

Preparing Teachers for 21st Century Classrooms

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As the teacher shortage crisis in California has become more acute due to teacher turnover and retirement rates, the desperate need for credential programs to prepare additional teachers can overshadow the need to equip preservice teachers with the tools to support K-12 student preparation for success in the 21st century, including readiness for college and career. There is no question, however, that we must not only prepare necessary numbers of teachers, but also prepare them well. The authors have each taken on this challenge in different contexts, but with a single vision: Prepare teachers and educational leaders to nurture students' career goals and provide real-world experiences and systemic supports that allow them to achieve career goals as they transition toward adulthood. In this article, we first describe the research and policy shifts that have been driving increased integration of academic and Career Technical Education (CTE) at the heart of the college and career school redesign effort. Next, each of the authors describe their efforts to transform teacher education, and then we conclude with an argument for changes colleges of teacher education should consider in preparing the next generation of teachers and educational leaders for 21st century classrooms.

California's teacher education programs are changing to address the dramatic expansion of Linked Learning, a high school reform movement that integrates academic and career-technical coursework in career-themed, college-preparatory pathways (Farnan, Hudis, & LaPlante, 2014). In 2008, the California Legislature defined the components of such Linked Learning pathways as integrated core curriculum that meets college eligibility requirements, "delivered through project-based learning and other engaging instructional strategies that intentionally bring real-world context and relevance to the curriculum where broad themes, interest areas, and CTE are emphasized." (California Department of Education, 2017, p. 4). The California Legislature directed districts to integrate academics and CTE in pathway core curriculum, infuse work-based learning into instruction, and embed the support services and supplemental instruction needed to ensure that all students can be successful in both college and careers.

Based on research-documented improvements in achievement outcomes (Kemple & Willner, 2008; Social Programs That Work, 2017; Visher & Stern, 2015), Califor-

nia invested heavily to expand Linked Learning pathways in Grades 9-14 in high-need, high-growth economic sectors, with a 2014 infusion of \$500 million in California's Career Pathways Trust (CCPT) grants. Across the state, K-12 and community college leaders made tremendous strides in developing and aligning career pathways in high wage, high demand industry sectors. This pathway expansion coincided with and supported Common Core implementation, as interdisciplinary pathway teams could provide authentic performance tasks and assessment contexts for the incorporation of practical applications of academic concepts mandated by Common Core (Castellano, Sundell, & Richardson, 2017; Meeder & Suddreth, 2012).

As K-12 districts increased their emphasis on college and career pathways, demand for integrated courses that address both academic and CTE standards also increased (University of California Admissions, 2015). Finding sufficient numbers of competent teachers for integrated CTE/academic courses emerged as a significant obstacle to the creation of college-preparatory pathway programs of study. Nearly two thirds (65%) of the leads at high school sites with Career Pathways Trust-funded pathways reported that finding faculty with appropriate credentials for dual Academic/CTE courses was challenging or very challenging (CDE Career and College Transition Division, 2017). These shortages particularly impact pathways serving large low-income and second language learner populations, as such schools have proportionally greater difficulty attracting and keeping qualified teachers (Darling-Hammond, 2017). California's College and Career Indicators now hold schools accountable for providing all students access to both college and career readiness, (Cardichon & Darling-Hammond, 2017), prompting a further increase in demand for teachers who can integrate academic and CTE instruction, work in college and career pathways, and deliver career education throughout all K-12 educational contexts (Farnan et al., 2014).

By **Corinne Martinez**

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As California's and the nation's largest producer of teachers, the California State University (CSU) is playing an integral role in revolutionizing teacher education to prepare students for 21st century career and college-going success. The CSU Linked Learning Initiative develops teacher leaders equipped to spread and advance the practices of Linked Learning—an academic approach that engages students by linking learning with the real-world workplace experiences that excite them. Linked Learning has been proven to contribute to academic achievement, improved attendance

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and graduation rates in both high school and college (Warner & Caspary, 2017). By effectively implementing Linked Learning, educators prepared in the CSU can help students who might typically fall through the cracks to get a quality education.

Since the launch of the program in December 2013, the CSU has infused Linked Learning into the educator preparation curriculum. Several CSU campuses have introduced pre-service teachers, counselors, and doctoral students in educational leadership programs to Linked Learning. In California State University Long Beach's (CSULB) credential program, secondary education teacher candidates are immersed in a Linked Learning Lens program, and taught how to integrate all aspects of Linked Learning into a classroom. They are later able to apply what they have learned by student teaching at a local school. For example, CSULB credential students participate in a "clinical" at a school in the Long Beach Unified School District where they have opportunities to develop and implement assignments that integrate Linked Learning principles. More recently, CSULB established a pathway to obtaining the Preliminary CTE Credential for teachers with prior industry experience, who hold a Valid California Education Specialist, Multiple Subject, or Single Subject Teaching Credential with an English Learner Authorization.

