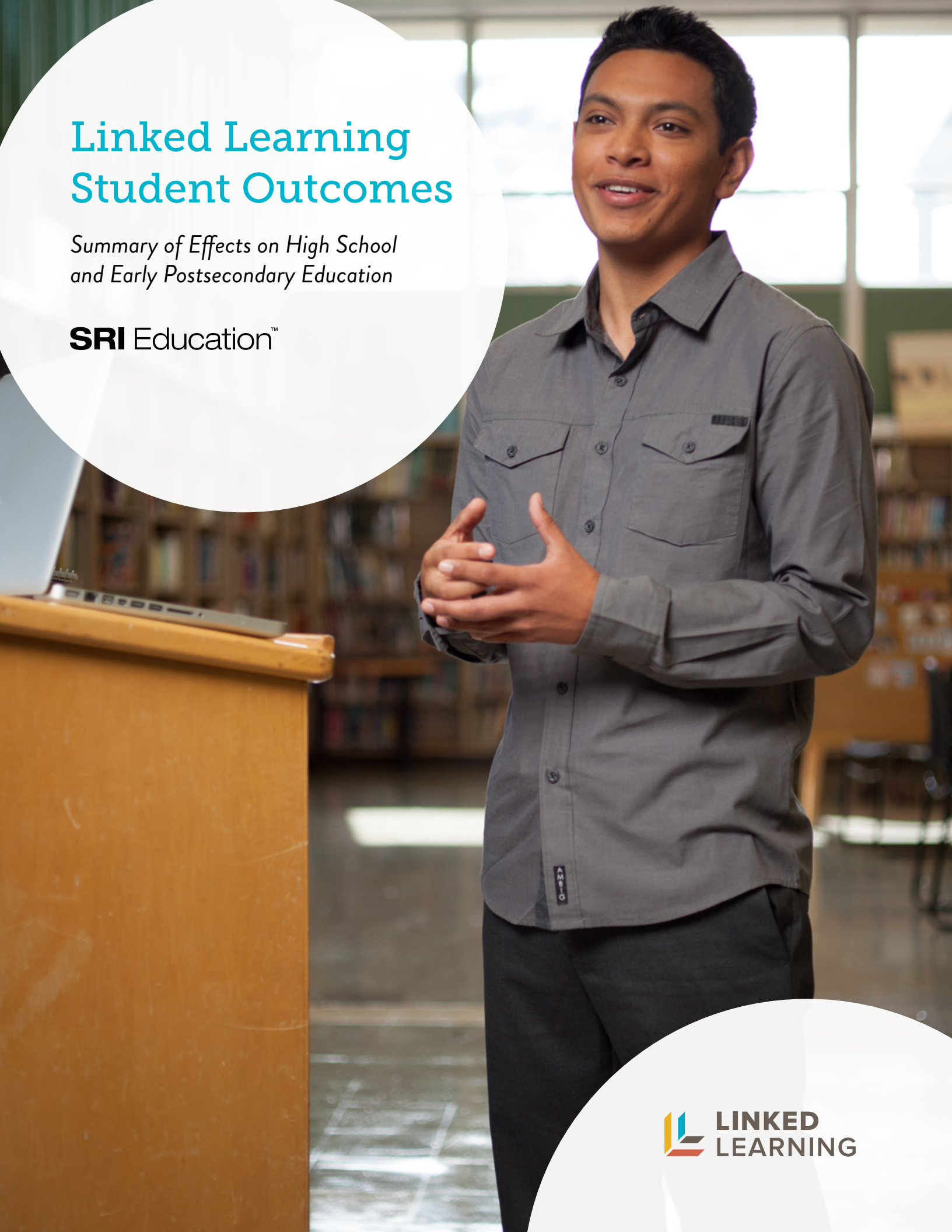


Linked Learning Student Outcomes

Summary of Effects on High School and Early Postsecondary Education

SRI Education™

LINKED LEARNING

Introduction

This research brief summarizes student outcome findings from SRI International's evaluation of the California Linked Learning District Initiative, an effort to build robust district-level systems to sustain high school career pathways in nine school districts in the state. With funding from The James Irvine Foundation, SRI conducted a rigorous multimethod evaluation of the initiative over 9 years. We reported on high school outcomes in our seventh-year report (Warner et al., 2016) and on postsecondary outcomes in a 2017 research brief (Caspary & Warner, 2017). The current brief summarizes, at the conclusion of the evaluation, these final high school and postsecondary findings; it also for the first time provides findings from an analysis of community college on-track indicators for Linked Learning students. The brief concludes with implications from our findings for policy, practice, and future research.

ABOUT LINKED LEARNING

Linked Learning is designed to prepare all high school students for college and career through pathways organized around industry sector themes. Pathways can take the form of stand-alone small schools or academies within larger comprehensive high schools. Ideally, pathway cohorts of students in every grade have their own course section for each of their classes—math, English, social studies, and a career and technical education course—so that teachers can implement integrated cross-discipline projects.

Linked Learning pathways integrate four core components: rigorous academics that prepare students to succeed in college; career technical education courses in sequence, emphasizing real-world applications of academic learning; work-based learning that provides exposure to real-world workplaces and teaches the professional skills needed to thrive in a career; and comprehensive support services to address the individual needs of all students, ensuring equity of access, opportunity, and success.

Linked Learning Certification
Linked Learning pathways can become certified by undergoing an external review process based on established pathway quality standards. Certification indicates that a pathway has attained a certain level of fidelity to the four core Linked Learning components.[1]

AN INTEGRATED APPROACH

SUMMARY FINDINGS

SRI's multi-year evaluation found that the students who participated in certified Linked Learning pathways had decreased dropout rates, higher graduation rates, more credits earned, and improved skills for success in the workplace compared to similar peers in traditional high school programs. Linked Learning had especially positive effects for students with low prior achievement. The following research findings were for students in pathways that met a level of quality indicated by pathway certification.

STUDENT SUCCESS SKILLS

Development of communication and collaboration skills, as well as information literacy.

Increased career navigation skills, including enhanced ability to create a job application letter or resume and knowledge of expectations for professional behavior.

