*Career and Technical Education Research*



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# Editor's Note

**James P. Greenan**
*Purdue University*

Volume 33, Issue 3 is the final Issue for which I will serve as Editor of *Career and Technical Education Research*. It is fitting that a "Special Issue" of the Journal has been produced that represents a new beginning for the field of Career and Technical Education (CTE). The theme of the Special Issue is "Programs of Study," a new requirement in the Perkins Career and Technical Education Improvement Act of 2006. This provision in Perkins IV has created much attention at the national, state, and local levels. Accordingly, programs of research have emerged, state departments of education have developed and implemented policies, and local schools have begun to develop, implement, and evaluate a variety of programs of study and career majors and academies.

The Special Issue focuses on significant national and state level topics. The topics are fundamental for successful planning and implementation of policies and practices pertaining to programs of study. The articles communicate theory and research that has been conducted in states across the nation. The Special Issue includes programmatic research studies conducted by staff at the National Research Center for Career & Technical Education (NRCCTE). In the "Foreword," Dr. James R. Stone III, Director of the NRCCTE, provides insight into the Special Issue with respect to the history and background leading to the current programs of study initiative, introductions of the authors and articles, and discussion of the issues surrounding the topics that the authors have addressed. This Special Issue can assist policymakers, researchers, teacher educators, administrators, practitioners, and other personnel to enhance theory and improve practice related to programs of study in CTE. I wish to thank the authors and Dr. Stone for their contributions to this Special Issue. Additionally, I wish to express my appreciation to the individuals who participated in the review process. Their dedication, professionalism, and excellent work well-represent our colleagues in the Association for Career and Technical Education Research.

I express my appreciation to the Editorial Board members and reviewers for their outstanding dedication, professionalism, and excellent work in the editorial review process of Volume 33. Thank you for your generous contributions of time and expertise, and expeditious and conscientious reviews. I look forward to working with you in future professional endeavors.

There are so many people that I want to thank personally for their support for and contributions to the Journal, and I will, as we meet. However, I must express my special thanks to Dr. James D. Lehman, Head, Department of Curriculum &

Instruction and Dr. Jeffrey W. Gilger, Associate Dean for Discovery & Faculty Development in the College of Education at Purdue University-West Lafayette. They provided strong support for the *CTER* Journal and to me in my role as Editor. Finally, I express my utmost thanks and appreciation to Lisa Neuenschwander who served as Assistant to the Editor during my tenure as Editor. Her dedication, conscientious approach to tasks, commitment to excellence, and attention to details contributed to making Volumes 32 and 33 a success. Please join me in expressing thanks and appreciation for Lisa's contributions to *CTER.*

In closing, it has been truly an honor to serve as Editor of the *CTER* Journal. In Volume 32, Issue 1, I mentioned several colleagues who had a profound impact on my professional development in CTE and research. We also have a duty and responsibility to connect the field's prosperous past to a promising future. I have come to know many new colleagues in the past two years, and there is no doubt, the future of CTE and CTE research is very promising. The new and emerging talent and enthusiasm will lead us into the future. I look forward to continuing the journey with you in advancing CTE and CTE research.



JPG

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# Foreword

The 2006 reauthorization of federal legislation for career and technical education included a requirement that each recipient of funds authorized by this Act must offer at least one program of study (POS). A POS must be designed to link secondary and postsecondary instruction within defined occupational areas, include rigorous academic and technical content that is aligned with challenging academic standards, and lead to the attainment of an industry-recognized credential or an associate or bachelor's degree. This may appear to be a major expansion of the traditional role of career and technical education (CTE), but it actually represents Congressional endorsement of changes that have been occurring in the field for more than 25 years.

I want to thank Dr. Greenan and the Editorial Board of *Career and Technical Education Research* for this special edition of the Journal and the invitation to introduce it. The articles in this edition are based on a publication of the National Research Center for Career and Technical Education, University of Louisville and an independent study of POS in Oklahoma. That Center publication represented the literature review underlying three longitudinal studies examining programs of study that were started at the National Center in 2008. These studies are described in more detail at www.nrccte.org. This issue provides an opportunity to make the findings of that review more available to researchers interested in high school occupational preparation and the transition to postsecondary education and employment.

The emergence of the global economy and the rapid pace of technological innovations during the past quarter century have produced a need for workers who have the skills and flexibility to continually learn and adapt to changing demands. In 1983, the National Commission on Excellence in Education issued *A Nation at Risk* that claimed American schools were not producing students who had the skills needed to compete in this new economy. Regardless of the validity of that claim, it was widely accepted, and from 1983 to today, educators have been pressured to improve the performance of American students.

Tech Prep, career clusters/pathways, and youth apprenticeships were three of the major initiatives within CTE that attempted to respond to these new demands. Each had all the basic components required of POS, with the possible exception of alignment with challenging academic standards. And a shortfall in academics appears to have been their major weakness. In the paper, *Effectiveness of Previous Initiatives Similar to Programs of Study: Tech Prep, Career Pathways, and Youth Apprenticeships*, Morgan Lewis examines the evidence on whether these initiatives achieved their goals. He concludes that, overall, they did not. The best evidence that is available indicates that relatively few of the participants in these programs attained postsecondary credentials or degrees. The major barrier appears to be academic deficiencies that required students who had completed the high school portion to take

developmental courses at the postsecondary level before taking the technical courses that they really wanted to study. Lewis recommends that if programs of study are to achieve their goal, they must place an explicit emphasis on using occupational context to strengthen the academic skills of their students.

Dual and concurrent enrollments that enable high school students to earn college credits also expanded greatly during the past 25 years. Limited initially to high achieving students, these courses became available to more students as a way of increasing both the efficiency and effectiveness of high school education. Taking college-level courses increases the rigor of the high school experience for participants, and the credits earned should reduce the time and cost of postsecondary education. In recent years, the Early College High School Initiative, targeting students who are traditionally unrepresented in postsecondary education, has received extensive support from several foundations. *Dual and Concurrent Enrollment and Transition to Postsecondary Education*, by Morgan Lewis and Laura Overman, reviews the research on CTE students who took dual/concurrent enrollment courses and the effects of these courses on postsecondary experiences. On some outcome measures (initial enrollment, persistence, grade point average) dual enrollment was related to statistically significant, but modest, benefits. On total credits earned, dual enrollment was associated with more meaningful differences, the equivalent of about one semester's total credits, when compared to similar non-dual enrollment students. The difficulty in interpreting these results is the self-selection of students into dual enrollment courses. The research that was reviewed statistically controlled for many of the variables associated with postsecondary enrollment and performance, but there may be other unmeasured influences, such as parental support and encouragement, that also affect the outcomes.

McCharen used archived data on healthcare students in Oklahoma secondary technology centers to explore programs that include many of the elements of programs of study and the extent to which students in these health care programs matriculated to related college programs or obtained related employment. The findings suggest, at best, a modest relationship.

The author concludes that the connection between health career programs at technology centers and colleges may not be well-defined for students and that the current framework for connecting high school students to related postsecondary studies or employment is not adequate for meeting the legislative intent of Perkins IV. The author recommends further research to identify or create models for implementing an effective program of study.

The fourth article in this issue, *State Plans for Implementing Programs of Study*, summarizes the methods states will use to support the implementation of programs of study. This summary is based on a review of the plans that states submitted to the Office of Vocational and Adult Education (OVAE) to qualify for the funds made available by the 2006 Perkins reauthorization. All states plan to provide professional development and technical assistance and to approve local plans. In two-

thirds of the states, local districts will develop their programs of study using criteria and templates provided by the state. In most of the remaining states, the state office responsible for CTE will develop model programs for adoption at the local level. Three-quarters of the states plan to organize their programs of study using the 16 career clusters adopted by OVAE. Virtually all the states plan to use channels they have in place, such as student handbooks, course catalogs, newsletters, and Web sites, to inform students and parents about programs of study.

The final article in this issue, *Growth and Exploration: Career Development Theory and Programs of Study*, by Natalie Kosine looks at programs of study through a career development lens. Virtually all high school students are in the exploratory stage of their careers. During this stage, they are attempting to find a match between their abilities and interests and the demands of occupations. Enrollment in CTE courses is for many, perhaps most, students less a commitment to particular occupational areas than it is an opportunity to determine how well these areas match their expectations and aspirations. Given the realities of career development, it is not likely that large proportions of students will obtain postsecondary certificates or degrees in the occupational areas of the programs of study they entered in high school.

In addition to my appreciation to the Editor and Editorial Board of *Career Technical Education Research* for this special issue, on behalf of the authors, I want to thank the individuals who conducted the anonymous peer reviews. Their careful reviews contributed significantly to improving the focus and clarity of the articles.

James R. Stone III
Director, National Research Center for Career & Technical Education
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# Effectiveness of Previous Initiatives Similar to Programs of Study: Tech Prep, Career Pathways, and Youth Apprenticeships

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## Abstract

*The federal career and technical legislation reauthorized in 2006 required the recipients of its funding to offer at least one Program of Study (POS). All states have developed some components of POS through earlier initiatives, primarily Tech Prep, career pathways, and youth apprenticeship, that attempted to ease the transition of students from high school to careers. Evidence on the effectiveness of these initiatives implies that they had minimal impact upon postsecondary educational outcomes. The academic instruction provided by POS must be better than those in prior initiatives if POS are to produce meaningful impacts on the postsecondary outcomes of career and technical education students.*

## Introduction

The 2006 reauthorization of federal legislation for career and technical education (P.L. 109-270) is the fourth version carrying the name of Carl D. Perkins (Perkins IV). This legislation requires the eligible recipients of its funds, both secondary and postsecondary, to offer at least one Program of Study (POS), which must include coherent and rigorous content aligned with challenging academic standards and relevant career and technical content. This content must be delivered in a coordinated, nonduplicative progression of courses that aligns secondary education with postsecondary education and leads to an industry-recognized credential or certificate at the postsecondary level or an associate or baccalaureate degree. In addition, programs may include opportunities for secondary students to participate in dual or concurrent enrollment programs or other ways to acquire postsecondary education credits. (P.L. 109-270. Sec. 122[c][1]).

Prior to Perkins IV, all states had developed these components to some degree through earlier initiatives that attempted to ease the transition of students from high school to careers. There were many attempts in the last quarter of the 20th century to forge stronger links between secondary and postsecondary education and between education and work. Career education in the 1970s (Herr, 1976) and school-to-work in the 1990s (Hughes, Bailey, & Mechur, 2001) were two major federal initiatives. Both attempted to improve education by emphasizing the relevance and utility of the knowledge and skills studied in school to students' future careers. Neither had the impact on academic education that their proponents had hoped (Kazis & Pennington,

1999; Marland, 1971), but these initiatives helped to create the context from which three approaches eventually emerged: Tech Prep, career clusters/career pathways, and youth apprenticeships.

Two decades before federal law required POS Parnell (1985) proposed Tech Prep, articulated programs designed to teach technical skills through a combination of the final two years of high school with the first two years of postsecondary education. In the 1990s, career pathways emerged. These are templates for the integration of academic and technical content and the articulation of secondary and postsecondary instruction within specific career clusters. Youth apprenticeships, similar to Germany's dual system of combining employment and related academic instruction, also received considerable attention. This article examines the best available evidence on the effectiveness of these precursors of POS on improving academic performance and linking secondary and postsecondary instruction. This evidence provides a perspective from which to anticipate the effect POS are likely to have upon these outcomes.

## Tech Prep

A Tech Prep program that satisfies the criteria set forth in federal legislation is a POS. The foundation of a Tech Prep program is an articulation agreement between one or more high schools with one or more postsecondary institutions. The agreement sets forth the instruction that will be delivered at the secondary and postsecondary levels and the criteria that students must satisfy to receive postsecondary credit for the skills and knowledge acquired in high school. This concept was endorsed in the 1990 reauthorization of federal vocational education legislation (Perkins II, P.L. 101-392), which authorized specific funds to support Tech Prep. This authorization was continued in Perkins III and IV, but under Perkins IV, states have the option of combining Tech Prep funds with their basic state grants. As with Tech Prep, Perkins IV gives states and local districts wide latitude on how they plan to implement POS. For Tech Prep, this flexibility has been both a strength and weakness. It allowed states and regional consortia to design programs judged to be responsive to particular circumstances, but the variability in the programs that emerged has made it difficult to isolate what is unique about Tech Prep much less the impact of participating in these programs.

## Evidence on Effectiveness

Stone and Aliaga (2003) analyzed data from the National Longitudinal Survey of Youth 1997 to determine the effects of Tech Prep on the academic achievement of young people who were in grades 9 through 12 during the period from 1997 to 1999. These data are based on a nationally representative sample, but rely on students' self-reports of both the kinds of courses taken and grade point averages (GPAs).

Regression analyses found no significant relationship between Tech Prep participation and GPA; however, participation in career pathways had a slight but statistically significant net, independent effect. There was no attempt to examine why career pathways, but not Tech Prep, had an association with GPA.

Bragg et al. (2002) at the University of Illinois made a sustained effort to assess the effects of participating in Tech Prep. Their study was longitudinal and followed students in eight selected consortia from high school to college and into employment between January 1998 and December 2001. With the help of a national panel of experts, they initially identified six consortia in the country as "mature" implementers of Tech Prep. These consortia were located in urban, suburban, and rural areas and demonstrated a strong commitment to Tech Prep as a primary vehicle of educational change that, in the judgment of state personnel and panel members, reflected preferred policies and practices. Later, two more designated consortia were added to strengthen the design.

To study the effects of participating in these consortia, Bragg et al. (2002) selected a total of approximately 4,600 students for follow-up, with roughly equivalent numbers of Tech Prep and nonparticipants in each group. A systematic random sampling procedure was employed to ensure that the characteristics of the students in each group were similar. It should be noted that the random selection occurred among students who were identified as Tech Prep or not. The students were not randomly assigned to the two groups. Tech Prep participants did not differ substantially from the comparison group on GPA, but family income and parental education were somewhat lower among Tech Prep participants. Four of the consortia also had significantly more males than females enrolled in their Tech Prep programs. Tech Prep participants had many of the characteristics that placed them at higher risk of not completing college-level courses, including first-generation college enrollment and part-time enrollment combined with part-time or full-time work (Tinto, 1996).

In six of the eight consortia, 85% or more of the Tech Prep participants continued their education at two-year colleges. However, in only two, East Central Illinois and Miami Valley, were their rates significantly higher than those of nonparticipants. The difference between the groups in Miami Valley was a striking 45 percentage points and at East Central Illinois a more modest 11 percentage points.

While many students, both Tech Prep and nonparticipants, enrolled in college-level classes, few earned sufficient credits to obtain a certificate or degree. Most were required to take developmental, noncredit courses. Bragg et al. (2002) found across consortia that 40% to 80% of the Tech Prep participants took some college-level coursework, with a slightly wider range (nearly 30% to 76%) among nonparticipants. Transcript data were obtained from the lead two-year colleges of the eight consortia, the colleges that awarded credit for courses completed in high school. These data showed that the median percentage of students earning some degree (associate of arts, AA; associate of science, AS; or associate of applied science, AAS) or certificates within three to four years after high school graduation

was only 10.5%. The range of completers reported by the consortia was 8.5% to 19.0%. These results were consistent across sites for both study groups. Even in Miami Valley, where all but one of the Tech Prep participants had attended a two-year college, slightly less than one in five (19%) had obtained a certificate within three to four years after leaving high school.

A major congressionally mandated evaluation of Tech Prep (Hershey, Silverberg, Owens, & Hulsey, 1998) had a formative rather than summative focus and included case studies of the 10 consortia selected because of the reputed quality of their programs. These case studies included interviews with 486 former Tech Prep students conducted approximately 18 months after they should have graduated from high school. This follow-up, however, did not include similar non-Tech Prep participants against whom the outcomes of the participants could be compared. Enrollment in postsecondary education or other types of formal occupational preparation from these 10 consortia was 61%, but only 15% reported that their programs awarded credits for the articulated courses they had taken in high school. Over one-third (37%) of those attending community colleges had not started programs leading to degrees, but instead were taking developmental and general education courses.

In summary, the results reviewed indicated that participation in Tech Prep does not have a significant relationship with improved academic performance or less need for remediation at the postsecondary level. Bragg et al. (2002) and Hershey et al. (1998) studied consortia that were judged to be following all the practices recommended for good Tech Prep. If these consortia were among the best and the programs they offered were similar to the POS that will be offered under Perkins IV, how likely is it that high percentages of POS participants will obtain postsecondary degrees or industry-recognized certifications in the occupational areas they study in high school?

## Career Pathways

At the same time Tech Prep consortia were being developed, other initiatives to align high school preparation more closely with the needs of the labor force were also being designed and implemented. One of these initiatives was career clusters/pathways. The link between Tech Prep and career pathways was highlighted by Dan Hull, the former chief executive officer of CORD[1] and one of the foremost advocates for Tech Prep. Under his leadership, CORD created the National Tech Prep Network to provide resources, professional development, and technical assistance to those establishing and leading consortia. In 2004, he responded to the

[1] Before it changed its name to its acronym, CORD was the Center for Occupational Research and Development. It was founded in 1979 to provide contractual services for educational improvement focused on careers.

growing interest in career pathways by publishing *Career Pathways: The Next Generation of Tech Prep.* In this publication, he challenged Tech Prep leaders "to become the change agents needed to convert traditional CTE programs to Career Pathways" (Hull, 2004, p. 3). The National Tech Prep Network accepted this challenge and in 2007 changed its name to the National Career Pathways Network.

The traditional organization of occupational instruction at the secondary level was created by federal legislation. In 1917, the Smith-Hughes Act limited the kinds of occupations eligible for federal funding to those in agriculture, trade and industry, and home economics, which evolved into family and consumer science. Later legislation expanded these categories to include distributive/marketing, health, and business occupations. For most of the 20th century, secondary vocational education was delivered within this structure and aimed primarily at teaching skills needed for entry into occupations. In the last two decades of the century, however, changes in the skills needed for success in the labor market caused increased emphasis on academics and preparing students to continue their occupational preparation at the postsecondary level. This emphasis led to efforts to more closely align academic and technical instruction and secondary and postsecondary education. Career clusters and career pathways emerged from these efforts. Career clusters organize related occupations by the types of products and services they provide, such as manufacturing, health services, and architecture and construction. Career pathways provide guidance as to the knowledge and skills, both academic and technical, that must be acquired to prepare for occupations at varying levels within these clusters.

Career clusters have evolved into the primary way of organizing secondary occupational instruction. Ruffing (2006) has summarized the somewhat difficult journey that led to their emergence as the accepted method of classification. This acceptance became official federal policy in 1999 when the Office of Vocational and Adult Education (OVAE), U.S. Department of Education adopted 16 clusters for use in funding and reporting CTE programs. The Web site of the States' Career Cluster Initiative (www.careerclusters.org/) provides information about the clusters and the pathways associated with each.

In the summer of 2007, the National Association of State Directors of Career Technical Education Consortium (NASDCTEc, 2007) surveyed its members on the implementation of career clusters and POS. Questionnaires were returned by 47 states, the District of Columbia, Puerto Rico, and Guam. Of these 50 respondents, 26 or more provided programs within 15 of the 16 career clusters adopted by the U.S. Department of Education, and 36 or more provided programs in the most popular 7 clusters. Many states reported working to ensure that the pathways being offered within these clusters satisfied the criteria for POS set forth in Perkins IV.

The College and Career Transitions Initiative (CCTI), a federally funded project administered by the League for Innovation in the Community College, works with community colleges to encourage career pathways within career clusters. The CCTI began in 2002 by inviting community colleges to submit proposals describing

how they would develop partnerships with high schools and employers to design and implement career pathways. The definition of career pathway adopted by CCTI was developed in cooperation with the National Clearinghouse for Career Pathways at CORD and other interested parties:

> A Career Pathway is a coherent, articulated sequence of rigorous academic and career courses, commencing in the ninth grade and leading to an associate's degree, an industry-recognized certificate or licensure, and/or a baccalaureate degree and beyond. A Career Pathway is developed, implemented, and maintained in partnership among secondary and postsecondary education, business, and employers. Career Pathways are available to all students, including adult learners, and are designed to lead to rewarding careers.[2]

From among the community colleges that responded to its request for proposals, CCTI initially selected 15 to receive funding to create pathways that would serve as models for other institutions. The initial experiences in developing partnerships and enrolling students in the 15 original colleges were sufficiently positive for CCTI to open its network to any community college in North America that wanted to adopt its goals and draw upon its resources. When the CCTI Web site was accessed on March 9, 2009, it listed 174 colleges in the United States and Canada as members.

At the 2008 meeting of colleges in the CCTI network, Warford, Beauman, and Kindell (2008)[3] presented data on the experiences of the original 15 community colleges. In 2004, the 40 high schools that had joined in partnerships with the 15 colleges enrolled 2,853 students in 15 different pathways based on 5 separate career clusters. By 2007, the number of high schools had doubled, the number of students had increased to 22,178, and they were following 176 pathways based on the 16 OVAE clusters. Each of these pathways had been jointly developed by the lead colleges and their cooperating high schools.

The original 15 CCTI colleges have provided yearly outcome data on 1,124 students who participated in pathways, graduated from high school in 2004 through 2007, and enrolled in the colleges cooperating with their high schools in the fall of their graduation years. These data do not include graduates who went on to other community or four-year colleges, or those who did not enroll in the fall following their graduation. Warford et al. (2008) reported the national average for enrollment in community colleges directly from high school at 14% compared to a CCTI average

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[2] The definition was retrieved on May 1, 2008 from http://www.league.org/league/ projects/ ccti /cp/characteristics.html. It is also published in Hull (2004, p. 6).