In 2017, CSULB successfully launched a Master's of Arts program that retains the more traditional Curriculum & Instruction elements while advancing the skills and knowledge needed to teach, excel, and lead in a Linked Learning setting. This M.A. program provides rigorous academic scholarship using Linked Learning principles, including interdisciplinary collaborations between academic and CTE teachers, project-based learning, and the integration of work-based learning experiences. The first cohort of 19 Master's candidates completed a series of courses designed to: (a) increase competence in designing meaningful instructional tasks based on real-world problems, (b) expand their learning through real-world externships, and (c) develop skills in coordinating school- and work-based learning. Faculty members teaching in the program are finding new opportunities to collaborate in curriculum-related work integrating CTE and academic core subjects through the creation of cross-curricular integrated projects. Our ongoing mission is to support students' acquisition of rigorous academic skills to successfully pursue industry- and career-related coursework. We do this by providing access to professional development in the following areas: standards alignment to career themed pathways, CTE and academic integration, and tools for developing projects and integrated units. The establishment of the Master's degree in Curriculum & Instruction with a specialization in Linked Learning serves as a model of qual-

ity standards for advanced recognition of Linked Learning teacher leaders.

By Stephanie Biagetti
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Teaching courses that integrate both academic and CTE standards, such as Medical Biology, or Engineering Physics, requires competence in academic and CTE standards and instructional practices. Single subject teachers cannot qualify for CTE funding unless they are dual credentialed in both the single subject content area and CTE. The requirements for a preliminary single subject credential and a preliminary CTE credential are quite different. While candidates seeking a preliminary single subject credential must hold a bachelor's degree, meet basic skills and subject matter competency, take a U.S. Constitution course, and complete a Commission on Teacher Credentialing (CTC) teacher preparation program, those seeking a preliminary CTE credential must hold a high school diploma, have a minimum of three years of work experience (3,000 hours) in the career field aligned with the credential sought, and be apprised of the requirements for both the preliminary and clear CTE credentials. However, a candidate who holds a single subject credential can have two years of work experience waived toward a preliminary CTE credential, leaving a minimum work experience requirement of 1,000 hours. Consequently, teacher preparation programs within the CSU system have begun to create pathways through their single subject programs that enable candidates to apply for a preliminary CTE credential at the same time they apply for a single subject credential.

At California State University, Sacramento, when candidates apply to the single subject program, they are asked on the application if they have work experience in any of the industry sectors listed in the CTC's (2009) leaflet for a designated subjects career technical education credential. If so, the applicant indicates how much work experience they have in years and in which industry sector. Toward the end of the single subject program, these candidates are provided with step-by-step information about how to apply for a preliminary CTE credential as well as the process to obtain a clear CTE credential after several years of CTE work experience.

CSU Sacramento applicants with industry work experience can also opt to complete the Career Pathways certificate program, a cohort-based avenue through the single subject program that uniquely prepares candidates for teaching in secondary level Linked Learning environments. Candidates complete their student teaching in Linked Learning classrooms that allow them to experience first-hand how career

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pathway themes are incorporated into the core curriculum. In addition, the candidates complete structured fieldwork that includes observations in CTE classroom and interviews with CTE teachers as well as core pathway teachers. Coursework includes activities and projects associated with Linked Learning teaching such as classroom management for project-based learning. Candidates create a multi-disciplinary integrated unit of study in collaboration with colleagues across subject areas. They develop curriculum addressing a career-themed essential question that includes a project, technology, inclusive practices, and English Language Development ((ELD) methods. Finally, candidates complete a work-based learning course that includes a 30-hour internship in an industry workplace along with curriculum development to incorporate what was learned in the internship experience into the core curriculum. While participating in the Career Pathways certificate program is not required to be recommended for a preliminary CTE credential, it does provide extensive opportunities to partake in activities associated with Linked Learning and especially dual-credentialed teaching. With the current focus in school districts on preparing students for both college and career, it would make sense that more teacher preparation programs offer information to their candidates about how to qualify and apply for a preliminary CTE credential and perhaps even work toward becoming a program sponsor for CTE credentials. In addition, teacher preparation programs that are strategically located near districts with numerous functioning career pathways should consider developing their own Career Pathways pre-service teacher certificate program.

