
**IMPROVING STUDENT ATTAINMENT
IN COMMUNITY COLLEGES:
INSTITUTIONAL CHARACTERISTICS
AND POLICIES**

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Community College Research Center
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IMPROVING STUDENT ATTAINMENT IN COMMUNITY COLLEGES: INSTITUTIONAL CHARACTERISTICS AND POLICIES

Executive Summary

Community colleges are a crucial point of access to higher education for low-income, minority, and other underserved students. Indeed, these groups are overrepresented (with respect to their share of undergraduate enrollment) in two-year and less-than-two-year postsecondary institutions. The community college access mission is built on low tuition, convenient location, flexible scheduling, an open-door admissions policy, and programs and services designed to support students who may have various socio-economic and academic barriers inhibiting postsecondary success. If community colleges—or similar institutions—were not available, many of these students would not have an opportunity to attend higher education.

While access to community colleges is an important first step for a wide variety of students, they must also be successful after they have enrolled. Unfortunately, many students never finish a degree. For example, only 36 percent of students who enrolled in a community college as their first postsecondary enrollment in the 1995-96 school year had completed a certificate, associate, or bachelor's degree within six years. Low-income, minority, and first-generation college students all have even lower six-year completion rates. Although many students can benefit from a community college education even if they do not complete a degree or certificate, community college faculty and administrators would all like to see completion rates rise.

This report is part of a broad initiative funded by the Lumina Foundation for Education. The initiative, *Achieving the Dream: Community Colleges Count*, will initially work with 27 community colleges in five states to help them increase retention, completion, and success for low-income students, students of color, first-generation college students, and other underserved groups.

The data and analysis in this report speak to four main goals:

- (1) to provide general descriptive information on community college student characteristics and educational outcomes and make comparisons with other higher education sectors;
- (2) to discuss the importance of college completion and transfer, reviewing the controversy about whether completion is a meaningful or justifiable standard for a community college;
- (3) to review the state of research on the determinants of student outcomes in community colleges in order to provide some programmatic guidance for colleges working towards improving their student outcomes and offer recommendations for improving the quality and effectiveness of the research; and
- (4) to initiate our own program of empirical research on institutional graduation rates by conducting an analysis of community college graduation rates and developing

a benchmarking system for evaluating college performance that takes account of differences in college characteristics.

Community College Enrollment and Degree Completion

To analyze student enrollment, we used data from Integrated Postsecondary Education Data System (IPEDS), which are collected annually by the National Center for Education Statistics (NCES) from all postsecondary institutions in the United States. In order to examine the persistence and graduation experience of minority and low-income students, we relied on data from the Beginning Postsecondary Students Longitudinal Study of 1995-96 (BPS96). This survey is based on a sample of students who started college for the first time in the 1995-96 school year. The students in the sample were re-interviewed in 1998 and 2001, providing information on what happened to them six years after their initial enrollment.

Enrollment

IPEDS data indicate that in the decade following 1992, undergraduate enrollment in the United States grew by 11 percent, totaling almost 15 million students by the fall semester of 2002. All of that growth was accounted for by minority students, since college enrollment for White students actually fell by more than 600,000 students. The growth of Hispanic enrollment was particularly strong, increasing by over 50 percent to over 1.7 million students. Some of this growth can be attributed to the overall growth of the Hispanic population in this country during the 1990s.

Two-year public institutions (henceforth called community colleges) account for 42 percent of total enrollments, while four-year institutions (public and not-for-profit together) account for 51 percent of total enrollments. Thus, all other categories (all less than two-year, two-year not-for-profit and for-profit, and four-year for-profit institutions) only enroll seven percent of all postsecondary students.

Community colleges are particularly important for Hispanics, African-Americans, and Native Americans (included under “other”), who are all overrepresented in two-year institutions. In addition, lower income students and those whose parents have less education are underrepresented in four-year institutions and overrepresented in two-year and less-than-two-year colleges. Community colleges enroll the largest number of low-income and first-generation students, but these students account for a larger share of enrollments at for-profit institutions than at community colleges.

Degree Completion and Transfer

After six years, 36 percent of community college students in the BPS96 sample had completed a certificate, associate, or bachelor’s degree. Degree completion rates are higher in four-year institutions and, not surprisingly, a larger share of the degrees for those colleges are accounted for by bachelor’s degrees.

Within community colleges, minorities are less likely than Whites to complete a degree or certificate. Only 27 percent of African-Americans had received any type of award within six years, and most of those awards were certificates. Hispanics complete at a slightly higher rate, and a larger proportion of their awards are accounted for by associate and bachelor's degrees.

With respect to family income, community college students from the top half of the family income distribution and those with at least one parent with a bachelor's degree are much more likely to earn some award—and these awards tend to be degrees rather than certificates. In addition, high socioeconomic status (SES) students who had not completed in six years were more likely to have transferred and still be enrolled at a four-year college. Not surprisingly, community college students with higher secondary school grade point averages and assessment test scores are also more likely to earn a degree.

Earlier research on bachelor's degree attainment demonstrating that attendance patterns strongly influence completion, and that delaying enrollment after high school, attending part time, or interrupting enrollment significantly decrease the chances that a student will earn a bachelor's degree holds for community college students as well. Moreover, community college students are much more likely to follow these non-traditional attendance patterns than four-year students, so it is significant that the patterns that put students most at risk of failing to persist are those that characterize most community college students.

Degree Completion and Transfer as Indicators of Student Success

Many community college students benefit from the skills they learn in college, even if they never earn a degree. There is now, however, an increase in the emphasis on graduation and we conclude that increasing degree completion and transfer rates should be central institutional goals, although certainly other measures of student success should also be considered.

Accrediting agencies, long criticized for an overemphasis on “inputs” such as the credentials of the faculty and number of books in the library, are beginning to focus more on outcomes as a result of changed accreditation policies and demands from policymakers for greater accountability. More than half of the states now engage in “performance budgeting,” under which state officials, in drafting annual budgets, take into account public colleges' performance, and 18 states have performance funding schemes in which public colleges gain or lose set amounts of money based on how well they meet certain standards. Further, under the Higher Education Amendments of 1998, to be eligible to receive federal financial aid, colleges are already required to report graduation rates for cohorts of first-time, full-time students in 150 percent of the “traditional” graduation period (three years for community colleges and six years for baccalaureate-granting institutions).

Community college educators, advancing three broad arguments, have resisted the use of graduation rates either as an accountability measure or as a normative goal. First, they

argue, with some research-based support, that many students at their institutions are not seeking degrees. Instead, in many cases, students enroll with the goal of learning some specific skills, perhaps to gain a promotion at their current job. Second, they assert that many factors that thwart graduation are beyond the control of the colleges, citing the fact that college students face serious barriers to success in college such as family and work responsibilities and deficient academic preparation. Third, they argue that students increasingly attend several colleges before completing their degrees.

Furthermore, while institutional graduation rates can be taken as underestimates of individual graduation rates, there is still useful information to be gleaned from examining *differences* among colleges in institutional graduation rates. Explaining why some colleges with similar characteristics and similar types of students have much higher rates than others might offer insights into possible policies and practices that could improve performance in many colleges. In addition, any individual college can analyze its completion and persistence rate as an important outcome of programs aimed at improving its performance.

Nevertheless, there are other factors that suggest that college completion or transfer should be important goals for community college students. First, research indicates that earning credits without completing a degree does have an economic value, but students get an additional financial benefit from the credential. Indeed, for students in academic majors in community college, the real benefit comes from eventually earning a bachelor's degree. Earning small amounts of credit in academic subjects also has no measured economic value. Therefore, research does not refute the argument that short-term course taking to upgrade skills can be valuable for students, but neither does it provide strong support for this hypothesis. In contrast, the literature consistently demonstrates the value of degrees, particularly bachelor's degrees. For these reasons, it might be argued that even when students do not seek degrees, community colleges should seek to raise their degree aspirations, and help them to recognize the opportunities for advancement in education and subsequently in employment with further education.

The disappointing completion data for low-income and minority students presents a final challenge to the argument that completion at community colleges should not be emphasized. Even after controlling for high school test scores, other personal characteristics, and stated degree goals, socioeconomic status continues to be strongly related to the probability of completion. If this fact represents systematic difficulties faced by lower income students, then colleges should try to do something about those difficulties. Alternatively, if it represents systematic differences in aspirations, even after controlling for high school academic record, then we should ask why low-income students have lower aspirations.

Research on the Effects of College Programs on Persistence and Completion

There is a tremendous amount of research on persistence and completion in higher education but few concrete insights about the specific effects of institutional policies on community college retention and completion. Moreover, two fundamental problems with the research literature in this area compromise the usefulness of research findings; one is

theoretical or conceptual and the other empirical. Still, some useful approaches to increasing retention and completion have been identified.

The conceptual problems generally result from attempts to apply, to community colleges, models of student retention and completion developed in the study of four-year institutions, whose student subjects are usually of traditional age, residential, and in BA-granting programs. Community college students, conversely, are likely to be older, working, and attending part time. The implication of the typical models is that community colleges should work towards making the community college experience as similar to the residential four-year experience as possible, but, in fact, a very different approach may be more effective for typical community college students.

Little high-quality national data are available for analyzing institutional practices: most provide little detail on specific institutional practices; do not provide information on a single college, which would permit evaluation of its characteristics, policies, and practices, and their effect on student success; and are of mixed quality.

The methodological problems in the research have several sources. The studies on persistence vary significantly in terms of the definitions given to persistence and completion. In addition, the current literature employs a wide range of datasets, including single-institution data, system-wide (state-level) data, and nationally-representative datasets, and the type used has implications for the interpretation of results. The large majority of research on effective practices in community colleges appears in unpublished reports that are both not widely disseminated or reviewed formally for quality.

Perhaps the most serious and difficult-to-solve problem concerns the attribution of causality in the evaluation of programs. Most practices that are studied are discrete programs in which some, but not all, students participate. Studies of the effectiveness of the programs generally consist of a comparison between participants and non-participants, although students were not randomly selected for each group and therefore may have personal characteristics that impact on the effect of the program on them. Experimental studies that assign students at random to program and comparison groups can address many of these problems, but these are rare, difficult to implement, and extremely expensive.

Nevertheless, considerable progress can be made with the resources and data now available. Multivariate analysis controlling for measurable student characteristics is a first step. In addition, reports must provide descriptions of the programs themselves as well as the process through which students are recruited and enrolled in the programs. This information allows the readers to evaluate the extent to which program and comparison students might differ. But most studies of community college practices fail to provide this type of information.

Given the wide variation in the quality of research on effective practices, what conclusions can be drawn from the existing literature?

Review of *advising, counseling, mentoring, and orientation programs* in several studies demonstrate mixed results for individual programs. Organizing these services into a single support center, however, did increase the measured effectiveness of support services. In addition, a review of the federally sponsored Student Support Services (SSS) programs showed that peer tutoring, workshops, and cultural events are effective program components, with peer tutoring shown as particularly effective.

Learning communities, which organize instruction around themes and allow students to go through a program as cohorts, constitute a particularly interesting model for community colleges since it is one way that these commuter institutions can engage with their students in a more intensive way than normally occurs in classrooms. There is extensive research on learning communities, although much of that research is focused on four-year colleges. Since learning communities usually involve coordination of several classes, the typical community college working and part-time students may have difficulty participating. (Four year college students are much more likely to be attending full time or even to be in residence.) And the extensive reliance on part-time faculty at many colleges may also thwart the close coordination required of the faculty who participate in the program. Nevertheless, research on community college programs has generally been favorable. Preliminary results from a random-assignment study show positive results.

The provision of *developmental education services* for academically under-prepared students is a fundamental function of every community college. In many colleges, the majority of students arrive with academic skills that are judged to be inadequate for success in college-level courses. Developmental education consists of some or all of the following activities: instruction in academic skills, advising, counseling, and comprehensive support services. In some colleges, research suggests that students who start in developmental courses or programs persist and graduate at rates similar to those experienced by students who started in regular college-level courses. But research on the effectiveness of developmental education suffers from serious methodological problems. Given the importance of developmental education to the mission of community colleges, this is an area that needs more attention.

Finally, much of the research on effective practices is concerned with discrete “programs” often involving only a limited number of students. Even if such programs are successful, they may be difficult to implement on a college wide basis. This suggests that attention to *college-wide reform* is necessary, yet there is little research that evaluates broad institutional reform or that identifies the characteristics of college that have been relatively successful in improving retention and graduation. There are encouraging examples of colleges in which some measures of student success have improved after the enactment of whole-school reforms involving changes in organization, teaching methods, counseling and student services, relationships to the community, and organizational philosophy. But given the importance of this issue, it deserves much more systematic attention.

Institutional Characteristics Associated with Completion and Persistence

This report is a first step in a longer process designed to identify institutional characteristics and policies that are related to improved graduation and persistence. There are, of course, many factors that might cause variation in student success and many of them may be beyond the control of an individual institution. Some such factors relate to the personal characteristics of their students, such as part-time attendance, which has been shown to hinder completion. These factors must also be taken into account when graduation rates are used to judge the performance of an individual college, because failing to control for students' academic readiness unfairly penalizes colleges that enroll less well-prepared students and gives undeserved credit to those with selective admissions policies.

Research Findings

Literature on institutional characteristics that promote student success consists mainly of studies of four-year institutions, so some findings are not directly applicable to community colleges and their students. Nevertheless, the studies identify these school factors as positively related to student persistence: students with higher SAT scores, students with a higher family income, a higher percentage of female students, the availability of student housing and a large percentage of students living in it, a smaller student body, and greater expenditures on instructional and academic support. Factors negatively affecting college completion have been identified as student bodies consisting of a large number who attend part time, are members of minority groups, and are older.

Studies, therefore, consistently find that the typical characteristics of community college students are also those characteristics that predict lower graduation rates. Since students with such characteristics are precisely the students that community colleges often enroll under their open access policies, any attempt to improve graduation rates by becoming more selective, while possible, would violate this underlying mission of the colleges.

To investigate whether the findings from these research studies apply to community colleges, we conducted our own analysis of institutional graduation rates at community colleges, using data from the National Center for Education Statistics' Graduation Rate Survey (GRS)—often referred to as the Student Right-to-Know (SRK) data, which is part of IPEDS. To compute this graduation rate, colleges report the percent of a cohort of first-time, full-time (FTFT) students in degree programs that earns an associates degree or certificate within three years of initial enrollment. We also computed a “predicted” graduation rate based on this analysis. This is the graduation rate that we would expect a college to have, given its institutional characteristics. We then compared actual and predicted rates. When the actual rate was higher than the predicted rate, we concluded that the college is, in effect, performing at a higher rate than we would expect.

This methodology has been increasingly used to analyze the performance of four-year colleges. It is now used as part of the *U.S. News and World Report* four-year college rankings. But this is the first time that it has been used to analyze community colleges.

We found that, overall, 22.3 percent of FTFT degree-seeking community college students in the sample attained a postsecondary credential in their starting institutions within three years. Graduation rates for women were higher than for men; and African-Americans, Hispanics, and Native Americans all graduated at lower rates than Whites. Contrary to findings at four-year institutions, Asian students in community colleges were also less likely to earn a degree or certificate than were Whites.

To analyze the potential different influences on the various community college graduation rates we created three models, each with “explanatory variables” that considered different college and student characteristics including urbanicity; enrollment size; the percent of enrollments accounted for by African-Americans, Native-Americans, Hispanics, part-time students, and women; federal aid per student; and several financial variables. We found that large colleges had lower graduation rates. Colleges with larger shares of African-American, Hispanic, and part-time students, and those with higher in-state tuition and lower instructional expenditures all had lower graduation rates. Colleges that conferred relatively more certificates had higher graduation rates because certificates are shorter and easier to complete than associates degrees. We found some unexpected results. Colleges with higher proportions of women and Asian students had lower graduation rates, and higher per student expenditures on student services were also associated with lower graduation rates. It may be that colleges with students facing more serious problems tend to spend more on student services so that any positive effect of the services may be offset by the more problematic characteristics of the students.

In addition to identifying institutional characteristics that are associated with higher completion rates, this methodology can also be used to identify colleges and states that perform at higher levels than expected (after measurable characteristics are taken into account). The analysis therefore can be used to benchmark both state-level and college-level performance. We illustrate this approach for states and colleges participating in the Lumina Achieving the Dream initiative.

There are many factors that are not measured or included in available data sets. However, identifying colleges or states that over- or under-perform, with respect to their measured characteristics, can be the basis of more qualitative case studies of states and institutions designed to identify additional institutional and policy factors that promote graduation and retention.

Therefore, this approach can make a promising contribution to understanding and improving college performance. Future research will refine the graduation rate measures and evaluate their usefulness in comparison to much more detailed and comprehensive measures of performance available in some states.

Conclusions and Recommendations

This report shows that low-income, minority, and other underserved students are over-represented at community colleges, and that they complete degrees and certificates at

relatively low rates. We have discussed community college retention and completion from various perspectives, including the argument about whether graduation rates are an appropriate index for judging the colleges. We have also reviewed institutional practices designed to increase college completion—such as enrollment size and student demographic and financial characteristics—and used them to explain community college graduation rates. Finally, we have used this analysis to develop an index that can be used to benchmark college graduation rates.

On the basis of our findings, we offer a set of programmatic and policy implications:

Retention, Graduation, and Transfer Rates

- (1) *Colleges must recognize the need to improve retention, graduation, and transfer rates.* We acknowledge the validity of many of the points about why more students do not graduate or transfer, but having good explanations for why some students never finish a degree or certificate is not the same as saying that graduation rates should not be higher. And, most colleges are indeed trying to increase retention. In fact, some colleges have been relatively successful at overcoming many of the barriers that all colleges face.

Practice and Policy

Despite a large amount of research on retention in higher education, we have much to learn about the effects of institutional practices on retention and completion at community colleges. While there are real weaknesses in the research, and limitations in the application of research findings on four-year institutions for community colleges, there are still lessons to be learned.