Improved self-management skills and sense of self-efficacy.

HIGH SCHOOL ACADEMIC OUTCOMES

Student outcomes	All Linked Learning students	Linked Learning students with low prior achievement
Less likely to drop out	2.1 percentage points	4.5 percentage points
More likely to graduate	3.1 percentage points	7.6 percentage points
More credits accumulated	8.9 credits	15.5 credits

COLLEGE READINESS

Linked Learning students overall completed approximately one more college preparatory semester course than traditional high school students.

This effect was larger for students with low prior achievement—who earned 1.7 more college preparatory requirements.

Linked Learning students and their peers in traditional high schools were equally likely to fulfill the course-taking requirements for California public 4-year higher education institutions and earned similar college-admission GPAs.

EARLY POSTSECONDARY OUTCOMES

Linked Learning students overall enrolled in college, remained through the first year, and persisted into a second year at rates similar to their traditional high school peers.

Linked Learning students who entered high school with low levels of academic preparation were 5.7 percentage points more likely to enroll in college directly after high school and 4.1 percentage points more likely to enroll in a 4-year as opposed to a 2-year college.

Linked Learning students who enrolled in college immediately after high school were equally likely as their similar peers to persist to a second year, and those who entered a California community college had similar success rates in the first two years on a number of on-track indicators.

NONCERTIFIED PATHWAY PARTICIPATION

The evaluation found fewer benefits from participation in pathways that did not undergo this quality review process. These benefits were exclusively related to dropout and graduation. Noncertified pathway students were 1.9 percentage points less likely to drop out before 12th grade and 2.9 percentage points more likely to graduate compared with similar peers in traditional high schools. The effects for dropout and graduation were smaller and less consistent than those for certified pathway participation among all subgroups examined.

IMPLICATIONS

The results of SRI's multiyear study of Linked Learning have several implications for Linked Learning policy, practice, and research.

Quality matters. The study found smaller and less consistent effects for noncertified pathway participation than it did for participation in pathways certified to meet Linked Learning quality standards.

Foster students' independence and postsecondary navigation skills. A focus on developing students' persistence, independence, and other self-advocacy skills may help ease the transition to complex and anonymous postsecondary education environments.

Examine long-term outcomes for students. Continued research on the impacts of Linked Learning should focus on later cohorts that will benefit from reforms to California's community college education, and should examine students' long-term outcomes including earnings and other indicators of career success.

POLICY CONTEXT

For much of the 20th century, the large "comprehensive" high school model dominated; high schools were designed to serve all types of students under one roof, although to prepare some for college and others for work. College-bound students were funneled into academically rigorous college preparatory courses, while students not deemed to be "college material"—due to either low academic achievement or racial or economic discrimination—were tracked into vocational education courses to prepare them for direct entry into the workforce. By the turn of the 20th century, however, the national vision for high school began to shift to embrace a goal of college and career readiness for all students. Evidence was mounting on the harms of curricular tracking for low-income and minority students, and employers began to express concern that status quo entry-level job training in high school was no longer sufficient preparation for the rapid pace of change in technology and in the organization of work (U.S. Department of Labor, 1991; Visher & Stern, 2015). This shift in mindset ultimately led to two strands of high school reform: the first geared toward modernizing and increasing the rigor of the vocational education experience, and the second designed to expand access to college preparatory courses to new segments of the student population.

As early as the 1980s, vocational education began evolving into what we now call career and technical education. Career and technical education courses are meant to be taken together with (not instead of) academic courses so that high school students are prepared for both work and postsecondary education. During the 1990s the career academy model—which combines academic with career and technical curricula around a career theme—became popular. There were an estimated 1,500 career academies nationwide by 2000; a nearly 15-fold increase in approximately 10 years (Kemple & Snipes, 2000). Moreover, the 2006 reauthorization of the federal law that funds technical education replaced the term "vocational" with "career and technical" and eliminated a prohibition against using these funds for courses to prepare students for careers that require a bachelor's or advanced degree.

Over the same time period, educators and policymakers interested in expanding access to college preparatory courses began to question whether the large, comprehensive high school was the optimal model to achieve their goal of college prep for all. In particular, large urban high schools came to be viewed as anonymous "dropout factories," ripe for reform. Research increasingly suggested that small high schools were more beneficial academically, particularly for students from disadvantaged backgrounds (Bickel, Howley, Williams, & Glascock, 2001; Fowler & Walberg, 1991; Howley, Strange & Bickel, 2000; Lee & Smith, 1997; McMillen, 2004).

Encompassing both these strands of high school reform, Linked Learning strives to transform high schools by establishing district-level systems to create and sustain high-quality, career-themed pathways that integrate college preparatory academics, rigorous technical training, work-based learning, and supports to help students stay on track. Rejecting the outmoded and usually inequitable separation of students into vocational and academic tracks, the approach is designed to prepare all students for college, career, and life.

THE LINKED LEARNING DISTRICT INITIATIVE

In 2009, recognizing the challenges for individual schools or pathways trying to redesign the high school experience, The James Irvine Foundation launched the California Linked Learning District Initiative. This demonstration project, implemented in nine California districts, focused on the establishment of district systems to support and sustain multiple Linked Learning pathways. The initiative was a vehicle for enhancing Linked Learning, determining what makes it successful at a systemic level, and demonstrating its viability as a comprehensive approach for high school reform.

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

PARTICIPATING DISTRICTS

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

EVALUATION OF THE CALIFORNIA LINKED LEARNING DISTRICT INITIATIVE

SRI documented the development of district systems to support Linked Learning through interviews with district administrators, partners, stakeholders, pathway teachers, and students. An earlier brief, What It Takes to Create Linked Learning, draws on these interviews to distill key strategies for successful implementation of Linked Learning by both school districts and individual pathways.

