numbers of failed courses, and a higher likelihood of being on track to complete the a-g requirements indicate that students in certified pathways are making steadier and more significant progress toward high school graduation and college eligibility than their peers. In the next section, we look to standardized measures of content mastery to see whether pathway students' success in school is translating into greater knowledge gains.

Knowledge Gains

We use a set of standardized test scores to measure academic knowledge. These tests measure mastery of the content the State Board of Education considers most important, set the bar for high school graduates in the state, and indicate readiness for college-level work. Specifically, we use the following indicators to measure the knowledge gains of pathway students and their peers:

- **Mastery of English language arts (ELA) content:** Mastery of ELA content standards is assessed by 9th- through 11th-grade ELA California Standards Test (CST) scores and 10th-grade California High School Exit Exam (CAHSEE) scores. Students' readiness for ELA college work is indicated by a *ready* or *conditionally ready* status as determined by the CSU's Early Assessment Program (EAP) test.
- **Mastery of mathematics content:** Mastery of mathematics content standards is assessed by 10th-grade CAHSEE scores.[15]

The differences between pathway students and similar peers on standardized tests of ELA and mathematics content mastery are inconsistent across districts.

Pathway students in five of the eight districts outperformed their peers on at least one test of ELA or mathematics content knowledge, although the findings in most of these districts were not consistent across grades or exams (Exhibit 6-7). Only 10th-grade pathway students in Oakland consistently out-scored their counterparts on content exams. In the remaining three districts, pathway students did not perform better than their peers. Two of these districts, Sacramento and West Contra Costa, show neutral findings on nearly all measures, while Pasadena's pathway students consistently performed lower than similar peers in the district.

[15] As CSTs in mathematics in high school are course specific, they do not provide a consistent measure of mathematical ability across all students in the same grade and are therefore excluded from our analysis. The EAP exam in mathematics was excluded from the analyses because it was taken by less than 50% of 11th-grade students.

Exhibit 6-7
Mastery of English Language Arts and Mathematics Content

		Antioch	Long Beach	Los Angeles	Oakland	Pasadena	Porterville	Sacramento	West Contra Costa
ELA CST Score	*9th Grade*	+	+	+		-	○	-	
	10th Grade	○	○	○	+	-	○	○	○
	11th Grade		○			-	○		
ELA CAHSEE Score	*10th Grade*	○	○	○	+	○	+	○	○
ELA EAP Status	*11th Grade*		○			-	○		
Math CAHSEE Score	*10th Grade*	○	-	○	+	-	+	○	○

KEY:

+ Positive and statistically significant association with enrollment in a certified pathway

- Negative and statistically significant association with enrollment in a certified pathway

○ No statistically significant association

No certified pathways in the district for the cohorts studied

Data requested but unavailable

Source: District-provided student data.

Exhibit Reads: The estimated ELA CST score in Antioch for 9th-graders in certified pathways was significantly greater than that of similar peers.

[a] One of Sacramento's certified pathways is a stand-alone pathway at a charter school that does not provide the districts with CST scores. CST models therefore exclude this certified pathway in each grade.

Overall, the largely insignificant results in six of the eight districts—Antioch, Long Beach, Los Angeles, Porterville, Sacramento, and West Contra Costa—provide little evidence that pathway students systematically differ from their peers in their mastery of the content knowledge measured by the available exams. Even where the results are significant for these districts, the magnitude is often too small to make a practical difference—pathway students' scores in these districts differ from the scores of similar peers by four points or fewer on the ELA CST, a test on which 50 points separate basic from proficient performance.

Pathway students do appear to perform differently from their peers in Oakland and Pasadena, where estimates are consistently positive and negative, respectively, and estimates of differences are roughly twice as large as in the other five districts. In both Oakland and Pasadena, we hypothesize that these results may speak partially to the appropriateness of the comparison groups as opposed to the strength of the Linked Learning approach. In Oakland, where the mean 10th-grade ELA CST results are significantly lower than in most other districts in our study (only West Contra Costa's are comparable), pathways may be seen as stable alternatives to large comprehensive schools that have seen frequent changes in leadership and structure over the past few years. We found a positive result when comparing the 9th-grade outcomes with the rest of the district, despite the fact that

Linked Learning does not begin until the 10th grade in Oakland. Likewise, in Pasadena, the comparison group includes one of the highest-performing public schools in the country, which enrolls 25% of the district sample, and may not provide an appropriate comparison for certified pathways in the district. The district made a conscious decision to develop pathways in the lowest-performing schools as a turnaround strategy for reconstituted schools. We found that in Pasadena, unlike in other districts, traditional high schools tended to outperform the district average on standardized test score outcomes.[16]

The content measured by these exams may provide an additional explanation for the mixed findings. The majority of the measures focus on ELA, and provide minimal information on the quality of instruction provided in other subjects not covered, including science, social studies, and career and technical education. Even though we do have information on one mathematics exam, the content measured by the CAHSEE mathematics exam falls below grade level for most 10th-graders—it primarily measures mastery of California 6th- through 8th-grade mathematics standards, with a small amount of Algebra I. This measure is less than ideal for the pathways under consideration, given that each district has at least one certified pathway with an industry theme that more naturally lends itself to a focus on mathematics rather than ELA (e.g., engineering, business, health).

While these exam results thus cannot provide a complete picture of the knowledge gains made by pathway students, we would expect students' increased success in school to translate into greater achievement gains on the available measures. The incomplete nature of these measures may provide some explanation as to the lack of positive findings, but these results also point toward a lack of focus on curricular rigor and instructional quality, consistent with findings noted elsewhere in this report.

Implications

As the first cohorts of Linked Learning students approach high school graduation, there are some promising signs that their enrollment in certified pathways may have led them to higher engagement and more success in school than they would have reached otherwise. Furthermore, preliminary analyses of the differences between certified pathways and other thematic programs indicates that important differences may exist between Linked Learning certified pathways and other programs with similar features, such as a small cohort or a career theme. On several measures, certified Linked Learning students seem to outperform not only their peers as a whole, but also similar students in programs that have not yet adapted all components of the Linked Learning approach.[17] Future evaluation work will explore these differences in more detail.

Given how central the idea of relevance is to the Linked Learning approach, the evidence that pathway students are more engaged in school is weaker than we might expect. Of the eight districts included in our analysis, only five showed statistically significant positive differences for pathway students on measures of engagement, and even then results were inconsistent across measures and grades. However, there is reason to believe that our estimates may understate the differences on this outcome. We find the strongest and most consistent results on the success in school outcomes. Students in certified pathways in each of the eight districts outperformed their peers on at least one measure of success in school, and the differences, particularly in terms of credits earned, are

[16] Comparisons among estimates of different pathway types can be found in the Technical Supplement.

[17] These preliminary estimates of the performance of students in noncertified programs come with significant caveats and therefore are not presented in the main text. For the purposes of this analysis, "noncertified programs" are those that (1) have enrollment records maintained in the district data systems, (2) have a small cohort, and (3) typically have a career theme. See Technical Supplement for detail.

meaningful. The default curriculum and comparatively supportive environment in many pathways may help students progress successfully through high school and toward college. Taken together, the outcomes in engagement and school success indicate that pathway students are doing their part to further their education: coming to school, taking the right classes, and passing them. Unfortunately, these actions do not seem to be translating into knowledge gains for students. A stronger focus on curricular rigor and instructional quality could help translate pathway students' more active participation in schooling into powerful learning gains.

