Charting Pathways to Completion for Low-Income Community College Students

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Abstract

This study uses administrative data from Washington State to chart the educational pathways of first-time community college students over seven years, with a focus on young, socioeconomically disadvantaged students. Of particular interest are the rates at which students enter a course of study (by passing multiple college-level courses within a focused field of study), the amount of remediation taken by students in each concentration, and the rates at which students in different concentrations earn certificates, earn associate degrees, or transfer to four-year institutions.

We found that students from low socioeconomic status (SES) backgrounds were less likely than higher SES students to enter a concentration, which we define as taking and passing at least three courses in a single field of study. Among those who did enter a concentration, low-SES students were less likely to concentrate in liberal arts and sciences and more likely to enter a concentration in career-technical education (CTE), where completion rates are lower. Low-SES students were overrepresented in fields such as education and childcare that have low completion rates, although they were well represented compared with high-SES students in nursing and allied health, which tend to have higher labor market returns for graduates. Overall, however, the majority of young students in our sample who entered a program of study—even low-SES young students—were more likely to do so in liberal arts and sciences than in career-technical programs. Some researchers and policy analysts have suggested that it would be beneficial to encourage more students into pathways that involve multiple, ~~–s~~tackable" credentials in CTE fields with relatively high labor market returns. Given that liberal arts and sciences is the default pathway for the majority of younger students, convincing recent high school graduates to choose a CTE path would likely require a fundamental shift in the way high schools and community colleges guide and prepare young, first-time college students. Regardless of whether they concentrated in a CTE field or in liberal arts and sciences, however, low-SES students were less likely to earn a credential or transfer to a four-year institution.

The majority of students in our sample of first-time students did not get far enough to enter a concentration. Despite the evidence of a systemic problem in low overall rates of credential completion, especially among low-income students, there are no easy solutions. However, a key intermediate step would be to increase the rate at which students enter coherent programs of study. The ~~–lo~~w-hanging fruit" may be the students who attempt but do not enter a concentration and the many who do not even get that far but who signal an intent to pursue a credential, whether they signal this through self-reporting, attempting developmental coursework, or attempting multiple college-level courses. In our sample of first-time college students, this represented more than half of the younger students who did not succeed in entering a concentration.

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1. Introduction

As open-admission institutions, community colleges have played a critical role in expanding access to postsecondary education for disadvantaged students. According to a nationally representative survey of first-time college students in 2003–04, among first-time college students with family incomes of $32,000 or lower, 57% started at a two-year or less-than-two-year college rather than at a four-year institution (Berkner, Choy, & Hunt-White, 2008). However, students who enter higher education through community colleges face long odds of actually earning a college credential. Of first-time college students who enrolled in a community college in 2003–04, fewer than 36% earned a postsecondary credential within six years (Radford, Berkner, Wheeless, & Shepherd, 2010).

A combination of factors, including increased educational attainment in countries perceived to be U.S. competitors, higher labor market returns to more education (Rouse, 2007), and financial pressures on governments and families, have converged to shift the focus of higher education policy beyond expanding college access to increasing college completion. Policymakers and funders are especially concerned with closing the gap in completion rates between educationally and economically disadvantaged students and their more advantaged peers. Lumina Foundation for Education has set a ~~"b~~ig goal" of increasing the percentage of college graduates from 39% to 60% by 2025, a goal that would require increasing rates of credential attainment among groups of students who have traditionally faced barriers to success in college.[1] The Bill & Melinda Gates Foundation has launched a postsecondary success initiative aimed at doubling the number of low-income young adults who earn a postsecondary degree or credential with value in the marketplace by age 26.[2]

Both Gates and Lumina see community colleges as key to achieving these goals precisely because they provide access to higher education for disadvantaged students. There is a plethora of research that has shown that the more disadvantaged students at community colleges complete and transfer at lower rates than do the more advantaged students (see, for example, Bailey, Jenkins, & Leinbach, 2005; Goldrick-Rab, 2010).

[1] See http://www.luminafoundation.org/our_work/our_goal.html
[2] See http://www.gatesfoundation.org/postsecondaryeducation/Pages/postsecondary-success-plan.aspx

However, despite the interest in increasing college attainment among disadvantaged students at community colleges, there has been little research on the pathways such students take through community colleges en route to completing a program.

Deil-Amen and DeLuca (2010) describe an *underserved third* of students in the United States, which refers to a population of students that is prepared neither for college nor for success in the labor market at the time of high school graduation. This underserved third is comprised of people who are likely to be of lower socioeconomic status (SES), part of an underrepresented minority, immigrant English language learners, or first-generation college students. Deil-Amen and DeLuca maintain that of such students, those who do go to college are likely to go to community colleges and other non-selective institutions, where they typically become mired in remedial coursework. To the extent that these students do get into college-level programs of study, they are often tracked into vocational programs that are less selective and lead to ~~"d~~irect employment in lower-end service and blue-collar jobs" (p. 35) rather than to programs such as nursing or engineering technology, which have entry standards but which also lead to higher paying employment.

There is evidence that the labor market returns to schooling and credentials differ across programs of study in community colleges. For example, Jacobson, LaLonde, and Sullivan (2005) found that returns to a year of schooling for displaced workers were higher if their credits were completed in more technically-oriented fields. Jepsen, Troske, and Coomes (2009) found that returns to credentials from community colleges varied by field, with health-related credentials showing the largest returns for both associate degrees and long-term certificates (known as *diplomas* in Kentucky). Another recent study focused on a young cohort of students (Jacobson & Mokher, 2009), tracking the 1996 cohort of ninth graders in Florida through 2007. That study found that among students who earned credentials from community colleges, students who concentrated in career-technical fields, particularly health care and other high-return fields, earned substantially more by their mid-twenties than did students who earned two-year credentials in arts and humanities, even after taking high school performance into account. The authors of that study argue that for disadvantaged students who did not do

well in high school, community college career technical programs can provide a more viable pathway to a good job than can the academic transfer route.

These studies of the labor market returns to different community college credentials largely focused on students with successful academic outcomes—that is, those who earned a certificate or degree. But to earn a credential, students first need to enter a coherent program of study (which may first require remedial coursework, and possibly a lot of it) and then complete the required coursework within that program. If community colleges wish to increase the rate at which students complete programs and earn college-level credentials, they first need to look at the rate at which students enter into college-level programs (Jenkins, 2011). Understanding the academic behavior of community college students and pinpointing where along the pathway to college completion students are most likely to founder or drop out can help colleges design strategies for accelerating progression and completion rates.

Studies of community college student enrollment patterns indicate that most do not get to the point of entering a program of study. Using cluster analysis to group students by their course-taking patterns, Bahr (2010) found that only 16% of a cohort of first-time California community college students attempted a reasonably large number of for-credit, college-level credits and passed more than three quarters of their courses. In contrast, 32% of students were labeled *drop-in* students because they attempted few credits (four on average) but had high pass rates in those few classes they did attempt, and 31% were labeled *experimental* students who attempted few credits (13 on average) and failed most of them. In a separate study, Adelman (2005) called these students ~~"v~~isitors" to the ~~"t~~own" of the community colleges, finding that 45% of traditional-age community college students earned at least one but fewer than 30 credits.

Other studies indicate that the rates at which community college students earn credentials vary by field of study once students enter a program. Alfonso, Bailey, and Scott (2005) looked at broad program categories and found that, at the subbaccalaureate level, students in occupational fields were somewhat less likely than students in academic fields to complete their educational goals, even after controlling for student characteristics and expectations. However, they did not examine outcomes for students in specific fields and programs, and they only considered students who officially declared a

major. Stuart (2009) examined academic pathways across certain fields of study at a particular community college and found that the likelihood of dropping out varied by field and was based on the labor market returns of having a credential within that field. Therefore, some fields (such as health services) had particularly low dropout rates while others (such as automotive services) had particularly high ones (Stuart, 2009). Neither study focused on patterns of entry into programs of study by disadvantaged students.

This study charts the pathways of community college students into and through programs of study and examines the characteristics of students who do and do not achieve key milestones associated with program entry and completion. Specifically, we address the following research questions:

- What distinguishes students who successfully enter a concentration in a field of study from those who do not? Do non-concentrators intend to complete a college credential but fail to progress in their college studies, or do they have other goals entirely?
- Do the characteristics of students who successfully enter concentrations vary by the field of study?
- Are there differences among students by field of concentration in the extent and type of remediation they receive?
- What types of credentials do students earn in different fields, and how do rates of completion and transfer vary across them?

A key focus of this analysis is on patterns of progression and completion among younger, economically disadvantaged community college students—the target population for the Gates Foundation's Postsecondary Success initiative. The study assesses how their educational pathways differed from those of higher income younger students and students who begin college when they are older and whether there is evidence to support Deil-Amen and Deluca's (2010) theory that educationally and economically disadvantaged community college students are steered into low-prestige, low-return fields of study. To address these research questions, we used a dataset that allows us to chart the progress over seven years of a cohort of first-time college students in Washington State's public two-year college system, which includes proxy measures of students' socioeconomic status that are created by tying their address records to Census block data.

2. Data

In this study, we examined patterns of program entry and completion over seven years among students with no prior postsecondary education who first enrolled in one of Washington State's two-year community and technical colleges in the 2001–02 academic year. Since our aim is to inform efforts to increase the postsecondary attainment of community college students who lack postsecondary credentials, especially younger students from economically disadvantaged backgrounds, we included in our analysis all first-time college students, regardless of what their objectives were upon entry and the program level at which they first enrolled.

In Washington, as in 13 other states, the two-year public colleges are primarily responsible for providing instruction for adults with low levels of literacy through programs that include adult basic education (ABE), GED preparation, and English-as-a-second-language (ESL) courses. Offering adult basic skills instruction is one of the three key mission areas of Washington's community and technical college system. Even though such courses are offered by colleges in Washington, students who take them many not have aspirations to advance to college or even think that that is possible. Indeed, rates of transition from basic skills to college have generally been low (Prince & Jenkins, 2005). However, over the past several years, Washington State has received national attention for its efforts to increase the number of basic skills students who go on to earn postsecondary credentials, specifically through the widely touted I-BEST model (Wachen, Jenkins, & Van Noy, 2010; Zeidenberg, Cho, & Jenkins, 2010). We therefore also include in our sample basic skills students as well as students who start in pre-college remedial or ~~"d~~evelopmental" coursework and those who enter directly into college-level courses.

The data used in the study were drawn from student unit records reported to the Washington State Board for Community and Technical Colleges (SBCTC) by all 34 colleges in the system. The data include information on student characteristics and course-taking patterns collected by the state's community and technical colleges (CTCs) upon students' enrollment in a CTC and throughout their attendance there. They also include complete records of students' transcripts and credentials earned while the students were enrolled at a Washington CTC. These data were matched by the SBCTC to

student unit record information from the National Student Clearinghouse on transfers to other institutions outside the Washington public two-year college system.

For this analysis, we first limited our sample to the 77,818 students who attended college for the first time in the 2001–2002 academic year and were ―state-funded"—that is, colleges could count them for reimbursement under the state's funding formula.[3] We then further limited our sample by dropping students who never attempted any credits that appeared on a transcript, leaving us with a sample of 62,235 first-time students in the 2001–2002 academic year. This sample of 62,235 first-time students is used throughout this paper. These students were tracked for 29 quarters, or a little more than seven years after their first quarter of enrollment. This long follow-up time period is an important strength of this dataset, providing ample time to follow the pathways of community college students, many of whom attend part time or stop out of college temporarily on the way to college completion.

