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Partnering to Improve Career and Technical Education for Students With Disabilities: A Position Paper of the Division on Career Development and Transition

Michael W. Harvey, PhD[1], Dawn A. Rowe, PhD[2], David W. Test, PhD[3], Catherine Imperatore, MEd[4], Allison Lombardi, PhD[5], Michelle Conrad, PhD[6], Amy Szymanski, MEd[7], and Kristy Barnett, MEd[8]

Abstract

This article describes the Division of Career Development and Transition's (DCDT) position regarding Career Technical Education (CTE) and provides recommendations regarding more intense collaboration to improve access to and persistence in CTE for students with disabilities. Professional groups, such as the DCDT and the Association for Career and Technical Education, as well as policy makers, should strengthen collaboration in this area. This position paper: (a) explores CTE's effectiveness as a secondary special education and transition service; (b) summarizes relevant federal legislation; and (c) presents key recommendations for policy, practice, personnel preparation and professional development, and research. Policy and practice recommendations emphasize access and equity, personnel preparation and professional development recommendations promote an understanding of related legislation and instructional practices, and research recommendations emphasize collaborative high-quality research.

Keywords

systems change/policy, student-focused, planning, interagency collaboration, high school, education

Preparing youth with disabilities for successful post-school outcomes has been emphasized in special education legislation for years. This began with the identification of model programs in transition (Education of the Handicapped Act, 1986), moved to the mandate for an individualized education program (IEP) transition component and transition planning (Individuals With Disabilities Education Improvement Act [IDEA], 1990), and includes the current transition mandate (IDEA, 2004). Unfortunately, recent data indicate that students with disabilities are not achieving postsecondary education and employment at the same rate as their peers without disabilities. According to the U.S. Bureau of Labor Statistics (2018), for individuals aged 16 and older, only 18.7% of the individuals with disabilities were employed compared with 65.7% of the individuals without disabilities. Outcomes in postsecondary education also lag with only 76.0% of youth with disabilities in high school expecting to enroll in some type of postsecondary education or training compared with 94.0% of their peers without disabilities (Lipscomb et al., 2017). Hinz, Arbeit, and Bentz (2017) reported that 48.0% of youth with disabilities enrolled in a 4-year college/university, 26.0% enrolled in 2-year college, and 1.0% enrolled in technical school.

To address these discrepancies in post-school outcomes for students with disabilities, researchers in the field of secondary special education and transition have identified evidence-based practices designed to teach academic and transition skills to support post-school

[1]Penn State University, University Park, USA
[2]East Tennessee State University, Johnson City, USA
[3]The University of North Carolina at Charlotte, USA
[4]Association for Career & Technical Education, Alexandria, VA, USA
[5]University of Connecticut, Storrs, USA
[6]University of Central Missouri, Warrensburg, USA
[7]State Support Team Region 1, Toledo, OH, USA
[8]Great Plains Technology Center, Lawton, OK, USA

Corresponding Author:
Michael W. Harvey, Professor of Education, Workforce Education and Development, Penn State University, 411C Keller Building, University Park, PA 16802, USA.
Email: mwh10@psu.edu

attainment (Test, Fowler, et al., 2009), as well as identified predictors of post-school success (Mazzotti et al., 2016; Test, Mazzotti, et al., 2009). Among these predictors of post-school success is secondary career and technical education (Career Technical Education [CTE]; Harvey, 2002). Although research has indicated that participation of students with disabilities in secondary CTE increases the likelihood of positive outcomes after high school, access to secondary CTE programs for students with disabilities remains limited (Dougherty, Grindal, & Hehir, 2018). In addition, research focused on students with disabilities and participation in CTE is not prevalent in special education, secondary transition, or CTE literature. As such, it is important to explore partnerships between researchers and practitioners in secondary special education and transition and secondary CTE to determine the effectiveness of secondary CTE programs for students with disabilities. Therefore, in this position paper, we recommend secondary special education, CTE, and other relevant stakeholders (e.g., vocational rehabilitation [VR]) increase collaborative efforts to improve implementation and delivery of CTE for students with disabilities. In doing so, we map a pathway to forge new collaborative efforts and professional relationships in policy, practice, personnel preparation and professional development, and research.

This article was developed jointly by members of the Council for Exceptional Children's Division of Career Development and Transition (DCDT), which supports professionals who work to expand and improve career development and transition services for persons with disabilities, and members of the CTE community, who belong to the Association for Career and Technical Education (ACTE). As such, we address secondary CTE's effectiveness as a secondary special education and transition service, summarize the interconnections among relevant federal legislation, and conclude with recommendations for the field. This article is based on the position that more intense collaboration should occur between special education and CTE education professionals to support and improve secondary CTE for students with disabilities. In addition, professional groups, such as DCDT and ACTE, as well as policy makers, need to promote collaborative efforts in this area.

The Promise of CTE to Facilitate Secondary Special Education and Transition Services

CTE, authorized under the Carl D. Perkins Act (Perkins IV, 2006), has had tremendous impact in supporting secondary and postsecondary education occupational skills training (Imperatore & Hyslop, 2017) and has a long-standing history of providing educational services to students with disabilities (e.g., U.S. Office of Education, 1965). Brolin and Loyd (2004) indicated that "the inclusion of vocational services as a component of the IEP" is essential for students with disabilities included in CTE general education programming (p. 20). In fact, early correlational research indicated that enrollment in secondary CTE coursework was predictive of positive outcomes in postsecondary education and employment for students with disabilities. For example, Jeon, Kern, and Passmore (2010) found that CTE provided advantages in employment outcomes among a national sample of 8,934 youth aged 12 to 16 years. Likewise, students with disabilities participating in secondary CTE had positive outcomes in employment (Harvey, 2002). Further research has found that CTE, particularly CTE concentration, leads to post-school full-time employment for students with disabilities (Lee, Rojewski, & Gregg, 2016). Most recently, Theobald, Goldhaber, Gratz, and Holden (2017) found that students with disabilities who were CTE concentrators (i.e., took 4+ CTE courses in high school) were more likely to graduate on time and were significantly more likely to be employed after graduation compared with those who did not concentrate in secondary CTE programs. Clearly, research indicates that secondary CTE participation provides educational and post-school employment benefits for students with disabilities.

