Can California Compete?

Reducing the Skills Gap and Creating a Skilled Workforce through Linked Learning

A report by: AMERICA'S EDGE
Strengthening Businesses Through Proven Investments in Kids

Executive Summary

California is experiencing a serious shortage of workers for so-called middle-skill jobs – those that require more than a high school education, but not necessarily a college degree. Even in 2009, during the recession and with 2 million Californians out of work, **only an estimated 38 percent of the state's workers had the appropriate training for the 47 percent of California's jobs in middle-skill occupations.** That shortage will likely continue as **200,000 of these middle-skill jobs are expected to open annually as our economy recovers**, accounting for 2.2 million new and replacement jobs from 2008 to 2018. But too few qualified workers are available to fill middle-skill jobs. In fact, there will be 50 percent more annual middle-skill job openings than low-skill job openings until 2018 and, currently, California has *more* low-skilled workers than available low-skill jobs.

47 Percent of Jobs are Middle-Skill, But Only an Estimated 38 Percent of Workers are Trained for Middle-Skill Jobs

CA jobs & workers during the recession, as a percentage of all jobs or workers (2009)

National Skills Coalition, 2010

Our state's economic health looks even more dire when this middle-skill "gap" is coupled with the shortage of workers expected for jobs requiring science, technology, engineering and math skills – the so-called STEM jobs. These jobs are growing much faster than other jobs, but three-quarters of STEM job openings through 2016 will require postsecondary education and half of them require bachelor's degrees. Filling those jobs will be difficult. Just six years ago, the Golden State ranked 14th in the nation in recent bachelor's degrees awarded in science and engineering (per 1,000 workers). **Today, California has fallen to 45th in the nation, recently awarding 40 percent fewer degrees in science and engineering than the national average.**

Both middle-skill and many STEM jobs increasingly require post-high school education:

- Between 2008 and 2018, the number of jobs for Californians with postsecondary education will grow 50 percent faster than jobs for high school dropouts.
- By 2018, three out of every five California jobs will require some education beyond high school.

- **By 2025, experts predict that the state will have a workforce shortage of 1 million college graduates.**

But as education and training needs are going up, California's education system is falling further behind. In 1970, California ranked seventh in the nation in the percent of the workforce that had completed high school; **in 2008, it ranked last**. And the picture for the workforce of the future is no brighter: In 2009, California ranked 46th out of the 50 states in eighth grade mathematics and was tied for 47th in fourth grade reading – only New Mexico and Louisiana ranked worse.

Every year, over 300,000 young people in California either drop out of school or graduate without meeting the entrance requirements for California's state universities. In fact, only 33 percent of graduates in the class of 2007 were eligible for California State University admission based on their courses, grades and test scores. Similarly, over 70 percent of California community college students need remedial work in developmental math and English.

To reverse these trends and secure the Golden State's economic future, state business leaders are calling for greater access to the career-relevant Linked Learning approach in California high schools to better equip young people for success in both post-secondary education and their future careers. The Linked Learning approach, which is based upon the proven "Career Academies" model, provides rigorous and relevant curricula that prepare students for education beyond high school, while also providing them with practical job skills, hands-on experience and connections to local employers. Career Academies have proven to increase labor force participation and to increase real earnings for young men by 17 percent per year – or an estimated $175,000 increase over a participant's working life.

The Sacramento Picture

Over half (57 percent) of surveyed Sacramento-area health care employers reported problems finding entry-level registered nurses at the height of the recession in 2009.

Similarly, 78 percent of Sacramento employers are already reporting difficulty finding entry-level employees for medical imaging occupations – an occupation expected to grow by 14 percent in the next three years.

Although Sacramento is booming as a clean energy hub, 60 percent of Sacramento employers in the energy efficiency field reported difficulty hiring workers in eight critical occupations in 2009. For example, two out of three employers had difficulty finding qualified employees to help retrofit buildings – an occupation with a 43 percent predicted growth rate over the next three years.

Centers of Excellence

The future of California's economy depends upon the caliber of our workforce. As we continue the debate on meaningful education reform in our state, the conversation must include promising education approaches like Linked Learning that provide young people the real-world experiences and skills businesses expect – and need – from their workforce.

