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Growing Interest in Providing Structured Career Pathways

In California and the rest of the nation, there is a growing interest in developing structured career pathways to and through postsecondary education. Interest in career pathways has been increasing for a variety of reasons, chief among them the need to address expected workforce shortages. There is evidence that California is preparing too few people with the skills necessary to fill expected job openings in occupations that pay a living wage. A recent report by the Public Policy Institute of California found that California could have jobs for one million more bachelor’s degree holders than the state is currently on track to produce (Johnson & Sengupta, 2009). Occupations that require some postsecondary education, but do not require a bachelor’s degree, are also expected to face job shortages. These middle skill jobs represent the largest share of jobs in California and the largest share of future openings (The Workforce Alliance, 2009). Research also points to expected shortages at all levels of postsecondary achievement in science, technology, engineering, and mathematics (STEM) occupations (Offenstein & Shulock, 2009).

Structured career pathways are also a means to improve social mobility for disadvantaged Californians. Although there have been recent gains in college-going, changes in the demographic profile of students and increasing numbers of students who are the first in their families to attend college have challenged postsecondary institutions designed to serve traditional college students (e.g., recent high school graduates who attend full time). While intense student services can aid these new college students, the high cost of these services limit their reach to a fraction of those who need them. As a result, completion rates in the state’s broad-access institutions have been lower than what both students and the state need. Well-structured career pathways are one set of reforms that could improve student outcomes for many students in a relatively cost efficient manner.

Streamlining career pathways can increase postsecondary education productivity. A lack of structure in career pathways can result in students taking courses in pursuit of lower-unit credentials that don’t count towards higher-unit certificates and degrees. This inefficiency in the accumulation of units has been well documented in the literature on community college transfer (Moore, Shulock, & Jensen, 2009), but may also be a factor impeding student movement from lower-unit certificates to higher-unit certificates and associate degrees. If relevant units don’t carry forward to the next highest credential, the cost to the state and the cost to students in time and money increase unnecessarily.

What are Career Pathways?

A career pathway is a sequence of articulated academic and career courses beginning in high school and continuing through to an industry-recognized certificate or licensure, an associate degree, or a baccalaureate degree and beyond (Hughes & Karp, 2006; Hull, 2005). The development and maintenance of pathways require partnerships between secondary and postsecondary educators and employers. Pathways should prepare students for careers and ideally include multiple points of entry and exit so that workers can gain skills as needed during the course of their careers (Jacobs & Warford,
A number of benefits are expected from developing career pathways including reduced high school drop-out rates, increased aspirations among students, increased college-going, improved transitions to workforce and postsecondary education, reduced remediation, and increased efficiency of students progressing through postsecondary education.

Career pathways are the latest evolution of career education. In the last few decades, vocational education has been transformed from training students for relatively low-skilled occupations to educating students for higher-skilled careers that have greater opportunities for advancement. These changes have been reflected in a change of terminology— from *vocational education* to *career technical education*. Newer models of career and technical education (CTE) emphasize the linkages between secondary and postsecondary education and increase the importance of community colleges as a bridge from secondary education to work and more advanced study in college. For example, in the Tech Prep model, students begin education in a particular career area in high school and then continue for an additional two years in a community college (Hull, 2005). Tech Prep programs are structured so that community colleges serve as a bridge between high school and the workforce. In the career pathways model, community colleges not only serve as a bridge between high school and the workforce, but also between high school and baccalaureate education. Community colleges also serve an important role for people already in the workforce who want to return to upgrade their skills by earning a new certificate or associate degree, or transferring to a four-year university.

The U.S. Department of Education’s College and Career Transition Initiative (CCTI) is one example of a career pathways initiative (Hughes & Karp, 2006). The initiative is designed to help community colleges create pathways from high school to community colleges and four-year programs and careers. The initiative has multiple goals: improve levels of preparation and academic skills, increase enrollment and persistence in postsecondary education, increase attainment of degrees and certificates, and facilitate entry into further education and employment.