Although CTE is critically important in meeting workforce development and skill demands of jobs in the 21st century, participation of students with disabilities in secondary CTE in the professional literature often remains elusive (Casale-Giannola, 2012). Reports find a higher concentration of students with disabilities participating in CTE (Dougherty et al., 2018; Gray & Lewis, 2018). However, participation varies across states and regions. Recent 2015 to 2016 national data indicated secondary CTE participants who are students with disabilities participate at rates ranging from 7%–8% (e.g., Idaho) to 26%–28% (e.g., Pennsylvania) across states (Harvey & Trainor, 2019). Furthermore, results of a more recent systematic literature review of top-tier CTE journals showed that few studies included students with disabilities (Dougherty & Lombardi, 2016). Of those that did, data were not disaggregated by disability (Lombardi, Dougherty, & Monahan, 2018), making it difficult to discern if in fact CTE was effective. Clearly, students with disabilities participation in secondary CTE programs are not well reflected in the literature. It is therefore critical that research studies that examine access to, and progress in, secondary CTE programs for students with disabilities are prioritized to understand how secondary CTE policy and practice can better serve students with disabilities and ensure successful transition. It is important to note that CTE may not be appropriate for all students with disabilities but should be considered for students with disabilities who will benefit from occupationally specific training.

Related Federal Legislation

Critical pieces of legislation (e.g., IDEA, Perkins) have paved the way for students with disabilities to access CTE. To facilitate collaboration among secondary special education and secondary CTE professional communities, it is important that all parties understand key legislation that affects students with disabilities in CTE. Each piece of legislation provides (and in many cases mandates) opportunities for collaborative services for students with disabilities.

The IDEA

IDEA (2004) mandates secondary students with disabilities 16 years or older (younger where deemed appropriate) have transition services included in their IEP that specifies postsecondary goals appropriate to education and training, employment, and, if appropriate, independent living skills. Postsecondary goals are based on the student's individual needs and on their strengths, interests, and preferences (20 U.S.C. §1400-14). Federal regulations define transition services as a "coordinated set of activities for a child with a disability that are a results-oriented process and meet academic and functional needs" (34 CFR § 300.43 [a]. 20 U.S.C. 1401[34]). Secondary CTE is one pathway students with disabilities can choose to become career ready.

The Workforce Innovation and Opportunity Act (WIOA)

WIOA (2014) supports workforce development for students with disabilities, and all in- and out-of-school youth, through Title I funded youth activities and services as part of job training and career development (Cushing, Therriault, & English, 2017). WIOA services focus on local in-demand jobs, associated occupational skill training, and high school completion. Some specified services to be provided as a result of WIOA include job exploration, work-based learning experiences, counseling, workplace readiness training, and self-advocacy skills, services also included as part of CTE programs. These efforts support education, training, and services to assist students with disabilities in gaining necessary skills for success in the jobs of the 21st century as required by employers. Collaboration among agencies and educational entities (e.g., special education, secondary CTE) is a significant part of the legislation, especially related to secondary CTE and students with disabilities (Advance CTE, 2018).

Every Student Succeeds Act (ESSA)

Recent educational reform efforts have centered on college and career readiness (CCR) in American public education with the explicit intent that all students, including students with disabilities, be prepared for college and careers after high school (ESSA, 2015; U.S. Department of Education, 2009). The most recent reauthorization of the ESSA (US DOE, 2015) emphasizes CCR by mandating states develop challenging academic standards and requiring states to develop indicators of students' success (Advance CTE, 2017). Many states include in their ESSA accountability systems "college and career readiness" indicators that may measure secondary CTE program completion, credential attainment, and work-based learning, all critical transition services to support the needs of students with disabilities as they prepare for post-school success (Cushing et al., 2017). ESSA provides states "an opportunity to develop a more coherent college and career readiness approach" (Tomasello & Brand, 2018, p. 1) in their state ESSA plans.

Strengthening Career and Technical Education for the 21st Century Act

In the recent reauthorization of the Perkins Act known as Strengthening Career and Technical Education for the 21st Century Act (2018), the law (PL 115-224 [commonly referred to as Perkins V] and the Carl D. Perkins Career and Technical Education Act of 2006 as Amended Through PL 116-6, 2019) continues its emphasis on developing career and college readiness in secondary, postsecondary, and adult students, including students with disabilities. One of the law's purposes is "increasing the employment opportunities for populations who are chronically unemployed or underemployed, including individuals with disabilities . . . " (PL 115-224—H.R. 2353).