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California Has a Growing Skills Gap Problem

Although businesses have always needed workers proficient in the "3 Rs" – reading, writing and arithmetic – today's fast-paced, international and technology-driven marketplace requires even higher proficiency levels in these hard skills. But they are too often lacking, especially among those entering the workforce.

- Over 300,000 young men and women leave California schools each year without the skills to compete in a competitive labor market. These students either dropped out of school or graduated, but without meeting the entrance requirements for the state universities.[1]
- Three out of every ten California high school freshman do not graduate within four years.[2]
- Only 33 percent of graduates in the class of 2007 were eligible for California State University admission based on their courses, grades and test scores, according to the latest available data. Only 13 percent of students were eligible for the more competitive University of California system.[3]
- About half of surveyed employers nationwide in 2006 reported deficiencies in the math and science skills of new workforce entrants who held only a high school diploma. Almost 40 percent of employers saw deficiencies in reading comprehension.
- One in ten surveyed employers reported college graduates' math or science skills as deficient.[4]

Just as important as the hard skills are the critical "soft skills" – communication, collaboration, critical thinking and creativity. Three out of four executives surveyed in 2010 believe the soft skills will become even more important in the next three to five years because of global competition and the pace of change in the business environment.[5] However, American businesses often find these skills lacking in the workforce, even among college graduates. In a recent survey, nine in ten executives said enhanced soft skills are important to support business expansion, but less than half of executives rated their employees as above average in these skills.[6]

> California CEOs report that attracting and maintaining a qualified workforce is one of the top challenges to doing business in the state – a challenge exacerbated by the need for enhanced skills and increased education levels. In fact, that inability to fill jobs is causing our state to lose businesses. Just last year, in Silicon Valley alone, one in six companies surveyed reported moving jobs out of the state and, of those, more than one in ten did so because of a more available workforce elsewhere.
>
> – Silicon Valley CEO Survey: Business Climate 2011

Middle-Skill Jobs

Middle-skill jobs – those that require less than a four-year degree, but more than a high school diploma – are the biggest share of California jobs, accounting in 2009 for 47 percent of all jobs in the state. Unfortunately, even at the height of the recession and with over 2 million Californians out of work, only an estimated 38 percent of California workers had the appropriate training for these positions – a gap of 9 percentage points. At the same time, there were far more low-skilled workers than low-skilled jobs.[7,8]

The demand for middle-skilled workers in California will remain high with 40 percent of all job openings – more than 2.2 million middle-skill job openings – expected between 2008 and 2018. These are local, hands-on jobs that are less likely to be outsourced. Each year between 2008 and 2018, there will be 50 percent more middle-skill job openings than low-skill openings and almost 20 percent more middle-skill job openings than high-skill job openings annually.[9]

The bulk of these middle-skill openings will be due to replacement needs, rather than new jobs created by growth. The leading edge of the baby boom generation will turn 65 this year and the share of California's population age 60 or older is projected to double between 2010 and 2040.[10] As this highly trained generation retires or workers leave middle-skill jobs, 175,000 replacement openings will need to be filled annually.[11]

Examples of Middle-Skills Jobs California Can't Live Without:

- **EMT**
- **Firefighter**
- **Police officer**
- **Carpenter**
- **Electrician**
- **Plumber**
- **Dental hygienist**
- **Medical lab technician**
- **Aircraft mechanic**
- **Heating and AC installer**
- **Industrial machinery mechanic**
- **Heavy truck driver**
- **Machinist**
- **Legal secretary**
- **Computer support specialist**

National Skills Coalition, 2009

Science, Technology, Engineering and Math (STEM) Jobs

From manufacturing, to banking, to e-commerce, to health care services, technology is increasingly central to many jobs. Manufacturing, for example, has shifted to more advanced, computer-assisted production, replacing the manual labor force with automation on the shop floor. To remain viable, workers in manufacturing facilities must now have a technical skill or trade-based skill that machines cannot adequately perform, such as knowledge of mechanical and electrical engineering processes, the ability to work with computerized systems and read and write machine programming code, and the ability to operate automated manufacturing systems.[12]