States are also focusing on improving career pathways. Washington’s I-BEST program is a well-regarded model for integrating academic education into career education to improve outcomes for returning adult students in need of developmental education. Ohio has developed a framework of “stackable” certificates to integrate remedial education into a series of occupational skills certificates (Community College Research Partners, 2008). In this model, all training by any community college builds so that certificates stack on top of one another and the credits count at any public community college towards a two-year degree. In California, the Research and Planning Group for California Community Colleges has begun an initiative to improve transfer from community college occupational programs to four-year programs. Career pathways were also an important component of the Ford Foundation’s Bridges to Opportunity initiative which aimed to improve state and local policies so that the needs of adult students are better served by community colleges. The Bridges initiative emphasized that community colleges are key to the success of career pathways because they are well-positioned to coordinate remediation, occupational training, academic credentialing, and transfer.

To strengthen pathways from community colleges to four-year universities, states are developing a variety of new degrees and articulation agreements (The RP Group, 2009). For example, some states are
developing articulation agreements for applied associate degrees awarded at community colleges that count the units earned in these degrees towards a Bachelor of Applied Science (BAS) degree. Another approach taken by states is “upside down degrees” in which students take their technical work at the community college and then complete the general education curriculum at a four-year university. Additionally, both four-year universities and community colleges in some states are beginning to offer applied bachelor’s degrees which are more occupationally and technically focused than the traditional bachelor’s degree.

State and national efforts to implement and improve career pathways for students can look to the research literature for evidence on the effectiveness of career-oriented education in both high schools and community colleges, and for information on how to strengthen CTE to improve student outcomes and better meet the needs of the workforce.

Evidence on the Effectiveness of Career-Oriented Education

Outcomes for High School Students
More is known about the effectiveness of career-oriented education in high schools than in community colleges. Findings from studies of high school students are relevant to postsecondary students because the experiences that students have in high school influence their outcomes in college. A growing body of research points to the benefits of multiple forms of CTE education in high schools.

Outcomes for Students Enrolled in CTE Courses
Students who complete career coursework in high school have been found to have better outcomes than those who completed traditional coursework, but the positive effects are clearer for workplace outcomes than for educational outcomes (Griffith & Wade, 2001; Lekes et al., 2007; Silverberg, Warner, Fong, & Goodwin, 2004). In a review of the literature on high school CTE, the National Assessment of Vocational Education (NAVE) found that, as currently structured, occupational coursework had no effect on academic achievement, that the evidence was mixed for the effect of CTE on dropping out, and that there was no effect for CTE on enrolling in postsecondary education (Silverberg et al., 2004). Although no consistent relationship was found between participation in CTE in high school and enrolling in postsecondary education, taking more CTE courses was associated with a higher probability that students would earn a certificate or associate degree as opposed to a bachelor’s degree. Some research has found that CTE students who did attend postsecondary education earned similar grade point averages (GPAs), had similar graduation rates, and finished college in about the same amount of time as students who did not participate in career education in high school (Griffith & Wade, 2001). Other research found that CTE students reported feeling more prepared for college and more directed toward a career goal, and they were more likely to take dual enrollment courses during high school (Lekes et al., 2007).

The NAVE report concluded that there was some evidence for a positive effect of occupational course-taking in high school on earnings in the short term, although the long-term effect on earnings was unclear. Similarly, one study found that occupational students worked more quarters during the six
years after graduation and worked for more continuous quarters than non‐occupational students (Griffith & Wade, 2001).

**Integration of CTE and Academic Coursework**
Research points to the importance of formal integration of academic coursework into high school CTE curricula for ensuring academic achievement. In a comparison of CTE courses with and without formal integration of math course content, average scores on standardized academic math exams were greater in courses with the integrated academic content than in courses with standard CTE content (Stone, Alfeld, & Pearson, 2008). Differences were not found on an applied mathematics assessment or on tests of occupational content. These findings suggest that explicit integration of academic content can improve academic learning without reducing occupational learning.

**Dual Enrollment**
An exploratory study of dual enrollment programs between a high school and a technical college found generally positive results for those who participated (Harnish & Lynch, 2005). Qualitative findings of students’ experiences suggest that students thought participation was beneficial because it increased their exposure to college, increased their awareness of options after high school, and helped them focus their career options. In a summary of research conducted at the Minnesota State Colleges and Universities system, Kotamraju reported that dual enrollment students who enrolled in both CTE and academic courses had a higher probability of receiving a postsecondary credential than students who took exclusively academic or CTE courses (2007).

