From Vocational Education to Linked Learning:

The Ongoing Transformation of Career-oriented Education in the U.S.

Michael Lanford
William G. Tierney
Pullias Center for Higher Education
University of Southern California

Career-Oriented Education

Educational discourse in the United States increasingly accentuates the importance of coupling secondary and postsecondary coursework with job training. Such an emphasis may stimulate numerous changes involving teacher certification, the assessment of students' acquired skills and knowledge, the relationship between educational institutions and business interests, and the credentials offered by a school, college, or university. Aside from these practical concerns, a shift to career-oriented education is also important from a philosophical standpoint. Traditionally, the purpose of education in the United States has been conceived broadly, encompassing several goals, such as equity, civic participation, "whole-person" development, aesthetic appreciation, and greater cultural awareness. The renewed focus on equipping students with marketable skills is both a response to the globally-competitive labor market engendered by the Financial Crisis of 2008 and an implicit critique of the traditional American liberal education model.

Is such a critique warranted? According to data collected by the Higher Education Research Institute at the University of California-Los Angeles, today's college students prize employment over the ineffable benefits of a liberal education.[1] In 1971, less than 40% of first-year college students considered "being very well off financially" to be an "essential" or "very important" objective; meanwhile, over 70% asserted that "developing a meaningful life" was a vital life goal. The most recent survey, taken in 2013, reveals a remarkable shift in the philosophies of first-year college students. Over 80% considered financial success to be paramount, while less than half emphasized the importance of a meaningful life.

As a result, innovative approaches to fostering student participation in STEM fields (Science, Technology, Engineering, and Math) are being promoted by a wide spectrum of politicians, corporations, and policy think tanks. In particular, the enduring belief that a college diploma is essential for financial security and lasting employment is being reevaluated. For example, Jonathan Rothwell (2013) from the Brookings Institution recently asserted that approximately half of all STEM jobs could be filled by workers who lack a four-year postsecondary degree but have the right competencies. Citing these figures, many observers argue that educational outcomes should reflect the changing needs of the workforce, and high school curricula should integrate academic instruction with work-based learning.

With these trends in mind, researchers at the Pullias Center for Higher Education are currently studying new educational paradigms that are attempting to redefine career-oriented education for the twenty-first century. This monograph first presents a brief history of vocational education in the United States, followed by descriptions of newer initiatives. Multiple Pathways, California Partnership Academies, and Linked Learning, movements in California that seek to combine career-oriented training with academic rigor, are each discussed in detail.

A second monograph will examine how vocational education is deployed in Germany, a country that is often appraised as a model for career-oriented education. The cultural, social, and economic factors that facilitate Germany's vocational education sector will be highlighted, and its potential as a model for the United States will be considered.

Subsequent monographs will disclose preliminary findings from a qualitative research study conducted by the Pullias Center on Linked Learning. Our questions include the following:

- ♦ Is Linked Learning viable as a public policy to increase the career readiness of high school graduates in California?
- ♦ How do industry partnerships happen?
- ♦ What are the relationships between students, teachers, administrators, and employers like in a partnership academy and/or Linked Learning program?
- ♦ Are these relationships sustainable and scalable?

---

1   See the CIRP Freshman Survey at the UCLA Higher Education Research Institute: http://www.heri.ucla.edu/cirpoverview.php

Career-Oriented Education in the United States: 1917 to 2000

In the twentieth century, two federal legislative acts were integral in the promotion of vocational curricula:

1. The Smith-Hughes National Vocational Education Act of 1917
2. The Carl D. Perkins Vocational and Technical Education Act of 1984.

At its inception, the Smith-Hughes Act utilized federal funding to stimulate coursework in the fields of agriculture, industrial trades, and home economics (Dortch, 2012). Students were placed in groups, based on their perceived abilities to manage varying degrees of curricular rigor (Mehan, 2009). These groups, known as "educational tracks," became quite controversial. Working-class youth were frequently "tracked" into industrial jobs, while students from more affluent families were prepared for higher education and white-collar employment (Oakes & Saunders, 2008; Stern & Sterns, 2008). Even though the purpose of the Smith-Hughes Act was to provide an array of options for students from diverse backgrounds, it ultimately "cemented the distinction between liberal arts and vocational education" and continued to stigmatize low-income minority students (Mehan, 2009, p. 8) by severely limiting their "access to college and high paying careers" (Rattray, 2008, p. 191).

Nevertheless, the Smith-Hughes Act vastly expanded the role of vocational education in the United States. Before the implementation of Smith-Hughes, less than $3 million was spent annually to train approximately 200,000 vocational students in the United States. By the 1950's, $176 million was allocated for vocational education, and enrollment had increased to 3.4 million students (Gordon, 2008). The Smith-Hughes Act proved especially attractive to individual states and municipalities. By the 1950's, state and local entities overmatched federal monies (Hayward & Benson, 1993).

Several amendments (in 1929, 1934, 1936, and 1946) kept the Smith-Hughes Act viable through funding increases and increased flexibility in the usage of funds. However, a new law in the second half of the twentieth century eclipsed the efficacy of the Smith-Hughes Act. The Vocational Education Act of 1963 not only increased funding for vocational education, but also subsidized work-study, research, training, and demonstration programs in support of vocational education. Five years later, the National Advisory Council on Vocational Education was established and procured funding for the collection and distribution of data on these programs (Dortch, 2012).

