At issue

Community college student success variables: a review of the literature

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The United States is addressing unprecedented economic challenges, and community colleges have been identified by the federal government as part of the solution (Lothian, 2009). Unparalleled federal support to community colleges provides these institutions with a tremendous opportunity to influence the trajectory of the country's economy through workforce development and increased educational attainment. As community college leaders and practitioners prepare to reach President Obama's goal of graduating 5 million more Americans from community colleges by 2020 (Obama, 2009), the research literature can provide insight into what is known about factors influencing student success and the promising interventions to address them. What student characteristics influence their academic success? What institutional factors shape student retention, persistence and educational attainment? What does the literature say about promising interventions? Armed with such foundational knowledge, community colleges can craft informed blueprints tailored to the unique needs of their students.

Introduction[1]

The United States is addressing unprecedented economic challenges, and community colleges have been identified by the federal government as part of the solution (Lothian, 2009). Unparalleled attention to community colleges provides a tremendous opportunity to influence the trajectory of the country's economy through workforce development and higher education. As community college leaders and practitioners prepare to reach President Obama's goal of graduating 5

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million more Americans from community colleges by 2020[2] (Obama, 2009), the research literature can provide insight into what is known about factors influencing student success and the promising interventions to address them. What student characteristics influence their academic success? What institutional factors shape student retention, persistence and educational attainment? What does the literature say about promising interventions? Armed with such data, research findings, and additional financial support, community colleges can craft informed action plans tailored to the unique needs of their students.

Variables influencing student success

Much of the community college literature is focused on retention and persistence, and for good reason. At a time when education beyond high school is a critical need, the national attention and pressure for community colleges to increase retention and persistence rates have grown exponentially. While the use of graduation rates as a performance measure is controversial, community college leaders and practitioners agree that open access institutions can improve in supporting students on the road to degree attainment. Currently, national community college three-year graduation rates for first-time students in 2000 hover around 30% (Integrated Postsecondary Education Data System (IPEDS), 2003). Bailey and Morest (2006) indicate fewer than half of students who begin at a community college earn a degree or certificate within eight years after initial enrollment. Of those students, 18% earn a bachelor's degree within eight years of high school graduation, 15% earn an associate's degree, and 6% earn a certificate. Fortunately, the community college research literature has begun to shed light on student and institutional characteristics that have an effect on persistence and degree completion.

Student characteristics influencing student success

Extensive research shows the characteristics of students most

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2 Five million more community college graduates by 2020 means each of the 1,177 community colleges in the country must graduate 425 additional students each year between 2010 and 2020. (Number of community colleges is according to the American Association of Community Colleges website http://www.aacc.nche.edu/AboutCC/Pages/default.aspx.)

likely to graduate—students who have strong high school preparation, enter college immediately after high school, come from high income families, have parents who attended college, and attend full-time uninterrupted. Community colleges, however, cannot improve graduation rates and other outcome measures by becoming more selective. Increasing selectivity would contradict the core mission of community colleges, which is to provide a place in higher education for all students who meet minimum entrance criteria (Bailey, Calcagno, Jenkins, Kienzl & Leinbach, 2005b).

Community colleges serve students who usually possess characteristics negatively associated with educational attainment. These characteristics include caring for children at home, single parenting, struggling with financial independence, delaying enrollment after high school graduation, being a first-generation college student, commuting, lacking a high school diploma, attending college part-time, working full-time and working off campus (Achieving the Dream: Community Colleges Count, 2006; Astin, 1993; Community College Survey of Student Engagement, 2005). According to Achieving the Dream (2006), approximately 70% of community college students face at least one of the aforementioned challenges and 50% face two or more.

Low-income

The challenges to achieving educational attainment are more likely to be experienced by low-income students (Bailey & Morest, 2006; Conley 2005). The rising costs of higher education is increasingly a concern for low-income students. In a study of 600 young adults who had at least some college experience, nearly six in ten students who did not complete their degrees reported having to bear the full financial responsibility of their education rather than being able to rely on their families (Johnson, Rochkind, Ott & DuPont, n.d.). In a study conducted by Bailey, Jenkins and Leinbach (2005), students in the lowest socioeconomic status quartile were less likely to earn a credential or transfer to a baccalaureate institution.