Chapter 7: Lessons Learned from the District Initiative

For the past four years, The James Irvine Foundation has invested heavily in supporting a demonstration of a systemic approach to Linked Learning in nine California districts. The Linked Learning District Initiative, along with California's new AB 790 Linked Learning Pilot Program, is part of an extensive national dialogue about how to prepare young people for college and 21st-century careers. The nine districts' successes and challenges with Linked Learning systems implementation over the past four years are highly instructive for the broader education and policy community in California and across the nation, as well as for continuing Linked Learning districts and those just beginning to engage with or scale up Linked Learning. Especially given the planned expansion of Linked Learning into many more California districts, this is an appropriate time to reflect on what we have learned about creating coherent systems of pathways—a very different task from developing a single pathway program. The most recent findings from our ongoing analyses of Linked Learning student engagement and achievement data merit attention as well. While not conclusive, the findings are certainly encouraging, particularly with respect to students' progress toward high school graduation and college eligibility.

The nine districts' experiences directly inform a set of elements that are essential for Linked Learning implementation, including critical district structures, policies, and practices; necessary pathway components; and the aligned external technical assistance, partnerships, and networking opportunities that help a district's system of pathways succeed. In this chapter, we describe how districts might begin to create conditions for successful systemic Linked Learning implementation; detail the essential elements for districts, pathways, and external coaches and partners; and discuss implications and next steps for districts, partners, and the field more broadly. We draw on four years of interviews with district, school, and pathway staff, students, technical assistance providers, and other Linked Learning partners, and we supplement these data with our own knowledge of best practices in district reform.

Initial Steps for Successful Linked Learning Implementation

A common question among Linked Learning stakeholders—especially those from districts new to the initiative—is how to approach the many and varied components of Linked Learning and specifically where to begin.

Although there is no definitive recommended order for implementing each of the essential Linked Learning components, the collective experiences of the pilot districts do suggest a sequence of logical starting points.

All the elements we describe in the rest of this chapter are important for districts to develop as they work to improve student outcomes through Linked Learning. However, the experience of districts participating in the initiative cautions against trying to focus on too many components at once. Every district is unique, and what is essential for one district to focus on at any given point as it develops Linked Learning-aligned policies, structures, and instructional practices depends largely on the policies, structures, and practices already in place. A district's capacity, culture, and the confluence of Linked Learning with other initiatives can also inform what a given district's immediate areas of focus should be. Accordingly, the first key lesson in a ConnectEd guide for developing a system of Linked Learning pathways states that "There is no one 'right way' to plan and implement a system of quality pathways. In each community, the process will take various twists and turns, and it will progress at different rates" (Stearns, 2012a).

Still, the various paths to successful implementation of a system of Linked Learning pathways have a common set of starting points. Echoing our own assessment, ConnectEd encourages districts at the outset to gain broad stakeholder support for Linked Learning. Such a focus requires that districts invest up front in creating and communicating a Linked Learning-specific districtwide vision and leadership structure. More precisely, ConnectEd suggests that districts spend the entire first year and a portion of the second year laying the groundwork and assessing readiness for Linked Learning, then creating a well-informed plan, then formalizing leadership and implementing a communications strategy, and finally beginning to dedicate resources and create conditions to sustain pathways—all before turning to the details of pathway implementation (Stearns, 2012a).

Planning can be time consuming, and it can be tempting for districts to jump straight into developing specific pathway components. However, districts seeking to develop coherent systems of pathways have "found that taking time to build support and plan collaboratively helped them implement and sustain their vision" in the long term (Stearns, 2012a). As the external evaluators who have followed this initiative for four years, we could not agree more. Accordingly, we encourage districts new to (or struggling with) implementation of Linked Learning to begin by developing the common vision, leadership and communication strategies, and district supports described next and then work closely with internal staff and external coaches to determine where and how to proceed, paying close attention to classroom instruction as well as pathway structures.

Essential District Structures, Policies, and Practices

During the 2012–13 academic year, we asked district and school administrators, pathway leads, coaches, and technical assistance providers to reflect on the systems, practices, and organizational structures that districts need to support and sustain a system of Linked Learning pathways. Elements that respondents identified as "nonnegotiable" centered around common vision and communication, active and explicit support of that vision by district leaders, the presence of a dedicated Linked Learning director with the appropriate resources and positional authority to oversee implementation, and the active participation of a broadly representative Linked Learning leadership team.

It is essential that educators across the district understand and buy in to a common vision for Linked Learning, requiring district leaders to first establish and then communicate that vision.

For Linked Learning to succeed, respondents across the nine districts agreed that the most essential element is for educators at all levels of the system to buy in to and support Linked Learning—from the superintendent, the executive cabinet, and school board to principals, assistant principals, teachers, and counselors. While districts should regularly engage with and involve site leaders and teachers in Linked Learning decisions, achieving this buy-in and commitment is an iterative process that begins with district leaders.

Establishing a clear vision for how Linked Learning will improve student outcomes: Districts are best positioned to create collective buy-in when their leaders establish a concrete vision for Linked Learning implementation and desired student outcomes. Equity and access should be at the core of this vision so that *all* high school students are included, should they opt to enroll in a pathway. To create a clear shared vision for how Linked Learning might function in their district, district leaders must first develop a deep understanding of what Linked Learning entails, its potential student outcomes, and how these components and outcomes align with the district's preexisting priorities and initiatives. Next, with guidance from external Linked Learning coaches and input from pathway staff, school leaders, and other district departments, district leaders should oversee a process to develop and tailor this vision to the district. One especially helpful exercise for district vision

development is to create a Linked Learning graduate profile—defined by ConnectEd as "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, 2012a)—to help internal and external stakeholders understand more concretely what the district aims to achieve through Linked Learning.

Creating a communication plan that positions key district leaders as visible and public champions of Linked Learning in the district and surrounding community: Once district leaders understand the components of Linked Learning and establish a common vision for how the initiative will operate in the district, they should develop and implement a comprehensive communication plan for sharing this vision widely. It is especially important for the highest-level district leaders—including the superintendent, executive cabinet, and school board—to demonstrate active and public engagement with the initiative. Having these district leaders consistently advocate for the initiative in formal presentations and informal conversations helps reinforce that Linked Learning is a long-term district priority requiring considerable attention and investment. It is in those districts where superintendents and other high-level leaders have been the most visible champions of Linked Learning that we have observed the greatest support and buy-in for Linked Learning systemwide and the most progress with implementation.

Using the district's communication plan to engage stakeholders at all levels: A district's Linked Learning communication plan should create structures for frequent, clear, consistent, and proactive communication, ideally using a variety of materials, tools, and media to ensure broad outreach. Such communication can help school leaders and staff, students, parents, and local business/community members understand the vision and implementation plan for Linked Learning and see how the related work that they and others are being asked to do fits in to the district's overall efforts to prepare every student for a range of postsecondary options. It is especially important that district communications explain how Linked Learning will align with other district priorities, such as implementation of the Common Core standards, new CTE standards, and other high school reform models (e.g., existing CPAs or NAF academies). Additionally, communication that highlights how Linked Learning can provide rigorous college and career preparation for all types of students is especially important to help all parties approach the initiative with an eye toward equity and access. A thoughtful graduate profile can help communicate and clarify a district's vision for Linked Learning and explain to all parties how the various elements are designed to fit together.