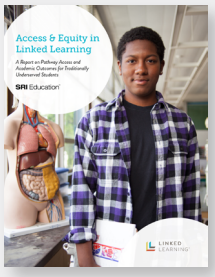
The evaluation also examined Linked Learning's impact on students by comparing end of high school and early postsecondary outcomes of certified pathway students with those of similar peers in traditional high schools. A central goal of the initiative was to increase student engagement; develop the knowledge, skills, and dispositions that would enable students to succeed in school and work; and ultimately improve high school academic outcomes, graduation rates, and successful transitions to a full range of postsecondary education opportunities, particularly for low-income and disadvantaged youth. To examine these outcomes, SRI surveyed students and collected administrative data on students' high school academic outcomes and postsecondary enrollment and persistence.

Focus on Pathway Quality: To understand the impact of participation in a high-quality career pathway in high school, SRI's evaluation focused on certified pathways. We compared the high school and early postsecondary outcomes of students who enrolled in certified pathways with those in traditional high school programs. Districts were early in the process of pursuing certification for Linked Learning pathways at the time of the evaluation. Across the nine districts, nearly four times as many students in the sample enrolled in noncertified pathways than in certified pathways.

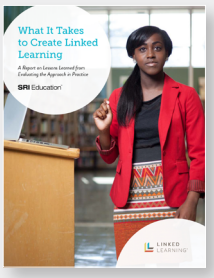
EVALUATION PUBLICATIONS

Multi-year evaluation of the California Linked Learning District Initiative surfaced findings with relevance to an array of audiences—including education practitioners, policymakers, and funders.

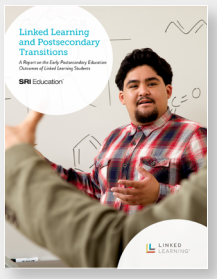
Access all evaluation reports at SRI.com



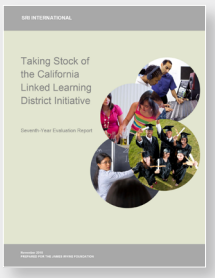
Access & Equity in Linked Learning



What It Takes to Create Linked Learning



Linked Learning and Postsecondary Transitions



Taking Stock of the California Linked Learning District Initiative

Executive Summary

Linked Learning Outcomes

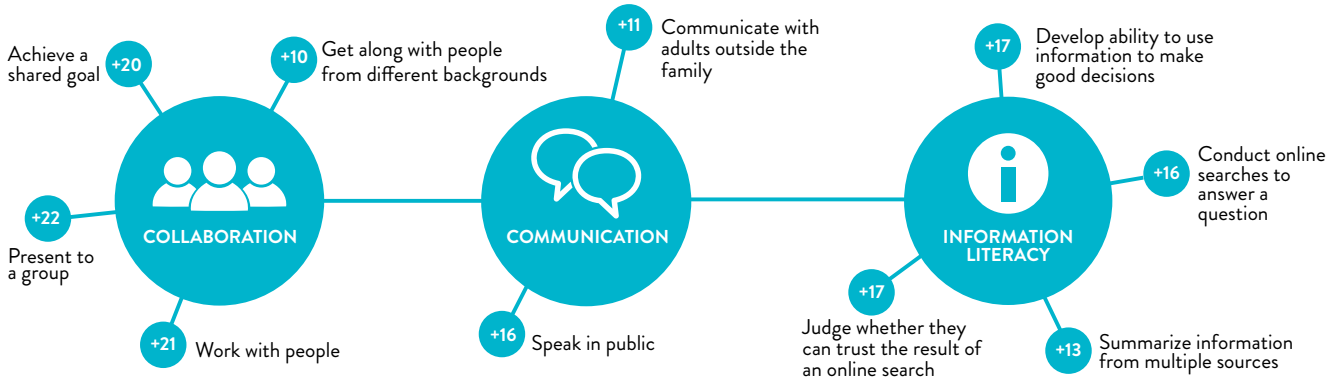
In this brief, we present results from surveys measuring students' perceptions of their development of key skills, behaviors, and dispositions needed for postsecondary success. We then summarize findings on the effect of Linked Learning participation on students' high school academic success, initial college enrollment and persistence, and early indicators of community college success. Because the Linked Learning approach combines rigorous academics with a career and technical education sequence, these outcomes are crucial to gauging the initiative's efficacy in preparing students for college and career.

STUDENT SUCCESS SKILLS

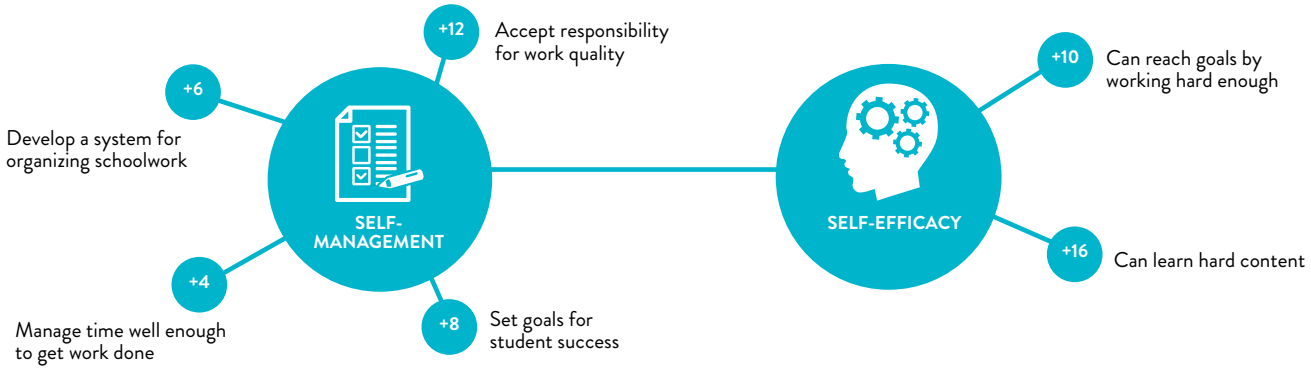
Through a survey of 12th graders in the nine districts in spring 2014, we explored whether Linked Learning students reported developing key skills for success in postsecondary education and careers.[2] Beyond academic preparation, students need a variety of skills to navigate the complexities of earning a degree and to succeed in the workplace (Belfield et al., 2015; Conley, 2010; Farrington et al., 2012; Melnick, Cook-Harvey & Darling-Hammond, 2017; Shechtman, Yarnall, Stites & Cheng, 2016). These skills include productive mindsets and behaviors such as the ability to set and achieve academic and personal goals, manage time, study, persist with difficult tasks, and seek help when needed. Further, success in college and career depends on a variety of interpersonal skills such as collaboration and communication. Finally, for postsecondary success, students need to be familiar with the norms of the job search process and with expectations for workplace behaviors.

