ALLIANCE FOR EXCELLENT EDUCATION

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Preparing Students for College and Career: Linked Learning in California

By Eric Richmond

The traditional American high school has long represented a critical decision point at which students must choose to pursue college or a career. Yet there is growing recognition that to best serve students and society, today's high schools must offer more than education for just one option or the other. To prepare students for success in life, the twenty-first-century American high school needs to shift its focus from preparing for college *or* career to achieving college *and* career readiness for every student.

In some areas of the country, progress is being made on this front. One of the most comprehensive efforts is the Linked Learning initiative in California (formerly known as "multiple pathways"), a reform model aimed at improving high schools by connecting strong academics, demanding technical education and real-world experience in a wide range of fields, such as engineering, arts and media, biomedicine and health. It provides multiyear programs of study that are rigorous, relevant, and directly connected to regional and state economic needs. By setting up students for success in the full array of options after high school, Linked Learning seeks to bridge the college-career divide that has long characterized the American education system.

Linked Learning: The New Name for Multiple Pathways

Linked Learning is the new name for the educational approach formerly known in California as "multiple pathways." After extensive public opinion research, the schools and organizations implementing this approach selected the Linked Learning name to convey more clearly its unique benefits to students, educators, parents and policymakers.

California, with its rich history of reform, has been an incubator for the beginnings of the Linked Learning movement. And as a microcosm of the larger United States, the work there offers important lessons for stakeholders addressing the national high school crisis. This brief details the Linked Learning movement in California, developed in response to poor and inequitable student outcomes, as it continues to garner interest and develop a growing base of evidence. The discussion lays out the rationale for the Linked Learning approach and the ways in which it seeks to address the need for rigorous, engaging educational options toward the goal of college and career readiness for every student.

The Need for a New Approach

California, like many other states, struggles with educational attainment for its high school students. The four-year graduation rate for the state hovers around 70 percent, similar to the rate for the United States as a whole.[1] And of those students who do manage to graduate in California, only 34 percent complete the minimum curriculum required for entry into the state's four-year higher education system—a figure that plummets for African American, Hispanic, American Indian, and Pacific Islander students.[2]

This problem is not new—national reports have long highlighted the deep-rooted problems in California, and many critical indicators have remained static. Reading achievement among eighth-grade students in the state has not significantly changed since 1998, when only 21 percent demonstrated proficiency.[3] And although there is no longer a racial or ethnic majority in California, schools serving large numbers of poor students and black, Latino, and Native American students still disproportionately receive fewer of the resources that matter for a quality education. For example, middle and high schools with the highest proportion of students of color are four times as likely to have underprepared math teachers as the least diverse schools.[4] As a result, white students have attained eligibility for the state's four-year universities at roughly twice the rate of their black and Latino peers since 1983.[5]

For those who do not complete high school prepared for success in college, career, and life, there is a clear and well-documented individual cost. High school dropouts in California earn a median income of $10,000 less than high school graduates, and barely half of what those with some college or an associate's degree earn.[6] What is often less apparent is the substantial negative impact that dropping out has on the community and on the state overall:

- California sustains $46.4 billion in lost wages, crime, and lost productivity for dropouts from each and every cohort.[7]
- For each high school graduate, the economic benefit to California's state and local government, taxpayers, citizens, and businesses is estimated to be $392,000.[8]
- If the high school dropout rate in California were reduced by half for just a single year, the government savings and social gains would amount to 1.4 percent of the California gross state product—more than $26 billion.[9]

New Expectations for a New Economy

Unfortunately, the shortcomings of high schools in California and the country will be exacerbated by increasingly stringent workforce requirements and a changing economy.

In California, which is the largest labor market in the country, eleven of the fifteen occupations that are projected to have long-term shortages require education or training after high school—figures that are mirrored by national trends.[10] Nearly two thirds of new jobs created nationally between 2004 and 2014 will be filled by workers with some postsecondary education, as will almost 90 percent of jobs with higher than average growth and higher than average earnings created over the same period.[11] Postsecondary options in these cases include not only four-year universities, but a range of opportunities such as community college, certification programs, military service, apprenticeships, and formal job training. Meanwhile, those with less education are more likely to be unemployed or out of the labor force.[12]

These shifts in the labor force reflect the changing requirements of the modern workplace in California, across the country, and around the globe. Employers increasingly value the ability to communicate effectively, collaborate productively, problem-solve, and innovate.[13] Researchers have documented strong and steady growth in the demand for these skills in the U.S. workforce since 1969, a dramatic departure from the repetitive, routine jobs that once were the staple of middle-class employment.[14]

Additionally, the academic requirements for successful entry into the workforce are rising. Empirical evidence shows that a comparable level of academic skills is needed for success in either a workforce

training program or in credit-bearing college courses.[15] Despite the different contexts in which they are applied, the level of proficiency required in reading and math skills, for example, is virtually identical.