Beyond ideological support and clear communication, district leaders need to consistently demonstrate active commitment to Linked Learning.

For Linked Learning to function effectively as a district initiative, key district leaders must pair their vision for Linked Learning and communication of that vision with active efforts to establish aligned structures, policies, and practices, including but not limited to those detailed in the following paragraphs. It is the responsibility of high-level district administrators to ensure that the district removes any impediments to these structures, policies, and practices; that their colleagues follow through on implementing these components; and that these implementation efforts have the desired effects in schools and pathways.

Integrating Linked Learning into the district's broader strategic plan and enacting supportive district and board policies: By integrating Linked Learning into the district's overall strategic plan, district leaders signal that Linked Learning is a key long-term effort rather than a passing reform. This integration can also help guide district staff to ensure that Linked Learning is aligned with other key initiatives (e.g., Common Core implementation). In addition, district staff need to enact policies that support Linked Learning as a key district strategy and engage with their boards to do the same. Examples of aligned policies include guidelines for pathway recruitment, selection, and

enrollment that are consistent with district targets; layoff protections for pathway teachers and/or other human resources policies to mitigate the impact of staff turnover; clear districtwide expectations for cohort purity and master scheduling; and graduation requirements that align with pathway course loads and expectations.

Setting and enforcing expectations for school- and pathway-level educators: Beyond enacting supportive board policies and other district-level procedures that affect school and pathway staff, district leaders also benefit from being very explicit with principals, pathway leads and teachers, and other involved staff about their roles and responsibilities in pathway implementation. Such communication is especially important with principals of schools that contain Linked Learning pathways because the leaders of those schools are best equipped to help pathways succeed when they understand as precisely as possible what conditions they need to create (e.g., pure pathway cohorts, master schedules that support common planning time). Districts also benefit from developing systems to hold educators accountable to these expectations, such as including progress on components of pathway implementation in a principal's or other educator's evaluation.

Overseeing the creation or adaptation of appropriate data systems: Districts are best equipped to support Linked Learning when their data systems allow for tracking and reporting on pathway assignment, persistence, and other student outcomes of interest in a format that supports both districtwide reports and reports that can be disaggregated into specific categories (e.g., demographics, previous academic performance, individual schools and pathways). Districts also need to ensure that the appropriate staff have clear processes for disseminating the data to appropriate stakeholders and that these stakeholders have sufficient training to request reports, interpret the data, and make informed decisions.

Marshaling necessary funding for pathways: Districts need to devote funds to a variety of sources, such as professional development and training for pathway staff (including pathway leads, teachers, counselors, and administrators); release time for pathway teams to engage in planning pathway structures and instruction; staff and structures to support work-based learning at the district and pathway levels; and facilities, instructional materials, and technology that are related to the pathway theme and facilitate project-based and work-based learning. Grant funding can help support some of these efforts, but pathways benefit when district staff are also strategic in allocating resources from within the district.

Ensuring that Linked Learning structures, policies, and practices explicitly focus on equity and access: District staff should engage in explicit, identifiable efforts to attend to equity and access to ensure that all students have opportunities to participate in a Linked Learning pathway. For example, districts should examine pathway-level enrollment, demographic, and performance data alongside choice policies. By reviewing these data, district staff can identify disproportionate concentrations of certain types of students in certain pathways and can strategize about how to encourage students to consider a broader range of pathway options (for example, by modifying pathway recruitment materials and policies or changing how transportation works between schools). It is also helpful for district staff to support pathway teachers in differentiating instruction and to strategize about how to ensure that pathway cohorts and master schedules accommodate a range of student scheduling considerations, such as those of English language learners, special education students, students in need of credit recovery, and students interested in advanced coursework.

Each district requires a dedicated Linked Learning director with high-level positional authority and access to the appropriate resources to support Linked Learning.

Districts' experiences thus far indicate that a best practice, especially during the first years of the initiative, is to have a specific individual dedicated to Linked Learning to bring people together and execute the district's Linked Learning plan. The most successful Linked Learning directors either have been in a position to participate in high-level planning and decisionmaking or have had direct access to high-level decisionmakers. Operationally, this means that the Linked Learning director must either sit on the executive cabinet or report directly to someone on the executive cabinet (e.g., the assistant superintendent of curriculum and instruction) in order to have sufficient influence and effectiveness in operationalizing the initiative.

Whether the director position should be full time or whether it could be taken on part time by someone with another role (e.g., the assistant superintendent of secondary schools) depends on the district's culture and context. For example, in some small districts it may not be possible for an individual person to be dedicated full time to Linked Learning. Additionally, while it may be possible in both smaller and larger districts to phase out the Linked Learning director position over time if understanding of and buy-in for the initiative become systemically well distributed, districts stand to benefit greatly from keeping the director in place at least until Linked Learning is well entrenched in the district's way of doing business.

Beyond the Linked Learning director, districts benefit greatly from a cross-district Linked Learning leadership team that includes invested representatives of relevant district departments, as well as principals and pathway leads.

While a Linked Learning director is essential, Linked Learning cannot be the responsibility of just one individual. Sustainability requires broad-based understanding of and commitment to Linked Learning as well as distributed leadership for implementation. To this end, a Linked Learning director must have a team at the district level dedicated to executing the policies put in place by high-level district leaders and otherwise supporting Linked Learning implementation. Respondents across several districts (especially the larger ones) noted that a cross-district Linked Learning leadership team is nonnegotiable and should include representatives of many district offices—curriculum and instruction, career-technical education, human resources, facilities, counseling, and research/data/assessment, for example. Even smaller districts have staff members who work under the Linked Learning director and are dedicated primarily to supporting the initiative (e.g., as internal coaches and work-based learning coordinators).

Essential Components of Linked Learning Pathways

Although Linked Learning is a district-level initiative and many issues that affect pathways require district-level policies and structures to support consistent implementation, the day-to-day experiences and interactions of pathway students and staff ultimately define Linked Learning. In this section, we describe the essential elements of pathways and the schools they are situated in, focusing first on the core pathway components and then on pathway staffing and structures.

Students' pathway academic experiences—including technical coursework—should be not only authentic and integrated, but also sufficiently rigorous to achieve desired outcomes.

As pathways focus on developing the structures necessary for Linked Learning implementation (e.g., relevant and integrated project-based curriculum), it is essential that school and district staff realize that these structures by themselves are not sufficient to help students master academic content. A concurrent, deep, and sustained focus on helping teachers develop, scaffold, and deliver

college- and career-preparatory curriculum is also necessary for Linked Learning pathways to attain desired gains in student achievement. In the preceding chapters, we explained how academic rigor and the quality of pathway instruction determine the extent to which initial student engagement and increased success in school can translate into gains in knowledge aligned with college and career preparation. This connection dictates that districts cannot realize gains in student postsecondary preparedness and success—the ultimate goal of Linked Learning—unless pathway instruction is sufficiently rigorous.

