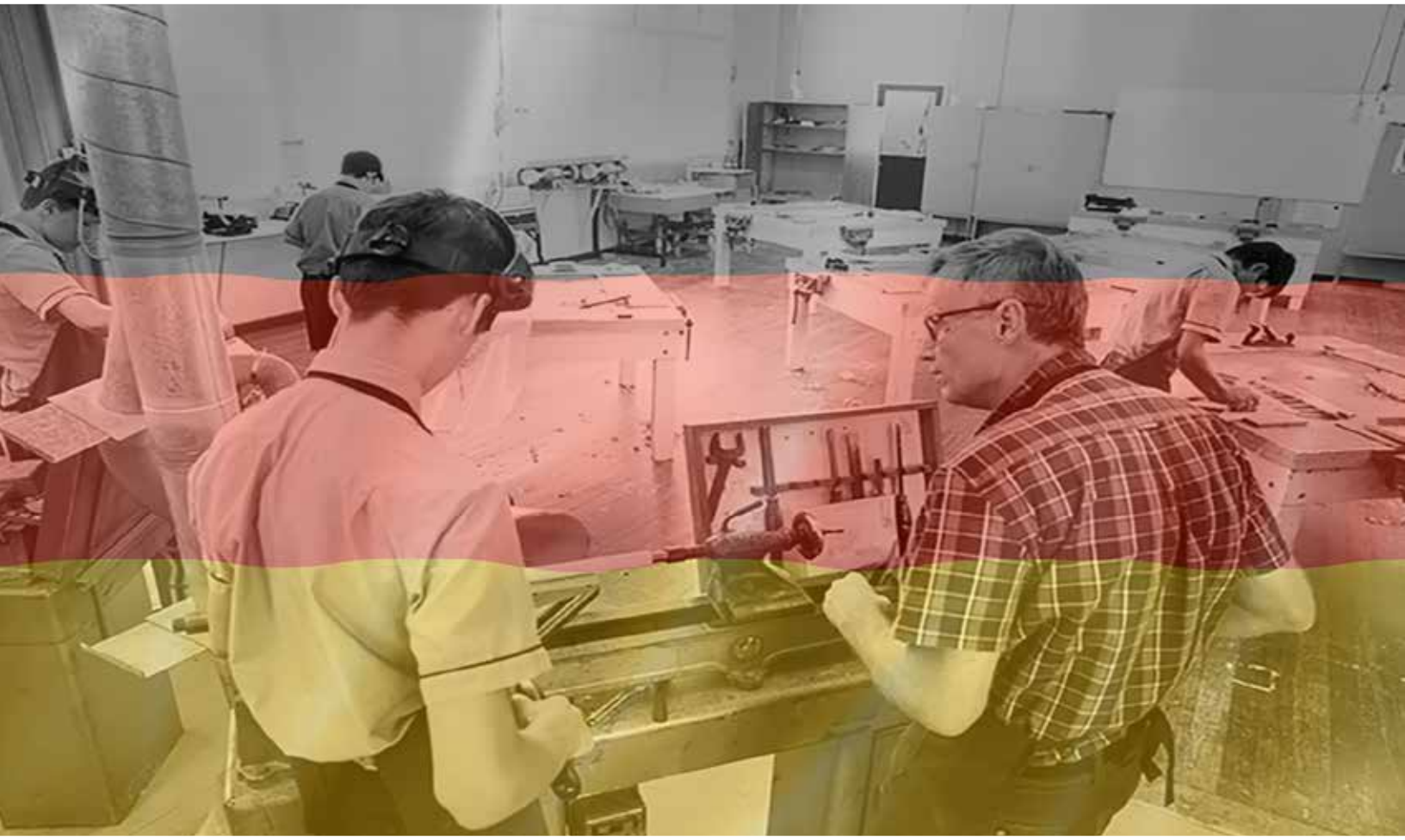
Prospects for Vocational Education in the United States:

Lessons from Germany



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

Pullias Center for Higher Education
Rossier School of Education
University of Southern California
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Introduction

This monograph is the second in a series of publications by the Pullias Center for Higher Education on career-oriented education in the twenty-first century. The previous monograph reviewed research on career-oriented education in three sections (Lanford & Tierney, 2015):

1. A brief history of federal legislative acts that supported vocational education in the United States from 1917 to the present
2. Four current pedagogical approaches to career-oriented education, including work-based learning, project-based learning, blended learning, and career academies
3. An overview of Linked Learning, a new educational archetype that integrates academic instruction with technical curricula to foster real-world skills and facilitate work-based learning.

