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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.

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