Issues related to curriculum, instructional delivery, student assessment, and student outcomes are the joint responsibility of the district and each of its pathways. To foster consistent and equitable rigor across schools and pathways, district and school leader roles include (but should not be limited to) working with pathway staff to communicate a clearly defined vision of what rigorous curriculum and instruction should look like within a Linked Learning pathway; making explicit, clear connections between this vision for pathway instruction and other district instructional initiatives, particularly Common Core implementation; creating and distributing sample instructional materials and student work; dedicating training and collaboration time for teachers and other pathway staff; providing experts from within and/or outside the district who can support teachers in developing rigorous curriculum that incorporates authentic cross-curricular connections; and determining well-defined and complementary roles that different types of school and district staff and community partners can play in support of rigorous curriculum and instruction. For their part, pathway teachers should be open to developing their content knowledge and pedagogical foundations and making instructional shifts in support of Linked Learning and should seek out related opportunities for professional learning. These areas of focus are especially relevant as pathway teachers work to align their instructional practices with the Common Core standards, which are highly consistent with strong Linked Learning instruction. Pathway teachers should also ensure that they use available time to work with colleagues on developing curriculum and delivering instruction that is rigorous as well as authentic and integrated.

Aligned and sequenced work-based learning experiences are also central to the academic experience in a Linked Learning pathway.

Through a Linked Learning pathway, students engage in work-based learning experiences that are aligned with the pathway theme and sequenced over time. These experiences, which help set Linked Learning apart from many other high school reform efforts, require that pathways develop relationships with relevant industry partners and set up work-based learning opportunities ranging from initial exposure (e.g., guest speakers, field trips) to more involved one-on-one or small group experiences (e.g., job shadowing, mentoring, internships). This work is intensely time consuming. Districts best position pathways to provide consistent and high-quality work-based learning opportunities when district leaders invest in staff and structures to support work-based learning (e.g., district- or school-level work-based learning coordinators). These structures may vary across districts of different sizes, but work-based learning cannot be the responsibility solely of pathway leads and teachers given the competing demands on their time and, in many cases, their lack of expertise in and/or experience developing relationships with industry partners.

School and pathway staffing is critical to the success of the Linked Learning approach.

As the individuals charged with operationalizing the Linked Learning approach, principals, pathway leads, and pathway staff all have distinct roles to play in ensuring success. Each of these roles requires a high level of engagement and investment in Linked Learning. Time and training are necessary for staff in each role type to be successful.

Active and knowledgeable principal leadership and support: Interviewees in all nine districts identified strong leadership by principals (and assistant principals) in support of Linked Learning as a key nonnegotiable feature. School leaders play critical roles in creating favorable conditions for pathway implementation. Thus, they require a deep working understanding of the core Linked Learning components, the centrality of cohort purity (i.e., pathway students enrolling in pathway-specific core classes to allow for themed instruction and integrated projects), and the importance of pathway teams having common planning time and remaining intact. To foster the requisite support, districts should get principals on board early, support them with Linked Learning implementation through coaching and technical assistance, and hold them accountable for pathway development.

Pathway leads with sufficient time to fulfill their responsibilities: In addition to their own instructional responsibilities, pathway leads' many crucial roles include overseeing the development and implementation of the core pathway components and associated structures and supports; developing work-based learning opportunities; providing leadership and guidance to the pathway team; modeling how to conduct teaching and learning differently; serving as liaisons with district officials, advisory board members, and other business and community partners; and fulfilling a range of other administrative functions. Given the scope and scale of these responsibilities, providing pathway leads with a combination of release time and support from other personnel is essential for making the position sustainable and ensuring that pathway leads have sufficient time to focus on the changes in teaching and learning that are central to Linked Learning implementation. District and school staff can work with pathway leads to strategize on how to divide responsibilities, perhaps allocating some of the many administrative and logistical tasks to clerical staff or soliciting parent or community volunteers.

Collaboration among a team of engaged teachers: Pathways must be composed of a team of teachers who are sufficiently engaged with the Linked Learning approach that they are willing to come together as a community of practice to develop integrated curriculum, deliver high-quality instruction, and support students. District and school administrators should communicate early and often with pathway staff about the Linked Learning approach to foster this level of engagement. The specialized knowledge and skills that pathway teachers develop and the investment of time that this development requires explain why districts and pathways stand to benefit so substantially from human resources policies that mitigate the impact of staff turnover.

Clear expectations and aligned training for staff to provide personalized college and career counseling: Pathways best position students to succeed when they provide tailored academic and postsecondary guidance that aligns with students' individual needs and interests. Because pathways differ in their staffing structures and counselor-to-student ratios, the appropriate distribution of responsibility for providing this support may vary widely, drawing on different combinations of counselors, other pathway staff, and community organizations or online programs. Districts should work with staff in each pathway to clarify expectations about who is tasked with supporting college and career planning and in what capacities, and district staff should ensure that the appropriate staff members receive sufficient training about postsecondary options related to the pathway's theme.

A supportive master schedule that allows for pure cohorts of pathway students and collaboration time for pathway teachers is essential.

Interviewees across districts unanimously identified supportive master schedules as one of the most essential school-level structures for Linked Learning. Consistent Linked Learning implementation requires that each of a district's pathways have a master schedule that supports pure student cohorts that spend all or almost all of their school day moving through classes together and includes regular collaborative planning time for pathway staff. A pathway's master schedule must address both of these components to allow for integrated curriculum and project-based learning related to the

pathway theme. Schools tend to require considerable technical assistance as well as consistent messaging from the district to determine how to balance pathway needs with what works most efficiently for the school overall.

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.

Pathways with the strongest integrated sequences of work-based learning opportunities typically have the active support of advisory boards. Working closely with the pathway lead and/or other pathway staff, advisory board members help connect students to individual work-based learning opportunities (e.g., through job shadowing, mentoring, internships). Advisory board members also provide valuable support to pathways in sequencing work-based learning opportunities and integrating the pathway's theme into day-to-day curriculum and instruction. For example, members of strong advisory boards have helped pathway staff assess student performance on real-world tasks against industry standards and develop curriculum that is aligned with workplace expectations. Pathway leads should work with district staff and available broad-based coalition members to build relationships with industry representatives who might serve on advisory boards.

Essential External Supports

As districts and pathways work to implement Linked Learning, they stand to benefit substantially by drawing on the knowledge, expertise, and previous experience of external partners. In this section, we describe the essential elements of district and pathway coaching, partnerships with external business and community groups through district-level broad-based coalitions, and other external technical assistance and networking opportunities.

District-level coaching is essential, particularly at the beginning stages when coaches can help district leaders strategize to create the strongest possible plans and systems.

In its early stages, district-level coaching should be at its most intense, focusing on helping district leaders navigate the initial planning in a way that is as efficient as possible and reflects the district's context. Knowledgeable district coaches with experience in Linked Learning implementation are critical in supporting district staff to understand and spread foundational knowledge of Linked Learning; getting key leaders, especially the superintendent and cabinet, on board; helping shift educators' and other stakeholders' mindsets to align priorities and supports with Linked Learning; and engaging a BBC. Drawing on a coach's external perspective, political savvy, and experience articulating the value of Linked Learning to different groups can be especially valuable for district leaders during these foundational stages. Over time, the frequency of the coaching might logically diminish and its focus can shift more toward technical support.