**Students who Prepare for College and Career**
Research using data from national surveys has found that not many students concentrate in both academic courses to prepare for college and occupational courses to prepare for a career. One study found that among three different graduating classes, .6%, 2.8%, and 4.5% of students completed both a college preparatory curriculum and a concentration in one vocational area in high school (Hudson & Hunt, 1999). A second study estimated that 6% of students concentrate in both academic and CTE coursework (Plank, 2001). This study also found that dual concentrators performed nearly as well as academic concentrators on tests of academic achievement in math, science, reading, and history. The better performance of academic concentrators may have been in part due to a greater number of units they completed in higher-level math and science courses. Because of the additional CTE coursework, CTE concentrators may have had less time available to take as many high-level math and science courses. Although dual concentrators’ performance was slightly lower than academic concentrators on achievement tests, Plank found that taking a mix of CTE and academic courses was related to a lower probability of dropping out. The optimal ratio was taking three units of CTE for every four units of academic coursework, with both smaller and larger ratios associated with a greater probability of dropping out.

**Career Academies**
The career academy is a model for delivering CTE content in high schools. The academies are typically organized as a school‐within‐a‐school, combining academic and career coursework into a career theme
(e.g., construction, healthcare) and utilizing partnerships with local employers (Kemple, 2001). Research suggests that career academies may lead to better outcomes for students than other forms of education. An evaluation of career academies that randomly assigned academy applicants to participate in career academies or to enroll in any other high school program found that career academy students had higher levels of school engagement, greater participation in career awareness and work-related learning activities, and lower drop-out rates (Kemple, 2001). Although the study found small or negligible impacts on high school graduation, enrollment in postsecondary education, and employment when participants were compared to the non-academy control group, the non-academy control group performed better on these outcomes than a similar group of students nationally. This suggests that students who applied to the career academies and were assigned to the control group may have been atypically high performers, and that the effectiveness of career academies may be greater than the findings of the evaluation study indicate. A study of high school applicants to a comprehensive university did find some positive associations between career academy participation and postsecondary outcomes (Maxwell, 2001). After controlling for demographic characteristics, high school GPA, and high school attended, the study found that students who participated in career academies had a lower need for remediation in college and were more likely to graduate from college.

**Summary of CTE Outcomes for High School Students**
The research literature suggests that CTE can improve outcomes for high school students. High school students who take CTE courses have better employment outcomes and feel more certain about their career direction. CTE can also lead to comparable or improved postsecondary outcomes as long as academic coursework is not sacrificed.

**Outcomes for Community College Students**
While less research has been conducted on community college students than on high school students, existing research suggests that occupational education has positive effects on workforce outcomes, although the results for educational outcomes are somewhat mixed.

**Outcomes for Occupationally-Focused Community College Students**
Alfonso, Bailey, and Scott (2005) examined the effect of choosing an occupational or academic major on students’ completion of their degree goals for students pursuing either a certificate or an associate or bachelor’s degree. In an analysis that controlled for a variety of background characteristics and patterns of educational attendance, the effect of choosing an occupational major was unrelated to completion for certificate students but was negatively related to completion for associate or bachelor’s degree students. Lower completion rates associated with an occupational major appeared to be primarily driven by lower transfer and baccalaureate attainment rates for these students. However, because of limited data on student’s educational background, researchers could not fully rule out the possibility that students with occupational majors were less well prepared and that this accounted for the negative effect of choosing an occupational major. Despite this uncertainty, the negative effect of choosing an occupational major on transfer may explain why a study found that a minority of the students who transferred to a four-year university were from occupational programs (Farmer & Fredrickson, 1999).
Although there is some evidence that choosing an occupational major may lead to a lower chance of completion, the effect may not be the same for all students. A study found that economically disadvantaged students with an occupational major were more likely to complete their degree goal, although in a second sample, the choice of an occupational major had no effect for this population (Bailey, Alfonso, Scott, & Leinbach, 2004).

Outcomes for Students in Occupationally-Focused Colleges
Concerns have been raised about the possible detrimental effects on student outcomes of community colleges’ focus on occupational education (Roksa, 2006). The argument is that colleges that focus on occupational education may divert students away from higher levels of educational attainment such as a bachelor’s degree toward earning short-term occupational credentials. Although research has found that students who attend community colleges that award a higher share of certificates have a lower probability of earning an associate degree as opposed to earning a certificate or no credential, it is hard to say whether this is because the institution diverts students away from associate degrees or whether students attending those institutions enter with the goal of earning a certificate (Roksa, 2006). Additionally, this study found that the share of credentials awarded by an institution that was certificates was unrelated to transfer and that the share of associate degrees awarded in occupational fields was unrelated to earning an associate degree or to transferring. Based on these findings, there is not clear evidence that occupationally-focused institutions divert students away from higher levels of educational attainment.