[3] The project director, Laurance Warford, kindly provided the 2008 CCTI Final Report (Warford, 2008) and a draft copy of the Year-4 quantitative report (Clery & Brooks, 2008). The outcomes summarized are based on these sources as well as the PowerPoint presentation

of 27%. This CCTI percentage, it should be noted, is based on graduates who enrolled in the same pathways they had studied in high school and in the community colleges that were the postsecondary partners in those pathways. The national figure cited by Warford et al. is for *any* community college enrollment and is derived from a longitudinal study that started in 1988. More recent data from the Educational Longitudinal Study of 2002 (Bozick & Lauff, 2007) indicated that the enrollment rate during the two-year period following high school is 27%. By limiting the data in the Bozick and Lauff report to public, two-year colleges, the enrollment rate estimated directly from high school is 23%. The national re-enrollment rate cited by Warford et al. is 54% and for CCTI participants 53%. Warford et al. reported remediation rates of 40% for mathematics and 27% for both English and reading for students following CCTI pathways into the original 15 community colleges. They also cited sources documenting that nationally about two-thirds of students entering community colleges require remediation in these subjects. These differences imply that the CCTI stress on rigorous academics and career courses, either through self-selection into the pathways or actual program effects, is associated with reduced need for remediation at the postsecondary level.

The Workforce Strategy Center (WSC) is another advocate of career pathways, but it defines them within a context of regional economic development. The WSC and CCTI definitions do not differ in goals, but do differ in emphases. The WSC definition stresses alignment of all systems and programs involved in workforce development within identifiable labor markets (Jenkins & Spence, 2006; Mazzeo, Roberts, Spence, & Strawn 2006). The CCTI definition focuses primarily on aligning academic and career courses and articulating secondary and postsecondary instruction (Hughes & Mechur Karp, 2006).

## Evidence on Effectiveness

Some outcome indicators are presented for CCTI, but there was difficulty finding additional evidence of the impact of career pathways, however defined and implemented, on achievement and transition. An ERIC search using the keywords "career pathways" for documents published in 1990 or later yielded 356 hits, but only a handful presented any evidence on the outcomes of career pathways.[4] Four that reported some data were conducted by the National Research Center for Career and Technical Education (NRCCTE). Each of these is discussed and then two others are summarized.

In the discussion of Tech Prep, it was noted that Stone and Aliaga (2003) analyzed data from students who had participated in different types of CTE programs. Regression analyses did not find Tech Prep participation to be related to high school GPA, but career pathways (also referred to as "career majors" in the

[4] The search was conducted on April 24, 2008 at http://www.eric.ed.gov/.

questionnaires) were. Students' reports of enrollment in career pathways/majors had a significant positive relationship with final, 12th-grade GPAs, and this relationship remained significant when measures of student characteristics, including their 8th-grade GPAs, were added to the equation. In the full equation, career pathways had a beta weight (the relationship with GPA holding other variables in the equation constant) of .079 compared to a beta of .401 for 8th-grade GPA. This equation explained 28 percent of the variability in final GPA, and the beta for pathways had approximately the same independent relationship with this outcome as gender, ethnicity, and household income.

Castellano et al. (2007) studied three selected high schools that were engaged in comprehensive school reform based on one of three models: career academies, High Schools That Work, or career pathways. All students at the third high school followed career pathways, and many whose pathways included CTE courses took these courses at a regional center that served several districts. The experiences of these students were compared to those of students in a similar comprehensive high school that had not adopted career pathways. Many students at the comparison school studying CTE courses took the courses at a different skill center than the pathway students. Comparisons of the students in the high schools implementing career-based reforms to their counterparts in similar high schools without such reforms did not control for unmeasured differences among the students. Such comparisons, however, did control for self-selection since all students in the intervention schools received the same treatment.

The career pathways model did not have higher graduation rates, but pathway graduates scored higher than their non-pathway counterparts on many measures of transition to postsecondary education. Logit regressions indicated that pathway students were about twice (1.85 times) as likely to have post-high school plans than non-pathway students, and equal numbers were accepted to four-year universities. Pathway graduates who attended the main community college serving their areas outperformed their comparison group counterparts. For each academic subject, fewer pathway students were required to take remedial courses; however, 65% still needed remediation in comparison to 85% of the non-pathway students. At the end of one year of college, pathway students had earned 28.2 credits and their counterparts 21.4, a difference significant at the .05 probability level.

A study by Lekes et al. (2007) reversed the sample selection from the secondary to the postsecondary level. This study chose one community college that had been identified by the National Dissemination Center for Career and Technical Education as having exemplary transitional programs, and a second community college that had received a *Star of Education* award from the NASDCTEc. At the first college, two health career pathways (Emergency Medical Technician and Patient Care Assistant) were examined, and at the second, the focus was on pathways for Information Technology/Computer Information Science (IT/CIS). For the secondary

component of the study, students following these pathways were matched with similar nonparticipants from their same schools. The high schools that were studied had been selected so that they varied in the degree to which they were engaged in career pathways. The postsecondary component relied primarily on analysis of transcript data from the second community college.

Like the Bragg et al. (2002) Tech Prep study, Lekes et al. (2007) studied transition initiatives that were recognized as among the best available. Their findings paralleled Bragg et al. in that few differences were found between students who had participated in pathways and those in comparison groups who had not. Pathway students were more likely than nonparticipants to have experienced the components recommended for pathways, such as contextualized learning, mentoring, and work-based learning. In most comparisons, however, these experiences were not associated with differences between pathway and non-pathway students in outcomes such as graduation, GPA, or postsecondary enrollment. Pathway students did have an advantage in postsecondary credits earned, in part, because of the dual credit courses they had taken in high school. This advantage appears to have increased their chances of earning a certificate or degree: 21.3% in the IT/CIS pathway earned a credential compared to 17.2% for the non-pathway students.

The third study conducted by the NRCCTE addressed career pathways that implemented the Workforce Strategy Center (WSC) model of attempting to coordinate all major components of workforce development. This model has been applied primarily with adult learners, and one of the three programs that were studied is described to show how the WSC emphasis differs from the traditional high school-postsecondary transition. Bragg et al. (2007) studied pathways at three sites that involved adult literacy, adult basic education (ABE), General Educational Development (GED), English language literacy (ELL), pre-collegiate developmental education, postsecondary career and technical education (CTE) certificate and associate degree programs, and potentially, baccalaureate degrees. As implied by this wide range of learning opportunities, these pathways were designed to serve low skilled adults.

Drawing on guidance from an advisory panel, a literature review, and telephone interviews with state and local educational administrators, the researchers, in collaboration with personnel from OVAE, selected the following three pathway programs for case studies: Carreras en Salud–Instituto del Progreso Latino (IPL), Chicago, Illinois; General Service Technician (GST)–Shoreline Community College, Shoreline, Washington; and Career Pathways Initiative (CPI)–Ouachita Technical College, Ouachita, Arkansas. Carreras en Salud–Instituto del Progreso Latino (English translation: Careers in Health–Institute for Latino Progress) is described to give a sense of the scope of these pathways.

Carreras-IPL is a fairly new program, starting in April 2005, in response to the need for bilingual health care workers in the Chicago area. Almost all of its participants are low skilled women with limited English proficiency. The program is

administered by IPL, an established Community-Based Organization (CBO) that has served the Latino population since 1977. Among the partners that IPL has involved are employers, another CBO, community colleges, a vocational education center, industry associations, chambers of commerce, religious organizations, labor organizations, and the local Spanish-language media. Employers are represented by the Metropolitan Chicago Healthcare Council, which consists of over 300 hospital and nursing home members. Through this council, IPL obtains assistance in the development of curriculum, identification and recruitment of instructors, and sites for practicum and job placement.

The IPL recruits participants through public service announcements on Spanish-language television and radio stations, presentations in churches, and contact with entry-level workers already in health care who are blocked from advancement because of limited English and academic skills. The participants start their pathway at the point appropriate for their skills as measured by the Test of Adult Basic Education. Regardless of the level at which they start, all receive English language and academic skill instruction in a health context, provided by bilingual instructors. As they progress, participants take courses to prepare them for the examination required to become a Certified Nursing Assistant as well as for the GED and COMPASS, the placement test used by the Chicago community college system. Options are available for students who have difficulty passing the GED or COMPASS, including courses in phlebotomy and electrocardiogram that can lead to employment as a Patient Care Technician.

Students who obtain the GED and improve their English skills sufficiently to pass the COMPASS exam begin taking the courses necessary to enter the Licensed Practical Nurse (LPN) program at the community college. The college holds 20 slots in every entering class for Carreras-IPL participants, but at the time of the site visit, this number was insufficient. There were 50 participants who were qualified to enter the LPN program for which no openings were available. Those who complete the LPN training can transfer as second-year students into a two-year program that prepares them for certification as Registered Nurses.

The Carreras-IPL pathway was visited in August 2007, 28 months after it started. Due to the varying starting and ending (or pausing) points of students, it has proved difficult to produce unambiguous indicators of progress. Administrators reported that of the initial starting groups, over 70% had attained appropriate milestones, passed licensure exams at varying levels, and were employed. Retention of current students was reported at 94%. Program administrators recognized the need for more comprehensive outcome data and are seeking funding and expertise to conduct systematic follow-up protocols with former participants. The two other sites that were studied target different populations, but each attempts to provide learning opportunities that enable low skilled adults to enter and progress on pathways that lead to employment in jobs paying wages sufficient to sustain a family. Although the

WSC publications discuss how features of pathways could be implemented in elementary and secondary education, the approach has been applied primarily in adult training and retraining.

In the review, only two other published reports on career pathways were identified that included any information on outcomes. Rudy and Rudy (2001) compared the academic performance of students in Berrien County, Michigan prior to and after pathways in six broad career areas were implemented for all students. Over a five-year period, they found improvement on high school attendance rates, mean high school GPA, scores on statewide testing, enrollment in dual-credit courses, and the percentage of graduates enrolling in postsecondary education. These were all countywide indicators and no data were available from a comparison group for the same period.

The other report was from the Austin (Texas) Independent School District (Oswald, 2002), which offered 29 career pathways in 8 career clusters. This report classified students who took any CTE, about 60% of all high school students in the district, into three groups: *Elective*, those who took an incidental CTE course; *Coherent*, those who took a sequence of CTE courses focused on developing occupational skills and knowledge within a given career pathway; and *Tech Prep*, those who satisfied the coherent definition given above in pathways that include state-approved articulation agreement (college credit) courses.

Comparisons were made across these three groups and with high school students who took no CTE courses. The comparisons were less precise than desired because of difficulties in classifying CTE students. The plans and courses students take change as they progress through high school and it may not be possible to classify them until they have completed all their courses. The comparisons that were possible yielded a mixed pattern. With regard to attendance, non-CTE had a rate of 87%, virtually the same as the Electives. Those classified as Coherent had the lowest attendance rates (83%) while those classified as Tech Prep had the highest (89%). Students in all three CTE groups were more likely to pass statewide tests (Elective 74%, Coherent 76%, Tech Prep 87%) than those without any CTE courses (69%). Those in the Coherent group took the test an average of 1.59 times in order to pass all sections compared to an average of 1.35 times in the other groups. Students taking CTE courses were more likely than non-CTE students to earn adequate credits to progress to the next grade level. In the 9th grade, however, students classified as Coherent were the least likely of the four groups to earn enough credits to be promoted to the 10th grade. The fact that 9th grade students had earned enough CTE credits to be classified as Coherent implied that many were repeating that grade.

Obviously, all of these studies have many limitations. The collective results of the six studies, however, raise the same questions as the review of Tech Prep studies about the degree to which POS are likely to impact achievement and transition.

## Youth Apprenticeships

In the 1990s youth apprenticeships emerged as a means of facilitating the transition between school and work. The German dual system of combining paid employment and academic studies linked to employment was perceived as a model with much potential for the United States. Youth apprenticeships have largely faded from the scene. Why did youth apprenticeships generate so much interest, and why did they fade so rapidly?

An ERIC search using the keywords "Youth Apprenticeships" yielded 372 documents.[5] The search identified any document with both "youth" and "apprenticeship" somewhere in the title, descriptors, or abstract. When these documents were reviewed by decade, 46 were found from 1979 or earlier, 59 from the 1980s, 215 from the 1990s, and 52 from 2000 to the present. Few of the earliest or most recent documents had the two words together. In the 1980s, the term "youth apprenticeships" appeared more frequently, and in the 1990s, the majority of documents concerned programs that were similar to the youth apprenticeships model that had been proposed by Hamilton (1990).

Stephen and Mary Agnes Hamilton were key players in generating the interest shown in youth apprenticeships during the 1990s. Stephen Hamilton became a college professor after having taught in a vocational high school. To overcome transition problems experienced by students who did not continue their education after high school and the inherent limitations of school-based occupational training, Hamilton (1990) proposed that elements of the German dual system be adopted. He not only proposed a model, he and his wife tested it in Broome County, New York (Hamilton & Hamilton, 1993). The model had all the components of POS. It articulated the last two years of high school with two years of postsecondary education. It had rigorous academic and technical standards and integrated academic and technical content. The goals of the Hamiltons' youth apprenticeships were for students to earn associate degrees and nationally recognized skill certificates once the program became registered with the New York State Department of Labor. The Hamilton model differed from POS; however, in that it placed the responsibility for skill training on employers.

The Hamilton model aligned well with the political climate of the 1990s. In the year before his election to the presidency, Bill Clinton (1991) wrote an article for the *Vocational Education Journal*, the primary publication of the American Vocational Association (now the Association for Career and Technical Education), in which he described the advantages of apprenticeship and endorsed their expansion. In his initial State of the Union address, Clinton proposed a federal initiative to encourage youth apprenticeships.

[5] The search was conducted on July 9, 2008 at http://www.eric.ed.gov/.

As interest in youth apprenticeships grew, the W. T. Grant Foundation asked six leading scholars, including the Hamiltons, to prepare papers that could serve as a conceptual foundation to guide future efforts (Rosenbaum et al., 1992). Earlier, this foundation had convened the Commission on Work, Family, and Citizenship to examine the declining employment opportunities being experienced by young people who did not continue their education beyond high school. The 1988 report of this commission, *The Forgotten Half*, recommended an expansion of apprenticeships and did much to create the climate that was so receptive to youth apprenticeships.

Rosenbaum et al. (1992) acknowledged the potential of youth apprenticeships to address many of the problems related to the transition from education to employment, but they also recognized the difficulties of large-scale adoption. The potential lies in demonstrating to young people the relevance of what they study in school, thereby, increasing motivation and the learning of both academic and technical skills. Apprenticeships can also socialize young people to the realities of the workplace by requiring the performance of tasks that have economic consequences. For these benefits to accrue, however, the authors discussed the many challenges that must be met if schools and employers are to work together. The most significant of these is encouraging employers to assume a greatly expanded role in training young people. When such employers are identified, students must be recruited and matched with employers. Teachers and workplace mentors must be trained and given time to work together to create and modify curriculum for both for the classroom and the workplace, and school and work schedules must be adjusted.

In 1994, the School-to-Work Opportunities Act was passed to bring about systemic changes in the preparation that young people receive to facilitate their transition from education to careers. Its primary strategy was to encourage the involvement of employers in the planning and delivery of instruction. The Act called for school-based learning, work-based learning, and connecting activities. Youth apprenticeships were a perfect fit with this legislation, and the Act provided funding for many state and local efforts to establish programs.

Youth apprenticeships even reached the level of serious scholarly discussion in *Educational Researcher*, the flagship publication of the American Educational Research Association, and a journal that rarely concerns itself with the role of education in preparing young people for careers. In 1993, however, it devoted most of one issue to an article by Bailey (1993a), Director of the Institute on Education and the Economy, Columbia University, a rejoinder from Hamilton (1993), and a response to Hamilton by Bailey (1993b). Bailey doubted if youth apprenticeships would ever enroll a significant number of young people. He cited the high job mobility of young people, as one of the major reasons for his pessimism. This mobility makes employers reluctant to offer serious training to those in their late adolescence and early twenties. Bailey also questioned the pedagogy of work-based learning. Such learning is often job- and even employer-specific and does not teach skills applicable in a range of settings. His third major concern was the likely

inequities in the availability of apprenticeships. There are inequities in the educational opportunities available to minorities and the poor, but these are less severe than the inequities in employment opportunities.

In his rejoinder, Hamilton (1993) argued that while young people in the United States have high rates of job mobility, this is not true of their counterparts in countries that have extensive apprenticeship systems. In Hamilton's view, the labor market floundering experienced by young people who do not continue their education after high school is the result of a disconnect between education and employment. Frequent job changes are due to the lack of true career opportunities, not the inability of young people to make career commitments. Hamilton acknowledged that employers train only to the degree that it is in their own self-interest. The changes that are occurring in the nature of the work, Hamilton contended, will redefine self-interest. The need for highly skilled, flexible workers will make employers willing to offer apprenticeships.

Bailey (1993b) concluded the exchange by recommending that work-based learning be incorporated into the broad educational reforms that were started by *A Nation at Risk* (National Commission on Excellence in Education, 1983). This would require greater employer involvement in education, but still keep the primary responsibility with schools. This approach became federal law with the passage of the School-to-Work Opportunities Act of 1994.

Even with broad political support and start-up funding from the School-to-Work Opportunities Act, however, Bailey's doubts about the widespread adoption of youth apprenticeships proved prescient. Some of the programs begun during the 1990s, including the one started by the Hamiltons, continue, but they enroll few students. During the four years that the Hamiltons directed the program, it enrolled a total of 100 students (Hamilton & Hamilton, 1999). That program continues now as one of the options offered by the Broome-Tioga Counties Bureau of Cooperative Educational Services (BOCES), a career center that provides skill training programs for 15 school districts. Enrollment in the youth apprenticeships offered by this center for the 2008-2009 school year was 32 (S. Watkins, personal communication, dated March 10, 2009).

## Evidence on Effectiveness

What is striking about the literature on youth apprenticeships is the absence of any studies that compare the achievement and postsecondary experiences of students who participated in apprenticeships to those who did not. After all the interest and investment following their emergence in the 1990s, youth apprenticeships just seemed to fade away. The closest approximation found to an outcome evaluation was a study by Schug and Western (1999) in Wisconsin. The results of this study are of special interest because Wisconsin was a national leader in the implementation of

youth apprenticeships. Schug and Western found that between 1992 and the 1996-1997 school year, only 1,150 students had participated in apprenticeships and only 347 had completed them. These 347 completers represented about one-tenth of 1% of the number of students in Wisconsin high schools during the 1994-1995 school year.

While no outcome evaluations of youth apprenticeships were found, an extended formative evaluation that identified the main problems involved in establishing such programs was found (Silverberg, Bergeron, Haimson, & Nagatashi, 1996). In 1990, as the interest in youth apprenticeships began to build, the U.S. Department of Labor funded six demonstration projects. In 1992, it extended grants for five of these six and issued 10 more. Data on the implementation of these 15 programs were collected for more than four years. These data showed that the amount of work-based leaning varied widely across the 15 sites. Some provided only job shadowing while others provided two full days per week at work sites. Only three came near the goal of evenly dividing the time spent in school-based and work-based learning.

Despite the variability in work site exposure, most students who participated in youth apprenticeships were positive about their experiences. From interviews and focus groups, the evaluators identified three categories of favorable comments made by participants: project-based learning, program requirements, and premium workplace experience. Under project-based learning were comments about learning in the context of job requirements, the direct relevance of mathematics, working in groups, and problem solving. All of these were much preferred to the traditional academic classroom. Students viewed the requirements for entering and staying in an apprenticeship, keeping a specified minimum GPA, and maintaining high rates of attendance as causing them to work harder in school. The comments classified as premium workplace experiences included the skills students reported learning, which they perceived as giving them an advantage in the labor market. Those who worked for well known companies thought this would add value to their resumes. A study regarding the attitudes of youth apprentices in Wisconsin yielded very similar findings (Scribner & Wakelyn, 1998).

Athough students who participated in the apprenticeships studied by Silverberg et al. (1996) perceived them favorably, the programs had difficulty recruiting both students and employers, changing how students learn at school, ensuring students learn on the job, and reducing costs. Most programs were unable to meet these challenges to the degree that youth apprenticeships became available for large numbers of students. For all but a few, youth apprenticeship is an initiative whose time came and went. It required too much change both by schools and by employers. It was difficult to recruit students and even more difficult to recruit employers who were willing to go beyond minimal types of work-based learning such as site tours and job shadowing.

## Conclusions and Discussion

The evidence reviewed in this article cautions that POS are unlikely to produce marked improvements in achievement and transition to postsecondary education. Good Tech Prep programs and career pathways have the components required for POS: rigorous academic and technical content and alignment of secondary and postsecondary instruction with the goal of preparing students to earn postsecondary degrees or industry-recognized certifications. Some of the programs studied, especially by Bragg et al. (2002) and Lekes et al. (2007), were selected because they were judged as among the best that could be found. When comparisons were made between the outcomes of participants and similar nonparticipants of these programs, however, few statistically significant differences emerged, and those that did were usually only a few percentage points. While no rigorous studies of the effects of youth apprenticeships could be identified, the unwillingness of significant numbers of employers to provide skill training makes the issue largely moot. An inference that can be drawn from the short history of youth apprenticeships is that initiatives that require major change in traditional practices have limited chance for wide-scale adoption. Programs of study represent incremental changes that build upon existing structures and offerings, which increases their potential for implementation

If POS are to produce higher achievement and postsecondary completion than their precursors, the academic components of secondary POS must be strengthened. Doing so will realize the hopes for CTE that were expressed in the 1914 *Report* from the Commission on National Aid to Vocational Education and repeated in the 1984 report, *The Unfinished Agenda* (National Commission on Secondary Vocational Education, 1984). Both of these reports carried the message that CTE is pedagogy as much as content. Career and Technical Education is inherently contextualized and can reach many students for whom the abstract nature of the typical academic classroom can be simultaneously intimidating and boring.