Academic preparedness

Youth from low-income communities often attend schools that do not have the resources needed to adequately prepare their

students for college (Wimberly & Noeth, 2005). Conley (2005) believes academic preparedness is the single most important factor in determining college success. Others believe academic preparedness coupled with student motivation is the main factor in determining college success (Kuh, Kinzie, Schuh, Whitt & Associates, 2005). In a longitudinal study of Florida students (Jacobson & Mokher, 2009), academically low-performing high school students who entered college were unlikely to remain in college for more than one year, and only 19% earned a post-secondary credential. In a study conducted at the Los Angeles Community College District (LACCD), an analysis of more than 4,000 student surveys determined race, age, high school GPA, calculus completion, reasons for enrollment, and dedication to persistence were significantly related to course completion or GPA (Perrakis, 2008). While the researcher hypothesized gender and race would be the primary factors related to success and achievement of male students in the LACCD, it was actually academic preparation that was more significant in the sample.

Supporting the argument for the critical role of academic preparation in college success, the level of mathematics preparation is one of the most predictive indicators of success in college. Students who complete high level mathematics courses are more than twice as likely to graduate from college as their peers who take lower level mathematics courses (Conley, 2005). Anthony S. Bryk, President of The Carnegie Foundation for the Advancement of Teaching, recently announced a commitment to conduct research and program development leading to an acceleration of students' mathematics learning and achievement in community colleges (The Carnegie Foundation for the Advancement of Teaching, 2009). Bryk cites recent research revealing students beginning with a basic math sequence of courses have only a 10% probability of reaching transfer-level mathematics.

Social capital

Students without adequate academic college preparation may also lack the social connections or social capital to be successful (Karp, O'Gara & Hughes, 2008). Social capital comes in the form of parents with college degrees, having a high school diploma as opposed to a GED, having a sibling or other relative who attended college, and having employers or other outside

networks who provide information on college. Without social capital, students may have limited access to information about higher education, may not get the help they need to navigate the college application process, and may not access the support services colleges provide (Johnson, Rochkind, Ott & DuPont, n.d.; Karp, O'Gara & Hughes, 2008). To access student support services such as advising and tutoring, students need high levels of social capital to understand that faculty and staff can serve as advisors and how to approach them for help. Access to strong social networks such as family or friends who are familiar with higher education can provide assistance in identifying potential support within a college. Karp et al. (2008) found students with more social capital were more likely to seek out college support services. These students also progressed towards a degree at higher rates. Students with low levels of social capital but who accessed support services made greater progress to a degree than those who did not access support services. It appears using support services may alleviate the influence of low levels of social capital on degree completion.

Socioeconomic status, levels of social capital, and academic preparedness are student characteristics emanating from their environment and social influences. What role do personality characteristics play? One body of literature explores undergraduate student personality variables and their relationship to academic performance. The Big Five personality traits—openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism—were studied by Conard (2006) for their ability to predict academic performance in undergraduates. Of the Big Five traits, conscientiousness was the factor most closely tied to student success. Conscientiousness predicted college GPA, course performance and attendance over academic ability. One standard deviation increase in conscientiousness translated into a 0.11 increase in GPA and a 2% increase in course performance. The author did not report the predictability of conscientiousness on class attendance, but emphasizes that the personality trait conscientiousness operates through behavior, such as attending class.

Early or late registration

Other studies have demonstrated conscientiousness is a viable predictor of academic achievement. In their study of univer-

sity psychology students, Ford, Stahl, Walker and Ford (2008) tested their hunches that early course registration by students is a behavioral indicator of conscientiousness and non-procrastination which then results in stronger academic performance than that of students who registered later. The authors found that there was indeed a significant inverse relationship between registration time and course grade, i.e., the later students registered, the lower their grades. Inverse and significant results were also found for the relation between registration time and students' course average, semester GPA and cumulative GPA. The Ford et al. study aligns with Safer (2009) who also found late registration leads to poorer grades. Smith, Street and Olivarez (2002) studied a sample of students at a Texas community college to determine the differences between students enrolling early, at regular time and late. Late registration was defined as registering one to eight days after the start of classes. The researchers discovered late registrants were much less likely to persist to the next semester than early or regular registrants and were more likely to withdraw from courses. Returning students significantly differed in their semester GPA and their successful completion based on their time of registration.

Smith, Street and Olivarez (2002) strongly argue the evidence indicates late registration should be eliminated, while acknowledging the rationales of open access and woefully lacking state funding. Pointing to accountability pressures not only to enroll students but to ensure their success, the authors recommend policies and practices such as encouraging early and regular registration and providing easy access to registration at these times, discouraging students on academic probation to register late, providing special tutoring for academic probation students who do register late, providing flexible payment schedules for tuition and fees for students who register on time, required group counseling for late registrants to cover time management, organizational skills, productive study habits and test taking. Late start programs may also provide colleges with an alternative for serving students who register late, but these programs are not yet included in the research literature.