On the survey, students in certified pathways were more likely to report that their high school experiences improved their productive behaviors and dispositions, such as self-management skills and sense of self-efficacy. These students were also more likely than comparison students to report that high school helped them develop such 21st century skills as communication, collaboration, and information literacy. In addition, pathway students were more likely to report that high school increased their career navigation skills, including their ability to create a job application letter or resume and their knowledge of professional behavior expectations.

Compared with peers, Linked Learning students gained 21st century skills (percentage point difference)



Compared with peers, Linked Learning students developed productive mindsets and behaviors (percentage point difference)



Differences between pathway and comparison students are statistically significant at the $p < 0.05$ level. Source: Spring 2014 12th-grade Student Experience Survey.

HIGH SCHOOL AND EARLY POSTSECONDARY SUCCESS

In addition to development of key skills and dispositions, we also examined students' high school and early postsecondary success for three cohorts (the classes of 2013, 2014, and 2015). We used multilevel modeling to compare outcomes for pathway students and students in traditional high schools in the same district who had similar demographic characteristics and prior achievement.[3]

We paid particular attention to equity, exploring how Linked Learning students in key subgroups compared with similar students in traditional high schools. In the following presentation of results, we call out findings for three subgroups, each with a pattern of effects that differed from the overall findings: students with low prior achievement, African American students, and English learners. Across outcomes, we found that the results for female and for Latino students mirrored the overall results, and that students with high prior achievement generally performed equally well in Linked Learning and traditional high school programs. Therefore, we did not highlight these three groups in this discussion. For a full treatment of subgroup findings, see our earlier brief, Access and Equity in Linked Learning.

STUDENT ENGAGEMENT AND SUCCESS IN HIGH SCHOOL

We examined a variety of indicators of student engagement and success in high school, including dropout and graduation, credit accumulation, attendance, and test scores. Statewide, 82.3% of public school students in California who started high school in 2010–11 graduated with their class in 2015. This overall rate masks significant disparities in graduation rate by student ethnicity, with 78.5% of Latino students and 70.8% of African American students graduating with their class compared with 88.0% of white students and 92.6 % of Asian students (California Department of Education, 2016).

In our evaluation of the California Linked Learning District Initiative, we consistently found that the Linked Learning approach made a difference for high school students, leading to decreased dropout rates, higher graduation rates, and more credits earned. Certified pathway students were 2.1 percentage points less likely to drop out, were 3.1 percentage points more likely to graduate, and accumulated 8.9 more credits than their peers in traditional high school programs.

The effects of certified pathways on other indicators of high school engagement and success—such as attendance, course failures, and test scores—were less consistent. Overall, we found that certified pathway students slightly outperformed similar peers in traditional high schools on the English Language Arts (ELA) California High School Exit Exam by an average of 1.8 points; this exam has a range of 175 points.[4] The two groups did not differ for other student engagement or school success measures, including daily attendance, course failures, ELA California Standards Test scores, and Math California High School Exit Exam scores.

The benefits of Linked Learning were particularly large for students who entered high school with low levels of academic preparation, and were less consistent for African American students and English learners.[5] As previously noted, results for female and Latino students were similar to those of the overall sample.

- On average, students who entered certified pathways with low prior achievement were 4.5 percentage points less likely to drop out, were 7.6 percentage points more likely to graduate, and accumulated 15.5 more credits than their peers in traditional high school programs. Further, Linked Learning students who entered high school with low prior achievement outperformed their peers in traditional high school programs on both the math and ELA portions of the California High School Exit Exam by 3.2 and 4.4 points respectively, and slightly outperformed their peers on the 9th grade ELA California Standards Test.[6]
- African American students in certified Linked Learning pathways earned 15.2 more credits than African American students in traditional high school programs. We saw no effect on dropout, graduation, or test scores for African American students in certified pathways.
- English learners who enrolled in certified pathways were 2.8 percentage points less likely to drop out than their peers in traditional high schools and earned an average of 11.7 more credits. We saw no effect on graduation or test scores for English learners in certified pathways.

For context, the size of the overall effect of Linked Learning on credits earned is equivalent to nearly two more semester courses, and the estimates for African American students and students with low prior achievement are equivalent to three more semester courses over the 4 years of high school.

The benefits of Linked Learning were particularly large for students who entered high school with low levels of academic preparation. These students were 4.5 percentage points less likely to drop out, were 7.6 percentage points more likely to graduate, and accumulated 15.5 more credits than their peers in traditional high school programs.

COLLEGE READINESS

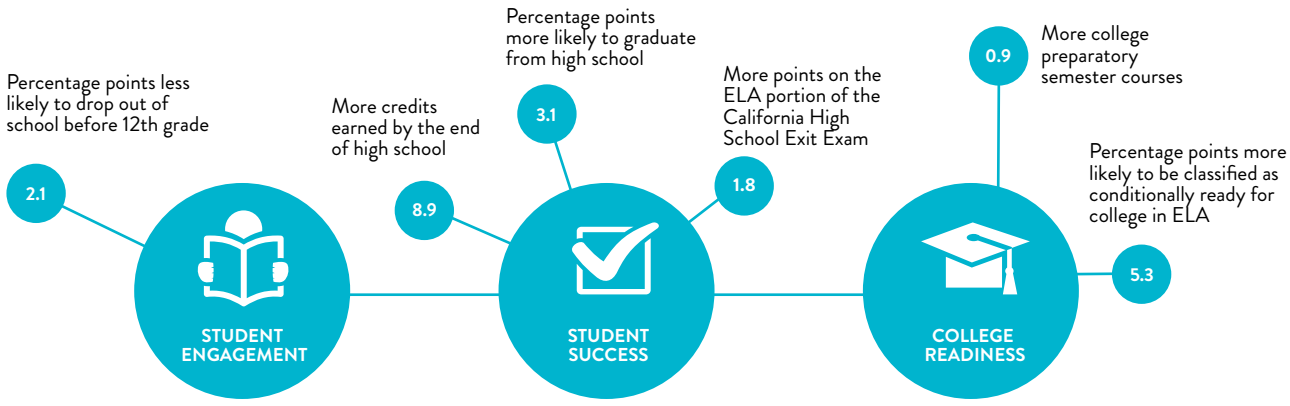
Our findings on certified pathway students' college readiness were mixed. As a key indicator of college readiness, we examined the number of college preparatory courses students completed as well as whether they completed the course sequences required to be eligible for admission at a California public 4-year institution. Statewide, 43.4% of 2015 high school graduates completed these college preparatory course requirements in 2015. This rate was higher for white and Asian students (49.7% and 71.8% respectively), and lower for African American and Latino students (32.7% and 34.6%) (California Department of Education, n.d.).

