Strengthening Transitions by Encouraging Career Pathways:

A Look at State Policies and Practices

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The American Association of Community Colleges (AACC) is the primary advocacy organization for the nation's community colleges. The association represents more than 1,100 two-year, associate degree-granting institutions and more than 11 million students. AACC promotes community colleges through six strategic action areas: national and international recognition and advocacy, learning and accountability, leadership development, economic and workforce development, connectedness across AACC membership, and international and intercultural education. Information about AACC and community colleges may be found at www.aacc.nche.edu.

The League for Innovation in the Community College is an international organization dedicated to catalyzing the community college movement. The League hosts conferences and institutes, develops Web resources, conducts research, produces publications, provides services, and leads projects and initiatives with member colleges, corporate partners, and a host of other government nonprofit agencies in a continuing effort to make a positive difference for students and communities. The College and Career Transitions Initiative (CCTI) contributes to strengthening the role of community and technical colleges throughout the United States in easing student transitions between secondary and postsecondary education as well as transition to employment and improving academic performance at both the secondary and postsecondary levels. Information about CCTI is available at www.league.orgleague/projects/ccti.

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Background

There is now common agreement that all youth need some education beyond high school to be economically self-sufficient. However, persisting in college and earning a credential is difficult for many students (see Bailey, Alfonso, Scott, & Leinbach, in press; Deil-Amen & Rosenbaum, 2002; National Center for Education Statistics, 2004).[1] In attempting to help students gain access to and be successful in postsecondary education, whichever type of degree or credential they seek, policymakers and practitioners increasingly speak of the need to improve the transition between secondary and postsecondary studies. Whether the call is for a "seamless web" (Hodgkinson, 1999), a "more robust set of pathways" (Schwartz, 2004), or "a new commitment to a single system" of education (National Commission on the High School Senior Year, 2001), the common element is tying together the curricula, requirements, and assessments of the secondary and postsecondary sectors.

Through the creation of P–16 (preschool through postsecondary) commissions in 30 states (National Governors' Association, n.d.), attention is being paid to the continuum of education in which students engage. Rather than viewing each step in isolation, the goal is to reconceptualize education as a pathway spanning high schools, colleges, and workplaces. Policymakers expect that connecting formerly separate facets of the education system will facilitate students' transitions into college and careers. In addition, policymakers have sought reforms that will better prepare students for postsecondary education. Such reforms include adopting more stringent high school graduation requirements and graduation exit exams and increasing the availability of rigorous programs such as advanced placement and dual enrollment.

Consistent with these reforms, increasing attention has been paid to the integration of academic and occupational preparation to increase the rigor of career and technical education (CTE) while making stronger connections to high-wage, high-growth occupations. At the federal level, these goals are encouraged by proposed changes to a key funding stream for career and technical education, the Carl D. Perkins Vocational and Applied Technology Act. Although revisions to the act have yet to be finalized, in recent reauthorization discussions the federal government sought to use the act to support vocational education reform in keeping with the federal emphasis on higher academic standards and accountability. Because all students are career bound as well as college bound, these changes will encourage the refinement of CTE programs in occupations that require postsecondary credentials, to ensure rigorous academics as well as to encourage smooth secondary-to-postsecondary transitions.

Perkins funding may be an impetus for reform, but states must address their own systems of education and how they are working (or not working) in support of these goals. States need to rethink the structure and focus of the education pipeline, including the relationships between high schools and colleges, academic and applied courses, and educational credentials and the labor market. In this report, we identify ways in which state policies can support CTE students' academic and labor market success by creating coherent systems of preparation for students entering technical fields. In particular, we focus on state policies that support the implementation of career pathways, such as those encouraged by the U.S. Department of Education's College and Career Transitions Initiative, which span secondary and postsecondary education and culminate in rewarding careers.

The College and Career Transitions Initiative

The College and Career Transitions Initiative (CCTI) builds on previous efforts to connect secondary and postsecondary studies in career and technical areas. One long-standing federally funded initiative is Tech Prep, which supports the creation of technically oriented course sequences that span the last two years of high school and the first two years of college. Articulated Tech Prep sequences usually provide college credit for some portion of the high school course work, once students continue in the program in the partnering college. Although precise enrollment data on the national level are not available, it is estimated that the majority of community colleges in the country participate (Bragg, 2001).

Unfortunately, recent evidence on Tech Prep is not encouraging. The U.S. Department of Education has reported that only an estimated 10% of Tech Prep consortia offer the comprehensive two-plus-two model envisioned by proponents (Office of Vocational and Adult Education, 2003). A national evaluation of eight consortia found that students tended not to benefit from the articulated credits, sometimes because student participants were unaware that they could earn college credits from their high school Tech Prep course work. In some of the consortia, Tech Prep students were more likely than the comparison group to transition directly to work after high school graduation and not enroll in college (Bragg, 2001). Moreover, an analysis of the 1997 National Longitudinal Survey of Youth (NLSY) showed that participation in Tech Prep programs had a negative effect on college attendance (Neumark & Rothstein, 2003). These results, as well as our own recent research (Hughes, Karp, Fermin, & Bailey, 2005), suggest that Tech Prep in many cases has not developed as the clear sequence of study that many hoped would lead to a smoother transition to college and work. Some have argued that this is in part because of some vagueness in the legislation as well as the flexibility given to states and local consortia in creating programs (see, e.g., Elliott, 2000).