- (2) *Current research does provide support for the effectiveness of learning communities.* Learning communities have attracted a great deal of attention in the last decade and the research on their effectiveness is generally positive. They may be particularly significant for community colleges, and for students in developmental education, since the classroom may offer the only opportunity to engage the students with the institution. At the same time, though, it is important for colleges to work out ways to organize learning communities to enable the participation of a wide range of students, including part-time students and those who work.
- (3) *Research on counseling, advising, and student orientation suggests that all can be effective for retaining students, but many questions about design and intensity remain.* Orientation and first-year seminars appear to be effective, but much of the relevant research concerns four-year colleges. Many practitioners are convinced that comprehensive services that include personal and career counseling and academic advising are effective. Yet, answers to these questions are needed: what is the role of faculty, what should constitute the educational preparation of

counseling and advising staff, how can services be provided without excessive cost, and how much counseling can be done on-line?

- (4) *Tuition levels, instructional expenditures, and institution size are related to graduation rates.* Our research suggests that higher tuition, lower instructional expenditures, and larger enrollments are related to lower graduation rates. It is unrealistic to propose cutting the size of colleges, but the result here does suggest that it would be interesting to try to explain what smaller colleges do that might influence retention. Indeed, an extensive discussion of the effects of school and classroom size at the K-12 level has been occurring for some time.
- (5) *It is essential to promote a more thorough discussion of the determinants of student outcomes and the effects of programs and policies on those outcomes.* There has been a tremendous amount of discussion of effectiveness and student outcomes, and some reports contain descriptive numbers. Accountability-related reports often also contain enrollment and graduation percentages for particular demographic groups. Still, the published reports of college practices rarely contain thorough discussions or analyses of outcomes that address questions of causality. In addition, colleges and community college organizations need to provide more opportunities for faculty and administrators to exploit the richness of the quantitative and institutional data that are available to them.

Research

The core strategy of the Achieving the Dream initiative is the use of data and analysis to identify and remove barriers to increasing student success at community colleges. There is a widespread consensus within the initiative and, indeed, throughout the leadership of the community college movement in the United States that colleges must be more “data driven,” and shift from a “culture of anecdote” to a “culture of evidence.” There is less consensus about exactly what constitutes “evidence.” While many programs are identified as “best practices” and, in some cases, there appears to be a consensus about “what works,” this report has argued that a rigorous look at the underlying research yields less than definitive conclusions.

Research on community colleges faces two important barriers. First, the large majority of research on higher education concerns four-year colleges. Second, assessing the effectiveness of educational initiatives is thwarted by difficult methodological problems. Many community colleges do not have the resources to do evidence-based research, and some administrators may not be convinced that it is necessary.

- (6) *It is necessary to recognize that assessments of the effectiveness of practices are difficult and involve a continuum of activities and analyses that range from simple descriptive comparisons to more time-consuming and expensive controlled analyses and experiments.* Descriptive comparisons of outcome measures for participants and non-participants are a useful beginning to any analysis, but more definitive research requires careful attention to the characteristics of participants

- and non-participants, and to the process through which students enroll or are recruited into relevant programs.
- (7) *Studies must pay increased attention to college-wide changes and the institutionalization of promising practices.* Research focused on practices to improve retention and completion tends to analyze specific programs. Other innovations, such as organizational changes or new hiring and professional development policies, are more difficult to isolate for assessment purposes. Moreover, even if discrete practices are successful for a small number of students, they may not be easily “brought to scale” or institutionalized. Indeed, a successful institution-wide reform may not look anything like a discrete program. Researchers, college administrators, and faculty need to focus more attention on college-wide innovations and develop methods to study them and identify successful strategies.
 - (8) *Community colleges must recognize the resource needs of institutional research.* While it is easy to agree with the need to strengthen a culture of evidence in principle, it may not seem so obvious if a college president is faced with a choice between strengthening the developmental education services and increasing the institutional research function. Institutional research must be seen as an investment that will make other resources more effective.
 - (9) *More systematic methods to publicize and disseminate useful research findings from state and institutional research offices must be developed.* State and college-level researchers frequently carry out analyses and assessments of policies and practices, but often they are not published in ways that make them useful to wider audiences. Many reports of “best practices” fail to provide enough backup information and data for readers to make a judgment about the relative effectiveness of the practice. Assessment results are often unavailable to researchers. The type of discussion that would arise from more systematic dissemination of local and state research results should be seen as a central element of an increased emphasis on a “culture of evidence.”
 - (10) *Researchers must develop models designed specifically to study community colleges.* The student integration model, developed to analyze student persistence at four-year institutions, has been the most influential perspective on student retention, but it has only limited applicability for commuter schools and, particularly, for community colleges. Researchers and college faculty and administrators need to consider alternative approaches and frameworks.
 - (11) *The wide variation in college performance must be exploited to develop insights about effective strategies and policies.* We have shown that there is a wide variation among community colleges in measured cohort graduation rates, and have developed a benchmarking index that can be used to compare graduation rates. As expected, for the most part, these measures are also related to college size, demographics, and financial characteristics. Nevertheless, variations in

college performance offer an as yet unexploited opportunity to examine, using a variety of methodologies, the effectiveness of different institutional strategies and characteristics.

- (12) *Collaboration between academic, institutional, and state-level researchers should be promoted.* Researchers working to improve the performance of community colleges face formidable problems. They will have more chance of success if they use a variety of methodologies and if they combine research based on national, state, and local datasets as well as specific institutional and state-level knowledge.
- (13) *It is crucial to act now, but question and measure.* We have been critical of the quantity and quality of research on the effects of institutional practices on community college graduation and completion rates, although we have found high-quality research on community college practices and sophisticated institutional research departments. Nevertheless, relevant results of much of the research that we have reviewed are either subject to alternative interpretations or published in such a way that makes it difficult to evaluate their validity. Therefore, its value as a guide for practice and policy must be carefully considered.

College personnel now have a variety of sources of information—including experience, institutional knowledge, and research of varying degrees of reliability—and this type of information serves as the basis for action. Colleges are, of course, ongoing operations and cannot wait for definitive evidence before acting; and, in any case, research should not be viewed in absolute terms—either definitive or useless. Still, faculty and administrators should move forward with the understanding that questions remain about the effectiveness of what they are doing.

Our suggestion is that, in planning activities, colleges should search for the best information they can find, but they should search critically, recognizing that all research is not the same and that even the most definitive studies, such as those using random assignment methodologies, have limitations. At the same time, they should do what they can to monitor progress, and do so in a way as thoroughly and rigorously as possible. The interaction between research and practice is not a search for the definitive answer of “what works.” Rather, it is a constant and continuous process and conversation within and among the colleges, and with outside researchers and policymakers, as practitioners try to improve their practice in the context of a constantly changing environment. We urge that, in this conversation, colleges use the best possible data and the most appropriate methodologies. The process of continuous discussion is probably better described as a “culture of inquiry” rather than a “culture of evidence.” When speaking of monitoring disarmament treaties, Ronald Reagan said, “Trust, but verify.” When developing and implementing innovations to improve student outcomes, we say “Act now, but question and measure.”

IMPROVING STUDENT ATTAINMENT IN COMMUNITY COLLEGES: INSTITUTIONAL CHARACTERISTICS AND POLICIES

I. Introduction

Community colleges are a crucial point of access for low-income and minority students, who are overrepresented (with respect to their share of undergraduate enrollment) in two-year and less-than-two-year postsecondary institutions (Cohen & Brawer, 2003; Rouse, 1995). The concentration of low-income and first-generation college students in community colleges is particularly striking. In the 1995-96 school year, for example, students from the lowest half of the family income distribution accounted for 55 percent of all first-time college students enrolled in two-year public institutions, but only 35 percent in four-year public and not-for profit institutions.¹ The community college access mission is built on low tuition, convenient location, flexible scheduling, an open-door admissions policy, and programs and services designed to support at-risk students with a variety of social and academic barriers to postsecondary success. Therefore, if community colleges—or similar institutions—were not available, many of these students would not be in college (Alfonso, 2004; Rouse, 1995).

While community colleges have played a central role in opening access to college to a wide variety of students, access alone is insufficient. Students must also be successful after they have enrolled. Consequently, in the last decade, policymakers, educators, accreditors, and scholars have increasingly turned their attention to persistence and completion among community college students. Graduation rates have long been a central preoccupation of educators, yet retention and completion at community colleges specifically have attracted much less attention even though many community colleges students never finish a degree. Only 36 percent of students who enrolled in a community college as their first postsecondary enrollment in the 1995-96 school year had completed a certificate, associate, or bachelor's degree within six years. Another 22 percent were still enrolled in college (about three-fifths of whom were enrolled in a four-year institution).² Therefore, 42 percent of students who started in a two-year public institution had left college within six years after initial enrollment without a degree or certificate. Low-income, minority, and first-generation college students all have even lower six-year completion rates. Those among these populations who do complete tend to earn lower level credentials—for example, certificates rather than associate and bachelor's degrees.

This report is part of a larger initiative funded by the Lumina Foundation for Education. The initiative, *Achieving the Dream: Community Colleges Count*, will initially work with 27 community colleges in five states to help them increase retention, completion, and success for low-income students, students of color, first-generation college students, and other underserved groups.³

¹Authors' calculations from the Beginning Postsecondary Student Longitudinal Study of 1995-96.

²Authors' calculations from the Beginning Postsecondary Student Longitudinal Study of 1995-96.

³ For more information on *Achieving the Dream*, see

http://www.luminafoundation.org/newsroom/news_releases/060104.html.

The report has four main goals, each addressed in a separate section. The first goal, addressed in the next section, is to provide both general descriptive information on community college student characteristics and educational outcomes and make comparisons with other higher education sectors. Thus, we review data on community college enrollment and completion, establishing that community colleges provide access to a broad range of students, but that many of them leave without degrees or certificates.

In the following section, we discuss the importance of college completion and transfer, reviewing the controversy about whether completion is a meaningful or justifiable standard for a community college. Community college faculty and administrators often argue that students attend their institutions for many reasons other than completing degrees or certificates, so evaluating colleges or judging student success on the basis of degree completion is misleading and unfair.

Our third goal is to review the state of research on the determinants of student outcomes in community colleges. This review provides some programmatic guidance for colleges working towards improving their student outcomes. Just as important, this section of the report reveals that current research provides surprisingly few definitive conclusions about the effect of institutional programs and practices on community college educational outcomes. While there is extensive literature on completion at four-year colleges, there has been much less analysis of community colleges. Moreover, the existing research on community colleges has important theoretical and empirical weaknesses. Thus, this section provides some programmatic guidance and also forms the basis for suggestions to improve research on student attainment in community colleges.

Our fourth goal is to initiate our own program of empirical research on institutional graduation rates. We begin this effort by conducting an analysis of community college graduation rates. As part of it, we develop a benchmarking system for evaluating college performance. The system is based on college graduation rates and takes account of differences in college characteristics. Therefore, it is a more meaningful and fairer measure than raw graduation rates and it forms the basis of subsequent research using both quantitative and qualitative methods to identify institutional practices that are related to improved student outcomes.

II. Community College Enrollment and Degree Completion

In this section, we present an overview of postsecondary enrollment and degree completion trends, placing particular emphasis on minority and low-income students. Using data from the Integrated Postsecondary Education Data System (IPEDS), we describe the higher education system in terms of enrollment and completion rates at different types of postsecondary institutions. IPEDS data are collected annually by the National Center for Education Statistics (NCES) from all postsecondary institutions in the country. Since the data provide only a snapshot of enrollments and completions at a point in time,⁴ they do not supply information on the demographic characteristics, experiences, and outcomes of individual students over time. Moreover, IPEDS does not include data on student family income nor other socioeconomic characteristics, such as parental education. Thus, in order to examine the persistence and graduation experience of minority and low-income students, we relied on data from the Beginning Postsecondary Students Longitudinal Study of 1995-96 (BPS96). This survey is based on a sample of students who started college for the first time in the 1995-96 school year. The students in the sample were re-interviewed in 1998 and 2001, providing information on what happened to them six years after their initial enrollment.⁵

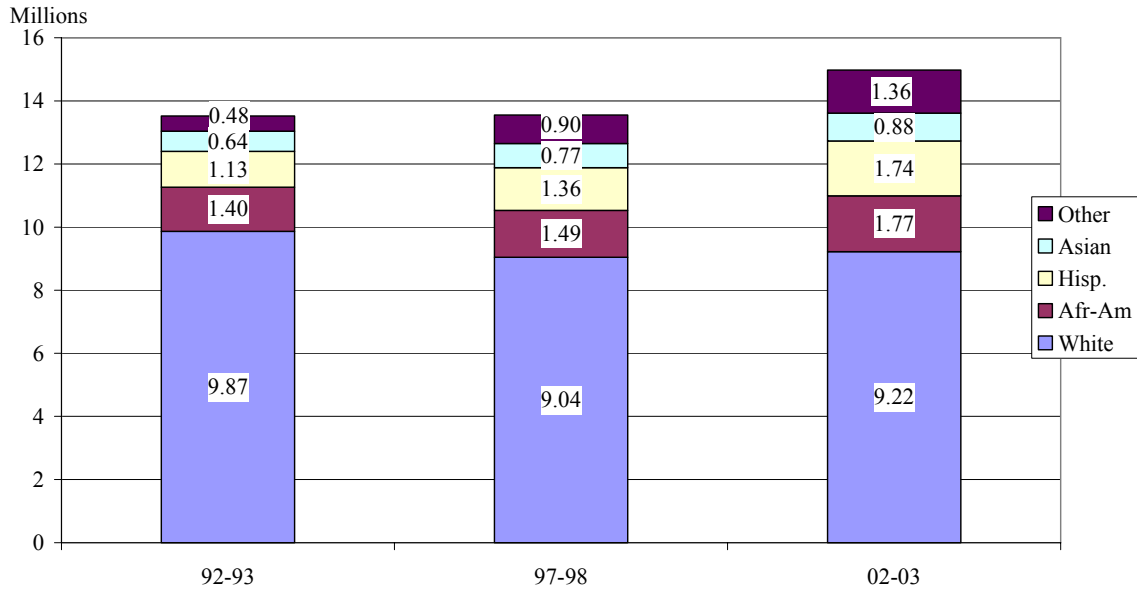
Community College Enrollment

Data from IPEDS indicate that in the decade following 1992 undergraduate enrollment grew by 11 percent, totaling almost 15 million students by the fall semester of 2002 (Figure 1). All of that increase was accounted for by minority students, since college enrollment for White students actually fell by more than 600,000 students. The growth of Hispanic enrollment was particularly strong, increasing more than 50 percent to over 1.7 million students. Some of this growth can be attributed to the overall growth of the Hispanic population in the United States during the 1990s.

⁴ As part of the IPEDS protocol, colleges provide data on the percentage of a cohort of first-time, full-time community college students starting in a particular year who graduate within three years. We will discuss these data later in this report.

⁵ Note that IPEDS sample includes all students, while the BPS96 sample includes only first-time college students. Although many first-time students are non-traditional in that they may have delayed postsecondary enrollment after high school, the BPS96 sample will contain proportionately more traditional (non-delaying) students than the IPEDS sample.

Figure 1. Undergraduate Fall Enrollment by Race/Ethnicity: 1992, 1997, and 2002



Source: Authors' calculations using data from IPEDS, Fall Enrollment Surveys: 1992, 1997, and 2002.

Neither the overall number of students nor the demographic subgroups are evenly distributed among institutions. Table 1 displays the share of enrollments by race among the nine categories of postsecondary institutions enumerated by NCES. NCES distinguishes among three types of institutional control—public (pub), private not-for-profit (p-nfp), and private for-profit (p-fp). NCES also distinguishes among three degree levels. Colleges that confer the bachelor's degree are categorized as four-year institutions (4yr). Institutions whose highest degree is an associate degree are considered two-year institutions (2yr), and those whose highest degree is lower than an associate degree are labeled less than two-year institutions (<2yr).⁶ In all of these cases, the categories are based on the highest degree conferred, so a four-year institution can also confer associate and lower degrees.

⁶ We acknowledge that these labels are misleading. For many institutions, most students take longer to complete their degrees than these labels suggest. Nevertheless, we use these terms in order to maintain consistency with the NCES usage.

Table 1. Fall 2002 Undergraduate Enrollment by Institution Type and Race/Ethnicity, Column Percents

	All	African American	Hispanic	Asian	White	Other
4yr pub	35	31	25	37	38	30
4yr p-nfp	16	14	13	12	17	20
4yr p-fp	2	3	2	2	1	8
2yr pub	42	44	51	46	41	38
2yr p-nfp	-	-	1	-	-	1
2yr p-fp	2	3	2	1	1	2
<2yr pub	1	1	1	1	1	1
<2yr p-nfp	-	-	-	-	-	-
<2yr p-fp	2	3	5	1	1	2

Source: Authors' calculations using data from IPEDS Fall Enrollment Survey 2002.

Notes: Totals do not sum to 100% due to rounding.

Dash (-) rounds to 0 percent.

