

Chapter 10

From Vocational Education to Career Readiness: The Ongoing Work of Linking Education and the Labor Market

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A long-standing debate has been waged over the past century or more about the purpose of education. Is the primary purpose to provide for the general edification of the individual, or must education have a pragmatic application that relates to one's intended role in the workforce? Public education's focus on these ends has evolved over time, often in relation to changing economic demands. Using a broad historical lens to examine recent developments, incorporating salient historical debates and social forces, the authors attempt to better understand how the relationship between education and preparation for the workforce has changed over time. They focus on the proliferation of federal innovations in this area over the past 100 years and consider persistent themes in philosophical and policy debates. They supplement this broad history and context with the results of a more focused survey of the literature in career and technical education, with search terms that yielded scholarship from the past 50 years. Drawing themes from this more recent literature, and in light of historical foci, the authors make recommendations for future directions of scholarship.

This year, which is the centennial of the American Educational Research Association, also marks a century since the first publication of John Dewey's (1916) *Democracy and Education*. Among other influences, this book is one of the first formal statements of the potential benefits of what is now known as career and technical education (CTE) made by American philosophers of education. The current focus on college and career readiness (CCR) in education policy emphasizes utilitarian

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elements of education and the need for learning to relate to the world of work. This acknowledgement of the need for both general and specific forms of educational training evolved from a fundamental point of conflict about the purpose of education. Was education to provide for the general edification of the individual (Dewey, 1916)? Or must it have a pragmatic application that relates to the individual's role in the workforce (Lazerson & Grubb, 1974)? These two perspectives have, in some ways, offered a false dichotomy as to the purpose of education, though, as other scholars have pointed out, understanding the purpose of education and its impacts on social stratification and social dynamics is as important as the purported ends of public education (Bowles & Gintis, 1976; Dorn, 1996; Labaree, 1997; Loveless, 1999).

The role of public education in supporting the various articulated ends has evolved over time, often in relation to changing economic demands. Recently, economists have identified changes in the economy and labor market that demand modifications in how we educate, while still highlighting the persistent needs of those less fortunate or less attached to schooling or employment (Autor, Katz, & Kearney, 2006; Autor, Levy, & Murnane, 2003; Holzer, Linn, & Monthey, 2013). Such revelations are reminiscent of the turn of the past century and the development of CTE instruction in schools, as well as of the midcentury revival of CTE as a pathway out of poverty, particularly in American cities and rural areas (Conant, 1959).

Much of what was developed to offer CTE in secondary educational settings stems from governmental supports in education and the workforce. As with all things in education, much of this support and guidance has come at the state and local levels. However, for almost a full century, the federal government has provided funding to states in order to support the use of education to promote the development of a workforce that can fill the current and emerging labor needs of industry. Federal policy helped normalize spending and development of CTE programs, in part by requiring that states match federal outlays for CTE at least dollar for dollar.

Despite a century of policy and practice directed at building capacity and renewing the purpose of technical education, there is no less debate now than there was at the start of the 20th century about whether education is intended primarily to promote understanding of the liberal arts and generalized knowledge or to add specific job skills for employment in response to labor market demands (Grubb & Lazerson, 2005). At all times, the emphasis has remained on the role of education as an engine of economic growth and a mechanism to equalize individual opportunity (Goldin & Katz, 2008; Labaree, 1997). Issues of whether and how educational structures consider class, gender, race, and ability have long threads in the literature and history across most of this period (Anderson, 1988; Clifford, 1982). Specifically, there has been a continual need to recognize that career preparation may need to take into account structural differences in the resources available to certain groups in the larger population. Which groups have been emphasized and the policy solutions that have been offered have also differed over time. There has also been a clear recognition that the educational enterprise itself, while perhaps intended to reduce inequity, may have adopted elements of design and practice that reproduce social inequality (Bowles & Gintis, 1976; Dorn, 1996; Grubb & Lazerson, 1982), and that access to different

types of educational opportunity may be incidentally or deliberately limited, based on the policies and programmatic structures of educational systems (Oakes, 1983, 1986; Oakes, Selvin, Karoly, & Guiton, 1992; Tyack, 1974).

Recent policy initiatives require that CCR be integrated in high schools for *all* students (U.S. Department of Education, 2010a, 2010b). The Common Core State Standards (CCSS) have been adopted by 42 states, the District of Columbia, and 4 territories. Thirty-seven states have defined college readiness, and 16 now require each high school student to complete a college preparatory curriculum resulting in an earned diploma (Mishkind, 2014). The Department of Defense Education Activity, 23 states, and the District of Columbia require schools to implement college and career readiness curricula aligned to the CCSS (Achieve, Inc., 2015). The content knowledge and skills associated with CCR are particularly important underlying goals of the CCSS (National Governors Association & Council of Chief State School Officers, 2010) and were incentivized via the Race to the Top Assessment Program (U.S. Department of Education, 2010b). Given the great variety in student interests and potential career paths, educators are faced with the daunting task of providing universal CCR for their students while at the same time personalizing career planning for each student, based on interests, skills, and performance to date. Thus, while CCR is the current policy priority, the concept of vocational education and preparation is not new.

Most recently, the passage of the Every Student Succeeds Act (ESSA), which is the latest iteration of the Elementary and Secondary Education Act, has provided for unprecedented incorporation of CTE, as well as recognition of its role in providing an appropriately balanced education (ESSA, 2015; Perkins Collaborative Resource Network, n.d.). This renewal comes even as individual states have already leveraged the CCR movement as a way to update their secondary school curricula and requirements (e.g., Arkansas' SmartCore requirements). ESSA and CCR are just the most recent domestic policy manifestations of the long-running linkages between public education and recognition of the need to prepare a workforce to meet the changing demands of the economy (Callahan, 1962; Grubb & Lazerson, 2004; Labaree, 1997; Lazerson & Grubb, 1974).

In this chapter, we first consider the history and development of CTE and its relationship to the concepts of contemporary notions of CCR. This examination includes a consideration of international trends as well as of the domestic federal legislation and policies that have influenced present-day CTE. Using a broad historical lens, recent developments, and incorporating salient historical debates and social forces, we attempt to better understand how the relationship between education and preparation for the workforce has changed over time, with a focus on the proliferation of federal innovations in this area over the past 100 years, as well as persistent themes in philosophical and policy debates. We then supplement this broad history and context with the results of a more focused survey of CTE literature, the terms of which yielded scholarship from the past 50 years. In this focused literature review, we point out trends in scholarship, synthesize subtopics that proved salient and notably absent and then consider these trends in light of the long-standing debates that have

characterized technical education and the purpose of schooling more generally. We conclude with a consideration of limitations and recommendations for further scholarship and policymaking.