Unlike past vocational approaches, Linked Learning is designed to cultivate academic and work-based skills translatable to a variety of post-secondary and career-based options. Currently, researchers from the Pullias Center are studying Linked Learning, as it is being adopted by several school districts in California (Rogers-Chapman & Darling-Hammond, 2013).

In our literature review of career-oriented education, three issues that could curtail the efficacy of a career-oriented educational model were highlighted (Oakes & Saunders, 2008; Hubbard & McDonald, 2014):

1. The necessity of support systems for teachers and administrators
2. Concerns about sustainability due to funding and/or the turnover of educational leaders and industry representatives
3. The inherent difficulties in scaling up a new career-oriented educational paradigm.

These issues are largely confined to the school and/or district level. In this monograph, we investigate other possible regional and national obstacles to the effective implementation of career-oriented education in the United States by turning our attention to Germany. In recent years, Germany's vocational education system has been frequently cited as a model for other countries (Euler, 2013; Hawley, 2007; Solga, Protsch, Ebner, & Brzingsky-Fay, 2014). Accordingly, an analysis of the factors that constitute Germany's vocational education system may offer insights into which elements may be feasible and sustainable in the American context.

The Resurgence of Interest in German Vocational Education

A primary reason behind the renascent interest in German vocational education is related to the country's enviable unemployment rate. In 2012, the overall unemployment rate in Germany as a percentage of the total labor force was 5.5%, while the comparable rate in the United States was 8.2%. German youth employment statistics are even more impressive. During the same year, the German unemployment rate for people 24 years of age and younger was 8.1%, compared with 16.2% in the United States (OECD, n.d.). Germany's apprenticeship programs, conducted in tandem with vocational colleges, are often credited with its robust labor market, and other countries have taken notice. For instance, Penang, one of the thirteen states of Malaysia, recently announced plans to "adopt" Germany's vocational model ("In race," 2015), ostensibly to attract multinational corporations that might be interested in relocation or an Asian base of operations (George, 2014).

Germany has recognized the potential benefits of exporting its approach to vocational education. In 2012, the German Embassy in Washington, D.C. launched a "Skills Initiative" to develop training programs within individual states that could support the workforce-related needs of German companies with operations in the United States and of American companies interested in developing a specialized workforce. According to a recent report published by the German Embassy, "finding and retaining workers with the right skills is the number one challenge for German companies operating in the U.S." (Kamm & Lerman, 2015, p. 3). Therefore, the primary goals of Germany's "Skills Initiative" are to "spread best practice in workforce training and scale up successful projects" (p. 2). As argued by Kamm and Lerman, "only if there is a critical regional mass of participating companies can the desired scaling up of best practice be achieved" (p. 3). From these quotes, it is apparent that German companies have a vested interest in endorsing and nurturing a widespread adoption of vocational education in the United States.

As a result, Germany's model of apprenticeships and vocational education has attracted American media attention from a sundry group of outlets like the *New York Times*,[1] *PBS Newshour*,[2] and *The Atlantic*.[3] Moreover, a number of influential commentators from the business community, like Harold Sirkin (2013), Senior Partner of the Boston Consulting Group and Adjunct Professor of Strategy at the Northwestern University Kellogg School of Management, contend that the United States should emulate Germany's vocational system:

> Our friends in Germany know - as we should - that some students are bored by traditional studies; some don't have the aptitude for college; some would rather work with their hands; and some are unhappy at home and just need to get away. They realize that everyone won't benefit from college, but they can still be successful and contribute to society. Americans often see such students as victims. Germans see these students as potential assets who might one day shine if they're matched with the right vocation. And it has a system in place - a partnership of employers and unions with government - to do the matching and provide the necessary training.

Sirkin is correct in arguing that a variety of post-secondary and career-based options are needed in the United States to help students achieve greater scholastic success and discover their career interests. Despite the rising number of high school graduates in California over the past few years, many students are not prepared to attend college, nor are they equipped with the necessary skills to secure a career. Students who are socioeconomically disadvantaged and/or of color face even greater obstacles in their quest for college acceptance and career attainment.