Earnings of CTE Students
Choosing an occupational major may have negative effects on earning an associate or bachelor’s degree, but students in select occupational fields have a substantial earnings advantage. In a study of students who attended community college in Florida, researchers classified students by their community college field of study into low-, medium-, high-, and very high-return fields. Most of the high- and very high-return fields were CTE fields and several of the low-return fields were academic areas. Seven years after leaving college, students who completed a community college credential or transferred and earned a four year degree in high-return fields such as engineering, business, and computer science earned more than $12,000 a year more than those in low-return fields such as fine arts, humanities, and human services. Students in the very-high return field, healthcare, earned nearly $19,000 more (Furchtgott-Roth, Jacobson, & Mokher, 2009). The study also found that students with lower high school GPAs who concentrated in high-return fields earned more than students with higher GPAs who concentrated in low-return fields, although lower GPA students were less likely to concentrate in low-return fields.

In a review of research on the effect that sub-baccalaureate education has on earnings, Grubb (2002) concluded that there are sizable returns for earning an associate degree in an occupational field but there is some uncertainty over the benefits of certificates and little benefit in earning an academic associate degree. Smaller benefits are found for students who complete one or two years of coursework without earning an occupational associate degree and students who earn less than a year’s worth (30 semester credits) of credits derive almost no earnings benefit. Additionally, the review concluded that credentials in some fields produce higher returns than others. Returns for earning an associate degree
were highest in engineering and computer fields for men and in business and health-related fields for women. Small sample sizes prevented conclusions about the returns for certificates in different fields.

A more recent study of the effect on earnings from attending a sub-baccalaureate program and from earning an associate degree or certificate also points to positive effects for postsecondary occupational education (Bailey, Kienzl, & Marcotte, 2004). For men, higher earnings were found for years spent in an occupational sub-baccalaureate program but not in an academic program in one sample, although the effect was not statistically significant in a second sample. Earning a certificate, however, was not associated with additional earnings beyond the gains from completing coursework without a credential. For associate degrees, completing the credential was associated with higher earnings if it was in an occupational major, compared to just enrolling in two years worth of credits without earning a degree. For women, each year of schooling in both academic and occupational sub-baccalaureate programs was associated with higher wages in one sample, but only for academic programs in a second sample. Additionally, completing a certificate or an associate degree in an occupational field was associated with additional earnings for women. In one sample, earning an associate degree in an academic field was also associated with additional earnings for women.

Overall, it appears that earning an associate degree leads to higher earnings, particularly if it is in an occupational field. Additionally, some occupational fields generate greater returns than others. The results for earning a certificate are less clear, but there is evidence to suggest that occupational certificates produce higher incomes for women. Additionally, there appear to be greater returns for completing an associate degree beyond the effect of just taking two years of coursework if the degree was in an occupational field.

Summary of CTE Outcomes for Community College Students
Although there is relatively less research on community college CTE students than on high school CTE students, it is possible to draw some conclusions based on what has been found. One advantage of occupational education in the community colleges is the potential for earning a higher income. Many of the highest-earning fields that former community college students enter are in occupational areas. By comparison, liberal arts fields tend to yield lower incomes, at least when entered with a two-year degree.

Some evidence suggests that choosing an occupational major is a risk factor for completing an associate degree at a community college, a finding that is consistent with criticisms that vocational training decreases students’ educational aspirations. However, this research is not conclusive. Lower completion rates among students with an occupational major may be due to unmeasured differences in the educational backgrounds (e.g., high school courses taken) of occupational and non-occupational students. Additionally, there is some evidence that choosing an occupational major may be associated with higher completion rates for low-income students.