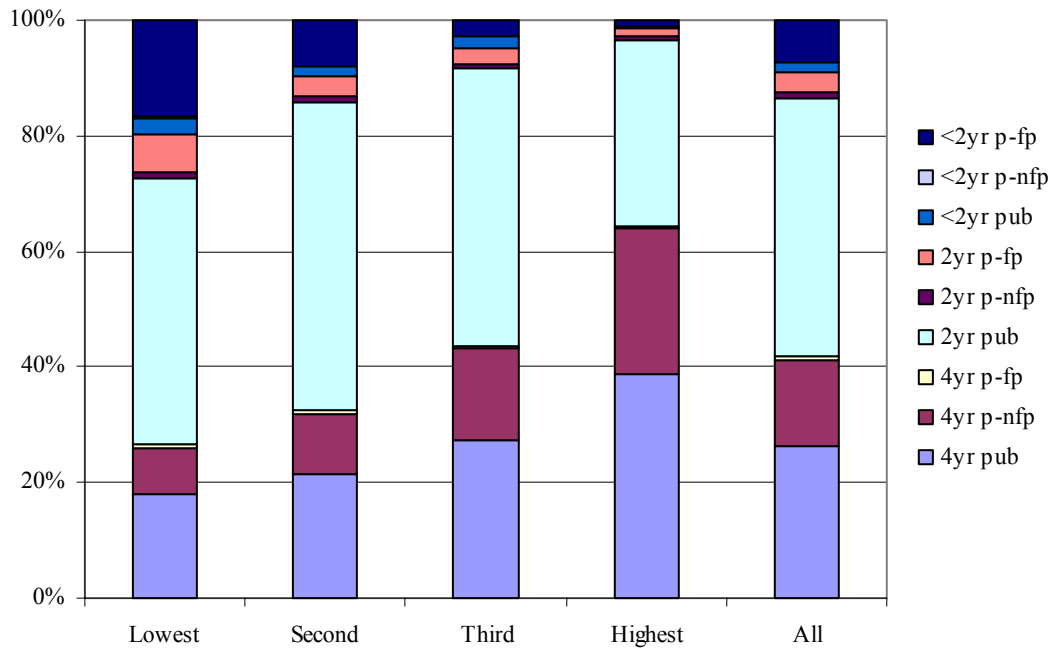
Two-year public institutions (henceforth called community colleges) account for 42 percent of total enrollments; four-year institutions (public and not-for-profit together) account for 51 percent of total enrollments (Table 1).⁷ Thus, all other types of institutions together enroll only seven percent of all college students. Note that community colleges are particularly important for Hispanics, African-Americans, and Asians. These three minority groups are all overrepresented in two-year institutions (i.e., 51 percent of all Hispanic college students are enrolled in community colleges compared to only 42 percent of all postsecondary students).

Enrollments by Socioeconomic Characteristics

Figures 2 and 3 display the enrollment distribution among the nine NCES college categories by family income and parental education for all first-time postsecondary students in 1995-96. These measures of socioeconomic status are strongly related to the patterns of enrollment. Lower income students and those whose parents have less education are underrepresented in four-year institutions and overrepresented in two-year and less-than-two-year colleges. Community colleges enroll the largest number of low-income and first-generation college students (those whose parents have a high school diploma or less), but these students account for a larger share of enrollments at for-profit institutions than at community colleges.

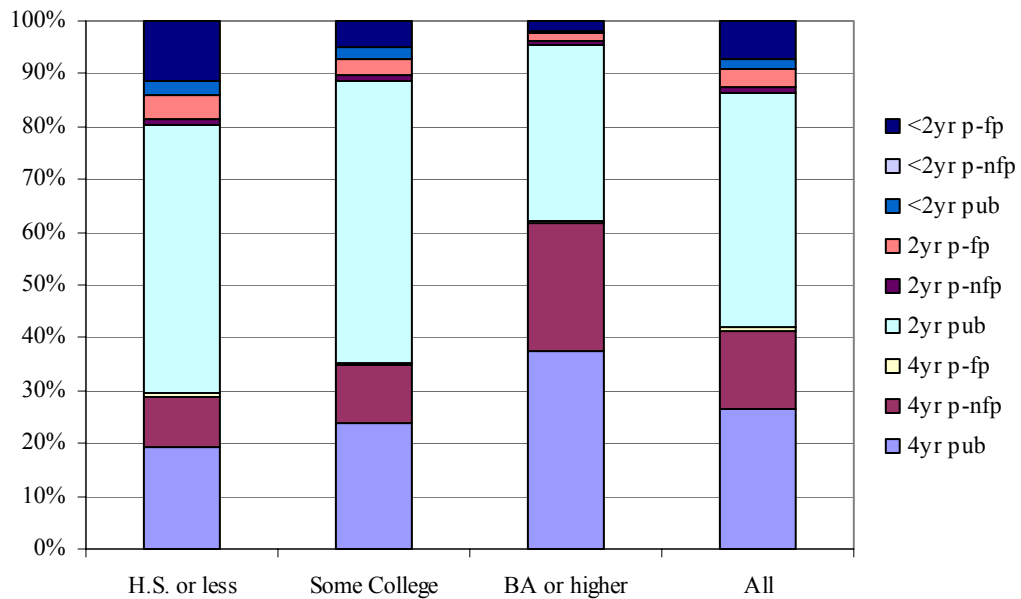
⁷ Note that these data are based on a student headcount at one point in the fall of 2002. If all students who enroll for credit in a postsecondary institution over the course of a year are counted, community colleges alone account for more than 50 percent. Since community college students are much more likely than students in four-year institutions to enroll part-time and to interrupt their enrollment over the course of a year, fall headcounts fail to count proportionately more community college students.

Figure 2. 1995-96 First-Time Students: Percent in Each Institution Type by Household Income Quartile



Source: Authors' calculations using data from BPS96.

Figure 3. 1995-96 First-Time Students: Percent in Each Institution Type by Parents' Level of Education



Source: Authors' calculations using data from BPS96.

In addition to enrollment variations between institution types by socio-economic status and race/ethnicity, there are similar distinctions by initial program enrollment within community colleges themselves. For example, African-American students are particularly concentrated in certificate programs, while Hispanics' patterns of program enrollment at community colleges resemble those of Whites (Table 2). Similarly, low-income and first-generation community college students are more likely to enroll in a certificate program than in an associate program. Specifically, while 23 percent of students in the lowest household income quartile enroll in certificate programs in community colleges, only 6 percent do from the highest income quartile. And among first-generation students in community colleges, 20 percent enroll in certificate programs, while only 5 percent of students whose parents have a bachelor's or higher degree choose a certificate program.

Table 2. 1995-96 First-Time Students in Community Colleges: Percent in Race/Ethnic Category by Initial Degree Program

Program	Certificate	Associate
White	14.6	85.4
African-American	26.8	73.2
Hispanic	13.9	86.1
Asian/Pacific Islander	4.4	95.6
Native American	6.5	93.5
All	15.4	84.6

Source: Authors' calculations using data from BPS96.

Degree Completion and Transfer

While enrollment trends and patterns by student type are important, since degrees are for most students the primary objective of enrollment in higher education, it is very important to observe outcome patterns over time and by various student types. Table 3 uses IPEDS data to present trends in certificate and degree completion in the past decade. There are several important findings. First, the number of certificates and associate degrees awarded in 2002-03 is almost identical. This is due to a small, yet steady rise in associate awards over the decade with a concomitant sharp decline in certificate awards. Observe that Whites are primarily responsible for the decline in certificate awards, while they are the only race/ethnic category that did not contribute to the increase in associate degree awards over the period of observation. In fact, commensurate with the observed decline in enrollment among Whites in postsecondary education (see Figure 1), they exhibit declines or no change in awards earned from 92-93 to 02-03. Finally, note that the number of associate degrees awarded increased slightly faster than bachelor's degrees, a pattern observable for all of the identifiable race/ethnic categories.

Table 3. Undergraduate Degrees Awarded by Race/Ethnicity: 1992-93, 1997-98, and 2002-03, All Majors

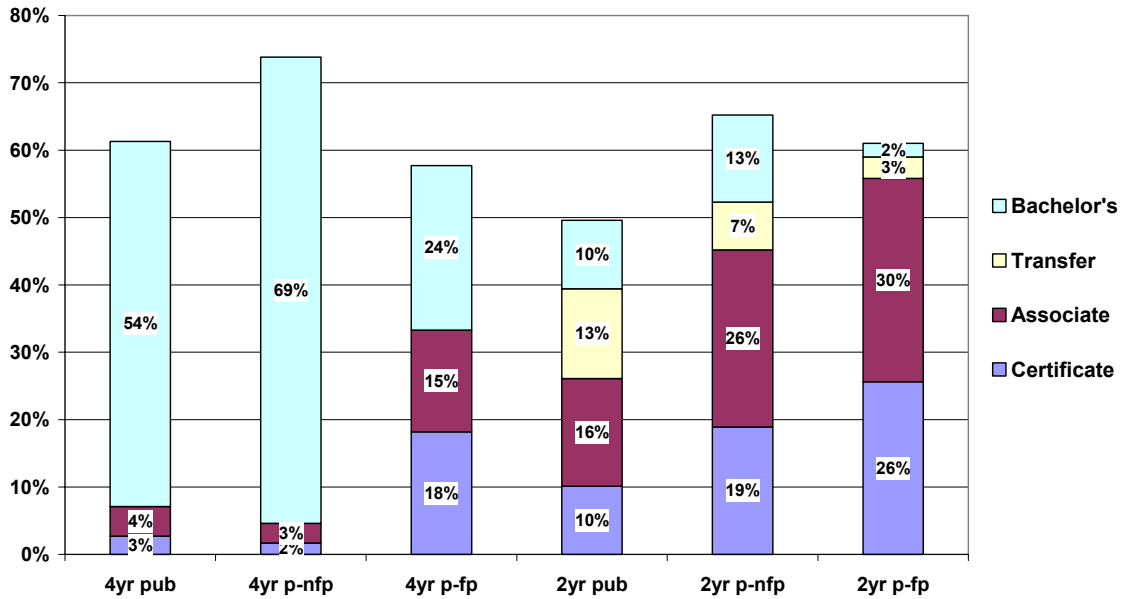
	92-93		97-98		02-03		% change 92-93 – 02-03	
	Students	%	Students	%	Students	%		
Certificates	All	822,052	100%	656,079	100%	597,576	100%	-27%
	Af-Am	100,839	14%	91,520	14%	100,325	17%	-1%
	Hisp	83,403	11%	83,004	13%	103,783	17%	24%
	Asian	24,423	3%	27,877	4%	26,283	4%	8%
	White	408,183	56%	348,957	53%	321,657	54%	-21%
	Other	116,523	16%	104,721	16%	45,528	8%	-61%
Associate degrees	All	539,361	100	580,591	100	604,764	100	12%
	Af-Am	42,956	8	56,700	10	65,231	11	52%
	Hisp	35,862	7	49,302	8	63,409	10	77%
	Asian	16,581	3	25,358	4	30,492	5	84%
	White	404,209	76	417,025	72	403,339	67	0%
	Other	34,491	6	32,206	6	42,293	7	23%
Bachelor's degrees	All	1,189,001	100	1,203,827	100	1,313,614	100	10%
	Af-Am	77,357	7	96,091	8	111,686	9	44%
	Hisp	58,229	5	78,270	7	95,681	7	64%
	Asian	50,891	4	70,167	6	79,634	6	56%
	White	937,545	79	880,351	73	917,739	70	-2%
	Other	62,058	5	78,948	7	108,874	8	75%

Source: Authors' calculations using data from IPEDS Degree Completion Surveys 1992, 1997 and 2002.

Note: Total number of observations do not sum to 100% due to degree completers for whom race/ethnicity was not indicated.

Using the BPS96 sample, Figure 4 displays the highest educational outcome, six years after first enrollment, for students by initial institution type. After six years, 36 percent of community college students had completed either a certificate, associate, or bachelor's degree. An additional 13 percent had transferred to a four-year institution (without yet earning any degree). Degree completion rates are much higher among students starting in four-year institutions and, not surprisingly, a much larger share of those degrees are accounted for by bachelor's degrees. Observe also the higher completion rates at private not-for-profit and for-profit two-year institutions, relative to that of community colleges. The figure also clearly shows the relative emphasis on certificates among both the two-year and four-year for-profit institutions.

Figure 4. 1995-96 First-Time Students: Highest Outcome after Six Years by First Institution Type



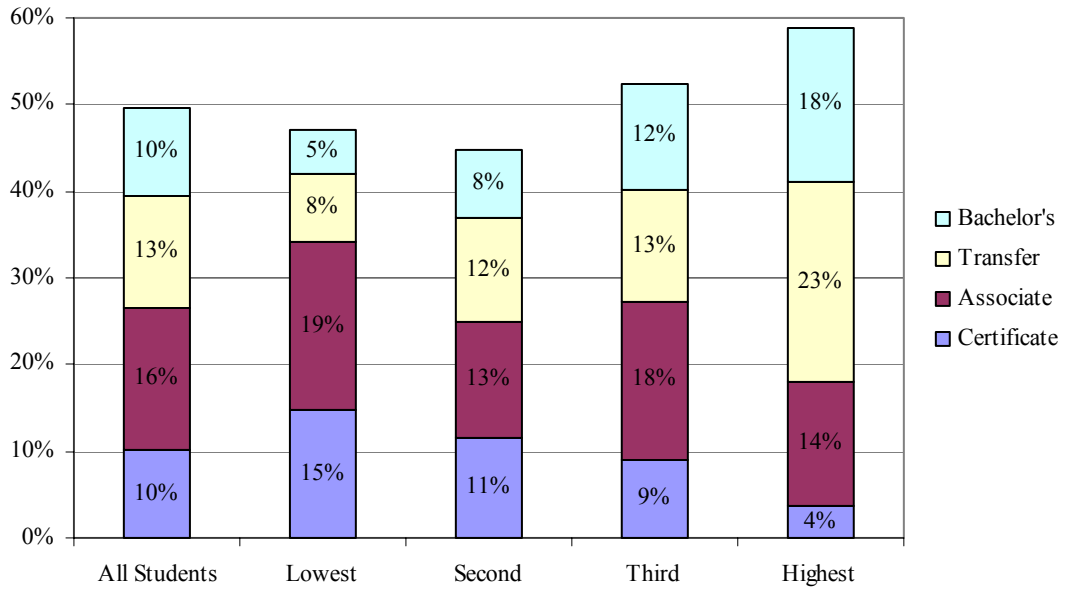
Source: Authors' calculations using data from BPS96.

Race/Ethnicity, Household Income and Outcomes of Community College Students

Within community colleges, minorities are less likely than Whites to complete a degree or certificate (data not shown here). Completion rates among African-Americans are particularly low. Only 27 percent earned any type of award within six years, while an additional 10 percent transferred to a four-year institution. The vast majority of those awards are certificates. Hispanics complete at a slightly higher rate (29 percent), and over two-thirds of their awards were accounted for by associate and bachelor's degrees.

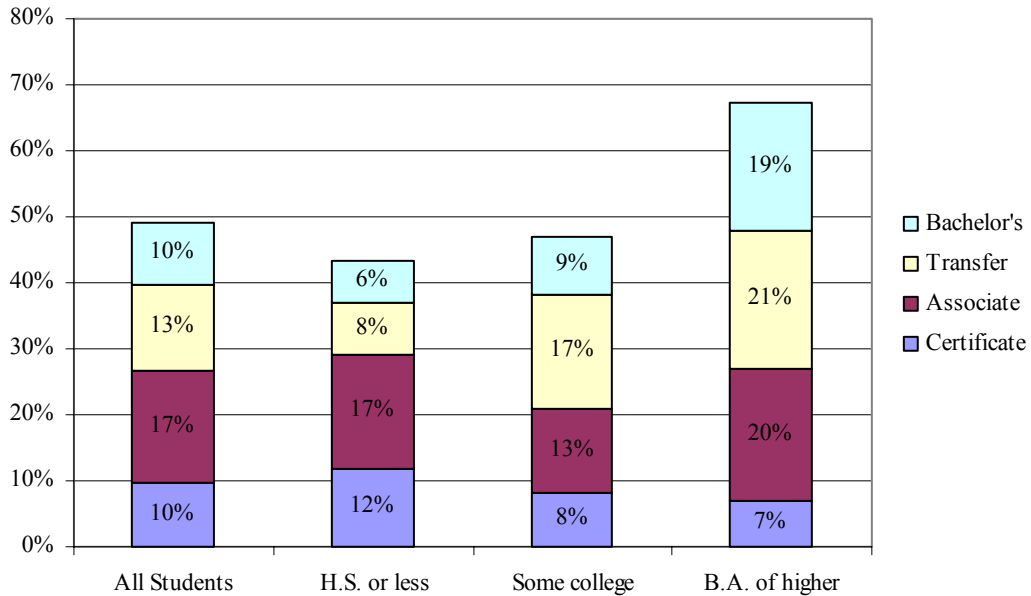
Figures 5 and 6 indicate predictable degree completion patterns by income and parental education levels for first-time students at community colleges. However, contrary to expectations, students from the second income quartile complete at lower rates than those from the lowest quartile, and completion rates for first-generation college students actually exceed those for students with at least one parent who had some college. Nonetheless, both the latter group and those in the second income quartile had higher rates of both transfer and bachelor's degree attainment. As might be expected, community college students from the top half of the family income distribution and those with at least one parent with a bachelor's degree are much more likely to earn some award—and these awards tend to be degrees rather than certificates. In addition, high socioeconomic status (SES) students who had not earned an award within six years were more likely to have transferred to and still be enrolled at a four-year college.

Figure 5. 1995-96 First-Time Students: Highest Outcome After Six Years by Household Income Quartile



Source: Authors' calculations using data from BPS96.

Figure 6. 1995-96 First-Time Students: Highest Outcome After Six Years by Parents' Level of Education



Source: Authors' calculations using data from BPS96.

Measuring Factors Affecting Completion and Transfer

The data that we have presented so far have shown the relationship between race/ethnicity and family SES measures on the one hand, and persistence and degree completion on the other. The availability of nationally representative longitudinal data allows for analysis of completion rates while simultaneously taking into account many variables. For example, it may be that minority students graduate at lower rates primarily because they tend to come from lower income families. Therefore, it is important to review carefully what existing empirical research, using more comprehensive analytical techniques, reveals about the effects of individual characteristics on persistence and degree completion.

Findings from such research indicate that African-American and Hispanic community college students earn certificates or degrees and transfer at lower rates than do Whites. Yet this effect is weakened in studies that control for high school background and family income. Community college students with higher family income and whose parents are college educated are more likely to complete degrees and transfer than those who are low income and the first in their family to attend college. Furthermore, community college students with higher secondary school grade point averages and assessment test scores are also more likely to earn a degree (Bailey, Alfonso, Scott, & Leinbach, in press).

One of the most common findings in research on student success in college is that attendance patterns have a strong influence on student completion (Horn & Carroll, 1996). For example, consistent with the findings of earlier institution-level research, Adelman (1999) found that delaying enrollment after high school, attending part time, or interrupting enrollment significantly decrease the chances that a student will earn a bachelor's degree.