Bailey, Calcagno, Jenkins, Kienzl & Leinbach (2005a) assert individual student characteristics appear to be more important determinants of graduation and retention than the institutional

variables. The Community College Survey of Student Engagement (2005) speculates that even the most engaging educational experiences provided by a community college might not be enough to offset the challenges their most high risk students face. Despite these assertions, considering the institutional characteristics that contribute to student success is still valuable.

Institutional characteristics

Research identifying the institutional characteristics and policies that promote student success is still in its infancy. Research exploring institutional characteristics contributing to student success is worthwhile because preliminary research has shown different community colleges with similar student profiles can have vastly different graduation rates (Bailey et al., 2005a).

Performance measures

Community college scholars and leaders have publicly argued against the use of common performance measures, such as graduation rates, for community colleges because it does not tell the entire story of this sector of higher education. Commonly used performance measures usually consider only a small portion of the institution's population, do not consider the barriers students face in attaining an education, or students' goals that may not include degree attainment or transfer (Bailey, Calcagno, Jenkins, Leinbach, & Kienzl, 2006). Bailey et al. (2005a) argue conventional models of institutional performance appear to work better for baccalaureate institutions than they do for community colleges because baccalaureate institutions have a simpler and more applicable outcome measure—attainment of a bachelor's degree.

Community college students have a wider variety of goals and the educational research community has a much weaker understanding of the determinants of student success in community colleges than in baccalaureate institutions. In conducting research on student success, these researchers found the complexities of the community college influence their ability to analyze data. For example, data for all community college students and data for students in associate degree programs were very different, suggesting certificate and associate programs have different dynamics. They also point out that national survey data is lim-

ited, which limits research to particular states that collect longitudinal data on students.

Community colleges and their stakeholders need accountability measures and data that reflect the reality of their institutions. Mellow and Heelan (2008) recommend tying community college effectiveness measures to the reality of students' lives and the college's multiple missions, including progressing toward academic goals, achieving general education, overcoming educational deficits, preparing for transfer, preparing the local workforce, contributing to regional economic development, and responding to community needs. In response to growing accountability pressures, The American Association of Community Colleges (AACC) is currently developing community college specific accountability measures (American Association of Community Colleges, n.d.). In collaboration with the Association of Community College Trustees and the College Board, AACC is developing a Voluntary Framework of Accountability that will provide colleges with the opportunity to benchmark student progress and completion against peers. Colleges will then be able to communicate to stakeholders critical student success data from sector-appropriate success measures.

Size and other institutional demographics

Despite the challenges in measuring community college performance, Bailey et al.'s (2005a) study includes several findings consistent with other research on institutional characteristics influencing student success. The institutional characteristics studied include institution size, size of minority student population, number of students who attend part-time, number of faculty who teach part-time, expenditures, and location. Institution size is negatively correlated with successful student outcomes—students complete at higher rates at smaller colleges (Astin, 1993; Bailey et al., 2005a; Pascarella & Terenzini, 2005). Larger colleges, especially those with 2,500 FTE undergraduates, have 9-13% lower graduation rates than smaller colleges (Bailey et al., 2005c). The more personalized atmosphere and services that seem to be likely at smaller institutions seem to benefit traditional aged students (Bailey et al., 2005b).

A larger percentage of minority students at an institution are associated with lower graduation rates. Students in colleges with

more minority students graduate at lower rates, even after controlling for the race of individual students (i.e., graduation rates are lower not because minorities are less likely to graduate and therefore lower the graduation rate, but rather because all students tend to graduate at lower rates when they attend high minority colleges) (Bailey et al., 2005a; 2005b). Higher percentages of students who are part-time tend to be related to lower graduation rates (Bailey et al., 2005a). A larger percentage of faculty who are part-time also correlates with lower student graduation rates at community colleges (Bailey et al., 2005a; Jacoby, 2006).

Rates of instructional expenditures and student service expenditures have some positive effects on graduation rates, but the data is inconclusive (Bailey et al., 2005a; 2005b). Colleges located in urban areas have a 3.7% lower graduation rate than those located in suburban areas (Bailey, Calcagno, Jenkins, Kienzl & Leinbach, 2005c). The particular state in which a college operates has significant impact on institutional graduation rates. State policies and how they play out at individual community colleges affect student outcomes (Bailey et al., 2005a).