Students in certified Linked Learning pathways completed approximately one more college preparatory semester course than traditional high school students. This effect was equivalent in size for African American students and English learners but larger for students who entered certified pathways with low prior achievement; these students earned 1.7 more college preparatory requirements than similar peers in traditional high school programs. Yet these additional college preparatory credits were not enough to translate into greater completion rates for the full complement of college preparatory courses. Certified pathway students and their peers in traditional high schools were equally likely to fulfill the course-taking requirements for California public 4-year institutions and earned similar college-admission GPAs.

In light of our finding that certified pathways retained students who otherwise might have left high school before senior year and were unlikely to pursue the full college preparatory curriculum, this evidence that certified pathways were doing at least as well as traditional high schools in helping students complete and succeed in college preparatory courses is promising. Further, we found that certified pathway students were more likely to be classified as ready or conditionally ready for college in ELA on the Early Assessment Program exam, potentially exempting them from remediation at the majority of California's postsecondary institutions. This finding should be interpreted with caution, however, because the exam is optional and thus the estimate is not based on the full student sample.

There is promising evidence that certified pathways were doing at least as well as traditional high schools in helping students complete and succeed in college preparatory courses.

Compared with peers, Linked Learning students demonstrated increased high school success



Differences between pathway and comparison students are statistically significant at the $p < 0.05$ level. Source: Student-level district administrative data.

COLLEGE ENROLLMENT AND PERSISTENCE

As part of the evaluation, we examined whether increased high school success resulted in smoother transitions to college for certified pathway students. In California and nationally, disparities in educational attainment by ethnic group are exacerbated by differential college enrollment and completion rates, with 72% of Latino and 71% of African American high school graduates in the state enrolling in college compared with 79% of white and 90% of Asian high school graduates. Further, in all three sectors of California public higher education—California community colleges, California State University, and the University of California system—Latino, African American, low-income, and first generation students are less likely than their peers to graduate (Johnson, Cuellar & Bohn, 2018).

We found that Linked Learning students overall enrolled in college, remained through the first year, and persisted into a second year at similar rates as their traditional high school peers, both overall and for most of the subgroups examined. Further, Linked Learning had a positive effect on college enrollment for students who entered high school with low academic achievement and a positive effect on 4-year college enrollment for African American students. Linked Learning students who entered high school with low levels of academic preparation were 5.7 percentage points more likely to enroll in college directly after high school than similar peers who participated in traditional high school programs. This increase in college enrollment appears to be driven by enrollment in 4-year institutions. Among students with low prior achievement who enrolled in college, Linked Learning students were 4.1 percentage points more likely to enroll in a 4-year as opposed to a 2-year college. African American Linked Learning students were equally likely as their traditional high school peers to enroll in college, but Linked Learning was more effective at supporting African American students in realizing 4-year college aspirations: They were 11.6 percentage points more likely to enroll in a 4-year than a 2-year institution. We found no negative effects of Linked Learning on postsecondary enrollment or persistence for any subgroup.

COMMUNITY COLLEGE INDICATORS

We also examined early indicators of college success for certified pathway students who enrolled directly in California community colleges after high school. We compared course-taking patterns of certified pathway students and traditional high school students who enrolled at a local community college—examining full-time enrollment, credit accumulation, and enrollment in and successful completion of college-level and transfer-level math or English courses in the first 2 years of college. These indicators are associated with degree completion or successful transfer to a 4-year institution (Leinbach & Jenkins, 2008; Offenstein, Moore, & Shulock, 2010). We found no impact of participation in a Linked Learning pathway on any of these indicators, overall or for any subgroup, except that students with high prior achievement were more likely to enroll full time (Harris, Warner, & Caspary, 2019). Given that we saw no other impact on high school or college outcomes for this subgroup, this finding may be anomalous.

Linked Learning students were at least as likely to enroll in college, remain through the first year, and persist into a second year as their traditional high school peers, both overall and for all of the subgroups examined. Linked Learning had a positive effect on college enrollment for students who entered high school with low academic achievement and a positive effect on 4-year college enrollment for African American students.

