Florida Study of Career and Technical Education

Final Report

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EXECUTIVE SUMMARY

This report examines whether the outcomes for career and technical education (CTE) students—high school graduation, achievement levels, postsecondary enrollment, and employment and earnings—reflect a positive impact from CTE participation. The purpose of this study is to examine rural-urban differences in the outcomes associated with CTE in educational attainment and earnings. This study also examines differences between CTE concentrators[1] and nonconcentrators more broadly.

Our data track 84,700 Florida public high school seniors (few students who leave high school prior to grade 12 complete a CTE concentration). We examine the outcomes for CTE concentrators and nonconcentrators before and after controlling for differences in early high school performance.

Overall, the results suggest that *high school* CTE concentrations have little effect on education and career outcomes, particularly after controlling for academic characteristics. Rural students are more likely to complete high school CTE concentrations than urban students, but other differences in education and career outcomes by locale are attributed to observable differences in factors such as high school background, family income, and credential attainment.

At the *postsecondary level*, CTE concentrators are associated with significantly higher earnings, even when we control for factors such as high school background, credential attainment, and work experience. In addition, the returns to CTE concentrators tend to be even larger for students employed in an industry related to their CTE program area.

Study Methods

This study examines differences between CTE concentrators and nonconcentrators who reached grade 12 for the following outcomes:

- *High school course taking*, including the completion of an academic curriculum called the "New Basics," which is required for admission to public four-year colleges in Florida (includes four credits in English and three credits each in science, social studies, and math);
- *Transitions* after high school to college or the workforce;
- *College course taking*, including enrollment in and completion of CTE and remedial courses;
- *Postsecondary persistence and credential attainment* (certificates and degrees); and,

[1] A high school CTE concentrator is defined as a student who completes at least three CTE credits (equivalent to three year-long courses) in one of 12 occupational areas in high school. A postsecondary CTE concentrator is defined as a student who completes at least 12 college credits (roughly four semester-long courses) and who completes the most credits in one of 11 CTE occupational areas, rather than in one of seven academic fields. For college students completing fewer than 12 credits, a CTE concentrator is one who attains a credential and takes the most courses in one of 11 CTE program areas.

- *Employment and earnings* after leaving school.

We break down the results to examine how outcomes differ in rural and urban areas as well as among students who attended comprehensive high schools, magnet high schools with a CTE academy, and specialized CTE high schools.

Our data track 144,545 Florida public high students entering grade 9 in 1996 (virtually the entire universe) as they progressed from high school to postsecondary education and the workforce through the end of 2007. Since so few students who leave high school prior to grade 12 complete a CTE concentration, our analyses are focused on students who reached grade 12 (N=84,700).

An important aspect of our approach is that we examine the outcomes for CTE concentrators and nonconcentrators by controlling for differences in high school performance prior to taking postsecondary CTE courses. By holding constant observable factors, such as high school grade point average (GPA) and New Basics completion, we can better assess the value added from CTE programs by obtaining a better estimate of how the CTE concentrators would have done, if they had not taken CTE courses.

Our findings are consistent with earlier research about the outcomes associated with CTE (Silverberg, Warner, Fong, & Goodwin, 2004), while also providing new evidence about the relationship between CTE concentrations and outcomes related to attainment and earnings.

Findings

High school course taking

- High school students in rural areas are more likely to concentrate in CTE than their urban counterparts (39 percent versus 26 percent), even when we take into account that higher percentages of rural students are white and come from low-income families.

- CTE concentrators are more likely to complete a New Basics curriculum than nonconcentrators, but the difference is small.

Transitions

- The majority of students who reached grade 12 attend college. There are no differences in the likelihood of attending college between CTE concentrators and nonconcentrators with similar academic backgrounds.

- Rural students are less likely to attend college (65 percent) than urban students (74 percent), but most of this difference is attributable to observable differences, such as high school performance and family income.

College course taking

- Among college attendees, high school CTE concentrators are slightly more likely to complete a postsecondary CTE concentration. Few students (about 16 percent) continue in the same program area as their high school concentration.

- CTE concentrations are more common in college (41 percent) than high school (30 percent).

- Among college students, the percentage with a CTE concentration varies by credential attainment. The percentage of college students with a CTE concentration ranges from 17 percent for students earning no credential to 87 percent for certificate students.

- Remedial course taking is similar for high school CTE concentrators versus nonconcentrators, and for rural versus urban students for students with similar academic backgrounds.

Postsecondary persistence and credential attainment

- College students are about twice as likely to earn a credential if they completed the New Basics curriculum in high school.

- Postsecondary persistence and credential attainment is similar for high school CTE concentrators and nonconcentrators with comparable academic backgrounds.

- Urban students are considerably more likely than rural students with similar backgrounds to receive a bachelor's or graduate degree, whether or not they are CTE concentrators.

- Postsecondary CTE concentrators are more likely to attain a credential than nonconcentrators, but this is because college students take most of their CTE courses after completing three semesters. As a result, they become CTE concentrators only after they are well on their way to attaining a credential.

Post-school employment and earnings

- Among students who did not attend college, median earnings are slightly higher for high school CTE concentrators than nonconcentrators ($672 per quarter), but most of this difference is attributable to differences in observable characteristics between the groups.

- For college attendees, median earnings are $849 to $2,665 per quarter higher for CTE concentrators than for nonconcentrators, depending on the highest level of education completed. Large differences remain even after controlling for observable characteristics; however, the differences show considerable variation by CTE program area. Holding other factors constant:

  – CTE concentrators with bachelor's degrees in computer sciences, education, engineering and architectural services, trade and industry, and health care earn on average between $3,500 and $5,000 more per quarter than students with bachelor's degrees in humanities with similar high school backgrounds.

  – CTE concentrators with associate's degrees in health care earn about $4,000 more per quarter relative to academic concentrators.

  - CTE concentrators in health care and protective services earn about $1,600 more per quarter relative to humanities concentrators.
  - For students who attended college but did not complete a credential, post-school earnings tend to be higher for CTE concentrators in business and marketing, education, and protective services than for humanities concentrators.

- Differences in student demographics, high school grades, school characteristics, work experience, and labor market characteristics account for 17 to 22 percent of the CTE earnings advantage for students with certificates, associate's degrees, and bachelor's degrees, and 7 percent of the difference for students who attended college but did not complete credentials.

- Earnings for CTE concentrators employed in an industry related to their program area are 9 percent higher for students with certificates, 54 percent higher for students with associate's degrees, and 30 percent higher for students with bachelor's degrees relative to those employed in non-related industries.

- There is little difference in post-school earnings between rural and urban students after controlling for differences in high school grades and course selection, credential attainment, and other factors that affect earnings.

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1.0 INTRODUCTION

A key goal of the *Carl D. Perkins Career and Technical Education Act of 2006 (Perkins IV)* is to ensure career and technical education (CTE) programs are widely available for preparing high school and college students for "high skill, high wage, or high demand occupations in current or emerging professions" (*Perkins IV*, 2006, Sec. 2-1). A related goal is to support schools in overcoming "geographic and other barriers affecting rural students and special populations" (Sec. 135-c-10). *Perkins IV* goals also include developing programs of study incorporating "rigorous and challenging" academic skills as well as technical skills, and to link CTE programs at high schools and community colleges with bachelor's degree programs at four-year colleges.

This study examines whether outcomes for CTE students—high school graduation, achievement levels, postsecondary enrollment, and employment and earnings—reflect a positive impact from CTE participation. This study uses data tracking virtually all Florida high students who entered grade 9 in 1996 as they progressed from high school to postsecondary education and the workforce through the end of 2007.

The analysis examines differences between CTE concentrators and nonconcentrators who reached grade 12 for the following outcomes[2]:

- *High school course taking*, including the completion of an academic curriculum called the "New Basics" that is required for admission to public four-year colleges in Florida;
- *Transitions* after high school to college or the workforce;
- *College course taking*, including enrollment in and completion of CTE and remedial courses;
- *Attainment* of postsecondary credentials (certificates or degrees); and,
- *Employment and earnings* after leaving school.

Our approach is to examine the education and labor market outcomes for CTE concentrators and nonconcentrators by controlling for differences in high school performance prior to taking CTE courses in grade 9. This approach allows us to assess the value CTE programs add by estimating how CTE concentrators would have done, if they had not taken CTE courses.

We also will break down our results to examine how outcomes differ in urban, suburban, and rural areas; in labor markets with different industrial mixes; and among students who attended comprehensive high schools, magnet high schools with a CTE academy, and specialized CTE high schools.

[2] A CTE concentrator at the secondary level is defined as a high school student who completes at least three CTE credits (equivalent to three year-long courses) in the same occupational area. Appendix A replicates all of the report tables using an alternate definition for a CTE concentrator, which is based on whether the student completes at least two credits (year-long courses) in the same occupational area. A postsecondary CTE concentrator is defined as a student who completes 12 or more credits (equivalent to four semester-long courses) and takes the most courses in a CTE program area; or as one who takes the most courses in a CTE program area and completes a credential in a program requiring less than 12 credits.

2.0 DATA

For this study, we had access to data from the Florida Department of Education. The Department granted us access to longitudinal person-level data files providing detailed information on public school students' demographic characteristics; high school transcripts describing courses taken, grades, and schools attended; similar postsecondary transcripts covering Florida's 28 community colleges and nine four-year colleges; credentials granted and date of award; and employment histories describing quarterly earnings from each Florida employer covered by the Florida unemployment insurance system.[3]

To examine the complete high school and college records of students and follow them into the workforce for as long as possible, we went back as far as the database allowed us. Our file included 144,545 Florida students who were first-time students in grade 9 in the 1996–97 school year and who were properly identified.[4] Throughout this report we describe this group as the 1996 Florida grade 9 cohort. Since so few students who leave high school prior to grade 12 complete a CTE concentration, our analyses are primarily limited to students who reached grade 12 (N=84,700).

This database only covered academic records for public high schools and colleges in Florida and only earnings from employers who paid Florida unemployment insurance payroll taxes. Because of these limitations, we primarily focused on analyzing the relationship among high school course taking, college course taking, and workforce outcomes for students who: (a) completed grade 12 at a Florida public high school (because we cannot distinguish between high school dropouts and students who transferred to private high schools or high schools in other states); (b) entered a Florida public college (because we cannot distinguish between students who did not attend college and students who attended a private college or a college in another state); and (c) had a follow-up period of at least four quarters after exiting school (N=53,371). Greater detail about the number of students with each type of post-school outcome, including unknown outcomes, is provided in Appendix B of the report.[5] Overall, the database allowed us to track the majority of high school students affected by CTE supported by the *Perkins Vocational and Technical Education Act* into those colleges also affected by the Act and into the workforce.[6] The linking of education to employment data, in particular, provided an unparalleled opportunity to assess how CTE coursework affects employment and earnings.

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[3] The self-employed are not covered; military employees are not covered; and some federal, state, and local government employees are not covered.

[4] The Common Core of Data (CCD) indicates that grade 9 enrollment in Florida was 182,980 during the 1996-97 school year. We excluded 30,403 records for students who were repeating grade 9 in 1996-97 so that we could track the outcomes of a single entrance cohort. We also excluded 5,216 records for students who had invalid ID numbers or had reports for 20 or more courses in at least one high school semester, indicating that several students had the same ID number. Our sample plus the number of excluded students equals 180,164, which is close to the CCD enrollment estimate.

[5] Appendix B includes a diagram of the outcomes for all students in the sample and a table that compares differences in key educational outcomes by subgroup.

[6] Because this study examines postsecondary outcomes from secondary schooling, the data used in this study come from a period when CTE was supported by the *Perkins Vocational and Technical Education Act*, the predecessor to the current Act.

3.0 ANALYTIC METHODS

Our goal is to examine the effect of completing CTE concentrations in different program areas on a variety of outcomes. Outcomes considered include completion of CTE concentrations and the New Basics curriculum, transitions from high school to college or the workforce, college course taking, postsecondary credential attainment, and post-school employment and earnings. We capture the effect of CTE course taking on students with different characteristics in two ways. One way is to compare the outcomes of CTE concentrators to those of nonconcentrators with similar characteristics in terms of labor market areas, socioeconomic backgrounds, and perhaps most important, attendance, academic course selection, and grades in high school. A second way is to make comparisons among CTE concentrators with similar characteristics who take different numbers of CTE courses in different CTE program areas.

An important analytical issue in determining the value added of CTE is adjusting for selection bias, a common problem with nonexperimental program evaluations. Selection bias can be positive as well as negative. For example, without taking academic high school performance into account, we might overstate the effect of taking CTE courses in computer science and engineering on education and career outcomes. This could occur because students with strong performance and interest in STEM (science, technology, engineering, and mathematics) areas are likely to have more positive outcomes regardless of whether or not they become CTE concentrators.

However, negative bias, also known as adverse selection, is a more serious problem because CTE concentrators in high school may enter CTE programs because they are not doing well in their academic subjects. If we did not properly take into account the preexisting factors that led these students to become CTE concentrators, we would potentially attribute the poor education and career outcomes of these students to taking CTE courses, rather than preexisting factors. By controlling for observable differences between CTE concentrators and nonconcentrators, we can provide a more accurate assessment of how much better (or worse) off students became as a result of taking CTE courses. Because of the richness of our database we can take into account many crucial factors that influence selection of CTE concentrations in different program areas, as well as education and career outcomes that are independent of taking CTE courses.

Controlling for observable characteristics, such as GPA, can also capture unobservable factors such as motivation and ability. For example, by controlling for GPA, we implicitly control for many of the unobserved factors that affect GPA such as family background and student motivation. However, there still can be unobserved factors that we cannot control for in our analyses, which limit the conclusions drawn from this paper. This means that we cannot prove that CTE course taking *caused* students to perform better or worse on a particular outcome. Instead, the results provide a comparison of outcomes among CTE concentrators and nonconcentrators with similar academic backgrounds.

This analysis directly builds on a study we recently completed for the Bill and Melinda Gates Foundation: "Pathways to Boosting the Earnings of Low-Income Students by Increasing Their Educational Attainment" (Jacobson and Mokher, 2009). While that study did not directly examine the effect of CTE concentrations on key education and career outcomes, it did examine the effect of high school course taking more broadly on many of the same outcomes.

As in this report, we used regression analysis to help disentangle the impact of specific courses from the impact of student, school, and labor market characteristics. Then we used the insights gained from the regression analysis to present our findings using relatively simple figures and tables to make key results readily accessible to a diverse audience. We used a similar approach in this study by providing figures and tables that classify high school students on two dimensions: whether they complete a New Basics curriculum (four credits in English, and three credits each in science, social studies, and math) and whether they complete a CTE concentration (the equivalent of three or more credits [year-long courses] in the same occupational area).[7]

Throughout this report we use the following four-way classification scheme:

	CTE	Non-CTE
New Basics	1	2
Non-New Basics	3	4

The advantage of this approach is that it allows us to compare CTE concentrators and nonconcentrators with similar academic qualifications. Thus, we often will compare cell 2 to cell 1, and separately compare cell 4 to cell 3.

In addition to making our results accessible by illustrating our regression-based findings using simple figures and tables, we also present the coefficients from the regression models in the main body and in the appendixes. The key advantage of displaying the regression-based results is that they convey the magnitude, direction, and statistical significance of the CTE-related variables, as well as the variables we used to control for differences in the outcomes of the CTE and non-CTE concentrators. In the earnings models, we also estimate the effect of each successive course in the same CTE program area for students who completed the same type of postsecondary credentials. Controlling for the number of courses taken in the same program area further reduced selection bias because students who took two courses in a given CTE program area were likely to be more similar in terms of unobserved factors to students taking one course than to students taking no courses in that area.

Throughout the report, the results are also disaggregated by school type and school locale. *School type* indicates whether the student attended:

- A comprehensive or nonmagnet CTE school
- A magnet school with a CTE academy
- A separate CTE school
- An "other" school (e.g., alternative or special education school)

The Florida Department of Education defines career academies based on the following three nationally recognized core elements: "(1) a small learning community comprised of a subset of students within a larger high school; (2) a college preparatory curriculum with a career theme;

[7] Technically, we define a high school CTE concentrator as someone who earns three or more Carnegie units. A Carnegie unit represents one year-long course or two semester-long courses.

and (3) partnerships with the local community, employers, and postsecondary institutions" (Florida Department of Education, 2006, p. 2). A magnet school with a CTE academy has a career academy with a "career theme" in one of the CTE program areas, and offers both academic and CTE courses. The CTE academy is similar to the model of a "school-within-a-school" and not all students participate in the magnet program.

Students who attend a separate CTE school typically enroll in only CTE courses at this type of school, while academic courses are taken at a comprehensive high school. Students are categorized as having attended a separate CTE school if they took at least one course in this type of school for two or more academic years. Otherwise, school type is based on the school where the student completed the most courses during high school.