These relationships are also important for community college students. Those who delay entering college after high school, work while attending school part time, and interrupt their schooling are less likely to earn degrees (Bailey, Alfonso et al., in press). Community college students in general are much more likely to follow these non-traditional patterns of attendance than students at four-year colleges, so it is significant that the attendance patterns that put students most at risk of failing to persist are those that characterize most community college students (Bailey, Leinbach, et al, in press; Horn & Carroll, 1996). Since lower income students also are more likely to delay or interrupt their enrollment, or to attend part time, these patterns may be one mechanism through which a student's socioeconomic status influences his or her educational outcomes.

Most studies find that community college students who receive financial aid are more likely to persist and graduate than are those who do not receive aid. The findings with respect to student loans and debt load are mixed. For example, in a study of semester-to-semester persistence of community colleges, Cofer and Somers (2000; 2001) found that students with low debt loads are less likely to persist than are those with no debt, but those with high levels of debt are more likely to persist. The authors argued that these

loan impacts could be related to students' motivation, suggesting that highly motivated students assume larger amounts of debt to meet their graduation goals, while those less motivated and insecure about their graduation possibilities take lower levels of loans. Thus, Cofer and Somers concluded that changes in financial aid policy—from grants to loans—facilitate the persistence of highly motivated students while discouraging the persistence of the less motivated.

Table 4 summarizes the characteristics of community college students that studies most often find significantly impact the likelihood of student degree completion or transfer.

Table 4. Association of Student Characteristic with Degree Completion of Community College Students

Student Characteristic	Effect on Degree Completion
Race/Ethnicity	- (for African-Americans and Hispanics, though effect weakened when controlling for SES)
Higher Socioeconomic Status	+ (effect weakened when controlling for attendance patterns)
Better High School Academic Record	+
Non-traditional Attendance Pattern <ul style="list-style-type: none"> • Delayed enrollment after high school • Interrupted enrollment or “stopping out” • Part time attendance (working while enrolled) 	- - -
Receipt of Financial Aid	+
More Household Responsibilities	-

Summary

The data presented in the preceding tables and figures confirm the important role that community colleges play in providing access to postsecondary education for low-income and minority students. But they also show the relative difficulty that those students have in converting their access into certificates and degrees. In addition, the analysis highlights some interesting points. For-profit institutions enroll relatively large proportions of African-American and Hispanic students. For-profits particularly emphasize certificates, and completion rates at these institutions are higher than they are at community colleges.⁸ African-American students have particularly low completion rates and are unusually concentrated in certificate programs. Having a high family income or highly educated parents significantly increases students' chances of enrolling in a four-year college and, for those who start in a community college, these factors increase their chances of

⁸ For a discussion of why for-profits may have higher completion rates, see Bailey, Badway, and Gumport (2001).

completing an associate or bachelor's degree, or at least of transferring to a four-year college.

III. Degree Completion and Transfer as Indicators of Student Success

A central goal of this report is to explore the determinants of college persistence and completion in order to help develop public and institutional policy designed to increase degree completion among community college students. Several forces are converging to bring about an increasing emphasis on community colleges' completion rates, and it is important to consider whether they are the best indicators of student success. Many community college students benefit from the skills they learn in college, even if they never earn a degree (Bailey, Kienzl, & Marcotte, in press). This positive finding indicates the need to consider how much significance should be placed on persistence and graduation. In this section we review the growth in the emphasis on graduation and discuss the controversy associated with that growth. We conclude that increasing degree completion and transfer rates should be central institutional goals, although other measures of student success certainly should be considered.

The Movement toward Outcomes and Accountability

Several recent trends in many spheres of American society surrounding education are leading the public and lawmakers to take a greater interest in measuring the performance of institutions of higher education by their student outcomes. And institutions are increasingly being held accountable for the results through ratings systems and funding levers at all levels of government.

The popularity of college rankings such as those produced by *U.S. News and World Report* are a reflection of the increasing interest in measures of the quality of higher education. Furthermore, accrediting agencies, long criticized for an overemphasis on "inputs" such as the credentials of the faculty and number of books in the library, are now beginning to focus more on outcomes. The North Central Association of Colleges and Schools and other accreditation agencies, for example, now require colleges seeking accreditation to give evidence of learning by all of their students, not just by those who complete their programs.

Policymakers are also demanding greater accountability. According to the Rockefeller Institute of Government at the State University of New York at Albany, 44 states issue annual "report cards" on their colleges, up from 30 in 2000 ("Linking Spending," 2003). More than half of the states now engage in "performance budgeting," under which state officials, in drafting annual budgets, take into account public colleges' performance. Eighteen states have performance funding schemes in which public colleges gain or lose set amounts of money based on how well they meet certain standards.

In the 2004 debate in Congress over reauthorization of the Higher Education Act, the Bush administration articulated its desire to hold higher education to higher standards of accountability, just as it had with the public schools through the No Child Left Behind

Act. Under the Higher Education Amendments of 1998, to be eligible to receive federal financial aid, colleges are already required to report graduation rates for cohorts of first-time, full-time students in 150 percent of the “traditional” graduation period (three years for community colleges and six years for baccalaureate-granting institutions). Beginning with the Integrated Postsecondary Education Data System (IPEDS) 2002-03 survey of graduation rates—what are referred to collectively as “Student Right-to-Know” (SRK) statistics—colleges are now required to report overall student graduation rates, as well as those for African-American, Hispanic, and female students.

The Accountability Debate at Community Colleges

While the focus of policymakers’ increasing demands for accountability has been primarily on four-year colleges, community colleges are unlikely to escape increased public scrutiny about their outcomes. As competition for public funding intensifies, and as community colleges are forced to compete both with other educational institutions—including the more politically powerful universities and K-12 systems—and with other non-education groups, such as seniors seeking support for health care and retirement (Kane, Orszag, & Gunter, 2003), community colleges will increasingly need to measure and document their outcomes and the returns on the public’s investment that they produce.

Community college advocates have, however, resisted the use of graduation rates either as an accountability measure or as a normative goal. They have advanced three broad arguments for this resistance. First, they argue that many students at community colleges are not seeking degrees. In many cases, students enroll with the goal of learning some specific skills, perhaps to gain a promotion at their current job. Indeed, in response to the question on the Beginning Postsecondary Students Longitudinal Study of 1995-96 (BPS96) survey asking community college students to report their “reasons for enrolling,” about 36 percent of the students in associate degree programs said that they either wanted to learn “job skills” or had enrolled for “personal enrichment.”⁹ From this perspective, the range of non-degree outcomes of students may be an indication that community colleges are serving multiple community needs, as they are chartered to do. Criticizing colleges for low completion rates would reflect a misunderstanding of the mission of community colleges and the goals of their students.

A second reason why community college advocates resist the use of completion as an accountability measure is that many factors which may thwart graduation are beyond the control of the colleges. Many community college students face serious barriers to success in college, such as family and work responsibilities and deficient academic preparation. Indeed, it is precisely many such students, who may not have access to four-year colleges, whom community colleges seek to serve. But many of these barriers are not under the control of the colleges, nor can be mitigated by the institutions. Therefore, advocates argue, community colleges should be neither criticized nor penalized for not getting many such students to degree completion.

⁹ Authors’ calculations from BPS96.

A third reason for resisting the use of graduation rates as a performance measure is that college students increasingly may attend several colleges before completing their degrees. For example, one out of five students in the National Education Longitudinal Study of 1988 (NELS) who earned a bachelor's degree received it from a four-year college other than the one in which they were initially enrolled (Adelman, 2003). And findings from BPS96 indicate that up to 40 percent of first-time community college students attended more than one institution during their six years of observation in the survey.¹⁰ Adelman points out that students change colleges for lots of reasons. In a recent article in *The Chronicle of Higher Education*, he states, "Why should institutions be judged for choices, made by students, that are beyond their control? College students are legal adults, after all" (Burd, 2004, p. A1).

These are all important points. Community college students do have varied goals and many face particularly challenging barriers that are beyond the control of colleges. Finally, many also transfer to four-year or to other two-year colleges without earning a degree, reducing a college's graduation rate—even though these outcomes may be positive for students. Thus, institutional graduation rates do underestimate individual graduation rates. This distortion is not very large for the three-year period that the NCES uses in its Student Right-to-Know data, but institutional and individual graduation rates do diverge substantially as the time period increases to six years.¹¹

Furthermore, while institutional graduation rates can be taken as underestimates of individual graduation rates, there is still useful information to be gleaned in examining *differences* among colleges in institutional graduation rates. Explaining why some colleges with similar characteristics and similar types of students have much higher rates than others might offer insights into possible policies and practices that could improve performance in many colleges. In addition, any individual college can analyze its completion and persistence rate as an important outcome of programs aimed at improving its performance.

Although—as already stated—institutional graduation rates taken alone can be misleading, there are other factors that suggest that college completion or transfer should be important goals for community college students. First, research indicates that earning credits without completing a degree does have an economic value, but students get an additional financial benefit from the credential (Bailey, Kienzl, & Marcotte, in press;

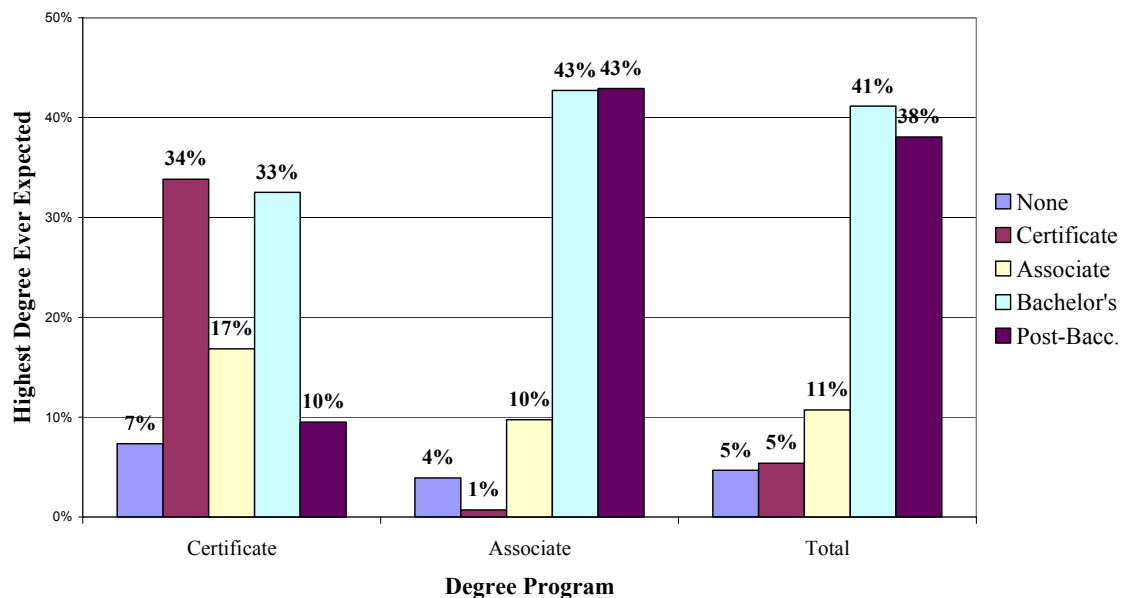
¹⁰ Authors' calculations.

¹¹ We used data from BPS96 to evaluate the difference between institutional graduation rates (the percent of an entering cohort that graduates within a given number of years from the institution of first enrollment) and individual graduation rates (the percent of entering students who graduate from *any* institution within a given number of years). We found that 23 percent of all first-time, full-time students in degree programs in BPS96 graduated (earned a certificate or associate degree) from their institutions of first enrollment within three years. This is conceptually equivalent to the Student Right-to-Know rate. Yet 26 percent of these students earned a certificate or associate degree at *any* institution within three years. The comparison suggests that the difference between institutional and individual graduation rates is not that large for a three-year period. But this difference is much greater for longer periods of time. Over a six-year period, while 28 percent of first-time, full-time students in degree programs in the BPS96 sample earned a certificate or an associate degree from their initial institution, 46 percent earned a certificate or associate degree from any institution.

Grubb, 2002). Indeed, for students in academic majors in community college, the real benefit comes from eventually earning a bachelor's degree. There appears to be little economic return to transfer-oriented education for students who do not transfer. Earning small amounts of credit in academic subjects also has no measured economic value. Therefore, research does not refute the argument that short-term course taking to upgrade skills can be valuable for students, but neither does it provide strong support for this hypothesis. In contrast, the literature consistently demonstrates the value of degrees, particularly bachelor's degrees. For these reasons, it might be argued that even when students themselves do not seek degrees, community colleges should strive to raise those students' aspirations, including helping them recognize the opportunities for advancement in education and subsequently in employment with further education (Jenkins, 2003).

The student-as-course-taker argument implies that enrollment in an associate degree program may overstate students' goals, since they may only want some specific skills that they can learn in a few courses. However, when students are asked about their long-term educational expectations, the goals almost always are equal to, and in most cases exceed, the level of the programs in which they are enrolled. For example, Figure 7 shows that 86 percent of students in community college associate degree programs in BPS96 actually expected to eventually earn either a bachelor's (43 percent) or a graduate (43 percent) degree. These data suggest that the program in which a student is currently enrolled actually understates, rather than overstates, their long-term aspirations.

Figure 7. 1995-96 First-Time Students in Community Colleges: Highest Degree Ever Expected, by Student's Initial Degree Program



Source: Authors' calculations using data from BPS96.

The completion data for low-income and minority students that we presented earlier in this report present a final challenge to the argument that degree completion at community colleges should not be emphasized. Even after controlling for high school test scores, other personal characteristics, and stated degree goals, socioeconomic status continues to be strongly related to the probability of completion (Bailey, Alfonso et al., in press). If this fact represents systematic difficulties faced by lower income and minority students, then colleges should try to do something about those difficulties. Alternatively, if it represents systematic differences in aspirations, even after controlling for high school academic record, then we should ask why such students have lower aspirations.

There is no question that community colleges encounter many challenges that impact their ability to increase graduation rates. Nevertheless, completion or transfer should be important goals for community college students and thus for the colleges themselves. Even among community colleges that face similar challenges, certain institutions perform considerably better than others. What do these institutions do to achieve better-than-expected results? In the next section, we review the available research to try to answer that question. In the subsequent section, we report on our own empirical work to go beyond the existing understanding.

IV. Research Review:

The Effects of College Programs on Student Persistence and Completion

What does available research say about institutional practices and policies that can increase student persistence and completion at community colleges? There is a tremendous amount of research on persistence and completion in higher education. Indeed, there are entire journals devoted to this and related topics—for example, the *Journal of College Student Retention: Research and Practice* and the *Journal of the Freshman Year Experience*—and a multitude of unpublished reports from studies on individual colleges or state systems. As we shall see, though, this vast landscape of papers and reports yields relatively few concrete insights about our specific topic: the effects of institutional policies on community college retention and completion.

Methodological Concerns

There are two fundamental problems with the research literature in this area. The first is theoretical or conceptual and the other empirical. Judgments about the implications of existing research need to be made in light of them. We will first discuss these problems at a general level and subsequently discuss specific conclusions from the research as they relate to the problems.

The conceptual problems for the most part result from attempts to apply models developed in the study of four-year institutions to community colleges. Fundamentally, theoretical models of student retention and completion have been developed primarily through studies of traditional age, often residential, students in BA-granting programs. As we shall see, the logic of these conceptualizations may be much weaker for studying typical community college students who are older, more likely to be working, and

attending part time. The implication of the typical models is that community colleges should work towards making the community college experience as similar to the residential four-year experience as possible. It may be that a very different approach is more effective for typical community college students.

Researchers face very serious empirical problems in searching for institutional practices that can improve retention and completion. First of all, there are little high-quality national data that are useful in analyzing institutional practices. Researchers have two options: they can use national data, such as the statistics available from the National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS), which has little detail on specific institutional practices, or they must rely on surveys of students at one college. These individual college surveys have much more institutional detail, but they are of mixed quality and, in any case, their results are difficult to generalize. Thus we have a much better grasp of the relationship between measures of student success and individual characteristics than between student success and institutional characteristics, policies, and practices.

In addition to managing with a lack of good data, researchers must also confront some difficult methodological problems. As a result, there is a tremendous range of methodological quality within the research literature. Thus, reviewing the research in this area is a formidable task. The empirical work on persistence varies significantly in terms of the definitions given to persistence and completion, as well as in the datasets used. Persistence has been defined as a student's continuous enrollment towards completion of a degree at one particular institution, and it has been measured as within-year persistence (semester-to-semester), year-to-year persistence, or persistence to degree completion, depending on the duration of the data collection period. Completion refers to degree attainment, although sometimes it includes transfers from one college to another (i.e., a two-year to a four-year college).

The current literature employs a wide range of datasets, including single-institution data, system-wide (state-level) data, and nationally-representative datasets. The type of dataset used has implications for the interpretation of results. For instance, when using data from one institution, a student who transfers from a two-year to a four-year college is classified as a dropout, but when using national-level data, this student would be classified as persisting.

Rather than analyzing the specific methodological issues from each study, we will generally review some of the problems that we have found in our literature search. In many cases, samples and variable definitions are not well-defined. Statements are made about what successful colleges do without defining how those exemplars were chosen. Sometimes reports do not provide much detail about the programs and especially about how student participants are selected and recruited. Many studies look at several components of an overall program—say counseling and mandatory placement in remediation—one at a time and then report the results for each one. But it may be possible that those components tend to go together, so it is not clear which one (or both together) has the effect, if there is an effect.

Perhaps the most serious problem, and also the most difficult to solve, involves the attribution of causality in the evaluation of programs. Most practices that are studied are discrete programs. Some students are in those programs and others are not. Studies of the effectiveness of the programs generally consist of a comparison between those two groups of students. But these types of comparisons often do not provide enough information to make a judgment. As long as there is some non-random process through which students enroll or are recruited to these programs, it may be that any differences between participants and non-participants results from the selection process, not the effect of the program. Even when authors recognize these problems, many do not take available steps that could help to address them.

There are several steps that researchers can take to purge the analysis of this distortion. Multivariate analysis can control for many characteristics. Perhaps the most important is some measure of pre-program academic ability. If a program enrolls more successful students, then it may not be surprising that program participants are more successful than comparison students. Pascarella and Terenzini (1991) generally discuss the strength of such controls in the studies that they review, but many studies, especially single-institution unpublished studies, do not take this step (or at least they do not report it).