And jobs that are heavily reliant on technology are growing fast. STEM jobs are expected to have the third-fastest rate of growth nationwide of all occupation groups between 2008 and 2018.[13] But workers often need post-secondary education to capitalize on this technology and the accompanying jobs. In California, more than three-quarters of STEM job openings until 2016 will require postsecondary education and half of the expected openings will require bachelor's degrees.[14]

Filling those jobs will be difficult. Just six years ago, California ranked 14th in the nation in recent bachelor's degrees awarded in science and engineering (per 1,000 civilian workers). Today, California has fallen to 45th in the nation, recently awarding 40 percent fewer degrees in science and engineering than the national average.[15] There may be too few college graduates available for hire and even fewer with the STEM-background California businesses need. In sectors like life sciences and aerospace and defense, six in ten companies nationwide reported shortages of scientists, engineers and other skilled workers they seek.[16]

Acceleration of the Skills Gap in California

The overall workforce landscape is also changing. Experts believe the recession may accelerate a demand for higher-skilled workers because many companies are not replacing laid-off lower skilled positions. Instead, they have automated those jobs or shipped them overseas. A recent survey showed that four in ten manufacturing companies nationwide expect increased shortages of skilled workers in the future.[17]

> ***Having a skilled workforce is critical to the economic vitality of every California community.***
>
> –Dr. Christopher Thornberg,
> Economist and Founding Principal,
> Beacon Economics
> Los Angeles, CA

The need for workers with more education is also accelerating the skills gap. Between 2008 and 2018, the number of jobs for Californians with postsecondary education will grow 50 percent faster than jobs for high school dropouts. And by 2018, three out of every five California jobs will require some education beyond high school.[18]

Demographic changes are also having a profound impact on the workforce. The retiring generation has more education and skills than the generation entering the workforce. New immigrants also tend to have lower education levels than native populations. As a result of these trends and higher education needs in jobs, experts predict the state will have a

workforce shortage of 1 million college graduates by 2025.[19,20]

The United States Is Falling Behind

Thanks to technology, more and more American workers are now directly competing with workers from around the world. How U.S. students stack up against students from other countries is, thus, increasingly important – but the United States is no longer on top.

The U.S. high school graduation rate ranks in the bottom third of developed nations.[21] On an international test of applied knowledge and skills, the Programme for International Student Assessment (PISA), U.S. 15-year-old students score significantly below the average for industrialized nations in math and trail far behind leading countries like Korea, Japan and Finland in reading and science.[22] Once a leader in math education, U.S. high school students now fall in the bottom half of teenagers from developed countries. The U.S. is getting worse results while spending 40 percent more on education: U.S. spending per student in 2007 was over $10,700, compared to an industrialized nation average of about $7,600.[23]

> Once a leader in math education, U.S. high school students now fall in the bottom half of teenagers from developed countries – behind such countries as Slovenia, Hungary and Poland, and far behind leading countries like Korea, Japan and Finland.
>
> – Organisation for Economic Co-operation and Development, 2010

Although higher education attainment in the U.S. has continued to climb, we are not keeping pace with other nations and not growing fast enough to keep up with labor market demand. As recently as 1995, the U.S was tied for first in college graduation rates. But as other countries dramatically improved their college completion rates, the U.S has fallen to 14th out of 26 industrialized nations – decidedly in the middle of the pack.[24]

High Cost of the Skills Gap

The lack of a skilled workforce comes at a high cost for individuals, businesses and the economy. Graduating an extra 10,000 of California's dropouts – just five percent of the Class of 2010 dropouts – could result in impressive economic benefits. These extra graduates would likely:

- collectively earn $140 million more in an average year than they would have without a diploma;
- spend $13 million more each year purchasing vehicles;
- buy homes worth $450 million more by the time they reach the midpoint of their careers;
- support 900 new jobs in the state;
- increase the gross state product by $190 million; and
- increase state revenues by $17 million annually through their increased spending and investments.[25]