We sorted students into socioeconomic status (SES) quintiles based on the average SES of the Census block of their home address.[4] Since the community college student population is so varied by age, this method may be preferable to employing data on a student's household income because it returns a measure of SES that does not fluctuate significantly depending on whether the student is a dependent or not. Of our sample, about 25% were missing SES information and 6% were missing age information, which is derived from a student's date of birth as declared in the first quarter a student is enrolled at a Washington CTC. Students with missing SES or age data were not dropped from the sample but were excluded from any of the analyses that take advantage of age and SES categories (such as ―young" or ―low-SES" students).

Throughout this paper, we define *entering a concentration* as successfully completing at least 12 quarter credits[5] or three courses within a single field of study as categorized by the taxonomy in Appendix B. We use this definition based on students'

[3] Foreign students and students funded through certain special programs were excluded.

[4] The SES measure used here was developed by CCRC researchers in collaboration with the research staff of the Washington State Board for Community and Technical Colleges (Crosta, Leinbach, & Jenkins, 2006). It is based on the average SES characteristics in each Census block, including household income, education, and occupation.

[5] This measure is explored in more depth by Jenkins (2011). Note that the Washington State community and technical colleges operate on a quarter system. Twelve quarter credits are equivalent to eight credits in a semester system. A typical class, however, might be five credits.

course-taking patterns rather than measures of students' educational objective or intent upon entry or declared major, because such measures are often unreliable indicators of students' actual behavior. We also use the terms *short-term certificate* and *long-term certificate*, defining a short-term certificate to be a certificate of less than one full-time year of study (45 credits) and a long-term certificate to be a certificate of one year or more of full-time study.

The next section provides descriptive information about the sample we examine in this paper and students' overall trajectory through community college. The sections after that address each of our research questions in turn, examining each step along the pathway through college in more detail.

3. The Sample: First-Time Colleges Students in WA CTCs

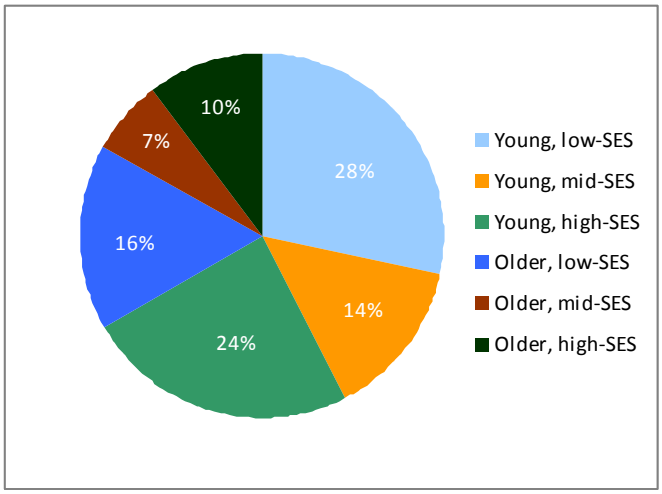
3.1 Demographics

A significant portion of students attending Washington CTCs are young students who enter college very soon after graduating high school. Although the mean age of students in our sample of first-time students in Washington CTCs was 27 at time of entry, the distribution of ages is skewed, with 42% of first-time students age 19 or younger and 64% of students age 26 or younger. However, the age distribution of older adults returning to school is more varied: the median age of older students (those students over the age of 26) was 38. Overall, the cohort is slightly skewed toward low-SES students, with 45% of students falling in the bottom two SES quintiles and only 34% in the top two SES quintiles.

For this report, we are most interested in the pathways of young, low-SES students compared with higher SES and older students. We define *young* as age 26 or under at time of entry (following the definition used in the Gates Foundation's Postsecondary Success initiative), low-SES as falling within the bottom two SES quintiles, and high-SES as falling within the top two SES quintiles. In making these comparisons based on SES, we exclude the middle quintile and focus on the lowest and highest SES students to better distinguish between the most and least disadvantaged students. Of those who have age and SES information available, 28% fell into this young,

low-SES category; 24% were young, high-SES students who fell into the top two SES quintiles; 16% were older and low-SES; and 10% were older and high-SES. Figure 1 shows the breakdown of students in our sample by age and SES.

Figure 1
Breakdown of First-Time College Entrants by Age and SES



About two thirds of first-time CTC students in 2001–02 were White (non-Hispanic), with 6% African American, 15% Hispanic, and 9% Asian or Pacific Islander. The overall gender split was relatively even: 51% of students were female. Table A.1 in Appendix A[6] summarizes demographic information about our four key demographic categories (distinguished by age and SES). A couple of differences across age and SES categories are evident from Table A.1: high-SES students were somewhat more likely to be White or Asian and less likely to be African American or Hispanic. Older students were less likely to be White and slightly more likely to be female.

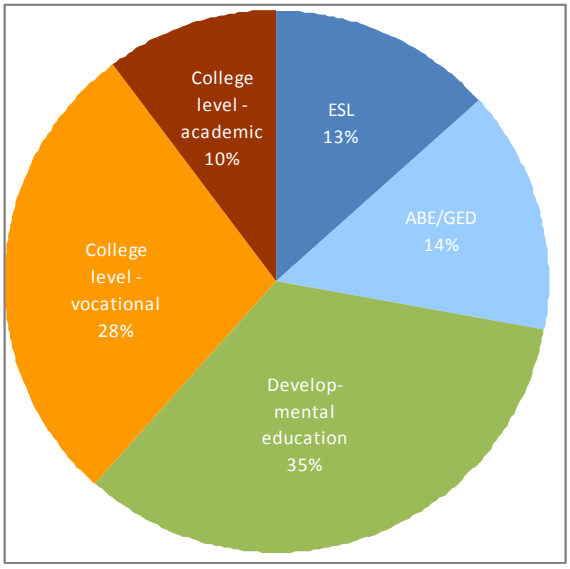
Most students started their community college experience in some form of remedial education (see Figure 2 below).[7] However, lower-SES students were more

[6] All tables prefaced with *A* are found in Appendix A.

[7] Students were associated with a starting level based on their course-taking behavior, primarily in their first quarter. The starting program is marked *college level—vocational* if a student took at least one course designated as vocational by the SBCTC in that first quarter and did not take any remedial courses. A student is considered *developmental* if he attempted a developmental course at any point and did not attempt any basic skills courses in his first quarter. A student is considered *ABE/GED* if a student took a basic skills course in his first quarter (which encompasses both ABE/GED and ESL) and never took an ESL course; otherwise, the student is designated as starting in ESL. It is important to point out that the policies and practices by which students are placed into developmental and adult basic education vary

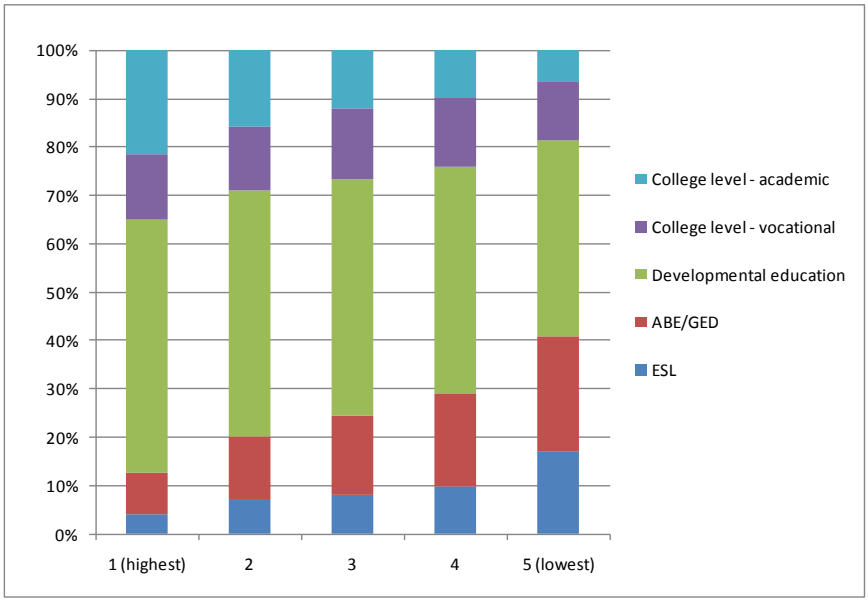
likely to take remedial coursework. In particular, students in the lowest quintile were three times as likely to be studying adult basic skills or English as a Second Language (ESL) as were students in the highest SES quintile, while students in the highest quintile were more than three times as likely to start in college-level academic classes. Figure 3 shows the program level at which young students (i.e., age 26 or younger at entry), the focus of this paper, began their studies by SES quintile. Table A.2 provides more detail for that figure.

Figure 2
Starting Program Level for First-Time College Entrants



across the 34 colleges in the Washington two-year college system. Students who end up in adult basic skills courses in one college might be placed in developmental in another.

Figure 3
Starting Program Level by SES Quintile for Young Students (26 and Under)



The SES and age characteristics of students who began their studies at each program level are detailed in Table 1. ESL and vocational college-level students were the most likely to be older; 60% of students who started out taking vocational college-level courses were over the age of 26, as were 62% of those who started out taking ESL. Students starting in developmental education courses (which are remedial in nature but required in order to complete a degree in most fields) were actually slightly more advantaged in terms of SES than students starting in vocational college-level coursework. However, students starting in academic college-level coursework were by far the most advantaged in terms of SES and students starting in adult basic education and ESL the least advantaged.

Table 1
Demographic Characteristics of Students at Each Start Level

	Top 2 SES quintiles	Bottom 2 SES quintiles	Young (age 26 or younger)	n
ESL	25%	57%	42%	8,235
ABE/GED	24%	56%	70%	8,971
Developmental education	38%	41%	83%	21,227
College level – vocational	35%	43%	40%	17,420
College level – academic	50%	29%	74%	6,365
Total	34%	45%	64%	62,218

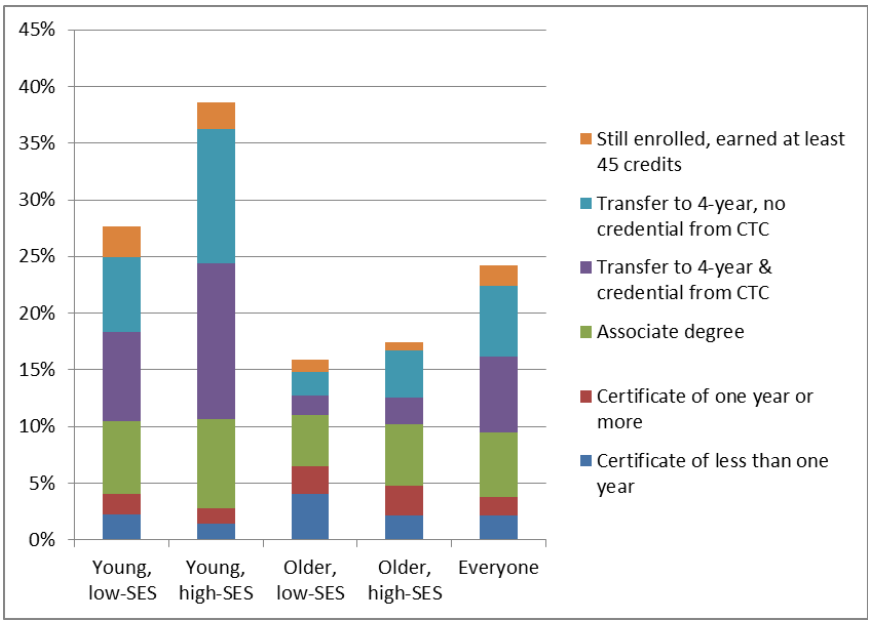
Overall, first-time students in Washington State's community and technical colleges have a wide range of demographic characteristics, although the majority of students are White and the student population skews young. Most students start by taking some form of remedial education. For example, only 21% of young, low-SES students in our sample began in college-level work. However, compared with older students, young, low-SES students were also more likely to start off in tracks that lead to an academic degree (developmental and college-level academic) or in ABE/GED classes and less likely to start off in college-level career-technical courses or in ESL.