In the fall of 2002, the U.S. Department of Education's Office of Vocational and Adult Education sponsored CCTI, furthering the model of linked secondary-to-postsecondary curricula. In keeping with its aim of strengthening the role of community and technical colleges in easing student transitions between secondary and postsecondary education, the League for Innovation in the Community College was selected through a competitive process to be the administrator of the project. The goal of the initiative is to help community colleges, working with high schools and business partners, to create career pathways that lead from high school to 2- and 4-year degrees and technical careers.

CCTI was established to build on the work being done around the country in Tech Prep, but also to reflect the national priority to increase rigor and attainment. Hence CCTI established five specific long-term outcomes goals: decreased need for remediation at the postsecondary level; increased enrollment and persistence in postsecondary education; increased academic and skill achievement at the secondary and postsecondary levels; increased attainment of postsecondary degrees, certificates, or other recognized credentials; and increased entry into employment or further education.

Fifteen site partnerships, composed of community and technical colleges, secondary schools, and employers, have been funded in occupational areas that include education and training; health science; information technology; law, public safety, and security; and science, technology, engineering, and mathematics. The site partnerships are working to develop exemplary models of college and career transition strategies and programs of study, raise students' academic achievement, and collect and report project implementation and student outcomes data. In addition, the site partnerships are to select their occupational foci with an eye toward local labor markets, to encourage meaningful participation by employers and to ensure that students are prepared for economically viable careers.

CCTI focuses on career pathways as the main strategy for pursuing its goals. As defined by the initiative,

> *A career pathway is a coherent, articulated sequence of rigorous academic and career courses, commencing in the ninth grade and leading to an associate degree, an industry-recognized certificate or licensure, 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* (CCTI, 2005).

Thus, CCTI renews efforts toward the seamless transition by coordinating academically rigorous study with career and technical courses across the secondary and postsecondary sectors. The ideal components of career pathways (see box) give some specifics as to the level of coordination expected. For example, the secondary school component of the pathway is expected to meet college entrance requirements as well as state academic standards and graduation requirements; opportunities for dual or

articulated credit must be available; and the postsecondary pathway should include articulation and alignment with baccalaureate programs. Although some of these efforts can come about through institutional reforms or partnerships, many would be enhanced by changes in the education policies at the state level.

Aligning secondary and postsecondary education, as demanded by the creation of career pathways, is not an easy task, especially given that the two exist as separate systems at both the national and state levels. The 50 states show a diversity of policies with regard to the level of centralization of education systems and the extent of coordination of systems. States vary as to their high school graduation requirements, policies overseeing dual enrollment opportunities, and articulation of courses between state postsecondary institutions, for example. Often unintentionally, state policies inhibit the creation of career pathways by creating disconnects among high schools, community colleges, 4-year colleges and universities, and the labor market. However, states also can encourage career pathways.

Career Pathways, Career Majors, and Career Clusters

There are many definitions of career pathways. With the national focus on connecting the many disparate elements of our education and training systems, the term *career pathways* has come into widespread use. Current language in the Perkins bill reauthorization defines career pathways similarly to the CCTI definition, although with less detail. However, experts from the Workforce Strategy Center in New York City have defined and are helping to implement career pathways that are more explicitly focused on integrating education and workforce development with programs driven by employers' hiring and training needs (Alssid et al., 2002). This model does not necessarily end at a postsecondary credential but is applicable to adult workers at any stage of their careers.

Individual states also have varying definitions of career pathways. At least seven states explicitly use the term career pathways, but the extent to which they span the secondary and postsecondary sectors, or emphasize one or the other, varies. In Delaware

Essential Characteristics of an Ideal Career Pathway

1. The Secondary Pathway component
   - Meets state academic standards and grade-level expectations
   - Meets high school testing and exit requirements
   - Provides additional preparation to ensure college readiness
   - Meets postsecondary (college) entry or placement requirements
   - Provides academic and career-related knowledge and skills in chosen career cluster
   - Provides opportunities for students to earn college credit through credit-based transition programs
2. The Postsecondary Pathway component provides
   - Opportunities for students to earn college credit through dual or concurrent enrollment or articulation agreements
   - Alignment and articulation with baccalaureate programs
   - Industry-recognized skills and knowledge in each cluster area
   - Employment, business, and entrepreneurial opportunities in the chosen career cluster at multiple exit points
3. Pathway partners ensure that a culture of empirical evidence is maintained by
   - Regularly collecting qualitative and quantitative data
   - Using data for planning and decision making for continuous pathway improvement
   - Maintaining an ongoing dialogue among secondary, postsecondary, and business partners

Source: CCTI (2005)

and West Virginia, high school students must select a career pathway and take sequences of courses in that pathway. The Missouri Department of Elementary and Secondary Education has implemented six career paths to provide context for career exploration in elementary and middle school, the creation of a career plan in high school, and a plan for postsecondary study that includes articulation or dual credit. Kentucky characterizes its career pathways initiatives as a new systemic framework, not a program, to improve workforce development. Although the state has outlined career pathways starting in the ninth grade, the initiative is overseen by the office of the chancellor of the community and technical college system.

There is also potential confusion about the differences among career pathways, career clusters, and career majors. Career clusters are broad occupational groupings of industry-based jobs. The U.S. Department of Education created 16 broad career clusters that encompass virtually all occupations; the National Association of State Directors of Career Technical Education Consortium has created educational resources related to each cluster. According to the consortium, each cluster can be divided into a set of narrower career pathways. Maryland, which advocates the use of clusters and pathways in curriculum and educational programming, uses 10 clusters instead of 16. North Carolina has divided occupational groupings into 10 career pathways and has created 53 career maps within those 10 pathways that outline high school course sequences, as well as postsecondary and career options.