By Annie Johnston

Statewide Technical Assistance Provider
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University of California, Berkeley

An essential strategy for expanding and diversifying teacher preparation is to align programs of study across K12, community college and four-year institutions of higher education (Bragg, 2007). Aligning college and career pathways across segments, and emphasizing early college credits, has been shown to exert significant positive effects on college persistence (Alfeld & Bhattacharya, 2013). Community colleges provide the vast majority of early college experiences, and account for 55-60% of teacher candidates enrolled in the CSU system (J. Bissell, personal communication, April 25, 2018).

Community colleges have already instituted significant systems changes to facilitate student transitions and persistence (Career Ladders Project & Jobs for the Future, 2015), including expanded student support systems and counseling. Both are essential components of community college Teacher Preparation Programs (TPP), as described on the TPP

website, teacherprepprogram.org. Serving students across many departments and programs, TPPs support and prepare future teachers in all subject areas and specializations, while also engaging faculty in teaching about high quality instructional practices, and in mentoring tomorrow's teachers. The California Community Colleges have prioritized the integration of TPP programs into college core operations through a "Guided Pathways" redesign.

Community college TPPs are now working to develop regional communities of practice with key education partners to expand and diversify the teacher workforce. With K-12 and CSU partners they emphasize dual enrollment and articulation to facilitate student transitions and accelerate the pathway into teaching. TPPs address the needs of a wide range of student populations, and serve to connect teacher pipelines to diverse, low income communities underrepresented in teaching professions. They provide supports and services essential to student success, from counseling, to academic supports, to internships and mentors. They reach into high school pathways and support transitions to four-year institutions. Collaborative, cross-system alignment thus serves not only to improve student success in transitions into teaching careers through student supports, articulation and curriculum development, but also to address disparities in education outcomes more broadly, by diversifying the teacher workforce.

By Cheryl Ney

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In Los Angeles County, 20 of 80 school districts offer industry/employment sector pathway programs, and approximately 150 pathway programs are served by instructors credentialed in subject matter and CTE areas (Linked Learning, 2017). Efforts are currently underway to increase recruitment into teaching careers for these pathway programs, accelerate time to credential completion, and encourage dual credentialing (single subject and CTE). CSU Los Angeles is collaborating with Teacher Academies in area high schools to foster dual enrollment with our community college partners so that students can accelerate the path into teaching. At CSU Los Angeles, we offer the single subject teaching credential in 11 subject areas, including an integrated teacher preparation pathway to the Math credential as well as offering an Industrial and Technology Education (ITE) credential (California State Los Angeles, 2017). This is the only offering of the ITE credential in the region, a single subject credential that authorizes CTE teaching in four broad industry sectors. Holders of the ITE credential often specialize by obtaining

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CTE credentials in specific sectors ranging from energy, environment and utilities, engineering and architecture, information and communication technologies to manufacturing and product development. Recruitment efforts also focus on current CTE credentialed teachers in these technical areas to encourage and support their pursuit of the single subject ITE credential. Professional learning opportunities are provided to prepare them for the California Subject Examinations for Teachers (CSET; M. Castillo, personal communication, February 21, 2016).

As technological advances rapidly remake the K-12 landscape, the skills required for K-12 STEM educators must also be revisited. The ITE credential provides a solid foundation of STEM academic concepts and practical applications which, if integrated with a science or math credential and the industry experience required for a CTE credential, has tremendous potential for preparing 21st century STEM teachers. While the standards for ITE predate the Next Generation State Standards and California's 2016 Science Standards (CDE, 2016), they are founded upon the same integration of engineering and technology concepts (CTC, 2010). Revisiting them would provide an opportunity to develop new models for teacher preparation credential programs that truly integrate academics and career technical education.

Call to Action

Current standards for teacher preparation programs do not adequately address the competencies required to prepare students for both college and career. Because historically college and career education have functioned as sorting mechanisms, integrating academics and CTE to make both accessible to all students requires considerable systems change in the education sector. To tackle academic and CTE integration, as well as to diversify and expand access to teaching professions, teacher preparation programs should consider several strategic approaches:

- Bachelor degree completion programs could use prior learning credit to accelerate bachelor degree completion for current CTE teachers, facilitating single subject teaching credential acquisition, as is done at CSU San Bernardino.
- New credential program approaches that overlay CTE induction with Single Subject induction could be developed to allow teachers to clear both their CTE and Single Subject credential at the same time. These could be developed using the CTC's Experimental Teacher Credential Program standards in key areas of high demand, such as health and STEM.
- Finally, to recruit more and more diverse credential candidates, as well as to affect policies on

teacher preparation, impact the development of new credential programs, and access funding for this work, colleges of teacher education need a forum for inter-segmental collaboration. The authors recommend energetic efforts to collaborate with community college and K-12 systems through regional networks, consortia and communities of practice.

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