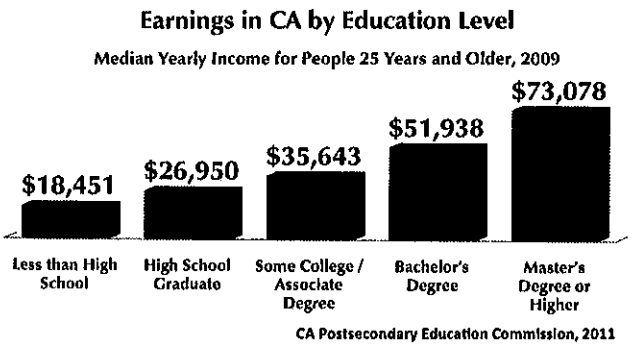
Higher levels of education can also help protect against unemployment – even in a recession. In 2009, 17 percent of California high school dropouts over the age of 25 were unemployed. Those without a diploma who were employed were only making an average of $18,000 per year. In contrast, only 6 percent of Californians with a bachelor's degree were unemployed and employed college graduates could expect to make an average of almost $52,000 per year.[26] Because they are more productive for employers, the average lifetime earnings of an individual college graduate are $2.1 million higher than those of a high school dropout, based on national data.[27]

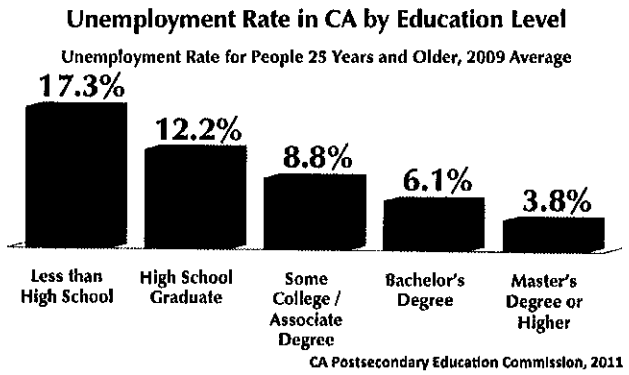
Required skills and traits for manufacturing

What Was Needed Then...	...And What's Needed Now
• Learning one or two specific technical roles • Physical strength & flexibility • Ability to follow fixed, unchanging procedures • General attention to production & safety procedures • Following orders • Operating, maintaining, designing mechanical machinery	• Mechanical reasoning, logic, troubleshooting & spatial visualization • Personal flexibility, communication & cooperation • Initiative, persistence & independence • Attention to detail, self-control & dependability • Making independent decisions • Operating computers or computerized machinery & using computers for a wide range of critical functions

Handler et al., 2009

> ***California's competitiveness depends on the skills of our workforce. We have no time to waste arguing about education reform while our international competition moves ahead of us.***
>
> – Daniel Rapaport, Partner, Wendel Rosen Black & Dean, LLP, Oakland, CA





Changing Course

As California and the nation wrestle with the vitally important debate on education reform, businesses know that career relevance must be incorporated into the classroom. Too many students do not understand why they need to know what they are being taught, lose interest in school and then do not develop the skills employers expect them to have. The career-themed Linked Learning approach, based upon the proven Career Academies model, helps high school students stay engaged in school and graduate with a concrete understanding of what they will need to succeed in the workforce and education post-high school, thus better ensuring California businesses have a workforce armed with the skills required in a global marketplace.

Linked Learning Puts Career Relevance into the Classroom

The Linked Learning approach integrates rigorous academics, relevant career-technical education, support services for students and real-world work-based learning experiences supported by industry and community partners over a three- or four-year period. Linked Learning students opt-in to industry-themed pathways in a wide range of fields, such as engineering, arts and media, biomedicine and health. These pathways prepare high school students for future careers and a full range of postsecondary options, including two- or four-year college, an apprenticeship, the military or formal employment training.

The Linked Learning approach can be found in a number of existing models, such as small theme-based learning communities, California Partnership Academies (CPA), other career academies and regional occupation centers and programs.

Our economy has lost billions because of an unskilled workforce. If we want sustainable economic security, we must remedy this unsustainable situation.