However, we should not accept at face value the proposition that students who perform poorly on a test that narrowly defines scholastic ability "do not have the aptitude for college." Not every middle or high school student receives a stimulating education with engaged teachers, state-of-the-art facilities, and ample support services.

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1 See http://www.nytimes.com/2013/12/01/business/where-factory-apprenticeship-is-latest-model-from-germany.html?_r=0
2 See http://www.pbs.org/newshour/updates/educate-americans-jobs-ask-germans-employers-urge/
3 See http://www.theatlantic.com/business/archive/2014/10/why-germany-is-so-much-better-at-training-its-workers/381550/

Furthermore, as noted by Baker et al. (2010) in a briefing paper for the Economic Policy Institute, "social scientists have long recognized that student test scores are heavily influenced by socioeconomic factors such as parents' education and home literacy environment, family resources, student health, family mobility, and the influence of neighborhood peers" (p. 8). In other words, low achievement may be attributable to a host of factors that impede a student's academic development.

The assumption that the vocational education system of one nation can be readily transferred to another is equally perilous. Euler (2013) cautions that "any country wishing to import a foreign system of vocational training must take existing framework conditions into consideration and implement the dual vocational training in line with the country's own educational, social, and economic objectives" (p. 4). In the remainder of this monograph, we interrogate the viability of the German vocational system in the United States by considering the sociocultural and economic systems in which it is embedded.

First, we demonstrate the burgeoning interest in vocational education in the United States by citing examples of state, federal, and private investments in career-oriented programs. Then, we provide an overview of the German vocational system, highlighting the three tracks that determine students' educational training and, in large measure, their future employment prospects. Afterwards, we compare Germany's economic system with the United States using a varieties of capitalism framework first proposed by Hall and Soskick (2011). The difficulties in combining a tripartite educational system like Germany's with the U.S. Liberal Market Economy are then discussed. As a final consideration, we review the cultural, social, and economic factors that animate the German model and question whether such a model - or even individual aspects of the model - can thrive in the United States.

Increased Funding for Career-Oriented Education in the U.S.

As evidenced by their financial support over the past few years, government agencies and private foundations alike are interested in the viability of career-oriented education in the United States. Since 2006, the James Irvine Foundation has sustained momentum for Linked Learning by investing more than $100 million (Guha et al., 2014). The Oakland Unified School District will receive $12.2 million over the next three years in grant funds from the Atlantic Philanthropies and California Endowment to expand Linked Learning health pathways (Harrington, 2015). Additionally, the Long Beach School District is currently using part of its $7.5 million grant from the Gates Foundation to create online professional coursework for training pathway instructors (Guha et al., 2014).

The state of California, intrigued by the prospect of expanding career-oriented pathways to postsecondary education, has also pledged substantial financial support. In July 2014, under Assembly Bill 86, the state legislature created a California Career Pathways Trust to support the regional development of work-based learning. From 2014 to 2016, the California Career Pathways Trust will allocate $250 million each year in the form of one-time competitive grants. Grantees are evaluated on "to establish or enhance a locally defined career pathways program that connects school districts, county superintendents of schools, charter schools, and community colleges with business entities."[4] Thus far, two rounds of the California Career Pathways Trust have completed, with 80 local and regional entities receiving between $500,000 to $15,000,000 in funds.

4 See http://www.cde.ca.gov/ci/ct/pt/

On the federal level, the U.S. Department of Labor has set aside $100 million for an American Apprenticeship Grants program.[5] Funded by taxes associated with the H-1B non-immigrant visa program, the American Apprenticeship Grants will competitively offer approximately twenty-five awards (between $2.5 million and $5 million each) to a variety of private-public partnerships. The grants program is especially keen to fund designated "high-growth industries," such as business services, healthcare, information technology, and manufacturing. Proponents of career-oriented education programs maintain that continued investments at the regional, state, and federal levels are necessary to develop skilled labor that meets the needs of industry, provides workers with remunerative middle-class jobs, and stimulates the economy. As of 2012, the United States registered 358,000 active apprentices nationwide, with approximately 21,000 available apprenticeship programs (Olinsky & Ayres, 2013). In countries where career-based training is more widely deployed throughout the educational system, comparable figures are much higher. For example, Germany, which has approximately one-fourth the population of the United States, counts approximately 1.8 million individuals as apprentices in 500,000 companies (Olinsky & Ayres, 2013).