In addition, the 1994 School-to-Work Opportunities Act used the term *career major* to refer to a coherent sequence of courses or field of study based on an occupational goal. *Career major* is sometimes used interchangeably with *career pathway*. NLSY asked student respondents about their participation in career pathways or career majors, defining it thus: "Career pathways or career majors are coherent sequences of courses or fields of study that prepare a student for a first job. They feature many of the same elements as Tech Prep and Youth Apprenticeship (integrated curriculum, work-based learning, secondary–postsecondary linkages) but may also include linkages to 4-year colleges and universities" (Stone & Aliaga, 2003). Not incidentally, analyses of the NLSY data showed that students' participation in career pathways in high school was associated with a number of positive outcomes, including high school achievement and increased science course-taking (Stone & Aliaga, 2003).

Structure of This Report

This report aims to assist CCTI by presenting a sample of state-level policies and legislation that support the implementation of career pathways and other strategies that facilitate education and employment transitions. In this report we highlight state policies that are promoting a seamless transition to college and careers and give examples of cases in which curricula, requirements, or assessments are being coordinated statewide.

We focus here on state policies that support career pathways as defined by CCTI for its charge from the federal government—those developed for the secondary-to-postsecondary pipeline—rather than the adult workforce development approach advocated by the Workforce Strategy Center. This report is by no means a review of policies in all 50 states, nor is it a comprehensive listing of policies that support career pathways. We present examples of ways that states are encouraging connections among high schools, community colleges, 4-year colleges and universities, and the labor market. We provide models for other states on which to base their own career pathways policies. We also give some examples of policies that inhibit the development of career pathways.

We start with the high school level, giving examples of policies that address advising, alignment with postsecondary curricula, and graduation requirements. In the next section we examine policies that play a role in the transition from high school to college, particularly dual-enrollment policies, as well as policies that determine students' college readiness. We then give some examples from policies addressing postsecondary education and articulation between 2- and 4-year colleges. These include policies regarding, for example, transfer advising, common course numbering within postsecondary systems, and the applied baccalaureate. Next, we turn to policies that help create a meaningful role for employers in a seamless system. Finally, we address the issue of the collection of student data as students progress through education.

Policies were identified using two methods: telephone interviews with knowledgeable people and Web site searches. We first compiled a list, with the help of the CCTI project managers, of experts in education and workforce development. Also included on that list were CCTI site contacts. We conducted telephone interviews with those people, asking them to identify the types of policies that might support career pathways, the types of policies that might inhibit career pathways, and states with promising policies. We also asked them to identify additional people with whom we should speak.

Those interviews were followed by conversations with people at state departments of education, community colleges, high schools, and CCTI employer partners. These interviews included people in states with CCTI grantees, as well as states not part of the initiative. During these interviews, we asked about specific pathways-related policies, such as those related to high school graduation requirements, dual enrollment, or postsecondary credit transfer. We also asked people to direct us to specific policies or publications, where applicable. Finally, we asked for interviewees' opinions regarding helpful and hindering policies.

Next, we conducted lengthy Web searches for each state with promising career pathways policies. As part of these searches, we sought additional legislation and regulation pertaining to career pathways. We also looked for pathways-related initiatives and state publications addressing career pathways. In total, we spoke with 65 people from 22 states and 18 national organizations.

High School

Advising

Students need access to information about career pathways so they can take advantage of those pathways. To make well-informed choices regarding which pathway to enter, students need help understanding the consequences of their choices. What types of careers might they expect to enter if they pursue a particular career pathway? What are the implications of their choice for their future course-taking and degree options? What are the benefits and possible trade-offs of participating in a career pathway? Career pathways should be structured in ways that help students answer these questions with the assistance of knowledgeable and caring adults.

Advising and counseling that address both academic and career plans can help students select a pathway that will meet their goals. There is widespread support for guidance activities. The Carl D. Perkins Vocational and Applied Technology Education Act Amendments of 1998 recognized the importance of career-specific advising. This legislation included language supporting "career guidance and academic counseling," defined as "providing access to information regarding career awareness and planning with respect to an individual's occupational and academic future that shall involve guidance and counseling with respect to career options, financial aid, and postsecondary options." Research has shown that such activities can have positive influences on young people, along a range of outcomes (Hughes & Karp, 2004).

However, this support does not always translate to investment in advising and counseling at the state and local levels. According to a survey of guidance counselors released by the U.S. Department of Education in 2003, the ratio of students to counselors was 284 to 1. This ratio may make it difficult for counselors to advise students individually. Still, guidance professionals who responded to the survey were overwhelmingly positive about career pathways, with 84% saying that organizing curricula around career pathways is an effective way to deliver guidance services (Parsad, Alexander, Farris, & Hudson, 2003).

Although most of the people we spoke with did not mention advising and counseling as integral components of career pathways, it appears clear that pathway plans should explicitly require the provision of such services. A number of states have implemented policies to support students as they develop their career and educational goals. These states encourage adults to help students set goals, understand the link between secondary course taking and career paths, recognize career trajectories in various pathways, and engage in long-term planning.

Ohio state policy requires all public postsecondary institutions to participate in the

Course Applicability System, a Web-based posting of degree requirements and course equivalencies among institutions. This system can serve as a tool for high school students to plan their course taking with their intended college major in mind. Students who want to enter the health professions, for example, will be able to see that they need a strong science background to do so.