School locale indicates whether the student attended a rural, suburban, or urban high school. School locale is based on Census Bureau designations described in the Common Core of Data:

- Urban
  - Large city—A central city of a consolidated metropolitan statistical area (CMSA) with the city having a population greater than or equal to 250,000
  - Midsize city—A central city of a CMSA or metropolitan statistical area (MSA)
- Suburban
  - Urban fringe of a large city
  - Urban fringe of a midsize city
  - Large town—A place with a population greater than or equal to 25,000 and located outside a CMSA or MSA
- Rural
  - Small town—A place with a population less than 25,000 and greater than 2,500 and located outside a CMSA or MSA
  - Rural—a place or territory designed as rural by the Census Bureau

The regression models also included up to five sets of control variables: (1) student characteristics; (2) student performance; (3) high school characteristics; (4) work experience; and (5) labor market conditions. The variables included in each set are listed below.

1. Student characteristics
   - Gender—dichotomous variable for female
   - Race—series of dichotomous variables for black, Hispanic, and other races (white is the comparison group)
   - Age—the student's age in years at the beginning of grade 9

- Free and reduced price lunch (FRL) status—a dichotomous variable that indicates student participation in the federally funded free and reduced price lunch program during the eighth grade[8]
- Limited English proficiency (LEP) status—a dichotomous variable for students who were identified as having limited English proficiency at any time during grades 9 through 12
- Students with disabilities (SWD) status—a dichotomous variable for students who were identified as having a physical, mental, or emotional disability at any time during grades 9 through 12

2. Student performance
   - High school GPA in grade 9
   - High school absentee rate (percentage of days absent each year in grade 9)
   - Cumulative college GPA (for regression models among students who attended college only)
3. High school characteristics
   - Percentage of students who reached grade 12 schoolwide
   - Percentage of black students schoolwide
   - Percentage of Hispanic students schoolwide
   - Percentage of FRL students schoolwide
   - High school size, defined as the number of first-time ninth graders in 1996
4. Work experience
   - Number of quarters employed in high school
   - Number of quarters employed in college (for regression models among students who attended college only)
   - Number of quarters with post-school earnings (for post-school earnings models only)
   - Average earnings in high school (for post-school earnings models only)
   - Average earnings in college (for post-school earnings models among students who attended college only)
5. Labor market conditions
   - Percentage of workers employed in each major industry at the workforce investment area (WFIA) where the student attended high school (for students who did not attend college) or college (for students who attended a Florida public college)
   - Average monthly earnings for all employees in the WFIA where the student attended school

[8] The data indicate whether students received free or reduced price lunches (FRL) in the eighth grade since many eligible students do not apply for the FRL program once they reach high school.

4.0 RESULTS

This section provides our empirical results. We present our results in six subsections, which describe: (1) rural and urban students, schools, and labor markets; (2) high school course taking; (3) post-high school transitions; (4) college course taking; (5) postsecondary credential attainment; and (6) post-school employment and earnings.

4.1 Comparison of Rural and Urban Students, Schools, and Labor Markets

We begin by comparing the characteristics of students, schools, and labor markets by school locale for all students in the 1996 Florida grade 9 cohort, regardless of whether they reached grade 12 (N=144,545). Approximately 10 percent of students in the cohort attended rural schools, 46 percent attended urban schools, and 44 percent attended suburban schools.

Table 1 shows the demographic breakdown of students across these different locales. Rural and urban students are similar in terms of gender, age, SWD status, grade 9 GPA, and grade 9 absentee rate (see Table 1). Approximately 48 percent of students are female at both rural and urban schools. The majority of students are between the ages of 14 and 15 at the beginning of ninth grade, with an average age of 14.6 years across all schools. About 18 percent of students are classified as SWD. The average high school GPA in grade 9 is about 2.2 (on a scale of 4.0 for an A), and the average absentee rate in grade 9 is 9 percent.

Rural and urban students are dissimilar with respect to race, LEP status, and FRL status. Urban students tend to be more racially diverse, with less than half of students (46 percent) being classified as white, compared to two-thirds of students from rural schools. More urban than rural students also are classified as LEP (15 percent compared to 3 percent). Yet there are more low-income rural students. Approximately 39 percent of rural students receive free or reduced price lunch, compared to 33 percent of urban students.

Table 1. Percentage distribution and average of selected student characteristics of students in the 1996 Florida grade 9 cohort, by school locale

	All	Rural	Suburban	Urban
Percent female	48%	48%	49%	48%
Percent by race				
White	52%	67%	56%	46%
Black	23%	19%	19%	27%
Hispanic	13%	6%	13%	15%
Other	11%	8%	12%	12%
Percent by age in grade 9				
Less than 14	3%	4%	3%	4%
14 or 15	84%	86%	87%	86%
16 or older	12%	10%	10%	10%
Average age in grade 9	14.6	14.6	14.6	14.6
Percent Free & Reduced Priced Lunch (FRL)	32%	39%	29%	33%
Percent Limited English Proficiency (LEP)	12%	3%	12%	15%
Percent Students With Disabilities (SWD)	18%	19%	17%	18%
Average high school GPA in grade 9	2.2	2.3	2.2	2.2
Average absentee rate in grade 9 (percent)	9%	9%	9%	9%

NOTE: Detail may not sum to totals because of rounding

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table 2 shows the characteristics of the schools in rural, suburban, and urban areas and is based on tabulations of the characteristics of the students in the 1996 Florida grade 9 cohort. Urban schools have higher percentages of black and Hispanic students than rural schools. In addition, rural schools have higher percentages of students receiving free or reduced price lunch than urban schools (36 percent compared to 30 percent). Rural schools tend to be about half the size of urban schools, with an average of 289 students in grade 9 relative to 566 students in grade 9 in urban schools. All school locales have similar high school persistence rates, with a schoolwide average of 59 percent of students reaching grade 12.[9]

[9] The official statewide four-year graduation rate provided by the state of Florida during this time was 62.3 percent. The number of students reaching grade 12 in our sample is underestimated due to student attrition at private or out-of-state schools.

Table 2. Percentage distribution of characteristics of Florida public schools and average percentage of students in each school characteristic category for students in the 1996 Florida grade 9 cohort, by school locale

	All	Rural	Suburban	Urban
Percent of students reaching grade 12				
Less than 25 percent	9%	5%	10%	7%
25 to 50 percent	6%	5%	1%	10%
50 to 75 percent	78%	83%	80%	78%
More than 75 percent	8%	7%	8%	6%
Average percent of students reaching grade 12	59%	60%	59%	59%
Percent of Black students				
Less than 25 percent	66%	72%	74%	58%
25 to 50 percent	24%	25%	19%	29%
50 to 75 percent	5%	2%	4%	5%
More than 75 percent	4%	1%	2%	7%
Average percent of Black students	26%	19%	19%	27%
Percent of Hispanic students				
Less than 25 percent	85%	93%	88%	81%
25 to 50 percent	8%	7%	5%	11%
50 to 75 percent	4%	#	5%	4%
More than 75 percent	3%	#	2%	5%
Average percent of Hispanic students	13%	6%	13%	15%
Percent of FRL students				
Less than 25 percent	46%	13%	54%	45%
25 to 50 percent	42%	75%	37%	42%
50 to 75 percent	11%	10%	10%	13%
More than 75 percent	#	2%	#	#
Average percent of FRL students	29%	36%	27%	30%
School size (# ninth graders)				
Less than 250	16%	46%	15%	10%
250 to 499	30%	42%	33%	25%
500 to 749	40%	12%	35%	50%
750 or more	15%	#	17%	15%
Average school size	513	289	511	566

Rounds to zero.

NOTE: Detail may not sum to totals because of rounding

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table 3 shows that the majority of students (71 percent) in the 1996 Florida grade 9 cohort attended comprehensive or non-CTE magnet schools, but there are large differences in the distribution of school type by locale. In urban areas, 30 percent of students attended a magnet school with a CTE academy compared to only 2 percent of rural students. Separate CTE schools were the least common school type, with less than 2 percent of all students taking at least one course at this type of school for two or more academic years.

Table 3. Percentage distribution of primary school type attended by students in the 1996 Florida grade 9 cohort, by school locale

	All	Rural	Suburban	Urban
Comprehensive or non-CTE magnet school	71%	91%	73%	64%
Magnet school with a CTE academy[1]	24%	2%	22%	30%
Separate CTE school[1]	2%	3%	1%	1%
Other school (e.g. alternative, special education)	4%	3%	4%	5%

[1] Students were categorized as attending a "separate CTE school" if they took at least 1 course at this type of school for 2 or more academic years

NOTE: Detail may not sum to totals because of rounding

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table 4 summarizes the five largest industries (in terms of total employment in 2006) and the five fastest growing industries (in terms of percentage change in employment from 2001 to 2006) in rural, suburban, and urban areas. In all locales, the two largest industries are retail trade and health care and social assistance, and the fastest growing industry is construction. Although the agriculture, forestry, fishing, and hunting industry is commonly associated with rural areas, it only comprised 4 percent of rural jobs in 2001 and decreased to 3.1 percent of rural jobs in 2006 (see Appendix C, Table C1).

Table 4. Five largest industries (in terms of total employment) in 2006 and five fastest growing industries (in terms of percentage change in employment from 2001 to 2006), by locale

	Largest Industries (2006)	Fastest Growing Industries (2001-2006)
Rural	Retail Trade	Construction
	Health Care & Social Assistance	Accommodation & Food Services
	Public Administration	Professional, Scientific, and Technical Services
	Educational Services	Health Care & Social Assistance
	Accommodation & Food Services	Real Estate, Rental, Leasing
Suburban	Retail Trade	Construction
	Health Care & Social Assistance	Health Care & Social Assistance
	Accommodation & Food Services	Professional, Scientific, and Technical Services
	Construction	Educational Services
	Administration and Support	Public Administration
Urban	Retail Trade	Construction
	Health Care & Social Assistance	Accommodation & Food Services
	Accommodation & Food Services	Professional, Scientific, and Technical Services
	Administration and Support	Real Estate, Rental, Leasing
	Construction	Health Care & Social Assistance

SOURCE: Florida K-20 data warehouse.

4.2 High School Course Taking by Locale, School Type, and High School Concentration

This section describes substantive differences in high school course taking among different school locales, school types, and high school concentration categories based on the protocol followed in National Center for Education Statistics (NCES) reports. Findings are presented for differences among relevant groups that are "substantively" different, defined as a difference of at least 3 percentage points or the equivalent. Unless otherwise noted, these differences are also statistically significant.[10]

Two broad types of CTE courses are offered at the high school level. The first type is nonoccupational CTE, which consists of courses in family and consumer sciences education and general labor market preparation. These courses cannot be linked to specific occupational or postsecondary pathways so they are not included in our analyses of the effect of CTE course taking. The second type is occupational CTE courses, which prepare students for employment at specific types of jobs. Occupational CTE courses are further disaggregated into 11 program areas based on the categories defined by NCES (NCES 2009-038). We created a crosswalk to match each Florida course with the corresponding occupational CTE program area using the taxonomy

[10] Statistics are used to draw inferences about a population based on a sample. The current analysis utilizes nearly the entire population of students in the 1996 Florida grade 9 cohort. Here we use statistics to estimate whether there are statistically significant differences after controlling for other factors, rather than to make inferences about a population.

of courses described in the *2007 Revision of the Career/Technical Education Portion of the Secondary School Taxonomy*.[11] High school students are classified as CTE concentrators if they complete three or more Carnegie credits in the same occupational program area—a Carnegie credit indicates that a student has completed the equivalent of a full-year course.

Academic courses in high school include mathematics, science, English, social studies, fine arts, and non-English languages. Students are classified as completing a New Basics curriculum if they earn four credits in English, and three credits each in science, social studies, and math. Completion of the New Basics curriculum is a key requirement for admission to public four-year colleges in Florida.

Any courses that cannot be categorized as nonoccupational CTE, occupational CTE, or academic are defined as "other." This category contains courses in areas such as physical education and general skills.

Students were categorized either as having completed courses while in grade 12 during the timeframe of the analysis (up to 2007)[12] or having left Florida public schools prior to taking courses in grade 12. Some students who leave the Florida public school system before taking courses in grade 12 may graduate from a private, out-of-state, or home school;[13] however, the majority of these students likely dropped out of high school. Most high school students leaving Florida public high schools before entering grade 12 do not complete a New Basics curriculum or a CTE concentration. Among the students who left prior to grade 12, only 3 percent completed a New Basics curriculum and 3 percent completed a CTE concentration (see Table 5). In contrast, 77 percent of students who reached grade 12 completed a New Basics curriculum and 27 percent completed a CTE concentration. These differences are reflected in the distribution of high school concentration types, with about 95 percent of high school students who left prior to grade 12 classified as non-New Basics + non-CTE, compared to only 18 percent of students who reached grade 12. Since so few students who left prior to grade 12 completed a CTE concentration, our analyses are limited to students who reached grade 12 (N=84,700).[14]

[11] Each course is assigned to only one occupational area, as recommended by the CTE Technical Review Panel in the *2007 Revision of the Career/Technical Education Portion of the Secondary School Taxonomy*.

[12] Ninety-nine percent of students in our sample are no longer enrolled in high school after the year 2000. Although it is possible that a student could enroll in grade 12 after 2007, it is highly unlikely. Only five students were enrolled in grade 12 during 2005, and no students were enrolled in grade 12 in 2006 or 2007.

[13] Nationwide, 1.7 percent of students in grades 9–12 were homeschooled in 1999 (NCES-2006-042, Table 2) and 8.4 percent of students grades 9–12 attended private schools (Planty et al. 2009, table A-5-2).

[14] Our data do not indicate why students leave prior to grade 12. Some of the students leaving Florida public high schools prior to grade 12 relocate out of state or transfer to private high schools in Florida. Our data also do not tell us whether students graduated from high school, but we assume that most of the students who reached grade 12 also graduate.

Table 5. Percentage distribution of New Basics and CTE concentrator status among Florida public school students in the 1996 Florida grade 9 cohort, by whether the student left prior to grade 12 or reached grade 12

	All Students	Left Prior to Grade 12	Reached Grade 12
All Students	100.0%	41.4%	58.6%
High school concentration type:			
Non-New Basics + Non-CTE	49.4%	94.3%	17.7%
Non-New Basics + CTE	4.6%	3.2%	5.6%
New Basics + Non-CTE	31.7%	2.1%	52.6%
New Basics + CTE	14.3%	0.4%	24.1%
Overall New Basics & CTE:			
New Basics completers	46.0%	2.5%	76.7%
CTE (3+) concentrators	18.9%	3.6%	29.7%

SOURCE: Florida K-20 data warehouse (authors' calculations)

4.2.1 Completion of Academic, Occupational CTE, Nonoccupational CTE, and Other Courses in High School by Students Reaching Grade 12

High school students who reached grade 12 completed an average of 18.7 credits in academic courses (70 percent of all high school credits), 3.1 credits in occupational CTE courses (11 percent), 1.9 credits in nonoccupational CTE courses (7 percent), and 3.2 credits in other courses (11 percent) (see Table 6). The number of credits completed in occupational CTE courses increase at higher grade levels; while the number of credits completed in academic courses declines, particularly in the senior year.

The number and percentage of credits completed in each type of course is similar for students who attended comprehensive or non-CTE magnet school compared to magnet schools with CTE academies. However, students who attended separate CTE schools complete an average of about three and half fewer credits in academic courses, and one and a half more credits in occupational CTE courses than other students do.

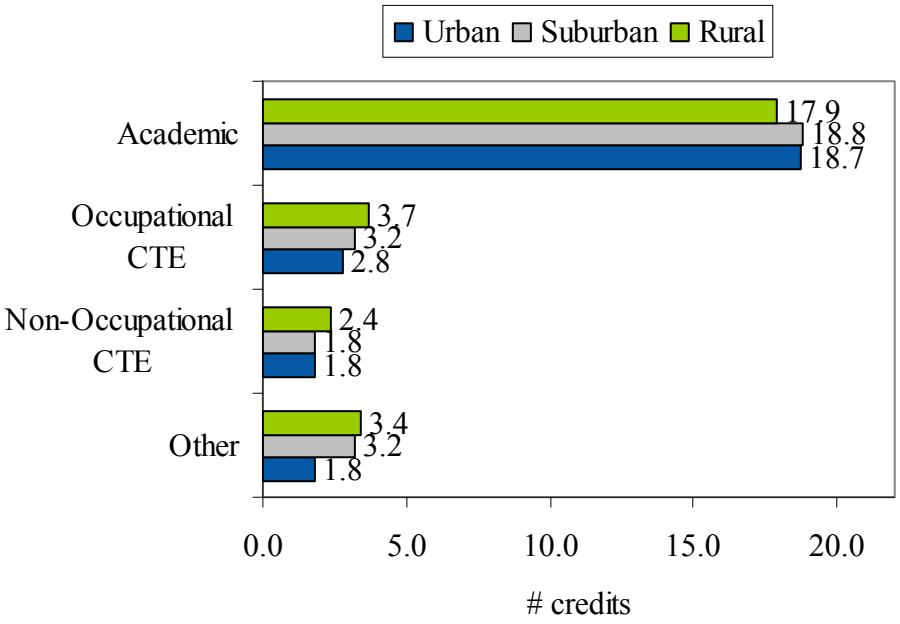
There are also differences in the number of credits completed in each subject by school locale (see Figure 1). Compared to urban students, rural students complete about one credit less in academic courses (17.9 credits versus 18.7 credits) and one credit more in occupational CTE courses (3.7 credits versus 2.8 credits).