Many politicians also contend that academic curricula should be more in tune with the demands of industry. To cite one example, President Obama's American Graduation Initiative encourages community colleges to "work with businesses": [6]

> Colleges could build partnerships with businesses and the workforce investment system to create career pathways through which workers will earn new credentials and promotions through step-by-step, worksite education programs that build essential skills. Colleges will [also] work closely with employers to design training that is relevant to the local labor market and likely to lead to employment and careers.

Due to their novelty, research studies assessing the impact and long-term sustainability of such regional public-private ventures are needed. In particular, the funded programs associated with the California Career Pathways Trust and American Apprenticeship Grants offer a rare opportunity for research that can offer new and perhaps unanticipated findings, particularly as public funding continues to support such initiatives.

Vocational Education in Germany: An Overview

Germany is one of a handful of Western European nations (including Austria and the Netherlands) that maintains a highly-differentiated educational system in which secondary level students are sorted into different schools on the basis on their perceived scholastic abilities. Despite the numerous political and cultural shifts in Germany over the past two centuries, the tripartite configuration of the German educational system has been remained essentially intact since the craft guilds of the early nineteenth century (Baldi, 2010; Ertl & Phillips, 2000; Solga et al., 2014). In fact, "the German educational system is perhaps the clearest and most-studied case of a highly differentiated system" due to its longevity and its influence (Buchmann & Park, 2009, p. 247).

For German students, differentiation occurs immediately after the completion of primary education in the *Grundschule*, generally at age ten (Ertl & Phillips, 2000). After teacher recommendations and parent consultations, students are sorted into one of three types of schools: the *Hauptschule*, the *Realschule*, or the *Gymnasium*.

The *Hauptschule* is the basic, compulsory schooling that focuses on the continued acquisition of math, reading, and writing skills. After five to six years, students receive the *Hauptschulabschluss*, a certificate that enables entry

5 See http://www.dol.gov/apprenticeship/grants.htm
6 See http://www.whitehouse.gov/issues/education/higher-education/building-american-skills-through-community-colleges

into vocational training and serves as the minimum point of entry for most employment. Traditionally, graduates of the *Hauptschule* immediately enter Germany's "dual system," whereupon they work for two to three years as an apprentice, while supplementing their practical work experience with classes for one to two days a week. Upon graduation from vocational coursework (*Berufsschule*), apprentices generally take jobs in the industrial, commerce, and craft-related sectors (Baldi, 2010; Brauns, 1999; Ertl & Phillips, 2000).

The *Realschule* offers Germany's "intermediate" level of education, with six years of simultaneous coursework in general education and technical subjects, such as engineering, science, and foreign languages. Graduates receive a *Realschulabschluss*, which presents a wider array of options than the *Hauptschulabschluss*. Aside from the "dual system," *Realschule* graduates can also apply for entry into an upper technical school, a full-time vocational school, or - if the student passes special qualifying exams called the *Fachhochschulreife* - a polytechnic college. Since graduates from the *Realschule* have a wide assortment of options, they tend to assume a variety of positions across the spectrum of the German workforce. After World War II, the *Realschule* experienced a period of extended protraction, as graduates were prized for their ability to combine practical and theoretical knowledge within a given field (Ertl & Phillips, 2000). Today, many workers in the state bureaucracy are *Realschule* graduates, and the sector as a whole tends to be less marked by social inequality than the *Hauptschule* or *Gymnasium*.

By far, the most prestigious of the three secondary school tracks is the *Gymnasium*. Based on the classical notions of *Bildung*, in which humanistic character and theoretical inquiry is stressed over vocational or practical training, the *Gymnasium* has trained the majority of the German elite since the nineteenth century. Students in the *Gymnasium* undertake a nine year liberal arts curriculum that includes coursework in history, cultural studies, literature, and (even in many cases to this day) Greek and Latin. Educational historians have speculated that the German elite (otherwise known as the *Bildungsbürgertum*), enamored with the educational training provided by the *Gymnasium*, have prevented thorough reforms of the German education system that would normally reform the tripartite school system (Wilborg, 2010). With an *Allgemeine Hochschulreife* diploma, graduates of the *Gymnasium* can apply for admission to the university system and enter prestigious professional occupations, such as law, medicine, state administration, or academia.