For most students, secondary occupational preparation will not provide sufficient skills to enable them to compete for the more rewarding jobs in the labor market. Many CTE high school graduates will need additional preparation that will be acquired at the postsecondary level. Deficiencies in academic skills, however, prevent many of these students from completing postsecondary training (Bailey, Jeong & Cho, 2008). Bragg et al. (2002) and Castellano et al. (2007) documented the high rates of enrollment by CTE graduates in postsecondary developmental courses. Students must complete these courses before studying the occupational skills needed to compete for jobs that offer stable employment and higher earnings.

Enhancing the academic content of CTE courses will require major change in the field; however, the hardest part has already been accomplished. Virtually all CTE leaders have accepted that their programs must reinforce academic skills. The best evidence to support this statement is ACTE's 2006 position paper, *Reinventing the American High School for the 21st Century*. The question is no longer whether

academics should be reinforced but how can academics be reinforced. The way not to do it is to try to resurrect career education or school-to-work. Both of these initiatives primarily impacted CTE and were peripheral to most of secondary education. The review of the short history of youth apprenticeships implies that efforts that require major change in the basic institutions of society have little chance for widespread adoption.

Programs of study are unlikely to have any significant impact upon academic education, but that is not to say that POS cannot enhance academic instruction in CTE. Career and Technical Education instructors can identify the academic concepts that are embedded in their curricula and develop lessons to explicitly teach these concepts. They can, and should, work with their academic colleagues to ensure that they understand the concepts and the best ways to teach them. But they should not attempt to become academic teachers. If they try to do so, they will devalue the technical component of their courses and, in all likelihood, lose their students' interest and engagement.

If what has been described sounds unrealistic, it is not. The NRCCTE conducted an experimental study that did just what has been described to enhance the teaching of mathematics (Stone, Alfeld, Pearson, Lewis, & Jensen, 2006). This study found that teaching enhanced mathematics in five separate occupational contexts yielded differences in academic performance between the experimental and control groups on two standardized tests of 8% and 9%, respectively. These improvements were achieved by spending an average of just 11% of the instructional time in a one-hour, year-long class. And the time spent on these lessons was not all allocated to mathematics; occupational content was also taught. The occupational content was essential to demonstrate the relevance of mathematics.

Such curriculum integration requires a major investment of teacher time. Teachers cannot be given a set of mathematics-enhanced lessons and told to teach them. A follow-up survey of the teachers who participated in the Stone et al. (2006) study in the school year following the experiment was conducted (Lewis & Pearson, 2007). After the experiment ended, the control group teachers were sent the lessons that had been developed for the experiment and some had attempted to teach them. When the control teachers were interviewed about their experiences, they reported considerable difficulty understanding, much less teaching, the lessons. They had not participated in the workshops that identified the mathematics in their curricula or collaborated with mathematics teachers to develop the lessons. These experiences were crucial to an understanding of the mathematics and the pedagogic model upon which the lessons were based.

Extrapolating from the experience in the Stone et al. (2006) study, it is *not* recommended that POS aligned with challenging academics standards be developed and distributed to teachers to implement. It is recommended that CTE teachers be given opportunities to work with their academic colleagues, examine CTE curricula to identify embedded academic content, and develop their own POS. Providing such

opportunities encourages the emergence of communities of practice (Wenger, 1998) among teachers. These communities, in turn, develop a sense of ownership in the POS and a commitment to their implementation. Obviously, these communities will need criteria, templates, professional development, and technical assistance. The review of the state plans (*State Plans for Implementing Programs of Study*, in this issue) indicates that virtually all states will be providing these kinds of support. The critical component is to involve the teachers who will have the final responsibility for delivering the POS in their development.

Evidence has accumulated that one of the essential components of educational improvement is professional development that promotes a sense of community among teachers (Hord, 2004; Leithwood, Louis, Anderson, & Wahlstrom, 2004; Louis, Kruse, & Marks, 1996; Newmann and Associates, 1996; Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009). Such communities incorporate what is probably the most enduring finding from decades of small group and organizational research: Individuals are more likely to accept change if they are involved in deciding what that change will be and how it will be implemented (Berelson & Steiner, 1964). In the years since this conclusion was published, several continuous improvement models, including Total Quality Management (Deming, 1986) and Six Sigma (Pande, Neuman, & Cavanagh, 2000), emerged in manufacturing and spread to all types of organizations. The Baldrige National Quality Program (2008) is the most visible example of applications of such improvement models within education. All of these models incorporate methods to involve those who will be affected by decisions in the making of those decisions. The degree to which POS aligned with challenging academic standards will be accepted and implemented by CTE teachers will be determined by the degree to which the teachers are involved in the development of the POS. Maximum involvement will yield maximum implementation, and minimum involvement will yield minimum implementation.

## References

Association for Career and Technical Education. (2006). *Reinventing the American high school for the 21st century: A position paper.* Alexandria, VA: Author.

Bailey, T. (1993a). Can youth apprenticeship thrive in the United States? *Educational Researcher, 22*(3), 4-10.

Bailey, T. (1993b). Youth apprenticeship in the context of broad education reform. *Educational Researcher, 22*(3), 16-17.

Bailey, T., Jeong, D. W., & Cho, S. W. (2008). *Referral, enrollment, and completion in developmental education sequences in community colleges.* CCRC Working Paper No. 15. New York: Community College Research Center, Teachers College, Columbia University. Retrieved March 10, 2009, from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/43/1c/f9.pdf

Baldrige National Quality Program. (2008). *Education criteria for performance excellence*. Washington, DC: National Institute of Standards and Technology, U.S. Department of Commerce. Retrieved June 30, 2008, from http://www.quality.nist.gov/PDF_files/2008_Education_Criteria.pdf

Berelson, B., & Steiner, G. A. (1964). *Human behavior: An inventory of scientific findings.* New York: Harcourt, Brace & World, Inc.

Bozick, R., & Lauff, E. (2007). *Education longitudinal study of 2002 (ELS:2002): A first look at the initial postsecondary experiences of the sophomore class of 2002* (NCES 2008-308). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Retrieved June 10, 2008, from http://nces.ed.gov/pubs2008/2008308.pdf

Bragg, D. D., Bremer, C. D., Castellano, M., Kirby, C., Mavis, A., Schaad, D., et al. (2007). *A cross-case analysis of career pathway programs that link low-skilled adults to family-sustaining wage careers*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota. Retrieved May 14, 2008, from http://www.nccte.org/publications/Career_Pathways.pdf

Bragg, D. D., Loeb, J. W., Gong, Y., Deng, C-P., Yoo, J., & Hill, J. L. (2002). *Transition from high school to college and work for tech prep participants in eight selected consortia*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota. Retrieved April 24, 2008, from http://www.nccte.org/publications/infosynthesis/r%26dreport/Transition-Bragg%20ALL.pdf

Castellano, M, Stone, J. R., III, Stringfield, S., Farley-Ripple, E. N., Overman, L. T., & Hussain, R. (2007). *Career-based comprehensive school reform: Serving disadvantaged youth in minority communities*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota. Retrieved March 10, 2009, from http://136.165.122.102/UserFiles/File/pubs/Career-Based_CSR.pdf

Clinton, B. (1991). Apprenticeship American style: Why the governor of Arkansas believes apprenticeship is a cure for what ails education. *Vocational Education Journal, 66*(7), 22-23.

Commission on National Aid to Vocational Education. (1914). Report. In M. Lazerson & W. N. Grubb (Eds.), *American education and vocationalism: A documentary history 1870-1970* (pp. 116-132). New York: Teachers College Press.

Commission on Work, Family, and Citizenship. (1988). *The forgotten half: Pathways to success for America's youth and young families*. *Final Report*. Washington, DC: W. T. Grant Foundation.

Deming, W. E. (1986). *Out of the crisis.* Cambridge, MA: Massachusetts Institute of Technology, Center for Advance Engineering Study.

Hamilton, S. F. (1990). *Apprenticeship for adulthood: Preparing youth for the future.* New York: Free Press.

Hamilton, S. F. (1993). Prospects for an American-style youth apprenticeship system. *Educational Researcher, 22*(3), 11-16.

Hamilton, M. A., & Hamilton, S. F. (1993). *Toward a youth apprenticeship system: A progress report from the youth apprenticeship demonstration project in Broome County New York*. Ithaca, NY: Cornell Youth and Work Program, Cornell University. Retrieved July 9, 2008, from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/14/76/d6.pdf.

Herr, E. L. (1976). *The emerging history of career education*. Washington, DC: National Advisory Council on Career Education.

Hershey, A. M., Silverberg, M. K., Owens, T., & Hulsey, L. K. (1998). *Focus for the future: The final report of the national Tech-Prep evaluation*. Princeton, NJ, Mathematica Policy Research. Retrieved April 28, 2008, from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/15/cb/7c.pdf

Hord, S. M. (Ed.) (2004). *Learning together, leading together: Changing schools through professional learning communities*. New York: Teachers College Press, Oxford, OH: National Staff Development Council.

Hughes, K. L., Bailey, T. R., & Mechur, M. J. (2001). *School-to-work: Making a difference in education.* New York: Institute on Education and the Economy, Columbia University. Retrieved June 30, 2008, from http://www.eric.ed.gov/ERICWebPortal/Home.portal?_nfpb=true&ERICExtSearch_SearchValue_0=School-to-work%3A+Making+a+difference+in+education&ERICExtSearch_SearchType_0=ti&_pageLabel=ERICSearchResult

Hughes, K., & Mechur Karp, M. (2006). *Strengthening transitions by encouraging career pathways: A look at state policies and practices*. Washington, DC: American Association of Community Colleges; and Phoenix, AZ: League for Innovation in the Community College. Retrieved April 29, 2008, from http://www.aacc.nche.edu/Content/ContentGroups/Headline_News/February_2006/9287_AACCvisualreport.pdf

Hull, D. (2004). *Career pathways: The next generation of Tech Prep*. Waco, TX: CORD. Retrieved April 30, 2008, from http://www.cord.org/uploadedfiles/Career%20Pathways--Next%20Generation%20of%20Tech%20Prep%20(Nov%2004).pdf

Jenkins, D., & Spence, C. (2006), *The career pathways how-to guide*. New York: Workforce Strategy Center. Retrieved May 7, 2008, from http://www.workforcestrategy.org/publications/WSC_howto_10.16.06.pdf

Kazis, R., & Pennington, H. (1999). *What's next for school-to-career*. Boston, MA: Jobs for the Future. Retrieved March 6, 2009, from, http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/15/fb/d0.pdf

Leithwood, K., Louis, K. S., Anderson, S., & Wahlstrom, K. (2004). *How leadership influences student learning.* Minneapolis, MN: Center for Applied Research and Educational Improvement, University of Minnesota and Toronto, ON: Ontario Institute for Studies in Education, University of Toronto.

Lekes, N., Bragg, D. D., Loeb, J. W., Oleksiw, C. A. Marszalek, J., LaRaviere, M. B., et al. (2007). *Career and technical education pathway programs, academic performance, and the transition to college and career*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota. Retrieved May 9, 2008, from http://www.nccte.org/publications/infosynthesis/r&dreport/CTE_Pathway_Programs.pdf

Lewis, M. V., & Pearson, D. (2007). *Sustaining the impact: A follow-up of the teachers who participated in the Math-in-CTE study*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota.

Louis, K. S., Kruse, S. D., & Marks, H. M. (1996). Chapter seven: Schoolwide professional community. In F. M. Newmann & Associates, *Authentic achievement: Restructuring schools for intellectual quality* (pp. 179-203). San Francisco: Jossey-Bass.

Marland, S. P., Jr. (1971). *Career education*. Washington, DC: Office of Education, Department of Health, Education and Welfare. Retrieved March 6, 2009, from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/3a/f6/4f.pdf

Mazzeo, C., Roberts, B., Spence, C., & Strawn, J. (2006). *Working together: Aligning state systems and policies for individual and regional prosperity*. New York: Workforce Strategy Center. Retrieved May 8, 2008, from http://www.workforcestrategy.org/publications/WSC_workingtogether_12.1.06_3.pdf

National Association of State Directors of Career Technical Education Consortium. (2007). *Career clusters and programs of study: State of the states*. Washington, DC: Author. Retrieved April 28, 2008, from http://www.careertech.org/uploaded_files/CareeerClustersProgStudySurveyJune07.doc

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform*. Washington, DC: Government Printing Office. Retrieved June 26, 2008, from http://www.ed.gov/pubs/NatAtRisk/index.html

National Commission on Secondary Vocational Education. (1984). *The unfinished agenda: The role of vocational education in the high school*. Columbus, OH: National Center for Research in Vocational Education, The Ohio State University. Retrieved June 27, 2008, from, http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/2e/bd/d6.pdf

Newmann, F. M., & Associates. (1996). *Authentic achievement: Restructuring schools for intellectual quality*. San Francisco: Jossey-Bass.

Oswald, K. (2002) *Career and technology education: Program evaluation report, 2000-2001*. Austin, TX: Office of Program Evaluation, Austin Independent School District. Retrieved May 5, 2008, from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/1a/22/49.pdf

Pande, P. S., Neuman, R. P., & Cavanagh, R. R. (2000). *The six sigma way: How GE, Motorola, and other top companies are honing their performance*. New York: McGraw-Hill.

Parnell, D. (1985). *The neglected majority*. Washington, DC: Community College Press.

Rosenbaum, J. E., Stern, D., Hamilton, S. F., Hamilton, M. A., Berryman, S. E., & Kazis, R. (1992). *Youth apprenticeship in America: Guidelines for building an effective system*. Washington, DC: W. T. Grant Foundation Commission on Youth and America's Future. Retrieved July 9, 2008, from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/13/93/19.pdf

Rudy, D. W., & Rudy, E. L. (2001). *Report on career pathways: A success story in Berrien County, Michigan.* Berrien Springs, MI: Berrien County Intermediate School District. Retrieved May 5, 2008, from http://eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/19/46/09.pdf

Ruffing, K. (2006). *History of career clusters*. Retrieved March 9, 2009, from http://www.careertech.org/uploaded_files/The_History_of_Career_Clusters_by_Katherine_Ruffing.doc

Schug, M. C., & Western, R. D. (1999). *School to work in Wisconsin: Inflated claims, meager results.* Milwaukee, WI: Wisconsin Policy Research Institute, University of Wisconsin-Milwaukee.

Scribner, J., & Wakelyn, D. (1998). Youth apprenticeship experiences in Wisconsin: A stakeholder-based evaluation. *High School Journal*, *82*(1), 24. Retrieved July 14, 2008, from http://wf2dnvr9.webfeat.org/PFRIK153/url=http://wf2dnvr9.webfeat.org:80/PFRIK153/url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=1572209&site=ehost-live&scope=site

Silverberg, M., Bergeron, J., Haimson, J., & Nagatashi, C. (1996). *Facing the challenge of change: Experiences and lessons of the school-to-work/youth apprenticeship demonstration: Final report*. Princeton, NJ: Mathematica Policy Research. Retrieved July 9, 2008, from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/15/0a/d1.pdf

Stone, J. R., III, Alfeld, C., Pearson, D., Lewis, M. V., & Jensen, S. (2006). *Building academic skills in context: Testing the value of enhanced math learning in CTE*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota.

Stone, J. R., III, & Aliaga, O. A. (2003). *Career and technical education, career pathways, and work-based learning: Changes in participation 1997–1999*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota. Retrieved May 21, 2008, from http://www.nccte.org/publications/infosynthesis/r%26dreport/CTE_CareerPathways_Stone_Aliaga_Res.pdf

Tinto, V. (1996). Persistence and the first-year experience at community college: Teaching new students to survive, stay, and thrive. In J. Harkin (Ed.), *The community college: Opportunity and access for America's first-year students* (pp. 97–104). Columbia, SC: The National Resource Center for the Freshman Year Experience and Students in Transition, University of South Carolina.

Warford, L. J, Beauman, K. M., & Kindell, R. (2008). *CCTI career pathways: Five years of lessons learned and moving into the future*. PowerPoint presentation to the 2008 CCTI Summit. Retrieved, May 23, 2008, from http://www.league.org/league/projects/ccti/summit/2008/2008CCTI-3.ppt#408,18, SummaryEnrollmentTotals

Wei, R. C., Darling-Hammond, L., Andree, A., Richardson, N., & Orphanos, S. (2009). *Professional learning in the learning profession: A status report on teacher development in the United States and abroad.* Dallas, TX. National Staff Development Council. Retrieved February 23, 2009, from http://www.nsdc.org/news/NSDCstudytechnicalreport2009.pdf

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge, UK: Cambridge University Press.

## Acknowledgement

The work reported herein was supported under the National Research Center for Career and Technical Education, PR/Award No.VO51A070003 administered by the Office of Vocational and Adult Education, U.S. Department of Education. However, the contents do not necessarily represent the positions or policies of the Office of Vocational and Adult Education or the U.S. Department of Education, and you should not assume endorsement by the federal government.

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*Career and Technical Education Research, 33(3), pp. 189-202*


# Dual and Concurrent Enrollment and Transition to Postsecondary Education

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## Abstract

*Dual and concurrent enrollments enable students to earn postsecondary credits while still in high school. The 2006 Perkins legislation encourages such enrollments as a component of programs of study. There is evidence that students who earn dual enrollment credits have slightly (typically 4% to 5%) more positive outcomes in postsecondary education than similar students who do not. These effects, however, may be due to self-selection into dual credit courses. The modest advantages associated with dual enrollment may not be sufficient to justify the effort to develop and implement such programs.*

The Carl D. Perkins Career and Technical Education Improvement Act of 2006 (P.L. 109-270) states that Programs of Study (POS) "may include the opportunity for secondary education students to participate in dual or concurrent enrollment programs or other ways to acquire postsecondary education credits" (Sec 122 [c][1][A][iii]). This language encourages but does not require POS to include such opportunities. It reflects a growing interest in expanding dual enrollment beyond its traditional function of providing challenging educational experiences for high-achieving students. In 1974, the first middle college high school was established to provide a different environment for students who were often alienated from the typical high school (Lieberman, 2004). The middle college was located on a college campus and enabled students to earn college credits while in high school. In recent years, the Early College High School Initiative expanded the middle college concept by attempting to give students the opportunity to earn enough credits for an associate degree or the first two years of a baccalaureate degree while in high school (American Institutes for Research and SRI International, 2007).

Proponents of dual enrollments perceive them as a means of both increasing the efficiency of education by reducing the time and cost of obtaining postsecondary degrees and increasing the rigor of high school instruction, thereby, reducing the need for postsecondary remediation. Reindel's (2006) summary of a conference that addressed the broad issues of accelerated learning identified a tension between these two objectives. The efficiency benefits (reducing time and cost) are maximized if accelerated learning primarily serves students who do well in school. The rigor

benefits (reducing the need for remediation) are maximized if accelerated learning also serves those students who are at academic risk by increasing their options and motivation. Other major issues addressed at the conference concerned the rigor and quality of accelerated learning and financing. Reindel concluded that a consensus emerged that accelerated learning "holds considerable promise as a means of bridging gaps in a decentralized educational system" (p. 9), but much more evidence is needed to determine if this promise is being realized.

There is evidence of participation by career and technical education (CTE) students in dual enrollment courses. Waits, Setzer, and Lewis (2005) reported that during the 2002-2003 school year, 71% of public high schools offered courses in which students could simultaneously earn both high school and college credit. Almost all (92%) of these schools offered dual credit academic courses and approximately one-half (51%) offered dual credit CTE courses. While dual credit courses were widely available, students taking these courses represented only 8% of the total high school enrollment during the 2002-2003 school year.[1] Students taking CTE courses comprised 36% of all dual credit students or 3.1% of total high school enrollment. These are the most recent national data available, but the growing interest in dual enrollment, as reflected in the conference reported by Reindel (2006), suggested that current figures are probably higher.

This article focuses on whether acquiring postsecondary credits while in high school facilitates secondary to postsecondary transitions for CTE students. Only dual enrollment courses are addressed, not Advanced Placement (AP) or International Baccalaureate (IB) courses. The full IB curriculum and 35 of the 37 AP courses are academic and designed as college-level courses for high school students, not actual college courses. No studies were found that addressed participation of CTE students in such courses. Studies of dual enrollment/credits for CTE students, in general, were first examined, followed by the more structured approach of middle/early college high schools.

## Dual Enrollment/Credits

Dual credit courses vary on several dimensions beyond their content. Students may take individual (cafeteria-style) courses or defined sequences, which may be taught by high school or college faculty. The courses may be offered in high schools or on college campuses, and may enroll only high school or both high school and

[1] This percentage was estimated by dividing the 1,200,000 students enrolled in dual credit courses reported by Waits et al. (2005) by the 14,067,000 enrollment in grades 9 through 12 in the fall of 2002 reported in Table 2 of the *Digest of Educational Statistics: 2007*, retrieved June 3, 2008 from http://nces.ed.gov/programs/digest/d07/tables/dt07_002.asp?referrer=list. The percentages of students taking dual credit courses may be slightly inflated because of duplicate counting of students taking more than one such course.

college students. The courses may be targeted to high-achieving or underserved students. Questions have been raised concerning the level of the courses: How qualified are the high school instructors who teach most of these courses as adjunct college faculty? Are the courses really at the postsecondary level or are they adjusted to accommodate high school students (Dougan, 2005)? With variability in delivery, it is difficult to estimate the effect of earning dual credits on secondary to postsecondary transition, but there have been attempts to do so. Only two studies were found that made explicit attempts to control for the self-selection inherent in enrolling in dual credit courses (Karp, Calcagno, Hughes, Jeong, & Bailey, 2007; Kotamraju, 2005). The method and findings of these two studies are presented in some detail.