Provisions throughout the law specifically affect students with disabilities:

- The requirement to use state leadership funds on individuals in state institutions (such as correctional institutions, juvenile justice facilities, or institutions for students with disabilities) has been expanded to "up to 2 percent," and a new set-aside has been added requiring states to spend funds on recruiting special populations into CTE programs.
- As part of the local application process, local entities must complete a comprehensive local needs assessment that includes an access and equity gap analysis for special populations, including students with disabilities. Local applicants must also evaluate their ability to prepare special populations for high-skill, high-wage, or in-demand industry sectors or occupations in competitive, integrated settings that will lead to self-sufficiency.
- Local Perkins grant recipients can use funds to coordinate with other education and workforce development programs and initiatives, including career pathways and sector partnerships developed under WIOA and transition-related services aligned with IDEA.

- The legislation allows for educators to receive professional development related to students with disabilities.

The legislation also provides definitions that align with those in WIOA concerning workforce development, including career pathways, in-demand industry sectors or occupations, and recognized postsecondary credentials, and with ESSA, including dual or concurrent enrollment, evidence-based practices, and universal design for learning. These shared definitions can become the building blocks for future collaboration and research efforts. In addition, Perkins V requires reporting about the number of students within special populations, including students with disabilities, who achieve concentrator status, defined as completing "at least two courses in a single CTE program or program of study" (PL 115-224—H.R. 2353).

Summary of Legislation

This legislation provides incentives for coordination of services for students with disabilities. IDEA provides secondary students with disabilities, where appropriate, the option to participate in CTE as part of secondary general education (34 CFR § 300.39). Perkins V supports secondary CTE as a transition service for students with disabilities by specifying that special populations participating in CTE need to be prepared for employment in related occupations and/or postsecondary education. Secondary CTE is one pathway for students with disabilities to prepare to be college and career ready for 21st century jobs (Dieterich & Smith, 2015). Goals of and definitions within IDEA and Perkins V also align with ESSA and WIOA. As such, legislation is in place to support partnerships among secondary CTE, special education, and VR transition professionals, yet such collaborative efforts are not common place in transition practice and should be more fully developed (Povenmire-Kirk et al., 2015).

Relevance to ACTE and DCDT

Given the positive impact secondary CTE can have on the education and post-school employment outcomes for students with disabilities, it is important for secondary CTE and special education stakeholders to support collaborative research, policy, and practice. As the CTE community strives to empower educators to deliver high-quality secondary CTE programs that ensure all students are positioned for career success, collaboration with DCDT can strengthen the training, services, and resources available for the CTE community. Similarly, special education professionals can leverage secondary CTE resources to ensure the special education community is fully aware of secondary CTE's benefits to students with disabilities and of strategies for incorporating CTE within secondary transition. It is up to professional development organizations, such as ACTE and DCDT, to help their members and partners capitalize on these opportunities and move policy to practice. This can be accomplished through collaborative efforts proactively focused on inclusive policy and practice, personnel preparation and professional development, and comprehensive research for all stakeholders (Sprunger, Harvey, & Quick, 2018). The increasing gap in post-school outcomes between students with disabilities and those without, the various legislative mandates, in addition to the lack of identified research regarding students with disabilities and secondary CTE, provides the opportunity for collaborative problem-solving between special education and CTE (National Center for Special Education Research, Institute of Education Sciences, 2017). This article's position is that more intense collaboration should occur between special education and CTE professionals to support and improve secondary CTE for students with disabilities. In addition, professional groups, such as the DCDT and the ACTE, as well as policy makers, need to promote efforts for collaborative efforts in this area. Following are recommendations to bring the fields together for the purpose of improving outcomes for students with disabilities.

Recommendations

There is great potential to use secondary CTE as a vehicle to improve employment and postsecondary outcomes for students with disabilities. In this section and in Table 1, we propose recommendations for how this might be accomplished. Kochhar-Bryant and Greene (2009) indicated that secondary CTE is a viable pathway to post-school success for students with disabilities. As such, secondary CTE should be considered an essential component in assisting students with disabilities in meeting the workforce demands of jobs in the 21st century (Imperatore & Hyslop, 2018). Therefore, we propose the following recommendations for policy and practice.

Policy Recommendations

1. *Ensure all national, state, and local policies require access to and equity in secondary CTE for students with disabilities.* The *2018 ACTE Quality CTE Program of Study Framework* (Imperatore & Hyslop, 2018) includes three key critical elements: (a) the program of study is promoted to all potential participants and their parents/guardians (as appropriate), in a manner that is free from bias, inclusive, and non-discriminatory; (b) students are actively recruited from populations that have been traditionally underrepresented, including by gender, race, and ethnicity, and/or special population status; and

Table 1. Summary of Recommendations.

Policy
1. Ensure all national, State, and local policies require access and equity to secondary CTE for all students with disabilities.
2. Develop policies that enable collaborative partnerships.
3. Create polices to ensure data, accountability systems, and needs assessments are aligned.
4. Align practice with standards in CTE for quality, access, and equity.
Personnel Preparation and Professional Development
1. Ensure understanding of secondary CTE and special education legal requirements.
2. Ensure knowledge of good pedagogy.
3. Involve secondary CTE professionals in transition planning/IEP development.
4. Ensure communication among professionals is provided in a systematic and timely manner.
5. Ensure secondary CTE and special education professionals are prepared to teach 21st century employability skills to students with disabilities.
6. Ensure secondary CTE and special education professionals are prepared to coordinate work-based learning experiences for students with disabilities.
Research
1. Conduct collaborative research.
2. Conduct high-quality research.
3. Publish findings of research in peer-reviewed journals.

Note. CTE = Career Technical Education; IEP = individualized education program.

(c) career guidance is offered to all potential and current programs of study participants in a manner that is free from bias, inclusive, and non-discriminatory. For example, having explicit local education agency (LEA) policy making sure that appropriate CTE personnel and school counselors are invited to IEP meetings where secondary CTE placement is being considered.