FOUNDATIONS AND ORIGINS OF CAREER-RELEVANT EDUCATION

The historical arc of formal education spans the apprentice and guild models of education for work in the 13th century, through the current system of increasingly differentiated structures for upper and postsecondary education worldwide (Bennett, 1926). The potential importance of developing specialized skills in education was formalized at least as recently as the 17th and 18th centuries, when philosophers such as Rousseau, Locke, and Adam Smith made sense of the role of formal education and training in terms of preparing individuals for increasingly specialized elements of working life (Bennett, 1926). This pragmatism was, at least in part, an acknowledgment of the monastic scholarship that aimed to perpetuate intellectual knowledge in the Dark Ages (Cahill, 1995), when guilds and apprenticeships were responsible for economic production. The evolution of the ideals of a common element of education for all, paired with specialized knowledge to support economic demand, is a duality that has persisted across the 20th century (and into the 21st) in the United States and elsewhere. How the acknowledgment of the dual purposes of education is translated into current educational systems has differed regionally. Whereas the central European nations have embraced a dual system that capitalizes on apprenticeships with employers in upper secondary school for the plurality of students, many British-influenced nations have favored longer stretches of compulsory general education with less investment in infrastructure to support apprenticeships or work-based learning (Hoffman, 2011). Despite differences in the ways that these systems have been operationalized, the scholarship and policy that are focused on understanding how best to develop a workforce with sufficient general and specific forms of skill (Becker, 1962) have been broad based and voluminous.

Philosophers in the 18th century observed the organization of the economy around them as well as the educational structures that supported that organization. Among other things, they acknowledged the role of apprenticeships and applied learning that led to the production of goods and services not otherwise made available by men of letters. This was no doubt made more salient as the feudal system dissolved and gave rise to what we now acknowledge as the foundations of our current capitalist economy. Around the world, the role and process of learning technical trades and methods of production became only more salient in the 19th century, as mechanization and forms of automated production were accelerated. In parallel, forms of mass education had evolved both nationally and internationally. There was a recognized disconnect between the common schools that provided general training in literacy and numeracy and the need for more technical training demanded by manufacturers and others in production (Bennett, 1937). There was also an acknowledgment that urbanization and poverty required that education be differentiated in

ways that could serve the needs of people with less access to resources—a theme that arose then but continues to this day. The demand for education linked to work skill development, initially given names like *manual arts* or *vocational education*, gave rise to what we now know as CTE.¹ In the United States, central Europe, Scandinavia, and Russia, systems of technical education evolved (though on quite different trajectories and yielding quite different forms) to ensure that youth could gain both general training (in reading, writing, and arithmetic) and specific technical training (Bennett, 1937).

In the United States, the common school movement, the lobbying of manufacturers, and the influence of organized labor all contributed to a debate in the late 19th century about whether and how job training or the development of occupational skills should be a part of government-funded education (Lazerson & Grubb, 1974). Over a similar time period, the vocational education and training systems of Europe evolved in response to industrial demand and the growth of manufacturing industries (Wollschlager & Reuter-Kumpmann, 2004).

The timing of the engagement of national governments in the provision and support of vocational education differed, with some of the latest adoptions of formalized support for vocational education occurring in the United States with the passage of the Smith-Hughes Act of 1917.² In both domestic and European societies the impetus for federal involvement was the recognition that vocational training was related to economic growth, and the interest in growth and employment spanned state boundaries. The new law provided funding to states, with the idea that states would match federal funds to determine total expenditures on vocational education. It also, notably, included provisions that vocational education was to comprise only part of a student's school day, the rest of the time being spent in general education settings focused on developing skills for reading, mathematics, and citizenship. In the wake of Smith-Hughes, the National Association of State Directors of Career and Technical Education (now Advance CTE) was formed to coordinate efforts across state boundaries and to work in conjunction with localized industry. Such developments, and the reports from a 1936 advisory commission, shaped vocational education in the United States until the Vocational Education Act of 1963 and subsequent amendments to that act, in 1968. Whereas legislation preceding the Vocational Education Act of 1963 was concerned with providing a justification and model for federal funding of vocational education, the 1963 and 1968 acts focused on addressing forms of social inequality that had been identified and addressed, simultaneously, in other parts of the Great Society reforms. The passage of the Carl D. Perkins Act in 1984 was the first in a series of four federal authorizations to continue to fund what is now called CTE. Importantly, the most recent reauthorization of the Perkins Act, in 2006, declared a clear need to increase the focus of CTE on preparing students for postsecondary education. This postsecondary connection has existed for some time abroad, perhaps most notably in Switzerland, which despite having a dual system of secondary education still has clear pathways to postsecondary education (Hoffman, 2011).

As educational and economic needs evolved, so did the commitment of the U.S. federal and state governments to providing and funding education to prepare students for the workforce. The Perkins Act and its three subsequent reauthorizations, each of which further modified how and what was funded, are the most recent examples of these commitments. As the federal government's role and commitment evolved, so did the states' as they experimented with schooling models. In the post-World War II era, and especially in the 1960s and 1970s, this included the first instances of occupation-focused academies (e.g., in the Philadelphia school district; see Neubauer, 1986; Stern, 1992), as well as specialized CTE schools (Conant, 1959). More recently, these models include new waves of career academies, linked learning models (started in California and now just beginning to proliferate), and the formation of other specialized academies (e.g., see Jacoby & Dougherty, 2016; Visher & Stern, 2015). Changing funding commitments also precipitated a change in name: from *vocational education*—often viewed negatively, based on the perceived concentration of lower ability individuals in these programs—to *career and technical education*. The change was first codified in the 2006 reauthorization of Perkins, but the new term had come into broader use sometime between the 1998 reauthorization and 2006.

Tensions and Trade-Offs in the Debates Over Technical Education

The evolution of policies to fund and codify federal and state support for CTE tended to mirror philosophical debates about the contemporary purpose of schooling, as well as the empirical realities about how schooling was organized, implemented, and made available to all manner of students. In this section we review more of the observations and concerns that paralleled much of the legislative change that we highlighted earlier.

In his landmark, groundbreaking study of the American comprehensive high school, James Bryant Conant (1959) proposed a set of recommendations for reforming secondary education and in many ways set the tone for how schools were updated in the 1960s and beyond. Central to this work was an understanding that the need for completion of a high school degree had expanded, and was likely to become increasingly important (Conant, 1959, p. 6). His emphasis on the customization of education to suit individual needs and the importance of offering broad access to core academic coursework, as well as to electives (including vocational courses), helped codify the broad range of offerings that dominated the latter half of the 20th century and the beginning of the 21st.

The need for the further evolution of the American high school, and the role of offering diverse curricular options, was also met by a recognition that earlier efficiency movements born out of the early 20th century retained a strong hold on how schools were organized and administered (Callahan, 1962; Tyack, 1974). Callahan (1962) criticized the overly large role of notions of efficiency in education; at the same time, the holdover of Taylorism led to increased focus on work-related training

in public education but at the risk of being too prescriptive and lessening the chance for real opportunity for learning and growth.

The Callahan critique of efficiency has also been advanced in several lines of argument that have problematized the notion that schooling should offer differentiated pathways from secondary education to postsecondary life. Whereas some pragmatists and others advancing notions of social efficiency have noted the importance of employability immediately after high school, others, such as Tyack (1974) and Bowles and Gintis (1976), have emphasized that the structure of schooling was created largely to facilitate the reproduction of social classes, rather than to spark upward mobility. This scholarship followed a decade of broad social movements and the Great Society reforms that were, in principle, aimed at reducing the social inequality that motivated the federal vocational policies of the 1960s. However, the critiques offered by these reforms suggested that education might acclimate students to remaining in their prior social class rather than provide them with an opportunity for upward mobility, long a purported goal of public education.