The importance of granting access to vocational education for adults was reaffirmed by the passage of the 1984 Carl D. Perkins Vocational Education Act (Stern & Sterns, 2008). An important revision in 1990 developed a "Tech-Prep" program to ensure that secondary and postsecondary vocational education activities were placed in a "coherent sequence of courses" (Dortch, 2012, p. 3). In 1998, further amendments to the Perkins Act allocated additional funds to local actors. The amendments also strengthened accountability by forming core performance indicators, sanctions if states fell below the performance indicators, and incentives for exceeding the performance levels (Dortch, 2012).
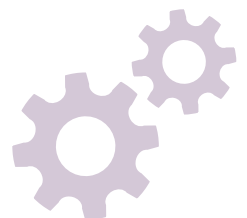
Career and Technical Education (Re)defined

As defined by the U.S. Department of Education, career and technical education (CTE) "prepares students for roles outside the paid labor market, teaches general employment skills, and teaches skills required in specific occupations or careers" (National Center for Education Statistics, n.d.). Historically, career and technical education has been restricted to non-college bound classrooms; hence, it remains stigmatized as being of "low level" quality (Gandara, 2008).

Consequently, two concerns have been frequently voiced by critics of career and technical education.

♦ First, students are compelled to decide too early about the career path they wish to pursue.
♦ Second, students from career and technical education backgrounds often face difficult hurdles if they later wish to apply to college, especially since some colleges do not recognize applied academic courses from CTE programs (Hubbard & McDonald, 2014).

Critics have further contended that the tracking resulting from CTE education creates greater inequality and wastes valuable resources that could be martialed in support of a student's collegiate ambitions (Mehan, 2009).

Interestingly, the 2006 amendment of the Perkins Act removed the distinction between academic and vocational education as separate entities. Previously, vocational education was defined as "a sequence of courses that provides individuals with the academic and technical knowledge and skills the individuals need to prepare for further education and for careers (other than careers requiring a baccalaureate, master's, or doctoral degree)" (Stern & Sterns, 2008, p. 39). As a result of the 2006 amendment, however, vocational education was redefined to include programs that combine coursework in career and technical education (CTE) with preparation for college (Stern & Sterns, 2008).

Since 2008, policymakers have made three interrelated claims concerning career and technical education (Rose, 2008):

1. CTE needs to become more academically rigorous.
2. A more robust focus on academic curricula would prepare students for the possibility of lifelong education and occupational training.
3. The workforce would therefore be better equipped for current and emerging labor markets.

Reform advocates further claim that career and technical education could benefit more students and attenuate achievement gaps if tracks and academic education were to be merged (Rose, 2008; Gandara, 2008).
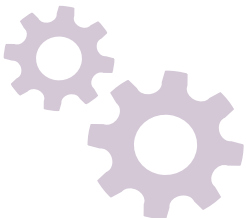
Multiple Pathways

The related concepts of Multiple Pathways and Linked Learning directly result from this conversation about the viability of career and technical education. By simultaneously offering students the opportunity to develop career skills and to prepare for college, the "Multiple Pathways" paradigm claims to transcend the simplistic dichotomy between academic and vocational studies (Oakes & Saunders, 2008). Multiple Pathways first garnered national attention in 2003, when several prominent organizations - including the Bill and Melinda Gates Foundation, the Carnegie Corporation of New York, Jobs for the Future, and the Wallace-Reader's Digest Foundation - each expressed support for its fundamental ideals. Soon afterwards, the James Irvine Foundation became a primary advocate for Multiple Pathways in the state of California (Oakes & Saunders, 2008).

As depicted by Oakes & Saunders, Multiple Pathways is a "high school reform" that enables the traditional high school to be replaced with the following characteristics:

> A portfolio of smaller high schools and programs within high schools ("pathways") that provide both the academic and real-world foundations students need to for advanced learning, training, and preparation for responsible civic participation (p. 6).

Oakes & Saunders imagined "considerable diversity" among pathways, but also outlined four components that would tie pathways together (p. 6-7):

1. A college-preparatory core that would enable admission to the "state's flagship university"
2. A professional core
3. Field-based learning
4. Support services that would be tailored to the specific needs of students.

The authors also envisioned that Multiple Pathways would present five noteworthy differences from a traditional school environment. First, school schedules with six or seven periods would need to be changed significantly to facilitate more "flexible blocks of time" (p. 8). Second, an integrated curriculum would convey the importance of applying content to real-world problems. Third, students would be enabled to choose pathways on the basis of interest, not by previously-identified abilities or through demonstrated achievement. Fourth, the conviction that all students, no matter their backgrounds or perceived weaknesses, can master the skills and concepts presented in a pathway would need to be inculcated throughout the academy. Fifth, a variety of pedagogical approaches could be utilized - either individually or in unison - in the multiple pathways model. The three most common pedagogical approaches include work-based learning, project-based learning, and blended learning. Since these pedagogical approaches are also employed in Linked Learning, they are worthy of greater elucidation.
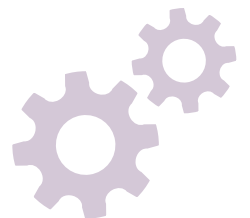
Pedagogical Approaches

WORK-BASED LEARNING

Work-Based Learning has also been referred to as "experiential learning." WBL is based on the notion that students can achieve a deeper understanding of concepts through the integration of academic theory and technical application (Huq & Gilbert, 2001; Rustique & Stam, 2013). The "real-world integration" of skills can be realized through internships, mentoring, workplace simulations, job shadowing programs, and apprenticeships that correlate with classroom curricula (Rogers-Chapman & Darling-Hammond, 2013). Students in work-based learning programs develop a variety of critical skills, such as maturity and emotional intelligence, team-building, negotiation, communication and interpersonal skills (Huq & Gilbert, 2001).