The State Board of Education in **Oregon**, under Oregon Administrative Rules 581–022–1120 through 1130, requires all high school students to develop an educational plan and an education profile for high school graduation. The plan must include short- and long-term career goals and plans after high school. It requires that students reflect on their interests and experiences to determine what steps they should take to reach their educational and career goals. The education profile documents students' progress toward their goals by recording evidence of the students' work, scores on standardized tests, and other accomplishments or honors. The Oregon Department of Education also encourages the use of Oregon Skill Sets and six broad Career Learning Frameworks to help students understand the educational paths involved in various careers.

In 2005, the **South Carolina** General Assembly passed, and the governor signed, legislation mandating high schools to provide career-focused advising to all students. By 2007, all middle and high schools must employ a career specialist certified in career development. Schools also are required to implement a career guidance program that will ensure that students are counseled about career choices, their personal goals, academic and career planning, and opportunities for experiential learning.

Washington State's new high school graduation requirements include a High School and Beyond Plan, in which students must outline how they will meet graduation requirements and their plans for their first year out of high school. The State Board of Education has disseminated guidelines for the implementation of the High School and Beyond Plan that include parental involvement and the use of "internal and external resources," including labor market information and "engage [ing] business, labor community, government and postsecondary institutions." The High School and Beyond Plan makes the link between high school and career planning explicit for students, families, and schools.

Graduation Requirements

In speaking with college faculty and staff, we often heard that high school graduation requirements could pose a barrier to creating career pathways. Possible barriers include uneven preparation for college; an emphasis on academics, to the exclusion of applied course work; the need for CTE students to take courses above and beyond regular graduation requirements to earn a diploma; and the lack of room in students' programs for CTE electives.

States have been increasingly setting statewide graduation requirements, so it is now rare for such requirements to be wholly determined at the district level (Iowa is one state that still follows the district-level model). Still, although almost states now specify the number of courses that must be taken in the subject-matter areas—for example, four English courses, three math courses, and so on—fewer specify the content of the courses—that is, whether American literature must be taken, or algebra, or biology (Somerville & Yi, 2002). This variation can make it difficult for colleges to develop pathways from high school to college, because students will enter college with very different academic backgrounds. Thus, imposing some consistency of requirements, at least across a particular state, is likely to have a positive effect on the high school-to-college transition.

Yet, imposing statewide requirements often goes hand in hand with raising graduation standards, which has been seen by some as discouraging CTE course taking. Increased academic requirements and emphasis on standardized tests may squeeze electives out of the curriculum. Students may not have room in their schedule for a sequence of CTE courses spanning multiple semesters or years. This is particularly true for students who underperform in academic courses, because they may be scheduled for extra reading or mathematics sessions. In addition, in some cases students at risk of failing or who have failed state exit exams are prohibited from taking elective courses.

Because CTE courses often are seen as electives or add-ons, students in career pathways programs may end up taking additional credits compared with their peers in more traditional areas of study. CTE courses, in these cases, are taken in addition to high school graduation requirements rather than as part of those requirements. An integrated technical course that focuses on applying mathematics to engineering professions, for example, often does not count toward graduation requirements. Thus, students may have to take more math courses than their non-CTE peers to receive a high school diploma while pursuing a career pathway.

A number of states, as we highlight in the following paragraphs, are finding ways to include CTE courses in their new high school graduation requirements. They do so by creating diploma endorsements that reward CTE students for the extra work in which they must engage. They also might create multiple pathways to a high school diploma or even a differentiated diploma that recognizes CTE course work as a graduation requirement.

The **Delaware** Department of Education integrated career pathways into the state's high school graduation requirements by establishing pathways as a central part of a high school education. The policy requires three credits in a career pathway in addition to credits in English language arts, mathematics, science, social studies, physical education and health, computer literacy, and elective courses. Career pathways are defined within the policy as a "planned program of sequenced or specialized courses designed to develop knowledge and skills in a particular career or academic area."

Indiana has implemented the Core 40, a set of courses recommended for high school graduation. Students who complete the Core 40 and an additional 8 to 10 credits of CTE and earn a state-recognized CTE certification receive a high school diploma with technical honors.

CTE students in **New York** may replace up to four academic credits required for graduation with specialized CTE or integrated academic or CTE courses. They must, however, earn the rest of their credits through nontechnical courses, and they must pass the same five academic exams as do other students.

CTE students in **New York** also may earn a technical endorsement on their high school diplomas by taking an approved sequence of technical courses. To earn this endorsement, students must take a nationally recognized certification in their career pathway field. In fields such as networking technology and automotive technology, the certification is valued by employers and thus can help students gain employment after graduation.

Oklahoma's high school graduation requirements allow students to meet math and science requirements with contextual courses that are technology oriented. Such courses may be taught at technology center schools. To ensure the academic rigor of these courses, they must be approved by the State Board of Education and the school district. In addition, Embedded Credit Crosswalks have been developed that identify the academic competencies contained within career and technology courses.

Connecting High School and College

Curricular Alignment, Articulation, and Dual Enrollment

Aligning high school and college curricula across education sectors and career requirements is a hallmark of a career pathway. As was noted in the introduction to this report, pathways should allow students to take high school courses that prepare them for and connect to their future postsecondary course work. These courses also should prepare them for entry into the job market, preferably by offering students the opportunity to earn an industry credential soon after high school graduation.

The Tech Prep legislation laid the groundwork for career pathways by encouraging Tech Prep consortia to align high school and college course work in technical areas. One common way of doing this is to create articulation agreements through which high

school electives serve as the first step toward a college major. Articulation agreements ensure that high school courses that potentially yield college credit include competencies taught in similar college courses. Traditionally, students who successfully complete articulated courses are awarded "credit-in-escrow" or college credit that can be applied toward a degree if the student completes additional course work at the college. Unfortunately, these arrangements have not been as uniformly successful as intended. Bragg found that many students do not use articulated credit (Bragg, 2001).