Concerns about education as a potential perpetrator of inequality were also evident in the earlier work of Conant (1959), where there was a clear indication that some of the inequality or limited options appeared to operate along gender and racial lines. A specific focus on the role of education in limiting professional options and social mobility was especially salient along racial lines, particularly for Black Americans in the South (Anderson, 1982). In particular, funneling of Black youth into vocational education was identified as a mechanism through which CTE was touted as improving the life outcomes of largely marginalized populations, while simultaneously being used to limit access or to track students based on racial stereotypes or law-based discrimination (Grubb & Lazerson, 1982).

The debate over whether the existence of CTE offered multiple educational pathways in secondary education or led to de facto tracking of students was accelerated by the scholarship of Jeannie Oakes and colleagues in the 1980s and 1990s. For instance, a study from Oakes (1983) demonstrated that access to particular vocational curricula (e.g., business versus building trades) differed systematically based on the racial composition of schools (predominantly White schools had more of the former). This finding echoed work by earlier historians of gender- and race-based distinctions in the offering and availability of CTE (see, e.g., Anderson, 1988; Clifford, 1982). Oakes's evidence in the 1980s harkened back to this earlier period and highlighted the question of whether vocational education was actually providing options to students or merely serving to reproduce existing social hierarchies. This critique was reminiscent of earlier social efficiency movements that actually justified the existence of differentiated learning opportunities in high schools based on the different work possibilities a student might face after formal schooling was complete (see discussion of David Snedden in the early 20th century by Bergen, 1981, among others). In later work, Oakes (1986) further advanced the same argument and later provided evidence of overrepresentation of low-income students and students of color in vocational

coursework in high school (Oakes et al., 1992). In the latter work, Oakes et al. also documented the relative lack of resources provided for CTE as evidence that it was treated as a lower status pathway.

Throughout the 1990s, and amid broad policy concern regarding educational tracking, vocational education as a manifestation of such tracking remained salient (Gamoran & Mare, 1989; Oakes & Guiton, 1995). Though advocates of CTE, as well as those who pushed for the passage of the School to Work Opportunities Act of 1994, continued to highlight the importance of preparing students for the world of work, the debates continued regarding what was the most important role of education and whether it was being achieved (Labaree, 1997).

The Shift to “Vocationalized” Higher Education

Change and debate regarding the role of CTE in education and its connection to job preparation have not been confined to the K–12 realm. There has also been a shift in higher education that provides further context. In the past century, higher education degree programs have shifted to meet the demands of the labor market (Grubb & Lazerson, 2005). Higher education has undergone a “vocationalization” process, whereby institutions have shifted away from educating an elite few on intellectual, moral, and civic values and moved to expand offerings of “professional education” for the masses (Grubb & Lazerson, 2005). *Professional education* refers to the incorporation of professional schools that are more pragmatic in nature and address the ongoing and changing needs of the labor market: professions, such as nursing, teaching, agriculture, and business, to name a few. This evolution of higher education has influenced the larger picture of vocational education and the CCR movement of late. The rise of vocationalized higher education has increased the demand for more students to be college- and career-ready on graduation from high school. The term *college* is applied broadly to any type of postsecondary education, ranging from short-term certificate programs to 4-year degrees. Within the broad sectors of health care, education, and business, professionals with varying levels of education and skill sets are needed. Thus, the vast majority of students need some exposure and readiness to enter these fields. Importantly, students need this exposure in high school. The tech-prep programs of the late 1990s and early 2000s required the creation of articulation agreements between secondary and postsecondary schools and were an initial acknowledgment of the importance of finding policy solutions to facilitating this transition. Existing evidence suggests that the tech-prep policy did increase college going but with most of the increase occurring at 2-year rather than 4-year schools (Cellini, 2006).

Reviewing the history of CTE and the research literature in the field is particularly important as CTE is designed to serve as a productive setting for secondary students who may not thrive in traditional, comprehensive high schools. In fact, from its inception, CTE was designed to prepare youth for careers that required varying levels of education. The 2006 reauthorization of the Perkins Act emphasized the

importance of access to CTE for special populations to promote self-sufficiency in adulthood, partly in response to evidence that traditional high schools might not be adequately serving students, especially those from low-income families, English language learners, and students with disabilities.

Though high school graduation rates have been trending positively across the nation (Stilwell & Sable, 2013), this has not been true for all groups of students (Doren, Murray, & Gau, 2014; Goodman, Hazekorn, Bucholz, Duffy, & Kitta, 2011; Stilwell & Sable, 2013). Students with disabilities, English language learners, and students from low-income families have all experienced lower rates of academic success and attainment (Gregg, 2007; Hoxby & Turner, 2013; Kanno & Cromley, 2013; Welton & Martinez, 2013). This reality suggests that these students may stand to benefit most from programs or curricula designed to make them career ready and that traditional high school may be inadequate for certain disadvantaged subgroups of students. Thus, CTE is an important option for all students and may be especially beneficial to disadvantaged students. However, we find historical examples where these ends have been posited but not attained. Therefore, it is important to draw from the current CTE literature to determine what works for all student populations, particularly disadvantaged students.

A SYSTEMATIC REVIEW OF THE LITERATURE: TECHNICAL EDUCATION AND THE LABOR MARKET

In this section, we focus on identifying peer-reviewed scholarship that studied the linkages between formal secondary education and preparation for the world of work. By relying on a systematic search, we sought to separate our own prior knowledge and potential biases from the corpus of relevant literature on this topic. Our intention was to later synthesize the findings and relate them to the long history of scholarship in this area. First, we generated a relevant and appropriate subset of the larger literature on CTE, using prespecified but limited search terms; then, we used the results to point out historical trends and cycles in the focus on education for work, as well as systematic changes in focal populations, particularly historically disadvantaged groups. In so doing, and in putting the articles from this search in conversation with long-established debates in education policy related to technical education, we emphasize the extent to which empirical research on the connection between education and preparation for employment has changed over the past five or more decades. We conclude with a consideration of what changes are still needed, and we offer recommendations for furthering the understanding of how education for work is implemented and can be studied.