PROJECT-BASED LEARNING

Viewed as a pedagogical approach that engages students who have become detached from education, project-based learning is a pedagogical style that transforms the teacher's role into that of a facilitator. Students, in turn, have the responsibility to transfer knowledge from the classroom into their everyday lives by exploring a complex, open-ended problem in depth (Johnson & Delawsky, 2013). Underscoring project-based learning is the theory that students who are encouraged to explore their passions will generate meaningful projects, thus discovering their passions (Wurdinger, Haar, Hugg, & Bezon, 2007).

BLENDED LEARNING

According to Garrison & Vaughn (2008), blended learning is a "fusion of face-to-face instruction and online learning experiences" (p. 5). This style of learning can be implemented in a multitude of ways, as long as teachers and administrators recognize that content should be reformulated to match the advantages presented by technology and professional development should be encouraged (Watson, 2008). Blended learning also gives teachers an opportunity to redesign the learning environment and extend learning outside of the traditional classroom (Moskal, Dziuban & Hartman, 2013).
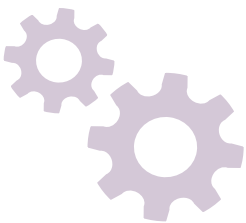
Career Academies

An important predecessor that influenced many of the ideas behind the Multiple Pathways paradigm is the career academy. Broadly defined, career academies are small learning communities with college-preparatory curricula that focus on career-related themes, such as health, business, arts, information technology, and communication (Stern & Sterns, 2008). The theme of a school can serve as a motivational hook or as a vehicle for learning (Quartz & Washor, 2008), and advocates argue that they are consistently present in the most successful programs based on a Multiple Pathways approach (Rattray, 2008). Ideally, partnerships with local employers and representatives from the postsecondary education sector are also forged. These individuals are encouraged to help formulate the curriculum, serve as mentors, conduct field trips, and - perhaps most importantly - enable internships (Stern, Dayton, & Raby, 2010).

"Broadly defined, career academies are small learning communities with college-preparatory curricula that focus on career-related themes, such as health, business, arts, information technology, and communication."

The first career academy, entitled the "Electrical Academy," was established in 1969 at Philadelphia's Thomas Edison High School, an institution notorious at the time for high dropout rates (Lehr, 2004). Supported by Philadelphia Academies, Inc., a nonprofit youth development organization, the number of academies in Philadelphia grew from a single academy in 1970, to approximately 5 in 1980, to 28 in 1995 (Stern, Dayton, & Raby, 2010). Inspired by the career academies in Philadelphia, Sanford I. Weill, Chairman Emeritus of Citigroup, created the National Academy Foundation in 1982. The NAF began subsidizing career academies across the United States in the mid-1980's, providing training in one of five themed professional fields: engineering, finance, health sciences, hospitality, or information technology.[2] To date, the National Academy Foundation sponsors 667 career academies serving over 80,000 students in 38 states, the District of Columbia, and the U.S. Virgin Islands.[3]

---

2   See http://naf.org/our-themes
3   See http://naf.org/our-partners
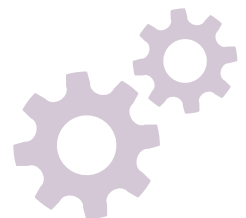
California Partnership Academies

Meanwhile, California became the first state, in 1984, to systematically legislate career academies into existence (Dayton, Hester, & Stern, 2011). Currently, close to 500 California Partnership Academies are in existence throughout the state (Osborn & Maitre, 2014), with 22% of California high schools hosting an academy in 2010 (Dayton, Hester, & Stern, 2011). In some districts, academies exist in the majority of the high schools; for instance, roughly two-thirds of the high schools in the Los Angeles Unified School District house an academy (Ong & Terriquez, 2008).

California Partnership Academies have a number of unique features in common. Only students in grades 10 through 12 are eligible to participate. No less than 50% of the students in each admitted class must be designated "at risk" based on a set of pre-determined criteria delimited by the state. Although substantial funding is provided by the state, California Partnership Academies are required by law to receive at least matching support from their local districts, as well as matching support from local employers. Accordingly, in 2009-10, California Partnership Academies received $26.5 million from the state, $41.3 million from their school districts, and $48.3 million from employers (Dayton, Hester, & Stern, 2011). If a student does not attend classes at least 80% of the time and earn 90% of the credits required for "normal progress" towards graduation, the academy loses funding attached to that student.

"California Partnership Academies have a number of unique features in common."

Unsurprisingly, California Partnership Academies boast high attendance rates (Dayton, Hester, & Stern, 2011). Available research also indicates that a greater proportion of students in California Partnership Academies pass the California High School Exit Exam during their sophomore year, complete their a-g college entrance requirements, and graduate from high school (Dayton, Hester, & Stern, 2011; Studier, 2008). Due to these achievements, Dayton, Hester & Stern (2011) claim that California Partnership Academies "[provide] a model for high school reform" in California and "have become an important part of the Linked Learning initiative in California" (p. 4).