2. *Develop policies that enable collaborative partnerships.*
   a. State agencies, LEAs, and workforce partnerships should better leverage the existing federal legislation—WIOA, Perkins, IDEA, and ESSA—to ensure cross-collaborative efforts to deliver services. For example, WIOA provides supports for in-school and out-of-school youth; policies should include VR personnel in the planning process for students with disabilities in CTE who are eligible for WIOA services.
   b. State agencies should specify cooperative partnerships between professional agencies in secondary CTE, special education, workforce development, and VR to develop innovative ways to implement evidence-based and promising practices to ensure students with disabilities access and persist through secondary CTE programs of study (i.e., become CTE concentrators). For example, this can be done through proactive partnerships to support CTE concentration to include work-based learning opportunities for students with disabilities in CTE where special education, CTE, VR, and WIOA with business and industry professionals support transition from school to work.
   c. State agencies and local administrators should maximize use of different funding sources within and across agencies to deliver services. For example, a transition specialist funded by WIOA could be assigned to a high school to support secondary CTE professionals in the delivery of work-based learning opportunities and/or to support special education in developing students with disabilities self-advocacy skills.
3. *Create polices to ensure data, accountability systems, and needs assessments are aligned.*
   a. State agencies should align data across systems using common indicators of employment outcomes across multiple reporting agencies, such as IDEA post-school indicators, Perkins V placement indicators, and local employment data. Historically, employment indicators across these reporting agencies have not aligned, creating a hindrance for postsecondary outcome follow-up and/or follow-along research efforts (Harvey & Kotamraju, 2017).
   b. State agencies should use definitions included in Perkins V, especially those related to secondary CTE concentrators, to forge better relationships among education entities, workforce development providers, and business and industry. For example, partnerships should align with CCR goals and training outcomes (e.g., ESSA, WIOA), as well as stakeholder engagement in business and industry (e.g., Perkins V).

c. States should continue efforts to build accountability systems (e.g., state longitudinal data systems) connecting education and employment data to better ensure education programs are providing valid and reliable data that can be used to improve programs to prepare students for positive post-school outcomes. For example, state data collection should account for common measures in accountability mandates (e.g., IDEA, 2004; Perkins V, 2018) and make sure that there is alignment for LEA reporting purposes and non-duplication of effort.

Practice Recommendations

1. *Align practice with standards in CTE for quality, access, and equity.* State agencies and district leaders should ensure secondary CTE program delivery is aligned with quality standards in CTE that address access and equity for students from special populations, including students with disabilities. For example, ACTE's *2018 Quality CTE Program of Study Framework* is a set of evidence-based standards that programs can use to self-assess their CTE quality and direct program improvement efforts. In addition, the National Alliance for Partnership in Equity (NAPE) Program Improvement Process for Equity™ and NAPE's Equity Gap Analysis provide more information on conducting equity gap analyses.
2. *Create and use industry-aligned curriculum and industry-recognized credentials to support the continuum of available careers.*
   a. For the benefit of students with disabilities and all students, state and local leaders should leverage mechanisms such as Perkins V comprehensive local needs assessment and CTE program of study approval processes to validate that secondary CTE programs of study are aligned to skills needed by industry and to industry-recognized credentials that lead to employment and/or further education and training.
   b. State and local education–industry partnerships should create micro-credentials that focus on developing and validating specific competencies within a larger skill set for individuals who cannot meet the requirements for a particular credential. For example, industry and education could collaborate to develop a micro-credential that validates oil change and tire rotation skills in the auto industry, for individuals who are unable to earn the full Automotive Service Excellence (ASE) credential. This micro-credential should still be useful in gaining employment or could serve as a stepping stone to additional credentials that will be valuable in the workplace.
3. *Ensure stakeholder understanding of appropriate accommodations and support for students with disabilities across legislation and in business and industry.*
   a. State and local administrators should ensure all stakeholders (i.e., CTE, special education, VR) understand: (a) differences across federal legislation when it comes to populations that are entitled or eligible for accommodations and support; and (b) the definition of accommodations established in business and industry (i.e., accommodations identified in Section 504/ADA and case law). For example, states should provide cross-agency professional development to facilitate collaborative efforts supporting appropriate accommodations aligned with legislative mandates and student needs.
   b. State and local agencies should determine appropriate accommodations and supports to ensure students with disabilities can access secondary CTE programs and are appropriately placed regarding industry occupational skills requirements and safety standards. For example, professional development aligned with industry standards and safety requirements for employment should be provided as front-end analysis in establishing appropriate accommodations and supports for students with disabilities enrolled in secondary CTE.
   c. State and local CTE and special education administrators should ensure that IEP transition goals for students with disabilities enrolled in secondary CTE align with occupational skills and industry credentials that enable students to continue their education or enter employment relevant to their CTE area of study and local workforce needs.
4. *Ensure dual/concurrent enrollment, articulation, and early college programs incorporate students with disabilities.*
   a. Secondary CTE educators and career development professionals should encourage students with disabilities to become concentrators in CTE programs focused on specific occupational skill development leading to career pathways with employment in the student's community. For example, these professionals should work with school counselors concerning CCR and focus on appropriate career pathways for students with disabilities and should include VR and WIOA professionals where appropriate.

   b. Local administrators and career development professionals (e.g., school administrators, guidance counselors, and/or career counselors) should support students with disabilities in exploring dual credit/enrollment courses that align with postsecondary college credentials, such as dual credit, concurrent enrollment, and/or early college experiences for participants in secondary CTE. This can be accomplished by including dual credit and/or concurrent enrollment opportunities in the IEP for students with disabilities enrolled in CTE where articulation agreements exist and are relevant/applicable.
5. *Ensure industry partnerships and work-based learning include students with disabilities.*
   a. Confirm state and local policies support including students with disabilities in industry partnerships and work-based learning experiences provided by the LEA.
   b. Prepare and support students with disabilities and employer partners at the local level before, during, and after work-based learning experiences. For example, CTE, school-to-work, career counselors, special education, VR, and WIOA professionals should coordinate supports and follow-up as appropriate. This should be included in the IEP transition plan.