Method

To identify the relevant literature, we followed a clear set of procedures and coding schemes. In all instances the choices we made led to both intentional and unintentional narrowing of the scope of the search. However, given the stated focus on the

intersection of schooling and preparation for work, we explicitly targeted literatures believed to overlap with both areas. First, we considered literatures that spanned social sciences broadly and that explicitly included education, as well as the disciplines of psychology, sociology, and economics. We searched the databases of ERIC, PsycInfo, and EconLit, where we found that the bulk of the literature related to vocational and technical education and work existed. Importantly, within these databases we further limited our search to peer-reviewed journals and books that indicated some degree of scholarly review.³

Within these databases, we narrowed our search terms to include the following: “vocational education,” “career and technical education,” “work,” and “career.” Initial searches on only the first two of these terms individually led to over 9,000 citations. Our focus on the intersection between (a) career vocational and technical education and (b) preparation for the workforce led us to employ one, then the other, of the first two terms (“vocational education” and “career and technical education”), followed in each case by both of the latter terms (“career” and “work”) in both possible orderings. Thus, any article or book related to vocational or career and technical education that did not explicitly make reference to work or career was not included in the final results.⁴ When we searched on “vocational education” followed by “work” and then “career,” we found 541 articles. The analogous search that led with “career and technical education” yielded 428 results. Reversing the order of “career” and “work” in these compound searches further restricted the overall pool of citations, though we included any additional citations not present in the initial searches. This led to an initial pool of 650 unique peer-reviewed publications. Our citations span the years 1946 through 2015 and include several books on the history of education that discuss the emergence and development of CTE in the United States and in relation to industrializing European nations.⁵

From this initial list we narrowed the literature to focus exclusively on work that addressed secondary or upper secondary education (e.g., Grades 6–12). Though we included domestic and international literature, in all contexts this meant removing articles or studies that focused on college-level education or adult populations as revealed by an initial abstract review of all 650 sources. These criteria eliminated nearly 200 sources, suggesting there is a growing and rich literature on the linkages between college and preparation for work. An additional 74 articles were removed during full coding once we determined that they focused on nonsecondary student populations (college or adult). We removed another 14 articles that were duplicated citations, six articles that did not actually cover career or vocational education, and 55 articles that were not locatable through the University of Connecticut library system or interlibrary loan. Of these 55, the title or journal names revealed that 9 were international in scope and 10 addressed students with disabilities—specifically, visual impairment, deafness, and emotional disorders. Our final analytic sample included 301 articles or books that met our selection criteria and that spanned the middle of the 20th century through early 2015 (see online appendix, available in the

online journal). The time span covered by the articles retained from our search was an unintended result of the search parameters, not an explicit restriction on the search.⁶

Our systematic review of the peer-reviewed articles and books focused on coding the data for 15 key characteristics, all of which were informed by our review of the historical literature as well as by our own prior work in this area. The categories for which we coded included whether an article was historical in focus, whether it was specific to the United States or another national context, and whether it had key sample characteristics indicating that it related to historically disadvantaged subgroups. The articles were assigned binary codes (1/0) for the following focuses as indicated by sample characteristics: male students, female students, Black or Latino students, students with disabilities, and students from families with lower incomes. Finally, we assigned binary codes for categories of programs according to whether they were curriculum-based, were situated in nonschool settings, included school-business partnerships, focused on particular occupations, addressed the transition process to postsecondary education or work, served disengaged youth, or addressed outcomes related to employment or high school completion. Though the initial search yielded a few articles prior to 1970, these articles were not available. Thus, based on our search terms, the included articles spanned the 1970s through the present and were representative of a broad range of themes and student populations, which we detail below.

Assessment of whether each of the 15 characteristics should be coded as equal to 1 was done in accordance with a series of nine decision rules that we established at the outset of coding (see the appendix for details) and then refined as we progressed through the pilot rounds and resolved disagreements. Each of the student subgroup categories (race, gender, disability, disengaged youth or dropouts, etc.) was coded as equal to 1 only if the article explicitly reported on that group. We accounted for whether an article addressed a particular program or intervention as follows: An article was coded as addressing a curriculum-based program if it was a CTE-focused intervention delivered in a dedicated class during the school day. We coded studies as addressing nonschool settings if they were operated outside of school hours (e.g., after school). School-business partnerships were coded as present if the program or intervention involved coordinated efforts between industry and school personnel in support of a CTE program. Occupation-based programs were those specific to a particular occupational field (e.g., construction, agriculture). Finally, with regard to student outcomes, we coded programs as emphasizing the transition from high school to postsecondary education if there was deliberate coordination or planning between employees at both levels and/or if programs to facilitate the transition were present (e.g., bridge programs, dual enrollment). Articles that looked at employment, wages, or job skills as an outcome were coded as having an employment focus. Articles that tracked school completion or high school graduation as a student outcome were coded as equal to 1 in that category.

We coded these characteristics as binary indicators of whether or not an article described each of the 15 dimensions (1 = *yes*, 0 = *no*). We both participated in the coding. First, we independently coded a subset of the articles ($n = 7$). Then the authors met to discuss any disagreements in order to reconcile and refine the coding instrument and/or decision rules. There were two rounds of this initial pilot process. In addition, 15% of the 300 articles were independently coded by both authors, and codes were later compared to calculate interrater reliability. Interrater reliability was calculated as a percentage of agreement, where the total number of agreed-on codes (numerator) was divided by the total number of possible codes (denominator). Among the 15% of articles that were double-coded, interrater reliability was calculated as 94%.⁷

Once all articles were coded, our initial analysis focused on summarizing areas of revealed emphasis, identifying trends and changes in CTE scholarship over time, and reconciling findings. In addition, we generated cross-tabulations of article content across coding categories, with an emphasis on overlaps that had been highlighted by prior policy or historical relevance. Within these cross-tabulations we conducted chi-square tests of independence (given our binary outcomes and our desire to limit parametric assumptions in analysis), to assess whether two coding categories in a given cross-tabulation were statistically dependent on one another.

Results

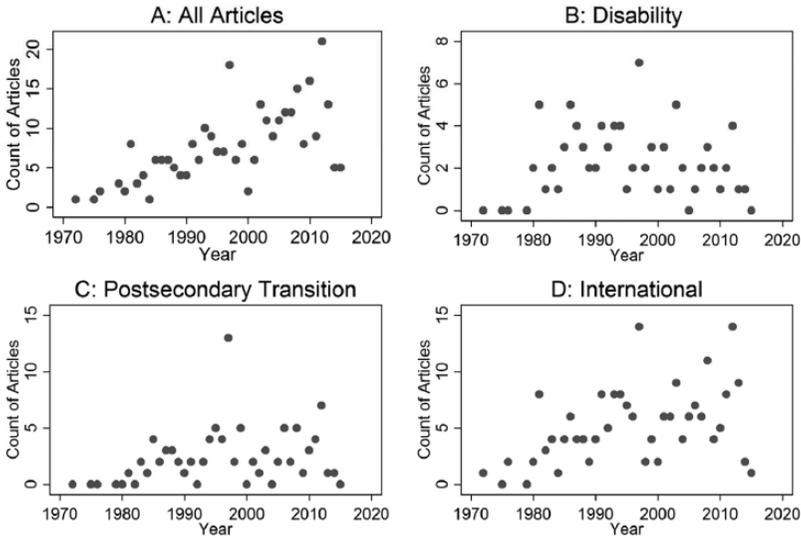
Our coding and analysis of the articles yielded several noteworthy trends. Scholarship relating to education and labor market preparation has increased in recent years, and the mix of topics covered has been highly focused on employment outcomes, transition to postsecondary education, international scholarship, and students with disabilities as a subgroup. We found interesting trends in topics over time, with regard to what was studied in this literature and time period and what was not.

Next, we report our findings, and in the discussion we consider how these trends related to long-standing historical trends and considerations in CTE policy.