Developmental education

Research on the institutional characteristics related to the success of students in developmental education is minimal. Systematic evaluation of developmental education at community colleges is woefully lacking, despite the fact that indications of low effectiveness increase the urgency. Outcomes research is needed on three groups of developmental students—remedial completers, remedial dropouts, and adequately prepared college entrants. Preliminary research suggests the proportion of underprepared students who require remediation do not appear to be systematically related to geographic region or an institution's placement policy (Perin & Charron, 2006).

The National Field Study, conducted by researchers at the Community College Research Center at Columbia University, analyzed fieldwork at fifteen community colleges from six states between 2000 and 2002 (Bailey & Morest, 2006). In their analysis of developmental education, they found, overall, completion rates were low regardless of the discipline/skill area and regardless of the institution's placement policy. Dropout rates from developmental courses were high and movement to higher level

courses was low. Fike and Fike (2008), however, found that completion of a developmental course is a significant predictor of retention. Successfully completing a reading course, as well as testing out of a reading course, has a significant effect on student retention.

As a result of their research, Perin and Charron (2006) recommend further study in several areas of developmental education, in particular the effectiveness of accelerated remedial instruction, the effect of immersion programs, and the benefits of self-paced versus the benefits of traditional remediation in math. Perin and Charron (2006) also encourage research on the value of incorporating content areas with remedial skills development.

Considering what is known about student and institutional characteristics associated with educational attainment, what interventions have been developed and implemented that are worthy of further exploration?

Interventions

Kuh et al. (2005) assert that a single blueprint for student success does not exist; there are many roads to becoming an institution that successfully engages students in their learning. Even though many educationally engaging institutions have similar policies and practices, they still differ in how they approach the road to effectiveness. Kuh et al. (2005) affirm that the absence of a single blueprint is good news for institutions who want to enhance student learning and engagement because it provides an opportunity to craft interventions that align with the needs of an institution's students and that fit the mission, people and cultures of that institution. A review of institutional, programmatic and classroom-based interventions discussed in the literature follows.

Institutional interventions

The institutional interventions described below are college-wide initiatives aimed at creating broad-base change or establishing partnerships with key stakeholders, or both. The Achieving the Dream initiative, creating strong PK-16 partnerships, fostering student engagement and building strong connections between Academic and Student Affairs are all college-wide approaches aimed at promoting student success.

Achieving the Dream

Achieving the Dream (2006) does not focus on improving student outcomes by adopting a set of best practices. Rather, colleges embrace a set of basic principles that guide the creation of appropriate changes to their policies, practices, structures and institutional cultures that are aimed to improve retention and student success. These principles are: a) diagnose the institution's unique situation by analyzing data; b) follow-up rigorous data analysis with strategic directions that are based on the experience of practitioners and the research literature; and c) make a strong commitment to equity. Colleges involved in the initiative are working to improve developmental education as well as improve gatekeeper courses and students' first year experience, improve advising and student support services, pilot or expand learning communities, provide tutoring and supplemental instruction, strengthen K-14 links, engage the community in developing strategies to support student success, and use data more effectively. While not every college is able to participate in the Achieve the Dream initiative, numerous aspects of the project can be implemented locally. For example, Middlesex Community College in Massachusetts has used Achieve the Dream strategies in developing new student success initiatives such as improving gatekeeper courses and first-year experiences. Middlesex has also used Achieve the Dream models to use data more effectively to improve student learning.

Strong PK-16 partnerships

In a survey of high school teachers, 65% reported their students were not ready for college level work (Conley, n.d.). Many community colleges partner with public school districts to prepare students for college. Despite work with secondary education institutions, students and families are familiar with the requirements for college admission, yet what is needed for college success is less known (Conley, 2005). Colleges must establish stronger relationships with high schools so together they can break down the barriers between high school and college. Conley (2005) advocates for strategic change resulting in "intellectually coherent" high school curricula that prepare students for college success. High school students experience a significant gap between high school coursework and the expectations of college (Conley, 2007). Courses in college are fundamen-

tally different—they are faster paced, require more reading, and expect higher level thinking. High school and college faculty must examine each other's curricula, analyze academic standards, and experience their respective classroom environments. Colleges and high schools can also work together to familiarize students with critical aspects of college coursework such as a faster paced curriculum; increased expectations for the amount and quality of writing, for editing and rewriting; more critical feedback from teachers, peers and outside sources; and analytical thinking and intelligent curiosity. Interaction between high school and college faculty can be time well spent resulting in the sharing of perspectives, ideas, and materials (Conley, n.d.).