Karp et al. (2007) analyzed student records from Florida and the City University of New York (CUNY). The Florida records were for 299,685 students who should have graduated during the 2000-2001 and 2001-2002 school years. The records included data with respect to (a) courses taken in high school and college, (b) dual enrollment courses and grades, (c) final high school grade point average (GPA) and semester averages in college, and (d) demographic information including age, gender, race/ethnicity, English language proficiency, and citizenship. The researchers added information regarding high school and neighborhood characteristics from the U.S. Department of Education Common Core of Data and the 2000 Census. Career and technical education students were defined as those who took three or more courses that provided preparation for employment in a given occupational area. The data in New York were for 2,303 students who graduated from one of the city's 19 CTE high schools and enrolled in any of the CUNY community or four-year colleges in 2001 or 2002. The information on these students included dual enrollment courses and grades, high school grades, credits and grades earned for all CUNY courses attempted, and demographic, high school, and neighborhood characteristics. The manner in which the New York sample was defined excluded records for non-CTE students.

Kotamraju (2005) also analyzed state-level data to determine the relationship between participating in the Minnesota Postsecondary Enrollment Options program and GPA at the postsecondary level. This program allows all high school students who meet eligibility standards to take courses offered by any of the institutions in the Minnesota State College and University system. Kotamraju selected students who satisfied the following criteria: took dual enrollment courses during the 1999-2000 or 2000-2001 school years, graduated in the spring of 2001, and enrolled as full-time students in the same two-year colleges that had offered the courses in which they had taken their dual enrollment courses anytime between the fall of 2001 and the spring of 2004. All of these colleges were part of the Minnesota State Colleges and Universities system. When these students were identified, they were matched with similar students who had also graduated in 2001 and entered these two-year colleges during the same time period. The matching was based on gender, ethnicity, and high

school cumulative GPA. The final sample included 3,639 students, of whom 461 had taken dual enrollment courses. Those who had taken such courses were classified into those who had taken only liberal and general study courses (45%), those who had taken only CTE courses (13%), and those who had taken both (43%). The restrictive criteria used by Kotamraju to define the sample resulted in students with similar personal characteristics and high school achievement who had similar exposure to postsecondary education but entered with or without having experienced dual enrollment. The matching, of course, could not control for differences in motivation, career aspirations, or other unmeasured variables.

The Karp et al. (2007) analyses of the data from Florida yielded a number of advantages associated with earning dual credits while in high school. Logit regressions that controlled for student, high school, and neighborhood characteristics yielded the percent advantages for dual credit students on the outcomes shown in Table 1. The percentages and pseudo $R^2$ are derived from the tables in the Karp et al. report that are listed in the last column of Table 1. The logit probabilities are expressed as percent advantages. For the first outcome, obtaining a high school diploma, all students who had earned credits in at least one dual enrollment course were 4.3% more likely to graduate than students who had not earned such credits. For CTE students, this advantage was only 1.0%. Most of the other results for the full sample and CTE students were similar. That is, dual enrollment was associated with essentially the same benefits on these outcome measures for both CTE and non-CTE students. The pseudo $R^2$ is interpreted the same as the $R^2$ in ordinary least squares; they represent the percentage of variability in the outcome variables that can be explained by the variables in the logit model.

Ordinary least squares (using the same independent variables as the logit regressions) was used to estimate the effect of dual enrollment on the continuous variables GPA and total credits earned at the postsecondary level. These analyses yielded the net increases in the outcome variables associated with dual enrollment shown in Table 2. Again, the advantages associated with earning dual enrollment credit for CTE students were similar to those for all students.

In Tables 1 and 2, the postsecondary outcomes for the full sample were based on more than 127,000 students and the results for CTE students were based on more than 18,000. All students had enrolled in public colleges and universities in Florida. These large numbers reduce the error estimates in the regression models and, therefore, increase the chances of finding significant relationships in the data.

The CUNY data had far fewer student records (2,303) and all of these students had graduated from a CTE high school that was operated by the New York City school system. Additionally, the students had enrolled in one of the colleges of the CUNY system. As a result, it was not possible to test the effect of dual enrollment on high school graduation or postsecondary enrollment. The advantage of the CUNY data is that all of the dual enrollment courses were through College Now, a cooperative program of CUNY and the New York City public schools. College Now

has standardized eligibility and application procedures and monitors curriculum and instruction. This coordination across high schools reduces the variability in dual enrollment experiences, thereby, enhancing the fidelity of the intervention.

Table 1

*Percent Advantage Associated with Participation in Dual Enrollment Courses in High School on Selected Outcome Variables, Full Sample and CTE Students, Logit Regressions*

| Outcome | Percent Advantage | | Pseudo $R^2$ | | Table |
|---|---|---|---|---|---|
| | Full | CTE | Full | CTE | |
| Obtain high school diploma | 4.3 | 1.0 | .19 | .20 | 5 |
| Enroll in postsecondary education | 16.3 | 18.1 | .14 | .14 | 6 |
| Enroll in 4-year degree program | 7.7 | 8.6 | .27 | .24 | 7 |
| Enroll full-time in first term | 4.5 | 4.9 | .05 | .04 | 8 |
| Persist to second term in first year of enrollment | 4.5 | 4.2 | .07 | .06 | 9 |
| Persist to second year | 5.4 | 5.2 | .08 | .07 | 12 |

*Note.* The results in this table are taken from the tables in the Karp et al. (2007) report that are listed in the last column. The modal number of observations for the first two outcomes is 217,466 for the full sample and 31,050 for the CTE students. The modal number of observations for the remaining four outcomes is 127,623 for the full sample and 18,573 for the CTE students. All differences between dual enrollment and non-dual enrollment students are significant at the .01 probability level. However, for those CTE students obtaining a high school diploma, the difference is significant at the .05 level.

Table 2

*Net Independent Effect Associated with Participation in Dual Enrollment Courses in High School on Selected Outcome Variables, Full Sample and CTE Students, Ordinary Least Squares*

| Outcome | Net Effect | | $R^2$ | | Table |
|---|---|---|---|---|---|
| | Full | CTE | Full | CTE | |
| First year GPA | .22 | .26 | .24 | .18 | 10 |
| Second year GPA | .21 | .26 | .27 | .20 | 13 |
| Cumulative GPA | .20 | .24 | .29 | .22 | 14 |
| Total credits | 15.20 | 15.20 | .29 | .26 | 15 |

*Note.* The results in this table are taken from the tables in the Karp et al. (2007) report that are listed in the last column. The modal number of observations for all outcomes is 128,295 for the full sample and 18,601 for the CTE students. All differences between dual enrollment and non-dual enrollment students are significant at the .01 probability level.

Among CTE graduates who enrolled in one of the CUNY colleges, those who had taken College Now dual enrollment courses were 9.7% more likely than those without dual enrollment to pursue a bachelor's degree. The GPA of the dual enrollment students was 0.13 higher than that of the non-dual enrollment students during their first semester. Over the 3.5 years of postsecondary experience that was examined, the dual enrollment students earned 10.6 more credits than their non-dual enrollment counterparts. Several other outcome measures that were examined did not reach statistical significance at the .05 probability level, but the effects estimates were all in the expected directions. If the number of student records had been as large as in Florida, many of these may have attained the .05 level of significance.

During the three years of postsecondary experience that Kotamraju (2005) examined, students who had taken dual enrollment courses in high school had a cumulative mean GPA of 2.92 compared to 2.53 among those students who had no dual enrollment courses. Students who took any CTE courses at the postsecondary level were classified as participants, concentrators, and completers.[2] Only among participants was there a statistically significant difference in GPA between those who had taken dual enrollment courses, 2.55, and those who had not, 1.88. Kotamraju concluded that the dual enrollment courses appeared to give students a head start on succeeding in college courses, but that this effect declines as postsecondary exposure increases.

Most of the results from these two studies indicated modest advantages associated with dual enrollment. Using the best methods, short of random assignment of students, to assess impact, it appears that dual enrollment is associated with slightly better enrollment, persistence, GPA, and total credits in postsecondary education. Unfortunately, the statistical methods used in these analyses cannot control for the self-selection of students into dual enrollment courses. These courses were more demanding than typical high school courses and students choosing this extra work were, by definition, different from their classmates. The researchers who conducted these studies were fully aware of these problems, as reflected in the following caution:

> It is important to recognize that other unmeasured factors, such as student motivation or parental encouragement and support, are likely correlated with participation in dual enrollment and are also likely to generate a positive effect. By not controlling for important factors affecting a student's decision to participate in dual enrollment, it is possible that our models may generate what appear to be positive impacts when in fact there are no such impacts or there are negative impacts. (Karp et al., 2007, p. 20)

[2] The participants were students who had selected a CTE major or taken one CTE course. Concentrators had completed one-third of the credits required by their programs. Completers had received certificates, diplomas, or AA or AAS degrees.

Self-selection and admission practices are also inherent problems when attempting to estimate the effects of middle/early colleges.

## Middle/Early College High School

Middle/early colleges are intensive dual enrollment programs targeted to students who are underserved and often deemed "at-risk" in a traditional high school. Many CTE students are also at risk, and the experiences of middle/early colleges provide some guidance as to what a major expansion of dual enrollment opportunities for CTE students is likely to yield. Is there a difference between a middle college and an early college? Middle college is by far the older term. The New York City Board of Education and LaGuardia Community College established the first middle college as a charter high school located on the college's campus in 1974 (Lieberman, 2004). This first school inspired many others, all of which have the goal of providing challenging educational experiences combined with a supportive environment. College-level courses are taught either by faculty of the college or high school teachers. In these courses, students both satisfy high school graduation requirements and earn college credit.

The original middle college served as a model for many others that were established across the country. In 2002, the concept provided the foundation for the Early College High School Initiative. This initiative is funded by several major foundations, including Bill & Melinda Gates, Ford, Carnegie Corporation, and W. K. Kellogg, and is coordinated and supported by Jobs for the Future. The use of *early* rather than *middle* to label this initiative appears to reflect an intention to indicate that it differs from its predecessors.

The literature about the two types indicates that early colleges differ from middle colleges primarily in where they are located and their expectations regarding credits to be earned. Early colleges may not be located on a college campus, but middle colleges must be. Accordingly, the first principle of the Middle College National Consortium[3] is that middle colleges must be on a college campus. Janet Lieberman, a professor at LaGuardia Community College, is credited with being the originator of the first middle college. In a paper she prepared for the Early College High School Initiative, she stated, "the early college high school design sees non-integrated space as a temporary accommodation, with the eventual hope of situating the high school on the college campus" (Lieberman, 2004, p. 3). The second difference is the extent of articulation between the high school and postsecondary curriculum, and the goal for students in early colleges to earn 60 postsecondary credits (an associate degree or two years of transferable credits to a four-year institution) by the time they graduate from high school. Middle colleges typically do

[3] See http://www.mcnc.us.

not have as articulated a curriculum or such specific credit goals. However, the emphases on providing challenging content in a supportive environment to underserved students are common to both.

When accessed on March 4, 2009, the Early College High School Initiative reported on its Web site[4] that its partners "have started or redesigned 200 schools in 24 states and the District of Columbia." The implementation of Early College High Schools is being evaluated by the American Institutes for Research (AIR) and SRI International. These organizations issued jointly three annual reports (AIR/SRI, 2005, 2006, 2007) that assessed how the various parties involved in implementation carried out their roles and the extent to which their performance reflected the initiative's core principles.

The implementation findings of the AIR/SRI reports are sobering for anyone concerned with improving education, especially for underserved populations. The Early College High Schools Initiative appears to have all the components necessary to have a significant impact on student performance. Many educators would endorse the approach that the initiative has adopted, especially the emphasis on the new *3 Rs*: rigor, relevance, and relationships. The initiative also provides high levels of support through intermediary organizations. These organizations are intermediary in that they represent the funding foundations to foster early college high schools within the geographic areas they serve. These intermediaries provide support far beyond anything a typical Local Education Agency (LEA) could provide.

Despite the soundness of the approach and the support provided, it is clear from the three evaluation reports that implementing the core principles of the initiative is difficult. Assisting students who are typically underrepresented in postsecondary education to do college-level work while in high school is a formidable task. There is a continuing debate among schools in the initiative about how selective they should be. Officials of some schools contend that it does little good to admit students unable to meet the demands of rigorous curriculum and, as a result, have established selection criteria. Others respond that such criteria are antithetical to the goals of early college. Few of the early colleges have been able to implement the second core principle of graduating students with an associate degree or 60 credits transferable to a four-year institution. They have modified this principle in various ways, including lowering the number of credits to be earned, giving high school credit for grades below B and college credit for B and above, and in at least one case, substituting the goal of preparing students to be college-ready for that of earning actual college credits (AIR/SRI, 2007, p. 17).

The 2007 AIR/SRI report and a few other studies have examined the academic performance and transition of middle/early college students. These typically show advantages over comparison groups (e.g., Lieberman, 1986; Resources for Learning,

[4] See http://www.earlycolleges.org.

2007); however, only one of these studies was found (Dynarski, Gleason, Rangarajan, & Wood, 1998) that used a matching or control group design. In the other studies, including the 2007 AIR/SRI report, middle/early college participants were compared to all other students in the schools or districts from which the participants were drawn. Without some attempt to control for the differences between students who choose to participate in early/middle colleges and those who do not, such comparisons have little meaning.

The Dynarski et al. (1998) study, in contrast, was a random assignment experiment that satisfied the What Works Clearinghouse (WWC) criteria for scientific rigor.[5] This study was part of a larger evaluation that examined the effectiveness of 16 middle school and high school dropout prevention programs. The middle college study included 394 students who applied to attend an alternative high school operated by the Seattle Public Schools in cooperation with Seattle Central Community College. At the time it was evaluated, the high school enrolled approximately 300 students and its core academic curriculum focused on two modules—mathematics/science and integrated humanities. The study participants were generally older students who were overage for grade (average was just under 18) or had previously dropped out of school. Because more students applied to the middle college than could be admitted, a lottery was used for admission. Students not admitted (i.e., those assigned to the control group) were free to participate in other regular and alternative education programs in the community and most did.

The original study sample of 516 students was comprised of two cohorts. Cohort 1, drawn from students who applied to the middle college at the beginning of the 1992-1993 school year, included 199 students who were admitted and 123 students in the control group. Cohort 2, drawn from those who applied for the 1993-1994 school year, consisted of 123 students who were admitted and 71 students in the control group. A follow-up survey was administered two years after random assignment; 244 intervention group students and 150 control group students responded yielding response rates of 76% and 77%, respectively. The results were reported for each cohort and for the cohorts combined.

Because this experiment was part of a larger dropout prevention evaluation, the outcome measures were limited to dropping out, graduating, or earning a GED. For Cohort 1, the only significant finding was that more control students earned a GED by the end of the third-year than middle college students (37% vs. 24%) resulting in an effect size computed by WWC of -.38. When the cohorts were combined, 36% of students in the middle college group had dropped out of school, compared with 33% of control group students. The researchers also found that 40% of students in the middle college group had earned a high school diploma or GED certificate two years after random assignment, compared with 38% of control group students. Neither difference was significant statistically or important substantively.

[5] For a description of these criteria, see What Works Clearinghouse (2008).

Even conceding that the Dynarski et al. study is from only one city and is over a decade old, its methodological rigor requires that its findings be considered carefully. There was no self-selection in this study. Random assignment ensured that any differences in ability and motivation among the participants were distributed randomly in the treatment and control groups. With this random assignment, the early college intervention did not show positive effects.

## Conclusions and Discussion

The Karp et al. (2007) and Kotamraju (2005) studies found that there were positive effects associated with taking dual enrollment courses. Both studies compared students who took dual enrollment courses of any type to students who did not. These studies controlled for characteristics of the students, but not for the type or quality of the dual enrollment courses that they took. Even with a treatment that was highly variable, advantages were found for dual enrollment students. Most of these advantages were found using regression methods that yielded estimated differences of 4% or 5%, except for entry into postsecondary education, in which dual enrollment students were 16% more likely to enroll. This large difference implied that even before taking dual enrollment courses, those who took them were more inclined to continue their education beyond high school than students who did not.

When the degree of articulation moves beyond high school students taking selected college courses, implementation becomes more difficult. Articulation agreements ensure a more structured alignment between secondary and postsecondary instruction; however, they are more difficult to achieve than dual enrollment. The foundation of a Tech Prep consortium is an articulation agreement between high schools and one or more postsecondary institutions. Articulation requires that faculty in the same occupational areas from the two levels must come to agreement on the content to be taught at their respective levels and on the competencies that high school students must demonstrate to receive college credits. In most agreements, the credits that students earn in high school are not awarded until the student (a) enrolls in a postsecondary institution that signed the agreement and (b) makes specified progress in the same occupational area studied in high school.

The credits earned in high school provide Tech Prep participants a head start in college, but the evidence is equivocal on whether these credits lead to postsecondary degrees or other credentials. As cited in *Three Previous Initiatives Similar to Programs of Study*, Bragg et al. (2002) conducted a longitudinal study of students who had participated in eight "high-fidelity" Tech Prep consortia. These consortia, in the judgment of an expert panel, had all of the characteristics that good Tech Prep programs should have. Over one-half of the high school graduates from these consortia (54%) continued their educations at the lead postsecondary institution in their consortia. In six of the consortia, over 80% continued their educations at some postsecondary institution. Despite these high rates, only 1 in 10 students who

enrolled obtained an associate degree or other certificate three to four years after high school. Even in the best performing consortium, only 19% obtained a credential. Bragg et al. compared these results to a matched group of non-Tech Prep participants and found no significant differences in credential attainment between the groups.

The study of career pathways by Lekes et al. (2007), found that students who earned dual credits while in high school increased their chances of earning a certificate or degree. Just as Bragg et al. (2002) had studied highly regarded Tech Prep programs, these data were from a community college that had received a national award for the quality of its transition pathways. Lekes et al. (2007) used regression methods to control for measured differences between students who had followed high school pathways to the community college and students who had not. The percentages in the two groups that received degrees or certificates were 21.3% for those students who had followed pathways and 17.2% for those who had not. This difference is of similar size to most of those found by Karp et al. (2007) on other outcome measures.

Early college high schools achieve the highest degree of secondary-postsecondary articulation, but the heavy emphasis on college-level instruction in high school does not appear feasible for most POS. Many of the students in CTE courses are similar to the students recruited for early college high schools. Both often come from economically disadvantaged families and perform poorly in academic classes. The large difference between them is self-selection into early college high schools.

Students who enter early college high schools commit themselves to studying much harder than the average student. Even with this commitment, however, the formative evaluation of the Early College High School Initiative (AIR/SRI, 2007) indicated that the initiative has had to modify one of its core principles. This principle originally stated that each student will complete high school with an associate degree or the credits for the first two years of a baccalaureate degree. The principle now states that students will earn *up to* two years of college credit. This modification reflects the difficulty of bringing students who are performing poorly at the high school level to the point that they can master college-level content. Like students in early college high schools, many CTE students do not possess the academic skills of the average high school student. Often they elect or are guided to CTE for this very reason. But enrolling in CTE courses does not require an explicit commitment to study hard. Their interest in the occupational areas they enter may provide more motivation to learn than the typical academic class; however, it is unlikely to bring them to college-level performance.

Given these considerations, it is concluded that, at best, modest gains in academic achievement are realized by CTE students who take college courses while in high school. Since regression analyses cannot fully control for individual differences, the advantages that have been found may be due to unmeasured differences between those who do and do not participate in dual enrollment classes.

These modest achievement gains must be considered, however, in light of the advantage in postsecondary credits earned by those who took college courses while in high school. The Karp et al. (2007) analyses of the Florida data found, for both the full sample and CTE students, that those students who participated in dual enrollment earned 15.2 more postsecondary credits than nonparticipants, the equivalent of a full semester of postsecondary education. In the CUNY data, the advantage for dual enrollment participants was 10.6 credits. These differences support the arguments that dual enrollment reduces cost and increases the efficiency of the educational process.

Dual enrollment may improve efficiency, but the evidence indicates that it has a modest impact on the academic skills that represent a major barrier to postsecondary success for many CTE students. Rather than assuming that the opportunity to take college courses will serve a motivational and remedial function, a more direct approach to improve the academic skills of high school CTE students is preferred. Career and Technical Education students' interest in the occupations they study can be used to improve their academic skills through curriculum integration. If academic skills are increased, students who enroll at the postsecondary level will be less likely required to take the developmental courses that often prevent them from studying the occupational skills they seek to learn.

## References

American Institutes for Research and SRI International. (2005). *Early College High School Initiative evaluation year end report: 2003–2004.* Washington, DC: American Institutes for Research. Retrieved May 27, 2008, from http://www.earlycolleges.org/Downloads/ECHSI2005Synthesis.pdf

American Institutes for Research and SRI International. (2006). *Early College High School Initiative: 2003-2005 evaluation report.* Washington, DC, and Menlo Park, CA: Authors. Retrieved May 27, 2008, from http://www.earlycolleges.org/Downloads/ECHS_Eva_2003-2005.pdf

American Institutes for Research and SRI International. (2007). *Evaluation of the Early College High School Initiative: Select topics on implementation.* Washington, DC: American Institutes for Research. Retrieved June 18, 2008, from http://www.earlycolleges.org/Downloads/ECHSI_Synth%20Report2007.pdf

Bragg, D. D., Loeb, J. W., Gong, Y., Deng, C-P., Yoo, J., & Hill, J. L. (2002). *Transition from high school to college and work for Tech Prep participants in eight selected consortia*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota. Retrieved April 24, 2008, from http://www.nccte.org/publications/infosynthesis/r%26dreport/Transition-Bragg%20ALL.pdf

Dougan, C. P. (2005). The pitfalls of college courses for high school students. *The Chronicle of Higher Education, 52*(10), B20.