Table 6. Average number and percentage of high school credits completed in academic, occupational CTE, nonoccupational CTE, other, and all courses in each grade level for high school students in the 1996 Florida grade 9 cohort reaching grade 12, by school locale and school type

		School locale			School type		
	All	Rural	Suburban	Urban	Compre-hensive or non-CTE magnet	Magnet w/CTE academy	Separate CTE
Academic courses							
Grade 9	4.9	4.5	4.9	4.9	4.9	4.8	4.2
Grade 10	5.0	5.0	5.0	4.9	5.1	4.9	4.2
Grade 11	4.8	4.6	4.8	4.7	4.8	4.7	3.6
Grade 12	4.1	3.8	4.0	4.1	4.1	4.1	3.2
Total academic courses	18.7	17.9	18.8	18.7	18.9	18.5	15.2
Percent academic courses	70%	66%	70%	71%	70%	71%	60%
Occupational CTE courses							
Grade 9	0.5	0.6	0.5	0.4	0.5	0.5	0.6
Grade 10	0.7	0.8	0.7	0.6	0.7	0.7	1.0
Grade 11	0.8	1.0	0.9	0.7	0.8	0.8	1.5
Grade 12	1.1	1.2	1.1	1.0	1.1	1.0	1.6
Total occupational CTE courses	3.1	3.7	3.2	2.8	3.1	2.9	4.7
Percent occupational CTE courses	11%	13%	12%	10%	11%	11%	18%
Non-Occupational CTE courses							
Grade 9	0.5	0.7	0.5	0.5	0.6	0.5	0.6
Grade 10	0.3	0.4	0.3	0.3	0.3	0.3	0.5
Grade 11	0.3	0.4	0.3	0.3	0.3	0.3	0.5
Grade 12	0.7	0.9	0.6	0.7	0.7	0.7	1.0
Total non-occupational CTE courses	1.9	2.4	1.8	1.8	1.8	1.8	2.7
Percent non-occupational CTE courses	7%	9%	7%	7%	7%	7%	10%
Other courses							
Grade 9	1.2	1.4	1.2	1.1	1.2	1.0	1.2
Grade 10	0.9	0.8	0.9	0.9	0.9	0.9	0.8
Grade 11	0.5	0.6	0.6	0.5	0.6	0.5	0.4
Grade 12	0.6	0.7	0.6	0.6	0.6	0.6	0.4
Total other courses	3.2	3.4	3.2	3.2	3.3	3.0	2.9
Percent other courses	12%	12%	12%	12%	12%	12%	11%
All courses							
Grade 9	7.0	7.3	7.1	6.9	7.2	6.8	6.7
Grade 10	6.9	7.0	6.9	6.8	7.0	6.8	6.6
Grade 11	6.4	6.5	6.5	6.3	6.6	6.3	6.0
Grade 12	6.4	6.5	6.4	6.4	6.5	6.3	6.2
Total all courses	26.8	27.3	27.0	26.4	27.1	26.1	25.4

SOURCE: Florida K-20 data warehouse (authors' calculations)

Figure 1. Average number of high school credits in academic, occupational CTE, nonoccupational CTE, and other subjects for students in the 1996 Florida grade 9 cohort who reached grade 12, by school locale



SOURCE: Florida K-20 data warehouse (authors' calculations)

Table 7 shows that only 10 percent of students reaching grade 12 do not complete any occupational CTE courses. The majority of students (54 percent) take some CTE courses but complete less than four credits, while one-third of students complete four or more occupational CTE credits. There are large differences in the distribution by school locale, with 45 percent of rural students completing four or more occupational CTE credits compared to 29 percent of urban students. When the distributions are compared by school type, 59 percent of students who attended specialized CTE schools complete four or more occupational CTE credits compared to 35 percent of students at comprehensive schools and 31 percent of students at magnet schools with a CTE academy. Approximately 6 percent of students at specialized CTE schools do not complete any occupational CTE courses. The majority of these students only complete nonoccupational CTE (general labor market or family and consumer sciences) courses.[15] In 2000, Florida graduation requirements included at least one credit in practical arts or exploratory career education, so students who attended high schools with few course offerings in these areas may have taken courses at specialized CTE schools to fulfill this requirement.

[15] Some students enrolled in occupational CTE courses received a failing grade or dropped the class so they did not complete any credits.

Table 7. Percentage of students completing none, 0.01–1.99 credits, 2.00–3.99 credits, and 4.00 or more credits in occupational CTE courses for students in the 1996 Florida grade 9 cohort who reached grade 12, by school locale and school type

	None	0.01-1.99 credits	2.00-3.99 credits	4.00 or more credits	Total
All students reaching grade 12	10%	25%	31%	34%	100%
School locale					
Rural	7%	19%	30%	45%	100%
Suburban	9%	24%	31%	36%	100%
Urban	11%	28%	32%	29%	100%
School type					
Comprehensive or non-CTE magnet	10%	25%	31%	35%	100%
Magnet with CTE academy	9%	26%	33%	31%	100%
Separate CTE school	6%	9%	26%	59%	100%

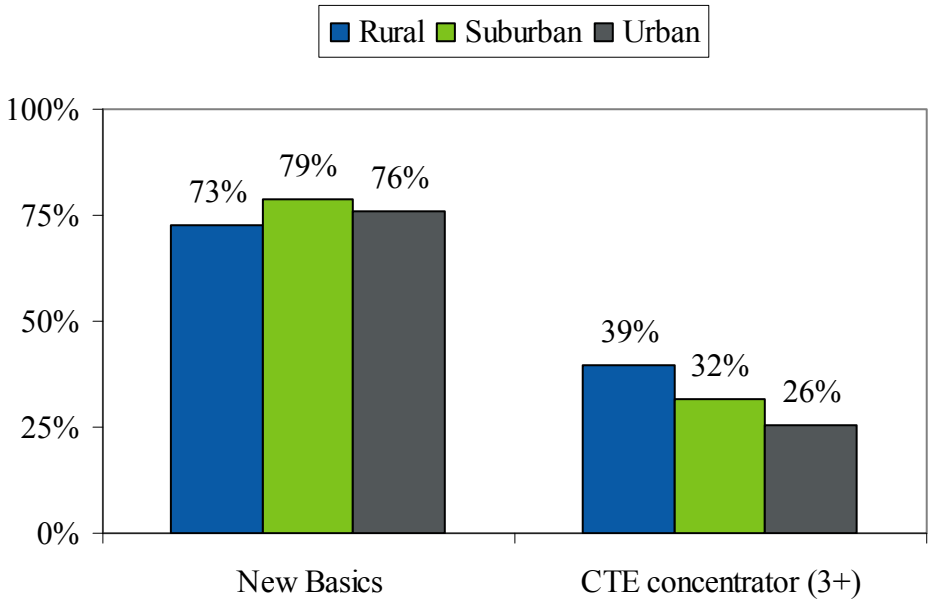
NOTE: Detail may not sum to totals because of rounding
SOURCE: Florida K-20 data warehouse (authors' calculations)

4.2.2 High School Concentrations by School Locale and School Type for Students Reaching Grade 12

Figure 2 illustrates the percentage of students who are New Basics completers or CTE concentrators by school locale. In both rural and urban schools, about three-quarters of students complete a New Basics curriculum. However, rural students are more likely to complete a CTE concentration than urban students (39 percent compared to 26 percent).

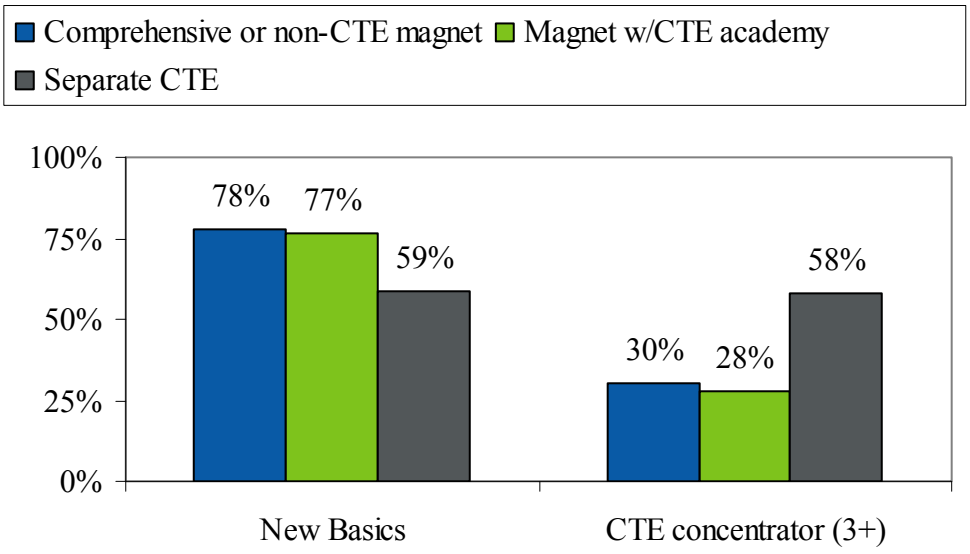
Figure 3 illustrates the percentage of students who are New Basics completers or CTE concentrators by school type. Only 59 percent of students who attended separate CTE schools complete a New Basics curriculum compared to over three-quarters of students at comprehensive or non-CTE magnet schools and magnet schools with CTE academies. In addition, over half of students who attended separate CTE schools completed a CTE concentration (58 percent), compared to 30 percent of students at comprehensive or non-CTE magnet schools, and to 28 percent of students at magnet schools with CTE academies.

Figure 2. Percentage of students who are New Basics completers or CTE concentrators among students in the 1996 Florida grade 9 cohort who reached grade 12, by school locale



SOURCE: Florida K-20 data warehouse (authors' calculations)

Figure 3. Percentage of students who are New Basics completers or CTE concentrators among high school students in the 1996 Florida grade 9 cohort reaching grade 12, by school type



SOURCE: Florida K-20 data warehouse (authors' calculations)

A multinomial logistic regression model was used to examine whether there were differences in the likelihood of completing each of the four types of high school concentrations by school locale and school type. The results are presented before and after controlling for student characteristics, high school performance, school characteristics, and work experience, to provide an estimate of the extent to which differences may be attributed to variation within groups among these characteristics. (Regression results are presented in Appendix D, Table D1.) Holding other factors constant, students in urban schools were significantly less likely to complete either type of CTE concentration than students in rural schools, and significantly more likely to complete a non-New Basics + non-CTE concentration. The predicted probability of completing a non-New Basics + CTE concentration is 4.6 percent for urban students compared to 6.9 percent for rural students (see Table 8). The predicted probability of completing a New Basics + CTE concentration is 21.5 percent for urban students compared to 32.4 percent for rural students. The predicted probabilities by school locale are similar regardless of whether control variables are included in the model.

Table 8. Predicted probabilities of completing each type of high school concentration for students in the 1996 Florida grade 9 cohort who reached grade 12, by school locale and school type

		School locale			School type		
	All	Rural	Suburban	Urban	Compre-hensive or non-CTE magnet	Magnet w/CTE academy	Separate CTE
Non-New Basics + Non-CTE							
Predict prob. (no controls)	15.4%	15.1%	13.5%	17.3%	14.6%	16.2%	16.1%
Predict prob. (with controls)	15.4%	12.4%	14.0%	17.6%	15.3%	15.4%	11.4%
Percentage point difference	0.0	2.7	-0.5	-0.3	-0.6	0.7	4.7
Non-New Basics + CTE							
Predict prob. (no controls)	5.2%	8.5%	5.3%	4.5%	5.1%	4.9%	23.7%
Predict prob. (with controls)	5.2%	6.9%	5.4%	4.6%	4.9%	5.4%	16.3%
Percentage point difference	0.0	1.6	-0.1	-0.1	0.1	-0.5	7.4
New Basics + Non-CTE							
Predict prob. (no controls)	54.7%	44.9%	54.4%	56.9%	55.1%	55.8%	25.2%
Predict prob. (with controls)	54.7%	48.3%	54.2%	56.3%	55.4%	54.5%	30.8%
Percentage point difference	0.0	-3.4	0.3	0.6	-0.3	1.3	-5.6
New Basics + CTE							
Predict prob. (no controls)	24.7%	31.4%	26.8%	21.4%	25.3%	23.3%	35.1%
Predict prob. (with controls)	24.7%	32.4%	26.4%	21.5%	24.5%	24.7%	41.5%
Percentage point difference	0.0	-0.9	0.3	-0.2	0.8	-1.5	-6.5

SOURCE: Predicted probability values are from a multinomial logistic regression model using the Florida K-20 data warehouse. Regression results are presented in Appendix D, Table D-1.

Students who attended separate CTE schools were significantly more likely to complete either type of CTE concentration, after controlling for student characteristics, high school performance, school characteristics, and work experience. Holding other factors constant, the predicted probability of completing a non-New Basics + CTE concentration is 16.3 percent for students at

separate CTE schools, compared to 4.9 percent for students at comprehensive or nonmagnet CTE schools. In addition, students at separate CTE schools were nearly twice as likely to complete New Basics + CTE concentrations as students who attended comprehensive or nonmagnet CTE schools (41.5 percent compared to 24.5 percent). The difference between the predicted probabilities with and without the control variables suggests that students who attended separate CTE schools would be more likely to complete both types of New Basics concentrations if they had characteristics similar to other students. After holding other factors constant, the probability of completing a New Basics + non-CTE concentration increases from 25.2 percent to 30.8 percent for students at separate CTE schools and the probability of completing a New Basics + CTE concentration increase from 35.1 percent to 41.5 percent. The likelihood of completing each type of concentration is similar between students who attended comprehensive or non-CTE magnet schools and students who attended magnet schools with a CTE academy.

4.2.3 Student Characteristics and Performance by Type of High School Concentration

The likelihood of completing each type of CTE concentration differs by student characteristics and performance.[16] For both types of New Basics concentrations (New Basics + non-CTE and New Basics + CTE), approximately 54 percent of students are female (see Table 9). In contrast, only 46 percent of students in non-New Basics concentrations (non-New Basics + non-CTE and non-New Basics + CTE) are female. White students are more likely to complete both types of CTE concentrations than students from different racial/ethnic backgrounds. Overall, 55 percent of students are white, but the percentage of white students increases to 62 percent for the non-New Basics + CTE concentration and 61 percent for the New Basics + CTE concentration. Concentrations with a CTE component were also less likely among other types of disadvantaged subgroups. Students categorized as FRL were most likely to complete a non-New Basics + non-CTE concentration, while LEP students were most likely to complete a New Basics + non-CTE concentration. SWD students were most likely to complete either type of non-New Basics concentrations.

[16] The differences presented in this section are based on mean values by type of CTE concentration. All of these differences are also statistically significant ($p<0.05$) based on the multinomial logistic regression model in Table D-1 in Appendix D.

Table 9. Percentage distribution and average of selected student characteristics of students in the 1996 Florida grade 9 cohort, by type of high school concentration

	All	Non-New Basics + Non-CTE	Non-New Basics + CTE	New Basics + Non-CTE	New Basics + CTE
Percent female	52.3%	46.5%	46.3%	54.1%	53.9%
Percent by race					
White	54.8%	48.2%	62.4%	53.6%	60.5%
Black	22.7%	29.3%	19.2%	22.5%	19.3%
Hispanic	12.8%	13.8%	11.8%	13.1%	11.7%
Other	9.7%	8.8%	6.6%	10.9%	8.6%
Percent by age in grade 9					
Less than 14	4.6%	3.2%	3.5%	5.2%	4.5%
14 or 15	91.3%	88.7%	89.9%	91.7%	92.7%
16 or older	4.1%	8.1%	6.7%	3.1%	2.8%
Average age in grade 9	14.4	14.6	14.5	14.4	14.4
Percent Free & Reduced Priced Lunch (FRL)	29.6%	37.0%	32.1%	28.2%	26.7%
Percent Limited English Proficiency (LEP)	11.5%	11.0%	9.6%	12.3%	9.4%
Percent Students With Disabilities (SWD)	15.8%	28.5%	22.7%	13.3%	10.3%

NOTE: Detail may not sum to totals because of rounding
SOURCE: Florida K-20 data warehouse (authors' calculations)

As shown in Table 10, CTE concentrators and nonconcentrators had similar high school grade point averages (GPAs) in grade 9 with average GPAs of 2.7 and 2.6, respectively. There was more variability in high school GPAs by New Basics status, with average values of 2.8 for New Basics completers compared to 2.3 for non-New Basics completers. When the results were disaggregated by high school concentration type, average GPAs were within one-tenth of a point for CTE concentrators and nonconcentrators with the same New Basics completion status.