Personnel Preparation and Professional Development Recommendations

Research indicates secondary CTE educators need additional training and professional development in working with students with disabilities in CTE settings (Cotton, Koch, Harvey, & McCallister, 2016). Perkins V addresses the need for professional development for CTE professionals on helping students with disabilities succeed in secondary CTE. Similarly, Schmalzried and Harvey (2014) suggested that special educators need to understand secondary CTE and provisions in Perkins V regarding special populations, including students with disabilities. Therefore, we offer six recommendations for providing collaborative personnel preparation and professional development.

1. *Ensure understanding of secondary CTE and special education legal requirements.* Dieterich and Smith (2015) indicated IDEA requires students with disabilities to receive specially designed instruction to include accommodations and adaptations as part of program services for participation in secondary CTE programs. Special education professionals require an understanding of secondary CTE and the supports/services mandated in the legislation. Likewise, CTE professionals need to understand the provision of services as required by IDEA. To accomplish this, teacher preparation programs and school administrators should plan preservice training and professional development activities for CTE and special education professionals that address legislative mandates for CTE and special education and how these mandates affect delivery of educational services to meet the needs of students with disabilities.
2. *Ensure knowledge of quality pedagogy.* It is essential special education, and CTE instructors, especially those coming from industry into education, know, understand, and implement quality teaching pedagogy. Pre-service training programs and professional development activities for secondary CTE professionals must address strategies to support students with disabilities through instruction, assessment, and experiential learning (e.g., differentiated instruction). Likewise, special education teacher preparation programs and professional development must emphasize CCR, IEP and transition planning, career pathways, and occupationally specific programs.
3. *Involve secondary CTE professionals in transition planning/IEP development.* Secondary CTE involvement provides the IEP team with information concerning specific occupation credentials, articulated programs of study with career pathways, local labor market needs, and skill requirements for employment, along with support for job placement. Many states, such as Pennsylvania, require secondary CTE to be represented in IEP team meetings where CTE program placement is being considered for students with disabilities (Pennsylvania Code: Title 22 Education, Chapter 339). The IEP transition goals for students with disabilities participating in secondary CTE should be associated with the education, training, and employment needs of students with disabilities, including specifically designed instructional services. These should align with state content standards, occupational pathways, and industry expectations for employment and/or postsecondary education (Peterson et al., 2013). To accomplish this, IEP teams should work together to:
   a. Ensure annual IEP goals align with individual academic and career plans, including postsecondary goals, and address specific skills needed to be successful in college and careers (e.g., industry standards, career readiness skills);
   b. Invite secondary CTE professionals to participate in IEP meetings when students with disabilities are being placed or are currently participating in secondary CTE programs;

   c. Understand the requirements of secondary CTE programs of study before recommending CTE placements. For example, students with disabilities may need to be able to pass occupational safety requirements, such as OSHA requirements, as part of CTE program placement decision-making; and
   d. Ensure students with disabilities have prerequisite skills to earn industry-based certifications needed for employment in the occupational area and/or micro-credentials that validate skills in specific competencies that align with industry standards.
4. *Ensure communication among professionals is provided in a systematic and timely manner.* Collaboration and communication are expressed areas of concern by secondary CTE and special education professionals alike (Harvey, Test, & Rowe, 2017). Schmalzried and Harvey (2014) recommended ongoing communication and collaboration concerning students with disabilities enrolled in secondary CTE settings. Haber and Sutherland (2008) suggested to facilitate communication administrators should:
   a. Develop adequate systems that support fluid communication so improved communication is more feasible (e.g., mail: weekly/bi-weekly progress report);
   b. Define expectations of all parties involved in education planning for students with disabilities; and
   c. Share progress monitoring data on an ongoing basis to determine the adequacy and effectiveness of services and supports provided.
5. *Ensure secondary CTE and special education professionals are prepared to teach 21st century employability skills to students with disabilities.* Twenty-first century employability skills training needs to be more prominent in secondary CTE curricula, particularly for students with disabilities. Employers are reluctant to hire some students with disabilities (Nota, Santilli, Ginevra, & Soresi, 2014). However, most employers are willing to work with students with disabilities as long as the student can demonstrate employability skills (Ju, Roberts, & Zhang, 2013). With appropriate training, secondary CTE professionals can provide occupational and employability skills training, including soft skills/social skills training, as part of the curriculum (Cotton et al., 2016). Teachers who assist students with employability skills development enable the student to function successfully and become accepted in school and within the community (Lorger, Schmidt, & Vukman, 2015). To adequately prepare professionals to teach 21st century skills, local CTE and special education administrators should:
   a. Collaborate on PD efforts in this area (e.g., workshops, study groups, curriculum development teams); and
   b. Explore implementing programs that support self-determination, self-advocacy, and social skills development with research to support their effectiveness (e.g., Project Search; WAGES curriculum).
6. *Ensure secondary CTE and special education professionals are prepared to coordinate work-based learning experiences for students with disabilities.* Work-based learning is integral to secondary CTE program delivery and includes developing students' academic, technical, and employability skills in a workplace setting. Work-based learning provides students with career exploration through discovery of job settings, work styles, and natural availability of supports and improves post-school outcomes for students with disabilities (Cease-Cook, Fowler, & Test, 2015). To support CTE and special education professionals in coordinating work-based learning, special education and secondary CTE professionals should:
   a. Collaborate on professional development efforts focused on work-based learning (e.g., workshops, study groups, and curriculum development teams);
   b. Collaborate to develop work-based learning sites that accommodate students with disabilities;
   c. Work together to identify students' strengths, interests, and needs, including through sharing data to ensure successful work-based learning opportunities.
   d. Engage with VR transition professionals to support design and deliver of work-based learning experiences for students with disabilities.
   e. Work with students with disabilities and industry partners to prepare both parties for work-based learning experiences and to support them before, during, and after the work-based learning experience, including through reflection and evaluation. This can be done with support from special education, VR, and WIOA where appropriate.