Given that the public educational system tracks students from an early age, one might expect that a market for private schooling would take root. However, independent schools in Germany have not proliferated on a significant level for two reasons. First, the private school sector largely replicates the public school sector, with a tripartite differentiation between schools. Second, the relative prestige of individual German universities is not as hierarchical as it is in other countries, particularly in the United States and the United Kingdom. Consequently, an elite group of independent "feeder" schools similar to Eton and Harrow in the U.K. or Phillips Exeter Academy and Groton in the U.S. has not emerged in Germany (Hahn, 1998).

Varieties of Capitalism: A Comparison of the German and U.S. Economic Systems

Differences between the American and German economies are perhaps best elucidated by Hall and Soskice's (2001) varieties of capitalism framework. In their theoretical conception, Hall and Soskice distinguish between Liberal Market Economies (LMEs), represented by countries like Australia and the United States, and Coordinated Market Economies (CMEs), as exemplified by Germany and Japan. The most striking features of LMEs are competition, formal contracting, the manner in which companies rapidly react to changes in the market, and their ability (if necessary) to restructure their operations. Wages in LMEs are typically negotiated between the firm and the worker, with low levels of unionization. In general, LMEs specialize in high-tech fields and other industries that prize either disruptive technologies (Christensen, 1997) or radical innovations in electronics and other scientific fields (Akkermans, Castaldi, & Los, 2009).

The behavior of CMEs, on the other hand, is more deliberative, focused on cooperation and collaboration between a variety of stakeholders, including management, employees, and shareholders. Firms in CMEs are certainly strategic, but they are also more likely than LMEs to weigh non-revenue factors in their decision-making process. The unionization rate of CMEs is high, and wages are generally based on industry-level expectations, rather than on closed-door negotiations between workers and employers. Since the companies in CMEs usually concentrate their energies on niche markets (especially manufacturing), they are able to prosper by either refining existing products through incremental change and innovation (Breznitz & Cowhey, 2012) or by specializing in radical innovations for the machinery and transport equipment industries (Akkermans, Castaldi, & Los, 2009).

These differences between the capitalist economies of the United States and Germany are reflected in their educational systems. Although the United States has promoted vocational curricula through the Smith-Hughes National Vocational Education Act of 1917 and the Carl D. Perkins Vocational and Technical Education Act of 1984, career-oriented education has never become a predominant part of the American educational sector. Instead, a comprehensive general education is provided, with a special focus on the development of critical thinking skills. Career concerns have traditionally been delayed in the U.S. until post-secondary education. Meanwhile, as previously depicted, German industries have benefitted from a tripartite educational system that tracks students at an early age, trains a select group of individuals for professional careers, and supplies an ample, specialized workforce for its industries. German industries themselves are rather unique, as explained in the following section.

The *Mittelstand* and *Mitbestimmung*: Structural Components to Germany's Vocational Success

Two fundamental concepts - the *Mittelstand* and the *Mitbestimmung* - differentiate Germany from other countries, making its system of vocational education viable. The *Mittelstand* are family-owned, medium-sized businesses that are often located in smaller cities. Generally, they have existed for generations and employ approximately 70% of Germany's workforce. The success of the *Mittelstand* is attributable to four key factors (Girotra & Netessine, 2013):

1. Their focus on a single product
2. Their efficiency
3. Their lean management chain of command
4. Their longstanding relationship with local schools via apprenticeships and vocational tracks.

Outside of Germany, however, *Mittelstand* companies are quite rare.

Mittelstand companies inspire astonishing fidelity from their employees, with a meager 2.7% attrition rate per year ("German lessons," 2014). A primary reason why Germany employees are so loyal to their *Mittelstand* has to do with the *Mitbestimmung*, a somewhat more complex concept that is codified into German law. Under the *Mitbestimmung* management system of "codetermination," Germany companies are compelled to fill between one-third and one-half of their supervisory board members with workers' representatives. That supervisory board (known as the *Aufsichtsrat*) chooses the members of a management board (known as the *Vorstand*) that directs company operations on a daily basis. This arrangement ensures that employees enjoy a remarkable level of influence on important decisions concerning their company, including safety resolutions, worker benefits, and hiring practices. Perhaps more importantly, the *Mitbestimmung* also mitigates the influence that shareholders can have on a company's long-term decisions and mission.