Even if available variables are included in an analysis, there may be unmeasured differences between the two groups. Students who sign up for a program may be more motivated than those who do not, even if their measured characteristics are similar, and their motivation may be the reason why they sought assistance in the first place. Alternatively, counselors may encourage enrollment for students whom they judge might “benefit” from a program.

What can researchers do to address this problem of comparison group differences? Fundamentally, the solutions require an analysis or manipulation of the process through which students enter a program. One approach is for program organizers to enroll a group chosen at random from a pool of applicants, thereby eliminating any systematic differences between the two groups of applicants. None of the studies on community college practices use this approach, however, although one such study is currently being conducted by the research organization, MDRC. A second approach involves conducting a statistical analysis of the selection process and using those results to adjust the measurement of the program effect (see for example Bettinger & Long, 2004). This is an increasingly popular approach in program evaluation, but it requires particular types of data that are often unavailable and the results are sometimes difficult to interpret. For the most part, this methodological approach has simply not been used in the community college literature.

When neither of these approaches is possible, in addition to controlling for relevant measurable characteristics such as academic achievement, researchers must include a detailed description of the process through which students enter a program so that at least the reader can make a judgment about the potential distortion that the recruitment and enrollment process might have on the analysis. If the selection process tends to result in

the enrollment of more motivated students, then the measured program effect may be exaggerated. Conversely, the enrollment process might result in an understatement of the program effect. For example, if counselors consciously send the students with the most serious problems to a program, and if students in that program do as well as other students with similar measured characteristics, then it may be reasonable to conclude that the program was effective. Since many of the studies of programs involve one or a very small number of institutions, there is no reason why researchers cannot provide this type of information, yet few of the studies reviewed here did so.¹²

Sometimes a reform involves a college-wide change and then presumably any student at the college will participate. Evaluations of these types of changes usually involve before and after comparisons of measures of student outcomes and they are often informative. Nevertheless, it is still important at least to measure the characteristics of incoming students and to evaluate whether other changes might have influenced the outcomes.

There are no easy solutions to these problems. Every approach has practical or substantive drawbacks. Nevertheless, given the growing interest in student outcomes, considerable progress can be made with the resources and data now available. What is most needed is a greater emphasis on thorough and thoughtful analyses that explicitly take account of the methodological problems, use available approaches to addressing those, and recognize the limitations.

Conceptual Perspectives on Retention and Completion

In this section we will discuss in more detail the theoretical approaches to studying student retention and how they are used for the analysis of community colleges. Vincent Tinto's (1993) *student integration model* forms the conceptual basis of much of the research on persistence and graduation. It also has some attractive implications for institutional policy. Tinto's 1993 book was written to help colleges understand the reasons why students leave so they could design college activities to better serve students' needs and thereby increase retention and graduation rates. Tinto states that students' departures from an institution "reflect the character of the individual's social and intellectual experiences within the institution. Specifically, they mirror the degree to which those experiences serve to integrate individuals into the social and intellectual life of the institution" (p. 51). The perspective implies that institutions should develop processes and activities that will foster greater intellectual and social engagement and connections among college students.

Although the model resonates with educators and portrays an attractive college environment, empirical analysis has been difficult. The central concepts of academic and social integration are difficult to define and measure. A review of the literature reveals a

¹² See Muraskin (1997) for an example of a study that did try to take account of the selection process. In this case, the author provided a detailed comparison of the students who did and did not receive the services. This gave some information to allow the reader to judge the reported results.

plethora of variables and measures.¹³ Several studies use measures of academic and social integration that are created by aggregating the effects of multiple variables, but the component variables are sometimes not defined and, even when they are, their individual effect on student success is hard to disentangle. Overall, there is no consensus about what variables to use to measure academic and social integration and how they should be combined in empirical analysis.

Moreover, research on student integration has a profound causality problem. Research on four-year colleges shows that students who participate in student organizations or interact with faculty graduate at higher rates. Nevertheless, it does not follow that graduation rates will rise if every student joins a student organization or interacts with faculty. Students may interact with faculty *because* they share faculty values and an orientation towards academic activity. These characteristics could result in a higher probability of success even if the student did not have much contact with faculty. Similarly, students who choose to be active in a student organization may have certain characteristics that would make them more likely to complete a degree with or without that participation.

Although this problem has not been resolved, the preponderance of research does suggest that academic and social integration have positive effects on the persistence of four-year college students (Cabrera, Nora, & Castañeda, 1993). In an extensive review of research on college student outcomes, Pascarella and Terenzini (1991) found that both the frequency and quality of interactions with peers and faculty and the participation in extracurricular activities—measures of social and academic integration into the college life—positively contribute to students’ persistence at baccalaureate-granting institutions. However, even here, the effect is less strong when factors such as student characteristics, pre-college experience, and other college experiences are taken into account.

Tinto (1993) makes clear that, from his perspective, the process of integration goes both ways. There is no “single path to enhanced student retention” (p. 201). Thus his suggestions with respect to developing student assessment systems emphasize understanding the diverse objectives of students. This perspective does not necessarily emphasize adherence to one model, but rather to the *fit* between the student and the institution.

Fit provides a different and broader theoretical framework for understanding students’ social and academic integration into campus life. However, research on fit is also plagued by methodological problems since the focus has remained on student characteristics and not on the relationship between student and institutional characteristics. Measuring student characteristics does not indicate how well they fit with what the college has to offer, and looking at actual student activities does not necessarily say much about fit either. For example, participation in extracurricular activities is usually taken as a sign of integration, but the *absence* of participation in extracurricular activities may reflect a

¹³ One study, for example, used 129 different measures for several different concepts—academic integration, social integration, external involvement, psychological adjustment, social support, satisfaction with the college, positive and negative life events, agreeableness, conscientiousness, and self-esteem (Napoli & Wortman, 1998).

good fit between a student who is not interested in such activities and a college that does not devote resources to providing them.¹⁴

Much of the research in this area is based on an image of college life typified by the residential liberal arts college with multifaceted interactions inside *and* outside the classroom among students and between students and professors. This assumption may be problematic for many public, less-selective four-year schools, but it is even less likely to be accurate for community college students. Community colleges are commuter institutions, a characteristic that makes their students less likely to interact socially outside of school hours. In addition, a substantial proportion of community college students attend part time. Trying to reproduce the liberal arts, residential ideal may not be the best strategy for community colleges, or at least for many students in community colleges. Flexible scheduling, convenient transportation, availability of daycare, high-quality on-line education, applied pedagogies, and well-designed internships may be more important to community college students than the nature of their relationships with professors or participation in student organizations.

These preferences may explain why research on community colleges is much less likely to show a positive relationship between measures of integration and student persistence and degree completion. Some research has found small positive effects (Bers & Smith, 1991; Napoli & Wortman, 1998), other studies found no effect, and, in at least one case, social integration was found to have a negative effect (Nora, Attinasi, & Matonak, 1990). In their review of empirical research on undergraduate student attainment, Pascarella and Terenzini (1991) contended that these models do not work as well for commuter colleges as residential colleges, stating that “with a few exceptions, the weight of evidence is clear that various measures of social integration (including interaction with faculty, interaction with peers, and extracurricular involvement) show little if any positive relationship with persistence at commuter institutions. This lack of a positive relationship holds regardless of the specific measure of social integration used and irrespective of whether or not student background characteristics were taken into account in the study design” (p. 402).

In order to test “fit” at community colleges, empirical researchers need to reformulate their conceptions of college life. For example, a student who wants a rich extracurricular life will presumably be more likely to persist in a college that offers many such opportunities, while a working adult student with many outside responsibilities may persist longer in a college that does not devote resources to the typical characteristics of “college life.” Alternatively, a highly intellectual student may feel more comfortable in a college that emphasizes a traditional pedagogy while a more practical student may thrive in a college that emphasizes concrete applications.

However, research on integration does not measure this alignment, probably because good data on student objectives with respect to the types of college experiences that they

¹⁴ Some of the for-profit institutions emphasize convenience over engagement. For example, the University of Phoenix has been known for using locations and schedules to facilitate the participation of working adults and has not put resources into promoting student involvement through development of extracurricular campus activities.

want are not available. So, rather than measuring fit, researchers tend to measure student characteristics such as GPA or descriptions of student activities such as participation in extracurricular clubs and then assume that this is what students want.

In conclusion, despite methodological concerns, there is a consensus among researchers that, on average, measures of academic and social integration and fit positively affect persistence and degree attainment at four-year colleges. The conceptual basis for applying this model to community colleges is much weaker and, indeed, the findings from empirical studies are far less definitive. This is a case where the extent to which the research emphasizing four-year colleges has not only reduced the number of analyses of community colleges but also distorted the work that has been carried out. Therefore, in addition to simply increasing the work on the two-year sector, it is important that researchers also develop new conceptual models on which to base that research.

Since the classroom is the one place where commuter schools do have contact with their students, application of Tinto's model for community colleges has focused increasingly on designing classroom environments that promote integration (Tinto, 1997). This approach has been realized primarily through an education practice referred to as learning communities. These communities will be discussed in the next section.

Empirical Studies of the Effect of Institutional Management and Practices on Student Outcomes

Much research in the academic literature has been concerned with testing various theories of student persistence and completion. Another genre of research asks a more direct set of questions. Do students who participate in a particular type of program or activity persist or graduate at higher rates? In this section we turn to studies that take this more straightforward approach.

Once again, the large majority of studies of this type are concerned with four-year colleges. An analysis of the research on community college practices gives a mixed message. There are many studies that do report positive results for various programs or policies. These results often agree with the opinions of experienced community college administrators and researchers and a general consensus has developed about the value of some of those practices. But from the point of view of research, many of the conclusions are not well supported or are open to alternative interpretations. To be sure, researchers in this area confront difficult challenges resulting from data limitations and methodological problems. There are some high-quality studies, but results based on even the best methodologies can be open to question.

While there are many studies on a long list of possible program activities, we will focus on three large categories. They include student services, such as advising, counseling, mentoring, and orientation programs; learning communities; and developmental education.

Advising, Counseling, Mentoring, and Orientation Programs

Colleges have been experimenting with various types of advising and student services for decades. According to Pascarella and Terenzini's summary on the effect of such programs, "the most consistently effective program format appears to be a first-semester freshman seminar that meets as a regular class with an assigned instructor. The purpose of this type of seminar is to orient the student to the institution and its programs and to teach important academic survival skills" (1991, p. 403). Muraskin and Wilner (2004), in their review of institutional practices, also concluded that freshmen year programs were effective. Nevertheless, both sets of authors acknowledged that participation in the programs was voluntary. Therefore, the positive association might be influenced by initial student characteristics and not the services itself. Still the consistency of the findings gives more weight to the positive conclusions.

Evidence on the effectiveness of other types of advising and counseling is more mixed. Pascarella and Terenzini (1991) concluded that when students' pre-college characteristics were taken into account, relatively short-term orientation programs had a trivial and statistically insignificant direct effect on persistence. They also found mixed results from research on the effects on persistence of the amount and quality of academic advising. Muraskin and Wilner (2004) reported that persisting students tended to express higher satisfaction with counseling services than those who left, although that research on the impact of such services was also mixed. They also suggested, though, that measurement of counseling effectiveness may be distorted because students who use counseling may have come to the college with more problems than those who do not use it. This is a situation in which failing to adequately account for differences in the characteristics of program participants and non-participants may understate the effectiveness of a program.

The studies on counseling and advising primarily concern four-year colleges, however. Research on these services, and indeed on institutional practices in general, is much scarcer for community colleges. For example, in a recent review of attrition research at community colleges by Summers (2003), only one out of 14 pages of text discussed the effects of institutional programs. The author cited two unpublished single-institution studies that generally found positive effects of "matriculation" services such as assessment, orientation, and counseling.

Reports on the Community College of Denver (CCD) have suggested that the college's institutional practices have been effective at increasing retention (Roueche, Ely, & Roueche, 2001). CCD's counseling and academic support services are organized in a comprehensive unit called the Academic Support Center (ASC). The college reports that the class withdrawal rate was 7.8 percent for students receiving ASC support, while the overall campus rate was 12.4 percent. Though this finding is encouraging, the reports do not include information that would allow a judgment about the comparability of the ASC and other students at the college.

Student Support Services (SSS), funded under the federal TRIO programs, is perhaps the most widespread student services initiative. SSS was evaluated in the mid 1990s

(Muraskin, 1997) and the study found that “freshman-year SSS participants increase their grade point averages by 0.15 in the first year and 0.11 in the second year of college. SSS participation also increased retention to the second year of college at the same institution by 7 percent and retention to the third year in *any* institution by 3 percent” (p. 1).

Interestingly, the study also found that effects increased with increased exposure to SSS activities. The author identified peer tutoring, workshops, and cultural events as effective components, with peer tutoring shown as particularly effective. This was a comprehensive study and the author was careful to compare the characteristics of participants to non-participants; nevertheless, he cautioned that unmeasured motivation might still have influenced both enrollment and program effects. Further, the number of students who could be served was limited by the available funds. At the time of the evaluation, SSS expenditures per student were falling on a year-to-year basis. Finally, the evaluation did not focus particularly on community colleges. Indeed, only one of the five colleges used in a follow-up benchmarking study was a community college (Muraskin, 1997).

Perhaps our understanding of the effectiveness of counseling may be distorted not only by the dearth of analyses of community colleges, but also by the influence of a four-year college perspective. The most effective counseling for residential four-year students may not be appropriate for part-time community college students with full-time jobs. Perhaps designs for student services have been particularly influenced by the four-year college experience. If so, it would be important to try to identify different types of counseling and advising and to take account of such differences when evaluating student services in community colleges.

Learning Communities

In the last 15 years, educators in both two- and four-year institutions have experimented with learning communities as a means of engaging and motivating students and thereby improving their outcomes. Learning communities organize instruction around themes, and students go through such programs as cohorts. Learning communities are designed to be more coherent and engaging than traditional courses, and to give students and faculty greater opportunities for increased intellectual interaction and shared inquiry (Knight 2002; Tinto & Love, 1995). The learning community model is particularly interesting for community colleges since it is one way that these commuter institutions can engage with their students in a more intensive way than normally occurs in classrooms. If the student integration model does apply to community colleges, it would probably be operationalized with classroom oriented approaches such as learning communities.

On the other hand, the design of learning communities may discourage non-traditional students from participating. To the extent that a learning community requires a cohort of students to attend several classes in group, it may be difficult for working students or students attending part time to participate. Since learning communities require close coordination among professors, they appear to be most effective when full-time regular faculty, rather than part-time adjuncts, are used. Full-time faculty are more likely to teach during the day, rather than at night when many non-traditional students attend classes,

however. These factors suggest that learning communities may attract the more middle-class, traditional-age students among those enrolled in community colleges.¹⁵

A review of research on the effectiveness of learning communities by the National Learning Communities Project at Evergreen Community College concluded that “a preponderance of studies indicate that learning communities strengthen student retention and academic achievement” (Taylor, 2003, p. iii). The authors of this review found more than 100 studies of learning communities. The large majority of them were unpublished single-institution assessments; only one-seventh were published in journals or books. Thus, while there is a tremendous amount of material on learning communities, much of it is difficult to access. Some of the reported studies base their assessment on comparisons between learning community and non-learning community students and some control for entering academic characteristics. But without knowing more about the process through which students are recruited to and enroll in learning communities, it is difficult to judge whether these controls are adequate to account for initial differences between learning community and comparison students.

Not surprisingly, learning communities in four-year colleges have received much more attention than those in community colleges—only 32 of the 119 studies, or about one quarter, covered community colleges. Taylor (2003) chose 17 studies that were “deemed notable for the quality of the assessment study and the manner in which it was reported” (p. 4). Of these, only one used a community college. The review does not highlight particular issues associated with the design and effectiveness of this innovation at community colleges.

The best known of the evaluations of community college programs is the 1997 article by Tinto published in the *Journal of Higher Education*, “Classrooms as Communities: Exploring the Educational Character of Student Persistence,” which discussed learning communities at Seattle Central Community College. Tinto found that participation in a learning community did increase the probability of quarter-to-quarter persistence. Based on a qualitative analysis at Seattle, he argued that learning communities promote persistence by facilitating the creation of supportive peer groups among students, encouraging shared learning, and giving students the opportunity to actively participate in knowledge creation. This study used a multivariate methodology that controlled for possibly confounding characteristics. Tinto also recognized the potential distortion in the model caused by student self-selection and he presented an argument for explaining why it was not a problem.¹⁶ In contrast, a study of learning communities at LaGuardia Community College by Tinto and Love (1995) found that participation in learning communities did not significantly increase the probability of persistence.

In 2003, the research organization, MDRC, started an evaluation of learning communities at Kingsborough Community College. The study involves freshmen between age 17 and 34, most of whom had applied directly to Kingsborough after missing the City University

¹⁵ We thank Kate Shaw for this point.

¹⁶ Although Tinto addressed the selection issue, he did not provide enough information to make a judgment about the extent to which it is a problem.

of New York (CUNY) system deadline.¹⁷ Other students who had low placement test scores were also invited to participate. Random assignment was used to allocate these students to learning communities or to a control group that received services generally available to students at the college. The course taking patterns of both groups were tracked through the second semester. Preliminary and unpublished results suggest that the learning community students had passed more courses (including basic English classes) and had higher grade point averages than the comparison group, with differences that were statistically significant. There were other encouraging, although not statistically significant, differences.¹⁸

Learning communities are an attractive strategy with some encouraging empirical support, although researchers still need to pay more attention to the process through which students are recruited and enroll. Learning communities offer the potential for more in-class opportunity for engagement with commuter students who may not have a chance to participate in social and other extracurricular activities at the college. Nevertheless, the particular problems associated with implementing learning communities at community colleges have not been adequately studied. Thus, practitioners and researchers need to make sure that the schedule and format of the programs are convenient for non-traditional students. This is another case where a strategy based on a four-year residential higher education model may need to be adjusted for the realities of the community college student body.