Dual enrollment is emerging as a popular alternative to articulated courses. Dual enrollment students take actual college courses, with credit recorded on a college transcript, eliminating the intermediate steps to credit earning required by many articulation arrangements. In addition, because dual enrollment courses are first and foremost college courses, students may receive a more authentic college experience. Although it used to be seen as a program for academically advanced students seeking enrichment in liberal arts courses, dual enrollment has been broadening its scope to include technical courses and a wider range of students.

Forty states have policies addressing dual enrollment (Karp, Bailey, Hughes, & Fermin, 2005). Sometimes these policies create a supportive environment for dual enrollment, such as when they ensure that both high schools and colleges receive funding for dually enrolled students. In other cases, policies can inadvertently inhibit the growth of technically oriented dual enrollment. In fact, a number of people we spoke with strongly expressed the desire for limited state policies in this area.

Policies can discourage technical dual enrollment in a number of ways. First, states may set admissions requirements for dually enrolled students. Sometimes students must have high levels of academic achievement to participate. Such policies ensure that students are prepared for college-level work but have the unintended consequence of preventing students who are disengaged from traditional academics or learn more effectively in applied situations from participating. Second, some states set target populations for dual enrollment. Often CTE students are overlooked.

In some cases, dual enrollment students earn dual credit—high school as well as college credit. In such cases, dual enrollment courses need not be electives. Students who still need to complete graduation requirements can take dual enrollment courses and remain on track for graduation. This may help maintain broad access to dual enrollment. In addition, for CTE students, who often take additional course work already, earning dual credit can make it easier for them to take a college course while still meeting all of their requirements for high school graduation. Thus, dual credit may be preferable to other credit-earning arrangements. However, many state policies do not specify whether students may earn dual credit. In addition, states' teacher licensure requirements may inadvertently prevent students from earning dual credit. College professors do not usually have course work in pedagogy and curriculum and thus may not be considered qualified to teach high school courses.

In an ideal pathway, it is not just technical courses that are aligned. Rather, academic courses taken at the high school level should segue into academic courses at the postsecondary level. Unfortunately, we did not find much evidence of policies encouraging such alignment. In addition, academic courses often remain disconnected from technical courses. For example, although a strong mathematics background is essential for success in many technical fields, high school math courses may not align with college technical course requirements.

Some states have engaged in efforts to link high school and secondary curricula in both technical and academic areas. They have sought to strengthen articulation agreements and increase students' and parents' knowledge about these agreements and open access to dual enrollment programs.

Florida's dual enrollment legislation allows high school students to enroll in technical courses if they have a grade point average of 2.0 or higher. These college courses lead to certificates and may not be transferable to degree programs. Students must have a 3.0 grade point average to participate in academic courses.

Iowa's Grow Iowa Values legislation supports the creation of career academy programs linking career-specific study at the high school and

postsecondary levels. Students in career academies participate in a sequential course of study that begins in high school and culminates in a postsecondary credential. Career academies typically include technically oriented dual enrollment courses and work-based learning experiences offered through high school–community college partnerships. Iowa legislation also encourages these programs by providing additional funds to high schools that participate in career academies. State policies permitting Iowa's career academies and postsecondary enrollment options programs do not require students to meet specific admissions standards. Institutions may create their own eligibility requirements for these two programs.

Missouri is developing statewide articulation agreements for career and technical courses of study. Representatives from the secondary and postsecondary sectors have developed and approved an articulation agreement in automotive technology and are working on others. High school automotive technology students who achieve at least a 3.0 grade point average in an industry-accredited program and pass the industry-sponsored end-of-program examination receive a minimum of 12 college credits on entering any community college automotive technology program in the state.

Missouri's school accreditation program requires that career and technical education programs have agreements in place that provide articulated or dual credit. The accreditation process is increasingly focused on not only whether such agreements exist but also on how many students are enrolled in articulated programs and what information is shared between secondary and postsecondary instructors to ensure a seamless transition for students.

New York State does not have any policies related to dual enrollment. This has allowed the City University of New York much leeway in creating a program that meets the needs of students in New York City. The College Now program includes traditional dual-enrollment courses as well as remedial courses, high school electives, and enrichment activities.

The **North Carolina** High School to Community College Articulation Agreement was developed in 1999 by numerous work teams made up of high school and community college faculty, industry alliances, and others; it has been endorsed by the State Board of Education and the State Board of Community Colleges. The agreement was revised in 2005. The agreement sets guiding principles for articulating course work and criteria for the award of college credit to high school students. It also recommends specific courses in 18 occupational areas for articulation.

Virginia's Senior Year Plus: Path to Industry Certification initiative allows high school seniors to begin work on an occupational certificate or license. Participants begin taking technical course work at a community college while completing the requirements for their high school diploma. They complete the certificate or licensure requirements by enrolling at a community college during their first year after high school graduation. The state pays for students' tuition and certification or licensure examinations.

College Readiness

A key goal of career pathways is to help all students become ready for college. Including rigorous high school academics in pathways is, of course, an important way to encourage this goal. However, the people we spoke with stressed that rigor is only part of the solution. Students need to understand what will be expected of them in college so that they can prepare for those expectations. The people we spoke with noted that students often receive unclear messages about what it means to be college ready.

High school teachers are rightly focused on graduating their students—ensuring that students pass their course work and preparing students for state exit examinations. However, in most states, the secondary and postsecondary education systems function separately from each other, so that high school graduation requirements (including exit exams) are not aligned with the assessments colleges use to determine students' readiness for college-level work. High school teachers may not be familiar with the college placement exams and may not realize

that their students are lacking in the appropriate preparation. Hence, students may be awarded a high school diploma but not be prepared for college.