While there are plenty of small-to medium-sized businesses in the United States, the American business sector is much more dependent upon large corporations and private capital than the German business sector. According to Bureau of Labor Statistics data, the survival rate of American small businesses is also rather tenuous, with only half surviving to see their fifth year and one-third surviving for at least ten years.[7] Linking these businesses with high

schools and community colleges is a laudable goal, but only if some U.S. version of the *Mittelstand* can thrive in an extremely competitive global marketplace.

If small- to medium-sized companies are linked with American high schools and community colleges, the volatility of the U.S. business sector might result in a burgeoning contingent labor sector. Of course, larger U.S. companies could be linked with high schools and community colleges. Several large companies, such as Boeing, Chevron, Southern California Edison, Kaiser Permanente, Pacific Gas and Electric, and Verizon, are financially supporting the Linked Learning movement in California.[8] Without a "codetermination" arrangement similar to the *Mitbestimmung*, though, will these large companies demonstrate loyalty to their pathway-educated employees? Likely not, according to the logic of Liberal Market Economies proposed by Hall and Soskice (2001):

> The structure of financial markets in a Liberal Market Economy links the firm's access to capital and ability to resist takeover to its current profitability; and they can sustain the loss of market share because fluid labor markets allow them to lay off workers readily. By contrast, German firms can sustain a decline in returns because the financial system of a Coordinated Market Economy provides firms with access to capital independent of current profitability; and they attempt to retain market share because the labor institutions in such an economy militate in favor of long-term employment strategies and render layoffs difficult (p. 16).

In short, as long as large companies in the United States are driven primarily by shareholder demands, they must value profitability and efficiency over the welfare of their apprenticeship-trained employees. Furthermore, a full-scale replication of the *Mittelstand* and the *Mitbestimmung* in the United States is not likely to develop, especially given the philosophical and structural differences between Liberal Market Economies and Coordinated Market Economies.

Are Apprenticeships Affordable?

The affordability of apprenticeships also entails consideration. Supporters of apprenticeships in the United States, like Olinsky and Ayres (2013), argue that "apprenticeships are among the most effective and cost-efficient workforce development tools available to the public, in large part because their costs are borne almost entirely by employers and trade unions" (p. 13). While admitting that "no rigorous evidence is available about apprenticeship's costs and benefits to U.S. employers" (p. 3), Lerman (2014) further contends that companies who invest in apprenticeships can save money on recruitment and training costs, reduced errors, and the availability of a ready labor supply.

Nonetheless, it is unknown whether or not private industry in the United States will financially support apprenticeship training in a manner similar to Germany. As explained by Deissinger (2004), this issue is essential because "the reliable participation of firms is one of the key requirements for the successful working of vocational training" (p. 78). Currently, the cost of apprenticeship training in Germany is shared between public and private entities. Classroom time devoted to vocational training is a cost incurred by taxpayers, while employers undertake the costs of teaching apprentices during on-job training sessions. Meanwhile, students accept lower wages during their apprenticeship periods in the understanding that their wages will increase once they have attained a skilled worker's certificate (Lazaryan, Neelakantan, & Price, 2014).

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7 See http://www.sbecouncil.org/about-us/facts-and-data/
8 See http://www.connectedcalifornia.org/downloads/ConnectEdBrochure.pdf

The costs of training, however, can be expensive for employers, especially for a multi-year period. In South Carolina, where over 28,000 workers are employed by German companies like BMW, apprenticeships have rapidly expanded. And yet, the state still approved a $1,000 annual tax credit per apprenticeship to help small and medium sized companies (Schwartz, 2013). Harhoff and Kane (1997) found that, "German employers - at least in larger, industrial firms - face large net costs in the training of apprentices… even after accounting for the low wages paid" (p. 172). In the same study, human resource managers explained that German companies underwrite apprentices "to comply with social expectations… even though they could increase their own profits by eliminating their apprenticeship programs and hiring apprentices trained elsewhere" (p. 173). This sense of societal commitment, befitting the profile of a Coordinated Market Economy, may be necessary for continued apprenticeship funding.