Developmental Education and Services for Academically Under-prepared Students

As Summers (2003) pointed out, “[M]any institutions’ primary strategy for reducing attrition is the early identification of students likely to drop out and the development and implementation of intervention services for those students” (p. 64). Therefore, colleges offer a variety of services for students with weak academic skills. Based on their review of the literature on academic achievement, Pascarella and Terenzini (1991) suggested that institutions can actively facilitate the academic adjustment of poorly prepared students by providing extensive instruction in academic skills, advising, counseling, and comprehensive support services. They contended that their findings have been replicated in several national studies, and hold even after controlling for important student and institutional characteristics, although they reported findings primarily from studies of four-year colleges.

Early intervention for academically weak community college students, through counseling or other student support services, could improve their persistence and academic performance (Grubb, 2003; Summers, 2003). In several cases, early intervention has proven to be successful at encouraging students to remain in college. Summers (2003), in a review of the literature on the impact of counseling on attrition,

¹⁷ Kingsborough institutional research indicated that these types of students are often the least prepared and have low retention rates.

¹⁸ Personal communication with Thomas Brock, the principal investigator of the MDRC study. This study is scheduled to be published in early 2005 after results from a second cohort of Kingsborough students become available.

indicated that studies have found that counseling increases retention of students who are identified as highly likely to drop out.

Developmental class work is the most common service for students who arrive at community college judged to be unprepared for college-level work. Results of existing studies on this practice are ambiguous. Many find that students who enroll initially in developmental courses graduate at lower rates than students who start in regular credit courses (Muraskin & Wilner, 2004), although, once again, many of these studies analyzed students at four-year colleges. In a study of college transcripts, Adelman (1998) found that the more remedial courses that students are required to take, the less likely they are to earn a degree. Among students who attended two-year and/or four-year institutions and earned more than ten credits, 45 percent of those who took two remedial courses earned either an associate or bachelor's degree by the time they were 30 years old, compared with 60 percent of those who took no remedial courses. Students who are judged to have low reading skills in particular are more likely to need extensive remediation and less likely to earn a degree. Students in the Community College of Denver (CCD) who started college in developmental classes were found to graduate at the same rate as students who started in regular courses (Roueche et al., 2001).

Researchers studying the effectiveness of developmental education face particularly serious methodological challenges. On average, students who attend developmental education classes start out with weaker academic skills. As a result, it is hard to identify a causal relationship between remedial education and subsequent educational attainment. Even if students who start in developmental classes appear to do poorer than other students, it is still possible that the remediation was effective—without it, the students might have done even worse. Comparing similar students who do and do not participate in developmental education is difficult since many states and individual institutions mandate remediation for students with low assessment scores.

A study by Bettinger and Long (2004) is of interest because it uses a statistical technique designed to identify the causal relationship in these types of cases, although, once again, it is a study restricted to four-year institutions. Their study focused on a large sample of first-time, full-time students of traditional age enrolled in Ohio's non-selective public four-year colleges in the fall of 1998. Their results suggest that students placed in remediation are more likely to withdraw from college, but they also found that remediation does not seem to decrease the likelihood of transferring to more selective institutions or attaining a bachelor's degree.

There are some studies that compare outcomes for different types of developmental programs. The best known of these types of studies is the National Study of Developmental Education, conducted by the National Center for Developmental Education (Boylan, Bliss, & Bonham, 1997). The programmatic implications of this and other studies of developmental education were subsequently published in *What Works: Research-Based Best Practices in Developmental Education* (Boylan, 2002).¹⁹ This study

¹⁹ Since this study only examined students placed in developmental programs or courses, it could not measure the effect of developmental programs compared with placement into mainstream courses.

tested the relative effectiveness of centralized programs (compared with decentralized programs); programs with tutorial services with trained tutors; programs with advising and counseling; and those that included program evaluation on outcome measures: first-term GPA, cumulative GPA, retention in development courses, and success (earning a D or better) in math and English developmental courses. In general, this study found more positive results for four-year colleges than for two-year colleges, perhaps because four-year students may have had stronger initial skills.²⁰ The study did find some positive and statistically significant effects for community colleges on some of these outcomes listed above.

The National Study (Boylan et al., 1997) has produced a significant amount of useful information about developmental education and its recommendations are reasonable conclusions that are in accord with the experience of many practitioners. However, there is information not included in the published reports that would also be helpful for evaluating the effectiveness of remediation. For example, it would be interesting to know the magnitude of the effects. Also, each program characteristic is analyzed separately, so if there is any relationship among program components, the methodology cannot identify which one has an effect or whether or not a feature is effective only in combination with other features. Finally, it would also be important to know whether there are any other institutional features such as size, college organization, financial condition, or typical student characteristics that might influence student outcomes and also be related to a particular program feature.

Boylan (2002) lists 33 features that he suggests are “best practices.” The book references five institutions judged to have successful developmental programs for benchmarking purposes, but the evidence for the 33 practices comes primarily from other studies and reports rather than from the five chosen sites.²¹ As is the case with most of the research on the effectiveness of learning communities, much of the research in this study on developmental/remedial education is either based on unpublished documents or material in the National Center for Developmental Education’s own publications. Thus, while many of these practices are widely used and considered effective by practitioners, it is difficult to judge the definitiveness of the evidence supporting them.

Given the pervasiveness of development education and the controversy surrounding the practice, it is surprising that there is still so much uncertainty about the most effective approaches to working with students with weak academic skills. Grubb (2001), in his review of research on developmental education, argued that learning community formats for developmental education did appear to have positive benefits, but he found less evidence on the effectiveness of other approaches to remedial education. To be sure, the research is complicated by the wide diversity of state regulations and locally defined cut scores on assessment tests and the resulting variation in the criteria used to place students in developmental programs. Further, many colleges use informal processes to alter these

²⁰ This type of information is not provided in the reports on the study.

²¹ The study itself does not present evidence of the effectiveness of the developmental programs at the five chosen sites. Indeed, the sites were chosen not on the basis of their outcomes (which are not reported), but on the basis of the programs that they used.

regulations on a case by case basis (Perin, in press). But this overall complexity also offers researchers opportunities to make comparisons among similar students who do and do not enroll in formal remediation or who enroll in different types of developmental courses. As more detailed transcript-based data become available, considerable progress can be made on understanding the characteristics and effects of these strategies.

College-Wide Reform

So far we have reported on research on individual programs. Many practitioners believe that the programs that they use are successful for the students who take part in them. However, we have suggested that an objective look at the empirical evidence and the methodologies used to test the effectiveness of these programs presents a more ambiguous picture, although there are certainly positive indications for counseling, advising, and learning communities. But while many people believe in the effectiveness of individual programs, there is much more pessimism about whether they can be “taken to scale.” As we have seen earlier in this report, completion rates at community colleges are extremely low. Making significant improvements will probably require both the successful expansion of pilot programs and the strengthening of related programs and services. No program, however well designed, can work in isolation. An excellent developmental or counseling program in a college with generally ineffective teaching may ultimately have no effect on student completion rates. We have found virtually no research that attempts to define and assess program institutionalization or broader college-wide reforms. (Later in this report we look at a measure of institutional completion and begin to ask what broad institutional characteristics are related to college-wide completion.)

There have been initiatives designed especially to bring about reform throughout an institution. The best known initiative for community colleges is the Learning College movement. Published work (see O’Bannon, 1997) on this model presents useful accounts of the processes through which the colleges have brought about important changes, but so far no rigorous assessment of this strategy has been published.

While community college practitioners believe that few colleges have been able to bring pilot programs to scale successfully, many are convinced that the Community College of Denver (CCD) has, over the last 20 years, succeeded in bringing about fundamental reforms in the basic ways that the college operates (Roueché et al., 2001) These reforms followed a systematic planning and benchmarking process and have included major changes in organization, teaching methods, counseling and student services, relationships to the community, and organizational philosophy. Significantly, the college also emphasizes judging success on the basis of measured outcomes. Roueché et al. (2001) also report increases in the number of graduates and in the number of graduates of color and the conclusion that “cohort tracking indicated no significant difference in student success on the basis of race, ethnicity, age, or gender” (p. 23). They report that many CCD students of color transferred successfully, that there were high rates of student satisfaction with programs and instructors, and that surveyed employers demonstrated unanimous satisfaction with the skills of CCD graduates. These are encouraging results,

although questions remain about the implications and interpretations of the numbers.²² Given the importance of the CCD case, further investigation is warranted. Careful investigations of other institutional change efforts will also be important. Nevertheless, the CCD experience suggests that institution-wide reform can have an effect and that perhaps a focus on individual programs may be less effective.

Conclusions

Thus, we are left with a good deal of research that has generally positive results for first year experiences, learning communities, supplemental academic services, advising, and counseling. Results from the evaluation of student support services are encouraging and research on learning communities have generally positive conclusions. Our knowledge about the design of remediation remains ambiguous and, consequently, controversial methodological problems are particularly important here. Certainly we need to strengthen our understanding of this fundamental community college activity.

More attention needs to be paid to how programs can be combined and what factors promote the institutionalization of successful pilot programs. Combining different reforms into comprehensive college-wide initiatives remains attractive, but we are far from any concrete understanding about how programs should be combined. Further, moving a successful pilot program to college-wide scale may be more difficult than implementing the pilot. So far, research has offered little guidance on these issues.

Since most of the programs that we have examined are voluntary, comparisons of outcomes for participants and non-participants need to be interpreted carefully. Some analysts have done a better job than others of taking into account potentially confounding factors. In almost all cases, however, research needs to pay more attention to the program recruitment and enrollment processes.

Research on four-year colleges continues to dominate the field, although this emphasis might be beginning to change. Conceptual models that are probably more appropriate for four-year environments still have a strong influence, and efforts to develop theories more suited to community colleges need to accelerate. The influential student integration model implies that colleges should work towards engaging their students both academically and socially, but the empirical support for this perspective is much weaker for community colleges than for four-year colleges. One promising approach for community colleges might be to design services based on the assumption that part-time, working students will have a much weaker social and psychological attachment to the institution. The focus on learning communities, which attempt to engage the students in the classroom, is one implication of this perspective, although its format, too, may be most effective for more traditional students.

²²For example, the levels of satisfaction are reported for one point in time but the reader does not know what those rates were before the introduction of the college-wide reforms. Enrollments and graduation rates improved but were there any accompanying changes in the skills of entering students? How was “student success” defined and what control variables were used in the cohort analysis?

Certainly one of the most encouraging current trends is the growing emphasis on analysis of student outcomes at both the state and the local level. Statewide data systems and more sophisticated cohort tracking on the campuses offer many opportunities for useful analysis. It is possible that there is a larger volume of more definitive research than is evident from a review of published work, since many studies are unpublished, published in obscure outlets, or published without providing enough information to judge the validity of their conclusions. More energetic and comprehensive efforts to disseminate and discuss assessments may reveal more useful findings.

Thus, there is still much work to do to strengthen the research and assessment carried out on the campuses and in state capitals and to disseminate the research that could be available. But there is not necessarily widespread agreement about what constitutes useful analysis. In giving colleges advice about how to conduct evaluations on developmental education, one influential expert stated: “Evaluation of developmental education does not require the use of complicated statistics. Program outcomes can be accurately described using nothing more than percentages, bar graphs, and pie charts” (Boylan, 2002, p. 42). We agree that these types of descriptive statistics can be a useful way to begin discussion and investigation, and that they are important to provide a basis for wide engagement of faculty and administrators in discussions of policies and practices. Nevertheless, evaluating the effectiveness of educational programs is extremely difficult and descriptive information should be seen as only a first step in understanding program effects. A thoughtful attempt to understand how the participants and non-participants compare on other factors that might influence the outcomes is essential.

At the same time, program improvement cannot await definitive research results. Educators, policymakers, and students must move forward based on the best information available, even if that information may be subject to alternative interpretations. But as policymakers, private funders, and the public have increasingly turned their attention to community colleges, we have the opportunity to strengthen the available research and provide more useful information as administrators and faculty members try to improve the educational outcomes of their students.

V. Institutional Characteristics Associated with Completion and Persistence at Community Colleges

In this section of the report we move from an analysis of individual programs to a more institutional focus. Our basic strategy is to examine college measures of student outcomes—for example, the percentage of an entering community college cohort that earns an associate degree within three years. These rates vary dramatically. Our research project begins to illuminate why some colleges have much higher rates of degree completion than others.

This analysis is the first step in a longer project designed to identify institutional characteristics and policies that are related to improved graduation and persistence. But there are many factors that might cause variation in student success and many of them

may be beyond the control of an individual institution. For example, a great deal of research suggests that students who attend part time, those from lower income families, and those with lower academic skills tend to complete at lower rates. Thus, two colleges that are equally effective may have different graduation rates if the one with a lower rate enrolls students from lower income families. Therefore, any research that tries to relate practices to outcomes must take into account other factors that impact graduation rates.

These factors must also be taken into account when graduation rates are used for purposes of accountability—that is, to judge the performance of an individual college. Failing to control for students' academic readiness and other characteristics unfairly penalizes institutions, such as community colleges, that enroll less well-prepared students and gives undeserved credit to those with selective admissions policies.

The research reported here uses institution-level data available from the Integrated Postsecondary Education Data System (IPEDS) to explain graduation rates. These data include student characteristics; institutional characteristics, such as location and enrollment size; and some financial characteristics, including expenditures for various types of services. The analysis will therefore help demonstrate how these factors are related to student outcomes. Even after taking the factors into account, wide variations in institutional completion rates remain. The next step in this research program, then, will be to use a variety of quantitative and qualitative methods to try to identify the institutional policies that explain the remaining variation.

We first review existing literature that analyzes institutional graduation rates, summarizing the characteristics that are most strongly related to these student outcomes. We then present our own research on community college graduation rates. Finally, we show how these results can be used at both the state and institutional levels as a foundation for further exploration of practices and policies that are associated with higher levels of student success.

Literature Review

A handful of studies have carried out this type of institutional analysis, although not surprisingly all of these studies have focused on four-year colleges. For example, in one study Porter (2000) found that average SAT scores and the percent of students who are female were associated with higher graduation rates, while institutions with higher percentages of students over age 25 tended to have lower graduation rates. Some more structural characteristics, such as expenditures per student, smaller total enrollment, and the availability of on-campus housing, were also related to higher graduation rates. Porter showed that performance measures such as graduation rates are sensitive to the variables used in the analysis and to the specification of the model. His research also highlights a serious methodological problem with this type of research. For example, one might conclude that building housing for students might increase graduation rates, but it is also possible that the availability of housing attracts a particular type of student who would have a higher likelihood of graduating, with or without the housing. Thus, housing might

increase a college graduation rate without increasing the probability that any particular student would graduate.

Astin, Tsui, and Avalos (1996) used data on a nationally representative sample of first-time, full-time students to compare the graduation rates of 365 four-year institutions in 1985. They found that private universities had the highest graduation rates, and believed that this finding resulted from the fact that such institutions tend to enroll better prepared students. They also found that highly selective institutions and those that enroll large numbers of students in fields like business, psychology, and the social sciences have higher graduation rates. Institutions with large engineering programs, commuter schools, and larger colleges have lower than expected rates. Mortenson (1997) also used a regression model to estimate predicted graduation rates for 1,100 baccalaureate-granting colleges. He had similar findings to Astin et al. (1996), namely that institutions whose students have higher average SAT scores and those with a higher percentage of freshmen living on campus had higher graduation rates, while those with many part-time students and relatively large engineering programs had lower rates.

Ryan (2003) used data on 363 four-year institutions to estimate the impact of institutional expenditures for instruction, academic support, student services, and administrative support on the six-year graduation rates of cohorts within each institution. He controlled for student SAT/ACT and other factors. His findings suggest that instructional and academic support expenditures have positive and significant effects on cohort graduation rates, as previously indicated by Astin (1993). However, expenditures on student services and expenditures on administrative (institutional) support failed to produce any significant impact on graduation rates. Ryan suggested that there are trade-offs in the utilization of financial resources within an institution in terms of degree attainment, and that institutions should be careful when deciding where to allocate resources.

More recently, Scott, Bailey, and Kienzl (in press) conducted an analysis of six-year graduation rates for baccalaureate-granting institutions based on data from the College Board's American Survey of Colleges and from IPEDS. They used grouped logistic regression, arguing that the ordinary least squares method used by previous researchers is not an appropriate technique since graduation rates are constrained within an interval ranging from 0 to 100. Using this new methodology, they found that private colleges and those with students with higher average SAT scores, a higher proportion of women, and higher instructional expenditures per FTE student had higher graduation rates. Institutions with higher proportions of minority students, older students, and part-time students had lower graduation rates. In addition, they found that institutions with higher in-state tuition also tended to have higher graduation rates, even after controlling for student characteristics.

These studies from the last 10 years roughly confirm the findings summarized in 1991 by Pascarella and Terenzini (1991), who also found that four-year colleges with students with higher SAT scores, students from higher income families, and more full-time and female students had higher graduation rates. Private and residential institutions also had higher rates. These findings are consistent with the implications of Tinto's integration

model. Pascarella and Terenzini (1991) also reported interesting findings on historically Black and women’s colleges. African-American students enrolling in predominantly White colleges are more likely to dropout than are African-American students who attend a Historically Black College or University (HBCU). They hypothesized that African-American students experience higher levels of social integration in HBCUs than in majority White institutions. They used the same reasoning to argue that attendance at a single-sex institution increases the level of persistence and educational attainment of women; although studies indicate that the magnitude of this effect is quite small.

Table 5 summarizes the institutional characteristics that research has found to be associated with attainment by undergraduate students. Again, most of this research has been conducted on four-year institutions.

Table 5. Institutional Characteristics Associated with Bachelor’s Degree Completion

Institutional Characteristic	Effect on Degree Completion
More Instructional expenditures	+
Greater Selectivity	+
Average student characteristics <ul style="list-style-type: none"> • Larger average student family income and parents’ education • Higher percent full-time students • Higher percent female 	+ + +

What can community colleges learn from the findings at four-year institutions? Assuming that the factors analyzed in these studies will have similar effects for community colleges, then the problems that these colleges face in increasing their graduation rates are clear. The studies consistently find that the characteristics of students that predict lower graduation rates are precisely those that community colleges possess in greater abundance relative to four-year institutions. Thus, it suggests that colleges must reduce their numbers of such students. But by attempting to improve graduation rates by becoming more selective, community colleges would violate one of their underlying missions—that of open access for all. Thus, attempting to demographically appear more like four-year colleges would be to the detriment of the colleges and their communities.