Absentee rates in grade 9 were also similar among non-New Basics students by CTE concentration status (6.5 percent of days absent for non-CTE concentrators versus 5.6 percent for CTE concentrators), and among New Basics students by CTE concentration status (approximately 4 percent for CTE concentrators and nonconcentrators).

Table 10. Average high school GPA and absentee rate in grade 9 among students in the 1996 Florida grade 9 cohort who reached grade 12, by New Basics and CTE concentrator status

	Average high school cumulative GPA	Average high school absentee rate
All students	2.7	4.5%
High school concentration type:		
Non-New Basics + Non-CTE	2.3	6.5%
Non-New Basics + CTE	2.4	5.6%
New Basics + Non-CTE	2.8	4.0%
New Basics + CTE	2.8	3.9%
Overall New Basics & CTE:		
Non-New Basics completers	2.3	6.3%
New Basics completers	2.8	4.0%
Non-CTE concentrators	2.6	4.7%
CTE concentrators	2.7	4.2%

SOURCE: Florida K-20 data warehouse (authors' calculations)

4.2.4 The Likelihood of Completing a New Basics Curriculum for CTE Concentrators and Nonconcentrators

A logistic regression model was used to test whether there are differences in the likelihood of completing a New Basics curriculum by CTE concentrator status, after controlling for differences in student characteristics, high school performance, school characteristics, and work experience (see regression results in Appendix D, Table D2). The results indicate that CTE concentrators are statistically significantly more likely to complete a New Basics curriculum, although the magnitude of the effect is small. After holding other factors constant, the predicted probability of completing a New Basics curriculum is 82.3 percent for CTE concentrators compared to 77.9 percent for nonconcentrators (see Table 11). The results are similar regardless of whether control variables are included in the model.

Table 11. Predicted probabilities of completing a New Basics curriculum among students in the 1996 Florida grade 9 cohort who reached grade 12, by school locale and school type

	Predicted Probability of New Basics		Percentage Point Difference
	No Controls	With Controls	
All students	79.3%	79.3%	0.0
High school CTE concentration			
No	77.4%	77.9%	0.5
Yes	83.3%	82.3%	-1.0
School locale			
Rural	76.2%	80.3%	4.0
Suburban	81.2%	80.5%	-0.7
Urban	78.1%	77.9%	-0.2
School type			
Comprehensive or Non-CTE Magnet	80.2%	79.8%	-0.4
Magnet with CTE Academy	79.0%	79.1%	0.2
Separate CTE School	60.0%	70.5%	10.5

SOURCE: Predicted probability values are from a logistic regression model using the Florida K-20 data warehouse. Regression results are presented in Appendix D, Table D-2.

Holding other factors constant, students who attended urban schools were slightly less likely to complete a New Basics curriculum relative to students who attended rural schools, but the magnitude of this difference was not meaningful (77.9 percent versus 80.3 percent). Students who attended separate CTE schools are also less likely to complete a New Basics curriculum than students who attended comprehensive or non-CTE magnet schools, but much of this variation is attributed to differences between students at separate CTE schools and other students in student characteristics, high school performance, school characteristics, and work experience. Before controlling for these characteristics, the probability of completing a New Basics curriculum is 60.0 percent for students at separate CTE schools and 80.2 percent for students at comprehensive or non-magnet CTE schools—a difference of 20.2 percentage points. After controlling for these characteristics, the probability of completing a New Basics curriculum increases to 70.5 percent for students at a separate CTE school compared to 79.8 percent for students at comprehensive or non-magnet CTE schools—a difference of 9.3 percentage points.

4.2.5 The Timing of CTE Course Taking for High School CTE Concentrators

Table 12 shows the timing of CTE course taking for high school CTE concentrators. The number of CTE credits completed tends to increase as students progress to higher grade levels. The average number of credits completed ranges from 0.8 credits in grade 9 to 2.0 credits in grade 12. The percentage of CTE concentrators with no CTE credits in each grade ranges from 35 percent in grade 9 to 11 percent in grade 12. In higher grade levels, there is also an increase in the number of students completing multiple CTE credits in a single grade. For example, only 4 percent of high school CTE concentrators completed more than two CTE credits in grade 9, compared to 35 percent of high school concentrators in grade 12.

Table 12. Distribution and average number of high school CTE credits completed each term by high school CTE concentrators, by grade

	Grade 9	Grade 10	Grade 11	Grade 12
0 CTE credits	35%	16%	11%	11%
0.5 CTE credits	14%	6%	3%	4%
1.0 CTE credit	31%	38%	31%	20%
1.5 CTE credits	8%	9%	8%	7%
2.0 CTE credits	8%	20%	28%	23%
More than 2.0 CTE credits	4%	11%	20%	35%
Total	100%	100%	100%	100%
Average number of CTE credits	0.8	1.3	1.6	2.0

NOTE: Detail may not sum to totals because of rounding

SOURCE: Florida K-20 data warehouse (authors' calculations)

4.2.6 The Most Common Program Areas for High School CTE Concentrations and Differences in Student Performance by Program Area

Overall, agriculture and natural resources is the most common CTE program area for non-New Basics + CTE concentrators, while communications and design[17] is the most common CTE program area for New Basics + CTE concentrators (see Table 13). The program areas of consumer and culinary services, communications and design, and business are among the top five program areas for both New Basics completers and non-completers. However, non-New Basics + CTE concentrators are more likely to enter the program areas of agriculture and natural resources or manufacturing, repair and transportation, while New Basics + CTE concentrators are more likely to enter the program areas for health sciences or engineering and technologies.

[17] The communications and design program area includes courses such as journalism, television production, photography, and graphic design.

Table 13. Top five most common program areas for CTE concentrations among students in the 1996 Florida grade 9 cohort who reached grade 12, by type of high school concentration and school locale

	Non-New Basics + CTE		New Basics + CTE	
All	Agriculture & Natural Resources	18%	Communications & Design	22%
	Consumer & Culinary Services	16%	Business	17%
	Communications & Design	14%	Consumer & Culinary Services	14%
	Mfg, Repair & Transportation	14%	Health Sciences	11%
	Business	13%	Engineering & Technologies	10%
Rural	Agriculture & Natural Resources	35%	Agriculture & Natural Resources	27%
	Mfg, Repair & Transportation	13%	Communications & Design	15%
	Business	11%	Business	14%
	Consumer & Culinary Services	10%	Health Sciences	11%
	Health Sciences	10%	Consumer & Culinary Services	10%
Suburban	Agriculture & Natural Resources	20%	Communications & Design	23%
	Consumer & Culinary Services	16%	Business	16%
	Business	14%	Consumer & Culinary Services	15%
	Mfg, Repair & Transportation	14%	Health Sciences	11%
	Communications & Design	13%	Engineering & Technologies	10%
Urban	Communications & Design	18%	Communications & Design	23%
	Consumer & Culinary Services	18%	Business	18%
	Mfg, Repair & Transportation	15%	Consumer & Culinary Services	13%
	Business	14%	Health Sciences	12%
	Engineering & Technologies	8%	Engineering & Technologies	11%
Comprehensive Non-CTE Magnet	Agriculture & Natural Resources	23%	Communications & Design	22%
	Consumer & Culinary Services	15%	Business	17%
	Communications & Design	13%	Consumer & Culinary Services	14%
	Business	13%	Agriculture & Natural Resources	11%
	Mfg, Repair & Transportation	12%	Engineering & Technologies	10%
Magnet w/ CTE Academy	Communications & Design	19%	Communications & Design	22%
	Business	18%	Business	18%
	Consumer & Culinary Services	16%	Health Sciences	18%
	Mfg, Repair & Transportation	14%	Consumer & Culinary Services	12%
	Health Sciences	12%	Mfg, Repair & Transportation	9%
Separate CTE School	Mfg, Repair & Transportation	31%	Mfg, Repair & Transportation	33%
	Consumer & Culinary Services	20%	Consumer & Culinary Services	18%
	Agriculture & Natural Resources	16%	Construction & Architecture	12%
	Construction & Architecture	15%	Agriculture & Natural Resources	11%
	Business	7%	Engineering & Technologies	8%

SOURCE: Florida K-20 data warehouse.

The greatest difference by school locale is the popularity of agriculture and natural resources in rural areas. This is the most common program area in rural schools, comprising 35 percent of CTE concentrations among non-New Basics + CTE concentrators and 27 percent of CTE concentrations among New Basics + CTE concentrators. In urban areas, the most common program area is communications and design for both types of CTE concentrators (18 percent for non-New Basics + CTE concentrators and 23 percent for New Basics + CTE concentrators).

When the most common program areas are compared by school type, the greatest differences occur among students who attended separate CTE schools. Nearly one-third of all CTE concentrators (regardless of New Basics status) at separate CTE schools are in the manufacturing, repair, and transportation program area. In comparison, less than 15 percent of CTE concentrators at other types of schools complete a concentration in this program area. Construction and architecture is another program area that is among the top five for CTE concentrators at separate CTE schools, but not among CTE concentrators at other school types. Additional information about the distribution of all CTE program areas by school locale and school type is presented in Appendix C, Table C2.

Overall, the absentee rate was higher and GPA was lower among non-New Basics students. Table 14 compares student performance, in terms of high school GPA and absentee rates, by program area for non-New Basics + CTE concentrators and New Basics + CTE concentrators. For both New Basics completers and non-completers, the absentee rate in grade 9 for each program area is within 2 percentage points of the average absentee rate for all program areas. There is greater variation by program area in student performance in terms of GPA in grade 9. The average GPA for non-New Basics completers in all CTE program areas is 2.38, with values ranging from 2.14 for the manufacturing, repair and transportation program area to 2.59 for the health sciences program area. The average GPA for New Basics completers in all CTE program areas is 2.80, with values ranging from 2.46 in the manufacturing, repair and transportation program area to 2.98 in the computer and information sciences program area.

Table 14. Average high school GPA and absentee rate in grade 9 among students in the 1996 Florida grade 9 cohort who reached grade 12 and completed a high school CTE concentration, by New Basics completion

	Non-New Basics		New Basics	
	Average high school cumulative GPA	Average high school absentee rate	Average high school cumulative GPA	Average high school absentee rate
All program areas	2.38	6%	2.80	4%
Agriculture & Natural Resources	2.37	6%	2.75	4%
Business	2.56	5%	2.93	3%
Communications & Design	2.55	5%	2.94	4%
Computer & Information Sciences	2.55	4%	2.98	3%
Construction & Architecture	2.16	5%	2.48	4%
Consumer & Culinary Services	2.22	6%	2.56	5%
Engineering Technologies	2.49	6%	2.92	3%
Health Sciences	2.59	5%	2.97	4%
Marketing	2.26	7%	2.67	4%
Mfg, Repair & Transportation	2.14	6%	2.46	5%
Public Services	2.53	5%	2.78	4%

SOURCE: Florida K-20 data warehouse (authors' calculations)

4.2.7 Summary

Most high school students leaving Florida public high schools before grade 12 do not complete a New Basics curriculum or a CTE concentration. Among students who reached grade 12 we found the following differences in course taking:

- Rural students completed an average of one Carnegie credit more in CTE courses than urban students, which translates to one additional full-year course.
  - As a result of this difference in course taking, 39 percent of rural students completed a CTE concentration (three or more Carnegie credits in the same program area) compared to 26 percent of urban students.
- Students who attended separate CTE schools were more likely to complete a CTE concentration and less likely to complete a New Basics curriculum than students who attended other types of schools.
- CTE concentrators and nonconcentrators with comparable academic backgrounds (based on New Basics completion status) had similar GPAs. Students who completed the New Basics curriculum had GPAs that were about one-half point higher and absentee rates that were about fifty percent lower than non-New Basics completers.

- CTE concentrators were more likely to complete a New Basics curriculum than nonconcentrators, but the difference was small.

- The most common CTE program areas completed differed by academic background (New Basics completer or non-completer), school locale, and school type.

4.3 Post-High School Transitions

This section describes the transitions that students in the 1996 Florida grade 9 cohort who reached grade 12 (N=84,700) make after high school, by type of high school concentration, school locale, and school type. We examine whether students attended a public college in Florida part-time or full-time *at any time* after leaving high school until 2006, or instead of attending college, whether students entered the workforce part-time or full-time directly after high school. The many students who attended college and worked (full-time or part-time) after high school are categorized as attending college since the primary transition of interest is college attendance.

College attendees are considered full-time students if they take 12 credit hours or more on average each fall and spring semester they attended college. High school leavers are considered full-time workers if they are employed in at least one quarter with average earnings at or above the federal minimum wage during the period from 2000 to 2004. Approximately 8 percent of students in the 1996 Florida grade 9 cohort that reached grade 12 did not have any college transcripts and also did not have any wage records between 2000 and 2004.[18] Data from the Integrated Postsecondary Education Data System (IPEDS) indicate that almost all of these students likely attended a private or out-of-state college,[19] although some could have been living in Florida but not working in a covered sector, or not working and not attending school. However, we excluded these students from the remaining analyses since we were unable to observe their post-high school outcomes.[20] Tables C3 and C4 in Appendix C provide more detailed information about the distribution of post-high school transitions by student characteristics and high school concentrations.

[18] In order to be included in this analysis, students with no college transcripts must have full-time wage records for at least one quarter between 2000 and 2004. This decreases the likelihood that students who attend an out-of-state college and then return to Florida for employment after receiving a credential will be categorized as not attending college.

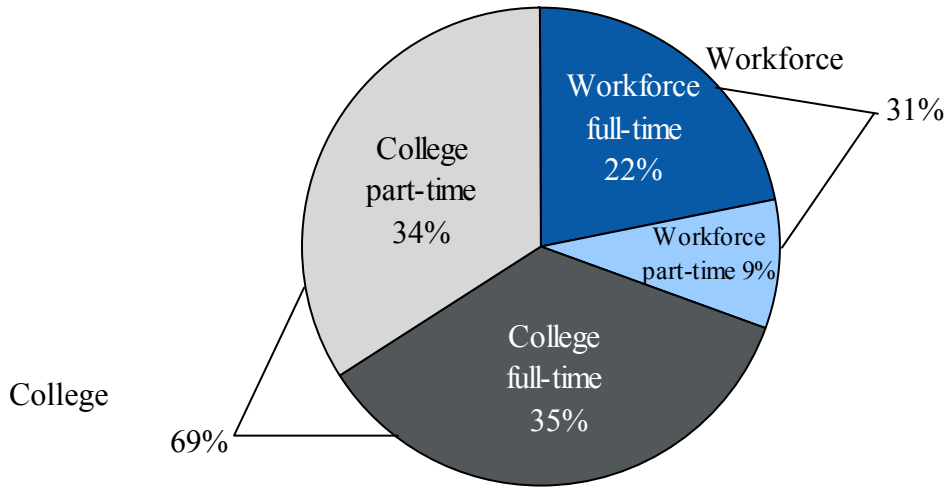
[19] In fall 2000, about 12 percent of Florida resident high school graduates who attended college were enrolled at an out-of-state college (Snyder 2002, table 204). In addition, about 26 percent of first-time freshmen attending Florida colleges were enrolled at private institutions in 2000 (Snyder 2002, table 182).

[20] Non-New Basics + non-CTE concentrators are more likely to have an unknown post-high school transition than students with other types of high school concentrations (12 percent versus 7 percent). The percentage of students with unknown post-high school transitions ranges from 7 percent to 9 percent for all school types and locales.

4.3.1 The Overall Distribution of Post-High School Transitions

Among all students who reached grade 12 and had transcript or wage data after high school, approximately 69 percent attended college by 2006 and 31 percent entered the workforce instead (see Figure 4). The percentage of students who attended college is evenly divided among part-time attendance (34 percent) and full-time attendance (35 percent).[21] The percentage of students who entered the workforce is more heavily weighted toward full-time employment (22 percent) than part-time employment (9 percent). There were also differences in the distribution of post-high school transitions by gender: 64 percent of males attended college compared to 74 percent of females.