Moreover, in many states, postsecondary institutions themselves decide which placement test to administer and what score is indicative of a student's college readiness. Thus, a student may qualify for college credit course work at one institution but, at a college just a county away, be told that he or she must take remedial course work. This may cause confusion and frustration for students. It also makes it difficult for those high school teachers who want to prepare their students for college placement exams to do so.

A number of our interviewees suggested that states adopt common testing procedures and cutoff scores. They argued that this would send a clear message to students regarding the academic preparation expected of students in college credit courses and would help high schools prepare students for those standards. A number of states, as is shown in the following paragraphs, have moved in this direction. However, it should be pointed out that the current system—although confusing to students and teachers—does allow for institutional control over the admissions process. Such control would be lost under a state system. Thus, states should carefully consider the trade-offs of either arrangement before implementing state policy.

Florida has established a common placement examination for all of its community colleges. The state defines the passing score on the exam, creating uniformity with regard to exempting students from remedial classes.

Illinois' 11th-grade achievement test, the Prairie State Achievement Examination (PSAE), includes the ACT Assessment and two ACT WorkKeys tests. The state's learning standards have been aligned with the ACT. Therefore, the PSAE simultaneously assesses students' progress toward state standards and their readiness for college admissions. Students can elect to have the ACT score they receive as part of the PSAE sent to colleges.

The City University of New York has aligned its entry standards with **New York** State's high school exit examinations. Students attaining a score of 75 or above on their English/language arts or mathematics regents exams are exempted from remediation in the applicable subject. This score is higher than the 65 that students need to earn on the exams to graduate from high school.

Connecting Two- and Four-Year Colleges

The transfer of credits between community colleges and 4-year institutions has historically been problematic. Students who earn credits at a community college cannot always apply all of those credits toward a bachelor's degree. This means that they may have to retake some classes whose content they have already mastered. This causes frustration, added expense, and delay in degree attainment.

The disjointed nature of the credit transfer process has its roots in the presence of two higher education systems. In many states, community colleges and universities are separate entities, with their own governing boards and leadership. Thus, communication between the two types of institutions occurs less often than might be ideal. Individuals within the two systems do not necessarily know what students in the other system are learning. Universities do not know what community college students are learning, and therefore may be reluctant to issue credit for courses not taken on their campuses. Furthermore, if community colleges do not know the expectations of university faculty, they may not be able to prepare their students accordingly. This disconnect mirrors the situation between secondary schools and community colleges regarding the lack of agreement on academic readiness.

Fortunately, this is an area in which many states have made significant progress in recent years. Many states are now creating systems that allow institutions to evaluate one another's credit and that help students transfer credit between institutions seamlessly. These efforts include articulation agreements, in which states mandate that certain courses transfer among all state institutions; common course numbering systems, in which institutions statewide use the same numbering for courses teaching the same content; and a transferable core, in which general education courses transfer to the baccalaure-

ate as a block. Although some preliminary research indicates that articulation agreements do not increase transfer rates (Anderson, Sun, & Alfonso, in press), such efforts require 2- and 4-year institutions to work together, to communicate, and to think about ways to ease student transfer.

In a career pathway, transfer is further complicated by the technical nature of some associate degree course work. Traditional liberal arts education usually includes general education in the first two years and major-specific courses in the third and fourth years, although many technical associate degrees focus primarily on discipline-specific course work. Thus, aligning applied associate degrees with bachelor's degrees has been quite challenging for states. In many cases, the associate degree in applied science (AAS) cannot substitute for the first two years of a bachelor of science (BS) degree, because the courses completed by students are not similar. Thus, technical students may have an even more difficult time than do their peers when applying previous college course work to a bachelor's degree. Some states have begun to address this by creating new degrees or programs that help AAS holders smoothly transfer to bachelor's degree programs.

Since 1975, **Florida** has had a statewide course numbering system among its 2- and 4-year colleges. A course within this system is guaranteed to transfer to any other institution that participates in the course numbering system and offers a course with the same number. All public institutions in the state are required to participate in the system, and a number of private colleges do so as well.

Florida's state colleges have nine AS-to-BS articulation programs or "career ladder arrangements." Students who graduate with an AS in any of these nine programs have guaranteed admission to a university BS program in the same field. Florida policy also allows universities to create "capstone programs" that facilitate the completion of a BS degree by AS degree holders. Students complete their general education requirements as college juniors and seniors, because their major or technical requirements were completed as part of the AS degree. Universities are not required to offer capstone programs, but, if they do, they must accept the AS from all community colleges in the state.

North Carolina requires community colleges to identify an academic advisor to specialize in transfer. The Transfer Information System Group ensures accurate and accessible transfer counseling. This includes a computerized articulation database and a computerized common transfer application, among other initiatives.

Recent legislation in **Ohio** created discipline-specific Transfer Assurance Guides (TAGs). These agreements outline course objectives for courses in 38 majors within 8 broad disciplines. Courses meeting these objectives are guaranteed to transfer to any Ohio public institution. The TAGs build on the state's long-standing Ohio Transfer Module (OTM) by identifying course work for specific majors, including education, business, health, and engineering.