Research Recommendations

Conducting high-quality research is an important step in moving the field toward a better understanding of what works for students with disabilities in secondary CTE.

Much of the recent literature regarding students with disabilities and secondary CTE is qualitative or correlational in nature. Very few experimental studies have been identified examining the effects of secondary CTE on student outcomes (Test, Fowler, et al., 2009). Dating back to 1980, Rowe et al. (2019) identified 32 correlational studies, 37 studies reporting descriptive data, and 16 qualitative studies that focus specifically on CTE or aspects of CTE and students with disabilities. Only eight used an experimental or quasi-experimental design. There is a need for more comprehensive analyses on secondary CTE for students with disabilities, particularly related to transition and postsecondary outcomes, to inform policymakers, educators, and other stakeholders, including parents and families, about the benefits of CTE for students with disabilities. This section includes three recommendations for research.

1. *Conduct collaborative research.* First, researchers in CTE and special education should collaborate to develop research studies that leverage expertise across both domains (Stone, Alfeld, Pearson, Lewis, & Jensen, 2007). Professional groups such as DCDT, ACTE, and the Association for Career and Technical Education Research can facilitate these collaborations. Second, state agencies for CTE and special education can collaborate to conduct data analysis or research studies using common indicators. To facilitate this, state agencies should develop memoranda of understanding for data sharing and ensure data analysts have time and resources to conduct more in-depth, collaborative analyses.
2. *Conduct high-quality experimental research.* There is a strong need for experimental studies to examine effects of secondary CTE on student outcomes. Experimental research will also help establish much needed CTE/special education evidence-based practices. There also continues to be a need to better understand the relationships between components of secondary CTE, such as work-based learning, and in-school and post-school outcomes of students with disabilities, as well as other contextual variables that influence access and persistence through secondary CTE for students with disabilities that will require rigorous methods of analysis. Researchers can conduct high-quality research (see Institute for Education Sciences, What Works Clearinghouse, 2017 Procedures and Standards Handbook Version 4.0) by:
    a. Using multiple rigorous designs that meet the current standards of practice for conducting high-quality research;
    b. Examining the effectiveness of secondary CTE overall, and components of CTE, by sub-groups of all disability categories; and
    c. Conducting longitudinal studies on the effects of secondary CTE on both in-school and post-school outcomes to identify practices that are effective for improving student outcomes over time.
3. *Publish findings of research in peer-reviewed journals.* Published literature is the primary source for identifying evidence-based practices in the field. Faculty in higher education should work with colleagues, graduate students, and others (i.e., business and industry, professional organizations, faculty at other institutions) to:
    a. Encourage publications regarding CTE and students with disabilities; and
    b. Pursue publication, regardless of the outcome of the study, to support the field in better understanding what works and what does not work in CTE for students with disabilities. For example, one outlet, the "Open Science" movement (Cook, Lloyd, Mellor, Nosek, & Therrien, 2018), should provide researchers with the opportunity to publish "pre-prints" that would be readily available to the general public, as well as report findings from high-quality studies with a variety of outcomes.

Conclusion

In this position paper, we outlined specific collaborative efforts and provided examples for special education secondary transition and CTE professionals involved in transition and workforce development for students with disabilities regarding policy, personnel preparation and professional, development, and research. Recommendations are offered jointly for members of professional organizations in special education and CTE. Ultimately, the purpose was to broadcast and amplify the critical need for better articulated policy, pro-active professional development and personnel preparation with intensive collaboration for CTE and special education professionals, and more rigorous research to identify effective practice to better meet the needs of students with disabilities in CTE.

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References

Advance CTE. (2017). *Career readiness & the Every Student Succeeds Act: Mapping career readiness in state ESSA plans*. Retrieved from https://cte.careertech.org/sites/default/files/files/resources/Mapping_Career_Readiness_ESSA_FULL_2017.pdf

Advance CTE. (2018). *Coordinating across Perkins V and the Workforce Innovation and Opportunity Act*. Retrieved from https://cte.careertech.org/sites/default/files/CoordinatingAcrossPerkinsV%26WIOA_102218.pdf

Brolin, D. E., & Loyd, R. J. (2004). *Career development and transition services* (4th ed.). Upper Saddle River, NJ: Pearson.

Carl D. Perkins Career and Technical Education Improvement Act, Pub. L. 109-270, 20 U.S.C. § 2301 *et seq*. (2006).

Carl D. Perkins Career and Technical Education Act of 2006 as Amended Through Pub. L 116-6, 20 U.S.C. (2019).