Dynarski, M., Gleason, P., Rangarajan, A., & Wood, R. (1998). *Impacts of dropout prevention programs: Final report*. Princeton, NJ: Mathematica Policy Research, Inc.

Karp, M. M., Calcagno, J. C., Hughes, K. L., Jeong. D. W., & Bailey, T. R. (2007). *The postsecondary achievement of participants in dual enrollment: An analysis of student outcomes in two states*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota. Retrieved June 3, 2008, from http://www.nccte.org/publications/Dual_ Enrollment.pdf

Kotamraju, P. (2005, April). *The Minnesota Post-Secondary Enrollment Options Program: Does participation in dual enrollment programs help high school students attain career and technical education majors and degrees in college?* Paper Presented at the Council for the Study of Community Colleges, 47th Annual Conference, Boston, MA.

Lekes, N., Bragg, D. D., Loeb, J. W., Oleksiw, C. A. Marszalek, J., LaRaviere, M. B., et al. (2007). *Career and technical education pathway programs, academic performance, and the transition to college and career*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota. Retrieved May 9, 2008, from http://www.nccte.org/publications/infosynthesis/ r&dreport/CTE_Pathway_Programs.pdf

Lieberman, J. E. (1986). *Middle college: A ten year study*. (ERIC Document Reproduction Service No. ED271153)

Lieberman, J. E. (2004). *The early college high school concept: Requisites for success*. Retrieved May 28, 2008, from http://www.earlycolleges.org/ Downloads/ECHSConcept.pdf

Reindel, T. (2006). *Postcards from the margin: A national dialog on accelerated learning.* Bolder, CO: Western Interstate Commission for Higher Educations; and Boston, MA: Jobs for the Future. Retrieved May 27, 2008, from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000 019b/80/29/e1/e4.pdf

Resources for Learning, LLC. (2007). *Texas study of the middle college early college expansion grant program: Final report.* Retrieved May 30, 2008, from http:// www.tea.state.tx.us/opge/progeval/HighSchool College/MCEC_05-07.pdf

Waits, T., Setzer, J.C., & Lewis, L. (2005). *Dual credit and exam-based courses in U.S. public high schools: 2002–03* (NCES 2005–009). Washington, DC: U.S. Department of Education, National Center for Education Statistics. Retrieved June 3, 2008, from http://nces.ed.gov/pubs2005/2005009.pdf

What Works Clearinghouse. (2008). *Procedures and standards handbook*. (Version 2.0). Washington, DC: Author. Retrieved March 4, 2009, from http://ies.ed.gov/ncee/wwc/pdf/wwc_procedures_v2_standards_handbook.pdf

## Acknowledgement

The work reported herein was supported under the National Research Center for Career and Technical Education, PR/Award No.VO51A070003 administered by the Office of Vocational and Adult Education, U.S. Department of Education. However, the contents do not necessarily represent the positions or policies of the Office of Vocational and Adult Education or the U.S. Department of Education, and you should not assume endorsement by the federal government.

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*Career and Technical Education Research, 33(3), pp. 203-215*


# The Success of Implementing Programs of Study in Health Careers through Career Clusters and Pathways

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## Abstract

*As career clusters and pathways are being implemented within the program of study requirement of the Perkins IV legislation, the current linkages between entry level occupations and careers requiring advanced certifications or degrees should be examined by career and technical education (CTE). This study examined the linkage in the healthcare field in Oklahoma and used archival enrollment trend data from 2000-01 through 2004-05. It determined the degree to which high school students completing Health Science Technology/Health Careers Certification programs were transitioning (i.e., articulating) into advanced healthcare programs in technology centers and colleges. The findings suggested that the connection between health career programs at technology centers and colleges may not be well defined for students as indicated by continuing study in postsecondary education. The findings also indicated that the programs of study that were examined may not be effective in connecting high school students to further studies in technology centers or colleges. The study has implications for rethinking programs of study, and their implementation through career clusters.*

## Introduction

The discussion regarding the role of career and technical education (CTE) is an important one as the United States is challenged in providing a highly qualified professional workforce to fill the demand for technicians within major industries (Association for Career and Technical Education [ACTE], 2008). A traditional measure of success in CTE has been program completion, student retention, and job placement. With the exception of Tech Prep programs, the examination of how students articulate from one program to another and to postsecondary education has not been studied in the Oklahoma system of CTE. However, the Carl D. Perkins Career and Technical Education Improvement Act of 2006 (Perkins IV) places an emphasis on the articulation outcome by mandating the implementation of a program of study leading to industry certifications or degrees. Section 122(c) (1) (A) (B) & (D) of the Perkins Act, 2006 states CTE content areas must:

> (i) incorporate secondary education and postsecondary education elements (ii) include coherent and rigorous content aligned with challenging academic standards and relevant CTE content in a coordinated, non-duplicative

> progression of courses that align secondary education with postsecondary education to adequately prepare students to succeed in postsecondary education.

Oklahoma implementation of the Perkins IV program of study mandate has been through the national framework of career clusters and pathways. To determine if changes are needed to implement Perkins IV and the new program of study structure within career clusters and pathways, it is critical to examine whether high school students were connecting a series of CTE programs and moving into a sequential progression of higher level knowledge and skills. Many states appeared to be developing programs of study without examining student progression in courses (National Association of State Directors of Career and Technical Education Consortium, 2009). Neither the programs of study required by Perkins IV, nor the coherent sequence of courses required in The Carl D. Perkins Vocational and Applied Technology Act of 1998 (Perkins III) specified measures to examine the degree to which students were following the sequence of courses or programs of study across years. This lack of specificity for building and evaluating student progression in course sequences of CTE programs provided the impetus for this study. Skills progression was defined and analyzed through the examination of enrollment in and completion of advanced health-related CTE certificate programs and two- and four-year college degrees. Health Science Technology/Health Careers Certification (HST/HCC) programs were selected for the study because of the importance of this industry in the state. According to a study by Oklahoma's Governor's Council for Workforce and Economic Development (2006), Oklahoma's health care industry provided 198,636 jobs in 2004, or 14% of the state's total employment. With an estimated 141,032 additional jobs created indirectly in other industry sectors, Oklahoma's health care industry contributed 339,668 jobs to the state in 2004 (Oklahoma Department of Commerce, 2005).

In Oklahoma, the HST/HCC courses are designed to provide for the exploration of health careers and development of multi-occupational knowledge and skills related to a wide variety of health careers. These programs also approximated the foundation courses and content within the national career cluster framework. Students were provided hands-on experiences for continued knowledge and skill development. The program is taught by different methodologies, such as pre-employment, laboratory, clinical rotation, or cooperative education. It is typically offered to high school juniors and seniors and is two school-years in length.

In the new structure of career clusters and pathways, as implemented in Oklahoma, the HST/HCC programs should provide the foundation that leads to progressively more complex and advanced skill levels. For example, traditional vocational education would offer a nursing program. A career cluster program of study would offer pathway options such as therapeutic services that include nursing, respiratory therapist, physician, paramedic, pharmacist, and surgical technician. A program of study defines the sequence of courses, credentials, and options available

for progressing to postsecondary education. This new starting point for instruction suggests that students would be exposed to more potential careers, thereby, increasing career and student awareness of educational options (Ferris State University, 2002).

The Oklahoma program of study implementation was based on the U.S. Department of Education, Office of Vocational and Adult Education (OVAE) project that developed a national framework of Career Clusters and Pathways that connect education to industry. The project developed 16 career clusters and 81 pathways with foundation level knowledge and skills; it also has more specialized and complex pathway and occupational specialty knowledge and skills (Ruffing, 2006). This national career cluster framework established a relationship among knowledge and skills and provided a broad structure within which states may create courses with the knowledge and skills suggested as content. The implication for this new structure is a connection among knowledge and skills and courses taught in high school CTE and career technology centers, and continuing in postsecondary education.

## Conceptual Framework

The conceptual framework for this study is derived directly from Perkins IV legislation. One of the purposes of Perkins IV is "promoting the development of services and activities that integrate rigorous and challenging academic and career and technical instruction, and that link secondary education and postsecondary education for participating career and technical education students" in high skill, high wage, and high demand occupations. In Oklahoma, healthcare fits all of these categories. This study sought to add to the knowledge base about Perkins IV purpose and implementation.

It is important to review Perkins III for background of CTE program sequencing and linkages with postsecondary education. Perkins III defined "vocational education" as: "organized educational activities that offer a sequence of courses that provides individuals with the academic and technical knowledge and skills the individuals need to prepare for further education and for careers in current or emerging employment sectors" (PL 105-332, Sec. 3, [29][A]). Perkins III required a sequence of CTE courses; however, guidance was not issued on the content of the sequence of courses or accountability established to examine the manner in which students progressed through the sequence of courses.

Perkins IV built upon Perkins III with the added expectation that states and local education agencies would create programs of study with challenging content provided in a progression of courses that are non-duplicative and aligned with postsecondary education. To examine the degree to which a sequence of courses satisfies Perkins IV intent, it is important to review whether Perkins III influenced the way students progressed through the "coherent sequence of courses." The archived data used in this study was reflective of the legislative intent and purposes

of Perkins III for establishing a sequence of courses that "link secondary and postsecondary education for participating vocational and technical education students" (PL 105-332, Sec. 2, [2]).

One of the principal tasks of adolescence is the development of various aspects of identity; therefore, career exploration, the formation of career plans, and tentative choices are important in the overall process of identity formation (Super, 1963). Career theorists have highlighted adolescence as a key developmental period in the exploration and formation of potential career objectives. During the high school years, students make crucial career decisions such as completing high school, seeking employment, and pursuing postsecondary education. These decisions are important because they inevitably influence career choice goals, aspirations, and plans (McWhirter, Rasheed, & Carothers, 2000). Gushue, Scanlan, Pantzer, and Clarke (2006) found that students who believed that they have the opportunity to engage in career exploration were more likely to do so and more likely to report an integrated vocational identity.

Research regarding career choice has discovered that there is a lack of knowledge regarding 21st Century careers, particularly in the allied health occupations. Mishoe, Valeri, and Beveridge (1995) surveyed high school students about factors that affected allied health career choices. Although 76.5% of the Georgia high school students in the study had a favorable impression of allied health, only 15% indicated that they were very familiar with the allied health professions (Mishoe et al., 1995). High school students in Houston, Texas, were also unaware of allied health careers, as reported in a study designed to measure interest in higher education, particularly the health professions (Thomson, Miller, Shargey, Smith, & Denk, 1991). These results point to lack of knowledge, rather than lack of interest, as an important possible cause of enrollment vacancies in allied health careers (Mishoe et al., 1995). The lack of information increases the value of a program such as HST/HCC to provide healthcare career exploration experiences, and to connect students with more advanced skills progression in the allied health field.

Perkins III and IV state plans have required each state to describe how CTE programs will prepare students for opportunities in postsecondary education or entry into high wage, high skill, and high demand occupations and how participating students become aware of such opportunities. Although career information and planning is expected to be provided to CTE students in Perkins IV, no direct or accountability measures are in place to determine the degree to which information is provided to students, or the effectiveness of programs of study in helping CTE students access the opportunities for high skill, high wage, or high demand occupations. The national career cluster framework was not in place to guide the coherent sequence of courses required in Perkins III; however, it is heavily influencing the development and implementation of programs of study required in Perkins IV.

Educational and counseling implications are strongly connected with the programs of study on which students may base their future plans to acquire career skills and experiences. The program of study may be a factor in directing students to additional certifications, licensures, or degrees as required by Perkins IV. Learning experiences influence significantly one's career interests and choices (Lent, Brown, & Hackett, 1994), and effective programs of study that link postsecondary education may affect the degree to which high school students continue into postsecondary education.

During this study, traditional CTE three-hour block programs in Oklahoma technology centers were transitioning into a series of courses sequenced to create programs of study within career pathways. The program of study is intended to lead to completion of career cluster foundation and career pathway knowledge and skills that lead to postsecondary education and employment in related industry sectors. The benchmarks for determining success in making more deliberate connections through a program of study in health careers education were not available in the literature; likely because such benchmarks were not required in Perkins III. This study provided a benchmark for examining the effects of programs of study as required in Perkins IV.

Enrollment, retention, completion, and follow-up are key assessment components in the Oklahoma CTE accountability system. Determining best practices for enrolling students in appropriate courses and assisting them in achieving the highest possible level is important for improved guidance and counseling practice. Guidance and counseling is critical for providing information to secondary students preparing for high skill, high wage, and high demand careers. Assisting CTE students in finding employment in high wage, high skill, and high demand careers is critical to performance goals, career guidance practices, funding state career technology centers, and Perkins IV accountability. The connections between CTE healthcare programs and the guidance provided through programs of study, that outline the academic and CTE courses from high school through postsecondary education, had not been studied for their effects on education and Perkins IV performance outcomes. This study was intended to address the lack of empirical data and create a knowledge base on the connection between programs of study, and implementation of a coherent sequence of courses required in Perkins III and a comprehensive system of programs of study required in Perkins IV.

## Purpose of the Study

The purpose of the study was to examine whether HST/HCC programs were serving (a) as the foundation to align and create programs of study leading to postsecondary education and (b) the current and emerging demands of industry for high skill employees as required in Perkins III and expanded in Perkins IV. Based on the review of literature, requirements of Perkins III, structure of Oklahoma career

technology centers, and health careers programs that have the options for employment and associate degree articulation, the following research questions were posited for the study:

1. To what extent do HST/HCC students continue to postsecondary education?
2. To what extent are HST/HCC students employed after completing the program?
3. To what extent do HST/HCC programs provide the foundation for a program of study?

## Assumptions

It was assumed that the HST/HCC courses were aligned with industry sector demands, standards, and credentials; or postsecondary degree options and provided the opportunity for making students aware of career and postsecondary options (Perkins III). It was also assumed that students were enrolled based on interest and/or aptitude and that some form of a plan of study was developed based upon the expectations of Perkins III for providing support for career guidance and academic counseling programs. These assumptions led to the belief that students who completed the HST/HCC program would transition (i.e., articulate) into postsecondary education more frequently than the general population of students entering postsecondary education in Oklahoma. Because the HST/HCC courses were designed for career exploration and building of core skills, it was believed that continuation into postsecondary education may be enhanced by program completers.

## Limitations of the Study

The study examined only archival enrollment data in health careers programs in career technology centers in Oklahoma. The archival data reflected the legislative intent of Perkins III for establishing a coherent sequence of courses that prepares CTE students for employment and postsecondary education. Only those students who had valid social security numbers and could be found in the Oklahoma State Regents for Higher Education (OSRHE) Unitized Data System (UDS) were matched for college attendance rates and degree completion. Qualitative analysis was not used to identify contributing factors to the findings. Individual career technology center data were not analyzed to identify best practices or contributing factors to the outcomes. Additionally, individual student characteristics such as gender, ethnicity, socio-economic status, high school course-taking patterns, career guidance interventions, or career goals were not examined in this study. Further, Unemployment Insurance (UI) data files could only be matched with valid social security numbers and employment for which UI was paid.

## Methodology

The analysis was performed on archival data collected by the Oklahoma Department of Career and Technology Education (ODCTE) from school year 2000-01 to 2004-05. These most recent data were from programs influenced by the expectations and requirements of Perkins III. They included student follow-up data after completion of a program at a career technology center. No identifiable student data were reviewed by the researcher. All data were archived and provided as aggregate and anonymous data.

The data were collected from 2000-01 to 2004-05 on individual high school students enrolled in HST/HCC programs offered in career technology centers across Oklahoma. Health cluster programs were offered at all 29 technology centers in the state. The ODCTE enrollment, completion, and follow-up data were reported for each student by each career technology center to the state during the five years.

The data were matched by student through the ODCTE Information Management Division (IMD). The process was completed by examining student name and/or social security number matches across program enrollments during the five year period 2000-01 through 2004-05. The purpose was to identify whether students were enrolling in additional health career courses following completion of the HST/HCC program. The HST/HCC is the initial health careers course that a high school student may enroll in at a career technology center; it forms the foundation of a coherent sequence of courses for a healthcare program under the requirements of Perkins III and Perkins IV. The course was offered for high school juniors and seniors. The analysis examined the number of high school students completing the HST/HCC program and enrolling in an adult CTE program in one of the health cluster programs at a career technology center or two- and four-year colleges.

The following health careers certification programs offered at state career technology centers were examined for individual student enrollment and completion matches: Clinical Medical Lab, Certified Massage Therapist, Dental Assisting, Emergency Medical Technician, Licensed Practical Nurse, Medical Assisting, Medical Office Technician, Nurse Assisting, Nursing Options, Occupational Therapy Assistant, Pharmacy Technician, Physical Therapy Assistant, Radiology Technician, Respiratory Care, Therapeutic Options, Surgical Technology, and Vision Care. For the analysis of college attendance rates and degree completions, the high school and adult student names were provided to the OSRHE through an interagency memorandum of understanding agreement for data sharing. These records were returned to the ODCTE without personal identifying information, but with matching completed on each individual student. The matches were made according to OSRHE methodology focusing only on first time, first semester college students for persistence and degree completion in two- or four-year colleges and universities.

The student follow-up data were completed through student survey and phone calls initiated from the local program instructors during the first quarter following

completion. Employment was verified with employment data collected by the Oklahoma Employment Security Commission utilizing Unemployment Insurance (UI) data files. "Status unknown" represents only 1% of HST/HCC program completers.

## Findings

### Research Question 1: To what extent do HST/HCC students continue to postsecondary education?

Over the five-year period from 2000-01 to 2004-05, enrollments from all 29 career technology center HST/HCC programs were examined. During that time, approximately 4757 students completed the program. Of the completers, 19% continued in what could be defined as a program of study in a health career area. Of those entering a certification program, 78% completed the program (see Table 1). The programs attracting the most HST/HCC completers were Practical Nursing ($n$ = 464), Medical Assisting ($n$ = 102), Nurse Assisting ($n$ = 101), and Emergency Medical Technician ($n$ = 41).

The HST/HCC completers were also matched with enrollments in state public two- and four-year colleges and universities. Over the five-year period from 2002-03 through 2005-06, of the 4757 HST/HCC program completers, 2611 enrolled in a state public two- or four-year college or university in a health-related degree program representing a 54% articulation rate. Those students completing a degree represented a 2% degree completion rate (see Table 1).

### Research Question 2: To what extent are HST/HCC students employed after completing the program?

The historic focus of CTE has been to prepare students for entry level jobs and seek employment rather than continuing education. The follow-up reports submitted on this population of HST/HCC completers were analyzed for job placement. To inform this analysis, HST/HCC completers were matched with student follow-up data for placement in employment. Only placement in related occupations as determined by the North American Industry Classification Codes (NAICS) codes was examined (U.S. Census Bureau, 2007). Of the 4757 HST/HCC program completers, a 33% placement rate was found for HST/HCC completers with 85% of those students employed in a related occupation (see Table 1). The placement rate in a nonrelated occupation was 5%. Because this study was a baseline study, comparisons with other sets of data on HST/HCC completers were not available. Complete numerical and percentage data for articulation, completion, and employment for all HST/HCC completers are reported in Table 1.

Table 1
*Articulation and Employment of HCC/HST completers (N = 4757)*

| | Articulation | Completion/Employment |
|---|---|---|
| Certificate programs entry | 904 (19%) | |
| Certificate completion | | 708 (78%) |
| | | |
| College degree programs | 2611 (54%) | |
| Degree completion (2- or 4-year) | | 58 (2%) |
| | | |
| Employment | 1608 (33%) | |
| Related occupation | | 1370 (85%) |
| Unrelated occupation | | 238 (14%) |

**Research Question 3: To what extent do HST/HCC programs provide the foundation for a program of study?**

The findings of the study did not appear to support the notion that HST/HCC courses enhance postsecondary articulation in programs of study. The rate of articulation into additional postsecondary healthcare programs was somewhat lower than the college attendance rate for all first time freshman students in the state. The average state college attendance rate for all high school students in Oklahoma was 57.8% (OSRHE, 2008). The college completion rate of the HST/HCC students was considerably lower than the completion rate for all high school students in the state. The rate of degree completion was 25% for Oklahoma community colleges and 40% for regional four-year colleges for all degree majors (OSRHE, 2008). The structure did not appear to be effective in connecting high school students to further knowledge and skill development in career technology centers or colleges. This also has implications for the professional development and training of CTE teachers, high school counselors, and technology center student services staff. They need to gain an understanding of, and build skills to effectively work within, this new cluster framework.

## Discussion and Implications

This study sought to determine the extent to which HST/HCC programs served the role of a program of study, enhanced the postsecondary rate of participation compared to the general population, and prepared students for employment in the health careers field in Oklahoma as required by Perkins IV. Enrollment, retention, completion, and placement in a single program have historically formulated the foundation for accountability and success for Oklahoma CTE. With the implementation of the national career cluster framework and Perkins IV, a new

expectation of more connectivity between programs into postsecondary education has emerged which could shape the way CTE accountability is examined.