Strong connections to PK-12 partners take leadership and initiative across the organization. Some of the programmatic opportunities for closer school/college connections include dual enrollment, early/middle college initiatives, curriculum alignment/vertical teaming, and placement testing support. Dual enrollment provides high school students with actual experience of college expectations. Dual enrollment typically involves junior and senior high school students taking college courses, providing them with academically challenging experiences and an opportunity to earn college credit. In a study of high school students in Florida and New York City, Karp, Calcagno, Hughes, Jeong and Bailey (2007) found positive relationships between participating in dual enrollment courses and student outcomes. Dual enrollment participation was positively related to students' likelihood of earning a high school diploma, enrolling in college, persisting to the second semester, remaining enrolled two years after high school graduation, earning a higher cumulative college grade point average, and earning more postsecondary credits.

Early and middle colleges are small schools that aim to provide the rigor of college level work for juniors and seniors in high school by combining the last two years of high school and the first two years of college (Newton & Vogt, 2008; The Early College High School Initiative, n.d.). Rigorous and supportive, early colleges are designed for low-income, first generation college students who are underrepresented in higher education (Newton & Vogt, 2008). The goal is to graduate with a high school diploma and some transferable college credit, if not a complete associate's degree. Early college high schools have the potential to increase

high school graduation rates and decrease the number of years students take to complete a college degree (The Early College High School Initiative, n.d.).

Curriculum alignment/vertical teaming is a critical beginning step to a systemic approach to ensuring the academic success of students. Professional development opportunities and incentives are needed for teachers from both education sectors to meet, review curriculum and expectations and align curriculum and assessments so students experience a continuum of knowledge and skills that are scaffolded from one grade to the next. California Alliance of PreK-18 Partnership (2004) recommends that each chief executive officer of each educational institution be assigned joint responsibility for ensuring alignment of the high school and college curriculum.

Strong partnerships between secondary school systems and colleges are an effective and efficient use of resources to boost student achievement (California Alliance of PreK-18 Partnerships, 2004; Massachusetts Executive Office of Education, 2009). Successful partnerships develop a shared vision and shared goals that resonate with local needs, are committed to good communication between partnership members, respect differences in organizational cultures, commit funding to adequately run the partnership and continuously review progress towards the partnership mission and make mid-course adjustments when issues and needs change. The California Partnership for Achieving Student Success (Cal-Pass) is an example of such a partnership – educators from elementary through university levels collaborate to analyze student data and improve student success (Bueschel, 2009; California Partnership for Achieving Student Success, n.d.).

Educationally engaging institutions

Students' engagement with their educational institutions and their learning has important significance. Karp, Hughes and O'Gara (2008) found students who felt a sense of belonging at their community college persisted to their second year. The Community College Survey of Student Engagement's (CCSSE) measures of student engagement predict outcomes related to academic success and persistence in community college students (McClenney and Marti, 2006). The five benchmarks in the CC-

SSE that capture the areas most important in high quality educational practices include active and collaborative learning, student effort, academic challenge, student-faculty interaction, and support for learners.

Kuh et al. (2005) identified six features of undergraduate institutions that foster student engagement and persistence (Kuh et al., 2005):

1. a lived mission and educational philosophy
2. an unshakeable focus on student learning
3. a willingness to adapt environments for educational enrichment
4. clearly marked pathways to student success
5. an improvement oriented culture
6. shared responsibility for educational quality and student success

Kuh et al. (2005) conclude that two key components contribute to student success: a) the amount of time and effort students put into their college experience, and b) how institutions organize learning opportunities and allocate resources to induce students to participate in them. The second component to student success is the most relevant to institutions because it is the one they have direct influence over.

Strong connections between academic and student affairs

Many of the programmatic and classroom-based interventions mentioned below require strong connections between the curricular and the co-curricular. Engaging and supporting the whole student requires colleges to use all of their resources (Keeling, 2004). Student affairs practitioners can be tapped in a college's effort to create learning-centered cultures and strategies to ensure student success (Dale & Drake, 2005).

Programmatic interventions

As the public pressures for increased accountability have grown, so has the research examining the effectiveness of programs targeted to address retention and degree completion (Pascarella & Terenzini, 2005). This section reviews the literature on programmatic interventions. Performance-based scholarship programs, advising and counseling programs and TRIO participation have

all shown to have positive effects on student achievement.