Casale-Giannola, D. (2012). Comparing inclusion in secondary vocational and academic classrooms: Strengths, needs, and recommendations. *American Secondary Education*, *40*, 26–42.

Cease-Cook, J., Fowler, C., & Test, D. W. (2015). Strategies for creating work-based learning experiences in schools for secondary students with disabilities. *TEACHING Exceptional Children*, *47*, 352–358. doi:10.1177/0040059915580033

Cook, B. G., Lloyd, J. W., Mellor, D., Nosek, B. A., & Therrien, W. L. (2018). Promoting Open Science to increase trustworthiness of evidence in special education. *Exceptional Children*, *85*, 104–118. doi:10.1177/0014402918793138

Cotton, S. E., Koch, K. R., Harvey, M. W., & McCallister, J. W. (2016). Revisiting classroom adaptation for special needs. *Academic Exchange Quarterly*, *20*(4), 12–19.

Cushing, E., Therriault, S., & English, D. (2017, November). *Developing a college and career readiness workforce: An analysis of ESSA, Perkins, and WIOA*. Washington, DC: American Institutes for Research. Available from www.air.org

Dieterich, C. A., & Smith, K. J. (2015). The impact of special education law on career and technical education. *American Secondary Education*, *43*, 60–72.

Dougherty, S. M., Grindal, T., & Hehir, T. (2018). The impact of career and technical education on students with disabilities. *Journal of Disability Policy Studies*, *29*, 108–118. doi:10.1177/1044207318771673

Dougherty, S. M., & Lombardi, A. R. (2016). From vocational education to career readiness: The ongoing work of linking education and the labor market. *Review of Research in Education*, *40*, 326–355. doi:10.3102/0091732X16678602

Education of the Handicapped Act Amendments of 1986, Pub. L. 99-457, 20 U.S.C. § 1472 *et seq*. (1986).

Every Student Succeeds Act, Pub. L 114-95, 20 U.S.C. § 6301 *et seq*. (2015).

Federal Register Part II Department of Education 34 CFR Parts 300 and 301. (2006). *Assistance to states for the education of children with disabilities and preschool grants for children with disabilities: Final rule*. Washington, DC: U.S. Government Publishing Office.

Gray, L., & Lewis, L. (2018). *Career and technical education programs in public school districts: 2016-17: First look* (NCES 2018-028). Washington, DC: National Center for Education Statistics, U.S. Department of Education.

Haber, G. D., & Sutherland, L. (2008). The four A's of managing the placement and service of students with disabilities in the CTE classroom. *Journal for Vocational Special Needs Education*, *31*(1-3), 4–8.

Harvey, M. W. (2002). Comparison of postsecondary transitional outcomes between students with and without disabilities by secondary vocational education participation: Findings from the National Education Longitudinal Study. *Career Development and Transition for Exceptional Individuals*, *25*, 99–122. doi:10.1177/088572880202500202

Harvey, M. W., & Kotamraju, P. (2017, December). *CTE, college and career readiness, and 21st century skills: The need for consistent follow-up data for researchers, policy makers, and practitioners*. ACTR annual conference (ACTE Research Division), *Nashville, TN*.

Harvey, M. W., Test, D. W., & Rowe, D. A. (2017, October). *Workforce development for 21st century jobs, STEM to STEAM*. DCDT 23rd international conference (CEC Division), *Milwaukee, WI*.

Harvey, M. W., & Trainor, A. (2019). *Participation of students with disabilities in secondary career and technical education: Findings from the Perkins Collaborative Resource Network*. Manuscript in preparation.

Hinz, S. E., Arbeit, C. A., & Bentz, A. (2017). *Characteristics and outcomes of undergraduates with disabilities: Web tables*. U.S. Department of Education. Retrieved from https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2018432

Imperatore, C., & Hyslop, A. (2017). CTE policy past, present, and future: Driving forces behind the evolution of federal priorities. *Peabody Journal of Education*, *92*, 275–289. doi:10.1080/0161956X.2017.1302221

Imperatore, C., & Hyslop, A. (2018). *2018 ACTE quality CTE program of study framework*. Alexandria, VA: Association for Career and Technical Education. Retrieved from https://www.acteonline.org/wp-content/uploads/2019/01/HighQualityCTEFramework2018.pdf

Individuals with Disabilities Education Act, Pub. L. 101-476, 20 U.S.C. § 1142 *et seq*. (1990).

Individuals with Disabilities Education Improvement Act, Pub. L. 108-446, 20 U.S.C. § 1400 *et seq*. (2004)

Institute for Education Sciences, What Works Clearinghouse. (2017, October). *Procedures and standards handbook version 4.0*. Retrieved from https://ies.ed.gov/ncee/wwc/Handbooks

Jeon, K. S., Kern, A. F., & Passmore, D. L. (2010, June). *Employment status: The relative impact of race, gender, high school curriculum, & special need classification among US youth*. University Park, PA: Institute for Research in Training and Development. Retrieved from http://ssrn.com/abstract=1628154

Ju, S., Roberts, E., & Zhang, D. (2013). Employer attitudes toward workers with disabilities: A review of research in the past decade. *Journal of Vocational Rehabilitation*, *38*, 113–123. doi:10.3233/JVR-130625

Kochhar-Bryant, C., & Greene, G. (2009). *What every teacher should know about transition and IDEA 2004*. Upper Saddle River, NJ: Pearson.