Figure 4. Percentage distribution of post-high school transitions for students in the 1996 Florida grade 9 cohort that reached grade 12



SOURCE: Florida K-20 data warehouse (authors' calculations)

Students who attended college part-time versus full-time differed in ways other than just the number of credit hours they completed each semester (see Table 15). Part-time students were more likely to delay college entry after high school. Overall, only 26 percent of college students enrolled after the year 2000, but the rates varied from 32 percent for part-time college students to 19 percent for full-time college students. In addition, 86 percent of part-time students started at a two-year college compared to 62 percent of full-time students. Part-time students were also more likely to attend only one institution over the course of their college careers than full-time students (66 percent compared to 44 percent). In addition, there were differences in employment status during college by enrollment status. Forty-five percent of part-time students were employed primarily full-time[22] during college, compared to only 25 percent of full-time college students.

[21] Students were categorized as attending college full-time if they were enrolled in at least 12 credit hours per semester for at least half of the semesters during which they attended college.

[22] Students are considered to be employed primarily full-time during college if their average earnings in the quarters that they worked were at or above the minimum wage.

Table 15. Percentage distribution of selected college attendance characteristics for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college, by part-time and full-time college enrollment status

	All	College part-time	College full-time
College entry			
Enrolled by 2000	74%	68%	81%
Enrolled after 2000	26%	32%	19%
Type of college			
Started at a 2-year college	74%	86%	62%
Started at a 4-year college	26%	14%	38%
Number of institutions attended			
One	55%	66%	44%
Two	32%	25%	39%
Three or more	13%	9%	17%
Employment status during college			
No employment	6%	7%	6%
Primarily part-time	58%	48%	69%
Primarily full-time	35%	45%	25%

SOURCE: Florida K-20 data warehouse (authors' calculations)

4.3.2 Factors Correlated with Post-High School Transitions (Employment versus College Enrollment)

A logistic regression model is used to predict the likelihood of enrolling in college after high school relative to entering the workforce. The predicted probability of enrolling in college is presented in Table 16 with and without holding constant observable differences in student demographic characteristics, high school performance, school characteristics, and work experience (regression results are presented in Appendix D, Table D3). When other factors are held constant, there is less than a 2 percentage point difference in the predicted probability of attending college between CTE concentrators and nonconcentrators with the same New Basics status (non-New Basics + non-CTE versus non-New Basics + CTE and New Basics + non-CTE versus New Basics + CTE). There are large differences in the probability of enrolling in college

Table 16. Predicted probabilities of enrolling in college after high school (relative to entering the workforce) for students in the 1996 Florida grade 9 cohort that reached grade 12, by high school concentration, school locale, and school type

	Predicted Probability of Attending College		Percentage Point Difference
	No Controls	With Controls	
All students	71.6%	71.6%	0.0
High school concentration type			
Non-New Basics + Non-CTE	48.7%	60.2%	11.5
Non-New Basics + CTE	50.3%	59.8%	9.5
New Basics + Non-CTE	77.4%	75.1%	-2.3
New Basics + CTE	75.9%	73.2%	-2.7
School locale			
Rural	64.9%	71.6%	6.7
Suburban	71.6%	70.5%	-1.2
Urban	73.0%	72.6%	-0.4
School type			
Comprehensive or Non-CTE Magnet	71.4%	70.6%	-0.8
Magnet with CTE Academy	74.0%	74.6%	0.6
Separate CTE School	42.2%	58.9%	16.7

SOURCE: Predicted probability values are from a logistic regression model using the Florida K-20 data warehouse. Regression results are presented in Appendix D, Table D-3.

between New Basics completers and non-completers, much of which is explained by differences in observable characteristics between the groups. Without holding these variables constant, the difference in the predicted probability of attending college between New Basics completers and non-completers is 28.7 percentage points for non-CTE concentrators (77.4 percent for New Basics + non-CTE, 48.7 percent for non-New Basics + non-CTE) and 25.6 percentage points for CTE concentrators (75.9 percent for New Basics + CTE and 50.3 percent for non-New Basics + CTE). When the control variables are held constant, the difference in the predicted probability of attending college between New Basics completers and non-completers is reduced by about half to 14.9 percentage points for non-CTE concentrators (75.1 percent for New Basics + non-CTE, 60.2 percent for non-New Basics + non-CTE) and 13.4 percentage points for CTE concentrators (73.2 percent for New Basics + CTE 59.8 percent for non-New Basics + CTE).

Rural students are less likely to attend college than urban or suburban students, but most of this difference is attributed to observable differences. For example, when observable differences are not held constant, the predicted probability of attending college is 64.9 percent for rural students

and 73.0 percent for urban students—a difference of 8.1 percentage points. However, if rural and urban students had similar characteristics, the predicted probability of attending college would be 71.6 percent for rural students and 72.6 percent for urban students—a non-significant difference of only 1 percentage point.

The results also indicate that students who attended separate CTE schools are less likely to attend college than students who attended comprehensive or non-magnet CTE schools. After holding observable characteristics constant, this difference is reduced but there are still substantive differences between the two groups. Holding other factors constant, the predicted probability of attending college is 58.9 percent for students at separate CTE schools compared to 70.6 percent for students at comprehensive or non-magnet CTE schools. Students at magnet schools with a CTE academy are slightly more likely to attend college than students at comprehensive or non-magnet CTE schools. Holding other factors constant, the predicted probability of attending college is 74.6 percent for students at magnet schools with a CTE academy compared to 70.6 percent for students at comprehensive or non-CTE magnet schools.

We also estimated a multinomial logistic model to predict the likelihood of entering the workforce part-time, entering the workforce full-time, enrolling in college part-time and enrolling in college full-time while holding constant observable differences. These results reflect the same main findings as above, while providing little additional information. For example, relative to students at comprehensive schools, students at separate CTE schools are more likely to enter the workforce part-time or full-time and less likely to enroll in college part-time or full-time. The results from the multinomial logistic regression and the predicted probabilities of each outcome are presented in Appendix D, Tables D4 and D5.

4.3.3 The Timing of Postsecondary Transitions

As shown in Table 17, 84 percent of students who make the transition from high school to postsecondary education enroll in their first college course within one year of high school. The amount of time between high school and college enrollment differs by highest level of education completed. Few students who completed degrees delayed the transition to postsecondary education, with 94 percent of students with associate's degrees and 98 percent of students with bachelor's degrees enrolling in college within one year of high school. In comparison, only 69 percent of students with certificates enrolled in college within one year of high school. Certificate students were also much more likely to delay college entry more than three years (19 percent compared to 2 percent of students with associate's degrees and less than 1 percent of students with bachelor's degrees).

Table 17. Number of years between last high school course and first college course for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college, by highest level of education completed

	Within one year	One to two years	Two to three years	More than three years
All students	84%	7%	1%	8%
No credential, no longer enrolled	78%	10%	2%	10%
No credential, still enrolled	64%	8%	2%	26%
Certificate	69%	11%	2%	19%
Associate's degree	94%	3%	#	2%
Bachelor's degree	98%	2%	#	#

Rounds to zero.

NOTE: Detail may not sum to totals because of rounding

SOURCE: Florida K-20 data warehouse (authors' calculations)

4.3.4 Summary

Among members of the 1996 Florida grade 9 cohort who reached grade 12 and had post-high school transitions within two years of grade 12 that could be observed, we find that:

- The majority of students with follow-up data who reached grade 12 attended college (69 percent). These students are evenly distributed among part-time and full-time college attendance status.

- The distribution of postsecondary transitions was similar for high school CTE concentrators and nonconcentrators with similar academic backgrounds (New Basics completion status).

- Rural students were less likely to attend college after high school than urban students, but most of this difference was attributed to differences between the two groups in student demographic characteristics, high school performance, school characteristics, and work experience.

- Holding other factors constant, the predicted probability of attending college (relative to entering the workforce) was greatest for students who attended magnet schools with a CTE academy and least for students who attended separate CTE schools.

- Most college-bound students enrolled in college within one year of high school (84 percent). Among students who completed a postsecondary credential, certificate students were the most likely to delay entry into college after high school.

4.4 College **Course Taking** by **1996 Florida Grade** 9 **Cohort Members Reaching Grade** 12 and **Entering Public Florida Colleges by 2000**

This section examines differences in college course taking by high school concentration type, school locale, and school type. The sample for this analysis is limited to students in the 1996 Florida grade 9 cohort that reached grade 12 and attended an in-state public two-year or four-year college by the year 2000 (N=40,240). Also, the sample is limited to students who enrolled in college by the year 2000 to allow for a six-year follow-up period from initial enrollment. Although some students may continue to take college courses more than six years after initial enrollment, 93 percent of the students in our sample were not enrolled in any college courses during 2006. The college transcripts for students with less than six years of follow-up are unlikely to represent all of the college courses that will be completed, particularly for part-time students.

There are four different types of courses offered at the postsecondary level:

- Academic courses: courses in mathematics, science, humanities, English/letters, social sciences, fine/performing arts, and interdisciplinary studies;

- Remedial courses: courses addressing basic skills deficiencies, which are designed to prepare students for college-level work;[23]

- CTE courses: courses in 12 different program areas that prepare students for employment in a specific type of occupation; and,

- Other courses: courses in personal improvement or leisure that cannot be classified as academic, remedial, or CTE. This may include courses in areas such as personal improvement and leisure.

CTE courses are subdivided into 12 different program areas (as defined in NCES 2008-035), which can be matched with occupational CTE program areas at the secondary school level.[24] These program areas are agriculture and natural resources; business and marketing; communications; computer sciences; education; engineering and architectural services; health care; legal services; personal and consumer services; protective services; public, social, and human services; and trade and industry.

The Office of Vocational and Adult Education (OVAE) defines a postsecondary CTE concentrator as a student who completes at least 12 credit hours (academic or CTE) in a program area that requires 12 or more credits and awards an industry-recognized credential, certificate, or degree; or completes such a credential in a shorter program (http://www.ed.gov/policy/sectech/guid/cte/perkinsiv/studentdef.pdf). Our Florida database does not indicate the program area or type of credential that the student *intends* to pursue. Due to this

[23] Students who score below an established score on Florida's college entrance exam must successfully complete remedial courses before enrolling in academic courses. Remedial courses do not satisfy degree requirements.

[24] Academic and CTE courses at the postsecondary level were coded based the crosswalk developed in the 2007 Revision of the CTE Portion of the Secondary School Taxonomy (SST) using Classification of Instruction Programs (CIP) categories.

limitation, the definition of a postsecondary CTE concentrator in this study had to be slightly modified from the OVAE definition.

First, students were classified into either an academic or occupational concentration, which was determined by the academic subject or CTE program area in which they completed the most credit hours. For students who attended a four-year college and enrolled in upper-level courses, the concentration is based on the academic subject or program area in which the most upper-level credits are completed.[25] Upper-level courses are primarily taken to fulfill requirements in students' majors and may be more representative of the subject or program area in which a degree is being pursued. The categories of concentrations include seven academic subjects and 12 CTE program areas. Students who completed the same maximum number of credits in more than one academic subject or CTE program area are categorized as having multiple concentrations. Students who completed less than 12 credits, and did not receive a postsecondary credential, are defined as having an unknown concentration.

Based on this classification scheme, a postsecondary CTE concentrator is defined as a student who completes 12 or more credits and takes the most courses in a CTE program area; or as one who takes the most courses in a CTE program area and completes a credential in a program requiring less than 12 credits. Table C3 in Appendix C provides a rough estimate of the percentage of students who may potentially be miscoded as a result of the data limitations.

Some of the students with academic or multiple concentrations also completed a substantial number of CTE courses. In order to examine the extent to which non-CTE concentrators are heavily engaged in CTE course taking, a separate category was created in this study for CTE explorers. A CTE explorer is defined as a student who does not have a postsecondary CTE concentration, but completes a total of 12 or more CTE credits.

4.4.1 Course Taking Among Academic, Remedial, CTE, and Other Courses in College

For all students who enrolled in college by 2000, approximately 35 percent of courses completed are CTE courses (see Table 18). Students starting at four-year colleges complete a slightly higher percentage of CTE courses compared to students starting at two-year colleges (37 percent compared to 33 percent). Among students who started at two-year colleges, high school CTE concentrators completed approximately one more CTE college course than nonconcentrators (7.0 courses compared to 6.7 courses). Students in both groups completed about 12 academic courses. Among students who started at four-year colleges, high school CTE concentrators completed roughly one more college CTE course than nonconcentrators (14.0 courses compared to 12.8 courses), and one less academic course (20.1 compared to 21.3).

[25] There are no upper-level courses for certificate or associate's degree programs.

Table 18. Average number of postsecondary courses completed in academic, CTE, remedial, other, and total courses; and percentage of courses taken in CTE for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000

	Academic	CTE	Remedial	Other	Total	% CTE
All students	14.7	8.9	1.1	0.8	25.5	35%
High school non-CTE concentrator	14.9	8.7	1.1	0.8	25.5	34%
High school CTE concentrator	14.2	9.5	1.1	0.7	25.5	37%
Students starting at 2-yr colleges	11.9	7.0	1.5	0.6	21.1	33%
High school non-CTE concentrator	12.0	6.7	1.6	0.6	20.9	32%
High school CTE concentrator	11.8	7.6	1.4	0.6	21.5	35%
Students starting at 4-yr colleges	21.0	13.2	0.1	1.1	35.4	37%
High school non-CTE concentrator	21.3	12.8	0.1	1.1	35.4	36%
High school CTE concentrator	20.1	14.0	0.2	1.0	35.3	40%

SOURCE: Florida K-20 data warehouse.

Table 19 provides details about differences in remedial course taking during college by high school CTE concentrator status. This table represents the number of remedial courses attempted, rather than the number of remedial courses completed, since the former is a better indicator of the need for remedial education. Overall, 37 percent of students attempted remedial courses and enrolled in 1.5 remedial courses, on average. There are large differences in remedial course taking by the type of institution attended. Over 90 percent of four-year college starters do not enroll in any remedial courses compared to only half of two-year college starters. The percentage distribution of the number of college remedial courses attempted, and the average number of college remedial courses attempted, is similar by high school CTE concentration status among students who attended the same type of institution. Both high school CTE concentrators and nonconcentrators attempt approximately two remedial courses if they start at a two-year college and about 0.2 remedial courses if they start at a four-year college.

Table 19. Percentage distribution of the number of college remedial courses attempted and average number of college remedial courses attempted for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000

	Number of remedial courses				
	None	One to two	Three to four	Five or more	Average number
All students	63%	13%	11%	13%	1.5
High school non-CTE concentrator	63%	13%	11%	14%	1.6
High school CTE concentrator	62%	14%	12%	12%	1.5
2-year college starters	49%	17%	15%	19%	2.1
High school non-CTE concentrator	49%	16%	15%	20%	2.2
High school CTE concentrator	50%	18%	16%	17%	2.0
4-year college starters	92%	5%	2%	1%	0.2
High school non-CTE concentrator	93%	5%	2%	1%	0.2
High school CTE concentrator	91%	6%	2%	1%	0.2

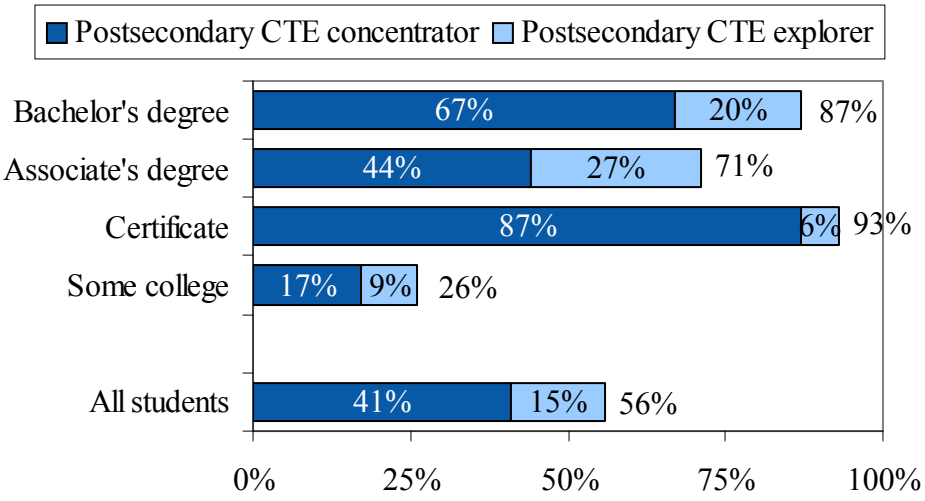
NOTE: Detail may not sum to totals because of rounding
SOURCE: Florida K-20 data warehouse (authors' calculations)

Overall, 41 percent of students are categorized as postsecondary CTE concentrators (see Figure 5). As described earlier, these are students who complete 12 or more credits and concentrate their course taking in a CTE program area or who concentrate their course taking in a CTE program area and complete a credential in a program requiring less than 12 credits. However, some students with academic or multiple concentrations also complete a substantial number of CTE courses. In order to examine the extent to which non-CTE concentrators are heavily engaged in CTE course taking, a separate CTE explorer category is examined. A CTE explorer is defined as a student who does not have a postsecondary CTE concentration, but completes a total of 12 or more CTE credits. Approximately 15 percent of students who attended college by 2000 are CTE explorers.