Growth in CTE and Work Scholarship

In Panel A of Figure 1, we demonstrate the growth in scholarship on this topic over the past five decades. The trend is clear and is interrupted only by the fact that the current decade, which is incomplete, is on pace to eclipse the previous ones. Though we focus on our selected and coded articles here, in our initial search, which yielded roughly 9,000 hits, we saw nearly identical positive trends in scholarship on this topic across the same span of time. This mirrors growth in education-related scholarship more broadly, though particular areas of growth, which we highlight below, are especially noteworthy. We emphasize a few of these areas in Panels B through D in Figure 1, where we show trends in scholarly focus on students with disabilities, postsecondary transition, and scholarship outside the United States. In all

FIGURE 1
Trend in Scholarship Addressing the Intersection of Secondary Education and Preparation for Work Over Time



Note. Each point represents the count of articles published and reviewed in a given year.

cases there is a positive trend over time, though in the case of studies involving students with disabilities the trend is more parabolic. We discuss reasons for this below.

In addition to observing temporal trends in volume, we also summarize in Table 1 the topics covered across this body of literature, as derived from our adopted coding scheme. In the table we report proportions of articles focused on a particular theme, along with their standard deviations. About 30% of the articles we reviewed addressed students with disabilities; 20% reported specifically about differences by gender; about 12% focused on Black or Latino students, with a similar share on students from lower income families; and about 10% focused on students who were more likely to be disengaged from school (e.g., dropouts). Over 60% of the articles focused on employment as an explicit or desired outcome of CTE programs or concepts; nearly 30% addressed transitions to employment and postsecondary education; only 17% focused specifically on CTE in relation to completing high school (see Figure 2 for a comparison of trends in employment and graduation focus). Emphasis on postsecondary transitions also trended positively during this time (though at a slower pace than overall scholarship on CTE and its connection to work), following a general secular trend and policy emphasis on college going, as well as the recognition that postsecondary training is increasingly demanded in the labor market.

TABLE 1
Proportion of Coded Articles Addressing Attributes of Students, Programs, and Outcomes

Attribute	<i>M</i>	<i>SD</i>
Historical	0.164	0.371
U.S. focus	0.709	0.455
Male	0.220	0.415
Female	0.234	0.424
Students with disabilities	0.305	0.461
Black/Latino	0.120	0.325
Lower income	0.113	0.318
Curriculum-based programs	0.490	0.501
Nonschool settings	0.318	0.467
School-business partnerships	0.086	0.280
Occupation-specific programs	0.274	0.447
Secondary-postsecondary transition	0.318	0.467
Dropouts or disengaged youth	0.107	0.310
High school graduation	0.159	0.366
Employment	0.632	0.483

Note. The proportions were calculated as the total number of articles coded as equal to 1 for a given attribute, divided by the total of coded articles, 301.

FIGURE 2
Trends in Focus on Employment and High School Completion as Outcomes of Interest



Note. Trends in the share of articles focusing on employment and high school completion as outcomes were smoothed using a localized polynomial smoothing option in Stata.

Disability Focus

In the 1980s and 1990s, growth in scholarship related to students with disabilities comprised 50% to 80% of all annual scholarship on this topic, and grew considerably faster than other scholarship related to CTE. In the early part of this time period, there was a massive growth in research related to students with disabilities, which constituted the clear majority of scholarship in the 1980s. This trend coincides with the passage of P.L. 94-142 in 1975 (Education of All Handicapped Children Act), which has since been reauthorized as the Individuals With Disabilities Education Improvement Act (IDEIA) of 2004. As part of the new law, children with disabilities had to be educated in public schools, and the legal mandate included transition planning for students exiting the K–12 system into the workforce. The share of this literature devoted to addressing students with disabilities has fallen off over time, largely due to the general increase in scholarship in CTE more broadly.

Among the articles about students with disabilities, more than three quarters focused on employment as an outcome, often including school-to-work transitions (e.g., Rusch, Hughes, Agran, Martin, & Johnson, 2009). Among the articles not addressing students with disabilities, only two thirds listed employment as a clear outcome. Results of a chi-square test of independence also supported the relationship between disability focus and employment outcomes ($p = .002$). Importantly, 43% of the scholarship that focused on students with disabilities also addressed the transition to postsecondary education, an association that is likewise statistically significant ($p = .001$). In contrast, only 25% of scholarship that is not disability-focused addresses the transition to postsecondary education.

The focus on employment outcomes, specifically school-to-work transitions, suggests that the vast majority of the programs described in the articles were geared toward preparing students with disabilities for low-wage work (e.g., Keim, Rak, & Fell, 1982; Sowers & Powers, 1989; Wisniewski, 1991). In fact, one particular study found that community business professionals may be less willing to partner with high schools to create meaningful work experiences for adolescents with disabilities, as opposed to their peers without disabilities, leaving this subgroup more limited options for work experience (Carter et al., 2009). Yet there are more students with disabilities in college settings now than ever before (Newman et al., 2011), and the types of disabilities represented are even more diverse (e.g., developmental disabilities, intellectual disabilities, and others). This increase represents a pivotal turning point for students with disabilities, as does more recent federal funding targeted toward building postsecondary programs for students with more severe disabilities (Think College, 2016). As more postsecondary programs become available for students with disabilities, it will be important to reconsider the secondary programs that are in place for this population. In other words, simply preparing all students with disabilities for low-wage work will no longer be sufficient.

In a similar vein, it is equally troubling that no articles in our review described the integration of technology tools into a curriculum, into an after-school program, or into a job setting for students with disabilities. As is the case for all students, technology

skills are critical for students with disabilities in order to compete in the job market. These students tend to be unemployed more often than others and, when employed, tend to earn lower wages (Sanford et al., 2011). Thus, it is arguably more important to ensure that students with disabilities are exposed to technology tools prior to entering the workforce so that they may reasonably compete. Students with disabilities should not be left out of any efforts to integrate technology into the classroom.

Finally, the majority of studies that involved students with disabilities described some link to the transition planning process as facilitated by the individualized education program (IEP) as the driving force behind setting the course of study (e.g., Colley & Jamison, 1998; Everson, Zhang, & Guillory, 2001; Hutchinson, Versnel, Chin, & Munby, 2008; Kolstoe, 1981). In other words, if a specific skill was not mentioned as an IEP goal, then it was not a priority for students to learn each year. This finding is not surprising, considering that the IEP is the cornerstone of special education (Yell, 2016) and, as such, prioritizes any and all skill development among students with disabilities. The legally mandated IEP structure can work for or against students with disabilities with regard to ensuring they have opportunities to gain vocational skills needed to compete in the job market. As long as critical vocational skills are assessed for and integrated into the IEP goals, the structure can work quite well. However, it is up to the adults—that is, the special educators, career and technical educators, school counselors, and other professionals who might be members of an IEP team—to ensure that there is adequate alignment between the critical vocational skills that are measured and prioritized and the IEP process. Compliance with IDEIA does not necessarily ensure quality (Flannery, Lombardi, & Kato, 2015); educators can write compliant IEP goals that are not necessarily aligned to critical vocational skills or quality. As a result, students with disabilities may have measurably compliant IEP goals that remain focused on preparation for low-wage work, with scarce integration of technology tools. The existing special education system mandated by IDEIA will not necessarily prevent this from occurring.