– Larry Ross, General Manager
Crowne Plaza Hotel,
Concord, CA

Although some programs are stand-alone schools, including charter or magnet schools, most are pathways within larger comprehensive high schools. Often called a "school-within-a-school," pathways typically comprise no more than 200 students who stay together with the same teachers for the duration of the program. That continuity helps create close relationships among the students, their peers and their teachers. It creates the kind of "team player" mentality employers too often find lacking in their younger employees.[28]

In a recent survey, 175 California CEOs put "improving the K-12 system" at the top of their list of how local and state government can strengthen the state's business climate and those CEOs support *increased* expenditures for California's K-12 system.

– Silicon Valley CEO Survey:
Business Climate 2011

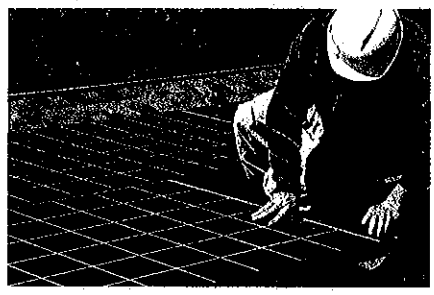
Enhanced Skill Levels

Through hands-on learning, Linked Learning students gain the practical skills that cannot be taught from a manual or learned through a classroom lecture. For example:

- Students in a health careers academy can learn how to measure a patient's blood pressure, administer shots, perform blood-typing, examine x-rays and apply casts. Through internships, students may have the opportunity to work with real doctors and learn how to express compassion and empathy for patients. Students in some pathways also have the opportunity to become certified in venipuncture, injection training, EKG, CPR and first aid.
- Students at an agricultural technology academy learn the mechanics of agricultural science, technology and veterinary medicine. One academy has a student-run farm, which features orange grove fields and livestock, providing opportunity for a hands-on learning experience. Students there learn how to operate tractors, understand irrigation systems and care for animals.
- Students in multimedia / video production academies learn the technical aspects of operating teleprompters,

Linked Learning Pathways are Designed to be Relevant to California's Economy

Agriculture and Natural Resources • Arts, Media and Entertainment • Building and Environmental Design • Education, Child Development and Family Services • Energy and Utilities • Engineering • Fashion Design, Manufacturing and Production • Finance and Business • Health Science and Medical Technology • Hospitality, Tourism and Recreation • Information Technology • Manufacturing • Marketing, Sales and Service • Public Services • Law and Justice • Transportation



video cameras, studio camera switchers, audio mixers and microphones. They also learn how to write video scripts and edit video using digital software. These are useful and in-demand skills for California's varied media sector.

By experiencing the Linked Learning approach, California high school students understand the skills they will need in a particular occupation and can make more informed decisions about postsecondary education and training. They will ultimately enter the workforce much more prepared to hit the ground running, potentially reducing the time and cost of on-the-job training or the need for hiring replacements.

Increased School Success

Increasing both California's high school graduation rates and enrollment in postsecondary education and training programs are keys to cultivating a skilled workforce. One review of data on students in California Partnership Academies found they had higher pass rates on the California High School Exit Exam and higher graduation rates than the state average.[33]

Traditional education models lack relevance. High-quality Linked Learning pathways can help reform our education system and create a pipeline of workers with 21st century skills.

– Teresa Goodwin, President, PeopleSpaces Design Group, Oakland, CA

Some California high schools also show marked improvements in grade point averages for students in Linked Learning. For example, for the 2009-2010 school year at Porterville High School, only 66 percent of students not in Linked Learning had GPAs over 2.0, while far more students in Linked Learning had GPAs over 2.0 – 92 percent (health academy) and 88 percent (business/finance academy).[34] Such increased student achievement is good news for California's economy: A study by the California Foundation for Commerce and Education found that student academic achievement has the largest impact on a state's economic performance ranking, based on trend data from all 50 states. A 5.5 percent increase in California's fourth grade math achievement test scores would boost the state from the 38th best economic performance to a top 25 ranking.[35]