With new and rising skills being demanded of workers, and comparable academic requirements coming into focus for college- and career-bound students, it is clear that all high school graduates are expected to be able to do similar things.

Laying the Groundwork for Change

While a long way from realizing college and career readiness for all students, California has taken some important and innovative steps toward reaching this goal. Among them is the recent alignment of high school graduation requirements, in some schools and districts, with the "A-G curriculum," a series of fifteen courses required for admission to California's four-year public higher education systems—the University of California (UC) and the California State University (CSU). Even for students in high schools that have not adopted A-G as the default curriculum, it offers a clear path for those who wish to keep all of their career options open.

Meanwhile, Career and Technical Education (CTE) in the state has been revitalized. Governor Arnold Schwarzenegger has become an outspoken advocate, bringing attention, funding, and support to CTE programs throughout the state. And in 2005 the state department of education released a new CTE framework that focused on preparing young people for postsecondary education and employment, and created detailed standards around fifteen CTE pathways aligned to state labor market needs. True to its goal of education and employment, California recently put into place a process by which CTE courses can be approved for A-G credit, creating more opportunity for academic-technical integration. More than 6,500 courses have been approved, allowing students and schools more flexibility to pursue career and academic interests.[16]

These important developments are helping college and career reforms to gain a foothold in state policy and build on California's sustained investment in programs like the California Partnership Academies (CPAs). The Partnership Academy model is a school-within-a-school program spanning grades 10–12 that creates a smaller learning environment for students and integrates academic and career-technical education around a particular industry theme that is tied to the local labor market.[17] The CPA initiative is one of the earliest integrated reform movements in the state, having been established by law in 1984 with continuous and growing funding since that time.[18] At least half of the students admitted to a CPA must meet "at risk" criteria, such as poor attendance or low socioeconomic status. The program has flourished, and today supports more than four hundred and fifty Partnership Academies throughout the state.

As a result of its commitment to CPAs and its rich history of similar programs that combine high-quality academics with career components, as well as its progressive state policies, California is well suited to promote college and career solutions for high schools. Too often, however, these strategies have been piecemeal rather than comprehensive, and have failed to transform teaching and learning. Faced with new career and workplace demands, it is clear that more dramatic reform is necessary to prepare the millions of students who today are not on track to graduate from high school ready for college and careers. In seeking new ways to engage and promote a growing, diverse population for the twenty-first century, education stakeholders—from educators and policymakers to philanthropies and state and local officials—are increasingly turning to Linked Learning.

Linked Learning: Pathways to College and Career Success

The California Linked Learning approach can be a valuable option for any young person. It does not prejudge students' abilities like many tracked systems of the twentieth century; instead, Linked Learning draws from the best of strong academics, demanding technical education and real-world experience to deliver a twenty-first-century high school education that offers the opportunity for every student to be ready for college and a career.[19]

The first mention of multiple pathways (now called Linked Learning) in California came from a working group appointed by the legislature to make recommendations for the state's new Master Education Plan in 2002. In its report, the group advocated for A-G to become the standard curriculum for all students and for the state to offer "multiple pathways" to help students complete it.[20] The concept has since evolved to include a focus on preparation for work as well as college. In more recent years, the James Irvine Foundation has spear-headed the Linked Learning approach through philanthropic work, and in 2006 founded ConnectEd, a policy organization focused on the topic, to build support and provide assistance to educators and advocates throughout California.

> Linked Learning is organized around California's major industries combining college-prep academics with high-quality career-technical education, work-based learning opportunities, and effective student support services.