Figure 5 also indicates that there are large differences in the percentage of postsecondary CTE concentrators and CTE explorers by highest level of education completed. Almost all students with certificates complete a substantial number of CTE courses, with 87 percent of students categorized as CTE concentrators and 6 percent categorized as CTE explorers. The percentage of students completing CTE concentrations is higher for bachelor's degree recipients than associate's degree recipients (67 percent compared to 44 percent). However, students with associate's degrees are more likely to be categorized as CTE explorers than students with bachelor's degrees (27 percent compared to 20 percent).

Students who attended some college but did not receive a credential have the lowest probability of being categorized as a CTE concentrator or explorer. Only 17 percent of some college students are categorized as CTE concentrators, and 9 percent are categorized as CTE explorers. To a large extent this is because 38 percent of students in the some college category earn fewer than 12 credits of any type.

Figure 5. Percentage of students categorized as postsecondary CTE concentrators and postsecondary CTE explorers for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000, by highest level of education completed



SOURCE: Florida K-20 data warehouse (authors' calculations)

There are also several differences in the extent of postsecondary CTE involvement by high school characteristics (see Table 20). Students who completed a CTE concentration in high school are more likely than nonconcentrators to complete a postsecondary CTE concentration (44 percent versus 39 percent). Yet there are no differences in CTE explorers by high school concentration, with 15 percent of both CTE concentrators and nonconcentrators categorized as postsecondary CTE explorers. The percentage of students categorized as postsecondary CTE concentrators or explorers is similar among students who attended rural high schools compared to students who attended urban high schools. There are some differences in postsecondary CTE involvement by high school type, with students from separate CTE high schools completing the fewest postsecondary CTE concentrations (35 percent of students).

Table 20. Percentage of students categorized as postsecondary CTE concentrators and postsecondary CTE explorers for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000, by high school concentration, high school locale, and high school type

	Postsecondary CTE concentrator	Postsecondary CTE explorer
All students	41%	15%
High school concentration		
High school non-CTE concentrator	39%	15%
High school CTE concentrator	44%	15%
High school locale		
Rural	40%	16%
Suburban	41%	15%
Urban	42%	13%
High school type		
Comprehensive or non-CTE magnet	41%	15%
Magnet with CTE academy	39%	16%
Separate CTE school	35%	14%

SOURCE: Florida K-20 data warehouse (authors' calculations)

4.4.2 The Most Common Program Areas for College CTE Concentrations

Among all college students, business and marketing is the most common program area for CTE concentrations, comprising 11 percent of all postsecondary concentrations (see Table 21). However, there are large differences in the distribution of postsecondary concentrations by highest level of education completed. Over 60 percent of students with certificates complete a concentration in two CTE program areas: health care and protective services. For students with associate's degrees, health care and business and marketing are the most common program areas for CTE concentrations, comprising 14 percent and 11 percent of all postsecondary concentrations, respectively. Business and marketing is the most common CTE program area for students with bachelor's degrees, with 23 percent of all bachelor's degree recipients completing a concentration in this program area.

Table 21. Percentage distribution of postsecondary concentrations for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000, by highest level of education completed

	All	Some college	Certificate	Associate's degree	Bachelor's degree
Agriculture & Natural Resources	1%	0%	1%	1%	2%
Business & Marketing	11%	3%	3%	11%	23%
Communications	4%	1%	0%	3%	9%
Computer Sciences	2%	2%	1%	2%	2%
Education	4%	1%	0%	4%	8%
Engineering & Architectural Sciences	3%	2%	2%	3%	6%
Health Care	7%	3%	31%	14%	8%
Legal Services	1%	0%	0%	1%	1%
Personal & Consumer Services	1%	1%	8%	0%	1%
Protective Services	4%	2%	32%	3%	5%
Public, Social, & Human Services	1%	0%	0%	1%	1%
Trade & Industry	1%	1%	9%	1%	1%
All CTE	41%	17%	88%	45%	67%
English	6%	9%	1%	4%	4%
Fine & Performing Arts	3%	3%	0%	4%	3%
Humanities	2%	3%	1%	3%	1%
Interdisciplinary	0%	0%	0%	0%	1%
Math	3%	4%	1%	5%	1%
Science	6%	6%	2%	10%	5%
Social Sciences	15%	14%	3%	19%	17%
All Academic	36%	40%	8%	46%	31%
Multiple Concentrations	10%	17%	4%	10%	2%
No Concentration (less than 12 credits)	13%	27%	0%	0%	0%

NOTE: Detail may not sum to totals because of rounding
SOURCE: Florida K-20 data warehouse (authors' calculations)

While Table 21 shows the distribution of all postsecondary concentrations, the popularity of each CTE program area cannot be compared across groups since there are differences in the percentage of students completing CTE concentrations (relative to academic, multiple, or no concentrations). The top section of Table 22 provides the five most common program areas among postsecondary CTE concentrations for two-year college starters and four-year college starters. For both groups of students, nearly half of all CTE concentrations are in the business and marketing and health care program areas. Communications and design and education are also among the top program areas for CTE concentrations in both groups. The other top program area is protective services for two-year college starters and engineering and architectural services for four-year college starters.

Table 22. Top five most common program areas for postsecondary CTE concentrations for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000, by all students, high school locale, and high school type

	2-Year College Starters		4-Year College Starters	
All	Business & Marketing	25%	Business & Marketing	30%
	Health Care	21%	Health Care	14%
	Protective Services	11%	Communications & Design	13%
	Education	11%	Education	11%
	Communications & Design	7%	Engineer & Architectural Services	10%
Rural	Health Care	23%	Health Care	20%
	Business & Marketing	19%	Business & Marketing	19%
	Protective Services	13%	Education	14%
	Education	10%	Communications & Design	11%
	Engineer & Architectural Services	7%	Protective Services	10%
Suburban	Business & Marketing	26%	Business & Marketing	30%
	Health Care	21%	Communications & Design	13%
	Protective Services	12%	Health Care	13%
	Education	11%	Education	11%
	Communications & Design	9%	Engineer & Architectural Services	10%
Urban	Business & Marketing	26%	Business & Marketing	31%
	Health Care	20%	Health Care	15%
	Education	11%	Communications & Design	12%
	Protective Services	11%	Education	11%
	Communications & Design	7%	Engineer & Architectural Services	10%
Comprehensive Non-CTE Magnet	Business & Marketing	25%	Business & Marketing	31%
	Health Care	21%	Health Care	14%
	Education	11%	Communications & Design	13%
	Protective Services	11%	Education	11%
	Communications & Design	8%	Engineer & Architectural Services	10%
Magnet w/ CTE Academy	Business & Marketing	25%	Business & Marketing	28%
	Health Care	21%	Health Care	16%
	Protective Services	12%	Communications & Design	12%
	Education	11%	Engineer & Architectural Services	11%
	Communications & Design	7%	Education	11%
Separate CTE School[1]	Health Care	26%		
	Business & Marketing	17%		
	Protective Services	15%		
	Engineer & Architectural Services	14%		
	Trade & Industry	8%		

[1] There were too few cases for a reliable estimate for 4-year college starters at separate CTE schools
SOURCE: Florida K-20 data warehouse.

The middle section of Table 22 shows the top program areas for postsecondary CTE concentrators by the locale of the high school attended. Overall, the distribution of postsecondary CTE program areas is similar across school locales. The greatest difference by school locale is that the percentage of students completing concentrations in business and marketing is higher among students from urban schools than rural schools, while the percentage of students completing concentrations in health care is higher among students from rural schools than urban schools.

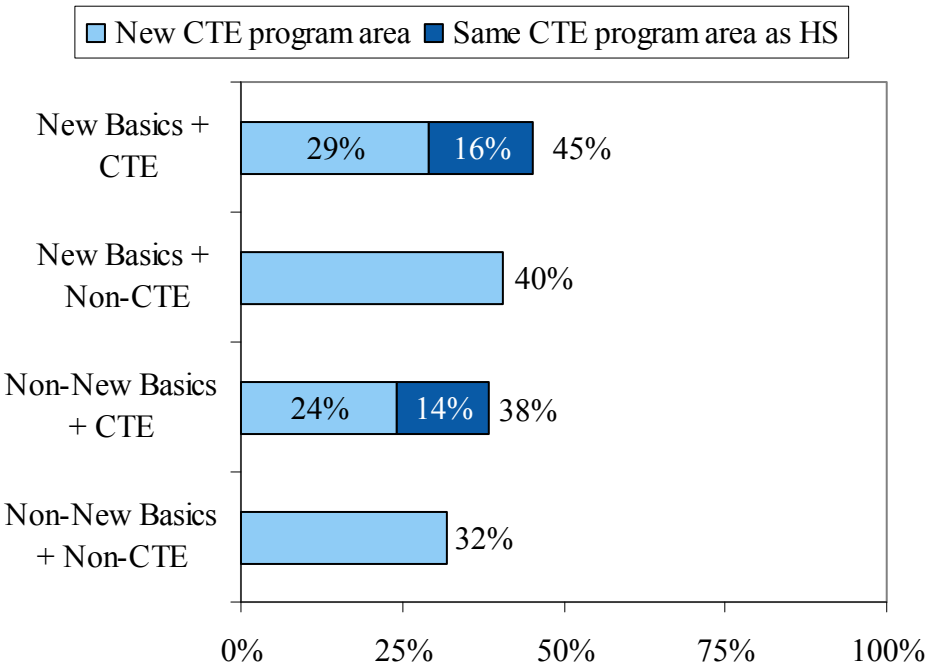
The bottom section of Table 22 shows the top program areas for postsecondary CTE concentrators by the type of high school attended. Among two-year college starters, business and marketing, health care, and protective services are among the top five program areas for CTE concentrators regardless of the type of high school attended. However, the percentage of students completing concentrations in engineering and architectural services and trade and industry is higher for students who attended separate CTE schools. The percentage of students completing concentrations in education and communications and design is higher for students who attended comprehensive or non-CTE magnet schools and magnet schools with CTE academies.

Among four-year college starters the top five program areas are identical for comprehensive or non-CTE magnet high schools and for magnet high schools with CTE academies. (There are too few four-year starters who attended separate CTE high schools to produce meaningful results.) The proportion of CTE concentrators in each program areas is almost identical for the students who attended the two other types of high schools. The biggest difference is in business and marketing (31 percent for comprehensive high schools versus 28 percent for magnet high schools).

4.4.3 The Relationship Between Concentrations in High School and College

This subsection explores the relationship between New Basic and CTE concentrations in high school and CTE concentrations in college. Few high school CTE concentrators remained in the same program area in college. As illustrated in Figure 6, 38 percent of students who were non-New Basics + CTE concentrators in high school, and 45 percent of students who were New Basics + CTE concentrators in high school, also are postsecondary CTE concentrators. However, students are about twice as likely to complete a postsecondary CTE concentration in a new program area as continue in the same CTE program area as their high school program area. Only 12 percent of non-New Basics + CTE concentrators and 16 percent of New Basics + CTE concentrators complete a postsecondary CTE concentration in the same CTE program area as their high school program area. One reason for this difference is that students have access to a broader range of CTE courses in college. This factor may lead them to explore new program areas that were not available to them in high school. For example, less than 20 percent of high schools in the sample offered three or more credits in construction and architecture, health sciences, marketing, and public services (see Appendix C, Tables C8 and C9). Thus, many students with an interest in these program areas would be unable to take enough courses in high school to be considered a concentrator in these areas. In addition, some high school CTE concentrators focus on CTE areas of vocational interest in high school, but they focus on CTE areas of vocational interest in college.

Figure 6. Percentage of students with a postsecondary CTE concentration in a new program area or same program area as their high school concentration for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000, by type of high school concentration



SOURCE: Florida K-20 data warehouse (authors' calculations)

Table 23 shows the relationship between CTE concentrations in high school and college for two-year college starters and four-year college starters. Among high school CTE concentrators, 33 percent of two-year college starters complete a postsecondary CTE concentration in a new program area compared to 53 percent of four-year college starters. Two-year college starters are also less likely to complete a postsecondary CTE concentration in the same program area as their high school program area. Only 13 percent of high school CTE concentrators starting at two-year colleges continue in the same program area, compared to 23 percent of high school CTE concentrators starting at four-year colleges.

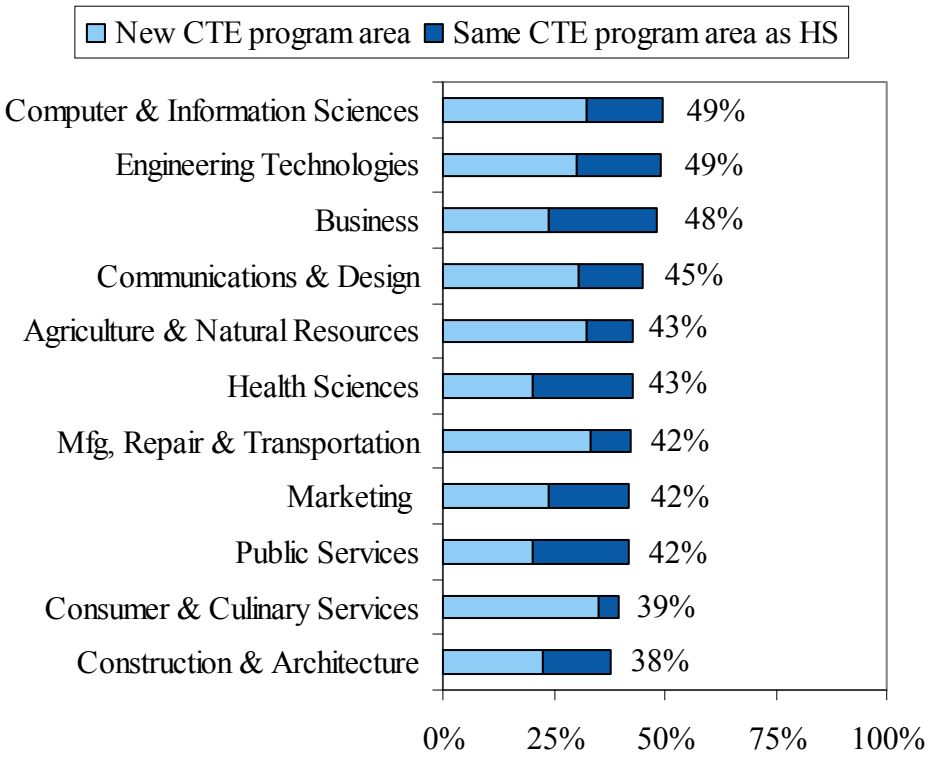
Table 23. Percentage of students with a postsecondary CTE concentration in a new program area or same program area as their high school program area for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000

	New CTE program area	Same CTE program area as HS	Total CTE concentrations
All students	36%	5%	41%
High school CTE concentrator	28%	16%	44%
High school non-CTE concentrator	39%	0%	39%
2-Year college starters	30%	4%	34%
High school CTE concentrator	25%	13%	38%
High school non-CTE concentrator	33%	0%	33%
4-Year college starters	48%	7%	55%
High school CTE concentrator	36%	23%	59%
High school non-CTE concentrator	53%	0%	53%

SOURCE: Florida K-20 data warehouse (authors' calculations)

The extent of continuity between high school and postsecondary CTE concentrations also differs by program area (see Figure 7). The percentage of high school CTE concentrators who complete a postsecondary CTE concentration ranges from 38 percent for construction and architecture to 49 percent for computer and information sciences and engineering technologies. For students in the public services, health sciences, and business program areas, there is a similar distribution among students with a postsecondary CTE concentration in a new program area or same program area as their high school concentration. Students in consumer and culinary services; manufacturing, repair, and transportation; and agriculture and natural resources are more than three times more likely to complete a postsecondary CTE concentration in a new program area than to continue in the same CTE program area as high school. Table C6 in Appendix C provides additional details about the extent of continuity between high school and postsecondary CTE concentrations for two-year and four-year college starters.