Even if there were more conclusive evidence that choosing an occupational major is associated with lower levels of educational attainment, it would be a mistake to conclude that occupational education
inevitably leads to lower levels of attainment. It could, instead, be a reflection of poor approaches to occupational education. Designing better CTE programs so that they have well-articulated pathways between certificate and associate degree programs, and between community colleges and four-year colleges and universities, could improve the educational attainment of occupational students. Attention to career pathways between community colleges and four-year institutions is especially warranted given that, by one estimate, 85% of occupational enrollments are in fields that have counterparts in four-year colleges (Grubb & Lazerson, 2004). The large share of enrollments in fields with four-year counterparts points to the potential for numerous opportunities for students in occupational fields to transfer to four-year universities to further their careers if programs are well structured to facilitate transfer.

Factors Affecting the Success of Occupational Community College Students

The previous section discussed the evidence for the educational and workforce outcomes for CTE students. This section discusses the factors that promote positive educational outcomes for CTE students. Although there is little research on the factors that predict success specifically for occupational students, most of the studies on community college students include occupational students. It’s likely that many of the factors related to outcomes for all community college students are also relevant to occupational students. Consequently, much in the following sections summarizes what has been found in two other recent reviews of the literature on community college student success: Beyond the Open Door: Increasing Student Success in California Community Colleges (Moore & Shulock, 2007) and Student Progress toward Degree Completion: Lessons from the Research Literature (Moore & Shulock, 2009). These findings are briefly summarized here and additional findings not included in those reviews are summarized and cited.

Student Characteristics

It is clear that not all students are equally likely to succeed in community college. Age, race/ethnicity, gender, socioeconomic status, and academic preparation predict the likelihood of students earning a degree, certificate, or transferring. Research consistently finds that older students are less likely to complete than younger students. This finding is particularly pertinent to occupational students, who tend to be older than non-occupational students (Bailey et al., 2004). Additionally, in comparison to white and Asian students, Latino and black students are less likely to complete an academic program. Lower completion rates among black and Latino students are partly a function of lower levels of academic preparation and socioeconomic status. Cultural differences may also explain some of the difference in completion rates. Gender is another explanatory factor for completion rates. In general, women are more likely to enter and complete community college than men. Lower socioeconomic status students are also less likely to complete an associate degree or transfer, although some research has found that they are more likely to earn a certificate. Academic preparation has consistently been found to predict community college outcomes. Students who took higher-level high school courses or have higher levels of measured academic skills are more likely to complete a credential or transfer than less-prepared students.
Student Course-Taking and Enrollment Patterns

Although research on student characteristics provides some insight about which students are likely to succeed, it offers little guidance to policy makers and institutional leaders on changes that could improve outcomes for students. Research on the relationship between student enrollment behaviors and completion points to actions that policy makers and institutional leaders can take to help students succeed. This research finds that enrollment behavior related to remediation, gateway courses, and credit accumulation predicts student completion.

There is some debate about whether or not developmental coursework for poorly prepared students can help them succeed. Research on the effectiveness of remediation is complicated by variation in institutional policies and practices and students’ self-selection into remedial coursework in institutions that do not strictly require it. Despite these challenges, some support has been found for the beneficial effects of remediation for under-prepared students. Studies have found that students who complete remediation tend to have success rates that are similar to students who did not need remediation. Other research indicates that developmental coursework may not be effective for students who score near the cutoff score used for placement directly into college-level coursework. However, better designed remedial coursework for students nearly prepared for college coursework, such as short brush-up courses, could lead to better outcomes for these students too. Despite the debate about the effectiveness of remedial education, students who adhere to placement decisions and those who enroll in remedial courses directly upon entry rather than delaying or avoiding placement are more likely to complete.

Several studies have found that completion of gateway courses soon after beginning postsecondary education predicts completion of an educational program. Early completion of college-level math has been most frequently linked to earning a degree, certificate, or transferring, but completion of courses in other subjects also predicts successful outcomes. Students who enroll in and pass science courses are more likely to complete than those who do not. Passing an English course was found to predict completion of a bachelor’s degree in one study, although another study did not find a relationship between completing a reading course and the likelihood of transferring. Research has also found that students who complete an orientation or student success course upon enrollment are more likely to complete.

Numerous studies have found that students who engage in behaviors that increase their accumulation of credits are more likely to complete than students who accumulate credits more slowly. Specifically students are more likely to complete if they enroll full time, enroll continuously without stopping out, earn more credits in the first year, earn credits during the summer term, and maintain academic performance while in college. Timely course registration may also facilitate credit accumulation because students who avoid registering late are more likely to complete their classes.