3.2 Educational Outcomes

The overall completion rate for our sample of first-time community college students in the Washington State CTCs was quite low but was comparable to other estimates of completion rates among students who start in public two-year colleges (see, e.g., Radford et al., 2010). Even after tracking students for seven years of follow-up, fewer than 25% of first-time students in our sample were still enrolled in the seventh year with at least 45 college-level quarter credits (equivalent to one year of full-time study) or had what we consider to be a "successful" outcome—that is, they either earned a certificate or associate degree or transferred to a four-year institution. Figure 4 shows the seven-year educational outcomes for the cohort by demographic group. Young students were more likely to achieve successful outcomes than older students and in particular were far more likely to transfer to a four-year institution. However, older students were

more likely to earn both short-term and long-term certificates. Additionally, low-SES students were more likely to earn certificates, while high-SES students were more likely to earn an associate degree or transfer to a four-year institution. Even for young, high-SES students, the "most successful" group, fewer than 40% of first-time students achieved a successful academic outcome within seven years of beginning college.

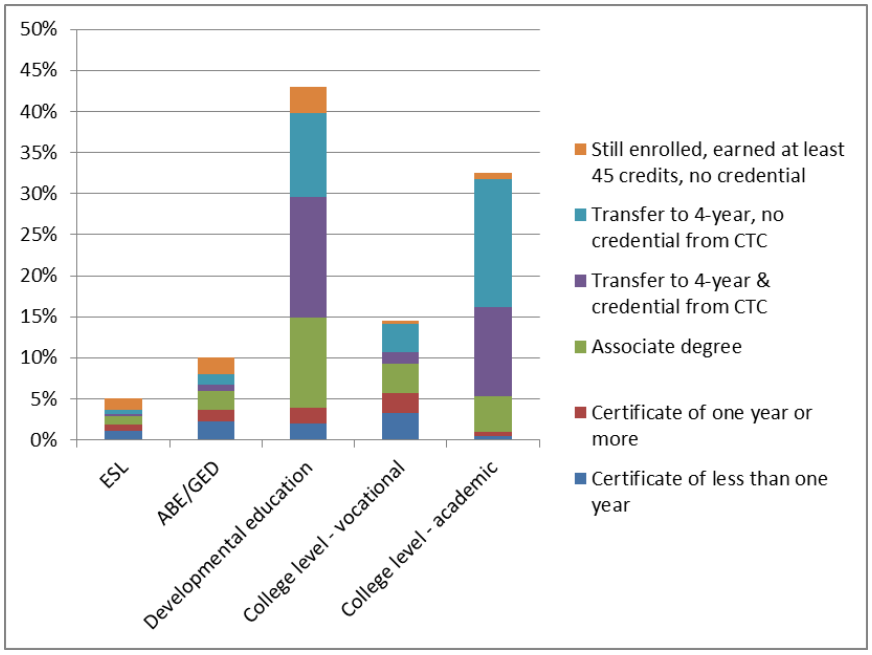
Figure 4
Academic Outcomes by Age and SES After Seven Years



There was significant variation in the overall success rates by the level at which students began their education. Students who began in developmental education or college-level coursework were much more likely to eventually earn a college-level credential or transfer to a four-year institution than were those who started in adult basic skills programs. The relatively high success rates for students who started in developmental education are likely due to the fact that taking developmental education signals an intent to earn a college-level credential, since only students who want to earn a college-level credential or transfer to a baccalaureate institution need to take such courses. In contrast to those starting in college-level or developmental programs, only 5% of ESL students and 10% of ABE/GED students had earned a college-level credential or

transferred, or were still enrolled with at least 45 credits after seven years.[8] Figure 5 displays these overall outcomes by starting program level.

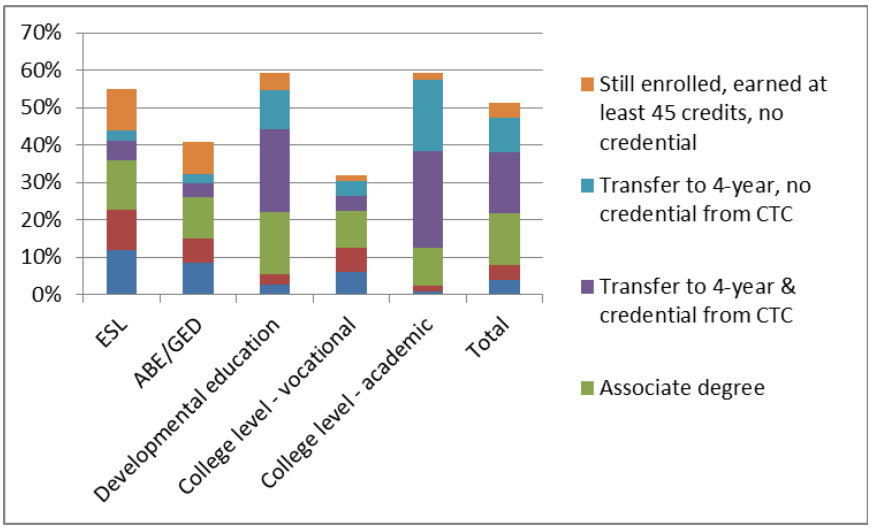
Figure 5
Highest Educational Outcome by Starting Program Level, All Students



As we will explore further in later sections, these low overall success rates are largely due to the fact that the majority of students in the cohort never really got started on a path to a credential—that is, these students never entered a coherent program of college-level study. Of students who *did* stick around college and enter a concentration at each starting level, outcomes are much more positive, as shown in Figure 6.

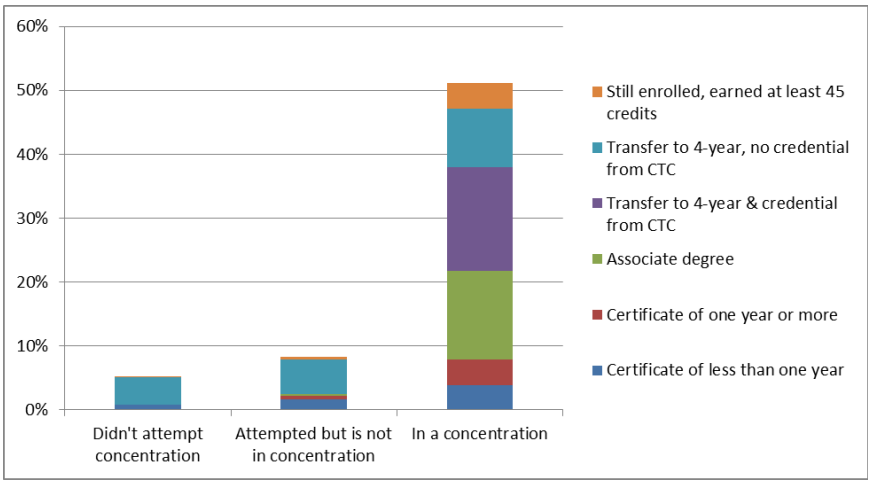
[8] Since the Washington State community and technical colleges serve large numbers of adult basic skills students, the low success rates among such students brings down the system's overall success rate. This should be noted when comparing these figures to those from states where the community colleges do not serve adult basic skills students.

Figure 6
Highest Educational Outcome by Starting Program Level, Concentrators Only



Not surprisingly, outcomes appear better across all subgroups when the sample is limited to concentrators only, since with very few exceptions students must enter a concentration before they can complete a program. Figure 7 shows the outcomes for students who successfully entered a concentration compared with those who did not. The difference in success rates between concentrators and non-concentrators is more dramatic for some groups than for others. Especially striking is that, once the sample is limited to students who have entered a concentration, outcomes for students who started in basic skills (ESL or ABE/GED) were roughly comparable with those for students who started at higher levels. A larger proportion of students who started in basic skills were still enrolled after seven years (after all, working through varying levels of remedial coursework and then into college-level work can take time), but among those who did make it into a college-level program of study, a relatively high proportion earned certificates and even associate degrees (41% of ESL students and 29% of ABE/GED students).

Figure 7
Highest Academic Outcome by Concentration Status



Some argue that the ability to *stack* credentials—that is, for students to earn credentials of value that do not close off opportunities for further study—is possible and desirable. Indeed, we found that some career education concentrators (15%, not shown) still went on to transfer to a four-year institution (see, e.g., Deil-Amen & DeLuca, 2010). Thus CTE educational pathways do not have to mean the end of all further college opportunities. As shown in Table 2, more than one third (35%) of young concentrators in our sample who earned a short-term or long-term occupational certificate went on to earn an associate degree as well (28% of older concentrators over the age of 26 who earned either type of certificate also earned an associate degree).

Table 2
Overall Rates of Credential Stacking, Young Concentrators Only

Credential earned	Percentage of students who also earned			
	Short-term certificate	Long-term certificate	Associate degree	Transfer to 4-year institution
Short-term certificate	N/A	11%	34%	12%
Long-term certificate	10%	N/A	38%	12%
Associate degree	5%	6%	N/A	59%
Transfer to 4-year institution	2%	2%	64%	N/A

4. Research Questions and Findings

In this section, we present our findings on the research questions posed in the introduction. As stated earlier, these findings are based on an analysis of the educational pathways of our sample of first-time students in the Washington State community and technical colleges.

1. *What distinguishes students who do not concentrate in a field of study from those who do? Do non-concentrators intend to complete a college credential but fail to progress in their college studies, or do they have other goals entirely?*

Most first-time college students who enroll in a Washington State community or technical college do not take a coherent set of college-level courses in a program area. Some students never intend to pursue a program of study. They may only want to take a limited number of classes related to their work or personal interests, or they may take certain courses simply because they want to improve their basic skills. Others may want to earn a college credential but either never make it out of remedial education and into college-level coursework or drop out for other academic or personal reasons.

Under the definitions described earlier, fewer than half (41%) of students in our cohort entered a concentration.[9] As is clear from Figure 8, younger students were more likely to enter a concentration than older students, and high-SES students were more likely to enter a concentration than low-SES students. Figure 9 shows that only 7% of students who started in ESL entered a concentration, as did only a 21% of ABE/GED students. However, students who took developmental coursework were the most likely to enter a concentration, even compared with students who started directly in college-level coursework. In general, students who take developmental coursework are likely to do so because developmental courses are prerequisites to the college-level math and English courses that are usually required for associate and bachelor's degrees as well as for some long-term certificates. Students who are not pursuing one of these credentials are generally not required to take developmental courses. So some portion of students in our sample who enrolled directly into college courses were likely not pursuing degrees or were seeking to earn shorter term occupational certificates, which often do not require

[9] These rates are similar to those found in studies of community college student enrollment patterns (Bahr, 2010; Adelman, 2005).

students to take college math, English, or other ―general education" courses. In this sense, taking developmental coursework signals an intent to earn a degree or a long-term occupational certificate. An alternative way to think about signaling intent through course-taking patterns is to look at students who attempted at least 12 college-level credits in *any* subject and see whether they took developmental courses or not; of these students, 87% entered a concentration.