Washington State code requires that the Higher Education Coordinating Board develop transfer associate degrees that will satisfy lower-division requirements at public 4-year institutions for specific majors. The purpose is to expand opportunities for transfer into 4-year programs without losing credits earned in a 2-year program and to better prepare students for transfer through curricular alignment. Students will be able to make use of this opportunity in three occupational areas identified by the state legislature: prenursing, engineering, and elementary education. The prenursing program is expected to be in operation by fall 2006, and the other two areas will be up and running by fall 2007.

Washington State's applied baccalaureate program will expand pathways for technical associate degree graduates. The pilot program allows four community colleges to offer an applied baccalaureate. The degrees must be in fields in which there is demonstrated demand from employers and must be designed for students who hold an AAS degree. The aim is that the creation of applied baccalaureates will increase students' ability to apply technical credits toward a bachelor's degree.

Employers' Involvement

Because career pathways are meant to prepare students for both postsecondary education and employment, it is important that employers are involved. This involvement can include a wide range of activities. Employers can (and should) help institutions select the occupational areas included in career pathways to ensure that students are being prepared for jobs that will be economically viable. They can advise faculty and program administrators on curriculum issues. They can provide students with work-based learning and job-shadowing experiences to enhance classroom learning. Employers also can help students gain employment in the pathway's field, either part time for those still in school or full time after graduation.

The people we spoke with almost unanimously agreed on the importance of employers' involvement in career pathways. Support for such involvement also comes from the research community, which has found evidence that the services employers provide can enrich students' experiences (see the review of the literature in Hughes, Bailey, & Mechur, 2001). Federal policy often gives employers a place at the table, for example, by requiring employers to participate on Workforce Investment Boards (WIBs) as part of the Workforce Investment Act.

Yet, many of the people we spoke with indicated that their programs did not have prescribed roles for their employer partners. Moreover, we found few policies that served as incentives to formalized participation by employers. Thus, employers' involvement often remains peripheral to the core activities of a career pathway. A few states, however, have implemented policies that support systematic and sustained involvement of employers.

Iowa's Accelerated Career Education (ACE) program provides funds for the creation or expansion of associate degree programs leading to high-wage employment. To receive funds through this grant, colleges must work with employer partners who promise to employ 25% of the program's graduates and to pay them at least 200% of the federal poverty wage for a family of two.

Kentucky's Postsecondary Education Improvement Act of 1997 (HB 1) created the Workforce Development Trust Fund, one of six Strategic Investment and Incentive Trust Funds, to enable the Kentucky Community and Technical College System to provide customized workforce training for the state's businesses and industries. Now called Kentucky's Workforce Investment Network Systems, the funds can be used for career pathways initiatives that demonstrate the commitment of employers and WIBs. The program is allocated $6 million each year.

In the health sciences, licensure requirements in many states effectively demand that colleges partner with employers to provide students with clinical experiences. For example, **Maryland** state code requires programs offering degrees in nursing to work with clinical facilities to expose students to a range of clients and patient needs. Although not written explicitly as a policy for employers' involvement policy, this code essentially requires partnerships between nursing programs and employers.

Through a line item in the state budget, **Massachusetts** funds Connecting Activities (CA), which provides staff funding for activities such as internships that link students and the workplace. Because time-consuming organizational and recruitment activities necessary for creating internships are conducted by CA staff, this funding removes a disincentive to involving employers in education.

Washington State has created 11 Centers of Excellence within the community college system. Each center is intended to be a comprehensive resource for an industry cluster, providing expertise and resources that meet the education and training needs of industry. The centers are in information technology, process manufacturing, energy production and distribution, materials and process development in manufacturing, careers in education, homeland security, construction, manufacturing, marine manufacturing, agriculture, and allied health technology. The centers are designed to encourage colleges to develop "in-depth knowledge of the training needs of the key industries

that drive their local economies" (Washington State Board of Community and Technical Colleges, 2005).

Data Collection and Use

In evaluating whether career pathways help students prepare for rewarding careers, it is important to collect data on student outcomes. These data should reveal whether students are following a coherent sequence of courses spanning secondary and postsecondary schools and whether they are more successful than their peers who did not participate in career pathways. Such knowledge also can be used to continually improve and upgrade career pathways so that they remain relevant and connected to the current occupational structure.

Because pathways encompass multiple education sectors, data collection becomes complicated. Ideally, we would like to be able to follow individual students from high school into the labor market, accounting for all of the steps in between. In doing so, we could understand what happens to participants at each stage in their education and career path. This would require the collection and use of data across multiple institutions—for example, the capability to follow students from high school into college.

Unfortunately, few states collect and use such data. In most states, high schools collect data on their students, colleges collect data on their students, and the two sectors do not combine these data sets. In some cases, the two sectors may define variables differently, making it impossible to connect high school and college data. In other cases, the two sectors do not share their data with each another. This means that longitudinal analyses cannot account for students' preexisting characteristics. In addition, education data are rarely linked to employment data, making it difficult to understand what happens to graduates in the labor market.

A few states have begun to combine data systems so that long-term analyses can follow students through their entire education careers. In some cases, these datasets have been combined with state labor market data to follow students into the job market. Because they are quite complicated, creating these datasets requires states to invest funding and staff time. They also require cooperation among various education sectors. However, states are beginning to see the benefits to creating such integrated data systems and are investing accordingly.[2]

A grant from the **California** Community College Chancellor's Office supports the development and expansion of the Cal-PASS system. This system encourages the development of consortia, including 4-year institutions, community colleges, and K–12 school districts, that work together to collect and analyze data to track students' education paths. Although the system is not available yet statewide, it continues to grow and can serve as a model for other data-sharing efforts.