A high-quality study found that students attending the Center for Advanced Research and Technology (CART) were more likely to enroll in community college than a demographically similar group of non-CART students. CART uses the Linked Learning approach, with 11th and 12th grade students from 15 Clovis and Fresno Unified high schools attending half-day classes in one of 13 project-based labs, such as human behavior, biomedical engineering or forensic science. Compared to similar students, CART students were 18 percent more likely to be enrolled in a community college directly after high school and 22 percent more likely to still be enrolled one year after graduation from high school.[36]

Another example comes from Kearny High's School of Digital Media and Design (DMD), the first school in the state to achieve Linked Learning certification by demonstrating that it met most of the 39 established criteria for creating an optimal environment for improving student achievement and engagement. Kearny's DMD graduated 99 percent of its 2009 class and 95 percent went on to postsecondary education. DMD's graduation rates have been consistently higher than district and state averages since it became an industry-themed pathway. The school has increased its state Academic Performance Index by 167 points since 2005-06 and received national recognition in 2010 as a Blue Ribbon School.[37]

California is Not Doing Enough

A 2010 report by the California Department of Education found that the state's public high schools are not preparing students for ongoing education and employment in the 21st century. In fact, students are not currently required to complete any coursework that connects academics to the world beyond school.[40]

Key elements of Linked Learning

Project-based learning helps students make connections across subjects and brings greater relevance to classroom learning. Students work together on projects, developing academic and technical skills, as well as more experience with collaboration, communication and critical thinking.[29]

Work-based learning such as mentorships, job shadowing opportunities and internships with local employers brings actual career relevance to the students, deepening their understanding of how traditional academics are used in careers. This helps direct them toward training and education opportunities that will get them the skills California industries are seeking.[30]

School-based enterprise, like student-led businesses or community service initiatives, is another form of work-based learning. It allows students to design, produce and deliver real products and services. At Porterville High School's Business and Finance Academy, for example, students are in charge of ordering the merchandise for the student store, running the store, keeping track of its inventory and making regular deposits at the local bank.[31]

Support services, including counseling as well as additional instruction in reading, writing and mathematics, help students keep their grades up and stay on track for graduation.[32]

Career Academies students, the model on which Linked Learning is based, were twice as likely as nonparticipants to be working in the computer, engineering or media technology sector eight years after graduation, thus helping to increase the supply of STEM workers.[38]

Earnings and Productivity

Career Academies have proven results for producing higher earnings, which are tied to productivity. Both increased productivity and higher earnings are good for the economy: increased productivity spurs economic growth, and higher earnings increase spending power and contributions to the tax base. A national study showed that:

- Young people who went through Career Academies earned 11 percent more than those not in the program.
- Young people from the program worked 12 percent more hours per week than those who did not participate.
- Eight years after graduation, young men in the Career Academies earned $3,731 more per year than non-participants. To illustrate what that could mean over their lifetime, if that same difference held throughout their career up to age 65, they would earn $175,000 more during their working years than those not in the program.[39]

Conclusion

California is falling behind when it comes to preparing its future workforce to compete successfully in a global economy. To stem this tide and close the growing skills gap, policy-makers should make sure we are spending our education dollars on what really works and include changes that will ensure young people enter the workforce with the skills California businesses need. State school districts should be granted greater flexibility to incorporate Linked Learning into their high schools utilizing their existing resources, and state funding for districts that have incorporated such an education approach, including approximately 500 existing California Partnership Academies, must also be protected. As the California economy rebounds, the state should make greater investments in Linked Learning. If we are serious about getting California back on top, we must act now to get California businesses the skilled workforce we need.

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AMERICA'S EDGE
Strengthening Businesses Through Proven Investments in Kids

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Who We Are

The business leaders of America's Edge take a critical look at the knowledge, skills and abilities businesses need their employees to have in the 21st century, including the ability to be communicators, collaborators and critical thinkers. Using that analysis, we educate policy makers and the public about high quality, proven investments that strengthen businesses, establish a foundation for sustained economic growth, and protect America's competitive edge in a global marketplace, while helping our nation's children get on the right track.

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