Figure 8
Percent Entering a Concentration Within Seven Years by Age and SES

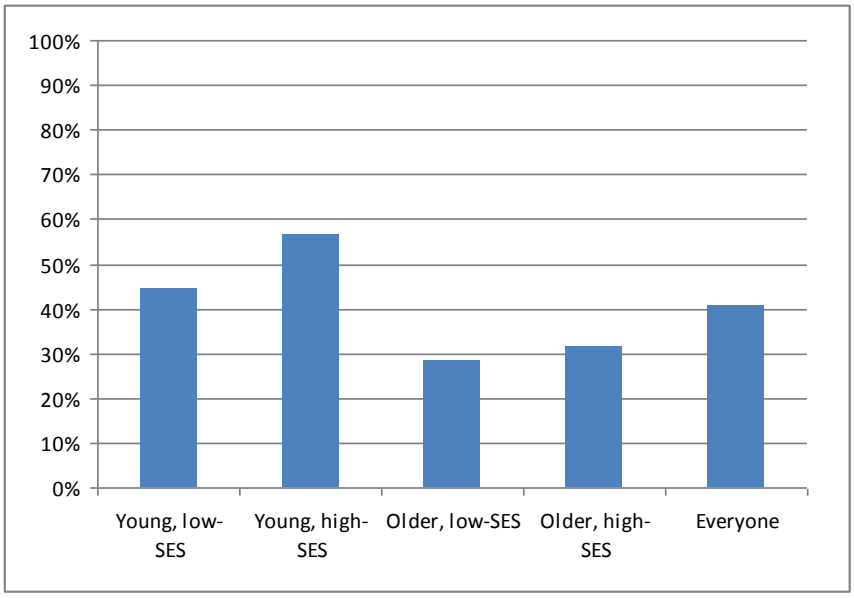


Figure 9
Percent Entering a Concentration Within Seven Years by Starting Program Level

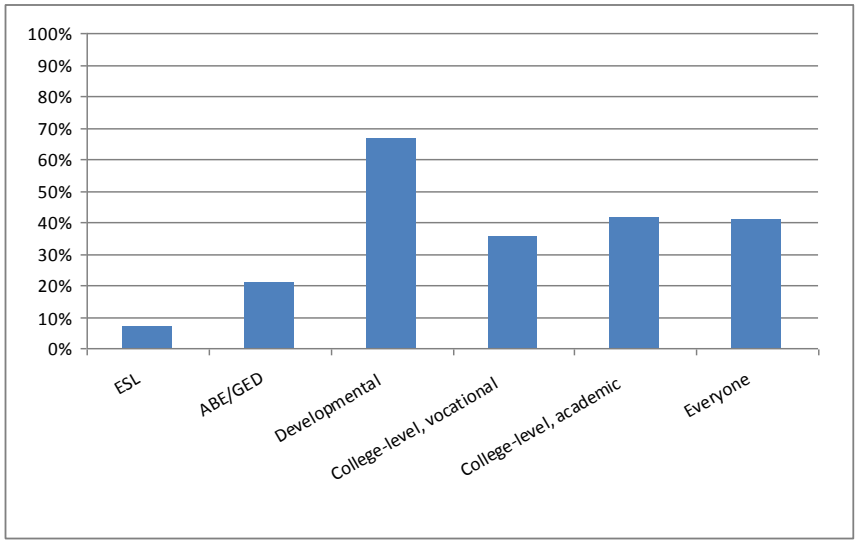
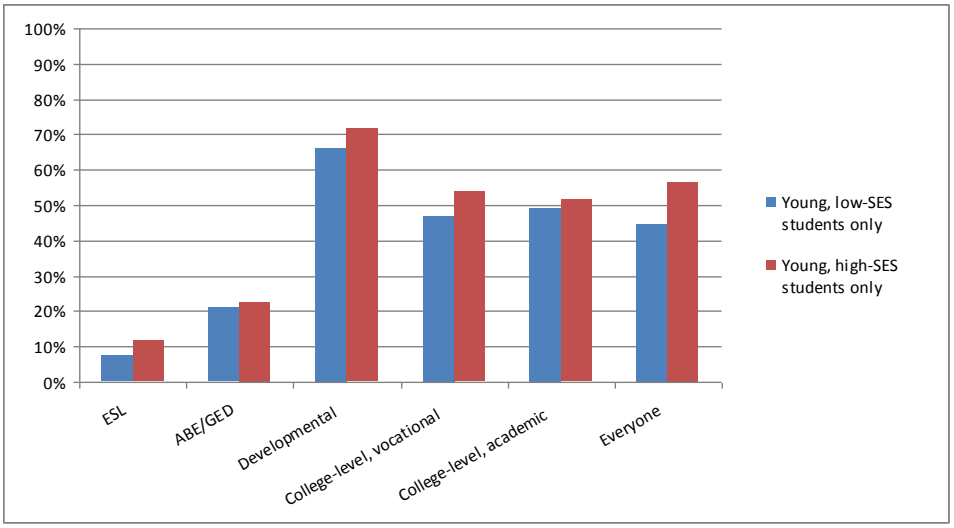


Table A.3 summarizes the demographic characteristics of students who entered a concentration compared with those who did not. Figure 10 illustrates how, even within each start level, younger, low-SES students were somewhat less likely to enter a concentration than were their high-SES counterparts. The overall difference in concentration rates by SES was driven in part by the lower program levels at which low-SES students were more likely to begin. Among young students, low-SES students started at lower levels but were less likely to enter a concentration even within each of those levels.

Figure 10
Percent Entering Concentration by Start Level and SES, Young Students Only



It is difficult to figure out why so many students did not enter a concentration. If students never intended to complete a college-level credential, should they be regarded as failures when they do not? Or, given the value of postsecondary credentials in the labor market, should colleges strive to encourage all of their first-time college students to earn college-level credentials, even those who come into the college without having such credentials as a clear goal?

Student intent is one way to think about this issue. Table 3 examines the objective or intent for enrolling at the college that students indicated when they first registered for

classes at the college. It compares the educational objectives or intents of students who entered a concentration with those who did not.

The intent variable is coded locally by colleges and therefore has some serious limitations. Some categories (such as the academic categories, as well as career and technical education) are coded consistently across institutions, while other categories, such as *general studies* and *adult basic skills* may be less so. In our sample, students who indicated a goal of ~~"a~~cademic transfer," ~~"a~~cademic non-transfer degree," or ~~"c~~areer and technical education" were more likely than not to enter a concentration. Students with ~~"u~~pgrading job skills," "general studies," and ~~"a~~dult basic skills" intents were less likely to enter a concentration, which is not surprising, given that these intent categories are not associated with earning a college-level credential.

Table 3
Percentage of Students in Each Intent Category, by Concentration Status

	Non-concentrators		Concentrators	
Intent	N	Percentage	n	Percentage
Academic	6,856	19%	11,543	46%
Career and technical education	3,838	10%	6,549	26%
Apprenticeship	950	3%	467	2%
Upgrading job skills	6,994	19%	1,975	8%
Vocational home and family life	1,238	3%	1,016	4%
General studies	2,196	6%	731	3%
Adult basic skills	13,591	37%	2,380	9%
Undecided or other	1,207	3%	704	3%
Total	36,870	100%	25,365	100%

While students who indicated at registration a desire to earn a postsecondary credential were more likely to enter a concentration, a substantial proportion of such students did not enter a concentration. Nearly two thirds (63%) of students who indicated an intent to earn an academic degree or career-technical credential entered a concentration. This is significantly higher than the overall rate of entering a concentration, but it still means that more than a third of students who indicated an interest in earning a credential did not enter a program of study. Some non-concentrators did earn awards other than college-level credentials, which suggests that they may have fulfilled their goals for attending college. About 5% of non-concentrators earned a GED

or high school completion certificate (although this is fewer than the 11% who indicated intent to receive one) and about 1% completed a job training program. But overwhelmingly, most non-concentrators did not earn any recognized awards at all.

Bahr's (2010) cluster analysis of students in California community colleges provides a useful perspective here. Bahr found two clusters with very low numbers of credits attempted: *drop-in* students who passed their classes and who may have fulfilled their more limited goals at the community college and *experimental* students who failed most of their classes. Table 4 below compares the academic performance of students in our sample who did and did not enter a concentration. Students who did not enter a concentration attempted 17 credits on average and earned only eight (compared with 93 and 81 credits, respectively, for students who did enter a concentration). Of these, a very low proportion of credits attempted were college-level credits; the average non-concentrator attempted only six college-level credits, compared with 80 for students who did enter a concentration. In our sample of first-time college students, the average overall course pass rate among students who did not enter a concentration was 49%. This compares with a course pass rate of 87% among concentrators. However, this rate masks the large variation in pass rates for these students: 34% had a pass rate higher than 90%, but 36% of non-concentrators had a pass rate lower than 10%. This mirrors Bahr's finding that there are both *drop-in* and *experimental* students, and suggests that some students may have wanted to earn a credential but faced academic or personal obstacles that prevented them from doing so.

Table 4
Academic Characteristics of Students Who Did and Did Not Enter a Concentration

	Total credits attemp-ted	Total credits earned	Total college-level credits attemp-ted	Total college-level credits earned	Start level: ESL	Start level: ABE/ GED	Start level: Develop-mental Education	Start level: college level, vocational	Start level: college level, academic	n
Non-concentrator	17.4	8.3	6.4	3.3	21%	19%	19%	31%	10%	36,870
Concentrator	93.6	81.2	80.2	70.7	2%	7%	56%	24%	10%	25,365

To better understand what these non-concentrators were doing, we looked at raw course enrollments for these students. What type of classes were they taking? Since we can categorize the field of each course attempted based on its CIP[10] code, we were able to examine this. Table A.4 details the percentage of course attempts by non-concentrators who fall into each of our fields of study. A large portion (43%) of course enrollments for non-concentrators were basic skills courses, which breaks down into 5% GED or high school completion courses, 10% ABE courses, 25% ESL courses, and 3% other basic skills and training courses to prepare students to enter the labor market or further education.

What about the non-basic-skills courses? Of these, 22% were developmental courses and an additional 28% were in liberal arts subjects (arts, humanities, English, social and behavioral sciences, mathematics, or academic sciences). Most of these liberal arts course enrollments probably represent students attempting and failing to meet college-level goals. However, a minority of the courses that fall into the liberal arts category—such as pottery or chorus—may indeed not be academic in nature or intention, but fall into this category anyway on the basis of the CIP code assigned to them.

An additional 13% of non-basic skills course enrollments were in CIP categories that are very likely to be personal or continuing education, even though they are generally for-credit courses. These courses may include subjects such as fitness courses, courses on personal health, courses on decision-making skills, and other self-improvement courses. Many of the other course enrollments were in fields that may emphasize continuing education for adult workers, such as business and marketing (7%) and computer and information sciences (7%). These business courses include classes in subjects such as keyboarding, violence in the workplace, interpersonal communication, and leadership skills. And some categories may include a substantial number of students taking courses related to their personal rather than academic goals, such as education and child care (6%) students who are really parents in pre-school co-ops or allied health (3%) students who are really taking CPR, first aid, or EMT classes. About 36% of allied health course enrollments of non-concentrators fell into one of those three categories.

[10] Classification of Instructional Programs. See http://nces.ed.gov/pubs2002/cip2000/ and Appendix B.

Examining the breakdown of course enrollments for students who did not wind up entering a concentration is certainly fuzzy science, and it is impossible to fully ascertain student intentions just from course titles and CIP codes. Nevertheless, it is clear that there were a significant number of students who wanted to earn a college-level credential based on intent but dropped out before making significant headway in their college-level coursework. Additionally, there are plenty of students who may not have clearly indicated an intention to earn a college-level credential but could be encouraged to do so: 56% of non-concentrators in this sample of students without prior postsecondary education were under the age of 26 when they first enrolled in college and therefore could benefit greatly over the course of their lifetimes from earning a college-level credential (Belfield & Bailey, 2011).