The studies we reviewed also have important, though disturbing findings about financial variables. The consistent finding in all of these studies is that higher instructional expenditures yield higher completion rates, even after controlling for student characteristics. This finding does not bode well for community colleges in the current political and fiscal environment, where, over the long run, per-student state support will probably continue to fall. Since higher tuition at four-year colleges does appear to promote completion, colleges might compensate for lower state funding by increasing tuition and thereby preserving completion rates. Unfortunately, high tuition also violates

the open access mission of community colleges. However, we suspect that the higher tuition effect may actually result from student selection and would probably disappear if there were better measures of student family income. In any case, in contrast to the findings for four-year colleges, our research on community colleges (discussed below) actually finds that higher tuition is negatively related to completion.

Analysis of Institutional Graduation Rates at Community Colleges

In this section of the report, we conduct an analysis of institutional graduation rates and their determinants at community colleges using IPEDS data. The National Center for Education Statistics publishes three-year degree completion rates for community colleges in its Graduation Rate Survey (GRS)—often referred to as the Student Right-to-Know (SRK) data, which is part of IPEDS. The “degree completion rate” refers to the percentage of first-time, full-time students who entered a community college in a particular year and received a certificate or associate degree from that same institution within three years, or in 150 percent of the time traditionally associated with earning a two-year college degree. Colleges exhibit wide variation in graduation rates, and in this section, we exploit this variation to determine the institutional characteristics that are related to higher institutional completion rates.

Using the GRS we identified the actual degree completion rates of colleges. Then, using additional data available in IPEDS, we computed a “predicted” graduation rate. This is the graduation rate that we would expect a college to have, given its institutional characteristics. We then compared actual and predicted rates. When the actual rate was higher than the predicted rate, we concluded that the college is, in effect, performing at a higher rate than we would expect. The converse would be true for colleges with lower than predicted rates.

We first summarize the latest data from IPEDS on community college graduation rates. We then present a model for using IPEDS data to estimate a predicted graduation rate for community colleges, controlling for student characteristics, resources, and other factors that affect student outcomes. We conclude with a discussion of how an index created by comparing the predicted graduation rate with the actual rate reported by each college in IPEDS can be used for further research on institutional policies and practices that can enhance outcomes for low-income and minority students.

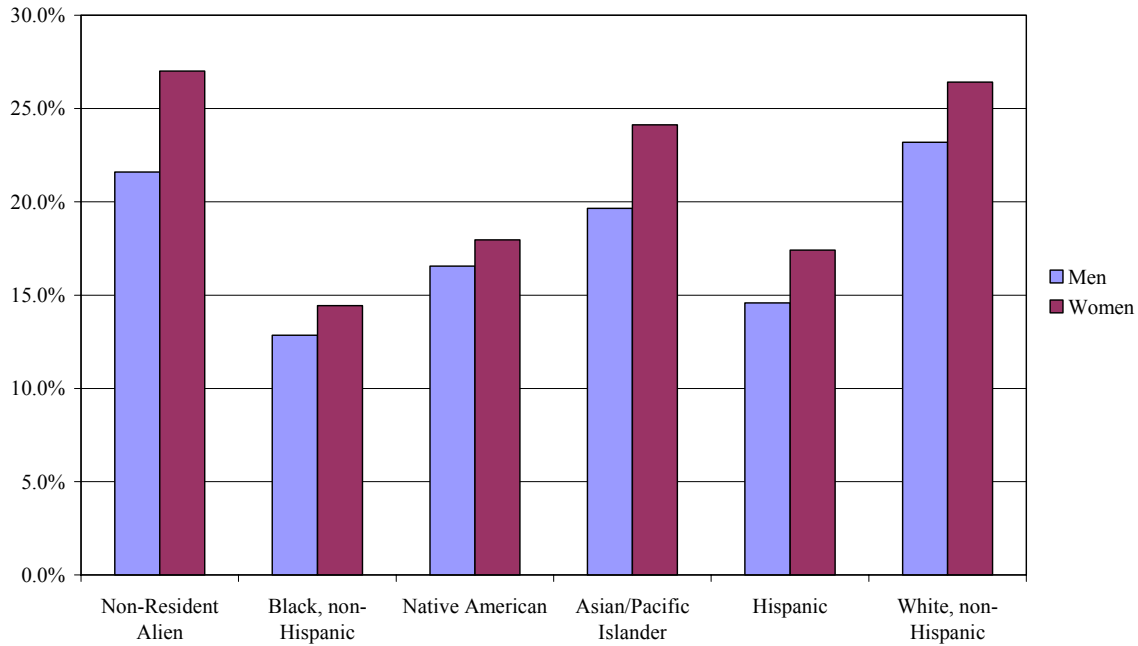
Community College Graduation Rates

Figure 8 presents data on community college outcomes from the 2002-03 IPEDS Graduation Rate Survey. The survey population for this dataset includes all first-time, full-time (FTFT), degree- or certificate-seeking undergraduate students entering the institution either during the fall term (by October 15) of the 1999-2000 school year.²³

²³ Institutions that do not offer programs based on standard academic terms use the 12-month period (Sept. 1 - Aug. 31) to determine their cohort. This description comes from the National Center for Education Statistics “Instructions for Graduation Rates – 2-year Institutions.” See http://nces.ed.gov/ipeds/pdf/webbase2002/grs_2yr_form.pdf

These completion rates are institution-specific measures in that they only capture outcomes for students who begin and complete in a particular college. They do not capture students who start at a given college and move to another institution before earning a degree.

Figure 8: 1999-2000 First-Time, Full-Time Students: Three-year Community College Graduation Rates by Race/Ethnicity and Gender.



Source: IPEDS Graduation Rate Survey 2002-03.

Overall, 22.3 percent of FTFT community college students in the sample attained a postsecondary credential in their starting institutions after three years. These findings are consistent with other results from the research literature. As the figure shows, graduation rates for women are higher than for men; and all minority populations graduate at lower rates than do Whites. Observe that contrary to findings at four-year institutions, Asian students in community colleges are also less likely to earn a degree or certificate than are Whites.

Data

To better understand the institutional characteristics associated with the graduation rates reported above, we used IPEDS data to create three statistical models of the three-year institutional graduation rates for cohorts of FTFT community college students in 1999-2000.

Sample

IPEDS includes information about the entire population of higher education institutions in the United States and its outlying areas. In order to extract a community college sample, we first considered only public two-year institutions in the United States. We also excluded institutions without regional accreditation and those that are non-degree-granting (granting only certificates). Finally, we used the procedure recommended by Hadi (1992; 1994) to identify outliers—institutions with improbably high values for institutional variables. Using this method we eliminated three institutions with outlier values for instructional expenditures.²⁴ Thus, the final sample contains 915 community colleges.

Outcome Variables

We used the overall degree completion rate for each institution from the 2002-03 IPEDS Graduation Rate Survey. Time-limited completion rates at community colleges are lowered both because most students attend part-time (and therefore take longer to complete, even if they eventually do complete) and because many may not be seeking degrees (they may enroll in a limited number of courses in order to advance their job skills or pursue a personal interest). The dependent variable used here measures completion rates only among first-time students who were enrolled full time and were seeking a credential. First-time, full-time students represent only a minority of community college students—17 percent of community college FTE enrollments in 1999-2000, according to IPEDS. This means that the measure used here, based on full-time, credential-seeking students, likely *overestimates* the graduation rate for most community colleges. In any case, as is indicated below, we controlled for the proportion of a college's students who are enrolled part time.

Our dependent variable does have limitations. It measures degree completion by students at their *first* postsecondary institution and does not capture students who complete programs at other institutions. Also, IPEDS does not provide data to break out the degree completion measure by type of credential awarded. Since graduation rates for certificate programs are higher than they are for associate programs (Bailey, Alfonso, Scott, & Leinbach, in press), institutions such as technical colleges that specialize in awarding certificates may have higher overall graduation rates than comprehensive community colleges, which are relatively more likely to emphasize programs leading to associate degrees. To account for this fact, we include a dummy variable indicating whether an institution awards more certificates than associate degrees.

²⁴ These community colleges are Iisagvik College (AK), College of the Marshall Islands (MH), and Los Angeles County College of Nurse and Allied Health (CA). We made some other adjustments in the sample. Missing values in the variable "Total certificates awarded" have a differential treatment. Our sample contains 43 institutions with missing values in this variable and we checked the accuracy of this information on their web pages. For those cases where the community college does *not* award certificates, we impute a zero instead of a missing value. Finally, changes were made for 21 institutions, which are available from the authors on request.

Explanatory Variables

We selected the explanatory variables for the model based on factors that previous studies have indicated are related to degree completion in community colleges. The inclusion of most such variables are self-explanatory. However, in addition, we included dummy variables for individual states with at least two community colleges. States, through their distinct policies and financial levers, can have fundamental influence on the graduation rates of colleges. Consequently, community colleges may play very different roles within the overall systems of higher education in different states. For example, Florida has a statewide articulation agreement that guarantees admission to a public four-year institution to any student who earns an associate degree. This gives students in Florida a strong incentive to complete their degree. While the significance of any individual state dummy variable does not in itself explain graduation rate variations, the assumption is that some set of practices of that state is having an impact. We expect that the statistical findings from the models will lead us to investigate policies of those states with significant state variables.

We grouped our explanatory variables into three categories: Fixed Institutional Characteristics (mostly geographic variables), College Characteristics (mostly characteristics of the student population), and Financial Characteristics. Table 6 lists the variables by category along with the expected effect (positive or negative) of each.

Table 6. Explanatory Variables in a Model of Community College Graduation Rates

Explanatory Variable	Hypothesized Effect
<i>Fixed Institutional Characteristics</i>	
Urban	-
Suburban [reference group]	
Rural	-
<i>State dummies</i>	
Historically Black College or University or tribal college	-
<i>College Characteristics</i>	
Size (1999 full-time equivalent undergraduates)	
0-1000 FTE [reference group]	
1001-2500 FTE	-
2501-5000 FTE	-
5000+ FTE	-
Racial/ethnic makeup of students	
Percent FTE White [reference group]	
Percent FTE African-American	-
Percent FTE Hispanic	-
Percent FTE Asian	+
Percent FTE Native American	-
Percent FTE part time	-
Gender (percent FTE female)	+
College grants more certificates than associate degrees	+
<i>Financial Characteristics</i>	
Average in-state tuition	-
Instructional expenditures per FTE undergraduates	+
Academic support per FTE undergraduate	+
Student services per FTE undergraduate	+
Federal aid per FTE undergraduate	-

Our list of explanatory variables has some key omissions. As discussed, studies of the graduation rates of four-year colleges indicate that institutions that enroll better-prepared students, as measured by SAT/ACT scores, tend to have higher graduation rates. Unfortunately, the IPEDS dataset does not include data on the academic preparation or the readiness of entering students. In general, there is not a widely used and available measure of the academic preparedness of community college students. Moreover, the IPEDS dataset does not include information on the income characteristics of students. We used the amount of federal aid per FTE undergraduate as a crude proxy for the extent of financial need among a college's students, although we realize that this measure is problematic. For example, an institution might serve many low-income students, but still receive relatively little funding through federal financial aid because it is prohibited from doing so due to high default rates or, perhaps, because it does not encourage and assist students in applying for aid.

We created these variables from four IPEDS surveys for 1999-2000 (the base year for the cohorts of students for which we have GRS data): Institutional Characteristics, Fall Enrollment, Finance, and Completions. Table 7 gives the mean values from IPEDS of each variable in the model for the community colleges in the sample. This provides us with the characteristics of the “average” college in the sample. For example, observe that most of the community colleges are located in suburban areas. The average school enrolls 3,044 full-time equivalent (FTE) students, most of whom are female (57.5 percent), and charges \$1,659 for in-state tuition per academic year. Nearly 12 percent of FTE undergraduates are African-American and 8.1 percent are Hispanic. One in five colleges awards more certificates than associate degrees.

Table 7. Descriptive Statistics of the Community College Sample

Variable	Mean	Standard Errors
<i>Cohort</i>		
Full-time, full-year (FTFY) degree-seeking undergraduates	504.689	494.177
Number who attained a degree within three years	112.639	123.948
<i>Fixed Institutional Characteristics</i>		
College is located in urban area	0.387	0.487
College is located in suburban area [reference group]	0.524	0.500
College is located in rural area	0.090	0.286
College is an Historically Black College or University	0.009	0.093
College is a tribal college	0.019	0.135
<i>College Characteristics</i>		
Total full-time equivalent (FTE) undergraduates [1000]	3.044	2.927
1000 FTE undergraduates or less [reference group]	0.207	0.405
1001-2500 FTE undergraduates	0.370	0.483
2501-5000 FTE undergraduates	0.250	0.433
More than 5000 FTE undergraduates	0.173	0.378
Institution awards more certificates than associates	0.171	0.377
Percent FTE African-American undergraduates	0.121	0.157
Percent FTE native American undergraduates	0.031	0.123
Percent FTE Asian undergraduates	0.033	0.078
Percent FTE Hispanic undergraduates	0.081	0.143
Percent FTE White undergraduates [reference group]	0.689	0.241
Percent FTE part-time undergraduates	0.339	0.132
Percent FTE female undergraduates	0.575	0.074
<i>Financial Characteristics</i>		
Average in-state tuition [\$1000]	1.659	1.184
Instructional expenditures per FTE undergraduate [\$1000]	4.157	1.491
Academic support per FTE undergraduate [\$1000]	0.817	0.695
Student services per FTE undergraduate [\$1000]	0.981	0.697
Federal aid (Pell grants) per FTE undergraduate [\$1000]	0.824	0.467

Source: Authors' calculations using data from IPEDS Graduation Rate Survey 2002-03.

Methodology

Following Scott et al. (in press), we estimated predicted three-year graduation rates for the community colleges in the sample using a grouped logistic regression method.²⁵ This method allows for an aggregate analysis in the sense that the mean values of the “inputs” are used in the evaluation of institutional graduation rates, which are themselves the aggregation of individual student successes. In this study, each observation is an institution; however, the outcome variable is the result of the behavior of a cohort of students in the institution. Specifically, the dependent variable is the percentage of a cohort of first-time, full-time students in 1999-2000 who completed a certificate or degree program at the starting institution by 2002-03—in three years or 150 percent of the conventional time.²⁶

Findings

The Appendix presents the results of grouped logistic regressions of three sequential models when the outcome variable is degree completion. The group logit coefficients have no straightforward interpretations. Therefore, in the Appendix, we compute the marginal effect for each variable to make the results easier to interpret. Thus, the marginal effect represents the change in the completion rate of a one unit change in the characteristic, holding all other characteristics constant.

Model One

The first model adds only geographic-related variables, such as degree of urbanicity (urban and rural) and 51 state dummies (including the District of Columbia) to control for state differences. In general, colleges located in urban areas are predicted to have nearly 4 percent lower graduation rates, while rural colleges can expect 3 percent higher completion rates. Historically Black community colleges and tribal colleges do not perform significantly different from other institutions. With just these geographic measures, the model is explaining roughly 35 percent of the variation in institutional graduation rates.

²⁵ The institutional graduation rate, while a continuous variable, is constrained to lie within 0 and 1. This procedure produces more robust results than does the ordinary least squares (OLS) method applied in most previous studies (see for example, Mortenson, 1997). By definition, the framework implies a heteroskedastic regression format, which can be estimated using weighted least squares (see Greene, 2003, pp. 686-689, for details). In the first step, OLS regression is used to estimate consistent but inefficient coefficients and then results feed into the corrected variances to estimate the second step in the weighted least square regression (routines like *glogit* in STATATM estimate these procedures).

²⁶ Using grouped information has clear limitations: the method explains institutional characteristics associated with completions rates, while the behavior of each individual in each cohort is not explicitly taken into account. Moreover, the model assumes that each individual in a given institution has the same probability of graduation. In another words, the method assumes that each cohort member is affected by the geographic, college, and finance characteristics in a similar way.

Model Two

The second model adds dummies for enrollment size, as well as the racial/ethnic and gender composition of the campus. Size is an important predictor of an institution's degree completion rate: larger community colleges, especially those with more than 2,500 FTE undergraduates, have 8 to 11 percent lower graduation rates than do smaller colleges. This result remains even after controlling for college location. Being in an urban area remains negative but now becomes insignificant.

In terms of the demographic characteristics of the student body, having a large percentage of African-American, Asian, or Hispanic students enrolled is negatively associated with an institution's degree completion rate. Colleges with a relatively larger part-time student population have lower completion rates (even for full-time students). As expected, colleges that award more certificates than associate degrees have slightly higher rates of degree completion.

The relationship between graduation rates and the share of women in the student body is surprising, and quite unexpected.²⁷ Almost all research on retention and graduation shows that women graduate at higher rates than men, even after controlling for other demographic characteristics. Indeed, even in GRS, first-time full-time female students have higher graduation rates than comparable men. Nevertheless, we found that colleges with more female students tend to have lower graduation rates. Of course it is possible, although still surprising, for women to graduate at higher rates while the full-time graduation rate of the college is lower. After all, the GRS sample only includes on average 17 percent of the FTE student population. Moreover, the negative female effect remains even when male and female rates are analyzed separately and when using a variety of different specifications. Clearly this result needs further study.

It is also important at this point to explain the meaning of our coefficients. Given that we are dealing with institution-level data, the interpretation of these variables represents the effect of campus or other environmental factors on the likelihood of a FTFT community college student in our cohort to achieve a positive educational outcome—and not the likelihood of a particular individual in a particular racial/ethnic group to attain a degree. For instance, having a large percentage of minority students enrolled at a college lowers the probability of the completion of any FTFT student even after controlling for other characteristics of the college. In the same way, having a substantial percentage of female and part-time undergraduates affects the completion likelihood in a similarly negative way.