Other Marginalized Populations

Given the historical focus of federal legislation and its relationship to ensuring educational access and economic mobility through CTE, we also generated cross-tabulations aimed at the overlap between disengaged students, lower income students, and the key outcomes of high school graduation, on one hand, and employment, on the other. As reported earlier, only about 10% of the articles we coded focused on students who were disengaged from school, and coverage of these topics has not trended as positively as in other areas, though it occupies a consistent share of total scholarship. However, there was a clear association between scholarship focused on disengaged students and whether the scholarship also used high school completion ($p = .000$) as an outcome. Similarly, there was a suggestive relationship ($p = .085$) between a focus on these students and whether employment was emphasized in the same set of articles.

Focus on high school completion among disengaged students was a clear theme, in part because there was broad recognition that, through much of this period, a high

school diploma was an important minimum marker of attainment for accessing middle-class wages (Goldin & Katz, 2008). In our review the significant relationship between focus on disengaged students and focus on high school completion as an outcome spans the entire time period. An article from Tanzman (1972) early in this period adopted the optimistic view of CTE as a way to get would-be dropouts to learn a trade and complete high school, whereas research published in the past 20 years has recognized the changed employment landscape and erosion of high school completion as a sufficient educational credential (Raffo, 2006). Some of this research also emphasizes the potential for CTE to provide increased relevance for disengaged students, which could induce school completion while promoting the accumulation of relevant work skills; this effect is suggested by several articles from Europe and the United Kingdom, where youth unemployment has been consistently high (Beekhoven & Dekkers, 2005; DeLuca et al., 2010; Raffo, 2006). As with disengaged students, scholarship on students from lower income backgrounds also accounted for a modest 12% of CTE scholarship in our sample. Yet we again found evidence of a clear relationship between articles that emphasized lower income youth and high school graduation ($p = .002$) and suggestive evidence with employment outcomes ($p = .06$). These relationships suggest that literature related to CTE over the past five decades has continued to include discussion of how CTE can be applied to or designed for students whose families have fewer economic resources, or who are disengaged from schooling. Such a focus highlights the ways in which CTE was touted in the past as a path to economic mobility; it also raises concerns that CTE may also be used to track students based on these observable characteristics.

There is remarkably little scholarship that spans both disengaged students and students from lower income backgrounds, despite a long-running understanding in the broader education literature that these factors are correlated. In fact, in our review, only 6 of the 35 articles addressing low-income students also focused on disadvantaged students. Of particular interest in this overlap is Kim (2013), who sought to understand the career trajectories of school leavers who were employed. Kim (2013) used his qualitative data to develop typologies of career trajectories and found most school leavers in positions with low growth potential. However, he found that about a third of these students gained access to career ladders through work experience and training and that elements of socioeconomic status (e.g., access to computers) influenced whether a student ended up in this particular category. Also important in this small, overlapping literature is empirical evidence that when employers lack good information about students making the high-school-to-work transition, they are likely to revert to statistical discrimination (Mueller & Wolter, 2014). That is, in the absence of good information on academic or work-related skill (such as high school diplomas, test scores, or other credentials), employers used observable characteristics as proxies for human capital. Such an approach, if generalized in the United States, could have problematic implications, especially for students of color, thus emphasizing the importance of this small overlapping literature on lower income and disengaged students.

International Scholarship

Less than one third of all articles reviewed focused on a context outside the United States. Since 1980 the share of international scholarship on this topic has been fairly constant, with overall volume growing in step with CTE scholarship more broadly (see Figure 1, Panels A and D). Despite the reputation of central European models for having substantial linkages between employers and secondary education (e.g., apprenticeships), there is no difference between the domestic and international shares of articles that addressed school-business partnerships. A chi-square test of independence led us to conclude that whether an article focused on employment as an outcome was independent of whether the research took place in the United States or another nation ($p = .19$). The absence of such a relationship may be related to the fact that the international literature notably includes some work set in African and Middle Eastern nations, with more focus in those settings on the role of CTE education as a vehicle for economic growth. In this way, the contemporary literature on developing contexts is a reprisal of the work and policies of Western nations from the turn of the 20th century.

Of the 90 internationally coded articles, more than 20% focused on Anglo contexts (Canada, Britain, Australia, or New Zealand), nearly 15% focused on Germany or the former East and West Germany, and about 7% focused on the Middle East or Africa, with each of those emphasizing training or economic growth. For instance, an article situated in Lebanon focused on moving vocational training from a historically stigmatized pursuit to one that could promote academic and workforce success (Vlaardingerbroek & El-Masri, 2008). The authors highlighted that positive perceptions of vocational training had emerged, as there had been broader awareness and acknowledgment of the positive career outcomes for individuals who made the transition from purely academic training to a hybrid of academic and technical training. Such work is salient in its ability to map onto other contexts, such as the United States, where it is only recently that awareness has increased regarding the career trajectories that are possible through CTE. In Stuart (2012), the context was South Africa and the challenges associated with trying to replicate the central European model of vocational education and training, particularly toward the end of developing manufacturing skills. Each of these cases highlights some potential challenges of trying to grow or establish CTE in new contexts.

The international literature also highlighted the tensions between using vocational education for long-term skill development and using it only to ensure shorter term labor market preparation. Santa Cruz, Siles, and Vrečer (2011) linked tracking toward vocational training early in students' schooling to midcareer employment vulnerability, emphasizing a concern in the policy world that accumulation of specific skills in the short term could have longer term costs if it means having lower levels of generalizable skills or knowledge that could facilitate career changing. This concern is similar to that of recently published work from Hanushek, Schwerdt, Woessmann, and Zhang (2016), who found a similar trade-off existing for workers across 11 European countries. This line of scholarship relays the importance of the fact that secondary education programs can better prepare youth for the need for

midcareer retraining by improving baseline “academic” or general skills. Other scholars of international CTE provided evidence, in a similar vein, of the growing importance of secondary credentials, of dwindling apprenticeships, and of perceptions that college preparation/readiness was increasingly vital for students who would have traditionally followed a vocational pathway (Kupfer, 2010). Niemeyer (2014) looked specifically at the case of Germany as an example of a system in transition, where the role of postsecondary education is growing.

International literature was focused less on the transition to postsecondary education (only 20% vs. 35% in the United States) and more on gender aspects (30% focusing explicitly on girls and women vs. 20% in the United States). Internationally oriented articles were much less focused on curriculum-based programs (28% vs. 53%, and a statistically significant association, $p < .000$) and were more likely to focus on specific occupations (36% vs. 24%, $p = .026$). In recent years, among articles that were set outside the United States, there was a more noteworthy uptick in the share of articles whose titles included the word *tracking* (Van Houtte & Stevens, 2009). In particular, in most instances the settings were European, which may reflect a growing emphasis on college going in those nations, and related reforms to detrack some of their systems (C. Hall, 2012).

Across the scholarship on vocational education outside the United States, there were several salient characteristics. First, in the literature we accessed there was a clear emphasis on European and Anglo contexts. Second, the literature was focused on details of vocational educational structure, the tradition of tracking, and the role of apprenticeships. There was a noteworthy and important rise in the frequency of discussion of tracking and of the need to move further toward college skill development, even among vocational education participants, as a way to hedge against career stagnation or midcareer job dislocation. This trend echoed a U.S. focus on the need to prepare for college and career and on the importance of strong academic and social skills as a means of reducing the risk of midcareer decline or job loss through technical change.