Performance-based scholarship programs

Performance-based scholarships are a strategy addressing two public policy concerns: financial need of low-income students and course completion and retention. MDRC, a social policy research organization, launched the Performance-Based Scholarship Demonstration to test the innovative strategy. It is based on positive findings from the Opening Doors Demonstration conducted at two community colleges in Louisiana. The purpose of performance-based scholarships is to provide scholarship funding that is supplemental to federal and state financial aid and contingent on enrolling in a minimum number of credit hours and making satisfactory academic progress. The scholarships are paid directly to the students, allowing them to make choices of how best to support their education (e.g., for some students the scholarships may be used to purchase books and for others it may be to cut down on work hours or hire a babysitter) (MDRC, n.d.).

The Opening Doors Demonstration targeted low-income students who were parents at two New Orleans-area community colleges (Richburg-Hayes et al., 2009). MDRC randomly assigned 1,109 parents to either a control group (students who receive their financial aid package and student services) or a program group (students who received the same standard financial aid package, student services, and eligibility for the performance-based scholarships). The results of the demonstration were positive. Students who received the scholarships were more likely to register and more likely to register full-time even though the program only required half-time enrollment. Program students were more likely (by 6.5 percentage points) to be registered through four semesters after random assignment. In addition, there were positive effects on credit accumulation, grades, engagement, and perceived social support. Hurricane Katrina interrupted the follow-up period of the study, but MDRC plans to replicate the program in order to build additional evidence of the potential of performance-based scholarships to help at-risk students.

Advising and counseling programs

Research has consistently shown academic advising plays a positive role in students' decisions to persist. Several studies show

statistically significant, positive results from participation in advising programs. Personal counseling also positively affects persistence; however, for both advising and counseling programs it is unclear whether the positive affects are direct or indirect (Pascarella & Terenzini, 2005).

The National Field Study conducted by the Community College Research Center found strong advising programs to take a systematic approach, be better integrated into the core functions of the college, and go beyond the "information dumping" to more substantive advising (Grubb, 2006). "Life-Course" is one advising program with distinctive developmental phases that include the Postsecondary Transition, Introduction to College, Progression to Degree, Graduation Transition, and Lifelong Learning. Colleges in the National Field Study have also incorporated advising and counseling into learning communities, developed one-stop student service centers, created dual-enrollment programs, developed computer-based student record systems to follow the progress of students, and used work-based learning to support undecided students. More research identifying the most effective design for advising programs is needed (Bailey & Alfonso, 2005).

Strong evidence exists supporting the significant and positive effects of TRIO participation on student persistence. TRIO consists of comprehensive support programs offering instruction in basic skills; tutoring, academic, career, financial and personal counseling; mentoring; workshops; and cultural events (Fike & Fike, 2008; Pascarella & Terenzini, 2005).

Classroom-based interventions

Community college students' time on campus is spent mostly in the classroom (Bailey & Alfonso, 2005; Hagedorn, Maxwell, Rodriguez, Hocevar & Fillpot, 2000; Tinto, 1997; Umbach & Wawrzynski, 2005). Mellow and Heelan (2008) argue professors continue to teach the way they were taught, which is mostly lecture. While some community college practitioners believe faculty do not lecture as much in practice as is discussed in the literature, educators can continue to adapt pedagogy to the nontraditional student who has become the norm. Mellow and Heelan (2008) promote student-focused, rather than teacher-focused, approaches to student learning and encourage

community colleges to create policies that move faculty towards pedagogic innovation. In order to encourage innovation and a culture of inquiry, colleges must foster institutional climates open to frank discussions about teaching and learning issues.

Specific classroom-based interventions include:

Learning communities

Vast amounts of literature point to connections between learning communities and student retention. Of all the community college practices Bailey and Alfonso (2005) analyzed for program effectiveness, learning communities had the most empirical support. Engstrom and Tinto (2008) conducted a multi-institutional, longitudinal four-year study on the impact of learning communities on the success of low-income and underprepared students. They found students in learning communities were significantly more engaged academically and socially and perceived a higher level of encouragement, support, and intellectual gain than similar students not enrolled in a learning community. Learning community students were also more likely to persist to the following academic year than their peers. Scrivener et al. (2008) found first-year students at Kingsborough Community College who participated in a learning community experienced improved educational outcomes, especially during their first semester. These studies align with others indicating learning communities have strong positive effects on educational outcomes and student persistence (Pascarella & Terenzini, 2005).