The approach addresses many of the well-documented shortcomings of a traditional twentieth-century education (see box on page 5). Engaging technical classes and opportunities to experience the workplace provide the relevance to real life that most students do not get in traditional high school settings. A college-prep core ensures that each program is characterized by academic rigor. And the versatility of the knowledge and skills learned in a Linked Learning program means that students have varied opportunities after high school instead of a narrow subset of options based on the educational track on which they were placed. Although the research supporting the Linked Learning approach is not incontrovertible—and more needs to be done—it does look promising:

- ***Applied learning.*** Research shows that many people learn better when they are taught concepts in context.[21] Applied project- and portfolio-based education has also been shown to improve achievement for English language learners; such approaches scaffold instruction for students who have not yet mastered English.[22]
- ***Academic-technical integration.*** When teachers collaborate to integrate content across disciplines, it can result in strong positive student outcomes. In a rigorous, fully experimental random-assignment study, CTE teachers who worked with math colleagues to highlight the math inherent to their curricula showed student learning gains in math that exceeded those in a control group.[23]
- ***Engagement and real-world context.*** The relevance of coursework is important to student motivation and engagement. One study found that abstract academic education unconnected to a career was only satisfying to students who were certain that they would get a four-year degree to meet their career aspirations.[24] One might infer the same from numerous studies that suggest that students who take CTE courses are less likely to drop out than those students who do not.[25] In California, students enrolled in CTE programs improved their GPAs more than those in a comparison group, and had similar post–high school outcomes despite being lower achieving and from lower socioeconomic backgrounds.[26] Working for a moderate number of hours during high school can also positively impact students' future educational and occupational attainment.[27]

The California Linked Learning Approach

The California Linked Learning approach is grounded in a set of **four guiding principles:**

1. **Linked Learning prepares students for both college and career.** Understanding that both objectives are critical to future success, pathways are predicated on meeting both without forcing a choice. Students exiting a Linked Learning program should have no option closed off to them.
2. **Linked Learning connects academics to the real world.** By integrating strong academics with a demanding CTE curriculum, Linked Learning alters how core academic subjects are taught, without lowering expectations or watering down content.
3. **Linked Learning leads to the full range of postsecondary opportunities.** Although not all Linked Learning students will enroll in a four-year college after high school, they will graduate prepared for the full range of options, including two- and four-year college, job training, apprenticeships, and certificate programs.
4. **Linked Learning improves student achievement.** The Linked Learning approach is designed to improve graduation rates, increase postsecondary enrollments, higher earning potential and greater civic engagement..

California Linked Learning programs are comprised of **four core components**:

1. **A challenging academic component** delivers academics built around the A-G curriculum that are designed to prepare students for success without remediation in all postsecondary options.
2. **A demanding technical component** delivers concrete knowledge and skills through a cluster of four or more technical courses. The focus is on preparing youth for high-skill, high-wage employment by emphasizing industry-related knowledge and skills, as well as academic principles and authentic applications that bring learning to life.
3. **A work-based learning component** offers opportunities to learn through real-world experiences such as internships, apprentice-ships, and job shadowing. Work-based learning helps students relate what they are learning in the classroom to the real world.
4. **Supplemental services** provide counseling and academic support to help students through a challenging program of study.

Source: G. Hoachlander, R. Stearns, and C. Studier, *Expanding Pathways: Transforming High School Education in California* (Berkeley, CA: ConnectEd: The California Center for College and Career, 2008).

Implementing the Linked Learning Approach

Promising Models

Career academies—integrated or interdisciplinary small learning communities organized around a career theme—offer valuable lessons because many versions espouse much of the pathways approach. Academies experience fewer dropouts, higher attendance, higher rates of college application, and additional credits awarded toward graduation than nonacademies.[28] And these advantages are not confined to high school but extend into the labor market. A longitudinal study that tracked academy students for eight years after high school found that they worked more hours, worked for a more sustained period of time, and earned higher wages than nonacademy students in a control group.[29]

California Partnership Academies also conferred measurable benefits. Students in CPAs were more likely to complete A-G college entrance requirements and more likely to pass the state exit exam than students statewide. Many also gained valuable career exposure, with more than half participating in work-based learning related to their academy's theme, and nearly three quarters taking advantage of mentorships.[30]

Similarly, the National Academy Foundation (NAF) supports more than five hundred career academies throughout the United States, thirty-two of which are in California, that emphasize academic excellence and focus on preparing students for professional careers. NAF has been educating students in the areas of hospitality and tourism, information technology, and finance for more than twenty years, and is now expanding to engineering and health sciences. Over that period more than 90 percent of NAF students graduated from high school and 80 percent went on to postsecondary education.[31]

Another proprietary model, run by a nonprofit called Project Lead The Way (PLTW), provides academically rigorous preengineering and biomedical sciences curricula to secondary school students. It meets high academic standards and utilizes applied, project-based instruction in which PLTW requires all teachers be trained. The program has enjoyed success by engaging students in interesting, relevant, challenging coursework that allows graduates to go on to top colleges and jobs. In fact, its students accomplish higher achievement and more rigorous course-taking patterns than students in a comparison group from other well-respected programs with a CTE component.[32] Incidentally, the PLTW curriculum is used in 173 schools in California and in many Linked Learning programs that have related themes, like health sciences or engineering.