While the frequency and intensity of pathway coaching and other specialized technical assistance vary widely across districts, pathways tend to benefit from whatever coaching and other support is available.

Pathway coaches are generally highly valued by pathway leads and others at the school site level, when and where their services are available. With district leaders often forced to decide between concentrating pathway-level coaching resources on pathways that are preparing for ConnectEd or NAF certification or distributing coaches more broadly across pathways at a lower intensity, districts may benefit from devoting additional resources to external or internal coaching positions. While the value added by additional coaching positions depends to some extent on what other supports a district's pathways already receive (e.g., from school and district leaders, advisory boards, or districtwide communities of practice), the tailored support available from a pathway

coach to meet a pathway's specific needs tends to be especially appreciated. Technical assistance providers focused on specific topics (e.g., master scheduling, development of integrated projects) were also described as valuable resources to build pathway staff expertise when training from these providers has been available.

Initial district investments in developing a strong broad-based coalition can pay considerable dividends later.

On the surface, the work of developing a strong BBC may not appear to be high priority in the early phases of Linked Learning planning and implementation. Yet early relationship building between district leaders and local business and community partners through this coalition is key to ensuring that pathways across a district consistently develop industry partnerships and support work-based learning. This early investment can also pay major dividends later as districts work to develop, expand, and sustain the initiative. Relationships built through the BBC can be key to fostering widespread long-term business and community support for Linked Learning. Sufficiently developed BBCs can also assume much of the responsibility for garnering ongoing support and resources for work-based learning across Linked Learning pathways, working in collaboration with pathway-level advisory boards that the BBC has often helped to build.

Networking opportunities within and across districts can be especially valuable when they account for local context and include collaboration time.

District and pathway staff did not always describe networking opportunities as nonnegotiable per se. However, staff explained that these opportunities have been highly valuable when they have included work time for individual pathway or district teams to discuss the content that had been presented and incorporate that content into their own pathway or district plans. Pathway staff in particular also explained that networking opportunities can be especially valuable when they are differentiated to account for local context (e.g., by grouping pathways according to theme or progress toward certification) and when they do not require large amounts of travel/time away from classrooms and regular responsibilities.

Implications and Next Steps

As a major 21st century redesign of high schools with far-reaching implications for how a given district does business, Linked Learning can succeed and sustain as a systemic district initiative only when it is positioned and supported as a long-term priority. From our four years of evaluation, we have learned that a systemic approach to Linked Learning implementation requires tremendous up-front support from and planning by high-level district leaders who create and communicate a vision for Linked Learning, foster stakeholder buy-in, and establish supportive staffing, policies, and structures *before* shifting focus to the many details of pathway implementation. District coaching is especially important in these crucial early stages because coaches can draw on their previous experiences to help district staff identify the appropriate goals, strategies, and messages.

As soon as districts do begin to address pathway-level implementation, successful implementation demands that they attend to the instructional components of Linked Learning as early and as intensively as possible. While focusing on pathway structures (e.g., work-based learning) can be tempting, it is vital for stakeholders to keep in mind that structures by themselves are not sufficient to help students master academic content, the linchpin to improving outcomes. Teachers need substantial time and training to develop, scaffold, and deliver high-quality, rigorous college- and career-preparatory curriculum; teachers' needs can be lost in the shuffle if not prioritized. To this end and in today's broader educational context, districts and technical assistance providers should take every opportunity to point out and leverage the synergies that exist between Linked Learning-

aligned instructional practices and the Common Core state standards as teachers receive training to implement the new standards.

For districts just beginning to engage with Linked Learning, such as those participating in the AB 790 Linked Learning pilot, perhaps the most important lesson is to plan and prepare for a long-term commitment to changing how stakeholders think about secondary education and how they operate or engage with high schools. Building collective buy-in and creating Linked Learning-aligned structures and instructional practices requires patience—beginning with major investments of time and energy to create and communicate a clear Linked Learning vision and message—but pays dividends in terms of smooth implementation and sustainability.

For districts continuing with Linked Learning, an important lesson from the initiative is that large-scale reform is a continuous improvement process. The essential elements outlined in this report and in ConnectEd's district framework can provide reference points to re-assess district progress as a whole, looking beyond individual pathway certification as a metric of success with Linked Learning. Districts that are several years into Linked Learning implementation can still benefit from taking the time to examine whether and where there are areas to refine their efforts—for example, by refocusing a district's common vision for Linked Learning, tightening a communication plan, or solidifying district policies and structures.

For funders, technical assistance providers, and the field more broadly, there is a critical take-away: Although Linked Learning takes years of time, money, and sustained effort to implement fully as a district initiative, there are early indicators that can signal a district's trajectory toward long-term success and sustainability. Our evaluation has confirmed that the elements that the Foundation and ConnectEd identified early on when selecting the nine districts to participate in the initiative—e.g. evidence of support from the district's board, superintendents, and principals; aligned district policies and practices—are indeed among the most essential. Funders and partners can assess a district's progress in the first two years toward developing the vision, communication, leadership structures, policies, and other conditions for successful Linked Learning implementation based on lessons learned from the district initiative. They can then use this information to provide guidance for the districts they are supporting and make informed decisions about continued investment.

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The team evaluating the Linked Learning District Initiative has been carefully documenting implementation of a system of pathways in six districts for four years and in another three districts for three years. Reflecting on the progress made by the nine districts involved in the initiative, we find that two districts have pursued a particularly successful implementation trajectory since the first year. These two districts are very different, but each has taken the resources offered through the initiative and successfully adapted them to its particular context, gradually building an identifiable system of Linked Learning pathways districtwide. A third district had a rocky start, and in Year 2 we would have predicted that successful systemic reform seemed unlikely there. Now, in Year 4, this district has made policy and staffing changes that turned its implementation story around. The key lesson from these three sites is that as Linked Learning expands, the implementation context will be different in each location, but the possibility of success will always be present, particularly if districts that are just beginning to implement Linked Learning pay attention to the lessons learned by their predecessors.

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Appendix: Research Methods

The Center for Education Policy at SRI International has been contracted by The James Irvine Foundation to evaluate the Linked Learning District Initiative. The evaluation is a multi-year study designed to examine district-level implementation of a Linked Learning system and to assess student outcomes associated with district participation in the initiative. SRI is employing a multi-method research design that includes qualitative and quantitative data collection and analysis. Here we describe our data collection methods and analytic approach.

Qualitative Methods

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 ConnectEd events that district and pathway staff attended; reviews of district documents, pathway certification reports, and relevant news stories; telephone interviews; and district site visits that included interviews and student focus groups. Here, we provide additional detail on these activities and analytic methods.

Observations of ConnectEd-hosted events. SRI research team members attended selected ConnectEd events that district teams attended. These included the 2012 Summer Institute and November 2012 and March 2013 district leadership series residencies. Researchers took notes on these meetings and talked informally with district and pathway staff.

Document and news review. The research team examined any available district Linked Learning documents, and also reviewed individual pathway certification reports to understand implementation progress and challenges. In addition, the research team monitored local news for stories to support understanding of state and district contexts.