## Continuation in Postsecondary Education

The findings that HST/HCC program completers were not successfully transitioning (articulating) in significant numbers to postsecondary education, or completing a degree or certification raises an important question: Why are students not continuing into postsecondary education? Of the 19% of students who articulated into a postsecondary CTE certificate program, 78% were successful. Understanding the underlying conditions that influenced students to choose postsecondary certificate programs, the process used to enroll students into CTE programs, the role of dual enrollment in articulation, and the factors leading to failure to complete need to be understood in greater detail. A study is needed to determine the reasons for the failure of so many students to complete a two- or four-year degree in health-related degree programs and those factors contributing to success. Additionally, a study is needed to determine the extent to which a plan of study that links high school academic and CTE courses with a college degree program could improve rates of articulation to higher education and degree completion.

Perkins IV requires CTE content areas to "include coherent and rigorous content aligned with challenging academic standards and relevant career and technical content in a coordinated and non-duplicative progression of courses that align secondary education to adequately prepare students to succeed in postsecondary education" (PL 109-270, Sec. 3, [5][A][i], pg. 4). The HST/HCC content needs to be examined to determine if the foundation for success in postsecondary education is contained in the course. Further, it should determine if the pathways (a) are clearly articulated to enable students to understand the progression to postsecondary education and employment, and (b) determine the possible reasons for student failure to progress in postsecondary education.

## Employment after Program Completion

Placement in employment has been a stable measure of success in CTE. The results of the study indicated that 33% of the students were placed in a related occupation. Because this was a benchmark study, additional investigation is needed to determine the trends for the rate of employment over time. Examination of the types of certification and occupational placements is needed. This information would inform practice and determine which health career fields may provide the best options for employment. Further, examination of the opportunities to attain additional credentials through employer supported experiences and which careers require postsecondary education for employment is also needed.

**Foundation for a Program of Study**

According to Lent (2007), exposure to areas of interest and confidence in gaining skills related to a career area enable students to set realistic career goals perceived as attainable. The National Governor's Association (NGA, 2007) stated that "students need help choosing a course of study to prepare them for the careers they want" (p. 5). Students need to know that what they study in high school has direct relevance to postsecondary coursework and the workforce. The HST/HCC program could provide the relevance and assistance to facilitate students' choosing the appropriate program of study in a relevant pathway, if the next courses were aligned and the connection made more directly for students and paired with appropriate guidance and advisement. This study should be replicated with clusters, pathways, and career majors to determine if changes in programs of study as required by Perkins IV are substantive sufficiently to result in different outcomes.

More discussion is needed within the CTE community regarding the contribution of career guidance and counseling to support postsecondary education completion. Additionally, there is a need to determine if greater advocacy for resources in the reauthorization of Perkins is required to improve student outcomes. Clearly, career guidance and counseling is valued in CTE as demonstrated through the provisions of Perkins IV; however, its precise contribution to student achievement and transition into postsecondary education should be determined.

A coherent sequence of courses was required of CTE programs as early as 1998; however, the findings presented a troubling outcome that raises questions about the extent to which high school CTE and postsecondary education articulation were implemented during Perkins III. The programs of study and career cluster and career pathway frameworks strongly recommended including the requisite academic skills and coursework for success in the chosen pathway. This study identified possible problems in the development and implementation of programs of study which could influence the effectiveness of Perkins IV. Next steps could include engaging state CTE leadership and organizations, and the Office of Vocational and Adult Education in creating models using scientifically-based research for implementing programs of study that satisfy the intent of Perkins IV. Once implemented, the extent to which high school programs of study link CTE courses to postsecondary programs should be examined for impact on student enrollment, achievement, and completion in postsecondary education. Studies of this type are needed to inform the reauthorization of the Perkins Act.

The results of this study have potential implications for Perkins accountability and reauthorization. They suggested that examining how programs of study could be aligned, connected, and implemented in a more intentional manner is required for implementing Perkins IV most effectively. Additional investigations should determine if programs of study, career pathways, and career clusters provide improved structures over the coherent sequence of courses required in Perkins III for encouraging further study in healthcare for high school students.

Determining relationships among CTE courses, programs, and the new curriculum structure of programs of study are critical in creating an environment which will facilitate successful Perkins IV implementation. The implications of this study for new definitions and measures of CTE program performance should be considered. Additionally, the implications for possible new practices in career technology center guidance and counseling programs should be examined as career clusters, pathways, and programs of study are implemented. If CTE is to be responsive to industry needs, then the extent to which programs of study provide qualified applicants for the workforce is critical and must be identified. The capacity to identify the most effective sequence of CTE courses leading to high wage, high skill, and high demand careers and a greater rate of attainment of credentials and degrees is essential. It has implications for future accountability and performance reporting with respect to career clusters, career pathways, and programs of study in CTE and Perkins IV.

## References

Association for Career and Technical Education. (2008). *ACTE issue brief: Career and technical education's role in workforce readiness.* Alexandria, VA.

Carl D. Perkins Vocational and Applied Technology Education Act of 1998. Pub. Law 105-332.

Carl D. Perkins Career and Technology Education Improvement Act of 2006. Pub. Law 109-270.

Ferris State University. (2002). *Decisions without direction: Career guidance and decision-making among American youth: Comprehensive report and data summary*. Retrieved April 28, 2008, from http://www.ferris.edu/career institute/report.pdf

Gushue, G. V., Scanlan, K. R. L., Pantzer, K., & Clarke, C. P. (2006). The relationship of career decision-making, self-efficacy, vocational identity, and career exploration behavior in African American high school students. *Journal of Career Development, 33,* 1.

Lent, R. (2007). Social cognitive career theory: What attracts students to--and keeps them in STEM fields? A theoretical perspective. In S. Olson, & A. P. Fagen (Eds.), *Understanding interventions that encourage minorities to pursue research careers: Summary of a workshop* (pp. 7-11). Washington, DC: The National Academies Press. Retrieved May 6, 2008 from www.national academies.org/moreworkshop

Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice and performance [Monograph]. *Journal of Vocational Behavior, 45,* 79-122.

McWhirter, E. H., Rasheed, S., & Carothers, M. (2000). The effects of high school career education on social-cognitive variables. *Journal of Counseling Psychology, 74,* 330-341.

Mishoe, S. C., Valeri, K. L., & Beveridge, L. H. (1995). A survey of high school seniors' career choices: Implications for allied health. *Journal of Allied Health, 22,* 33-43.

National Association of State Directors of Career and Technical Education Consortium. (2009). *Status of career cluster implementation across the nation.* Retrieved May 19, 2009, from http://www.careertech.org/ show/publications

National Governor's Association. (2007). *Issue brief: Retooling career and technical education*. Washington, DC: NGA Center for Best Practices.

Oklahoma Department of Commerce. (2005). *Local health care cluster analysis,* Author.

Oklahoma Governor's Council for Workforce and Economic Development. (2006). *Oklahoma's health care industry report.* Oklahoma City, OK: Oklahoma Department of Commerce.

Oklahoma State Regents for Higher Education. (2008). *Outcomes for higher education*. Oklahoma Education Information System. Retrieved March 3, 2009, from http://www.okhighered.org/oeis/Outcomes.shtml

Ruffing, K. (2006). *The history of career clusters.* National Association for State Directors of Career and Technical Education Consortium: Washington, DC.

Super, D. (1963). Vocational development in adolescence and early adulthood: Tasks and behaviors. In D. E. Super, R. Starishevsky, N. Maitlin, & J. P. Jordaan (Eds.), *Career development: Self-concept theory* (pp. 79-95). New York: College Entrance Examination Board.

Thompson, W. A., Miller, L. M., Shargey, B. O., Smith, Q., & Denk, J. (1991). A follow-up study of allied health educational and career interests of graduates of a high school for health professions. *Journal of Allied Health, 20,* 233-44.

U.S. Census Bureau. (2007). *U.S. NAICS manual: North American Industry Classification System:* Washington, DC.

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*Career and Technical Education Research, 33(3), pp. 217-226*


# State Plans for Implementing Programs of Study

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## Abstract

*This article examines how the states plan to implement the Programs of Study (POS) that were mandated by the 2006 reauthorization of the federal legislation for career and technical education. A coding system was developed for summarizing the methods described in the plans of all 50 states, the District of Columbia, Guam, and the Virgin Islands. The POS will primarily be implemented through modification and expansion of existing delivery methods. In two-thirds of the 53 plans, local districts will have the primary responsibility for developing POS using criteria and templates provided by the states. All states will approve local plans and provide technical assistance and professional development.*

Federal legislation addresses issues about which a Congressional consensus emerges concerning the gap between current conditions and more desirable future conditions. Once such a gap has been identified, the legislation specifies actions that available evidence suggests may have an impact on these problems (McDonnell & Grubb, 1991). Among the issues addressed in the Carl D. Perkins Career and Technical Education Improvement Act of 2006 (P.L. 109-270, Perkins IV) are concerns about the transition of career-technical students from high school to postsecondary education. The legitimacy of these concerns is supported by the evidence on transition examined elsewhere in this issue. The elements of Programs of Study (POS) specified in Perkins IV reflected current thinking among educators concerning practices that assist students to make a successful transition (Bangser, 2008). These include the alignment of secondary and postsecondary instruction, high standards and expectations, and integration of academics with career-focused classes.

Once legislation is passed in a federal, highly decentralized educational system, how is it implemented at the state and local levels? Since the establishment of the Federal Board for Vocational Education by the Smith-Hughes Act of 1917, the state plan has been the primary means for translating federal policy into state and local actions. The state plan is essentially a contract between a state and the federal government. In the plan, the state describes how it will work with its local districts to implement the activities required or authorized by legislation, and how it will evaluate the degree to which these activities are achieving the objectives of the

legislation. For this paper, state plans were examined to determine how the requirement for POS in Perkins IV will be translated into action taken by the states and local districts. The approaches that states have described in their plans are summarized and compared to results from a prior survey that collected data on these approaches. Further, the results are compared to a prior survey that collected data on these approaches.

## Methodology

When Perkins IV was passed, states were given the option of submitting a one-year transition plan followed by a 5-year or a 6-year plan describing how they would implement the new legislation. By April 1, 2008, all states were required to have submitted their plans. The sections of the plans relevant to POS for all 50 states, the District of Columbia, Guam, and the Virgin Islands were obtained from the Office of Vocational and Adult Education (OVAE), U.S. Department of Education. In the following discussion, all references to "states" include these jurisdictions.

All state plans were written following the directions in the "Guide for Submission of State Plans," which had been issued in 2007 by OVAE. This guide instructed the states to describe how they and their eligible recipients of Perkins funds will develop and implement POS. The guide repeated the language of Perkins IV regarding the components that POS must include: (a) secondary and postsecondary elements; (b) coherent and rigorous content, aligned with challenging academic standards, and relevant career and technical content; (c) opportunity for secondary education students to participate in dual or concurrent enrollment programs or other ways to acquire postsecondary education credits; and (d) outcomes consisting of industry-recognized credentials or postsecondary level certificates, or associate or baccalaureate degrees. The guide also required the states to describe how they will support eligible recipients in developing and implementing articulation agreements between secondary education and postsecondary education institutions, and make information about POS available to secondary students and their parents.

A coding system was developed to summarize the manner in which the states responded to these instructions. To develop the initial code, five states that vary in size and the emphasis they place on secondary level career and technical education (CTE) were selected: Maine, Michigan, Ohio, Pennsylvania, and Texas. The relevant sections of the plans from these states were reviewed and codes were developed to classify the responses to the instructions issued by OVAE. Two coders who had not been involved in the development of the coding system separately applied it to nine states. Questions that arose were resolved by adding additional codes and deleting those that were not clear. When agreement had been reached on the final version of the coding system, the codes assigned independently by the two coders were compared. Identical codes were assigned for 94.8% of the total codes. Almost all

disagreements involved the codes that had been developed to classify strategies for implementing POS and methods for disseminating information about them.

When the system was found to be reliable, one person coded the remaining 44 states and created a file that contained the language from the state plans that discussed strategies for implementation of POS and methods for informing students and parents about POS. These strategies and methods were reviewed by a third coder to determine if they supported the codes that had been assigned. The third coder disagreed on 20 of a total of 522 codes for an agreement rate of 96.2%. Where there was disagreement, the codes applied by the final coder were used in the analysis. The following plan excerpt is an example of a disagreement from the Connecticut state plan with regard to a strategy for implementing POS. The plan reads as follows:

> In Connecticut's Career Pathways Initiative, Connecticut will no longer offer a separate Tech Prep grant opportunity. Instead, funds once awarded separately to implement secondary/postsecondary transition strategies and articulation processes will become part of the basic secondary and postsecondary grants and will be referred to as College Career Pathways…During the transition year, the grant was utilized to support professional development activities designed to strengthen secondary/postsecondary partnerships and develop and implement articulation agreements that support seamless career pathways between high school and postsecondary educational opportunities. (Connecticut State Department of Education, 2008, p. 18)

The first coder applied code 4, statewide articulation agreements. The final coder saw no reference to statewide agreements and changed this to code 3, continue/expand existing career pathways/Tech Prep. The results that emerged from this coding are presented. These data allowed inferences about whether the states or local districts will have the primary responsibility for the development of POS, the strategies to be followed for implementation, and the methods that will be used to inform stakeholders about the POS that local districts offer.

## Results

### Implementing Programs of Study

The coding of the state plans indicates that in two-thirds (66%) of the 53 states, local districts will have the primary responsibility for developing POS. In 15 states, the state office responsible for CTE will have the primary responsibility, and in 3 states, there was not sufficient information in their plans to make a judgment. State-developed POS are typically described as core content that must be delivered, with local education agencies having the discretion to add material appropriate for local circumstances. An agricultural-based POS, for example, might be quite different if it was to be offered in an urban or rural area.

The development of the coding system identified four primary strategies that states were planning for implementation of POS. In addition to these strategies, all

states plan to approve local plans for POS and provide professional development and technical assistance in their development and implementation. The four strategies that vary across states and an "other" category were used to code the 53 state plans. The percentages of states that will use these strategies are presented in Figure 1. Providing criteria, templates, models, and frameworks for local districts to use is, by a large margin, the most frequent. Of the 35 states where local districts will have the primary responsibility for developing POS, 31 proposed providing criteria/templates for local districts to use as one of their strategies.

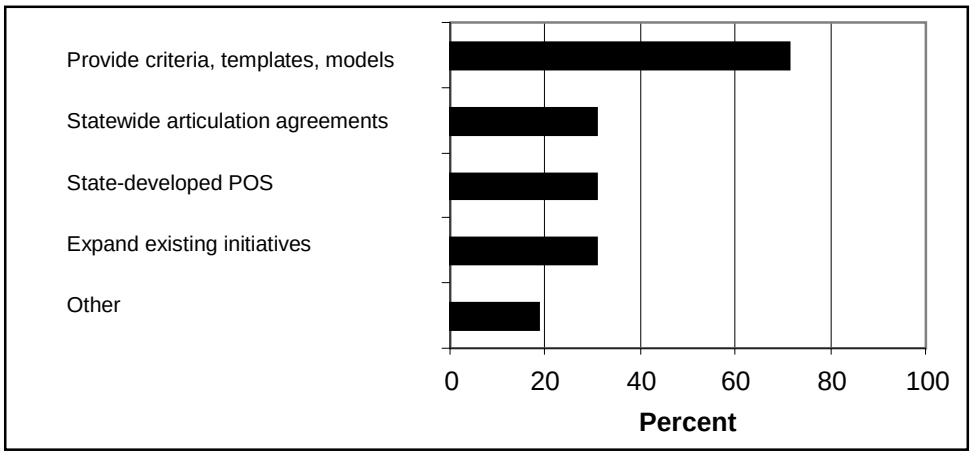


*Figure 1.* Strategies Identified in State Plans for Implementing Programs of Study

*Note*. The percentages are based on 49 states' plans. No strategies beyond approval of local plans, technical assistance, and professional development could be identified in four states. The sum of the percentages exceeds 100% because an average of 1.82 strategies was coded for each state plan.

Statewide articulation agreements enable students who have earned postsecondary credit while in high school to be awarded those credits by any postsecondary institutions in their states that have entered into the agreements. Such agreements were coded if a plan indicated that the state either had such agreements or was actively working to develop them. Even with this rather liberal criterion, a little less than one-third (31%) of the state plans referred to statewide articulation. The identical percentage referred to expanding or strengthening existing Tech Prep consortia. In Michigan, for example, the Tech Prep consortia areas are aligned with the 25 Michigan Works Agencies that implement federal Workforce Investment Act programs to facilitate increased coordination of efforts.

A sampling of the strategies coded in the Other category includes: (a) Iowa and South Dakota will strengthen transition from two-year to four-year postsecondary institutions, (b) California intends to identify exemplary locally developed POS and disseminate information about them, (c) Maine will require each eligible recipient of Perkins funds at the secondary and postsecondary levels to designate a position that will be responsible for facilitating, documenting, monitoring, and reporting on articulation agreements, (d) Arizona will establish a statewide POS that leads to an associate degree that will be accepted by the three state universities as the first two years for a bachelor's program, and (e) Nebraska plans a statewide consortium to provide leadership and direction for the alignment of secondary/postsecondary curriculum, development of statewide articulation agreements, and expansion of dual credit opportunities.

Of the 53 plans examined, three-fourths (40) described using career clusters as the basis for organizing their POS. Twenty-two made specific references to the 16 career clusters that have been adopted by OVAE,[1] and the remaining 18 referred to other clusters. It appeared that some of these were just a different grouping of the 16. If the plan referred to career clusters, but did not explicitly cite the 16, the state was coded as using a different set. Eight states indicated that they planned to use the career pathways that have been developed by the Career College Transitions Initiative in developing their POS. In 13 states, no reference to career clusters was found.

Only 15 of the state plans specified the grades to be included in the POS. The narrowest range was found in Minnesota, grades 11 to 14, the last two years of high school and the first two years of postsecondary education. The Minnesota plan encourages but does not require a wider range. Nine states specified or encouraged POS that start below grade 11 and extended to 14, and five more extended the upper grade to 16, a bachelor's degree.

Twenty-eight of the state plans specified that one POS must be offered by each recipient of Perkins funds during the first year of the plan, and Arkansas and Texas required three. The other 23 plans that were reviewed did not address the number to be offered. Of the 28 requiring one POS in the first year, 7 specified higher numbers in subsequent years, and 4 anticipate, but did not specify, higher numbers. Connecticut, Ohio, and the Virgin Islands set a goal of eventually delivering all CTE through POS. The language regarding this goal from these plans includes:

> *Connecticut*: Key to Connecticut's 2008-13 Five-Year State Plan is the ongoing development and implementation of the Career Pathways Initiative and the continued adoption of the Student Success Plan (Programs of Study)

[1] The article "Effectiveness of Previous Initiatives Similar to Programs of Study: Tech Prep, Career Pathways, and Youth Apprenticeships" in this issue discusses the emergence of the 16 career clusters as the primary way of organizing CTE programs.

> model for every Connecticut CTE student. (Connecticut Department of Education, 2008, p. 13)
>
> *Ohio*: The State will develop a phase-in plan that will ensure that existing programs transition to POS and that 100 percent of State-approved secondary career-technical education (CTE) programs have a State-approved Program of Study in FY2014. Postsecondary recipients will be required to develop/review/revise POS in collaboration with their secondary partner(s) following the same schedule as the secondary recipient. (Ohio Department of Education, 2008, pp. 15-16)
>
> *Virgin Islands*: Through the local application process, eligible recipients will be required to implement programs of study that are aligned with the Career Clusters for at least 25% of all CTE programs offered each year of Perkins IV resulting in 100% implementation of all CTE programs by 2012-13. (Virgin Islands Department of Education, 2008, p. 27)

## Providing Information about Programs of Study

Perkins IV requires recipients of its funds to describe how they will make information available regarding the POS they will offer. All but one of the 53 plans that were reviewed described one or more methods of providing such information. Figure 2 shows that all but one of the states will rely on channels that are currently in place. These existing channels include student handbooks, course catalogs, newsletters, publications, and program listing on state websites. The following paragraph from the Iowa plan is similar to the descriptions of the methods to be used in many states:

> Information about programs of study at the secondary level will be disseminated using diverse methods, resources and media. IDE [Iowa Department of Education] career and technical education consultants provide technical assistance to eligible recipients concerning technical knowledge and skills as well as infused academic and career skills and knowledge. Professional development opportunities, utilizing the Iowa Professional Development Model (IPDM) for eligible recipients, will be conducted to provide information on effective practices for integrated career and technical education programs.
>
> Examples of resources include Iowa Choices (Iowa's Career Information Delivery System), electronic bulletins and updates, student course handbooks, secondary school curriculum guides, community college handbooks, and publications such as Iowa's Community College Program Guide as well as the Iowa Career Resource Guide. (Iowa Department of Education, 2008, p.17)

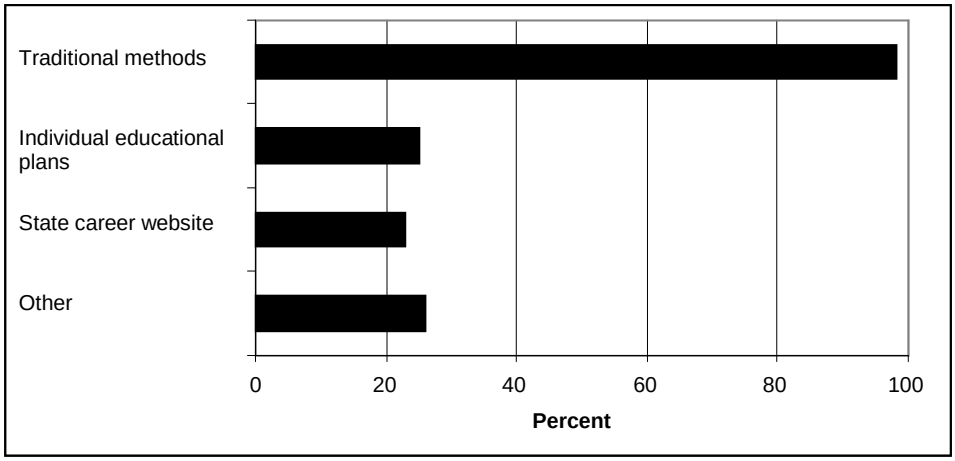


*Figure 2.* Methods described in state plans for informing secondary students and parents about Programs of Study.