DISCUSSION

Our synthesis of the literature on CTE and preparation for work or career identified several trends or areas of focus. In most instances, these trends related directly to long-standing debates and focus on CTE and schooling as preparation for work. Equally clear were several noteworthy areas where students or topics were underrepresented. We highlight three notable trends that our review and analysis revealed and put them in conversation with the earlier literature on this topic: (a) students with disabilities have been studied disproportionately, while other historically marginalized groups (e.g., lower income students, students of color) have received less attention; (b) there has been increased attention on postsecondary transitions in the literature; and (c) employment remains a salient point of focus, as opposed to academic outcomes (e.g., achievement, graduation).

Marginalized Populations

While scholarship on students with disabilities has grown over the past five decades, focus on lower income students and students of color in this literature has not been as salient. The implications of this undercoverage relate directly to earlier scholarship on economic mobility and tracking for these groups, both of which are underemphasized in recent decades.

The absence of scholarship focusing on African American or Latino students, or on students from lower income families, suggests that we know little about whether or how these students may benefit from CTE exposure in high school, especially in more recent years. Importantly, these groups of students are often among those who are touted as potentially benefiting from an expanded focus on career readiness. Also important is that the most recent national statistics, as well as statistics from some states (Dougherty, 2015; National Center for Education Statistics [NCES], 2013), suggest that students of color and lower income students are overrepresented in CTE, a fact that was first unearthed by Oakes (1983). Investigation of such potential overrepresentation or tracking has garnered less scholarly attention in recent years (notable exceptions are C. Hall, 2012; and Lewis & Cheng, 2006, though the latter did not find evidence of race-based tracking in CTE). However, simply seeing that some groups of students are overrepresented makes understanding the potential influence of CTE on outcomes for these students of particular import. Interestingly, our initial cursory review of over 9,000 peer-reviewed sources that came from a larger source for work related to career and technical or vocational education showed a clear focus on both lower income youth and African American students in the first half of the 20th century, making the absence of this literature in the more recent scholarship more surprising (Anderson, 1982; Lazerson & Grubb, 1974).

The mountain of research exploring the experiences and outcomes of students with disabilities in CTE programs could inform and support the extension of these lines of inquiry with respect to students of color and lower income students in CTE. Specifically, thinking about what services and experiences can be built into high schools that can enable students to make the transition from secondary to postsecondary education or the workforce seems potentially valuable in communities where many students cannot afford to attend college outright or where college may not be an optimal placement for many (Sanford et al., 2011). There is existing evidence that students (with and without disabilities) earn higher wages after participating in CTE models such as school-to-work programs in the 1990s and career academies in the early 2000s (Bishop & Mane, 2004; Kemple & Willner, 2008; Neumark & Rothstein, 2006). Such results emphasize that exposure to these programs in high school could provide enhanced financial support while young people are working only or working while in college. There may also be a substantial pool of students who graduate from high school but whose academic skills are too high to qualify them for special education services and too low to set them up for success in college (Martorell & McFarlin, 2011). In such cases we must have a more robust understanding of how CTE exposure

in high school could influence later outcomes, as well as the factors that influence whether and how these students access CTE while in high school.

Our review of the literature in the first half of the 20th century showed some clear evidence of focus on the potential for classed and discriminatory education systems (Bowles & Gintis, 1976; Dorn, 1996; Tyack, 1974). For instance, coverage of gender differences in CTE was not robust in the literature that we reviewed (it was stronger in the international articles), although there was ample scholarship on the role of vocational education in preparing women for vocations and secretarial work (Clifford, 1982; Goldin, 2006; Kopczuk, Saez, & Song, 2010), which was also noted as a feature of high schools in the late 1950s by Conant (1959). There is a parallel literature on the argument for vocational education in the segregated South as a means to economic self-sufficiency for Black Americans (Anderson, 1988; Bowles & Gintis, 1976; C. W. Hall, 1973). Both of these themes that are connected to historically marginalized populations echo the earlier sentiments that led to the adoption of federal investment and innovation with respect to CTE policy. The underrepresentation of these themes in more recent literature (at least as concerns direct connection to preparation for work) is perhaps emblematic of the continued wage and employment discrimination faced by these groups in schooling and the workforce. At the very least, the suppressed level of scholarship in CTE with respect to these populations of students is noteworthy.

Postsecondary Transitions

Increasing scholarship attending to postsecondary transitions reflects a broad secular focus on the importance of at least some postsecondary training in preparation for entering the workforce. This is reminiscent of Conant's (1959) observation of the importance of increasing the share of high school graduates more than 50 years ago, and it highlights the importance of continued research in this area, particularly with expansions of programs that are modified versions of tech-prep (Cellini, 2006) and emphasize postsecondary transition. Early-college high schools and structures that fuse high school and associate's degree credentials within a CTE context have been proliferating (Jacoby & Dougherty, 2016) but remain largely understudied. Initial evidence regarding the early-college high school, or 9–14 model, has been promising (Haxton et al., 2016), but evidence of replicated results and examinations in multiple contexts does not yet exist.

In addition, the fact that we removed nearly 200 articles from our initial search on the grounds that they focused exclusively on adult or postsecondary settings underscores that some scholarship on CTE in postsecondary settings is already under way. Recent work has looked at the impact of CTE programs in community colleges and found positive economic returns to certificates earned in these settings (Kurlaender, Huff-Stevens, & Gros, 2014; Xu & Trimble, 2016). However, overall scholarship on up-to-date delivery models for CTE in postsecondary settings is somewhat limited.

Employment

The idea that employment is an end of education or an impetus for education policy is not new. The advocacy for the Smith-Hughes Act by manufacturers, the space race and the push for economic competition with Russia during the Cold War, the Great Society reforms, and the recent use of PISA scores as a call to improve the nation's global competitiveness are all instances of emphasis on employment as a goal of education. In the context of this chapter, the overall prevalence of employment as an outcome in our literature review is at least partially driven by our focus on the linkages between education and preparation for the workforce and the search terms we employed. However, the fact that so many articles relied on this outcome as an element of study in their research also highlights the persistent pragmatic connection between education and employment.

The focus on employment as an outcome in the studies of CTE that we reviewed mirrors existing literature in labor economics that explores whether and how additional education is rewarded in the labor force (e.g., Angrist & Krueger, 1991). Emphasis on employment as an outcome in international contexts also highlights the potential for career-oriented education to provide a foundation for economic development and growth. In the late 19th and early 20th centuries, career-focused education was justified as part of an overall economic development plan (Lazerson & Grubb, 1974) and as a means to compete globally (Benavot, 1983); this, in turn, provided justification for the federal role in funding CTE. During the 1960s, vocational education was used as a motivation for helping lower income urban populations escape the "poverty trap," and in recent years it has been touted as an alternative (or concurrent complement) to college. That our review revealed such a tight linkage between employment and historically disadvantaged populations suggests that because these groups of students are not as well represented in the literature, there is room for more scholarship in the future.