Phone interviews and site visits. The research team conducted individual interviews in fall 2012 and spring 2013 to follow district implementation progress in all nine districts. The interview topics included districts' plans for expanding the number of Linked Learning pathways, supports for developing high-quality instruction, supports for principal leadership, collaboration with postsecondary institutions, and the role of technical assistance providers in facilitating Linked Learning implementation. In addition, we asked respondents to report on what they believed to be the "nonnegotiables" of a district Linked Learning system, e.g., district systems and organizational structures that need to be in place to support and sustain a system of Linked Learning pathways, as well as any successes or challenges to implementation more generally. We developed semistructured interview protocols covering these topics or a subset of them for key respondent categories (e.g., district leader, 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 2012, members of the SRI research team conducted a total of 37 telephone interviews with Linked Learning directors, internal coaches, and other key district administrators from each of the nine Linked Learning districts and with district and pathway coaches from ConnectEd and the LA Smalls School Center. We conducted site visits to the nine Linked Learning districts in spring 2013. During these visits, we interviewed superintendents and/or assistant superintendents, Linked Learning directors, other key district administrators, internal coaches, and district partners (industry and postsecondary institutions). In consultation with the Linked Learning director from each district, we selected up to three of the most mature pathways to visit. A team of two or three

researchers visited each of these pathways to interview principals and/or other school administrators, guidance counselors, pathway leaders, and pathway teachers. We also conducted a focus group with students in each pathway (the majority 11th-graders), for a total of 22 student focus groups across the nine districts. Finally, in all but one district we conducted a focus group with pathway leads; in some cases these focus groups included pathway teachers. Through these focus groups, we spoke with an additional 37 pathway leads (or teachers). In addition, we conducted telephone interviews with district and pathway coaches and selected staff members from ConnectEd and the LA Small Schools Center.

In total, SRI researchers conducted 253 interviews and focus groups over the course of the fall 2012 and spring 2013 data collection. Exhibit A-1 contains more detailed information about these interviews.

Exhibit A-1
Summary of Interviews and Focus Groups Respondent Types

Respondent Type	Interview and Focus Group Count	
	Fall 2012	Spring 2013
District staff	15	42
School administrators	--	28
Guidance counselors	--	20
Pathway leads	--	26
Pathway lead focus groups[a]	--	8
Teachers (not pathway leads)	--	34
Linked Learning coaches[b]	15	17
Internal coaches	6	7
Technical assistance providers and external partners[b]	1	12
Student focus groups	--	22
Total	37	216

[a] Pathway lead focus groups ranges in size from 2 to 9 respondents

[b] In a few cases, two respondents were interviewed jointly.

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.

Survey Methods

In spring 2013, the research team surveyed 11th-grade pathway and comparison students to provide an update on students' perceptions of school climate, their 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. Here we provide details about the sample and response rates for the survey. More detailed

tables summarizing the results of the survey are available in the accompanying technical supplement.[18]

Survey Sample

For the spring 2013 survey, we sampled 11th-grade pathway and comparison students in the Linked Learning districts.

Pathway Sample: We surveyed 11th-graders in all pathways across the nine Linked Learning districts that were certified as of the 2011–12 school year (Exhibit A-2). Montebello was the only district that had no certified pathways as of the 2011–12 school year, so we surveyed 11th-graders there in the four pathways the district identified as being most developed. In all districts except Long Beach, we sampled all students enrolled in 11th grade in these pathways. Because so many 11th-graders are enrolled in the four certified pathways in Long Beach (590), we sampled half the students in each of those pathways.

Comparison Sample: We determined the number of comparison students to sample based on the number needed to achieve sufficient power (80%) to detect a difference in means of .30 standard deviations for a continuous outcome variable or a difference in proportion of .15 on a dichotomous outcome variable between pathway and comparison students. We sampled comparison students from the same school where the numbers of students not enrolled in pathways were sufficient. Otherwise, the team selected comparison schools based on their similarity to the size, achievement level, and demographics of the pathway schools. We avoided charter schools and schools with special themes or programs whenever possible. Where districts had implemented wall-to-wall pathways in all schools, we sampled comparison students from selected pathways or small learning communities that were in the earliest stages of development or least aligned with the Linked Learning approach. Within comparison schools, we selected a sample of students that were academically similar to pathway students.

[18] Arshan, N., Warner, M., Caspary, K., Tyler, N., Escobar, J. R., Biscocho, F., & Black, A. (2014). Taking stock of the California Linked Learning District Initiative: Technical supplement to the fourth-year evaluation report. Menlo Park, CA: SRI International.

Exhibit A-2
Pathways Surveyed, by District

District	Pathways Surveyed, 2012–13
Antioch	Health Science and Medical Technology at Dozier-Libbey Medical High School
Long Beach	Architecture, Construction and Engineering Academy (ACE)
	California Academy of Mathematics and Science
	The Community of Musicians, Performers, Artists, and Social Scientists (COMPASS)
	PEACE Academy
Los Angeles	Los Angeles High School of the Arts
	Los Angeles School of Global Studies
Montebello	Creative Arts and Technology School (CATS)
	Culinary Hospitality Opportunities Pathway (CHOP)
	Developing Resourceful Individuals who Value Education Now (DRIVEN)
	Innovation, Child Development, Academia, Resources for Family, and Education (iCARE)
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
Porterville	Engineering Academy
	Multimedia Technology Academy
	Partnership Academy of Business
	Partnership Academy of Health Science
	Performing Arts Academy
Sacramento	Health Professions High School
	New Technology High School
West Contra Costa	Engineering Academy
	Law Academy
	Multimedia Academy

Note: All pathways were certified as of the 2011–12 school year except those in Montebello.

Survey Administration

We worked with the Linked Learning director of each district to identify district and/or school liaisons to help coordinate survey administration. We asked schools to provide us with enrollment numbers for pathway and for non-pathway classes. We then randomly sampled classrooms until we met our targeted sample size. We verified enrollment numbers with each teacher at the time of survey administration. Districts chose paper or online administration, and in some cases this varied by school within districts.

SRI researchers traveled to four of the nine districts to administer the surveys in person to reduce the burden on school staff. In the other five districts, we trained and supported district staff in administering the surveys using SRI protocols. We followed up with teachers wherever there were significant numbers of students absent on the day of administration to ensure a high response rate in all districts.

Survey Response Rate

SRI surveyed 1,656 11th-graders in certified pathways and 2,488 comparison students, excluding Montebello. We achieved an overall response rate of 83% of surveys fielded. Exhibit A-3 displays response rates for both pathway and comparison students in each district, as well as the overall response rate across the district

Exhibit A-3
Student Survey Response Rates

	Surveys Fielded	Response Rate (%)
Antioch		
Pathway	148	99
Comparison	328	82
Total	476	87
Long Beach		
Pathway	298	92
Comparison	175	88
Total	473	90
Los Angeles		
Pathway	175	78
Comparison	326	76
Total	501	77
Montebello[a]		
Pathway	99	75
Comparison	N/A	N/A
Total	99	75
Oakland		
Pathway	164	62
Comparison	472	69
Total	636	67

Exhibit A-3
Student Survey Response Rates (concluded)

	Surveys Fielded	Response Rate (%)
Pasadena		
Pathway	239	94
Comparison	225	93
Total	464	94
Porterville		
Pathway	283	91
Comparison	217	98
Total	500	94
Sacramento		
Pathway	146	90
Comparison	506	88
Total	652	88
West Contra Costa		
Pathway	203	88
Comparison	239	61
Total	442	73
Overall[b]		
Pathway	1,656	88
Comparison	2,488	81
Total	4,144	83

[a] Because Montebello did not have any pathways certified as of the 2011–12 school year, we did not survey comparison students there and do not include students from Montebello in the overall analysis of pathway and comparison students in the body of the report.