The Linked Learning Approach at Construction Tech Academy

In 2004, one of San Diego's largest and lowest-performing high schools, Kearny High, was reopened as four small, themed schools, after a period of restructuring. One of those schools, the Stanley E. Foster Construction Tech Academy (CTA), embraced a multiple pathways approach (they are transitioning to the new name Linked Learning) through an innovative curriculum focused on construction, architecture, and engineering.

As part of the new approach, the school developed a series of multidisciplinary, hands-on, project-based classes called advisories. Advisories were designed to be developed and taught collaboratively by grade-level teachers across all the disciplines, and infuse academic content and work skills into a student-run project with real-world applications. One ninth-grade advisory project, for example, organized teams of students to bid on the construction of a theme park. Students worked in teams, created a business plan, got a design approved, and built a physical model.

School leaders found that not only did the project make students apply both academic and technical concepts taught in other courses, but it also forced them to collaborate in real-world situations. Teams elected a foreman, and distributed tasks to match the strengths of different teammates; if students did not meet standards, they could get "fired" from the project, just like a real job. At the end of the year, teams were able to meet with officials from SeaWorld to present their ideas and get feedback from professionals working in the field—offering a concrete example of how their work related to something they might be doing in a career after high school.

The advisory classes are just one part of the Linked Learning approach at CTA, and the school has enjoyed student success that far outstrips Kearny High's results with the same population just a few years earlier. Not only are its attendance and graduation rates hovering in the mid- to high 90s, but a majority of students earn some college credit by graduation. A recent survey of alumni indicated that every student from the Class of 2008 went on to enroll in some form of postsecondary training, including apprenticeships, community college, four-year institutions, and the military. By integrating academic content with applied technical skills and workplace exposure, CTA is truly drawing from the best of both worlds to give students the best education possible.

Challenges

The promise of Linked Learning is in bridging the academic-technical divide to offer education that is equitable and valuable and meets the twenty-first-century needs of students and society. However, there are many impediments to the actual implementation of this work.

Human Capital

There are a range of human capital difficulties for those trying to adequately staff a Linked Learning school. For example, there are hiring and training challenges to delivering integrated curricula: academic and technical teachers come from different backgrounds, are trained and certified differently, usually receive different professional development, and are in many other ways isolated from each other. The case is the same for leaders and administrators. Not only is it difficult to develop a workforce capable of meeting the requirements of a Linked Learning program, but fostering a culture of teacher collaboration, especially between CTE and academic teachers, can be challenging.[33] Some have also argued that there are additional pedagogical challenges to teaching occupational courses.[34]

System and Policy Alignment
There are, more broadly, major systemic and programmatic challenges to Linked Learning that derive from the traditional division of academic and technical policy and practice. Linked Learning programs must attempt to reconcile isolated state and federal policies that have resulted in separate funding streams, distinct facilities, unrelated standards and curricula, disparate literatures, and siloed communities.[35] For example, California's data system was, for many years, not even capable of categorizing courses that met both A-G and CTE credit. Attempting to join these strands together into a cohesive educational program can frustrate even the savviest administrators.

Funding
Linked Learning costs money. Industry tools, curriculum development, ongoing teacher training, district support, and the various other costs associated with Linked Learning programs can be significant—costs that become more difficult to manage in economic downturns or recessions, especially if such financial crises persist. Administrators need to draw from a variety of local, state, and federal funding streams, and supplement those with donations from business and communities. Many successful Linked Learning schools solicit materials donations and volunteerism from their industry partners.

Building Support

The California Linked Learning approach is enjoying a relative boom in interest and participation. In addition to its adoption by many schools and academies, a number of districts have taken on the challenge of developing and implementing a Linked Learning strategy.[36] And ConnectEd has released tools for more schools and districts to adopt a Linked Learning approach. Support from policymakers has followed this growth; the state legislature passed a bill (AB 2648) that became law in 2009 to fund a report that will explore the feasibility of establishing and expanding the approach in California.[37]

The widespread support for Linked Learning is evidenced by the Linked Learning Alliance (formerly the Coalition for Multiple Pathways), a statewide collaboration of education, industry, and community organizations dedicated to improving California's high schools through Linked Learning. It aims to bring a collective voice and coordinated effort to expand access for California's young people to Linked Learning programs that prepare students for college and a career.[38] The group has more than 140 members, including:

- state agencies;
- business, industry, and trade organizations;
- community and advocacy organizations;
- education organizations and associations;
- public agencies;
- research and policy organizations; and
- individuals.