Table 5 shows students who, among those who did not succeed in entering a concentration, signaled a desire to earn a credential. This includes students who indicated such an intent when they first registered at the college, those who attempted to enter a concentration (by attempting three college-level courses in a field) but did not enter one, and those who took at least one developmental course (which again are not required of those not seeking to earn a degree). Such students represented more than half of the younger students in the cohort who did not succeed in entering a concentration.

Table 5
Non-Concentrators Indicating Intent to Earn a Credential, by Age Group

	Listed intent associated with credential	Took at least one developmental class	Attempted but did not enter a concentration	At least one of these
Young students	37%	36%	14%	52%
Older students	14%	12%	11%	26%
Everyone	25%	24%	12%	38%

Among younger students who did not enter a concentration, 42% began in ESL or ABE/GED courses. The Washington State community and technical colleges are national leaders in their efforts to help students transition from basic skills courses into college-level programs through the I-BEST program and other polices (Wachen et al., 2010; Zeidenberg et al., 2010). The I-BEST program was implemented after our 2001–2002 cohort had already entered college but could be a promising model to increase overall

completion rates, given the large number of low-SES students who need significant remediation and also are likely to need a college-level credential to achieve successful career outcomes.

2. Do the characteristics of students who enter a concentration vary by field of study?

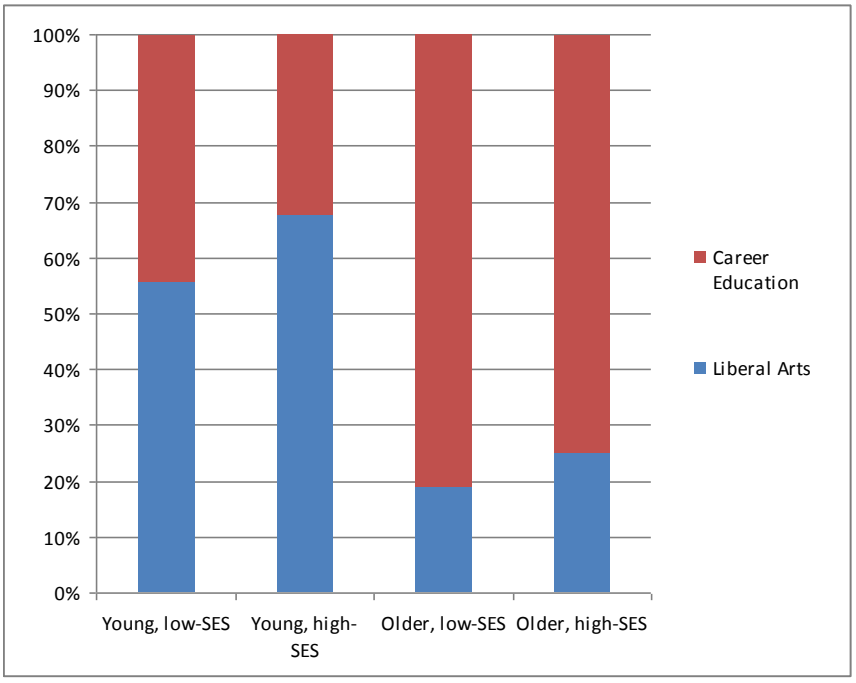
We created a postsecondary field taxonomy, adapted from an unpublished taxonomy of postsecondary fields developed by NCES, to group similar Classification of Instructional Programs (CIP) codes into academic fields. This taxonomy is detailed in Appendix B. We sorted students into concentrations based on the field in which they earned the greatest number of credits (or, if they are tied between two fields based on credits, the greatest number of classes). Concentrations are organized into two broad types: liberal arts and sciences and career technical.

More than socioeconomic status, student age is more strongly associated with student choice of a field of concentration. Younger students coming to college soon after high school were far more likely than older students to enter a liberal arts and sciences concentration rather than a career education concentration, as is shown in Figure 11 on the next page. High-SES students were somewhat more likely to enter a liberal arts concentration than low-SES students, especially among younger students, but age was the characteristic more strongly correlated with field choice by a considerable amount. Table A.5 shows the detailed breakdown of concentrators by program type, age, and SES.

This large average age difference between students entering liberal arts and career education concentrations suggests that these two types of programs may be educating very different populations of students. As suggested above, the difference is stark: 74% of students who entered a liberal arts concentration were 19 or younger when they entered college, but only 36% of career education concentrators were. This potentially has very important implications for thinking about how to motivate younger students to enter programs that are likely to lead to long-term career success. Some researchers and policy analysts suggest that it would be beneficial increase the number of students in high-return career-technical education (CTE) programs (see, e.g., Jacobson & Mokher, 2009; Bosworth, 2010). Yet, high school counseling emphasizes preparation for college rather than for careers, and without the encouragement and support to do career

exploration and planning, many young people arrive at community colleges unsure of their career goals. College counselors tend to encourage students without clear goals to start accumulating "general education" credits (Grubb, 2006). Therefore, it could require a fundamental shift in the way high schools and community colleges guide and prepare young, first-time college students to encourage them toward high-return career fields.

Figure 11
Type of Concentration Entered by Age and SES



Some of these fields are much more popular than others. Table 6 shows the breakdown of how many students in our first-time student cohort entered each field of concentration. Table A.6 describes the demographic characteristics of concentrators by field in more detail. Two fields from our initial taxonomy—automotive and aeronautical technology and engineering and architecture—had so few students that we omitted them from future analyses by concentration.

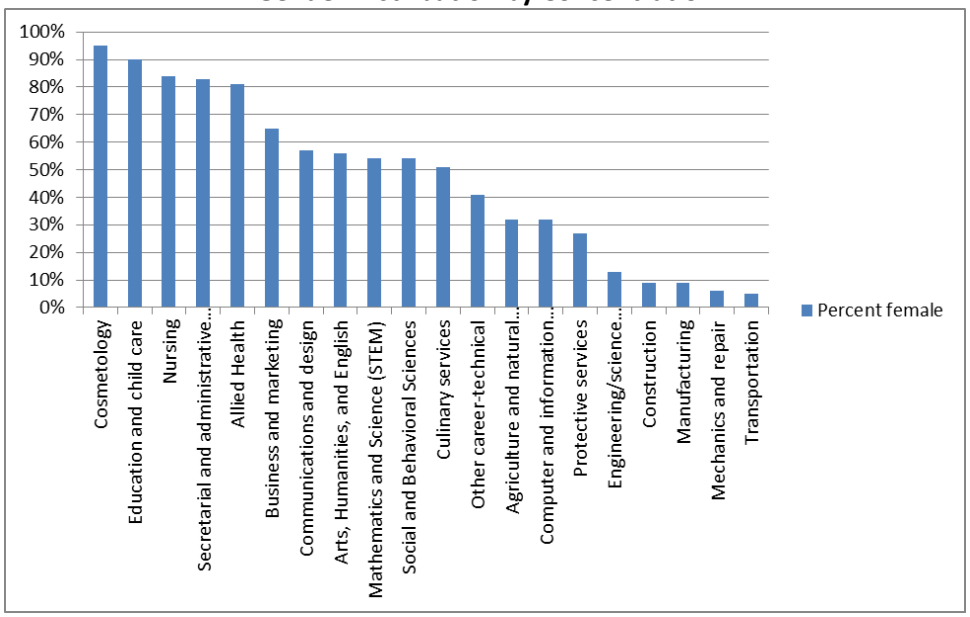
Despite a fairly even overall gender split (with 51% of the student body being female), the gender split varied enormously by concentration. Outside of liberal arts and sciences, very few individual concentrations had even roughly balanced gender splits. This is shown in Figure 12. More than 80% of students who entered concentrations in fields such as secretarial and administrative studies, cosmetology, education and child

care, allied health, or nursing were female. However, fewer than 15% were female in fields like engineering, construction, manufacturing, mechanics and repair, and transportation. This shows that student characteristics can vary drastically across fields of concentration and puts the more modest differences in SES across fields of concentration in context.

Table 6
Number of Concentrators by Field of Concentration

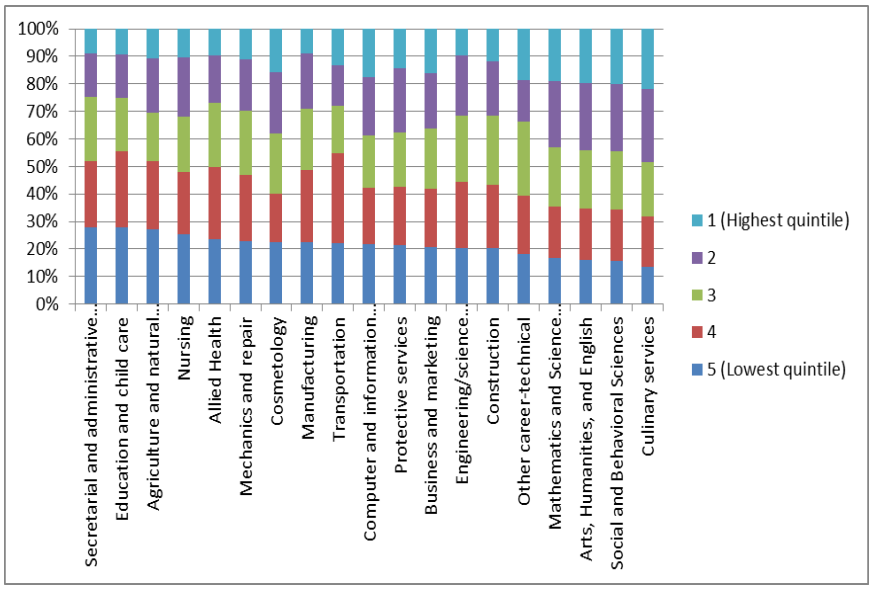
		% of concentrators who concentrate in this field	
	n	Young students	Older students
Liberal arts	11,718	57%	19%
Arts, humanities, and English	7,162	35%	11%
Mathematics and science (STEM)	2,310	11%	5%
Social and behavioral sciences	2,246	11%	3%
Career and technical education	13,647	38%	79%
Agriculture and natural resources	296	1%	2%
Automotive and aeronautical tech	19	0%	0%
Business and marketing	1,733	5%	11%
Secretarial and administrative studies	366	1%	3%
Communications and design	264	1%	1%
Computer and information science	1,448	4%	10%
Cosmetology	290	1%	1%
Culinary services	323	1%	1%
Engineering and architecture	26	0%	0%
Engineering/science technologies	583	2%	4%
Education and child care	1,731	4%	15%
Allied health	1,467	5%	9%
Nursing	651	2%	4%
Construction	808	2%	6%
Manufacturing	613	2%	4%
Mechanics and repair	922	3%	5%
Transportation	212	0%	2%
Protective services	568	2%	2%
Other career-technical	202	1%	1%
Not assigned	*1,125*	*5%*	*2%*
Total	25,365	100%	100%

Figure 12
Gender Distribution by Concentration



As Figure 13 shows, there is variation across program areas in the socioeconomic status of students who entered a concentration. Low-SES students were overrepresented in fields like education and childcare, agriculture and natural resources, and secretarial and administrative studies, while high-SES students were overrepresented in liberal arts, communications and design, and culinary services. A higher proportion of secretarial and administrative studies students were low-SES than were students in other business and marketing courses. However, low-SES students were also well represented in some high-return fields such as nursing and allied health.

Figure 13
Distribution of Concentrators by Socioeconomic Status (SES)



Taken together, these results suggest that students' demographic characteristics may play a large role in their choice of concentration. Younger students in our sample—even those who are from low-SES backgrounds—were more likely than not to enter liberal arts and sciences programs than career-technical programs. Liberal arts and sciences may offer students more academic flexibility (and less structure) to students who are undecided about their career direction than would career-technical programs at the same institutions and would also promote transfer to four-year colleges. Among CTE programs, low-SES students were more likely to enter fields that are sometimes associated with lower prestige and earnings, although nursing and allied health are exceptions.