[b] Overall numbers do not include Montebello.

Survey Analysis

We compared the frequency with which pathway and comparison students reported participating in different activities and experiences related to core components of Linked Learning. Because Montebello did not have any certified pathways as of the 2012–13 school year, we did not include students from there in the overall analysis of students in the body of the report. We used a chi-squared test of independence to determine whether differences between pathway and comparison students in the survey sample were likely to represent true underlying differences in the population of students (i.e., were statistically significant at the .05 level). We used univariate analysis such as frequencies and means when presenting responses for pathway students only. For overall means and frequencies that pooled data from across the districts, we weighted both pathway and comparison respondents so that the total number of respondents in each group equaled the number of pathway students surveyed in each district. This weighting was done to ensure that the number of comparison students by district was proportional to the number of pathway students in each district in calculations of overall frequencies.

Extant Student Data and Value-Added Methods

To estimate the value added of participation in Linked Learning pathways on students' engagement and achievement outcomes, SRI researchers obtained student-level data for all nine Linked Learning districts. In eight of the districts, these data enabled us to obtain a detailed picture of the outcomes of pathway students compared with peers in the district with similar demographic characteristics and prior achievement, as presented in Chapter 6 of this report. This appendix provides an overview of the data available for each district and presents a conceptual summary of the analytic approach. A more detailed description of the analytic methods as well as the descriptive and value added results for each district are available in the technical supplement to this report. [19] This supplement displays descriptive statistics for students in each district, both the overall mean for the district and the students enrolled in each program type, regardless of inclusion in the analytic sample.

Classification into Programs

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

We assigned students to a particular pathway or school based on their 9th- or 10th-grade enrollment, depending on the lowest grade level served by certified pathways in the district. In Antioch, Long Beach, Los Angeles, Montebello, Sacramento, Pasadena, and Porterville, pathways begin in 9th grade. In Oakland and West Contra Costa, pathways begin in 10th grade.

To describe enrollment in these various academic options, we classified all program types in each district, although we focused on the outcomes of students in certified pathways. We also excluded any schools deemed out of district control (e.g., home school programs). All districts analyzed in Chapter 6 had the following program types:

- **Certified pathways**: Because pathways develop throughout the students' time in them, we considered a student to be enrolled in a certified pathway if the pathway had passed certification before the students' 10th-grade year. This classification means that students enrolled in the same pathway in different cohorts may be considered to be enrolled in different program types. We considered pathways to be certified based on Linked Learning's classification and thus included those certified by NAF in the 2012–13 school year. Exhibit A-4 shows the certified pathways in each district, including the first graduating cohort for which students in the pathway were classified as belonging to a certified pathway.
- **Themed programs**: We considered any program that is not certified but that possesses a career theme and small cohort to be a "themed, non-certified program." These programs shared some important features with the certified pathways (including a small cohort and typically a career theme) but varied in how closely they align with or aim to replicate the full Linked Learning approach. We included in the themed category programs deemed "in progress" toward certification.
- **Traditional high school**: We classified schools with neither an intentional cohort nor a career theme in this category.

[19] Arshan, N., Warner, M., Caspary, K., Tyler, N., Escobar, J. R., Biscocho, F., & Black, A. (2014). *Taking stock of the California Linked Learning District Initiative: Technical supplement to the fourth-year evaluation report*. Menlo Park, CA: SRI International.

- **Alternative schools**: We classified schools for struggling students (e.g., credit recovery programs) or students with special needs (e.g., English language learners) into one group. In Long Beach, the alternative schools category also encompassed freshman academies within three high schools that enrolled students who had not yet selected a pathway or program. Long Beach has begun to phase out freshman academies at two high schools, but one school has decided to maintain a model where all students enroll in the freshman academy and all their pathways begin in 10th grade, after the students have been exposed to each program and career theme.

There were two additional program types that do not exist in all districts:

- **Honors/IB programs**: Long Beach provides a small number of academic pathways that share a small cohort experience with the Linked Learning model but do not have a strong career theme. These programs are also among the more academically rigorous in the district, with minimum recommended GPAs and sometimes minimum test scores, middle school curriculum, and/or recommendations for entry.
- **Non-pathway 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 "non-pathway at wall-to-wall schools." We included these students in the descriptive demographic tables in the technical supplement to this report, but excluded them from the outcomes analysis.

Exhibit A-4
Certified Pathways Included in Analysis, by District

District	High School	Certified Pathway	First Cohort Certified
Antioch[a]			
	Dozier-Libbey Medical HS	Health Science and Medical Technology	Class of 2013
Long Beach[b]			
	California Academy of Mathematics and Science	Engineering and BioScience	Class of 2013
	Jordan HS	Architecture, Construction, and Engineering Academy (ACE)	Class of 2013
	Millikan HS	Community of Musicians, Performers, Artists, and Social Scientists (COMPASS)	Class of 2013
	Millikan HS	Personal success through Empowerment, Academic achievement, Conflict resolution, and Ethics in action (PEACE)	Class of 2013
Los Angeles			
	Robert F. Kennedy Community Schools Complex	Los Angeles High School for the Arts	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
Pasadena			
	John Muir HS	Arts, Entertainment, and Media Academy[c]	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 Academy	Class of 2015
	Harmony Magnet	Engineering Academyd	Class of 2013
	Harmony Magnet	Performing Arts Academyd	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 Science	Class of 2014

Exhibit A-4
Certified Pathways Included in Analysis, by District (concluded)

District	High School	Certified Pathway	First Cohort Certified
Sacramento			
	A. A. Benjamin Health Professions HS	Careers in Health	Class of 2014
	Hiram W. Johnson HS	Corporate Business 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[e]			
	Richmond HS	Engineering Academy	Class of 2014
	Richmond HS	Law Academy	Class of 2014
	Richmond HS	Multimedia Academy	Class of 2014

Note: In contrast to Exhibit A-2, included here are pathways certified in the 2012–13 school year.

[a] The two pathways certified in the 2012–13 school year will be included when Class of 2015 data is available for Antioch.

[b] Because the one additional pathway in Long Beach certified in 2012–13 (the Media and Communication pathway at Jordan High School) starts in 10th grade, it will be included when 10th-grade data are available for the Class of 2015.

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

[d] Pathway flags were unavailable for Harmony Magnet for the 2010–11 and 2011–12 school year. Both pathways are modeled jointly.

[e] The Health Academy at De Anza High School will be included when 10th-grade data is available for the Class of 2015.

Data Sources and Measures

The research team received student-level data from a third party, the Institute for Evidence-Based Change (IEBC). The research team requested 7th- through 11th- grade data for the class of 2013 (students who started 9th grade in the 2009–10 school year) in Antioch, Long Beach, Pasadena, and Porterville and 7th- through 9th- or 10th-grade data for the classes of 2014 and 2015 respectively (students who began high school in 2010–11 and 2011–12) in all nine districts. We requested data on students' background characteristics and prior achievement to allow us to examine pathway enrollment trends to include as controls in our value-added models. We requested indicators for students' gender, socioeconomic status (SES), and race/ethnicity, as well as students' special education status and whether they were English language learners or are enrolled in a Gifted and Talented program. We also requested 7th-and 8th-grade course failures, GPAs, and math and ELA CST scores.