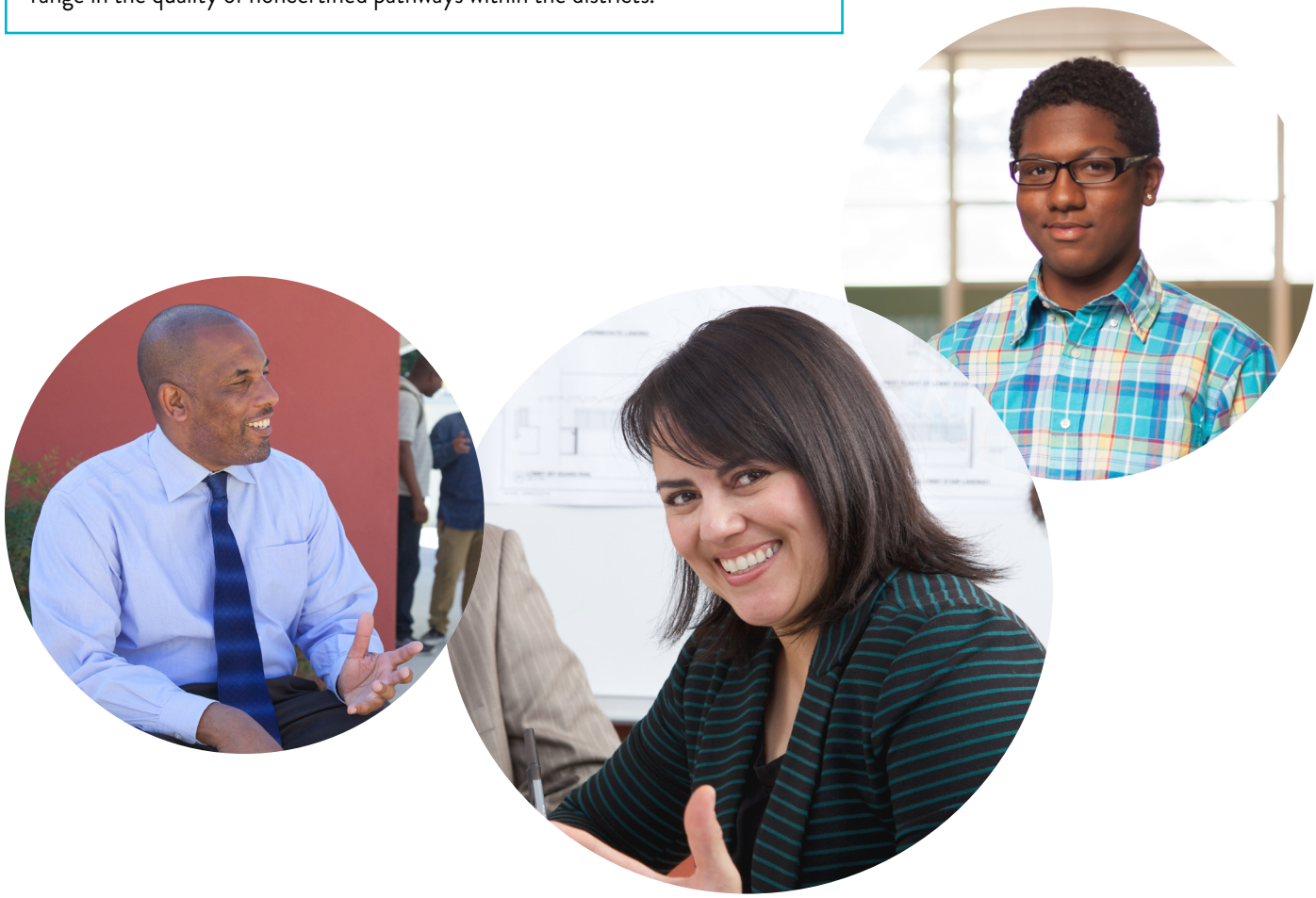
NONCERTIFIED PATHWAYS

To better understand whether Linked Learning must be implemented with fidelity to achieve optimal results or whether creating career-themed pathways of any quality is sufficient, we separately assessed high school outcomes (e.g., graduation, dropout, credits earned, college preparatory credits earned, completion of the full complement of college preparatory courses needed to enter California's public 4-year colleges, test scores) for noncertified pathways in comparison with those of similar peers in traditional high school programs. Noncertified pathway programs typically share some important features with the certified pathways, such as a small cohort and career theme, but vary in their degree of implementation of the full Linked Learning approach.

We found few positive effects from noncertified pathway participation, and these were exclusively related to dropout and graduation. Noncertified pathway students were 1.9 percentage points less likely to drop out before 12th grade and 2.9 percentage points more likely to graduate compared with similar peers in traditional high schools. The effects for dropout and graduation were smaller and less consistent for the subgroups as well. For example, the positive effects from pathway participation on graduation rates only held for African American and female students who participated in noncertified pathways. We did not find statistically significant differences between noncertified pathway students and similar peers in traditional high schools for any other high school outcomes—such as number of credits earned and college preparatory requirements completed—either overall or for any of the subgroups we examined.

VARIED QUALITY IN NONCERTIFIED PATHWAYS

Interviews with district staff indicated that noncertified pathways reflect a wide range of adherence to the Linked Learning approach. Some pathways were themed in name only, whereas others were nearing certification. We believe this wide range of adherence to the Linked Learning approach translates to a wide range in the quality of noncertified pathways within the districts.



Implications

With their origins in vocational education, career pathways may carry the stigma of a less rigorous high school academic track for some. Our evaluation of the Linked Learning District Initiative suggests that Linked Learning has created systems to support career pathways that do not sacrifice college preparation. We found consistently positive results related to high school success for certified pathway students—decreased dropout rates, higher graduation rates, and more credits earned—and found that Linked Learning students reported greater growth in high school on a range of skills needed for college and career success. Further, Linked Learning students were equally likely as their peers to complete a college-preparatory curriculum in high school, even with the additional curricular demands of a career and technical course sequence. We saw fewer positive effects from pathway participation for pathways that did not go through the certification quality review process.

The evaluation findings were particularly strong for students most at risk for dropping out of school—those who enter high school with low academic skills—suggesting that participation in a certified pathway may have a number of benefits for these students. The benefits of Linked Learning extended to increased postsecondary enrollment, both overall and at 4-year institutions, for this population of students. Linked Learning's positive impact for students who entered high school with poor academic skills is consistent with the thesis that a pathway's prescribed course of study may be very beneficial for disadvantaged students who otherwise might find themselves tracked into lower-level academic classes and who may find the real-world relevance and smaller community of a certified pathway key to thriving in school. Importantly, we found no evidence that these gains are at the expense of high-achieving students. Across all the high school and college outcomes we examined, Linked Learning students who entered high school with high levels of academic preparation performed just as well as their peers in traditional school programs.