Nevertheless, more research is needed to understand the factors that have propelled higher exam scores and graduation rates in California Partnership Academies. To date, we do not know if the successes attributable to California Partnership Academies are motivated by career-relevant curricula, the stability attainable through a three year relationship between teachers and students, smaller class sizes, and/or a combination of these and other unanticipated factors. Also, extant research indicates that the lead teachers of California Partnership Academies experience overload due to the nature of their expanded duties (Johnston, 2013; Stern, et al., 2002). Since the model of collaboration and interdisciplinary coursework espoused by Multiple Pathways and career academies is vastly different from the paradigms and expectations of their greater high schools, scaling up might present difficulties (Wasley & Lear, 2001).
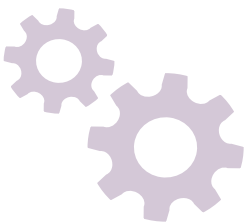
Linked Learning

HISTORY AND OVERVIEW

Based on the Multiple Pathways concept proposed by Oakes and Saunders (2008), Linked Learning is a district-level educational paradigm, first piloted in California, that integrates academic instruction with technical curricula to foster real-world skills and facilitate work-based learning (Rogers-Chapman & Darling-Hammond, 2013). This integration, known as a "pathway," is intended to be multidisciplinary, with collaboration between English, mathematics, science, social studies, and vocational teachers in the development of lessons and curricula ("Fact sheet," n.d.). The first cohort of nine Linked Learning districts started in 2009. Two years later, Assembly Bill 790 established twenty additional Linked Learning pilot districts throughout the state.[4] In total, approximately 480 pathway programs have been created in these 29 total districts,[5] many of which were formerly California Partnership Academies.

Linked Learning arises from the belief that different career skills will be required in the 21st century. Hence, educational outcomes should reflect the changing needs of the workforce, and curricula should integrate academic instruction with work-based learning (Rice, 2011b). Moreover, student-adult relationships should be emphasized through "mentorships, internships, apprenticeships, or job-shadowing programs" to "compliment students' interests and their eagerness to produce knowledge as well as acquire it" (Oakes & Saunders, 2009).

Although Linked Learning specialists do not prescribe pathways for school districts, a Pathway Quality Review Design Team has defined four components that should be included in a pathway (and are remarkably similar to the Multiple Pathways components delineated by Oakes and Saunders) ("Criteria," 2012):

1. An academic component
2. A technical component
3. A work-based learning component
4. Support services that offer counseling and supplemental instruction in reading, writing, and math.
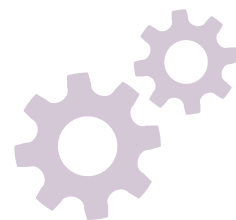
The pathways themselves are structured to prepare students for careers in a variety of fields, such as engineering, health care, law, and the performing arts. According to the design team, pathways should be "set in the context" of one of 15 defined "major industry sectors" in California ("Sample pathways," n.d.). Therefore, one of the primary goals of Linked Learning is to establish partnerships between schools and local businesses, thereby facilitating relationships between students and industry professionals through a variety of job-shadowing programs.

Four guiding principles have also been outlined ("FAQs," n.d.):

1. The preparation of students to succeed in college, career, and life
2. The preparation of students for a full range of post-graduation opportunities
3. The connection of academics to real-world applications
4. The improvement of student engagement.

---

4   See http://www.cde.ca.gov/nr/ne/yr13/yr13rel2.asp
5   See http://edsource.org/2014/linked-learning-academies-throughout-california/65441

The last principle has seemingly changed since 2010, when it was initially defined as "student achievement" (Armistead, 2010).

ADVOCATES FOR LINKED LEARNING

Four principal advocates for Linked Learning are the James Irvine Foundation,[6] ConnectEd: The California Center for College and Career,[7] the Stanford Center for Opportunity Policy in Education,[8] and the Institute for Democracy, Education, and Access at the University of California at Los Angeles.[9] Aside from the state of California, the James Irvine Foundation has likely been the most devoted financial supporter of Linked Learning, investing more than $100 million since 2006 (Guha, et al., 2014). ConnectEd, a private, nonprofit organization based in Berkeley, CA, first developed Linked Learning (Hubbard & McDonald, 2014). Today, ConnectEd is focused on providing "technical assistance and coaching" to school districts through assessment, strategic planning, implementation planning, and teacher training programs ("FAQs," n.d.). During the first Linked Learning District Initiative in 2009, ConnectEd provided "coaches," funded by the James Irvine Foundation, who offered their expertise to plan and implement district strategies.[10] ConnectEd is also collaborating with six California State University campuses to provide "pre-service" training for teachers in pedagogy, teamwork, and curriculum design (Gewertz, 2011). The staff members of ConnectEd have a wide range of career experiences in private industry and education.

In June 2011 and June 2013, Stanford University hosted Linked Learning Summer Institutes that helped leadership teams from various school districts define outcomes and strategies for implementing Linked Learning philosophies. Researchers at Stanford have also published several policy briefs on Linked Learning, as well as case studies concerning the implementation of Linked Learning in three California cities: Pasadena (Rice & Rutherford-Quach, 2012), Porterville (Rustique & Rutherford-Quach, 2012), and Sacramento (Rutherford-Quach & Rice, 2013). UCLA, in turn, has produced a guidebook and accompanying DVD that offers suggestions for the successful implementation of Linked Learning (Saunders, et al., 2013).