Limitations

The primary limitation of this study of the CTE literature is its relatively narrow focus on the intersection of CTE exposure in secondary education and preparation for a career, a focus that undoubtedly masked rich variation in the scholarship related to CTE more generally. Our initial search for scholarship that addressed the topics of vocational education and CTE revealed more than 9,000 peer-reviewed articles or books spanning the years 1900 to 2015. Systematically culling a subset of these articles that also explored the connection with work or job preparation still resulted in a large volume of scholarship. A related limitation is that in choosing databases to search we may have inadvertently limited our access to the international literature from this period. Specifically, focusing on English-language publications alone limited the results of our search, suggesting that true comparative work would have to take a more nuanced and comprehensive approach to identifying the relevant international literature.

Despite our review of this substantial body of work, there remains opportunity to further review and synthesize the existing literature. In particular, our focus on studies situated in secondary education settings means that, at a minimum, the literature on postsecondary CTE exposure and both college and employment outcomes is ripe for analysis. The increased availability of longitudinal data systems, the richness of the National Student Clearinghouse data for covering college outcomes (Dynarski, Hemelt, & Hyman, 2015), and the increased emphasis on multiple measures of performance under ESSA provide ample motivation and possibility for extending such work.

CONCLUSION

The results of the historical analysis and systematic literature review that we have undertaken here reveal several key areas to consider in moving forward in scholarship and policy related to vocational education and career readiness. These key areas are (a) historically marginalized student subgroups, (b) transitions to postsecondary education, and (c) continued focus on employment as an outcome. Our synthesis highlights the need for a return to critical analysis of the ways in which CTE may or may not be paying off for lower income students, students of color, and women. Concerns about tracking, social reproduction, and the potential for heterogeneous access and impact may not be warranted but must be explored in ways that do not appear in the CTE literature for at least the past decade. In addition, the literature related to the role of CTE in facilitating the transition to postsecondary education and employment is in need of additional updating. While there is a growing interest in transition in general, it has been concentrated on students with disabilities, with less focus on typically developing peers. Furthermore, the recent proliferation of new or revamped CTE delivery models, particularly with respect to facilitating the transition to college, suggests that more research and evaluation of such models are needed.

In the next 10 years, the field needs more work to examine critically the new models of CTE delivery, the changes in program offerings (e.g., the addition of information technology, biotechnology, advanced manufacturing), and the mechanisms by which students have come to access them (selective admission, lotteries, school choice). Lessons from the shifting role of CTE in European economies and its implications for educational practice and policy should be salient in informing this future work (Hanushek et al., 2016; Kupfer, 2010; Niemeyer, 2014; Santa Cruz et al., 2011). In an era of large-scale longitudinal data systems, the ability to conduct high-quality impact analyses on such new (and old) programs is better than ever before, and the level of detail available in these data permits reexamination of questions of access to curriculum and potential renewed tracking, as well as impact of program participation on postsecondary enrollment and employment outcomes. Without continuous investigation, we risk lapsing back to the highly unequal systems of the past, particularly for the students who, historically, are least well served by our education system (Raffo, 2006). We also risk misunderstanding the effect of CTE on student outcomes, particularly over the long run (Hanushek et al., 2016).

As many states adopt (or have adopted) the CCSS and pivot to emphasize both college readiness and career readiness, it is an opportune time to study how policy and program shifts in these areas affect student experiences and outcomes. In light of our review, it will be particularly important to understand how these changes affect students with disabilities, students from lower income families, and students who exhibit signs of being disengaged with schooling. Furthermore, with CTE featured more prominently in ESSA, and as Congress continues to entertain a reauthorization of the Perkins Act, there is an opportunity to refocus the policy conversation on what is known in the literature and what sorts of policy or program adoption should be encouraged. Specifically, requirements of states regarding how and where they spend Perkins funds could create incentives for evaluation of those programs. The best innovations in scholarship connecting CTE participation and outcomes will undoubtedly come from the ability of researchers to connect education and labor market data and to critically examine the ways in which CTE access intersects with long-standing debates about whether and how CTE promotes long-term success and allows for social mobility, or reinforces inequalities in access and outcomes.

APPENDIX

Decision Rules: CTE Literature Search

All subgroup categories: Any reporting of listed subgroups (e.g., race, gender, disability) can be counted as a 1, including frequencies and percentages. Count all that apply.

Program/Intervention Characteristics

Curriculum based: The program or intervention is delivered as a curriculum, which might include lesson plans, activities, assignments, work products, and so on. The curriculum could be delivered in a dedicated class period or somewhere else (e.g., a resource room) and must be implemented during the school day. The curriculum includes specific career and tech education courses.

Nonschool setting: The program or intervention is delivered outside of the school building or school day (includes community-based settings, after-school programs, job shadowing, work experience, work-study, etc.).

School-business partnership: The program or intervention is a coordinated effort between school personnel and a business entity or corporation.

Occupation-based: The program or intervention is specific to a certain field (e.g., construction, agriculture). There is no mention of a partnership with a business or corporation.

Secondary-postsecondary transition: The program, intervention, or research study involves a coordinated effort between secondary and postsecondary systems and/or personnel (e.g., teachers, counselors), including transition planning. This includes bridge programs such as dual enrollment, where students can earn simultaneous credit and/or work with personnel from both systems.

Dropouts or disengaged youth: The focus of the program is on special populations that are at risk (e.g., high school dropouts, students at risk for dropout, disengaged youth). The program does not necessarily include students with disabilities.

School completion/high school graduation: The study addresses school completion and/or high school graduation in some way (e.g., high school graduation is an independent or dependent variable in the study).

Employment: There is a focus on job skills, wages earned, employment/unemployment, or something else related to employment during or after high school.

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NOTES

¹The name change from *vocational education* to *career and technical education* was first codified at the national level under the 2006 reauthorization of the Perkins legislation, though it had been in relatively broad use for several years prior.

²The earlier Morrill Act of 1861 arguably had moved in this direction with the establishment of land-grant universities, but the focus of Smith-Hughes was exclusively on secondary education.

³The search feature allowed us to select peer-reviewed sources and books as distinct categories of scholarship. These excluded dissertations, newspaper articles, and other popular media.

⁴This, we realize, eliminated some seminal pieces related to the study of CTE. However, in our historical review, as described at the beginning of this chapter, we leveraged other searches, prior knowledge, and seminal literature to later put our objective search in conversation with these weighty historical pieces.

⁵With the assistance of a research librarian, we compiled a spreadsheet that captures all of these search results and records the database, identifier, journal, title, ISSN, year, volume, issue, and the link to the electronic citation that includes an abstract.

⁶It should be noted that the passage of additional federal legislation that subsequently spurred greater investment by states in vocational and technical education in the 1960s likely spurred the more voluminous scholarship in this area after 1970.

⁷In the initial round of comparison, agreement was calculated at 87%. Among the 15% of all coded articles that were coded by both authors, roughly one third were coded identically as not fitting the scope of the study. In all instances, not fitting the scope of the study meant that the article was focused on adult populations or students in higher education, both of which were defined as outside the purview of this analysis.

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