²⁷ As mentioned above, caution must be taken when interpreting the marginal effects. For instance, the marginal effect on the “percent FTE female” variable is -50 percent. This does not mean that every percent change in female enrollment lowers the institution's graduation rate by 50 percent. Since the variable is in the same units as a binary variable, the marginal effect represents the change in graduation rate between a community college with no females and a similar college that is female only.

Model Three

The final model adds finance and financial-aid related variables. In-state tuition, instructional expenditures, and student services are significant, but the magnitude of the effect is not very large. Community colleges with higher than average in-state tuition have lower degree completion rates. On the other hand, community colleges that invest relatively more in instruction have higher rates of degree completion. An additional \$1,000 spent on instruction per FTE undergraduate improves graduation rates by 1.2 percent. Finally, a higher level of expenditure in student services is associated with lower levels of graduation rates. The effect of the variables remains similar to what was found using the previous models, and the model fit does not improve greatly with the addition of the finance-related measures—around 60 percent of the variation in the outcome is explained by the model.

Conclusion

This analysis confirms several hypotheses about institutional determinants of graduation rates at community colleges, but also raises some questions. Our study, like others, found that colleges with many part-time students have lower graduation rates, even for the full-time students. Many studies reveal lower graduation rates for African-American and Hispanic students and our results are consistent with them as well. Other research shows an ambiguous relationship between school size and graduation but our analysis indicates a consistent negative relationship between a large enrollment and completion. Colleges that emphasize certificates, not surprisingly, have higher completion rates, but this is an artifact of the measure—certificates and associate degrees are combined without differentiation in the graduation rate. Higher tuition is related to lower graduation, while greater instructional expenditure is related to higher graduation. Determining the direction of causality in a cross-section analysis is always difficult, but these results do suggest that the current trend towards higher tuition may lead to lower completion, although if funds are used to increase instructional expenditure, the two effects may cancel each other out.

Use of the Results to Benchmark Performance of Community Colleges

Our analysis has two broad purposes. First, it can be used to identify institutional characteristics that are associated with higher completion rates. Second, it can identify colleges and states that perform at higher levels after measurable characteristics are taken into account. While our findings do not directly reveal the factors that cause better performance, they indicate where we might search for those factors.

For the state-level analysis, we have included state dummy variables in our models. The coefficients on those dummies are a measure of how well colleges in the state perform on average, after taking account of the other characteristics in the model, relative to colleges in other states. California, Florida, and Nebraska are the three states with the highest average adjusted (for the control variables) graduation rates. Before we conclude that these states have found the key to improved retention, however, we must first understand

the institutional and legal context in these states. We have already suggested a regulatory reason why graduation rates in Florida might be higher: the incentive of acceptance at a four-year institution encourages students to earn an associate degree. The states in the Lumina Achieving the Dream initiative other than Florida—Texas, North Carolina, Virginia, and New Mexico—all have overall graduation rates below the average for states. We consider these state comparisons to be preliminary; nevertheless, they do suggest fruitful areas for further investigation.

Our method for determining relative performance at the college level is based on computing the difference between the actual graduation rate and the “predicted” rate, which is based on the college characteristics and the coefficients calculated in our logistic analysis. Colleges whose actual completion rates are higher than their predicted rates do better than expected in enabling students to complete degrees. Conversely, colleges whose actual rates are lower than their predicted completion rates do not graduate students at a rate that would be expected, given the mix of students they serve, the financial resources available to them, and other factors. We identify a group of “high performers” as those with predicted outcomes two standard deviations higher than the overall predicted mean. “Low performers” are identified as having a predicted outcome that is more than two standard deviations lower than the overall predicted mean.

To illustrate this approach, among the colleges participating in the Lumina Achieving the Dream initiative, the raw graduation rates range from 1 percent to 34 percent. Several of the colleges with the highest graduation rates also perform above their expected levels based on their characteristics. But for some, the ranking shifts significantly after controlling for college characteristics. The college with the fourth highest graduation rate (25 percent) actually has a predicted rate of 34 percent. Therefore, while this college ranks fourth (out of 27 colleges) based on its raw graduation rates, it ranks eighteenth when the difference between the expected and actual graduation rates is used. Similarly, a college ranked eighteenth based on its raw graduation rate rose to tenth based on its performance relative to its expected rate.²⁸ In future work, we plan to use this type of analysis to identify a sample of colleges that do better or worse than expected for a more in-depth study on which institutional policies and practices result in improved attainment for students.

VI. Conclusions and Next Steps

This report is part of a broad initiative, *Achieving the Dream: Community Colleges Count*, funded by the Lumina Foundation for Education. The initiative is designed to increase retention, completion, and success for low-income students, students of color, first generation college students, and other underserved groups at community colleges.

The report begins with a general discussion of enrollment and completion data for community colleges, which provide important access to postsecondary education for a wide and varied range of students. The data clearly show that low-income, minority, and

²⁸ The community college completion benchmark index is available in a spreadsheet from CCRC. Colleges can use the index to benchmark their institutional completion rates against those of other institutions.

other underserved students are overrepresented at these colleges, and they complete degrees and certificates at relatively low rates. These conclusions hold even when multivariate methods of analysis are used.

The rest of the report discusses community college retention and completion from various perspectives. First, we reviewed the arguments about whether graduation rates were an appropriate index against which to judge community colleges, noting, in particular, that some students enroll with an educational goal other than earning a degree and do, indeed, meet it. We next reviewed institutional practices designed to increase college completion, and in the final section we used institutional characteristics—such as enrollment size and student demographic and financial characteristics—to explain community college graduation rates. We used this analysis to develop an index that can be used to benchmark college graduation rates.

On the basis of our findings, we present here a set of programmatic and policy implications, divided into three groups: (1) retention, graduation, and transfer rates; (2) programs and practices; and (3) research on community colleges.

Retention, Graduation, and Transfer Rates

- (1) **Colleges must recognize the need to improve retention, graduation, and transfer rates.** Community college faculty and administrators are often defensive about graduation and transfer rates, arguing that there are many good reasons why more students do not graduate or transfer and that the critics of college graduation rates fail to understand the role and nature of the colleges. We acknowledge the validity of many of these points; nevertheless, having good explanations for why some students never finish a degree or certificate is not the same as saying that graduation rates should not be higher, and most colleges are indeed trying to increase retention. We have shown that there is significant variation in college graduation rates, even after taking account of many of the factors that are believed to thwart retention. Thus, some colleges have been relatively successful at overcoming many of the barriers that all colleges face.

Practice and Policy

Despite a large amount of research on retention in higher education, we have much to learn about the effects of institutional practices on retention and completion at community colleges. A search for lessons for community college practitioners is thwarted by an overwhelming emphasis among researchers on four-year colleges and serious methodological difficulties in conducting studies that would provide useful information. Thus while available research can provide guidance for community college practice at the local and state levels, practitioners should be aware that many questions remain about the design and effectiveness of common innovations and programs.

- (2) **Current research does provide support for the effectiveness of learning communities.** Learning communities have attracted a great deal of attention in the

last decade and the research on their effectiveness is generally positive. They may be particularly significant for community colleges, since, unlike at a residential college, the classroom may offer the only opportunity to engage the students with the institution. The learning community format also appears to be effective for students in developmental education. At the same time, though, in developing these programs it is important for colleges to work out ways to organize them to allow the participation of a wide range of students, including part-time students and those who work.

- (3) **Research on counseling, advising, and student orientation suggests that all can be effective for retaining students, but many questions about design and intensity remain to be answered.** Orientation and first-year seminars appear to be effective, but much of the relevant research concerns four-year colleges. Research on the TRIO Student Support Services suggests a positive effect, but that work is now close to a decade old. In addition, institutionalization of the program beyond the targeted students remains a problem. Many practitioners are convinced that comprehensive services that include personal and career counseling and academic advising are effective. Yet, many questions still need answers: what is the role of faculty, what should constitute the educational preparation of counseling and advising staff, how can services be provided without excessive cost, and how much counseling can be done on-line?
- (4) **Tuition levels, instructional expenditures, and institution size are related to graduation rates.** Our research suggests that higher tuition and lower instructional expenditures are related to lower graduation rates. Expenditures on student services are not related to completion rates, but the lack of an effect could be explained if expenditures on student services reflect a greater need for such services rather than an exogenous institutional policy. Our results on the effects of expenditures are worrisome in an environment in which state expenditures on community colleges are falling. Colleges with enrollments under 1,000, on average, have graduation rates about 10 percentage points higher than colleges with enrollments over 5,000, even after controlling for urbanicity. It is unrealistic to propose cutting the size of colleges, but the result here does suggest that it would be interesting to try to explain what smaller colleges do that might influence retention. Indeed, an extensive discussion of the effects of school and classroom size at the K-12 level has been occurring for some time.
- (5) **It is essential to promote a more thorough discussion of the determinants of student outcomes and the effects of programs and policies on those outcomes.** There has been a tremendous amount of discussion of effectiveness and student outcomes, and some reports contain descriptive numbers. Accountability-related reports often also contain enrollment and graduation percentages for particular demographic groups. Still, as we have pointed out, the published reports of college practices rarely contain thorough discussions or analyses of outcomes that address questions of causality.

For many community college faculty, the best opportunities to discuss research outcomes concerning their college or, particularly, other colleges occur in short panel discussions at conferences, such as those held by the American Association of Community Colleges (AACC) or the League for Innovation in the Community College, or at one-shot faculty workshops. Neither of these types of forums lend themselves to the type of thorough discussion that can promote a real understanding of outcome data, what lies behind them, and what needs to be done to improve outcomes. Colleges and community college organizations need to provide more opportunities for faculty and administrators to exploit the richness of the quantitative and institutional data that are available to them.

Research

The core strategy of the Achieving the Dream initiative is the use of data and analysis to identify and remove barriers to increasing student success at community colleges. There is a widespread consensus within the initiative and, indeed, throughout the leadership of the community college movement in the United States that colleges must be more “data driven,” and shift from a “culture of anecdote” to a “culture of evidence.” There is less consensus about exactly what such a shift entails and what constitutes “evidence.” While many programs are identified as “best practices” and, in some cases, there appears to be a consensus about “what works,” this report has argued that a rigorous look at the underlying research yields less than definitive conclusions.

Research on community colleges faces two important barriers. First, the large majority of research on higher education concerns four-year colleges. Second, assessing the effectiveness of educational initiatives is thwarted by difficult methodological problems. Although there is some high-quality research about community colleges and sophisticated institutional research departments at some community colleges, in many cases, colleges do not have the resources to do this type of research; in other cases, administrators may not be convinced that it is necessary. Moreover, the research or studies that have been carried out are often published or disseminated in internal reports or other modes that are difficult to find, or they are published in such a way that no judgment can be made about the accuracy of their conclusions. Clearly there is considerable room for improvement in the research basis for “data driven” initiatives to improve community college student outcomes.

- (6) **It is necessary to recognize that assessments of the effectiveness of practices are difficult and involve a continuum of activities and analyses that range from simple descriptive comparisons to more time-consuming and expensive controlled analyses and experiments.** Descriptive comparisons of outcome measures for participants and non-participants are a useful beginning to any analysis, but more definitive research requires careful attention to the characteristics of participants and non-participants, and to the process through which students enroll or are recruited into relevant programs. Randomized experiments provide some solutions to these problems, but they are expensive and difficult to implement. Given the current state of research in this area, a great deal

of progress can be made with currently available data or state data that are increasingly available.

- (7) **Studies must pay increased attention to college-wide changes and the institutionalization of promising practices.** Research focused on practices to improve retention and completion tends to analyze specific programs. These are discrete, well-defined activities and it is usually possible to know whether a student is enrolled or not. Other innovations, such as organizational changes or new hiring and professional development policies, are more difficult to isolate for assessment purposes. Moreover, even if discrete practices are successful for a small number of students, they may not be easily “brought to scale” or institutionalized. Indeed, a successful institution-wide reform may not look anything like a discrete program. Researchers, college administrators, and faculty need to focus more attention on college-wide innovations and develop methods to study them and identify successful strategies. Comparing outcomes before and after a change is a first step, but researchers must also take account of other factors that might have changed as well.
- (8) **Community colleges must recognize the resource needs of institutional research.** While it is easy to agree with the need to strengthen a culture of evidence in principle, it may not seem so obvious if a college president is faced with a choice between expanding the developmental education services and increasing the institutional research function. Institutional research must be seen as an investment that will make other resources more effective.
- (9) **More systematic methods to publicize and disseminate useful research findings from state and institutional research offices must be developed.** State and college-level researchers frequently carry out analyses and assessments of policies and practices, but often they are not published in ways that make them useful to wider audiences. Many reports of “best practices” fail to provide enough backup information and data for readers to make a judgment about the relative effectiveness of the practice. Assessment results are often only available in PowerPoint slides, institutional reports, various types of testimony, or in the files of institutional researchers. The type of discussion that would arise from more systematic dissemination of local and state research results should be seen as a central element of an increased emphasis on a “culture of evidence.”
- (10) **Researchers must develop models designed specifically to study community colleges.** The student integration model has been the most influential perspective on student retention. Researchers have recognized, though, that this view is less obviously applicable to commuter schools and particularly to community colleges that are dominated by part-time students. Indeed, this may be why empirical work on the effects of integration at community colleges has been much more ambiguous than such work for four-year colleges. Researchers and college faculty and administrators need to consider alternative approaches and frameworks.

- (11) **The wide variation in college performance must be exploited to develop insights about effective strategies and policies.** We have shown that there is a wide variation among community colleges in measured cohort graduation rates and have developed a benchmarking index that can be used to compare graduation rates. As expected, for the most part, these measures are also related to college size, demographics, and financial characteristics, although they clearly need to be refined and supplemented. Nevertheless, variations in college performance offer an as yet unexploited opportunity to examine, using a variety of methodologies, the effectiveness of different institutional strategies and characteristics.
- (12) **Collaboration between academic, institutional, and state-level researchers should be promoted.** Researchers working to improve the performance of community colleges face formidable problems. They will have more chance of success if they use a variety of methodologies and if they combine research based on national, state, and local datasets as well as specific institutional and state-level knowledge.
- (13) **It is crucial to act now, but question and measure.** We have been critical of the quantity and quality of research on the effects of institutional practices on community college graduation and completion rates, although we have found high-quality research on community college practices and sophisticated institutional research departments. Nevertheless, relevant results of much of the research that we have reviewed are either subject to alternative interpretations or published in such a way that makes it difficult to evaluate their validity. Therefore, its value as a guide for practice and policy must be carefully considered.

College personnel now have a variety of sources of information—including experience, institutional knowledge, and research of varying degrees of reliability—and this type of information serves as the basis for action. Colleges are, of course, ongoing operations and cannot wait for definitive evidence before acting; and, in any case, research should not be viewed in absolute terms—either definitive or useless. Still, faculty and administrators should move forward with the understanding that questions remain about the effectiveness of what they are doing.

Our suggestion is that, in planning activities, colleges should search for the best information they can find, but they should search critically, recognizing that all research is not the same and that even the most definitive studies, such as those using random assignment methodologies, have limitations. At the same time, they should do what they can to monitor progress, and do so in a way as thoroughly and rigorously as possible. The interaction between research and practice is not a search for the definitive answer of “what works.” Rather, it is a constant and continuous process and conversation within and among the colleges, and with outside researchers and policymakers, as practitioners try to improve their practice in the context of a constantly changing environment. We urge that, in this

conversation, colleges use the best possible data and the most appropriate methodologies. The process of continuous discussion is probably better described as a “culture of inquiry” rather than a “culture of evidence.” When speaking of monitoring disarmament treaties, Ronald Reagan said, “Trust, but verify.” When developing and implementing innovations to improve student outcomes, we say “Act now, but question and measure.”

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**APPENDIX:
Results of Group Logistic Regression on Degree Completion**

	MODEL 1		MODEL 2		MODEL 3	
	Coef (std err)	dy/dx	Coef (std err)	dy/dx	Coef (std err)	dy/dx
College is located in urban area	-0.215 0.044	-0.038	-0.009 0.037	-0.002	-0.012 0.038	-0.002
College is located in rural area	0.184 0.092	0.034	0.050 0.077	0.009	0.050 0.078	0.009
College is a Historically Black College or University	0.173 0.251	0.032	0.470 0.209	0.095	0.486 0.211	0.097
College is a tribal college	-0.778 0.640	-0.111	-0.863 0.742	-0.122	-0.753 0.747	-0.108
1001-2500 FTE undergraduates			-0.131 0.073	-0.023	-0.110 0.076	-0.019
2501-5000 FTE undergraduates			-0.485 0.080	-0.082	-0.455 0.085	-0.076
More than 5000 FTE undergraduates			-0.719 0.084	-0.114	-0.678 0.091	-0.107
Institution awards more certificates than associates			0.373 0.057	0.071	0.328 0.059	0.062
Percent FTE African-American undergraduates			-0.906 0.187	-0.163	-0.922 0.202	-0.165
Percent FTE native American undergraduates			0.203 0.711	0.037	0.032 0.727	0.006
Percent FTE Asian undergraduates			-1.112 0.449	-0.201	-1.145 0.487	-0.205
Percent FTE Hispanic undergraduates			-0.486 0.144	-0.088	-0.530 0.174	-0.095
Percent FTE part-time undergraduates			-0.747 0.196	-0.135	-0.820 0.212	-0.146
Percent FTE female undergraduates			-2.773 0.298	-0.500	-2.464 0.331	-0.440
Average in-state tuition [\$1000]					-0.067 0.037	-0.012
Instructional expenditures per FTE undergraduate [\$1000]					0.069 0.019	0.012
Academic support per FTE undergraduate [\$1000]					0.031 0.049	0.005
Student services per FTE undergraduate [\$1000]					-0.080 0.041	-0.014
Federal aid (Pell grants) per FTE undergraduate [\$1000]					-0.002 0.070	0.000
Constant	-0.901 0.077		0.984 0.210		0.701 0.244	
Adjusted R squared	0.352		0.601		0.602	
Number of observations	884		861		841	

Notes: Bolded coefficients are significant at the 5% level. Regressions also include state dummies (not shown). Coefficients for these variables are available from authors on request.