The alliance notably includes such major institutions as the California Department of Education, the UC, and the CSU. It also appears to enjoy widespread educator support through the California Teachers Association, the California Federation of Teachers, the California School Boards Association, the California Charter School Association, more than twenty school districts, and numerous individual members. Such support suggests that Linked Learning can be expected to continue to grow, expand, and change the lives of young people throughout the state.

Implications for Federal Policy

Because Linked Learning seeks to integrate rigorous core academic education with technical preparation aligned to college and career readiness, various federal laws, funding streams, and policies are involved. Those who seek to implement the Linked Learning approach must contend with the requirements of the Elementary and Secondary Education Act of 1965 (ESEA), most recently authorized as the No Child Left Behind Act, for many of their academic requirements related to teachers, testing, and accountability. At the same time, they must also meet the requirements of the Carl D. Perkins Act, which sets federal policy related to career and technical education, and influences the career-oriented aspects of Linked Learning. Linked Learning programs may also be impacted by the Higher Education Act, especially as they seek greater alignment with postsecondary education institutions in the preparation of teachers, or work to create training and professional development for teachers. Still others receive funds from the Workforce Investment Act, a labor law that includes workforce training education components.

Federal policymakers must address the challenges that current structures and silos present for schools and districts attempting this work. Steps forward were taken in 2006 when the Perkins Act was reauthorized with more expansive language around academic-technical integration, slowly building on a trend toward integration in the law. However, much must be done to reciprocate these efforts, especially in ESEA, and the general lack of coordination among federal policies remains a significant barrier to the Linked Learning reform effort.

As education leaders seek to establish ambitious visions and new approaches to school reform, federal policy needs to enable the innovation that makes this possible. When definitions only reflect the needs of traditional (and sometime archaic) programs without a ready outlet for initiatives that may not fit the mold, progress can suffer. However, the secretary of education's call to innovate in combination with an unprecedented influx of federal funding offers a unique opportunity for cross-cutting programs like Linked Learning to receive the support, funding, and flexibility needed to thrive. As the secretary said, "[T]here is a huge need for effective, scalable strategies that can improve student achievement in high-poverty, high-need schools."[39] The federal government has embraced this sentiment, allocating hundreds of millions of stimulus dollars for an innovation fund, and has announced an intention to continue seeking new and promising practices to ensure positive outcomes for young people across the country.

Much has been accomplished in California, and much has yet to be done. But there are also limits to what can be achieved without the understanding and support of federal policymakers. The Linked Learning approach has the potential to secure bright and fulfilling futures for young people in California and across the country. Federal policy must nurture and support the good work that is happening, and build toward the promise of success in college, career, and life for every student.

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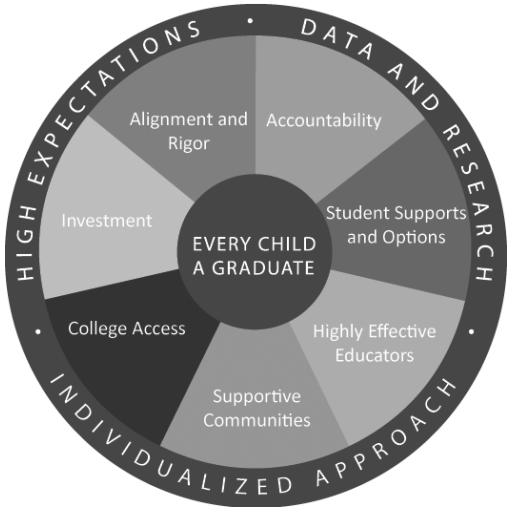
The mission of the Alliance for Excellent Education is to promote high school transformation to make it possible for every child to graduate prepared for postsecondary learning and success in life.

The Alliance for Excellent Education is a national policy and advocacy organization, based in Washington, DC, working to improve national and federal policy so that all students can achieve at high academic levels and graduate high school ready for success in college, work, and citizenship in the twenty-first century.

The Alliance has developed a "Framework for Action to Improve Secondary Schools" that informs a set of federal policy recommendations based on the growing consensus of researchers, practitioners, and advocates about the challenges and solutions for improving secondary student learning.

The framework, shown graphically here, encompasses seven policy areas that represent key leverage points in ensuring a comprehensive, systematic approach to improving secondary education. The framework also captures three guiding principles that apply to all of the policy areas. Although the appropriate federal role varies from one issue area to another, they are all critically important to reducing dropouts and increasing college and career readiness.



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