First-year seminars and academic success skills

Lack of preparation for college is usually considered in terms of deficiencies in basic academic skills, but community college practitioners argue that in addition to academic skills, students also lack sufficient study skills as well as academic and career goals. Community colleges have responded with student success courses addressing proper study skills such as note-taking, time management, and test taking. Success courses also may address academic and career goals, exploration of learning styles, and academic and career planning. As these types of courses become more popular in community colleges around the country, rigorous research is needed to determine their impact. In a study of the Florida community college system, researchers

found positive marginal effects on the persistence and educational attainment or transfer among students who completed success courses. They encourage community colleges to consider expanding requirements for success courses (Zeidenberg, Jenkins & Calcagno, 2007). Karp et al. (2008) also found evidence supporting beliefs that participating in student success courses encourages student success. In their qualitative study, Karp et al. (2008) discovered students learned the bulk of their college-related knowledge in their student success courses. They also found that by not requiring the course for all students, such as those attending part-time, the college was inadvertently creating inequitable access to support services for the students who were not required to take the student success course.

First-year seminars were introduced in the early 1970s by John Gardner and since then have proliferated to almost 95% of colleges and universities across the country. Since the 1980s a substantial body of research has grown (Pascarella & Terenzini, 2005). The extent to which this research considers community college students is unclear, but in general most studies indicate first-year seminars produce positive, statistically significant results regarding student persistence. Derby (2007) examined the predictive nature of participating in a semester-long orientation course on degree completion at a Midwestern community college. Participation in the orientation course was positively related to degree completion; graduation for students who participated in the orientation course was 72 times higher than for nonparticipants. Self-selection of students in elective first-year seminars and the extent to which studies control for pre-first-year seminar characteristics are possible research limitations that must be taken into account. Despite these considerations, Pascarella and Terenzini (2005) still consider first-year seminars to have at the minimum positive, indirect effects on grades and academic and social integration which are related to retention and completion.

Hattie, Biggs & Purdie (1996) conducted a meta-analysis of 51 studies in which study skills were used to enhance student learning. Study skill interventions typically focused on task-related skills, self-management of learning, and affective aspects of learning such as motivation and self-concept. The results of the meta-analysis emphasize study skills training should be in a teaching-learning context that supports and reinforces the strate-

gies being taught, rather than in a stand alone course.

Lynch (2007) compared the learning and study strategies college students used in a course with the learning and study strategies their professors believed to be most important for success in the course. Five-hundred one freshman and upperclass undergraduates at a private university completed learning questionnaires and their faculty rated the extent to which certain learning strategies were required to succeed in their courses. The results showed considerable discrepancies between what faculty deemed important and the strategies students reported actually using. Discrepancies were greatest for cognitive strategies associated with deep learning. First year students had a greater underestimation of the need for critical thinking than their upperclass peers. The authors recommend faculty explicitly discuss learning strategies in their courses and explain how they may be applied to course content and assignments.

Engaging pedagogy and evidence-based practice

Learner-centered instructional methods that are active, collaborative, cooperative, and allow students to construct knowledge rather than receive it from an expert are far more powerful than traditional methods (Pascarella & Terenzini, 2005; Tinto & Love, 1995; Zhao & Kuh, 2004). Mellow and Heelan (2008) assert emerging, constructivist, learner-centered techniques foster the success of community college students. Service learning, for example, is an active and collaborative strategy engaging students in their learning and generates positive student outcomes associated with student success (Simonet, 2008). Karp, Hughes and O'Gara (2008) found student-centered pedagogy created information networks among students. These peer information networks were social ties stemming from students' academic experiences ones that facilitated the transfer of institutional knowledge and procedures among students, paving the way for persistence and completion.

Mellow and Heelan (2008) argue community colleges and their faculty truly concerned with student success are building a culture of inquiry at their institutions. They are using evidence-based practice to illustrate whether or not students are truly learning. Implementing innovative pedagogy is not enough; learning must be assessed. Assessment of learning at community

colleges is taking many forms, including institutional student learning outcomes, student portfolios, capstone courses, and performance benchmarking.

Faculty inquiry into student learning can take many forms. The Strengthening Pre-collegiate Education in the Community College (SPECC) project created faculty inquiry groups to understand more deeply how students learn in developmental courses (The Carnegie Foundation for the Advancement of Teaching, n.d.). SPECC faculty from California community colleges worked together to investigate different approaches to developmental pedagogy. They identified research questions; gathered evidence of student learning; and brought their discoveries to the classroom as new curricula, new instructional strategies, and new assessments. The inquiry process was an iterative one; once faculty made discoveries and brought them to the classroom, new questions were raised (The Carnegie Foundation for the Advancement of Teaching, 2008). Around the country, faculty members are engaged in similar inquiry through the scholarship of teaching and learning (SoTL). SoTL is classroom-based inquiry into teaching and learning conducted by faculty that may be conducted collaboratively, similar to SPECC, or individually.