*Note.* The percentages are based on 52 states. No methods of disseminating information could be identified in one state. The sum of the percentages exceeds 100% because an average of 1.73 methods was coded for each state plan.

Thirteen states included information about POS as part of the development of individualized educational plans. These individualized plans have various labels including Career Action Plan (Arkansas), Student Success Plan (Connecticut), Student Core Curriculum Plan (Iowa), Graduation Plan (Indiana, South Carolina, and Wyoming), Next Step Plan (New Mexico), and Student Education Occupation Plan (Utah). Twelve state plans noted that they would use their career information system websites to provide information about POS. In the past, these websites typically received at least some of their funding under Section 118 of Perkins III. Perkins IV continued this authorization, but since July 2007, funds have not been appropriated to implement this section of the Act. These 12 states are continuing their career information websites without these funds.

## Discussion

The procedures for implementation of POS identified by the coding paralleled the results obtained in a survey conducted by the National Association of State Directors of Career Technical Education Consortium (NASDCTEC, 2007). In the summer of 2007, less than a year after Perkins IV had set the requirement for at least one POS, NASDCTEC surveyed its members to determine how they were responding to this mandate. A total of 47 states, the District of Columbia, Guam, and Puerto Rico responded to the survey. All of these respondents, except Puerto Rico, were among the state plans that were analyzed for this article. The OVAE had

required that 5-year state plans for the implementation of Perkins IV be submitted by April 1, 2008. It seems likely that at the time states responded to the NASDCTEC questionnaire, they were working on their 5-year plans.

The survey found that most states are using the 16 career clusters adopted by OVAE for planning their POS. The clusters used most frequently, reported by 78% of the states, were agriculture and health science. The coding of the state plans indicated that 75% of the states planned to use career clusters. The survey found that 35% of the states planned to develop POS at the state level. The comparable figure derived from the coding was 31%. With regard to the number of POS to be offered, the survey found 54% of the states requiring one program at the secondary and postsecondary levels. The coding found one program to be required in 53% of the state plans. In 43% of the plans, however, no reference to the number required was found.

Almost all of the plans described how POS will draw upon other high school improvement initiatives in the states. Overall, the plans implied that POS will be implemented as modified, refocused versions of existing methods rather than as major changes in how the states deliver CTE. Although POS were newly enacted, they incorporated features with which states have had some experience. The templates that the states will provide for the development of POS were being drawn from the career pathways that most states had adopted or planned to adopt. The methods used to disseminate information will employ existing publications and web-based resources that existed prior to POS.

This documentation of the use regarding established methods should not be interpreted as an implied criticism of the ways states plan to implement POS. In fact, modification of existing delivery methods should improve the changes for successful implementation. Initiatives that require major changes in traditional practices reduce their chances for success. Additionally, POS developed at the local level have a higher probability of successful implementation than POS developed at the state level.

It is apparent that the states wanted to qualify for the funds authorized by Perkins IV and prepared their plans to comply with the instruction issued by OVAE. The states have indicated their intentions were to develop POS that incorporated the features required by the legislation. As it has for 90 years, the state plan provided a means for translating federal policy into state and local actions. There is no guarantee, however, that these actions will yield the results that are desired: enhanced transition from high school and the attainment of postsecondary degrees and certificates. The success of POS will not be known until they have been implemented and evaluated.

## References

Bangser, M. (2008). *Preparing high school students for successful transitions to postsecondary education and employment. Issue Brief*. Washington, DC: National High School Center. American Institutes for Research. Retrieved March 12, 2009, from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/3f/62/07.pdf

Connecticut State Department of Education. (2008). *Carl D. Perkins career and technical education state plan*. Harford, CT: Author. Retrieved June 23, 2008, from http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Career/state_plan_admin.pdf

Iowa Department of Education. (2008). *Carl D. Perkins five year state plan*. Des Moines, IA: Author. Retrieved June 24, 2008, from https://s3.amazonaws.com/basec/795551/1592328/IA%202008%20Sec%20II%20State%20Plan.pdf?AWSAccessKeyId=1RF809NDDCNB7616HJ02&Expires=1214335727&Signature=IVzjZhU3ELxmLnJYwQ8IdgaeKa0%3D

McDonnell, L. M., & Grubb, W. N. (1991). *Education and training for work: The policy instruments and the institutions.* Santa Monica, CA: Rand. Retrieved March 10, 2009, from http://www.rand.org/ pubs/reports/2009/R4026.pdf

National Association of State Directors of Career Technical Education Consortium. (2007). *Career clusters and programs of study: State of the states*. Washington, DC: Author. Retrieved March 18, 2009, from http://www.careertech.org/uploaded_files/CareeerClustersProg StudySurveyJune07.doc

Office of Vocational and Adult Education, U.S. Department of Education. (2007). *Guide for submission of state plans.* Washington, DC: Author. Retrieved May 21, 2008, from http://www.ed.gov/policy/sectech/guid/cte/perkinsiv/stateplan.doc

Ohio Department of Education. (2008). *Carl D. Perkins five-year state plan*. Columbus, OH: Author. Retrieved May 29, 2008, from https://s3.amazonaws.com/basec/795551/1592328/OH%202008%20State%20Plan.pdf?AWSAccessKeyId=1RF809NDDCNB7616HJ02&Expires=1214335408&Signature=6Sp%2FhdAyimnTRs0IqtxZsRe%2B%2Bzw%3D.

Virgin Islands Department of Education. (2008). *Career and technical education plan 2008-2013*. St. Thomas, VI: Author. Retrieved June 24, 2008, from http://www.doe.vi/component/option,com_docman/task,cat_view/Itemid,73/gid,67/orderby,dmdate_published/ascdesc,DESC/

## Acknowledgement

The work reported herein was supported under the National Research Center for Career and Technical Education, PR/Award No.VO51A070003 administered by the Office of Vocational and Adult Education, U.S. Department of Education. However, the contents do not necessarily represent the positions or policies of the Office of Vocational and Adult Education or the U.S. Department of Education, and you should not assume endorsement by the federal government.

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*Career and Technical Education Research, 33(3), pp. 227-243*


# Growth and Exploration: Career Development Theory and Programs of Study

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## Abstract

*Super's theory of career development states that the life stages of growth and exploration are inherent to the process of acquiring knowledge of how one's interests and abilities align with the requirements of occupations. Virtually all high school students are in the exploratory stage of their career development. This article examines the implications of this stage for the choices high school students must make concerning programs of study. Evidence relative to the theory and effectiveness of interventions designed to facilitate career development is reviewed.*

The importance of one's work cannot be overstated. Philosophers and scholars throughout the ages have recognized the importance of a human being's work and attested that finding a vocation is one of life's most challenging tasks. Our work in many ways signifies who we are—defining our personality, our habits, and our lifestyle. Finding the right career can lead to a lifetime of satisfaction, but not finding the right career can lead to poor self-esteem, lowered self-efficacy, a lack of life satisfaction, and even depression (Csikszentmihalyi & Le Fevre, 1989; Haworth & Hill, 1992; Wang, Lesage, Schmitz, & Drapeau, 2008; Warr, 2007). Research has demonstrated that people who find satisfaction in their work exhibit higher levels of commitment, competency, and productivity and report higher levels of life adjustment (Auty, Goodman, & Foss, 1987; Henderson, 2000; Mueller, 2003; Stott, 1970).

Developing a career is a process, not just a destination. Unfortunately, not enough attention is paid to the process that is required for thoughtful, thorough career development. Students are confronted with substantial career and life decisions at an early age with limited opportunities for career exploration. In the typical high school, students are expected to choose and follow a program of study (POS) that will prepare them to exit high school with the skills necessary to continue their education and to enter the workforce. Career and technical education (CTE) students are often required to choose specific occupational areas even though many do not continue the same career emphasis upon completing high school (Bishop, 1989; Levesque et al., 2008). The CTE student's POS consists of an occupational track with rigorous

academic and CTE courses; these are sometimes referred to as career clusters. Too often, however, these students are offered few opportunities to engage in career exploration and are given little useful information with respect to postsecondary options (Dykeman et al., 2003). The result is that career development is often a by-product of educational curriculum, with a *figure it out as you go along* mentality prevalent among educators and students regarding career exploration.

## The Need for Intentional Career Development Efforts

One of the central purposes of POS is to prepare students for postsecondary education and the world of work by providing them with the CTE and academic skills needed to make a smooth transition to their chosen vocational field. However, there appears to be a lack of persistence between high school POS and post-high school work-related activities. For instance, Levesque et al. (2008) synthesized findings from 11 different surveys conducted by the National Center for Education Statistics. They concluded that there was no systematic relationship between the occupational credits that students earned in high school and the occupations in which they were employed when surveyed. Miller and Gray (2002) found that while postsecondary education and training was high (91%) for students who completed a high school Tech Prep program, only 45% of these students persisted in the same occupational areas at the postsecondary level. Similarly, a research synthesis conducted by Bishop (1989) found that less than one-half of secondary students trained in vocational education programs were employed in training-related occupations upon completing high school.

One of the probable reasons for this lack of persistence is that the role of career development for students in CTE programs has been largely ignored, and that most of the emphasis to this point has been placed on skill preparation (e.g., Schmidli, 2001). Although skill preparation is essential in preparing students for the world of work, career exploration is needed to aid students in effectively directing their efforts. The purpose of this article is to explore this issue by applying career development theory in the context of CTE programs of study. An overview of career development using the framework of Super's (1990) life-span, life-space theory is presented. Research relevant to the current state of career development services for students is also presented. Furthermore, intentional efforts toward the career development of students are advocated.

## The Life-Span, Life-Space Approach to Career Development

Super's (1990, 1996) life-span, life-space theory addresses career development at different stages and recognizes the need for intentional efforts toward career development. Over a 60 year period, Super's theory evolved in response to research and social changes resulting in its most recent formulation in Super, Savickas, and Super (1996). Like any complex field of study, career theories have developed from

one another, merged, and branched off in other directions, thereby, weaving an intricate path with the goal of understanding the hows and whys of the career process. The core of most career theories, however, is the same: an effort to explain the "evolving sequence of a person's work experiences over time" (Arthur, Hall, & Lawrence, 1989, p. 8).

## Overview of Super's Theory

The career development process is unique to every person. Factors like gender, ethnicity, ability, personality, socioeconomic status, family, geography, and opportunity all, to varying degrees, play a part in the development of one's career path. At the foundation of Super's theory lie life stages, vocational tasks, and self-concept (Patton & McMahon, 2006). The life-span perspective recognizes that career development does not end in young adulthood but continues throughout life resulting in an increased sense of career maturity. The work of Super and his colleagues "changed the focus of career choice from that of a static point-in-time event to that of a dynamic process where career development was viewed as an evolving process of life" (Patton & McMahon, 2006, p. 53). Additionally, Super acknowledged that many factors influence career development, such as social learning experiences, personality development, and one's needs, values, and abilities. These constructs, among others, were highlighted with the introduction of the Archway Model (Super, 1990).

Super's theory is a combination of stage development and social role theory (Super et. al, 1996), which posits that people progress through five stages during the career development process, including growth, exploration, establishment, maintenance, and disengagement. It should be noted that Super's theory is not a rigid stage theory in which an individual's age dictates his or her progression from stage to stage, a process referred to as maxicycling. Super contended that movement through the five stages could be a flexible process where people recycle through certain stages during various periods of life. Super referred to this process as minicycling. For the purposes of this article, the exploration stage will be discussed in-depth within the context of its traditional occurrence during adolescence.

There are several key constructs included in Super's theory that serve as a foundation for the career development process, including vocational self-concept and career maturity. According to Super (1957), the growth stage begins as children and adolescents are introduced to a variety of occupations and begin to develop their careers or vocational self-concepts. Giannantonio and Hurley-Hanson (2006) defined general self-concept as "one's abilities, personality traits, values, self-esteem, and self-efficacy" (p. 320). Vocational self-concept includes attributes that are vocationally relevant to the individual (Super, 1963). This sense of vocational self-concept is advanced during the growth stage as individuals are exposed to occupations through family, school, community, and the media, among other sources. Through these experiences, young people develop a sense of autonomy and

industry, begin to develop work-related skills and habits, and identify relevant role models, all the while developing a better understanding of their own interests along with a burgeoning awareness of their abilities (Patton & McMahon, 2006; Super et al., 1996).

During the exploratory stage, individuals engage in experiences that aid in developing their vocational identity by investigating careers, engaging in educational training and apprenticeships, and other work-related experiences. They learn about themselves, their interests, and abilities, furthering the development of their self-concepts. According to Super (1957), individuals apply what they learn through the exploratory process by matching their interests and abilities to occupations and applying their self-concepts to both work and life roles. Moreover, Blustein (1988) has suggested that exploration is intrinsically motivated by natural curiosity.

The establishment stage is a period in which the individual is focused on establishing a stable work environment and working towards career advancement. The major goal during this stage is for individuals to stabilize their role within the career context. Some individuals may work towards promotion and advancement in their careers, thus, increasing their job-related responsibilities (Patton & McMahon, 2006).

During the maintenance stage, "individuals are concerned with maintaining their self-concept and their present job status" (Giannantonio & Hurley-Hanson, 2006, p. 323). Nevertheless, individuals may decide to make career changes during the maintenance phase (e.g., moving to other organizations or positions or changing occupations). According to Super's theory, this results in the individual recycling through the exploration and establishment stages—referred to as a minicycle. The central focus for individuals, however, is towards preserving or maintaining their positions within their established careers (Patton & McMahon, 2006).

The final stage, disengagement, is the process of disengaging from the world of work, which usually comes in the form of retirement. During this stage, individuals engage in the process of planning for retirement, begin to reduce their workloads, and finally leave the work setting. In all the stages, one's self-concept is formed and solidified through one's experiences. Furthermore, career maturity is accomplished as individuals age and progress through the stages. This sense of maturity is coupled with an individual's readiness to cope with developmental activities, including biological, social, and societal expectations (Super, 1990). In the following sections, this process is addressed in-depth during the exploration stage, including a discussion of relevant research. Finally, the role that POS may play in the career development process is examined.

## Making the Case for Exploration

According to Savickas and Super (1993), career-relevant concepts develop in childhood, strengthen in adolescence, and function as determinants of adolescent career maturity. Exploration typically begins during adolescence and lasts into young adulthood (14 to 24 years of age). Typically, individuals within this age range seek

opportunities to explore careers through education and work experiences. These endeavors help them to identify their career-related desires and options which further the development of vocational identity (Patton & McMahon, 2006) or vocational self-concept. Vocational self-concept has been defined as, "The constellation of self attributes considered by the individual to be vocationally relevant, whether or not they have been translated into a vocational preference" (Super, 1963, p. 20). According to Jordaan (1963), vocational exploration consists of clarifying one's self-concept in occupational contexts, developing an understanding of occupations related to one's vocational self-concept, and applying this vocational sense of self to relevant activities.

The exploration stage is comprised of substages or tasks, including crystallization, specification, and implementation. Those engaged in the exploratory stage seek self and world knowledge, and in an effort to increase their understanding of reality, they experiment and search for new experiences and perspectives (Jordaan, 1963). It is through the exploration process that the individual *crystallizes* his or her career interests by narrowing choices, *specifies* a vocational choice, and then *implements* the choice by making it a reality via training, education, and work.

Erikson (1959) considered one's occupational identity as key to one's overall identity development stating, "In general it is primarily the inability to settle on an occupational identity which disturbs young people" (Erikson, 1959, p. 92). This statement reflects the urgency and importance in fostering teens' engagement in exploration. Exploration is seen as critical during adolescence in promoting general identity formation and helping teens to develop a sense of vocation. Further, identity development and vocational decision making are closely linked, in that individuals who possess well developed career interests also display an overall stronger sense of self (Blustein, Devenis, & Kidney, 1989; Vondracek, Schulenberg, Skorikov, Gillespie, & Wahlheim, 1995; Weyhing, Bartlett, & Howard, 1984). The work of Super and Erikson illustrates the bidirectional influence of general and vocational identity development; because without a sense of self or identity, a fulfilling vocation appears to be out of reach. Discovering one's true vocation appears scarcely attainable without self-understanding.

Research efforts have established links between general and vocational identity development. Moreover, these links reveal that the ties between general and vocational identity development aid in career decision making. For example, Gushue, Scanlan, Pantzer, and Clarke (2006) examined the career development of African American students and found that higher levels of career decision making self-efficacy were related to a more differentiated vocational self-concept and more engagement in career exploration. In a similar study with Latino students, Gushue, Clarke, Pantzer, and Scanlan (2006) found that students with higher levels of career decision making self-efficacy possessed a more differentiated identity and were more engaged in the career exploration process. Shoffner and Newsome (2001) conducted a study with gifted adolescent females and found that vocational exploration and commitment contributed strongly to the identity development of this population.

These studies revealed the influence of exploration on vocational identity development, demonstrating that engagement in exploratory activities enhances the career development process. Another example of the importance of exploration in career development, demonstrated in a study by Lapan, Aoyagi, and Kayson (2007), found that students who engaged in an enhanced career development program that included an exploration component, reported greater progress in transitioning into life roles, a better sense of direction in their work, and a greater sense of life satisfaction.

To further demonstrate this link, Wallace-Broscious, Serafica, and Osipow (1994) conducted a study based on the constructs of exploration and identity status. Their results supported these constructs as fundamental to the career development process. They discovered that students' identity status played a role in predicting career certainty, indecision, exploration, and planning. Specifically, individuals identified as having an achieved identity reported higher levels of career decidedness and career planning than those struggling with identity formation. Age and gender influenced exploration and career decision making with older students engaging in more exploration than younger students, females engaging in more planning and exploration than males, and females reporting higher levels of career decidedness. This finding supported the link between exploration and crystallization, in that the females in this study appeared to crystallize their career interests through the exploration process.

In summary, the studies presented supported the link between career exploration and vocational identity development. Furthermore, they provided evidence of the need for exploration activities and intentional career development efforts. An examination of the exploration activities of students engaged in CTE programs is presented next.

## Exploration in K-12 Settings and CTE Programs of Study

Evidence supports the importance of growth and exploration in helping individuals develop their vocational identities and engage in thoughtful career decision making. What efforts then, do schools take in helping students engage in career exploration? Is there a difference in the career exploration outcomes of students who are enrolled in traditional educational programs versus those who are enrolled in the CTE programs that preceded POS?

Career development efforts in high school settings have been portrayed as hit and miss, in that students do not typically receive comprehensive guidance services and do not engage in career planning activities to help them achieve their career goals (Hollenbeck & DebBurman, 2000; Hughes & Karp, 2004). This lack of focus on career development in K-12 programming was demonstrated by Bloch (1996) in a multistate survey of high school principals and counselors that showed a lack of commitment to the career development of students, in particular for those considered at-risk for dropping out. Helwig (2004) examined the career development issues experienced by a group of students over a 10-year period in which data were

gathered six times throughout their K-12 educational experiences. The students in this sample reported mediocre satisfaction with their schools' role in helping them engage in career development activities.

Other large sample studies echo the finding that students are not receiving the experiences and information they need to develop their vocational identities and help them progress through the growth and exploratory stages of career development. For example, Wimberly and Noeth (2005) reported on a large-scale study conducted by American College Testing (ACT) in which 2,942 students in the 8th-, 9th-, and 10th-grades completed the Educational Planning Survey. The survey examined issues related to high school programs, class selection, and the helpfulness of school, family, and friends in educational planning and decision making. Over 77% of the students reported that they planned to attend college; however, only two-thirds of these students described their high school programs as college preparatory programs, indicating some discrepancies between career guidance and program choice. With respect to exploration, almost one-fourth (22%) of the sample indicated that they had not begun considering the education, training, and work options they would pursue upon graduation from high school. Furthermore, although most of the sample had set educational or career goals, they were not engaged in planning activities. When comparing these data with the constructs of Super's theory, the majority of the sample had crystallized their vocational goals but had not engaged in the specification and implementation steps needed to make their goals a reality. The conclusion was that middle and high school students were not engaged in the necessary curriculum to prepare them for postsecondary education. Furthermore, a lack of comprehensive exploration results in missed opportunities due to limited information about postsecondary options.

Although intentional efforts at career development appear to be lacking, there is evidence that participation in the CTE precursors of POS (e.g., career pathways, school-to-work, Tech Prep, career magnets) are more likely to engage students in career development activities, if not directly, then at least peripherally. This suggests that career development may be a by-product of engagement in such programs. Several of these studies will be discussed.