Through a budgetary appropriation in 2000, **Florida** created a K–20 Education Data Warehouse. The system allows for longitudinal analyses of education data spanning from elementary to graduate school. Analyses can track individual students over time, even as they move across education sectors. The data also can be linked to the state's unemployment insurance database, allowing for analyses of labor market outcomes. The Education Data Warehouse is housed in the state's Department of Education and maintained through annual budget appropriations.

Conclusion

Although restructuring career and technical education around career pathways is an ambitious reform, it is one that many states are beginning to undertake. Because career pathways traverse education sectors, they rely on a variety of policies to help them smooth students' progress through their education trajectories. Although no state has implemented policies addressing all pieces of career pathways, quite a few have made strides in a number of areas. Florida has led the way with regard to system integration, creating in 2001 a K–20 system, with all education levels governed by one state department of education and a single education commissioner. As we have illustrated, other states have implemented changes in policy that hold great promise in encouraging and facilitating coherent pathways of study that span education sectors.

However, reviewing the state policies discussed here raised a number of issues. Perhaps the most striking is the continued division between academic and career–technical education. Despite the long-standing goal of integrating the two, they remain separate. Admission into CTE courses (particularly CTE dual enrollment courses) has different requirements than does admission into academic courses in some states. The two have separate faculty and often separate funding streams. In addition, in many places CTE programs lead to different credentials than do academic programs (e.g., an AAS rather than an AA or AS).

Thus, it appears that the separation between CTE and academics remains, particularly at the system level. Some of our interviewees argued that it is still appropriate to treat the two separately in some cases, such as with faculty credentialing and funding. For CTE programs, adjunct faculty with recent experience in the career area are often sought out as opposed to traditional academically trained educators. And CTE programs tend to be more expensive because of equipment needs and thus require separate and additional funds.

The problem lies in system structures that do not allow students the flexibility to move and transfer course work between CTE and academic programs. The creation of new pathways between applied and academic course work, such as applied baccalaureates, is a positive start. However, overall, policymakers should pay more attention to finding ways to integrate programs and curricula.

This and other problems identified in this report derive partly from the false assumption that students will pursue education and training in a linear fashion. CCTI, as well as many of the policies cited, implicitly makes this assumption. But others have argued that career pathways should contain multiple entry points, because many people do not progress from education to work in a direct route. Workers returning to education and recent immigrants, as two examples, may not be able to access career pathways through the mechanisms described. Thus, policymakers should pay attention to creating multiple pathways that meet the needs of both traditional and nontraditional students.

Washington State, for example, has funded demonstration projects tying basic skills instruction to credit-bearing occupational programs. The projects, called Integrated Basic Education and Skills Training, focus on pairing English as a second language or adult basic education instructors with occupational program instructors in the classroom to concurrently advance students' gains in literacy and technical skills. Criteria are being developed to aid in the statewide implementation of the model. This model provides an alternative entry point into career pathways. Other states might consider supporting similar efforts to expand career pathways opportunities beyond traditional student populations.

Employers appear to be, for the most part, absent in the policies we examined. Although some employers may play a meaningful role in career pathways in practice, it was difficult to find state policies that encouraged or rewarded them for doing so. This situation is ironic, because one goal of career pathways is to connect students to the labor market and help them smoothly enter rewarding careers.

This problem probably stems from the frame used to create career pathways—whether they are devised and driven from the supply side (educational institutions) or from the demand side (employers). Pathways that emerge from the supply side may not be tightly connected to employers. Alssid et al. (2002) made a strong case that for career pathways to be successful, they must be framed as a system for workforce development, with structured roles for a broad group of regional partners. Employers should identify which career areas are ripe for growth and should partner with educational institutions to develop pathways into those careers.

Whether pathways are driven by the supply side or the demand side, state policymakers have an important role to play in refining and clarifying the involvement of employers. State policies could encourage stronger involvement by employers by providing incentives to those firms offering internships or committed to hiring career pathways graduates. Policymakers should examine state funding streams for worker training to determine how they can encourage, and avoid discouraging, career pathways systems.

Finally, although we have focused primarily on highlighting positive examples of policies that support career pathways, implementing new policy is not always desirable. We encountered a number of people who believed that in some areas, such as dual enrollment, less regulation would be more conducive to the development of career pathways. In the absence of state directives, institutions can develop their own creative ways to link secondary and postsecondary education with the labor market. They can tailor these solutions to local needs.

Policies that stimulate and provide support for innovation may be more welcome, and ultimately more effective, than policies that are restrictive. For example, Ohio's legislature has mandated that the state Department of Education and the Board of Regents work together toward better articulation. Although the outcomes of this collaboration are demanded by state law, the Department of Education and the Board of Regents are being given flexibility in achieving them.

Because federal policy tends to shift with different administrations, it is important for every state to have its own vision for long-term educational and career pathways systems. It is up to each state to determine its own governance of education and workforce development. This report should help states consider career pathways as a system for delivering career and technical education and the policies needed to implement that system.

Endnotes

[1]Nearly 60 percent of postsecondary students need to take at least one remedial course on entering college, and students required to take many remedial courses are more likely to drop out of college before receiving a degree than are their counterparts who need less remediation. Analyses of the Beginning Postsecondary Study dataset showed that of those students entering an associate degree program in 1995, 44% had dropped out without completing their degree by 1998 (Bailey, Alfonso, Scott, & Leinbach, in press; Deil-Amen & Rosenbaum, 2002; National Center for Education Statistics, 2004).

[2]For more information on national efforts to encourage the collection of longitudinal education data, see *Creating a Longitudinal Data System* and other publications of the Data Quality Campaign, in collaboration with the National Center for Educational Accountability (www.DataQualityCampaign.org).

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