Lee, I. H., Rojewski, J. W., & Gregg, N. (2016). Causal effects of career-technical education on postsecondary work outcomes of individuals with high-incidence disabilities. *Exceptionality*, *24*, 79–92. doi:10.1080/09362835.2014.986608

Lipscomb, S., Haimson, J., Liu, A. Y., Burghardt, J., Johnson, D. R., & Thurlow, M. L. (2017). *Preparing for life after high school: The characteristics and experiences of youth in special education—Findings from the National Longitudinal Transition Study 2012. Vol. 1: Comparisons with other youth: Executive summary* (NCEE 2017-4017). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.

Lombardi, A. R., Dougherty, S. M., & Monahan, J. (2018). Students with intellectual disabilities and career and technical education opportunities: A systematic literature review. *Journal of Disability Policy Studies*, *29*, 82–96. doi:10.1177/1044207318764863

Lorger, T., Schmidt, M., & Vukman, K. B. (2015). Social acceptance of secondary school students with learning disabilities. *CEPS Journal*, *5*, 177–194.

Mazzotti, V. L., Rowe, D. A., Sinclair, J., Poppen, M., Woods, W. E., & Shearer, M. (2016). Predictors of post-school success: A systematic review of NLTS2 secondary analyses. *Career Development and Transition for Exceptional Individuals*, *39*, 196–215. doi:10.1177/2165143415588047

National Center for Special Education Research Institute of Education Sciences. (2017). *Technical working group on career technical education meeting summary*. Retrieved from https://ies.ed.gov/ncer/whatsnew/techworkinggroup/pdf/CTE_TWG.pdf

Nota, L., Santilli, S., Ginevra, M. C., & Soresi, S. (2014). Employer attitudes towards the work inclusion of people with disability. *Journal of Applied Research in Intellectual Disabilities*, *27*, 511–520.

Pennsylvania Code: Title 22 Education, Part XVI Standards, Chapter 339. *Vocational Education*.

Peterson, L. Y., Burden, J. P., Sedaghat, J. M., Gothberg, J. E., Kohler, P. D., & Coyle, J. L. (2013). Triangulated IEP transition goals: Developing relevant and genuine annual goals. *Teaching Exceptional Children*, *45*(6), 46–57.

Povenmire-Kirk, T., Diegelmann, K., Crump, K., Schnorr, C., Test, D. W., Flowers, C., & Aspel, N. (2015). Implementing CIRCLES: A new model for interagency collaboration in transition planning. *Journal of Vocational Rehabilitation*, *42*, 51–65. doi:10.3233/JVR-140723

Rowe, D. A., Mazzotti, V. L., Test, D. W., Fowler, C. H., Clark, K., & Gushanas, C. (2019). *Evidence-based practices in secondary transition: An update to the research base*. Manuscript in preparation.

Schmalzried, J. E., & Harvey, M. W. (2014). Perceptions of special education and career and technical education collaboration and communication. *Career Development and Transition for Exceptional Individuals*, *37*, 84–96. doi:10.1177/2165143412467666

Sprunger, N. S., Harvey, M. W., & Quick, M. M. (2018). Special education transition predictors for post-school success: Findings from the field. *Preventing School Failure*, *62*, 116–128. doi:10.1080/1045988X.2017.1393789

Strengthening Career and Technical Education for the 21st Century Act (Perkins V), Pub. L. 115-224 (2018). Retrieved from http://www.congress.gov/bill/115th-congress/house-bill/2353

Stone, J. R., III., Alfeld, C., Pearson, D., Lewis, M., & Jensen, S. (2007). *Rigor and relevance: A model of enhanced math learning in career and technical education*. St. Paul: National Research Center for Career and Technical Education, University of Minnesota.

Test, D. W., Fowler, C. H., Richter, S. M., White, J., Mazzotti, V., Walker, A. R., . . . Kortering, L. (2009). Evidence-based practices in secondary transition. *Career Development and Transition for Exceptional Individuals*, *32*, 115–128.

Test, D. W., Mazzotti, V. L., Mustian, A. L., Fowler, C. H., Kortering, L. J., & Kohler, P. H. (2009). Evidence-based secondary transition predictors for improving post-school outcomes for students with disabilities. *Career Development and Transition for Exceptional Individuals*, *32*, 160–181.

Theobald, T., Goldhaber, D., Gratz, T., & Holden, K. L. (2017). *Career and technical education, inclusion, and postsecondary outcomes for students with disabilities* (CEDR working paper 2017). Seattle: University of Washington. Retrieved from https://caldercenter.org/publications/career-and-technical-education-inclusion-and-postsecondary-outcomes-students

Tomasello, J., & Brand, B. (2018, January). *How ESSA and IDEA can support college and career readiness for students with disabilities: Considerations for states*. Washington, DC: American Institutes for Research. Retrieved from https://ccrscenter.org/sites/default/files/ESSA-IDEA_CollegeCareerReadiness.pdf

U.S. Bureau of Labor Statistics. (2018). *Persons with a disability: Labor force characteristics summary*. Retrieved from https://www.bls.gov/news.release/disabl.nr0.htm

U.S. Department of Education. (2009). *Race to the top* (Education Recovery Act as part of the American Recovery and Reinvestment Act of 2009), Pub. L. No. 111-5, Stat. 115 (2009).

U.S. Department of Education. (2015). *Every Student Succeeds Act* (Reauthorization of Elementary and Secondary Education Act of 1965), Pub. L. No. 114-95, S. 1177 (2015).

U.S. Office of Education. (1965). *The Vocational Education Act of 1963: A summary of part A of public law 88-210*. Washington, DC: U.S. Department of Health, Education, and Welfare, Office of Education.

Workforce Innovation and Opportunity Act, Pub. L 113-128, 29 U.S.C. § 3101, *et. seq*. (2014).