The findings about successful enrollment and course-taking behaviors have implications for CTE students. Better academic preparation of CTE students is likely to make them more successful in postsecondary education and students who need remedial education would be better served to take it
early rather than postpone it. Additionally, it is important for CTE students to complete gateway courses soon after enrolling because this increases their chance of success. Because CTE students tend to be older (Bailey et al., 2004), research points to possible differences in the importance of some course-taking patterns for CTE students compared to non-CTE students. Research has found that completion of a math course is less important for older students (Calcagno, Crosta, Bailey, & Jenkins, 2007). Additionally, it may be particularly important for CTE students to complete a student success course because research has found that completion of a success course predicted completion for older students, but not for younger students (Moore, Shulock, & Offenstein, 2009). Research has documented that occupational associate degree students are less likely to enroll full time than non-occupational students (Bailey et al., 2004). The greater tendency to enroll part time makes credit accumulation a particularly important factor for CTE students because on average they will accumulate credits at a slower rate.

**Institutional Characteristics, Policies, and Practices**
A limited amount of research has identified institutional characteristics that affect students’ chance of completing an academic program. A study that used a nationally representative sample of community college students and institutional characteristics from the Integrated Postsecondary Education Data System (IPEDS) found that students were more likely to graduate if they attended smaller institutions, institutions with a larger proportion of full-time faculty, and institutions with a smaller share of minority students (Bailey, Calcagno, Jenkins, Kienzl, & Leinbach, 2005). An analysis of community colleges’ graduation rates as reported in IPEDS found that graduation rates were larger at colleges with smaller enrollments and at colleges with larger expenditures per FTE (Bailey, Calcagno, Jenkins, Leinbach, & Kienzl, 2006). The state in which colleges were located also had a strong effect on graduation rates. The effect of the state on graduation rates suggests that state policy may be an important factor in graduation rates but could also be explained by state differences in how degree-seeking students are defined, how they are tracked to completion in IPEDS reporting (e.g., whether they are tracked within a single institution or across multiple institutions), and whether or not states encourage completion of an associate degree prior to transfer (such as aligning degree and transfer requirements or guaranteeing transfer for students who complete the degree).

There is a general consensus that assessment and placement of students into developmental coursework should be mandatory. Doing so ensures that students in college-level coursework have the skills necessary for success and ensures that these classes can be taught at a “college level.” Also, there is recognition that not all remedial policies and practices are equally effective. It has been recommended that for remedial education to be effective, (1) assessments should focus on what is needed for success in college-level coursework, (2) support services should be incorporated into college-level courses because ambiguity inherent in assessment scores means that some less-well prepared students are enrolled in those courses, and (3) accelerated forms of remedial education should be developed to minimize the time needed before students begin accruing college-level credits. Additionally, there is an increasing interest in integrating basic skills education with substantive course content. This strategy may be particularly effective for occupational students. Research on Washington state’s I-BEST program, which integrates basic skills into occupational courses, found that I-BEST students earned more college
credits and more vocational credits, and were more likely to persist and complete during a two-year period compared to a set of matched students who took standard basic skills coursework (Jenkins, Zeidenberg, & Kienzl, 2009).

Learning communities are another effective practice that colleges can engage in to promote student success. Research has found that community college students who participate in learning communities are more likely to persist and earn more credits, although this effect may only hold during semesters in which the student is participating in the learning community. Research on first-year experience programs has also generally found positive results, although student self-selection into these programs clouds the interpretation of the positive findings. Students who participate in first-year experience programs tend to persist and succeed at greater rates than students who do not participate in these programs.

Lastly, a study that compared outcomes for students who took CTE courses online compared to students who took the same courses in a classroom, found little difference in the outcomes of students in the two formats. Students who took the course in a class or online earned similar test scores and grades.

**New Areas of Research Will Improve Understanding of Career Education in the Community Colleges**

Community college students face numerous obstacles to completion and they enroll for a variety of reasons including to prepare for transfer to a four-year college, for workforce preparation, or to improve their basic skills. Because of these complexities, traditional measures of student outcomes have proven deficient for understanding the success of these students. Measures such as retention and graduation rates are too simplistic for understanding how students are progressing in community colleges and to provide guidance to policy makers and practitioners on how to intervene to improve student outcomes. More information is needed about what helps students make progress and where students stop progressing in order to provide useful guidance for changes to policy and practice. Fortunately, research has begun to look at students’ progress through intermediate milestone points on the path to a degree and the factors correlated with successfully reaching these points.