CALIFORNIA CAREER PATHWAYS TRUST

Over the next few years, Linked Learning is likely to attract significant attention from both researchers and popular media not only because it presents an intriguing new archetype for primary, secondary, and postsecondary education, but also because it is receiving extraordinary levels of state financial support. In July 2014, the California Legislature allocated $250 million in competitive grants to school districts, charter schools, and community college districts for career pathways programs.[11] This money will be managed by a new California Career Pathways Trust that will continue to allocate funds for at least the next three academic years. Grantees will be evaluated on their ability to propose a pathways program that connects businesses, schools, and community colleges (Ceasar, 2014).

STRENGTHS

One strength of Linked Learning is its flexibility. Several types of educational institutions, including learning academies, career-based schools, and traditional high schools, can develop Linked Learning pathways (Education Trust-West, 2011). Also, Linked Learning pathways ensure that students remain eligible for admittance to California public universities, without resorting to tracking (UCLA, n.d.). The Irvine Foundation further argues that Linked Learning may expand dual enrollment opportunities for underrepresented youth (Hughes, et al., 2012).

---

6   See https://www.irvine.org/
7   See http://www.connectedcalifornia.org
8   See http://edpolicy.stanford.edu/projects/193
9   See http://idea.gseis.ucla.edu/projectsup /linked-learning
10 See http://www.connectedcalifornia.org/schools_districts/district_initiative
11 See http://www.cwib.ca.gov/Career_Pathways_and_Education_Committee.htm

Theories on distributive leadership and design thinking have informed Linked Learning policies. Unlike traditional leadership, distributive leadership "weaves [responsibility] into the relationships and interactions of multiple stakeholders" (School Redesign Network, 2010, p. 1). Schools that incorporate Linked Learning have Pathway Leadership Teams that consist of administrators, teachers, and other staff. These teams have the ability to change "structures, policies, and instructional practices, such as master schedule, curriculum integration, and professional development" (p. 2). Rice (2011a) defines design thinking as a process that encourages "thinking outside the box, progress through trial and error, and a commitment to changing traditional policies, structures, and practices" (p. 1). Thus, the autonomy, collaboration, and experimentation that Linked Learning offers may appeal to some educational environments.

Since the first Linked Learning districts were established in 2009, SRI International has conducted a longitudinal study of student outcomes, student engagement, and students' perceptions of their pathways. In December 2014, SRI published its fifth year evaluation report of Linked Learning. Consistently, SRI has found that students in Linked Learning pathways accumulate credits at a rate that outpaces their peers. Although SRI has not been able to measure the student dropout rate, they have used student retention within districts as a proxy; indeed, according to this proxy, Linked Learning students have higher retention rates (Guha, et al., 2014). Unlike their peers in California Partnership Academies, though, Linked Learning students have not yet exhibited better attendance than their fellow students, nor have they scored higher on standardized achievement tests (Guha, et al, 2014).

WEAKNESSES

Parsi, Plank, & Stern (2010) examined the costs of ten Linked Learning pathways, concluding that an additional $505 to $1,937 per student per year is required for effective implementation. Start-up costs are an additional $500, requiring school districts to either increase their total budgets or reallocate resources. Financial and logistical problems can also be caused by crowded schedules and personnel turnover (Siri, et al., 2011).
Linked Learning pathways may also create structural changes in schools that can disorient administrators, teachers, and students. For example, Porterville's school district had to reassign principals in the middle of the school year, and the school day was changed from six to seven periods (Rustique & Rutherford-Quach, 2011). Furthermore, the collaborative and interdisciplinary nature of the Linked Learning model may conflict with the "individualistic and subject-oriented nature of teacher culture" (Johnston, 2013, p. 63). Hubbard and McDonald (2014) found that the existing cultures within the school sites they investigated "significantly affected the implementation of Linked Learning" (p.16). Even when teachers are eager to collaborate, their busy schedules may prevent an effective partnership (Siri, et al., 2011). Ultimately, the expectations placed on teachers can result in overload and a high turnover rate, "which has implications for the sustainability of [the pathway] model" (Johnston, 2013, p. 63).

Another challenge for the implementation of Linked Learning pathways concerns the integration of college preparatory classes with career pathway coursework. In California, the master calendar must encompass a-g requirements, common core, and CTE/Linked Learning pathway courses. For this reason, the master calendar has been described as a "nightmare" by principals (Hubbard & McDonald, 2014, p. 11).

Pathway courses total 21.5 of the 24 units that are available for California high school students (FAQs, n.d.), leaving little room for electives - including AP classes. Students who have either failed a class, need to make up a class, or want to take AP classes occasionally face inextricable scheduling difficulties. To settle conflicts, students may be forced to leave the Linked Learning pathway, making them either "not ready" for a career or for college (Johnston, 2013; Hubbard & McDonald, 2014).
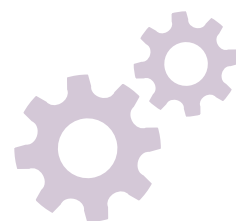
Concluding Thoughts

Three themes emerge in the literature on Multiple Pathways, California Partnership Academies, and Linked Learning.

- ♦ First, support systems must be in place for teachers and administration if these school reform initiatives are going to be successful.
- ♦ Second, scaling up has proven especially difficult (Oakes & Saunders, 2008).
- ♦ Third, the sustainability of these initiatives is always a concern (Hubbard & McDonald, 2014).

While it is possible that educational initiatives like Linked Learning can promote diversity, stimulate a student's interest in lifelong learning, and inculcate valuable skills that lead to a successful career, their relative novelty means that current research is far from conclusive.