We also requested all variables so that we could create the following outcomes measures.

Engagement in school: We used two measures of students' engagement in school: (1) attendance as measured by the number of absences per school year and (2) disruptions to educational progress as measured by whether students were retained within the school district.

Success in school: We used three measures of students' success in school. The first two measures—the number of course failures and the number of credits earned each year—captured students' progress toward graduation. Progress toward college eligibility was assessed by whether students had completed the coursework necessary to enter the University of California or California State University systems. Both four-year college systems in California require students to complete a set number of courses across academic subjects and to earn a grade of C or better (these courses are collectively referred to as the "a-g requirements"). We used a measure of whether students were "a-g on track" for their grade level, based on whether they had completed the grade-level classes suggested by Transcript Evaluation Services.

Academic achievement: Mastery of ELA content standards is assessed by 9th- through 11th-grade ELA California Standards Test (CST) scores and 10th-grade California High School Exit Exam (CAHSEE) scores. Students' readiness for ELA college work is indicated by a "ready" or "conditionally ready" status as determined by the CSU's Early Assessment Program (EAP) test. Mastery of mathematics content standards is assessed by 10th-grade CAHSEE scores. As CSTs in mathematics in high school are course specific, they do not provide a consistent measure of mathematical ability across all students and therefore were not included in our analysis.

Data Challenges

Providing all the specific data elements needed for the analysis posed a challenge for districts, which often house data elements in different data systems and are still developing systems for flagging and tracking pathway students. A number of gaps in the data meant that analysis based on student-level data was not possible in some cases or must be interpreted with caution.

- Antioch was unable to provide accurate data in this year of the evaluation. The evaluation team therefore included the data from last year's analysis (9th- and 10th-grade data for the class of 2013 and 9th-grade data for the class of 2014). These data have several gaps. First, Antioch was unable to provide pathway flags for students in 2009-10 (i.e., 9th grade for the class of 2013). Because the only certified pathway in Antioch is a stand-alone school, we were still able to estimate a certified pathway effect in Antioch but could not identify students enrolled in the one noncertified program in 2009–10. Additionally, because there was a large proportion of students with credits earned but a failing grade in the student data from

Antioch, we recalculated credits earned assuming that each class indicated five credits attempted, with these credits awarded when students earned a nonfailing course grade.

- Porterville could only provide prior achievement data for students who attended middle schools in the district, so in our student outcome analysis we could not include the approximately 50% of high school students who entered the district in high school from feeder districts. Additionally, the pathway flags submitted for Harmony Magnet—a wall-to-wall pathway school housing two certified pathways—did not identify which pathway students in the classes of 2014 and 2015 were enrolled. The evaluation team treated the entire school as a single certified pathway for the purposes of this analysis.
- Each district's data contained some records where students were listed as attending a pathway not housed at their school of record. In such cases, we assumed the school assignment was correct and recoded the students' pathway accordingly.
- Each district data set included a few more minor omissions. The evaluation team was unable to estimate models predicting the a-g on-track indicator in Sacramento because of issues with the course data file; in Pasadena, Porterville and West Contra Costa, problems with the absence data prevented an analysis of this outcome. We detail the control variables included in each district in the methodology section.

In addition to these data issues, a few facets of Linked Learning implementation limited the analysis of outcomes in three districts:

- In both Oakland and West Contra Costa, pathways do not begin until 10th grade. Analyses in these districts therefore included only outcomes beginning in the 10th grade, limiting the sample in these districts to students from the class of 2014.
- Montebello has not yet put a pathway through certification, and the results for the certified pathways were therefore not included in the main analyses. The results for other program types are presented in the Technical Report.

Analytic Sample

In all districts but Los Angeles, the analytic sample was determined by the number of cases with nonmissing values for all control variables and outcomes. In Los Angeles, an additional restriction applied: only high schools that were originally in Local District 4 and ended up in the innovation subdistrict were included, since the district reorganized during the period under study. Note that the analytic sample varied slightly among outcomes, even within the same district, for several reasons. When using retention in the district into the 10th grade as an outcome, the 10% or so of students who left the district between 9th and 10th grade were included in this model but not in any other 10th-grade outcomes. Additionally, the logistic models dropped some programs because of lack of variation in the outcome. Rather than exclude these programs from all analyses, we chose to allow the sample size of the estimates to vary slightly between models. We additionally dropped any programs with fewer than 10 students, as we deemed these programs too small to accurately estimate a value-added effect. We also dropped any nonpathway students in a wall-to-wall school. The availability of control variables varied by district (and sometimes by outcome). For a complete list of the control variables used in each model, see the Technical Report.

Value-Added Analysis

To estimate the value-added scores for models predicting continuous outcome variables, we regressed the outcome variable on a vector of centered control variables representing students' demographics and prior achievement. We used a vector of indicators for a student's program to

predict the fixed effects of each program. Next, we calculated the individual value-added estimate for each program/school by adding the individual fixed effect for that program/school to the constant term. To predict the overall district average, we weighted each program's predicted average outcome by the size of the program enrollment. We summed these weighted values, providing us with the predicted outcome for an "average" student in the district, without regard to program or school enrollment.

To predict the outcomes for the certified pathways, we multiplied the individual estimates for the certified pathways by the percentage of certified pathway students in the sample enrolled in that particular pathway. We summed these weighted values, giving us the predicted outcome for the average student in that district, if that student enrolled in a certified pathway. Our final step in predicting the value-added score was to compare this predicted outcome for the average student in that district, if enrolled in a certified pathway, with the district average for this student. To do so, we subtracted the predicted district outcome from the predicted outcome for students in a certified pathway. We refer to this difference as the "value-added" score.

Binary and count outcomes: We used logistic regression to predict binary outcomes (on track to complete a-g; at least conditionally college ready on the EAP exam, retained in district to 10th or 11th grade). We used a negative binomial model for the count outcomes (number of F's, days absent), which models count data while allowing for an individual error term for these outcomes.[20] For both types of models, we first transformed the estimates into probabilities or counts before combining the scores of different pathways or schools. Finally, we performed significance testing of these combined estimates.

Interpretation of estimates: We present all value-added estimates for certified pathways in the technical supplement. All continuous variables (credits, CST and CAHSEE scores) have been standardized and value-added scores should therefore be interpreted in standard deviation units. Count data (absences, number of F's) should be interpreted as counts of the outcome variable (that is, .5 could be interpreted as half a day or failing .5 fewer classes). Binary outcomes (a-g on-track indicator, retention in district, passing the EAP exam) should be interpreted as percentage points (.05 indicates 5 percentage points more likely to have a value of 1 in the outcome). We also visually display the value-added estimates for *all* program types through graphs showing the point estimates for each program and standard error bars representing the 95% confidence interval for these estimates.

[20] Kennedy, Peter. 2003. A Guide to Econometrics, Fifth Edition. The MIT Press, Cambridge, MA.