3. *Are there differences among students by field of concentration in the extent and type of remediation they received?*

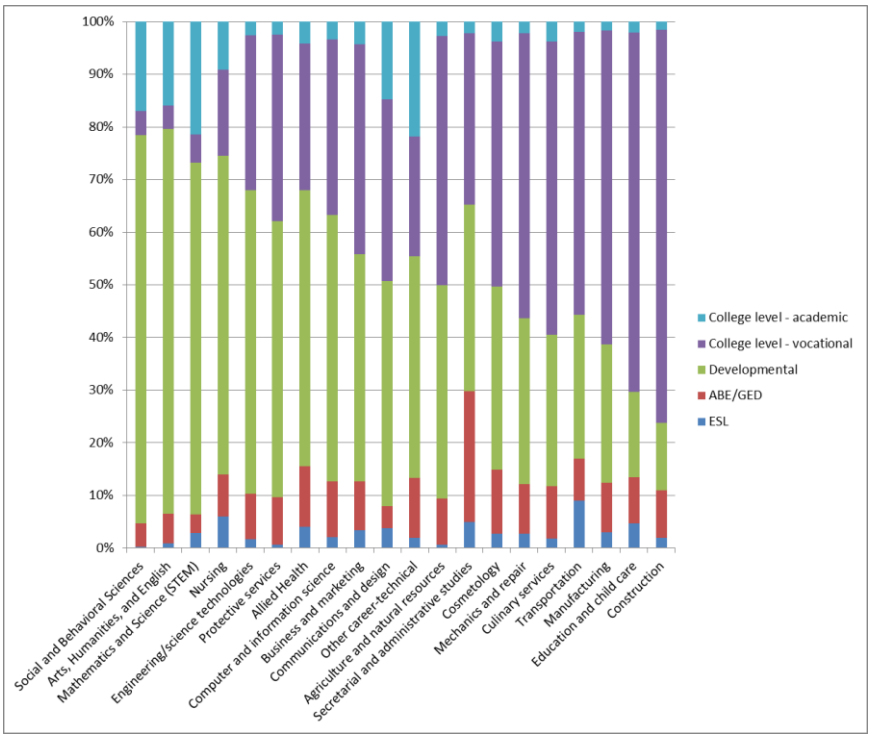
Most Washington community college students took some form of remedial coursework. For students pursuing college-level credentials or academic transfer based on intent at registration, developmental education was the most common type of remediation, though some students take adult basic education (ABE), general educational

development (GED), or English as a second language (ESL) coursework in addition to or instead of developmental classes.

Students in liberal arts concentrations were more likely to take some form of remedial coursework (77%) than students in career education concentrations (52%). However, there were differences by type of remediation: students in career education concentrations were more likely to take ABE/GED coursework (13% versus 6% for liberal arts and sciences concentrators) and ESL coursework (4% versus 1%) but much less likely to take developmental coursework (44% versus 76%). Given that there are almost always math, reading, and writing general education requirements for associate degrees in liberal arts fields and that students usually must score high enough on a placement test or pass out of developmental education in order to take those general education classes, this is not surprising. Among developmental subjects, concentrators were most likely to take developmental math: more than half of concentrators (54%) took developmental math, while only a quarter of concentrators (25%) took developmental writing and an eighth (12%) took developmental reading. Table A.7 breaks down the type of remedial courses taken by concentrators by their field of concentration.

As is evident from Figure 14, there was great variation among concentrators in different fields in the program level at which students started. Even among career-technical education program areas, there was wide variation. For example, construction concentrators were very likely to have started directly in college-level vocational courses without remediation, while nursing students were more likely than not to have started in developmental education. This probably reflects the fact that some career education fields (such as nursing) have stricter entry requirements and more stringent academic prerequisites than others. In another case, students in secretarial and administrative services were the most likely to have taken ABE/GED courses compared with students in other concentrations, while transportation students were the most likely to have taken ESL courses.

Figure 14
Starting Program Level Among Concentrators by Field of Concentration



Young concentrators were more likely to take some kind of remedial coursework (72%) than older students (51%). Focusing on the young students only, low-SES students were somewhat more likely to take remedial coursework (77%) than high-SES students (70%), but this difference is small. The difference between low-SES and high-SES students was slightly larger among liberal arts concentrators, where 83% of low-SES students took some form of remedial coursework compared with 72% of high-SES students. However, regardless of SES or concentration, a large majority of young students took at least one remedial class. Table A.8 breaks down the type of remediation received in detail by SES and field of concentration for young students.

4. *What types of credentials do students earn in different fields, and how do rates of completion and transfer vary across them?*

Different program areas within community colleges emphasize different types of credentials and outcomes as measures of success. Certificates may be acceptable in some fields, while others require an associate degree or bachelor's degree (see Stuart, 2009).

At the same time, some programs may just do a better job at getting students through whichever course sequence is ideal to earn credentials with value. This may be because these fields have more academically advantaged students to begin with, but it may be due to the structure and quality of instruction in the program itself. Therefore, it is worthwhile to examine students' academic outcomes by field of study. What are the academic outcomes achieved by students after tracking them for seven years after their first quarter of enrollment and how do these academic outcomes vary across key student characteristics and fields of study?

Figure 15 shows that, on average, low- and high-SES young students have more similar overall completion rates in career-technical programs than they do in liberal arts programs. There is a difference of 7 percentage points in the rate of credential completion, transfer, or continued enrollment among liberal arts concentrators (65% for high-SES students, 58% for low-SES students); however, the difference is only 1 percentage point among career education concentrators (51% for high-SES, 50% for low-SES). In the liberal arts, a much greater percentage of high-SES students transferred to a four-year institution. In career-technical fields, it's also true that more high-SES students transferred to a four-year institution, but this is compensated for by increased certificate completion rates among low-SES students.

Figure 15
Highest Academic Outcome by SES and Liberal Arts Versus Career Education Concentrators, Young Students Only

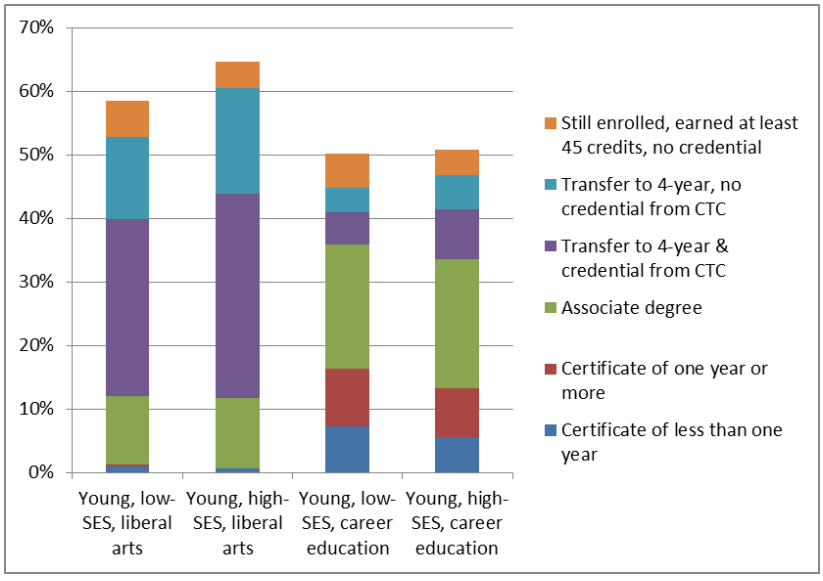
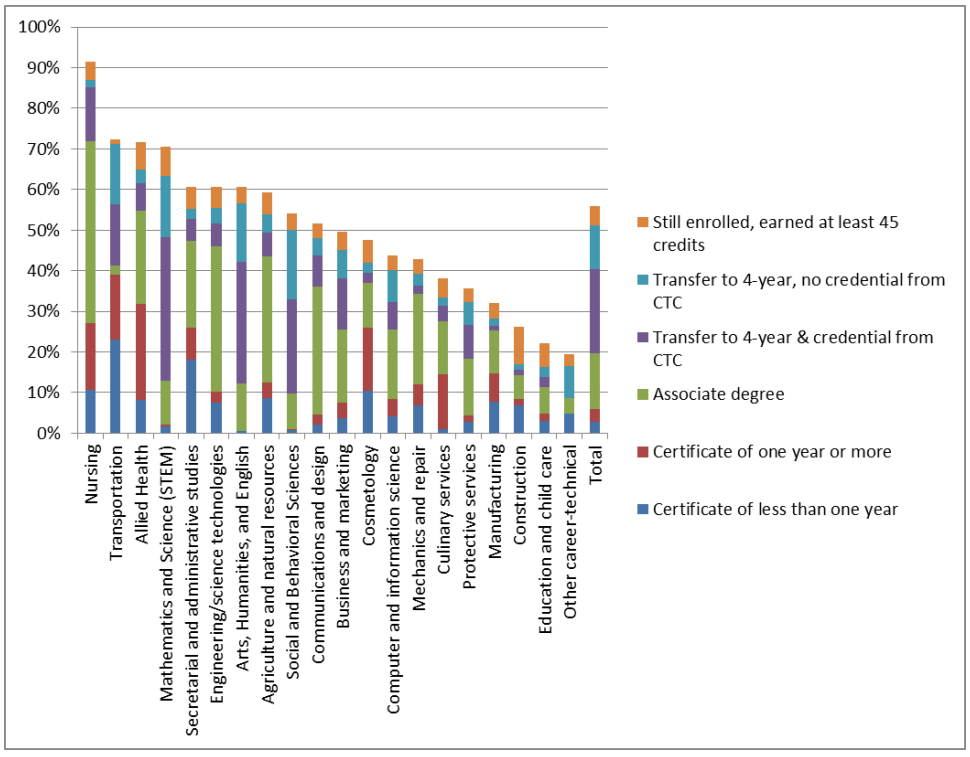


Figure 16 shows that indeed both the rates of success and the types of credentials awarded vary by field. Construction students were very unlikely to earn a credential or transfer over the seven years tracked here, while nursing students were very likely to do so. Some fields, such as transportation, seem to emphasize short-term certificates, while others, such as allied health, seem to emphasize long-term certificates. Students who concentrated in communications and design achieved successful outcomes at a lower rate overall than did secretarial and administrative services concentrators, but were much more likely to earn an associate degree and much less likely to earn a certificate. As might be expected, liberal arts students had extremely low rates of certificate completion but relatively high rates of transfer to four-year institutions.

Figure 16
Highest Academic Outcome by Field of Concentration, Young Students Only



5. Conclusion

Charting the pathways of a cohort of first-time students through Washington State's community and technical colleges, we find that students from low SES backgrounds were more likely to start at a lower level than were high-SES students and were less likely to make progress toward a postsecondary credential. Specifically:

- Low-SES students were much more likely to start in adult basic skills courses.
- Low-SES students were less likely to enter a concentration in a field of study.
- Of students who entered a concentration, low-SES students were less likely to concentrate in liberal arts and sciences and more likely to enter a concentration in career technical education, where completion rates are lower.

Even within a concentration type (that is, CTE versus liberal arts and sciences), low-SES students were less likely to earn a credential or transfer.