Faculty inquiry into teaching and learning has the potential to position community college faculty as experts knowledgeable in the complex process of teaching and learning (Cross, 1989). It is a professional development model that goes beyond the typical one-shot workshops or conferences and incorporates key principles to professional growth and learning. Sustained over time, it involves collaboration and is focused on evidence of student learning (Hutchings, 2008). Several higher education scholars and practitioners believe the systematic, reflective, public inquiry and scholarship conducted by faculty yields positive student outcomes (Huber & Hutchings, 2005; Hutchings & Shulman, 1999; McCarthy & Duffy, 2007; Tinberg, Duffy & Mino, 2007). Community colleges can move forward in improving student outcomes by providing the support for faculty to further investigate their teaching and its effect on students' learning.

Grading and classroom management systems

Two Middlesex Community College English faculty members explored unique grading and classroom management systems

that show promising results in promoting course completion. Marchionda (2010) developed a grading system that transfers the power of successful course completion from the faculty member to the student. Modeled after a part-time job, Marchionda (2010) developed a system allowing students to earn points for numerous daily and weekly assignments, projects, and class attendance. "When participating in a course using the Point-by-Point grading system, students are in command of their own grading destiny and choose to earn points or not. Nothing is taken away; they are not penalized for anything. Giving students this power often leads to great success" (Marchionda, 2010). The evidence is in the numbers. In spring 2007, 90% of her English Composition I students were retained. In fall 2007, 82.6% of her Basic Writing students were retained; both completion rates are much higher than the norm.

Post-course surveys indicated students found the Point-by-Point grading system to be motivating, and they understood their grading destiny was in their control (D. Marchionda, personal communication, July 29, 2009). Keller (2009) also used a point system aimed at enhancing student engagement and motivation in her English Composition courses. Keller's (2009) Competency Points (CP) were used to reward achievement on tests and essays as well as provide incentive for positive student behaviors such as attending class, participating in discussions and completing reading assignments. Competency Points were used over and above traditional course grading and could raise a student's final grade. The CPs resulted in an increase in the number of papers submitted and classes attended. The CPs also resulted in a 13% higher course completion rate. Marchionda (2010) and Keller (2009) demonstrate the potential for creative grading and classroom management systems that appear to resonate with community college students. These two projects exemplify how SoTL can influence teaching and learning, for both projects were investigated through classroom research.

Undergraduate research

Undergraduate research programs are meant to provide a view into the intellectual life of a scholar, actively involve students in their learning, increase student-faculty interaction, promote application of students' learning, and provide academic challenge.

Initial research indicates it is a relatively powerful approach to addressing persistence and degree completion, with strongest effects for African-American and sophomore students (Pascarella & Terenzini, 2005).

Conclusion

Reaching President Obama's goal of graduating 5 million more Americans from community colleges by 2020 (Obama, 2009) is an important challenge and will require community colleges to create their own blueprints for attaining the goal. The research literature can provide campuses with ideas for constructing blueprints that reflect their institutional mission and their students' needs. Colleges' plans for supporting student success must include strategies addressing the challenges students face, such as work and family responsibilities, low-income, inadequate academic preparation, and lack of social capital.

Accountability measures tied to community college multiple missions will provide the opportunity to benchmark student progress and completion against peers. Institutions can then consider their characteristics such as size, student diversity, the number of part-time faculty and part-time students, expenditures, and state policies to create initiatives that offset unintended and negative effects as described above. The growing menu of interventions being piloted around the country provides community colleges with options that can be adopted and customized to institutions' needs.

Colleges can also encourage a culture of inquiry and evidence-based practice among administrators, faculty and staff. Several of the interventions described above begin with the identification and analysis of appropriate data to answer questions about student success. Historically, community colleges are not accustomed to using institutional or classroom data or the research literature to make decisions. Inquiry and the scholarship of teaching and learning can aid community colleges in generating accountability evidence as well as pedagogical solutions to meeting the needs of students.

Generating evidence of student learning and knowledge of the variables influencing student success presented in the research literature can point leaders and practitioners to innova-

tive programs, pedagogies, and policies that support student goal attainment, resulting in unique and multi-layered blueprints for change.

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