Most importantly, career-oriented educational initiatives like Linked Learning will have to resist the temptation to narrowly define success by the number of students who enter their pathway's defined professions. According to the Bureau of Labor Statistics, people who were born from 1957 to 1964 held an average of 11.3 jobs from ages 18 to 46, and the average median tenure in a job is only 4.4 years. In a dynamic, globalized world where job security is tenuous, younger generations are switching jobs and careers at an even more rapid pace. For these reasons, job training is only effective if it is paired with an education that fosters critical thinking, versatility, and an awareness of global trends.
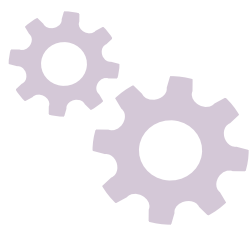
References

Armistead, L. (2010). Linked learning demonstrates blend of academics and career-focused learning. Retrieved from
　　　　http://files.eric.ed.gov/fulltext/ED538411.pdf

California Department of Education. (2014). *California careers pathways trust.* Retrieved from
　　　　http://www.cde.ca.gov/ci/ct/pt/index.asp?print=yes

California Department of Education. (2014). *ROCP basics.* Retrieved from
　　　　http://www.cde.ca.gov/ci/ct/rp/basics.asp

California Legislation Information. (2011-12). AB-790 career technical education: Linked learning pilot
　　　　program. In *Assembly Bill No. 790,* chapter 616. Retrieved from
　　　　http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120AB790

California Legislation Information. (n.d.). Education code–regional occupational centers [52300-52334.5].
　　　　In *California Constitution: Education Code,* chapter 9, article 1. Retrieved from
　　　　http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=EDC&sectionNum=52302.3.

Ceasar, S. (2014, May 30). State grants $250 million for programs linking learning and careers. *The Los Angeles
　　　　Times*. Retrieved from
　　　　http://www.latimes.com/local/lanow/la-me-ln-la-unified-grants-20140530-story.html.

College of Education. *College secures james irvine foundation grant for linked learning: Models of clinical teacher
　　　　preparation and induction.* California State University, Long Beach. Retrieved from
　　　　http://www.ced.csulb.edu/college-secures-james-irvine-foundation-grant-linked-learning

ConnectEd. (n.d.). *Fact sheet on linked learning.* Retrieved from http://connectedcalifornia.org/4

ConnectEd. (n.d.). *FAQs.* Retrieved from http://www.connectedcalifornia.org/linked_learning/faqs

ConnectEd. (n.d.). *Sample pathways.* Retrieved from http://www.connectedcalifornia.org/linked_learn
　　　　ing/sample_pathways

Dortch, C. (2012). Carl D. Perkins Career and Technical Education Act of 2006: Background and performance.
　　　　CRS Report for Congress: Prepared for Members and Committees of Congress. Congressional Research
　　　　Service. Retrieved from www.crs.gov

Dulaney, J. (2013). CSULB grant goes to linked learning program. *Press-Telegram.* Retrieved from
　　　　http://search.proquest.com/docview/1472015786?accountid=14749

Education Trust-West. (2011). *Report: Unlocking doors and expanding opportunity.* Retrieved from
　　　　http://west.edtrust.org/resource/unlocking-doors-and-expanding-opportunities/

Fritz, S. (2010, June 1). Linked learning spreads in california. *Youth Today.* Retrieved from
http://youthtoday.org/2010/06/linked-learning-spreads-in-california/

Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines.* San Francisco, CA: Jossey-Bass.

Gordon, H. (2008). *The history and growth of career and technical education in America.* Long Grove,
IL: Waveland Press.

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

Hayward, G. C. & Benson, C. S. (1993). Vocational-Technical Education: Major reforms and debates 1917-Present. Retrieved from http://files.eric.ed.gov/fulltext/ED369959.pdf

Hubbard, L. & McDonald, M. (2014). The viability of combining academic and career pathways: A study of linked learning. *Journal of Education for Students Placed at Risk, 19(1),* 1-19. doi: 10.1080/10824669.2014.943759.

Hughes, K. L., Rodriguez, O., Edwards, L., & Belfield, C. (2012). Broadening the benefits of dual erollment. Community College Research Center, Columbia University. Retrieved from http://ccrc.tc.columbia.edu/publications/broadening-benefits-dual-enrollment.html

Huq, A. & Gilbert, D. H. (2013). Enhancing graduate employability through work-based learning in social entrepreneurship: A case study. *Education + Training, 55(6),* 550-572.

Johnson, C. S. & Delawsky, S. (2013). Project-based learning and student engagement. *Academic Research International, 4(4),* 560-570.

Johnston, A. (2013). *At the crux of a systemic reform: California partnership academy lead teachers in comprehensive high schools in a linked learning district (unpublished doctoral dissertation).* University of California, Berkeley. Retrieved from https://escholarship.org/uc/item/73z9k3dh

Linked Learning. (2012). Criteria for linked learning pathway quality review and continuous improvement. Retrieved from http://www.connectedcalifornia.org/direct/files/Cert_Criteria_11_12.pdf

Mehan, H. (2009). Restructuring and reculturing schools to provide students with multiple pathways to college and career. In *Multiple perspectives on multiple pathways: Preparing california's youth for college, career, and civic responsibility.* Institute for Democracy, Education, and Access, Los Angeles, CA. Retrieved from idea.gseis.ucla.edu/publications/files/mp06_Mehan.pdf

Moskal, P., Dziuban, C., & Hartman, J. (2013). Blended learning: A dangerous idea? *Internet and Higher Education, 18,* 15-23. doi: 10.1016/j.iheduc.2012.12.001

National Academy Foundation. (2013). *Statistics and research: 2014-2015.* Retrieved from http://naf.org/statistics-and-research

National Center for Education Statistics. (n.d.). *Career/technical education (CTE) statistics.* Retrieved from http://nces.ed.gov/surveys/ctes/tables/glossary_secondary.asp

National Skills Coalition. (n.d.). *Issue brief: Carl D. Perkins Career and Technical Education Act: Reauthorization recommendations to strengthen CTE.* Retrieved from www.nationalskillscoalition.org.