Few studies have examined explicitly the effects of participating in CTE courses focused on career development. A few efforts have been made, however, to examine career development in the context of school-to-work (STW) programs. For example, Perry, DeWine, Duffy, and Vance (2007) examined the self-efficacy of urban students who were part of a school-to-work program. Qualitative measures found that the students who participated in the program showed a more realistic sense of academic self-efficacy and had better strategies for engaging in academic tasks. Additionally, Benz, Yavanoff, and Doren (1997) reported that high school students, both with and without disabilities, who engaged in work-based learning experiences and possessed both social and job search skills were more likely to be engaged in competitive employment one year after graduation. Furthermore, the possession of career awareness skills was also a predictive factor of the students'

productive engagement in employment. It should be noted that some experts have debated the capability of STW programs to provide career development opportunities (e.g., Hanson, 1999; Lent & Worthington, 1999; Worthington & Juntunen, 1997). More recently, however, some experts have declared that STW programs have improved career development efforts in high schools (Gray, 2000; Visher, Bhandari, & Medrich, 2004).

In the article, *Effectiveness of Three Previous Initiatives Similar to Programs of Study: Tech Prep, Career Pathways, and Youth Apprenticeships* (this issue), the researchers examined students' career-related behavior associated with participation in CTE programs that were direct precursors of POS. This included examining the rates of enrollment and persistence in postsecondary education and training programs. Additionally, Lekes et al. (2007) examined the matriculation of CTE secondary students into community college programs and found that in some career pathways, these students rated themselves more college ready than did non-CTE students. In comparison to their non-CTE counterparts, students who completed CTE programs reported (a) feeling more prepared to transition to college, (b) believing that their high school programs of study had prepared them with the necessary information about college programs and courses, and (c) having clear career goals and plans. A study by Bragg et al. (2002) investigated the postsecondary outcomes of 4,600 Tech Prep students. This study found that approximately 65% of the sample enrolled in some form of postsecondary education. Additionally, the participants were more likely to be working than non-Tech Prep students.

Crain et al. (1999) examined the outcomes of students graduating from career magnet programs. They found that students in career magnet programs enrolled in more college courses, felt more supported by their parents to go to college, and socialized more with career-minded students. Furthermore, they were less likely to engage in risky behaviors. The authors concluded that career magnet schools created a school culture that supports hard work, dedication, and continuity of purpose which produced career identities. Similarly, in a study by Flaxman, Guerrero, and Gretchen (1997) career magnet graduates enrolled in more career-related courses than the comparison group, which was comprised of comprehensive high school graduates. Career magnet graduates expressed more understanding of the factors that impacted their growth and development, indicated a stronger sense of self-efficacy, and were more trusting of their abilities and skills. Post-high school outcomes for career magnet students revealed that they were more likely to have declared a college major, to be taking more college credits than the comprehensive high school graduates, and to be pursuing professional careers.

Parallel results have been found for career academies. Kemple and Willner (2008) examined the long-term impact of career academies on educational attainment and transition. The results of the study were based on data from students who were selected at random to attend academies and a control group of students who applied, but were not admitted into career academies. The random nature of the assignment provided strong evidence of the independent effects of the academy experience.

Several advantages for students enrolled in career academies were detected. Academy students were more likely to (a) take career-related courses and be exposed to career awareness and career development activities, (b) work in jobs that were connected to their school work, and (c) stay in school, attend regularly, and earn more credits. In addition, approximately 80% of the academy students earned a high school diploma and approximately 50% earned a postsecondary credential, which was comparable to non-academy students.

Finally, in an examination of Tech Prep programs, Hershey, Silverberg, Owens, and Hulsey (1998) reported that schools engaged in Tech Prep placed a greater emphasis on career guidance and development in addition to using a variety of methods to familiarize students with career options. The methods included career exploration software, career development courses and curriculum, career fairs, employer presentations, workplace site visits, job shadowing, and school-based career counseling centers. Additionally, learning experiences alone have been shown to affect vocational self-efficacy, which in turn has been shown to influence career interest and decision making (Tang, Pan, & Newmeyer, 2008; Turner & Lapan, 2002).

Persistence is an important factor in the career development of students engaged in CTE programs. Persistence has two intentions: (a) the engagement in postsecondary education/training or work pursuits and (b) the continuous engagement in one's high school area of study (or major) in postsecondary or work pursuits. Although research on persistence within this context is limited, dual enrollment studies have shown some promising outcomes. For example, Karp, Calcagno, Hughes, Jeong, and Bailey (2007) found that students who engaged in dual enrollment opportunities were more likely to remain enrolled in college two years after graduating from high school. Bragg and Ruud (2007) reported that dual credit programs aided in "accelerated progress and success at earning college certificates and degrees" (p. 4), suggesting that dual credit and CTE may serve as a catalyst for college persistence and completion. Furthermore, Zavattieri, D'Anna, and O'Sullivan-Maillet (2007) measured the impact of a high school-based health science career program on student retention and careers. They found that 97% of the participants continued their education after high school. Forty-nine percent of those who entered two-year colleges and 57% of those who entered four-year colleges pursued health-related careers. Further study is needed, however, to determine the degree to which students continue working and/or studying within their programs of study beyond high school.

What can be concluded from these studies? First, it is evident that students involved in CTE programs (e.g., work-based learning, career pathways, career magnets, career academies, Tech Prep) are likely to have a greater sense of self-efficacy, an increased sense of career awareness, a higher level of college readiness, clearer career-related goals, and a higher level of college participation, to name a few. Additionally, it appears that some of these programs engage students in

intentional career development (e.g., Tech Prep, career academies), where students are exposed to career exploration courses, job shadowing, and career counseling. Overall, it appears that these programs, either directly or peripherally, provide students with the career exploration they need to develop a sense of vocational identity and career maturity. Persistence in one's area of study beyond high school, however, continues to be an issue of concern for researchers and educators.

## Conclusions

The pragmatic CTE educator may view this discussion of career development as a diversion from the main theme of POS in CTE. This discussion, however, is anything but a diversion, because career development should be the foundation on which POS are built. The choice of a POS intensifies the dilemma of all secondary level occupational programs in that decisions about future occupational goals are made when virtually all students are at the exploratory stage of career development. They select the programs they wish to study as a way of exploring occupations as much as to prepare for them. Many students learn; however, that the occupations that initially interested them are not what they expected or do not fit their personalities and goals. As a result, many reconsider their choices and may engage in further exploration by studying different programs. This should not be considered as a failure on the part of the student, but as an inherent aspect of the career development process that results in the formation of one's vocational identity.

If students are not ready to make firm choices about their interests and future careers, why should they be asked to do so? Would it not be more appropriate to provide opportunities for exploration rather than skill training? The kinds of exploration that schools can offer (e.g., individual guidance, career courses, job shadowing, career fairs) typically take place in middle school and the early years of high school and are limited inherently. For young people to internalize the information from these experiences, they need to make initial choices and be given opportunities to encounter occupations in-depth. To truly test the fit between what they like to do and what occupations require, students must learn to perform the tasks required by the occupations that interest them. The review of youth apprenticeships (presented in the article *Effectiveness of Three Previous Initiatives Similar to Programs of Study: Tech Prep, Career Pathways, and Youth Apprenticeships*) found, however, that few employers are willing to provide skill training for young people. For many high school students, therefore, CTE courses serve as a means of exploring possible career paths as well as preparing to enter those paths, fostering career development.

Obviously, well before students choose POS, schools can provide many opportunities for students to increase their knowledge of occupations. There is a variety of ways that students can learn about occupations in school, and many resources are readily available. A Google search with the words "career exploration lesson plans" yielded 367,000 hits. Even if students come to learn that their initial

occupational goals are not appropriate for them, the study of occupations can still make learning relevant and is vital to the exploration stage of career development.

There is an emerging consensus that interest in occupations can increase students' motivation and engagement. Stone (2004) described the specific ways in which CTE can increase engagement. The Center for Comprehensive School Reform and Improvement (2007) summarized instructional methods schools can take to enhance engagement and achievement. Many of these methods, such as long-term projects, hands-on activities, and differentiated instruction, are inherent to CTE. The U.S. Department of Education's Institute of Education Sciences issued a practice guide on dropout prevention that stated: "Career and technical education (CTE) implemented to allow all students 'multiple pathways' toward careers and higher education is a way to engage the student" (Dynarski et al., 2008, p. 34). The Institute rated the scientific evidence supporting this statement as "moderate." If there is engagement, teachers can ask more of students and challenge them to learn the rigorous and relevant content required of POS. In 1909, Frank Parsons wrote:

> We guide our boys and girls to some extent through school, then drop them into this complex world to sink or swim as the case may be. Yet there is no part of life where the need for guidance is more emphatic than in the transition from school to work—the choice of a vocation, adequate preparation for it, and the attainment of efficiency and success. (p. 4)

Some students and educators may wonder, after reading this passage, if much has changed in the 99 years since Parsons wrote these words. Although great efforts have been made to engage students in the educational process and prepare them for the world of work, there is still much to do. Namely, career development should become an intentional process in the education of students. In addition, career development needs to occur earlier during the growth stage of development while children are engaging in the processes of learning, play, and fantasy. These experiences, according to Super and other theorists, provide children with the necessary tools to develop and clarify their career aspirations and, therefore, prepare them for the exploration phase of development that occurs during adolescence and young adulthood.

Career development needs to occur as a deliberate process throughout students' educational experiences. Based on student outcomes, there is evidence of career development occurring in the CTE programs that preceded POS. In many cases, however, the evidence appears to be a byproduct of the curriculum and not necessarily the result of intentional career development efforts. There is a need both for more intentional efforts toward career development and for better studies to evaluate the efforts in CTE programs of study.

## References

Arthur, M. B., Hall, D. T., & Lawrence, B. S. (1989). Generating new directions in career theory: The case for a transdisciplinary approach. In M. B. Arthur, D. T. Hall, & B. S. Lawrence (Eds.), *Handbook of career theory* (pp. 7-25). New York: Cambridge University Press.

Auty, W. P., Goodman, J., & Foss, G. (1987). The relationship between interpersonal competence and work adjustment. *Vocational Evaluation & Work Adjustment Bulletin*, *20*(2), 49-52.

Benz, M. R., Yovanoff, P., & Doren, B. (1997). School-to-work components that predict postschool success for students with and without disabilities. *Exceptional Children, 63*(2), 151-165.

Bishop, J. (1989). Occupational training in high school: When does it pay off? *Economics of Education Review*, *8*(1), 1-15.

Bloch, D. P. (1996). Career development and workforce preparation: Educational policy versus school practice. *The Career Development Quarterly*, *45*, 20-39.

Blustein, D. L. (1988). The relationship between motivational processes and career exploration. *Journal of Vocational Behavior, 32*, 345-357.

Blustein, D. L., Devenis, L. E., & Kidney, B. A. (1989). Relationship between the identity formation process and career development. *Journal of Counseling Psychology, 36*(2), 196-202.

Bragg, D. D., Loeb, J. W., Gong, Y., Deng, C-P., Yoo, J., & Hill, J. L. (2002). *Transition from high school to college and work for Tech Prep participants in eight selected consortia*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota. Retrieved April 24, 2008, from http://www.nccte.org/publications/infosynthesis/r%26dreport/Transition-Bragg%20ALL.pdf

Bragg, D. D., & Ruud, C. M. (2007). Career pathways, academic performance, and transition to college and careers: The impact of two select career and technical education (CTE) transition programs on student outcomes. *In Brief.* Champaign, IL: Office of Community College Research and Leadership, University of Illinois at Urbana-Champaign. Retrieved June 12, 2008, from http://occrl.ed.uiuc.edu/Publications/In_Brief/Brief-Ruud-fall-07.pdf

Center for Comprehensive School Reform and Improvement. (2007, April). Using positive school engagement to increase student achievement. *Newsletter*. Retrieved August 29, 2008, from http://www.centerforcsri.org/index.php?option=com_content&task=view&id =446&Itemid=5

Crain, R. L., Allen, A., Little, J. W., Sullivan, D., Thaler, R., Quigley, D., et al. (1999). *The effects of career magnet schools* (IEE Brief Number 22). New York: Columbia University, Teachers College, Institute on Education and the Economy.

Csikszentmihalyi, M., & Le Fevre, J. (1989). Optimal experience in work and leisure. *Journal of Personality and Social Psychology, 56,* 815-822.

Dykeman, C., Wood, C., Ingram, M. A., Pehrsson, D., Mandsager, N., & Herr, E. L. (2003). The structure of school career development interventions: Implications for school counselors. *Professional School Counseling, 6,* 272.

Dynarski, M., Clarke, L., Cobb, B., Finn, J., Rumberger, R., & Smink, J. (2008). *Dropout prevention: A practice guide* (NCEE 2008–4025). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved September 3, 2008, from http://ies.ed.gov/ncee/wwc /pdf/practiceguides/dp_pg_090308.pdf

Erikson, E. H. (1959). Identity and the life cycle: Selected papers. *Psychological Issues, 1,* 1-171.

Flaxman, E., Guerrero, A., & Gretchen, D. (1997). *Career development effects of career magnets versus comprehensive schools.* Berkeley, CA: National Center for Research in Vocational Education, University of California, Berkeley.

Giannantonio, C. M., & Hurley-Hanson, A. E. (2006). Applying image norms across Super's career development stages. *Career Development Quarterly, 54,* 318-330.

Gray, D. L. (2000). Shaping America's workforce for the new millennium. *Education, 120,* 631-633.

Gushue, G. V., Clarke, C. P., Pantzer, K. M., & Scanlan, K. R. L. (2006). Self-efficacy, perceptions of barriers, vocational identity, and the career exploration behavior of Latino/a high school students. *The Career Development Quarterly, 54,* 307-317.

Gushue, G. V., Scanlan, K. R. L., Pantzer, K. M., & Clarke, C. P. (2006). The relationship of career decision-making self-efficacy, vocational identity, and career exploration behavior in African American high school students. *Journal of Career Development, 33*(1), 19-28.

Hansen, L. S. (1999). Beyond school to work: Continuing contributions of theory and practice to career development of youth. *Career Development Quarterly, 47,* 353-358.

Haworth, J. T., & Hill, S. (1992). Work, leisure and psychological wellbeing in a sample of young adults. *Journal of Community & Applied Social Psychology, 2,* 147-160.

Helwig, A. A. (2004). A ten-year longitudinal study of the career development of students: Findings. *Journal of Counseling & Development, 82*(1), 49-57.

Henderson, S. J. (2000). 'Follow your bliss': A process for career happiness. *Journal of Counseling & Development, 78,* 305.

Hershey, A. M., Silverberg, M. K., Owens, T., & Hulsey, L. K. (1998). *Focus for the future: The final report of the national Tech-Prep evaluation*. Princeton, NJ, Mathematica Policy Research. Retrieved April 28, 2008, from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/15/cb/7c.pdf

Hollenbeck, K., & DebBurman, N. (2000). *Use and effectiveness of formal course and career planning forms in secondary schools in the Ottawa area intermediate school district. Final report.* Kalamazoo, MI: Upjohn Institute for Employment Research.

Hughes, K. L., & Karp, M. M., (2004). *School-based career development: A synthesis of the literature*. New York: Institute on Education and the Economy, Columbia University.

Jordaan, J. P. (1963). Exploratory behavior: The formation of self and occupational concepts. In D. E. Super, R. Stariskevsky, N. Matlin, & J. P Jordaan (Eds.), *Career development: Self-concept theory* (pp. 42-78). New York: College Entrance Examination Board.

Karp, M. M., Calcagno, J. C., Hughes, K. L., Jeong. D. W., & Bailey, T. R. (2007). *The postsecondary achievement of participants in dual enrollment: An analysis of student outcomes in two states*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota. Retrieved June 3, 2008, from http://www.nccte.org/publications/Dual_Enrollment.pdf

Kemple, J. J., & Willner, C. J. (2008). Career academies: Long-term impacts on labor market outcomes, educational attainment, and transitions to adulthood. Retrieved June 12, 2008, from http://www.mdrc.org/publications/482/full.pdf

Lapan, R. T., Aoyagi, M., & Kayson, M. (2007). Helping rural adolescents make successful postsecondary transitions: A longitudinal study. *Professional School Counseling, 10*, 266-272.

Lekes, N., Bragg, D. D., Loeb, J. W., Oleksiw, C. A. Marszalek, J., LaRaviere, M. B., et al. (2007). *Career and technical education pathway programs, academic performance, and the transition to college and career*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota. Retrieved May 9, 2008, http://www.nccte.org/publications/infosynthesis/r&dreport/CTE_Pathway_Programs.pdf

Lent, R. W., & Worthington, R. L. (1999). Applying career development theories to the school-to-work transition process. *The Career Development Quarterly, 47*, 291-296.

Levesque, K., Laird, J., Hensley, E., Choy, S. P., Cataldi, E. F., & Hudson, L. (2008). *Career and technical education in the United States: 1990 to 2005* (NCES 2008-035). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Retrieved July 31, 2008, from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2008035

Miller, D. M., & Gray, K. (2002). Tech prep persistence in comprehensive high schools: An exploratory study. *Journal of Industrial Teacher Education, 39*(4), 26.

Mueller, M. K. (2003). Take this job and love it: Factors related to job satisfaction and career commitment among physical therapists. (Doctoral dissertation, Union Institution and University, 2002). *Dissertation Abstracts International: Section B: The Sciences and Engineering. 63*, 11B.

Parsons, F. (1909). *Choosing a vocation*. Boston: Houghton, Mifflin and Company.

Patton, W., & McMahon, M. (2006). Career development and systems theory: A new relationship (2nd ed). Belmont, CA, US: Thomson Brooks/ColePublishing Co.

Perry, J. C., DeWine, D. B., Duffy, R. D., & Vance, K. S. (2007). The academic self-efficacy of urban youth: A mixed-methods study of a school-to-work program. *Journal of Career Development, 34,* 103-126.

Savickas, M. L., & Super, D. E. (1993). Can life stages and substages be identified in students? *Man and Work, 4*(1), 78-71.

Schmidli, K. W. (2001). Infusing the career development facilitator curriculum into career and technical teacher education: A model for fundamental change to improve outcomes for all students. *Journal of Industrial Teacher Education, 38*(4), 62-83.

Shoffner, M. F., & Newsome, D. W. (2001). Identity development of gifted female adolescents: The influence of career development, age, and life-role salience. *Journal of Secondary Gifted Education, 12*(4), 201.

Stone, J. R. (2004). Career and technical education: Increasing school engagement. In J. Smink & F. P., Schargel (Eds.), *Helping students graduate: A strategic approach to dropout prevention* (pp. 195-203.). Larchmont, NY: Eye on Education.

Stott, M. B. (1970). What is occupational success? *Occupational Psychology, 44,* 205-212.

Super, D. E. (1957). *The psychology of careers.* New York: Harper & Row.

Super, D. E. (1963). Self concepts in vocational development. In D. E. Super, R. Stariskevsky, N. Matlin, & J. P Jordaan (Eds.), *Career development: Self-concept theory* (pp. 1-26). New York: College Entrance Examination rd.

Super, D. E. (1990). A life-span, life-space approach to career development. In D. Brown & L. Brooks (Eds.), *Career choice and development: Applying contemporary theories to practice* (2nd ed., pp. 197-261). San Francisco: Jossey-Bass.

Super, D. E., Savickas, M. L., & Super, C. M. (1996). The life-span, life-space approach to careers. In D. Brown & L. Brooks (Eds.), *Career choice and development* (3rd ed., pp. 121-178). San Francisco: Jossey-Bass.

Tang, M., Pan, W., & Newmeyer, M. D. (2008). Factors influencing high school students' career aspirations. *Professional School Counseling, 11*(5), 285-295.

Turner, S., & Lapan, R. T. (2002). Career self-efficacy and perceptions of parent support in adolescent career development. *Career Development Quarterly, 51*(1), 44-55.

Visher, M. G., Bhandari, R., & Medrich, E. (2004). High school career exploration programs: Do they work? *Phi Delta Kappan, 86*(2), 135-138.

Vondracek, F. W., Schulenberg, J., Skorikov, V., Gillespie, L. K., & Wahlheim, C. (1995). The relationship of identity status to career indecision during adolescence. *Journal of Adolescence, 18*(1), 17-29.

Wallace-Broscious, A., Serafica, F. C., & Osipow, S. H. (1994). Adolescent career development: Relationships to self-concept and identity status. *Journal of Research on Adolescence, 4*(1), 127-149.

Wang, J. L., Lesage, A., Schmitz, N., & Drapeau, A. (2008). The relationship between work stress and mental disorders in men and women: Findings from a population-based study. *Journal of Epidemiology & Community Health, 62*(1), 42-47.

Warr, P. (2007). *Work, happiness, and unhappiness*. Mahwah, NJ: Lawrence Erlbaum Associates.

Weyhing, R. S., Bartlett, W. S., & Howard, G. S. (1984). Career indecision and identity development. *Journal of Psychology and Christianity, 3*(1), 74-78.

Wimberly, G. L., & Noeth, R. J. (2005). *College readiness begins in middle school. ACT policy report*. Ames, IA: American College Testing (ACT), Inc.

Worthington, R. L., & Juntunen, C. L. (1997). The vocational development of non-college bound youth: Counseling psychology and the school-to-work transition movement. *The Counseling Psychologist, 25*, 323-363.

Zavattieri, L., D'Anna, S., & O'Sullivan-Maillet, J. (2007). Evaluation of high-school health science careers: Program impact on student retention and careers. *Journal of Allied Health, 36*(2), 81-87.

## Acknowledgement

The work reported herein was supported under the National Research Center for Career and Technical Education, PR/Award No.VO51A070003 administered by the Office of Vocational and Adult Education, U.S. Department of Education. However, the contents do not necessarily represent the positions or policies of the Office of Vocational and Adult Education or the U.S. Department of Education, and you should not assume endorsement by the federal government.

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ISSN 1554-754X (print)
ISSN 1554-7558 (online)

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