Much of the effort already underway has developed in relation to community colleges because of the multiple missions of that sector and the inadequacy of traditional graduation rates as a measure of student success. Some have noted that, when applied to community colleges, traditional outcome measures ignore any value-added of students meeting non-completion outcomes that result in increases in basic literacy and workforce skills (Morris, Phillips, Brock, Nagler, & Dowd, 2005). The research is clear, however, that there are negligible economic benefits to accumulating only a small number of college credits, with one year of college credits being the point at which economic benefits begin to accrue (Bailey, Kienzl, & Marcotte, 2004; Marcotte, 2006). This makes it essential to monitor completion rates for those community colleges students who do seek to earn a college credential.

An example of efforts to develop intermediate measures of student success in community colleges can be seen in the work of the Community College Research Center (CCRC) using administrative data from
Washington’s community college system (Leinbach & Jenkins, 2008). CCRC developed “milestones” and “momentum points” for several groups of students, with student groups defined based on their program objective or their initial course enrollments. “Milestones” were defined as measurable educational achievements that include both traditional measures of completing a certificate/degree and transfer, as well as intermediate outcomes like completing remediation. “Momentum points” were defined as shorter-term attainments that were empirically correlated with the completion of a milestone, such as completing a college-level math course. The goal is to use the information gained from such analyses “to identify college practices and student behaviors that are associated with successful outcomes and inform the development of policies and practices that address barriers to achievement” (p. 1).

In another example, the eleven states that have participated in either the Ford Foundation’s Bridges to Opportunity or the Lumina Foundation’s Achieving the Dream initiative have developed a set of measures of success for community college students to help states improve system and institutional performance (Ewell, 2006). The indicators measure the success of students in reaching “milestone events” based on their initial starting place in the curriculum (adult basic education, developmental education, or college-level coursework). The recommended measures include traditional measures of persistence and completion as well as the rate at which skills-deficient students complete remediation and transition to college-level coursework.

A recent study of community college students in California also developed a set of “milestones” and measurable academic patterns associated with continued progression towards a degree referred to as “indicators of success” (Moore, Shulock, & Offenstein, 2009). This study illustrated how the milestones and indicators of success could be used to identify where there is a problem in student progress and how further analysis could point to changes in policy and practice that could improve student outcomes.

Although interest in measuring intermediate student outcomes and tracking student progress through completion is growing, little work has been done on occupational students specifically. One exception is the work on Washington’s community college students and their IBEST program. This research developed a separate set of milestones and momentum points for workforce students that largely paralleled those developed for transfer students. The similarity in results that they found for transfer and workforce students suggests that there are probably a number of similarities in how occupational and academic students progress toward their goals. Yet, differences between CTE and non-CTE students suggest that milestones and success indicators may differ for these two groups of students. For example, CTE students tend to be older and some research indicates that completing a math course is less important for older students while completion of a college success course is more important for older students. Additionally, the countless occupational programs mean that there could be milestones that are only important for specific occupational programs. For example, completion of physiology or beginning clinical experience may be key milestones for nursing students but irrelevant for computer information systems students.

There are multiple benefits to be gained from a better understanding of intermediate outcomes for students who are attempting to complete career pathways. First, developing a set of intermediate
outcomes would improve the reporting of beneficial outcomes for students that fall short of earning a degree or transferring, such as completing a year’s worth of credits. It would also improve monitoring of student progress and aid in understanding where students fall off track on the road to earning a credential or transferring. Knowing where students fall off track could lead to the development of new policies and practices that improve students’ progress to completion. Such information could be used to help improve how career pathways are structured and where educational resources should be focused to help students progress. By facilitating completion, analysis of students’ intermediate progress will help address the workforce needs of the economy and improve the workforce prospects for community college students.

Additionally, much more information is needed for research and accountability purposes about the employment benefits of CTE for community college and four-year students. Clearer information about the earnings advantage of taking CTE courses, completing a certificate, or completing an occupational associate or bachelor’s degree is needed. Information is also needed on how quickly and consistently graduates of different fields are employed. Also of use would be more information on what happens to CTE students throughout their careers, for example, whether they remain employed and increase their earnings over time.
References