Figure 7. Percentage of students with a postsecondary CTE concentration in a new program area or same program area as their high school program area for high school CTE concentrators in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000



SOURCE: Florida K-20 data warehouse (authors' calculations)

4.4.4 Summary

For students who reached grade 12 and attended college by 2000, our analysis of differences in college course taking by high school concentration type and school locale indicates the following:

- The distribution of remedial course taking in college is similar for high school CTE concentrators and nonconcentrators with similar academic backgrounds.
- Forty-one percent of all college students complete a postsecondary CTE concentration.
- The percentage of college students completing a postsecondary CTE concentration shows considerable variation by highest level of education received.
  - Students with certificates are the most likely to complete a postsecondary CTE concentration (87 percent), while students who do not complete any credential are the least likely (17 percent).

- The distribution of program areas for postsecondary CTE concentrators is similar for rural and urban students and for students who attended comprehensive high schools with or without magnet CTE programs.

- Students who attended separate CTE high schools were more likely than other students to have CTE concentrations in engineering and architectural services, trade and industry, and protective services and less like to have concentrations in education and business and marketing.

- Among high school CTE concentrators who attended college, just under half also concentrated in any CTE program area in college.

- The majority of high school CTE concentrators who attended college and completed a postsecondary CTE concentration did so in a program area that was different from their high school CTE program area. However, there are large differences in the extent of continuity between high school and postsecondary CTE concentrations by type of program area.

4.5 Postsecondary Persistence and Credential Attainment

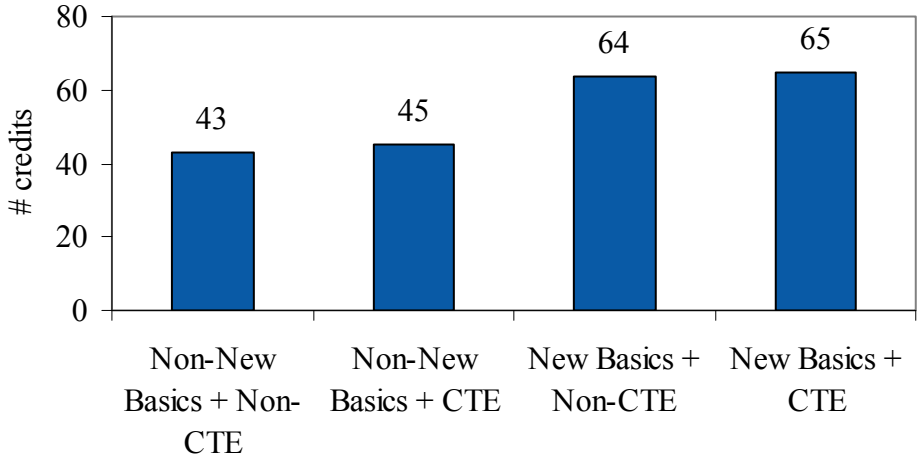
This section describes the relationship between completing CTE concentrations at the high school or college level and the outcomes of postsecondary persistence and credential attainment for Florida grade 9 students in the 1996 cohort. The sample includes all students who reached grade 12 (N=84,700) when comparing attainment outcomes among students with different high school characteristics (type of concentration, school locale, or school type). However, the sample is limited to students who reached grade 12 and attended an in-state public two-year or four-year college by the year 2000 when outcomes are compared among students with different types of concentrations in college (N=40,240). This approach allows credential attainment to be tracked over a six-year follow-up period after initial college enrollment. In both samples, students are excluded if they did not have any wage records after high school and they did not attend college. Since the outcomes of these students cannot be tracked using the data available, removing them from the sample ensures that students who left the state or attended a private college are not incorrectly classified as being non-college attendees who also are out of the labor force.

Postsecondary persistence and credential attainment represent outcomes 10 years after *entering* high school (1996 to 2006). Postsecondary persistence is defined in terms of the total number of credits completed in CTE and academic subjects. For the credential attainment outcome, students are categorized into five groups based on the *highest* level of education completed: (1) received no postsecondary credential and is not enrolled college, (2) received no postsecondary credential but is still enrolled in college, (3) completed a certificate, which is a credential for specific job training with a typical time-to-completion that ranges from a few months to two years; (4) completed an associate's (A.A.) degree; and (5) completed a bachelor's degree or a graduate degree (master's or doctoral). In this study, the term postsecondary credential refers broadly to the completion of any type of certificate or degree (certificate, associate's degree, bachelor's degree, or graduate degree).

4.5.1 Postsecondary Persistence Among High School Students by Type of High School Concentration

Among students with the same New Basics status in high school, the total number of postsecondary credits completed is similar for students with and without high school CTE concentrations. Non-New Basics completers who reached grade 12 and attended college complete an average of about 44 postsecondary credits, which is equivalent to approximately 15 college courses (see Figure 8). New Basics completers who reached grade 12 and attended college complete an average of about 65 postsecondary credits, which is equivalent to approximately 22 college courses.

Figure 8. Average number of postsecondary credits completed by students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college, by type of high school concentration



Multivariate regression analysis is used to estimate the effect of high school concentration type on the number of postsecondary credits completed after controlling for differences in student demographic characteristics, high school performance, high school characteristics, and work experience during high school. The results indicate that these control variables account for almost all of the difference in the number of postsecondary credits completed by high school concentration type. Holding other factors constant, New Basics + non-CTE concentrators complete an average of 2.85 credits more than non-New Basics + non-CTE concentrators do; a difference equivalent to less than one course (see Table 24). There is no statistically significant difference in the number of postsecondary credits completed between non-New Basics + non-CTE concentrators and any of the other types of high school concentrations. There are also few differences in the number of postsecondary credits completed by high school type or locale, with the exception of students from "other" schools (e.g., alternative, special education), who tend to complete significantly fewer college credits.

Table 24. Coefficients and standard errors from an ordinary least squares (OLS) regression of number of postsecondary credits completed on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college

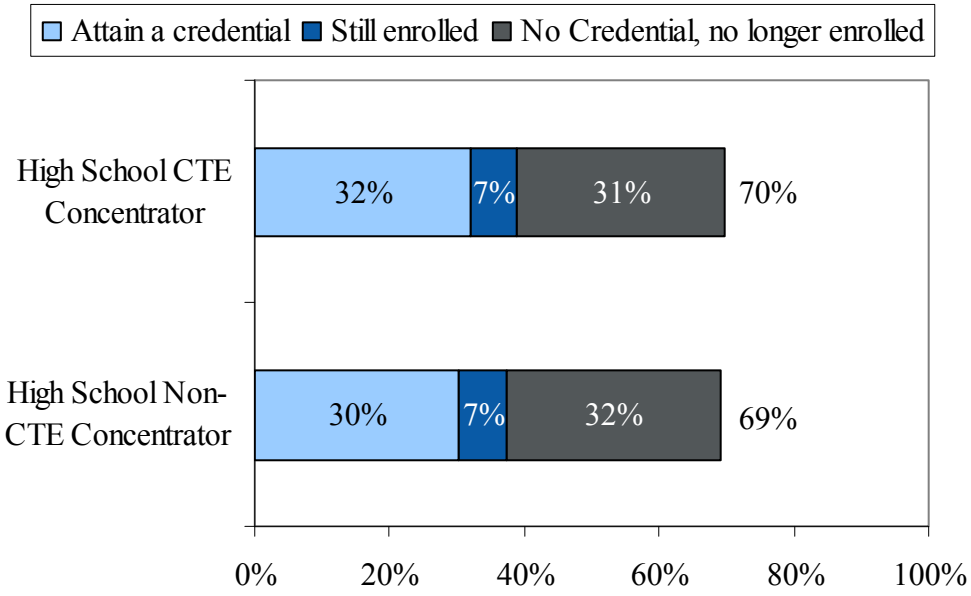
	β		S.E.
High school concentration (relative to non-New Basics+ non-CTE)			
Non-New Basics + CTE	−1.83		1.11
New Basics + Non-CTE	2.85	**	0.64
New Basics + CTE	1.36		0.71
Student characteristics:			
Gender (relative to male)			
Female	1.40	**	0.41
Race (relative to white)			
Black	0.82		0.61
Hispanic	−0.62		0.81
Other	8.65	**	1.21
Age	−2.10	**	0.32
Free and Reduced Lunch (FRL)	−6.64	**	0.53
Limited English Proficiency (LEP)	0.46		0.83
Students With Disabilities (SWD)	−4.64	**	0.60
High school performance:			
Cumulative GPA	41.56	**	0.42
Absentee rate	−0.66	**	0.05
School characteristics:			
School locale (relative to rural)			
Urban	3.83	**	0.81
Suburban	1.40		0.79
School Type (relative to Comprehensive or non-CTE magnet)			
Magnet school with a CTE academy	3.68	**	0.48
Separate CTE school	−2.95		1.93
Other school	−21.49	**	4.26
School % reaching grade 12	17.54	**	2.17
School % black	13.69	**	1.66
School % Hispanic	29.37	**	1.84
School % FRL	−36.16	**	2.19
School size (# students in grade 9 cohort)	0.01	**	0.00
Work experience:			
Number of quarters employed in HS	−0.14	**	0.06
Constant	−41.73	**	5.23
Number of observations	49,845		
R^2	0.27		

** $p < 0.05$, ** $p < 0.01$.*
SOURCE: Florida K-20 data warehouse.

4.5.2 Credential Attainment Among High School Students by High School CTE Concentrations and New Basics Completion Status

Among students in the 1996 Florida grade 9 cohort who reached grade 12, the educational pipeline is similar regardless of whether they completed a CTE concentration in high school (see Figure 9). Seventy percent of CTE concentrators and 69 percent of nonconcentrators attend college at anytime within 10 years of starting high school (1996 to 2006). For both groups, approximately one-third attain a credential within this time and an additional 7 percent are still enrolled in college. Credential attainment rates differ by gender, with only 25 percent of males completing a credential relative to 36 percent of females.

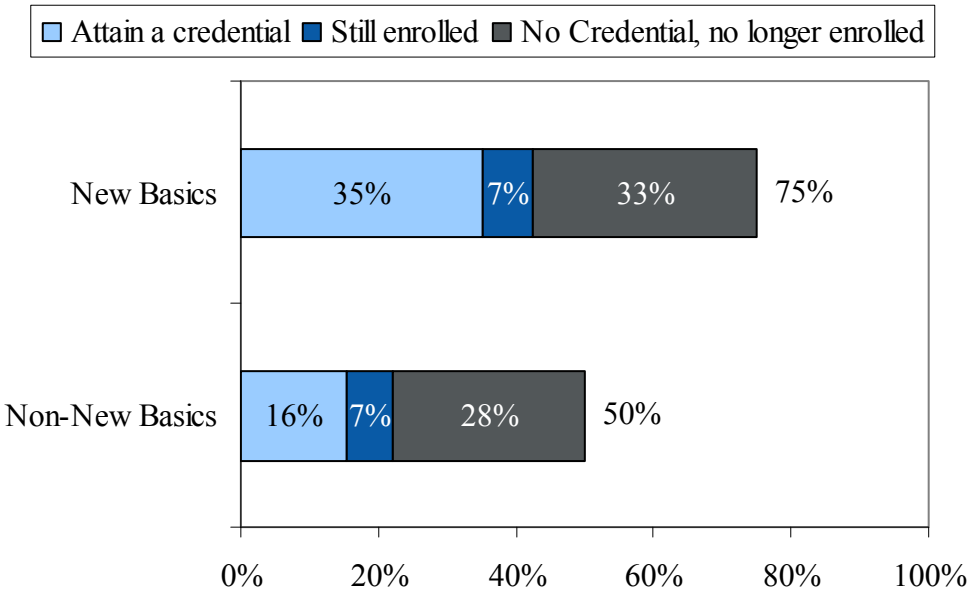
Figure 9. Percentage of students who attain a credential, are still enrolled, or have no credential (no longer enrolled) for students in the 1996 Florida grade 9 cohort who reached grade 12, by high school CTE concentration status



SOURCE: Florida K-20 data warehouse (authors' calculations)

There are large differences in educational attainment between high school New Basics completers and non-completers (see Figure 10). Only half of non-New Basics completers attend college compared to three-quarters of New Basics completers. New Basics completers are also about twice as likely to complete a credential as non-completers. Thirty-five percent of New Basics completers attain a postsecondary credential compared to 16 percent of non-New Basics completers.

Figure 10. Percentage of students who attain a credential, are still enrolled, or have no credential (no longer enrolled) for students in the 1996 Florida grade 9 cohort who reached grade 12, by high school New Basics completion



SOURCE: Florida K-20 data warehouse (authors' calculations)

4.5.3 Credential Attainment by High School Concentration Type, High School Locale, and High School Type

Table 25 shows how credential attainment differs for all students who reached grade 12 by high school concentration type, high school locale, and high school type. The distribution of attainment outcomes by high school concentration type reflects the differences by CTE concentrator and New Basics status described in the previous section. Students with the same status for New Basics have similar attainment outcomes, regardless of whether they completed a CTE concentration in high school. At each type of school locale, less than one-third of students receive a postsecondary credential. However, there are differences by school locale in the distribution of the different types of postsecondary credentials. Twenty percent of urban high school students receive a bachelor's or graduate degree compared to 13 percent of rural high school students. A key reason for the difference in bachelor's or graduate degree attainment between rural and urban students is that it is much more difficult for rural than urban students to live at home and commute to one of Florida's nine four-year universities. The difficulty of attending four-year colleges for rural students is further accentuated because rural students tend to come from lower income families. More rural than urban students attain certificates and associate's degrees because it is much easier for the rural students to commute to one of the 28 Florida community colleges. There are also differences in attainment by type of high school attended, with only 12 percent of students from separate CTE schools completing a postsecondary credential, compared to nearly one-third of students from comprehensive or non-magnet CTE schools and magnet schools with CTE academies. As noted earlier, students at separate CTE schools are less likely to complete a New Basics curriculum, which may also affect the likelihood of completing a postsecondary credential.

Table 25. Percentage distribution of postsecondary credential attainment and enrollment status for students in the 1996 Florida grade 9 cohort who reached grade 12 and had a college transcript or wage record after high school, by high school concentration type, high school locale, and high school type

	Attainment and enrollment status						
	Achieved a credential or were still enrolled	Highest credential attained				No credential, still enrolled	No credential, not enrolled
		Any credential	Certificate	Associate's degree	Bachelor's or graduate degree		
All students	38%	31%	2%	9%	19%	7%	62%
High school concentration type							
Non-New Basics + Non-CTE	22%	15%	2%	5%	8%	7%	78%
Non-New Basics + CTE	23%	17%	3%	6%	7%	6%	77%
New Basics + Non-CTE	42%	35%	2%	10%	23%	8%	58%
New Basics + CTE	42%	35%	3%	11%	22%	7%	58%
High school locale							
Rural	34%	28%	5%	10%	13%	6%	66%
Suburban	38%	31%	2%	9%	20%	7%	62%
Urban	39%	31%	2%	9%	20%	8%	61%
High school type							
Comprehensive or non-CTE magnet	38%	32%	2%	9%	20%	7%	62%
Magnet with CTE academy	38%	30%	2%	9%	19%	8%	62%
Separate CTE school	20%	12%	4%	5%	4%	7%	80%

SOURCE: Florida K-20 data warehouse (authors' calculations)

4.5.4 Credential Attainment for Postsecondary CTE Concentrators

This subsection compares credential attainment outcomes by type of postsecondary concentration among students who reached grade 12 and enrolled in college by the year 2000. Overall, 59 percent of students received a credential or were still enrolled (see Table 26). The distribution of postsecondary credential attainment and enrollment status differs by type of postsecondary concentration type. The percentage of students who received a credential or were still enrolled ranged from 84 percent for postsecondary CTE concentrators to 58 percent for postsecondary academic concentrators, and to 34 percent for students with multiple postsecondary concentrations. Students were categorized as having no concentration if they completed less than 12 credit hours and did not receive a credential. Only 3 percent of these students were still enrolled in 2006.

Table 26. Percentage distribution of postsecondary credential attainment and enrollment status for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000, by postsecondary concentration type

	Attainment and enrollment status						
		Highest credential attained					
	Achieved a credential or were still enrolled	Any credential	Certificate	Associate's degree	Bachelor's or graduate degree	No credential, still enrolled	No credential, no longer enrolled
All students	59%	52%	3%	15%	34%	8%	41%
CTE concentration	84%	80%	6%	16%	58%	4%	16%
Academic concentration	58%	47%	1%	19%	28%	11%	42%
Multiple concentrations	34%	20%	1%	14%	5%	13%	67%
No concentration (less than 12 credits)	3%	0%	0%	0%	0%	3%	96%

SOURCE: Florida K-20 data warehouse (authors' calculations)

The results from Table 26 must be interpreted with caution. The categories for academic and multiple concentrations include students who may have *intended* to pursue a CTE concentration, but who did not complete enough CTE classes to be identified as a CTE concentrator in the data. Over half of all postsecondary CTE concentrators do not take any CTE courses in each of the first three terms of college enrollment, but the majority of these students take one or more CTE courses in each term after the third term (see Table 27). This suggests that most CTE course taking occurs after students have persisted for several terms, when the risk of dropping out tends to be lower.