Oakes, J., & Saunders, M. (2009). Multiple pathways: Bringing school to life. *Education Week.* Retrieved from http://www.edweek.org/ew/articles/2009/07/20/37oakes.h28.html

Oakes, J., & Saunders, M. (2008). *Beyond tracking: Multiple pathways to college, career, and civic participation.* Cambridge, MA: Harvard Education Press.

Ong, P. & Terriquez, V. (2008). Can multiple pathways offset inequalities in the Urban Spatial Structure? In J. Oakes & M. Saunders (Eds.), *Beyond tracking: Multiple pathways to college, career, and civic participation*, 313-151. Cambridge, MA: Harvard Education Press.

Parsi, A., Plank, D., & Stern, D. (2010). *Policy Report: Costs of california multiple pathway programs.* Policy Analysis for California Education, University of California, Berkeley. Retrieved from http://casn.berkeley.edu/resources.php?r=301

Quartz, K. & Washor, E. (2008). Meeting the individual and collective aims of schooling. In J. Oakes & M. Saunders (Eds.), *Beyond tracking: Multiple pathways to college, career, and civic participation,* 313-151. Cambridge, MA: Harvard Education Press.

Rattray, D. (2008). Making it real: Implementing multiple pathways. In J. Oakes & M. Saunders (Eds.), *Beyond tracking: Multiple pathways to college, career, and civic participation,* 175-195. Cambridge, MA: Harvard Education Press.

Rice, E. (2011). *Design thinking: A process for developing and implementing lasting district reform (Knowledge brief).* Stanford Center for Opportunity Policy in Education. Retrieved from http://edpolicy.stanford.edu/publications/pubs/260

Rice, E. (2011). *Reframing student outcomes to develop 21st century skills (Knowledge brief).* Stanford Center for Opportunity Policy in Education. Retrieved from http://edpolicy.stanford.edu/publications/pubs/391

Rice, E., & Rutherford-Quach, S. (2012). *Linked learning in pasadena: Creating a collaborative culture for sustainable district reform.* Stanford Center for Opportunity Policy in Education. Retrieved from http://edpolicy.stanford.edu/publications/pubs/593

Rogers-Chapman, M., & Darling-Hammond, L. (2013). *Preparing 21st century citizens: The role of work-based learning in linked learning.* Stanford Center for Opportunity Policy in Education - Knowledge brief. Retrieved from http://edpolicy.stanford.edu/publications/pubs/983

Rothwell, J. (2013). *The hidden STEM economy.* Metropolitan Policy Program at Brookings. Retrieved from http://www.brookings.edu/~/media/research/files/reports/2013/06/10%20stem%20econo my%20rothwell/ thehiddenstemeconomy610.pdf

Rose, M. (2008). Blending 'hand work' and 'brain work': Can multiple pathways deepen learning? In J. Oakes & M. Saunders (Eds.), *Beyond tracking: Multiple pathways to college, career, and civic participation,* 21-35. Cambridge, MA: Harvard Education Press.

Rustique, E., & Rutherford-Quach, S. (2012). *Linked learning in porterville: Creating capacity for innovation and change through collaborative leadership and community engagement.* Stanford Center for Opportunity Policy in Education. Retrieved from http://edpolicy.stanford.edu/publications/pubs/579

Rustique, E., & Stam, B. (2013). *The linked learning advantage: Using linked learning to implement the common core state standards.* Stanford Center for Opportunity Policy in Education - Knowledge brief. Retrieved from http://edpolicy.stanford.edu/publications/pubs/661

Rutherford-Quach, S., & Rice, E. (2013). *Linked learning in sacramento: Organizing the district and community for sustainable reform.* Stanford Center for Opportunity Policy in Education. Retrieved from http://edpolicy.stanford.edu/publications/pubs/705

Saunders, M., Hamilton, E., Fanelli, S., Moya, J., & Cain, E. (2013). *Linked learning: A guide to making high school work.* UCLA Institute for Democracy, Education, and Access, Los Angeles, CA. Retrieved from http://idea.gseis.ucla.edu/projects/linked-learning/guidebook-1

Saunders, M., Rogers, J., & Terriquez, V. (2013). Exploring the education, labor market, and civic trajectories of young adults who attended linked learning pathways: Survey and interview findings. The Institute for Democracy, Education, and Access, University of California, Los Angeles. Retrieved from http://idea.gseis.ucla.edu/publications/201306_LLYouthTrajectories.pdf

School Redesign Network. (2010). *Distributive leadership in district reform: A model for taking linked learning to scale (Knowledge brief).* Stanford Center for Opportunity Policy in Education. Retrieved from http://edpolicy.stanford.edu/publications/pubs/261