Taken together, this evidence suggests that there is no one point at which low-SES students struggle and where colleges could focus their resources. Low-SES students are less likely than high-SES students to progress from one milestone to the next on the way to a credential. There are some cases in which low-SES students do not do as poorly in comparison to higher SES students. For example, the overall attainment gap seems to be lower in career education areas of study compared with liberal arts areas. This suggests that career education pathways could be a promising route to help reduce the attainment gap; however, career education pathways have lower rates of credential attainment and transfer overall, so it's unclear how much benefit (if any) low-SES students would receive by transitioning into career education fields. Moreover, some of the education pathways that low-SES students are most disproportionately likely to enter are fields that have low rates of completion and are associated with lower labor market returns. In particular, the fields in which low-SES students make up the highest proportion of concentrators are education and childcare, secretarial and administrative services, and agriculture and natural resources. At the same time, we do find that younger, low-SES students were well represented compared with high-SES students

among concentrators in nursing and allied health, which are associated with higher labor market returns for graduates.

Overall, though, the majority of young students in our sample who did enter a program of study—even low-SES young students—were more likely to do so in liberal arts and sciences than in career-technical programs. However, other research has shown that longer term occupational certificates provide better labor market opportunities than associate degrees in liberal arts and sciences (Jacobson & Mokher, 2009; Jepsen, Troske, & Coomes, 2009; Bosworth, 2010); certificates are specific to career education fields, and are usually faster to complete and may provide the opportunity to earn certificates en route to an associate degree within the same field. In contrast, students in liberal arts fields who make substantial progress in their postsecondary education but drop out before earning an associate degree or transferring to a four-year institution are unlikely to have a lower level credential to fall back on. If a central policy goal is to encourage many younger students to enter into high-return career pathways that offer "stackable credentials" along the way, this will require a fundamental shift in the way high schools and community colleges guide and prepare young, first-time college students. Right now, the majority of younger students who do enter a college-level program of study do so in liberal arts and sciences rather than in career technical fields.

Despite the evidence of a systemic problem in low overall attainment, especially among low-income students, there are no easy solutions. As Deil-Amen and DeLuca (2010, p. 43) admit, "the exact support mechanisms that would best serve various subpopulations of low-income youth are relatively unknown." However, a key intermediate step would be to increase the rate at which students enter coherent programs of study. The "low-hanging fruit" may be the students who attempt but do not enter a concentration and the many who do not even get that far but who signal an intent to pursue a credential, whether they signal this through self-reporting, attempting developmental coursework, or attempting several college-level courses. In our sample of first-time college students, this represented more than half of the younger students who did not succeed in entering a concentration. Such students are probably a good target for efforts by colleges to increase college completion rates for young students.

There is still a gap in the literature in terms of looking at programmatic pathways through college. As Bahr (2010) found in California and as we found in this study using data from Washington State, a substantial portion of entering community college students attempt very few credits and never enter a college-level concentration. The literature lacks research about why so many students never enter into any pathways at all and why students who do enter a program choose to enter the particular field of study that they do. Since students must first enter a course of study in order to earn a credential, and many students who lack a postsecondary credential fail to enter a program, these questions are essential to consider if there is to be a serious effort to improve college completion rates, especially for low-income and other disadvantaged students.

References

Adelman, C. (2005). *Moving into town—and moving on: The community college in the lives of traditional-age students.* Washington, DC: U.S. Department of Education.

Alfonso, M., Bailey, T., & Scott, M. (2005). The educational outcomes of occupational sub-baccalaureate students: Evidence from the 1990s. *Economics of Education Review, 24*(2), 197–212.

Bahr, P. R. (2010). The bird's eye view of community colleges: A behavioral typology of first-time students based on cluster analytic classification. *Research in Higher Education, 51*(8), 724–749.

Bailey, T., Jenkins, D., & Leinbach, D. T. (2005). *What we know about community college low-income and minority student outcomes: Descriptive statistics from national surveys.* New York, NY: Columbia University, Teachers College, Community College Research Center.

Belfield, C. R., & Bailey, T. (2011). The benefits of attending community college: A review of the evidence. *Community College Review, 39*(1), 46–68.

Berkner, L., Choy, S., & Hunt-White, T. (2008). *Descriptive summary of 2003–04 beginning postsecondary students: Three years later* (NCES 2008-174). Washington, DC: U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences.

Bosworth, B. (2010). *Certificates count: An analysis of sub-baccalaureate certificates.* Washington, DC: Complete College America and Future Works.

Crosta, P., Leinbach, T., & Jenkins, D. (2006). *Using Census data to classify community college students by socioeconomic status and community characteristics* (CCRC Research Tools No. 1). New York, NY: Columbia University, Teachers College, Community College Research Center.

Deil-Amen, R., & DeLuca, S. (2010). The underserved third: How our educational structures populate an educational underclass. *Journal of Education for Students Placed at Risk (JESPAR), 15*(1), 27–50.

Goldrick-Rab, S. (2010). Challenges and opportunities for improving community college student success. *Review of Educational Research*, *80*(3), 437–469.

Grubb. W. N. (2006). "Like, what do I do now?" The dilemmas of guidance counseling. In T. Bailey & V. S. Morest (Eds.), *Defending the community college equity agenda* (pp. 195–222). Baltimore, MD: Johns Hopkins University Press.

Jacobson, L., LaLonde, R., & Sullivan, D. G. (2005). Estimating the returns to community college schooling for displaced workers. *Journal of Econometrics, 125*(1–2), 271–304.

Jacobson, L., & Mokher, C. (2009). *Pathways to boosting the earnings of low-income students by increasing their educational attainment.* Washington, DC: Hudson Institute Center for Employment Policy.

Jenkins, D. (2011). *Get with the program: Accelerating community college students' entry into and completion of programs of study* (CCRC Working Paper No. 32). New York, NY: Columbia University, Teachers College, Community College Research Center.

Jepsen, C., Troske, K., & Coomes, P. (2009). *The labor-market returns for community college degrees, diplomas, and certificates* (Discussion Paper Series No. DP 2009-08). Lexington, KY: University of Kentucky, Center for Poverty Research. Retrieved from http://www.ukcpr.org/Publications/DP2009-08.pdf

Prince, D., & Jenkins, D. (2005). *Building pathways to success for low-skill adult students: Lessons for community college policy and practice from a statewide longitudinal tracking study.* New York, NY: Columbia University, Teachers College, Community College Research Center.

Radford, A. W., Berkner, L., Wheeless, S. C., & Shepherd, B. (2010). *Persistence and attainment of 2003–04 beginning postsecondary students: After 6 years* (NCES 2011-151). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.

Rouse, C. E. (2007). Consequences for the labor market. In C. R. Belfield & H. M. Levin (Eds.), *The price we pay: Economic and social consequences of inadequate education* (pp. 99–124). Washington, DC: Brookings Institution Press.

Stuart, G. R. (2009). *A benefit/cost analysis of three student enrollment behaviors at a community college: Dropout, transfer and completion of an associate's degree/certificate* (Doctoral dissertation). Retrieved from http://etd.ohiolink.edu

Wachen, J., Jenkins, D., & Van Noy, M. (2010). *How I-BEST works: Findings from a field study of Washington State's Integrated Basic Education and Skills Training program.* New York, NY: Columbia University, Teachers College, Community College Research Center.

Zeidenberg, M., Cho, S.-W., & Jenkins, D. (2010). *Washington State's Integrated Basic Education and Skills Training program (I-BEST): New evidence of effectiveness* (CCRC Working Paper No. 20). New York, NY: Columbia University, Teachers College, Community College Research Center.

Appendix A: Detailed Tables

Table A.1
Demographic Characteristics of Key Demographic Subgroups

	Mean age	Median age	Female	Top 2 SES quintiles	Bottom 2 SES quintiles	White	African American	Latino	Asian	n
Young, low-SES students	20.2	19.4	51%	0%	100%	62%	7%	19%	8%	12,907
Young, high-SES students	19.6	18.9	46%	100%	0%	74%	4%	8%	11%	10,990
Older, low-SES students	40.7	37.8	52%	0%	100%	56%	8%	23%	9%	7,405
Older, high-SES students	42.0	39.6	52%	100%	0%	64%	5%	13%	15%	4,642
All students	27.7	21.6	51%	34%	45%	66%	6%	15%	9%	62,235

Table A.2
College Start Level by SES Quintile (Young Students Only)

	SES Quintile					
Start level	1 (highest)	2	3	4	5 (lowest)	Total
ESL	4%	7%	8%	10%	17%	10%
ABE/GED	9%	13%	17%	19%	24%	17%
Developmental education	52%	51%	49%	47%	40%	47%
College level - vocational	14%	13%	15%	14%	12%	14%
College level - academic	22%	16%	12%	10%	6%	13%
Total	100%	100%	100%	100%	100%	100%
n	4,653	6,337	6,352	6,260	6,647	30,249

Table A.3
Demographic Characteristics of Students Who Do and Do Not Enter a Concentration

	Mean age	Median age	Female	Top 2 SES quintiles	Bottom 2 SES quintiles	White	African American	Latino	Asian	n
Did not attempt concentration	30.0	24.8	50%	30%	49%	58%	6%	22%	10%	32,424
Did attempt concentration	25.4	19.6	52%	38%	40%	74%	5%	8%	9%	29,811

Table A.4
Courses Attempted by Both Concentrators and Non-Concentrators

Subject	Percentage of course attempts by non-concentrators	Percentage of course attempts by concentrators
Arts, humanities, and English	8.1%	18.9%
Mathematics and science (STEM)	2.7%	12.4%
Social and behavioral sciences	4.8%	10.9%
Agriculture and natural resources	0.7%	1.1%
Business and marketing	4.2%	5.6%
Secretarial and administrative services	0.8%	1.5%
Communications and design	0.4%	1.3%
Computer and information sciences	3.8%	6.0%
Cosmetology	0.1%	0.7%
Culinary services	0.2%	1.2%
Engineering/science technologies	0.5%	2.0%
Education and child care	3.2%	3.6%
Allied health	2.0%	5.8%
Nursing	0.3%	2.4%
Construction	2.1%	1.5%
Manufacturing	1.0%	1.4%
Mechanics and repair	1.0%	2.7%
Transportation	0.2%	0.4%
Protective services	0.6%	1.4%
Other career-technical	3.2%	4.6%
Developmental	12.2%	9.0%
Personal and continuing education	4.3%	2.7%
GED or HS completion	5.0%	0.5%
ABE	10.3%	0.9%
ESL	24.7%	0.8%
Workforce/educational prep	3.3%	0.2%

Table A.5
Concentrators by Age and SES

	Young, low-SES	Young, high-SES	Older, low-SES	Older, high-SES	Everyone
Liberal Arts	53%	64%	18%	24%	46%
Arts, humanities, and English	33%	40%	11%	14%	28%
Mathematics and science (STEM)	10%	12%	4%	7%	9%
Social and behavioral sciences	10%	12%	4%	4%	9%
Career education	42%	31%	79%	73%	49%
Agriculture and natural resources	1%	1%	2%	2%	1%
Automotive and aeronautical tech	0%	0%	0%	0%	0%
Business and marketing	5%	5%	9%	10%	7%
Secretarial and administrative studies	1%	1%	4%	3%	1%
Communications and design	1%	1%	1%	1%	1%
Computer and information science	5%	4%	10%	12%	6%
Cosmetology	1%	1%	1%	1%	1%
Culinary services	1%	2%	1%	2%	1%
Engineering and architecture	0%	0%	0%	0%	0%
Engineering/science technologies	2%	2%	4%	4%	2%
Education and child care	4%	1%	6%	5%	7%
Allied health	6%	3%	11%	9%	6%
Nursing	3%	2%	5%	4%	3%
Construction	2%	1%	6%	7%	3%
Manufacturing	2%	2%	5%	3%	2%
Mechanics and repair	4%	2%	7%	6%	4%
Transportation	0%	0%	3%	2%	1%
Protective services	2%	2%	2%	2%	2%
Other career-technical	1%	0%	1%	2%	1%
Not assigned	*5%*	*5%*	*2%*	*2%*	*4%*
n	5,744	6,212	2,108	1,452	25,365