We see no evidence, however, that the overall gains in high school success translate into increased college success, as measured by college persistence and a variety of other community college on-track indicators. It is important to note that *similar success rates* on these postsecondary indicators can be viewed as a positive accomplishment, given the evidence that Linked Learning students with low prior achievement are more likely to enroll in college than their peers, thus broadening the pool of students to include those who might not otherwise have matriculated. Nonetheless, these postsecondary performance results were unexpected given the preliminary evidence from the California Early Assessment Program that Linked Learning students were more likely to be conditionally ready for college, and thus might be more likely to enter directly into college-level coursework.

At the conclusion of the nearly decade-long evaluation of the California Linked Learning District Initiative, we consider the implications of the study findings, first for Linked Learning policy and practice and then for future research.

We found consistently positive results related to high school success for certified pathway students—decreased dropout rates, higher graduation rates, and more credits earned—and found that Linked Learning students reported greater growth in high school on a range of skills needed for college and career success.

The evaluation findings were particularly strong for students most at risk for dropping out of school—those who enter high school with low academic skills—suggesting that participation in a certified pathway may have a number of benefits for these students.

LINKED LEARNING POLICY AND PRACTICE

The evaluation findings point to several important takeaways for the Linked Learning field.

Quality matters

The pathway designation alone was not sufficient to achieve positive effects on student outcomes. We saw few effects from noncertified pathway participation, and these were smaller in magnitude than the estimates for certificated pathways. Although the certification process itself may not be imperative for a pathway to improve student outcomes, certification indicates that a pathway has certain structures in place (e.g., work-based learning systems, career and technical course sequencing). When these structures are in place, we observed positive effects of pathway participation on high school success and college eligibility. These structures are difficult to sustain without a strong district commitment to the Linked Learning approach, including district systems such as favorable human resource policies, curriculum and teacher professional development that support integrated instruction, and staff to support linkages to industry and postsecondary (Caspary and Warner, 2016).

Foster students' independence and postsecondary navigation skills

The evaluation findings suggest that the field needs to focus on strategies to help students develop the full range of skills they need to succeed after they enroll in college. More than three-quarters of the study analysis sample is either low income or first-generation college; these students face a variety of challenges that hinder their enrollment and success in higher education, including lack of financial resources and the need to work, family obligations, and logistical barriers (Dougherty, Lah, & Morest, 2017; Gleason, 1993). The college environment can also present obstacles to completion for students who do not have the knowledge or social resources to help guide them. In the California community college system, students earn an average of 30 more credits than the 60 required for an associate degree, and less than half earn this "2-year" degree within 6 years (Foundation for California Community Colleges, 2017). In the context of large postsecondary public institutions, students need a high level of resourcefulness and persistence to ensure they secure the classes and financial assistance they need to complete a degree in a timely manner.

The student survey results indicate that Linked Learning students are well-equipped with some important skills to successfully navigate college, such as aspects of self-management and goal setting, but the qualitative findings suggest that not all Linked Learning pathways fostered the full self-regulatory skills students need to succeed. In interviews, some pathway teachers described a tension between providing sufficient supports to help students succeed academically in high school and helping them develop the independence and behavioral attributes that will equip them for success in postsecondary education (Guha et al., 2014). These types of academic behaviors need to be developed systematically over time if they are to become ingrained by the time students reach a postsecondary education program, where they will be expected to take much more responsibility for their own learning. The evaluation findings suggest that Linked Learning contributes to greater high school completion and college access, but the Linked Learning field should also foster strategies to help students develop the skills they will need to succeed as they transition from high school to the oft-times more anonymous college environment.

In recent years, California has pursued two strategies to mitigate the challenges that impede student progression and to improve on-time degree completion rates for its community college students: reforming placement practices and instituting guided pathways. Although these reforms come too late to benefit the students in our Linked Learning evaluation cohorts, the latest of which completed high school in 2015, they could ease the transition to postsecondary for future generations of Linked Learning students.

Reform to placement policies in the California community college system along with implementation of guided pathways could ease the transition to postsecondary for future generations of Linked Learning students.

LINKED LEARNING RESEARCH

Examining mid-term outcomes such as college enrollment and persistence is critical to understanding whether Linked Learning is readying students for college while at the same time providing them with career exposure and preparation. By the time such postsecondary findings are available, however, they are already dated. For example, at the publication date for this brief, four cohorts of high school students had graduated after the most recent evaluation cohort (class of 2015), and Linked Learning had evolved significantly in the interval. The Linked Learning Alliance assumed responsibility for the Linked Learning certification process beginning in 2017, articulating quality standards for pathway certification with an emphasis on equity along with pathway development and continuous improvement. Analyzing outcomes for more contemporary Linked Learning student cohorts would provide insights as to whether this ongoing focus on quality, combined with the reforms in California higher education, resulted in improved student outcomes.

Further, the retrospective nature of the evaluation means that we relied on an older generation of standardized tests to assess learning gains. The last administration of the California Standards Tests was in spring 2013; since then, California has transitioned to assessments aligned with the Common Core State Standards. These college and career readiness standards focus on development of students' higher-order thinking skills, application of real-world concepts, and authentic demonstrations of learning, and thus should be better aligned with Linked Learning than the previous standards and assessments.

Finally, the effectiveness of Linked Learning can only be assessed fully by understanding the labor market outcomes of Linked Learning students, and the extent to which these students are able to transition to sustainable employment and careers. A rigorous study of career academies by MDRC found that participation had no impacts on early labor market outcomes but had significant impacts on earnings and hours worked 8 years after expected high school graduation (Kemple, 2001; Kemple & Willner, 2008). These findings suggest that some of the benefits of pathway participation may not be visible initially and may instead accrue over time. Examining these critical labor market outcomes will require a long-term commitment to Linked Learning evaluation.

Some of the benefits of pathway participation may not be visible initially and may instead accrue over time. Examining these critical labor market outcomes will require a long-term commitment to Linked Learning evaluation.

Accurate data on student participation in Linked Learning, as well as a wide range of demographic and performance data for students enrolled in California's K–12 and postsecondary public education system, are critical to the ongoing refinement and sustainability of the Linked Learning approach. California elected officials' commitment to building a longitudinal data system has wavered over the past decade, and the state's efforts toward this goal have relied heavily on federal funding, suggesting a lack of understanding and commitment to implementing a comprehensive system (Hansen, 2006). The California Longitudinal Pupil Achievement Data System (CALPADS) launched in 2009, allowing for the calculation of a consistent 4-year cohort graduation rate. This system, however, is limited to K–12 schools. The lack of a comprehensive state data system that includes higher education and employment and earnings data is a barrier to fully understanding the impacts of Linked Learning on students' life trajectories.