Nevertheless, commitment works both ways, and workers rarely settle in one or two jobs in today's dynamic, globalized economy where technological change favors entrepreneurialism and the production of knowledge (Manyika et al., 2014; Thurik, Stam, & Audretsch, 2013). According to the Bureau of Labor Statistics (2015), Baby Boomers who were born from 1957 to 1964 accepted an average of 11.7 jobs between the ages of 18 and 48. Younger generations, especially in the United States, are switching jobs and careers at an even more rapid pace. Statistics from January 2014 revealed that the median employee tenure for women was 4.5 years; for men, the median employee tenure was 4.7 years (Bureau of Labor Statistics, 2014). Hence, industries in a Liberal Market Economy may be reluctant to train a workforce that is highly mobile. Since apprenticeships and vocational education can require costly one-on-one tutelage with an expert (as well as investments in specialized equipment), we do not know if the American public and private money invested in apprenticeship training can be offset by an amplified sense of societal responsibility from employers and reciprocal feelings of loyalty from employees.

A Conclusion and an Epilogue

In summary, a combination of cultural, social, and economic factors could present challenges to the successful implementation of career-based education in the United States. When vocational education is successful, it is supported by a corporate culture (such as the German *Mitbeststimmung* management model) that gives workers a voice in company decisions and social attitudes that weigh a company's financial burden against the potential benefits to society. Moreover, career-based education may flourish in a Coordinated Market Economy that not only protects certain industries that are held in high esteem, but also safeguards the traditional methods of production.

To determine the extent with which career-based instruction should be endorsed at the expense of more comprehensive education, the United States should also keep one eye on the future. In September 2013, Oxford University economists Frey and Osborne published a study interrogating the probability that 702 discrete occupations in the United States might be supplanted by advances in computer-controlled equipment, algorithmic sophistication, improved sensory tools, and exponential increases in processing power. The primary finding attracted considerable attention, as Frey and Osborne asserted that approximately 47% of the total U.S. workforce may be at risk of losing their jobs due to computerization. Their analysis of individual job sectors, however, may be even more important when considering the relationship between higher education and the workforce.

The occupations that Frey and Osborne identified as "high risk" for displacement involve tasks requiring mobility and dexterity. Such occupations, many of which are learned through apprenticeship programs, can be found in the transportation and logistics sector, office and administrative support, the service sector, and construction. Occupations that are "future-proof" to computerization require either creativity or social intelligence. Therefore, the probability that computer programming, public relations, communication, and education jobs will be computerized is extremely low. Jobs in the fine arts are at virtually zero risk of displacement.

More recently, Bakhshi, Frey, and Osborne (2015) published another report for the U.K.-based Nesta foundation that expands upon their previous findings. In the report, they state the following:

> As technology progresses, creative skills will become more important, meaning that places that have specialized in creative work will most likely be the main beneficiaries of the digital age (p. 21).

Could a single-minded focus on vocational training marginalize students in the wake of globalizing forces that value worker flexibility and creativity? Quite possibly - if vocational education is too fixated on the acquisition of competencies, rather than on a combination of skills, theoretical knowledge, and informed inquiry. For this reason, we believe that any approach to career-oriented education should not come at the expense of cultivating an environment in which creativity, critical thinking, and the ability to appreciate multiple disciplinary perspectives are each fostered. The success of future educational models will likely be attributable to how they prepare students for a future in which the ability to create, innovate, and contribute to human knowledge will be an individual's most valuable workforce-related skills.

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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.

Tattiya Maruco is a Research Project Specialist for the Pullias Center for Higher Education. She earned her Bachelor's degree in Psychology, with a minor in English Literature, from San Francisco State University, and her Master's in Social Psychology from the University of Wisconsin-Madison. Current projects at the Center include Linked Learning, the First in the World study, and SummerTIME.

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.

USC
Rossier
School of Education
Pullias Center for
Higher Education

Pullias Center for Higher Education
Waite Phillips Hall, Room 701
3470 Trousdale Parkway
Los Angeles, CA 90089-4037
Phone: 213.740.7218
pullias.usc.edu