Table A.6
Demographic Characteristics by Concentration

	Mean age	Median age	Female	Top 2 SES quintiles	Bottom 2 SES quintiles	White	African American	Latino	Asian	n
Liberal arts	22.2	19.0	55%	43%	36%	75%	5%	7%	9%	11,718
Arts, humanities, and English	21.1	18.9	56%	44%	35%	75%	4%	8%	9%	7,162
Mathematics and science (STEM)	21.7	19.0	54%	43%	35%	70%	4%	6%	16%	2,310
Social and behavioral sciences	20.9	18.9	54%	44%	34%	77%	5%	7%	8%	2,246
Career education	30.1	25.2	51%	33%	46%	75%	6%	8%	7%	12,477
Agriculture and natural resources	28.5	20.9	32%	30%	52%	80%	4%	8%	3%	296
Business and marketing	29.4	23.4	65%	36%	42%	73%	4%	7%	11%	1,733
Secretarial and administrative studies	32.0	28.7	83%	25%	52%	62%	11%	10%	12%	366
Communications and design	24.9	19.6	57%	44%	34%	83%	4%	6%	5%	264
Computer and information science	29.4	24.3	32%	39%	42%	76%	4%	5%	10%	1,448
Cosmetology	22.4	19.1	95%	38%	40%	75%	9%	4%	6%	290
Culinary services	25.3	19.9	51%	48%	32%	77%	5%	5%	10%	323
Engineering/science technologies	27.9	22.8	13%	32%	44%	81%	3%	4%	8%	583
Education and child care	30.4	29.6	90%	25%	55%	72%	5%	14%	6%	1,731
Allied health	28.2	22.8	81%	27%	50%	74%	8%	8%	9%	1,467
Nursing	26.7	22.8	84%	32%	48%	73%	9%	6%	9%	651
Construction	29.8	26.2	9%	32%	43%	74%	9%	8%	5%	808
Manufacturing	28.8	23.9	9%	29%	49%	84%	3%	7%	4%	613
Mechanics and repair	27.8	21.7	6%	30%	47%	73%	4%	10%	10%	922
Transportation	32.6	31.6	5%	28%	55%	72%	9%	7%	5%	212
Protective services	24.3	19.7	27%	38%	42%	77%	8%	8%	4%	568
Other career-technical	31.9	21.7	41%	34%	39%	75%	9%	6%	4%	202
Not assigned	*21.5*	*19.0*	*51%*	*40%*	*38%*	*76%*	*5%*	*6%*	*9%*	*1,125*
Total	24.8	19.4	53%	39%	40%	75%	5%	8%	9%	25,365

Table A.7
Remediation by Field of Concentration

	Any remedial class	ABE	ESL	Any dev. ed. class	Dev. math	Dev. writing	Dev. reading	n
Liberal arts	77%	6%	1%	76%	71%	30%	12%	11,718
Arts, humanities, and English	79%	6%	1%	78%	73%	28%	12%	7,162
Mathematics and science (STEM)	72%	6%	3%	71%	63%	30%	14%	2,310
Social and behavioral sciences	78%	5%	0%	77%	71%	33%	12%	2,246
Career education	52%	13%	4%	44%	37%	21%	11%	12,477
Agriculture and natural resources	47%	6%	1%	44%	37%	16%	7%	296
Business and marketing	56%	12%	4%	51%	41%	26%	14%	1,733
Secretarial and administrative studies	68%	30%	6%	45%	35%	24%	15%	366
Communications and design	51%	8%	4%	47%	34%	20%	9%	264
Computer and information science	63%	13%	2%	58%	50%	26%	12%	1,448
Cosmetology	49%	14%	3%	42%	27%	21%	10%	290
Culinary services	40%	11%	2%	34%	27%	17%	7%	323
Engineering/science technologies	68%	9%	2%	64%	59%	23%	15%	583
Education and child care	32%	14%	6%	20%	16%	10%	7%	1,731
Allied health	69%	17%	4%	61%	52%	33%	16%	1,467
Nursing	76%	16%	7%	70%	64%	21%	11%	651
Construction	24%	11%	3%	15%	13%	6%	3%	808
Manufacturing	38%	12%	3%	29%	22%	14%	6%	613
Mechanics and repair	44%	13%	3%	35%	29%	15%	8%	922
Transportation	37%	10%	10%	25%	22%	11%	4%	212
Protective services	60%	9%	1%	56%	45%	32%	13%	568
Other career-technical	57%	14%	3%	50%	41%	32%	18%	202
Not assigned	*79%*	*7%*	*1%*	*78%*	*71%*	*35%*	*13%*	*1,125*
Total	65%	10%	3%	61%	54%	25%	12%	25,365

Table A.8
Remediation by SES and Field of Concentration, Young Students Only

	Young, low-SES students					Young, high-SES students				
	Any remedial class	ABE	ESL	Any dev. ed. class	n	Any remedial class	ABE	ESL	Any dev. ed. class	n
Liberal arts	83%	8%	1%	82%	3,033	72%	4%	1%	72%	3,975
Arts, humanities, and English	85%	9%	1%	84%	1,889	75%	4%	1%	75%	2,491
Mathematics and science (STEM)	76%	8%	3%	76%	598	65%	4%	2%	63%	738
Social and behavioral sciences	86%	6%	1%	84%	546	70%	4%	0%	70%	746
Career education	68%	18%	4%	59%	2,405	63%	12%	2%	57%	1,893
Agriculture and natural resources	57%	5%	1%	54%	74	66%	7%	0%	66%	41
Business and marketing	79%	16%	5%	72%	293	68%	12%	3%	64%	282
Secretarial and administrative studies	75%	32%	7%	55%	69	83%	29%	3%	66%	35
Communications and design	65%	8%	2%	65%	51	47%	10%	4%	41%	83
Computer and information science	76%	16%	3%	70%	266	67%	12%	2%	64%	270
Cosmetology	64%	14%	3%	59%	81	40%	12%	1%	36%	75
Culinary services	45%	10%	2%	40%	60	47%	14%	2%	40%	100
Engineering/science technologies	71%	12%	0%	66%	120	68%	12%	3%	63%	94
Education and child care	81%	45%	9%	53%	206	68%	16%	2%	59%	82
Allied health	77%	20%	3%	68%	348	81%	14%	4%	76%	183
Nursing	80%	18%	7%	74%	163	77%	15%	5%	75%	108
Construction	35%	14%	3%	24%	125	35%	10%	1%	28%	91
Manufacturing	45%	17%	2%	33%	130	44%	8%	0%	41%	103
Mechanics and repair	43%	11%	1%	37%	219	54%	16%	2%	44%	153
Transportation	48%	8%	4%	40%	25	64%	4%	4%	60%	25
Protective services	74%	11%	0%	70%	136	66%	4%	1%	63%	139
Other career-technical	87%	10%	0%	85%	39	86%	24%	3%	72%	29
Not assigned	*83%*	*8%*	*1%*	*82%*	*297*	*76%*	*5%*	*1%*	*76%*	*335*
Total	77%	12%	2%	72%	5,744	70%	7%	1%	68%	6,212

Appendix B: Classification of Instructional Programs

Amended Program of Study and Credentials Classification Taxonomy
Using the 2000 Classification of Instructional Programs (CIP)

Field		Associated 2000 CIP code series
Academic (Transfer) education		
	Arts, humanities, and English	9 - Communication, journalism, and related programs [non-technical] 16 – Foreign languages, literatures, and linguistics 23 – English language and literature/letters 24 – Liberal arts and sciences; General studies and humanities 30.1301 – Medieval and renaissance studies 30.2101 – Holocaust and related studies 30.2201 – Ancient studies/civilizations 30.2202 – Classical, Mediterranean, Near Eastern studies 30.2301 – Intercultural and diversity studies 30.9999 – Multi/interdisciplinary studies, unspecified 38 – Philosophy and religious studies 50 except 50.04 – Visual and performing arts
	Mathematics and science (STEM)	26 – Biological and biomedical sciences 27 – Mathematics and statistics 40 – Physical sciences 30.0101 – Biological and physical sciences 30.0601 – Systems science and theory 30.1001 – Biopsychology 30.1801 – Natural sciences 30.1901 – Nutrition sciences 30.2401 – Neuroscience 30.2501 – Cognitive science
	Social and behavioral sciences	5 – Area, ethnic, cultural, and gender studies 22 except 22.03 and 22.0103 – Legal studies 30.0501 – Peace studies/conflict resolution 30.1101 – Gerontology 30.1501 – Science, technology, and society 30.1701 – Behavioral sciences 30.2001 – International and global studies 30.12 – Historic preservation and conservation 30.1401 – Museology/museum studies 42 – Psychology 45 – Social sciences 54 – History
Career-technical education		
	Agriculture and natural resources	1 – Agriculture 2 – Agricultural sciences (1990 classification) 3 – Natural resources and conservation
	Automotive and aeronautical technology	15.08 – Automotive and Aeronautical Technology

Business and marketing	52 series other than 52.04, 52.14, 52.15, 52.18, 52.19 – Business 19.0505 – Foodservice Systems Administration/Management 19.0604 – Facilities Planning and Management 52.14 – Marketing 52.15 – Real Estate 52.18 – General Sales, Merchandising, and Related Marketing Operations 52.19 – Specialized Sales, Merchandising, and Marketing Operations 8 – Marketing and Distribution (1990 classification)
Secretarial and administrative services	22.0103 – Paralegal/legal assistant (1990 classification) 22.0301 – Legal administrative assistant/secretary 22.0302 – Legal assistant/Paralegal 22.0303 – Court reporting 52.04 – Business Operations Support and Assistant Services
Communications and design	10 – Communications technologies 19.0202 – Human sciences communication 19.0906 – Fashion and fabric consultant 50.04 – Design and applied arts
Computer and Information Sciences	11 – Computer and information sciences and support services 25 – Library sciences 30.0801 – Mathematics and computer science 30.1601 – Accounting and computer science
Cosmetology	12.04 – Cosmetology
Culinary services	12.05 – Culinary studies
Engineering and architecture	4 – Architecture and related services 14 – Engineering 19.06 except 19.0604 – Housing and human environments
Engineering/science technologies	15 except 15.08 – Engineering technologies 41 – Science technologies/technicians
Education and child care	13 – Education 19.0706 – Child development 19.0709 – Child Care Provider/Assistant 20.0102 – Child Development, Care & Guidance (1990 classification) 20.0107 – Family Living & Parenthood (1990 classification) 20.02 – Child Care & Guidance Workers & Managers (1990 classification)
Allied health	51 except 51.16 – Health professions and related clinical sciences 19.05 except 19.0505– Dietetics / Human Nutritional Services (1990 classification)
Nursing	51.16 – Nursing
Construction	46 – Construction trades
Manufacturing	19.09 except 19.0906 – Apparel and textiles 48 – Precision production

	Mechanics and repair	47 – Mechanics and repair technologies/technicians
	Transportation	49 – Transportation and materials moving
	Protective services	29 – Military technologies 43 – Security and protective services
	Other career-technical	12 series other than 12.04 or 12.05 series 19 series other than 19.0706, 19.0709, 19.05, 19.09, 19.06 – Family and consumer sciences 20 series other than 20.0102, 20.0107, 20.02 – Family and consumer sciences (1990 classification) 31 – Parks, recreation, leisure, and fitness studies 44 – Public administration and social services professions
Not for college credit		
	Basic skills	32 – Basic skills
	Personal and continuing education	34 – Personal health improvement and maintenance 35 – Interpersonal and social skills 36 – Leisure and recreational activities 37 – Personal awareness and self-improvement