References

Belfield, C., Bowden, B. Klapp, A., Levin, H., Shand, R. & Zander, S. (2015). *The economic value of social and emotional learning*. New York, NY: Teachers College, Columbia University.

Bickel, R., Howley, C., Williams, T., & Glascock, C. (2001). High school size, achievement equity, and cost: Robust interaction effects and tentative results. *Education Policy Analysis Archives*, *9*(40).

California Department of Education. (n.d.). Dataquest [Data file, One-Year Graduation Data-2014-15]. Retrieved from http://data1.cde.ca.gov/dataquest.

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

Caspary, K., & Warner, M. (2017). *Linked Learning and postsecondary transitions. Report on the early postsecondary education outcomes of Linked Learning students.* Menlo Park, CA: SRI International.

Caspary, K., & Warner, M. (2016). *What it takes to create Linked Learning. A Report on lessons learned from evaluating the approach in practice.* Menlo Park, CA: SRI International.

Conley, D. T. (2010). *College and career ready. Helping all students succeed beyond high school.* San Francisco, CA: Jossey-Bass.

Dougherty, K. J., Lah, H., & Morest, V. S. (2017, November). *Reforming the American community college: Promising changes and their challenges.* CCRC Working Paper, No. 98. Teachers College, Columbia University. Retrieved from https://files.eric.ed.gov/fulltext/ED579007.pdf.

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

Foundation for California Community Colleges. (2017). *Vision for success: Strengthening the California community colleges to meet California's needs (statewide report)*. Retrieved from: http://foundationccc.org/Vision-for-Success.

Fowler, W. J., & Walberg, H. J. (1991). School size, characteristics, and outcomes. *Educational Evaluation and Policy Analysis*, 13(2), 189–202. https://doi.org/10.3102/01623737013002189.

Gleason, P. M. (1993). College Student Employment, Academic Progress, and Postcollege Labor Market Success.

Guha, R., Caspary, K., Stites, R., Padilla, C., Arshan, N., Park, C., . . . Adelman, N. (2014). *Taking stock of the California Linked Learning District Initiative. Fifth-year evaluation report.* Menlo Park, CA: SRI International.

Hansen, J. (2007). Education data in California; availability and transparency. *Getting Down to Facts.* Palo Alto, CA: Stanford University.

Harris, J., Warner, M., & Caspary, K. (2019). *Linked Learning and community college outcomes.* Menlo Park, CA: SRI International.

Howley, C., Strange, M., & Bickel, R. (2000). *ERIC Digest: Research about school size and school performance in impoverished communities.* Charleston, WV: ERIC Clearinghouse on Rural Education and Small Schools. (ERIC Document Reproduction Service No. ED448968).

Johnson, H., Cuellar Mejia, M., and Bohn, S. (2018). *Higher Education as a Driver of Social Mobility.* San Francisco, CA: Public Policy Institute of California.

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

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

Kemple, J., & Snipes, J. (2000). *Career academies: Impacts on students' engagement and performance in high school.* New York, NY: MDRC.

References

Lee, V. E., & Smith, J. B. (1997). High school size: Which works best and for whom? *Educational Evaluation and Policy Analysis, 19*(3), 205–227. https://doi.org/10.3102/01623737019003205.

Leinbach, D. T., & Jenkins, D. (2008). *Using longitudinal data to increase community college student success: A guide to measuring milestone and momentum point attainment.* New York, NY: Community College Research Center, Columbia University.

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

Melnick, H., Cook-Harvey, C. M., & Darling-Hammond, L.(2017). *Encouraging social and emotional learning in the context of new accountability.* Palo Alto, CA: Learning Policy Institute.

Offenstein, J., Moore, C., & Shulock, N. (2010). *Advancing by degrees: A framework for increasing college completion.* Institute for Higher Education Leadership & Policy. (ERIC Document Reproduction Service No. ED511863).

Shechtman, N., Yarnall, L., Stites, R., & Cheng, B. (2016). *Empowering adults to thrive at work: Personal success skills for 21st century jobs. A report on promising research and practice.* Chicago, IL: Joyce Foundation.

U.S. Department of Labor. (1991). What work requires of schools: *A SCANS report for America 2000.* Washington, D.C.: Secretary's Commission on Achieving Necessary Skills.

Visher, M., & Stern, D. (2015) *New pathways to career and college: examples, evidence and prospects.* New York, NY: MDRC.

Warner, M., Caspary, K., Arshan, N., Stites, R., Padilla, C., Patel, D., . . . Adelman, N. (2016). *Taking stock of the California Linked Learning District Initiative. Seventh-year evaluation report.* Menlo Park, CA: SRI International.

Endnotes

[1] The pathways in this study were certified by either ConnectEd or NAF. Beginning in 2017, the Linked Learning Alliance took over certification for Linked Learning pathways.

[2] In spring of the 2013–14 school year, we surveyed 12th graders enrolled in certified pathways as well as comparison students enrolled in traditional high school programs in the same districts (Guha, et al., 2014).

[3] We followed the class of 2013 in four districts—Antioch, Long Beach, Pasadena, and Porterville—and the classes of 2014 and 2015 in all nine districts (Warner et al., 2016). Data available varied by district and class.

[4] The requirement to pass the California High School Exit Exam in order to receive a high school diploma was suspended retroactively by a 2016 state law. Further, in 2014 California replaced the California Standards Tests with the Smarter Balanced Assessments, which are aligned with the Common Core State Standards.

[5] We did not examine attendance or course failures for subgroups.

[6] On average, certified pathway students who entered high school with low prior achievement scored 5.9 points higher than students in traditional high school programs on the ELA portion of the 9th grade California Standards Test, which has a 450-point range, but scores were similar in other grades and in math (Guha et al., 2014).

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