Siri, D. K., Zinner, J., & Lezin, N. (2011). Blending rigor and relevance. *Leadership, 40(3),* 8-11. Retrieved from http://www.acsa.org/FunctionalMenuCategories/Media/LeadershipMagazine.aspx

Stern, D., Dayton, C., Lenz, R., & Tidyman, S. (2002). Implementing career academies schoolwide: 2001-2002 developments promising practices (Working paper). UC Berkeley College and Career Academy Support Network. Retrieved from http://files.eric.ed.gov/fulltext/ED471279.pdf

Stern, D., Dayton, C., & Raby, M. (2010). Career academies: A proven strategy to prepare high school students for college and careers (Working paper). UC Berkeley College and Career Academy Support Network. Retrieved from http://casn.berkeley.edu/resource_files/Proven_Strategy_2-25-1010-03-12-04-27-01.pdf

Stern, D., & Sterns, R. (2008). Evidence and challenges: Will multiple pathways improve students' outcomes? In J. Oakes & M. Saunders (Eds.), *Beyond tracking: Multiple pathways to college, career, and civic participation,* 37-54. Cambridge, MA: Harvard Education Press.

Stoll, M. A. (2008). Can multiple pathways link vulnerable groups to changing labor markets? In J. Oakes & M. Saunders (Eds.), *Beyond tracking: Multiple pathways to college, career, and civic participation,* 113-130. Cambridge, MA: Harvard Education Press.

Studier, C. (2008). Evidence from california partnership academies: One model of linked learning pathways. ConnectEd: The California Center for College and Career. Retrieved from http://connectedcalifornia.org/downloads/LL_Evidence_CPA%20Summary_web.pdf

Thijs, J. & Verkuyten, M. (2009). Students' anticipated situational engagement: The roles of teacher behavior, personal engagement, and gender. *Journal of Genetic Psychology, 170(3),* 268-286. Retrieved from http://search.ebscohost.com/

University of California, Los Angeles. (n.d.). Frequently asked questions about linked learning: Pathways to college, career, and civic participation. Institute for Democracy, Education, and Access. Retrieved from http://idea.gseis.ucla.edu/projects/linked-learning/LL_FAQ.pdf

Watanabe, T. (2014, January 21). $250-million grant program launched to link learning and careers. *The Los Angeles Times.* Retrieved from http://www.latimes.com/local/lanow/la-me-ln-career-ed-20140121-story.html

Watson, J. (2008). Blended learning: The convergence of online and face-to-face education. North American Council for Online Learning. Retrieved from http://files.eric.ed.gov/fulltext/ED509636.pdf

Wurdinger, S., Haar, J., Hugg, R., & Bezon, J. (2007). A qualitative study using project –based learning in a mainstream middle school. *Improving Schools, 10,* 150. doi: 10.1177/1365480207078048.

ABOUT THE PULLIAS CENTER

With a generous bequest from the Pullias Family estate, the Earl and Pauline Pullias Center for Higher Education at the USC Rossier School of Education was established in 2012 (the center was previously known as the Center for Higher Education Policy Analysis). The gift allows one of the world's leading research centers on higher education to continue its tradition of focusing on research, policy, and practice to improve the field.

The mission of the Pullias Center for Higher Education is to bring a multidisciplinary perspective to complex social, political, and economic issues in higher education. Since 1996 the center has engaged in action-oriented research projects regarding successful college outreach programs, financial aid and access for low- to moderate-income students of color, use of technology to supplement college counseling services, effective postsecondary governance, emerging organizational forms such as for-profit institutions, and the retention of doctoral students of color.

ABOUT THE AUTHORS

Michael Lanford is a doctoral candidate in the Rossier School of Education, where he works with William Tierney studying the impact of globalization on institutional change, faculty roles, and student development. He holds Master's degrees from the University of Hong Kong, where he graduated "with distinction" in higher education, and Washington University in St. Louis, where he was a Harvey Fellow in American Studies. At USC, Michael is a Provost's Fellow who has received scholarships to present his work at conferences in Taipei, Canada, and the United States. Over the last two years, he has published several articles and book chapters on creativity and innovation in higher education, international branch campuses, and academic freedom. His work has appeared in the *Higher Education: Handbook of Theory and Research, Higher Education, and Frontiers of Education in China*. In his spare time, Michael mentors low-income students preparing to go to college, plays classical piano, and enjoys golf.

William G. Tierney is University Professor and Wilbur-Kieffer Professor of Higher Education at the Rossier School of Education and the Co-Director of the Pullias Center for Higher Education at University of Southern California (USC). Former President of the USC Academic Senate, he has chaired both the Ph.D. program for the USC Rossier School of Education and the University Committee on Academic Review. He serves on the International Advisory Board of King Abdulaziz University (Saudi Arabia) and is an Interdisciplinary Research Fellow at the University of Hong Kong. Dr. Tierney is committed to informing policies and practices related to educational equity. He is involved in projects pertaining to the problems of remediation to ensure that high school students are college-ready, interactive web-enhanced computer games for preparing low-income youth for college, and a project investigating how to improve strategic decision-making in higher education. His recent publications include: *The Impact of Culture on Organizational Decision-making, Trust and the Public Good: Examining the Cultural Conditions of Academic Work*, and *Understanding the Rise of For-profit Colleges and Universities*. Tierney earned a master's from Harvard University and holds a Ph.D. from Stanford University in administration and policy analysis. Tierney has been president of ASHE, president and vice president of AERA, and is a Fellow of AERA. He was recently elected to the National Academy of Education.