Table 27. Average number of postsecondary CTE courses completed by postsecondary CTE concentrators among students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000, by term in college

	0 CTE courses	1 CTE course	2 CTE courses	3 CTE courses	4 or more CTE courses	Average number of CTE courses
Term 1	59%	29%	9%	1%	1%	0.6
Term 2	53%	30%	13%	1%	2%	0.7
Term 3	51%	27%	17%	3%	2%	0.8
Term 4	38%	27%	26%	5%	3%	1.2
Term 5	48%	22%	20%	6%	4%	1.1
Term 6	38%	18%	27%	11%	8%	1.6
Term 7	34%	15%	28%	13%	9%	1.8
Term 8	39%	16%	26%	12%	8%	1.6

NOTE: Detail may not sum to totals because of

SOURCE: Florida K-20 data warehouse (authors' calculations)

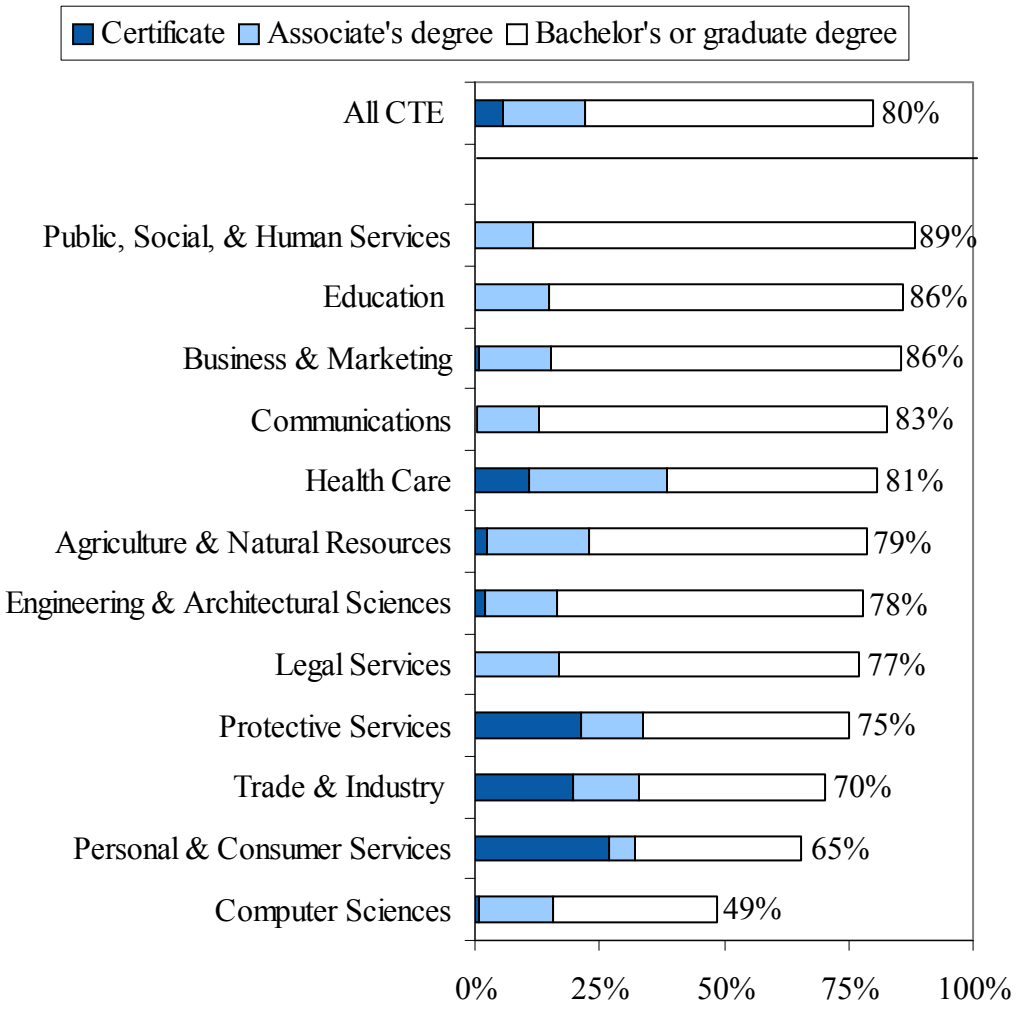
4.5.5 Postsecondary Credential Attainment by Postsecondary CTE Program Area

The distribution of postsecondary credential attainment outcomes for postsecondary CTE concentrators varies widely by program area (see Figure 11). Overall, 80 percent of postsecondary CTE concentrators complete a postsecondary credential, but credential attainment rates range from 49 percent for the computer sciences program area to 89 percent for the public, social, and human services program area.

Bachelor's and graduate degrees are the most common type of credential students complete. Among all CTE concentrators, 58 percent complete bachelor's or graduate degrees, 16 percent complete associate's degrees, and 6 percent complete certificates. However, the distribution of credential type varies substantially across CTE program areas. The percentage of CTE concentrators completing bachelor's or graduate degrees is about the same as the percentage completing certificates and associate's degrees in personal and consumer sciences, trade and industry, and health care. In other areas, the percentage of students completing bachelor's and graduate degrees is much greater than the percentage completing associate's degrees and certificates. Much of these differences are related to differences in the program areas offered at two-year and four-year colleges and variation in the number of credits required to be earned to obtain different two-year credentials.

For example, because there are no certificate programs in public, social, and human services, students with an interest in this program area must complete a degree in order to attain a credential. Similarly, most students with education, business and marketing, communications, legal services, and computer sciences program areas complete four-year programs and take most of their courses in these areas after two years of college, whether or not they initially attend two-year or four-year institutions. Table C7 in Appendix C provides more detail about the distribution of attainment and enrollment status for all types of postsecondary concentrations.

Figure 11. Percentage of postsecondary CTE concentrators who complete a certificate, associate's degree, and bachelor's or graduate degree for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000, by CTE program area



SOURCE: Florida K-20 data warehouse (authors' calculations)

4.5.6 Summary

Our analysis of the association between completing a postsecondary CTE concentration and attaining a postsecondary credential indicates that:

- High school students who complete a New Basics curriculum are about twice as likely as non-completers to attain a postsecondary credential. Postsecondary credential attainment outcomes are similar for students with comparable high school academic backgrounds, regardless of whether they completed a CTE concentration in high school.

- Just under one-third of students reaching grade 12 receive some form of postsecondary credential, regardless of school locale. However, the percentage of students receiving

bachelor's and graduate degrees is greater among students from urban schools than rural schools.

- Most students who complete a postsecondary CTE concentration also complete a credential, in large part because students with CTE concentrations take most of their CTE courses after completing 2 years of college.

- The percentage of postsecondary CTE concentrators completing bachelor's and graduate degrees is higher than the percentage completing certificates or associate's degrees.

- Overall, 84 percent of postsecondary CTE concentrators obtain a credential, but there is substantial variation by program area. In program areas such as public, social, and human services; education; and business and marketing, close to 90 percent of concentrators complete a credential. In comparison, only about half of concentrators in computer sciences complete a credential.

- The distribution of different types of credentials for postsecondary CTE concentrators varies by program area. About 70 percent of CTE concentrators in communications complete bachelor's or graduate degrees. In comparison, only about 45 percent of CTE concentrators in health care complete bachelor's and graduate degrees.

4.6 Post-School Employment and Earnings

This section examines the effect of completing a CTE concentration in high school and/or in college on post-school employment and earnings for students who work in the state of Florida. First, an overview looks at the amount of time spent in school and in the workforce for students with different educational backgrounds. Next, we estimate the effect of CTE concentrations on post-school earnings. Finally, the section examines trends in post-school earnings over time and the extent to which CTE concentrators' industries of employment are related to their CTE program areas. The sample for these analyses (unless otherwise noted) includes all students who reached grade 12 and were not still enrolled in college in the year 2006, the latest year college transcript data are available (N=83,942). Students' college attendance status is based on whether they ever enrolled in college after high school, regardless of the year of initial enrollment.

4.6.1 Work Experience Prior to Leaving School by CTE Concentration Status

One factor that may affect students' post-school earnings is the amount of work experience that they acquired while still in school. Among students who reached grade 12 but did not attend college (at any time up to 2006), the average amount of work experience during high school is 4.2 quarters for non-CTE concentrators and 4.5 quarters for CTE concentrators (see Table 28). Most of this work experience was gained through part-time employment; only 1 percent of CTE concentrators and nonconcentrators worked primarily full-time.[26] The percentage of students with no high school wages ranges from 20 percent for non-New Basics + CTE concentrators to 27 percent for New Basics + non-CTE concentrators.

[26] Student employment during school is categorized as primarily part-time or primarily full-time based on whether their average wages during school (in quarters with earnings) are above or below the federal minimum wage equivalent for full-time employment. The minimum wage in the follow-up period (1997–2007) was $5.15 per hour (http://www.dol.gov/esa/minwage/chart.htm).

Table 28. Percentage distribution of wage status and average number of quarters with wages *during high school* for students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college, by high school concentration category

	No high school wages	Primarily part-time wages	Primarily full-time wages	Average # quarters with wages
All	25%	74%	1%	4.3
Non-New Basics + Non-CTE	25%	73%	2%	4.4
Non-New Basics + CTE	20%	79%	1%	4.7
New Basics + Non-CTE	27%	72%	1%	4.2
New Basics + CTE	23%	76%	1%	4.5
Overall:				
Non-CTE (3+) concentrators	26%	72%	1%	4.2
CTE (3+) concentrators	22%	77%	1%	4.5

NOTE: Detail may not sum to totals because of rounding
SOURCE: Florida K-20 data warehouse (authors' calculations)

Among students who attended college, there are differences in the amount and type of work experience accrued during college by highest level of education completed. Among all students with credentials, the average number of quarters of work experience during college ranges from 12.5 for students with certificates to 15.4 for students who completed an associate's degree. Students with certificates are the most likely to work primarily full-time during college, while students with bachelor's degrees are the least likely (65 percent versus 26 percent among all students). Students with no credential, but still enrolled, are also likely to be working full-time (60 percent) and have the highest average number of quarters with wages (16.0 quarters).

There are also differences between postsecondary academic and CTE concentrators in the amount and type of work experience accrued during college. On average, postsecondary academic concentrators have slightly less work experience during college and are less likely to work full-time than CTE concentrators reaching similar education milestones (see Table 29). For example, among students with bachelor's degrees, the average number of quarters of work experience during college is 12.8 for academic concentrators and 13.5 for CTE concentrators. However, only 20 percent of academic concentrators with bachelor's degrees work primarily full-time compared to 28 percent of CTE concentrators.

Table 29. Percentage distribution of wage status and average number of quarters with wages *during college* for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college, by highest level of education completed and postsecondary CTE concentration status

	No college wages	Primarily part-time wages	Primarily full-time wages	Average # quarters with wages
All students	6%	58%	35%	8.2
No credential, no longer enrolled	10%	58%	31%	7.3
No credential, still enrolled	5%	36%	60%	16.0
Certificate	4%	31%	65%	12.5
Associate's degree	3%	57%	41%	15.4
Bachelor's degree	3%	71%	26%	13.3
Academic concentrators	4%	62%	34%	12.7
No credential, no longer enrolled	5%	62%	32%	10.0
No credential, still enrolled	3%	39%	59%	17.7
Certificate	0%	45%	55%	16.9
Associate's degree	4%	62%	35%	14.5
Bachelor's degree	4%	76%	20%	12.8
CTE concentrators	3%	59%	38%	13.4
No credential, no longer enrolled	6%	58%	36%	10.0
No credential, still enrolled	4%	35%	60%	16.4
Certificate	4%	29%	67%	12.3
Associate's degree	2%	51%	47%	16.5
Bachelor's degree	2%	69%	28%	13.5

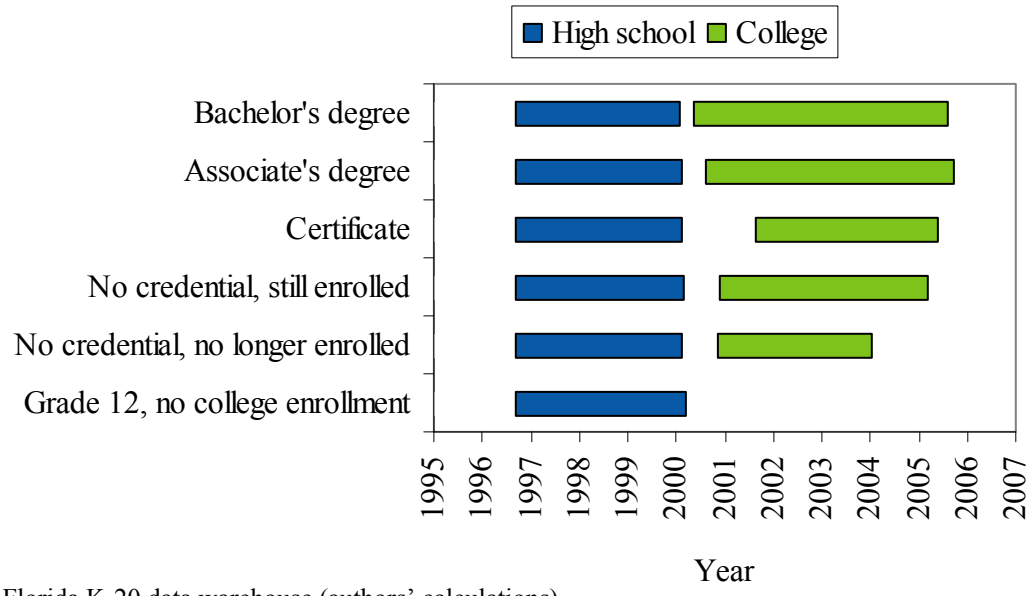
NOTE: Detail may not sum to totals because of rounding

SOURCE: Florida K-20 data warehouse (authors' calculations)

4.6.2 Post-School Employment by Highest Level of Education

Our wage data include earnings from every quarter from 1995 through 2007. Because students who advance further through the education pipeline also tend to leave school later, there are systematic differences in the amount of post-school work experience that students acquire. Figure 12 illustrates the average timeline for enrollment in high school and college, by highest level of education completed. Students at all levels of education tended to be enrolled in high school until the year 2000. This means that students who did not continue their education beyond grade 12 may potentially complete up to seven years (or 28 quarters) of work experience by the end of the observation period. For students who attended college, the amount of time between high school and college tends to be less than a year; except for students with certificates, for whom the average amount of time between high school and college is closer to two years. Students with all types of postsecondary credentials tended to finish college between 2005 and 2006, so they will have an average of less than two years (or eight quarters) of post-school earnings by the end of the observation period. Students with no credential who were no longer enrolled exited college around 2004, so they will have an average of three years (or 12 quarters) in which post-school earnings can be accrued.

Figure 12. Average timeline for enrollment in high school and college for students in the 1996 Florida grade 9 cohort who reached grade 12, by highest level of education completed



SOURCE: Florida K-20 data warehouse (authors' calculations)

4.6.3 Defining Low, Moderate, and High Estimates of Post-School Earnings

The wage records from the state of Florida used for this analysis provide each student's wages (total earnings from all Florida employers covered by unemployment insurance tax records) for

each quarter from the first quarter in 1995 to the third quarter in 2007.[27] The strength of using unemployment insurance wage records for follow-up is that the coverage of Florida employment is close to complete and highly accurate since it does not suffer from survey response bias. One key weakness of these data is that they do not separate estimates of hours worked or any indicator of why wages are not reported. As a result, we cannot separately examine the effect of CTE coursework on hourly wage rates versus hours worked. Another limitation is that we cannot determine if wages are underreported for students with zero earnings because wages are omitted from sectors uncovered by Florida unemployment insurance reports, primarily governmental employment, self-employment, or working outside of the state of Florida. These limitations mean that we cannot determine to what extent earnings are affected by unemployment or underemployment versus the choice to be out of the workforce or to work only part-time.

To compensate for these weaknesses we use three assumptions in estimating wages. The first is that we should look only at wages in a quarter where wages are greater than zero because zero wages are more likely to reflect not working for a unemployment insurance-covered employer or being out of the workforce voluntarily than being unemployed. According to the Bureau of Labor Statistics (2010) Florida's unemployment rate for 20- to 24-year-olds ranged from 5.2 percent to 9.5 percent during the period of 2000 to 2007. Approximately 21 percent of all students in our sample had no earnings in the first four quarters after leaving school (see Table 30). The percentage of students with no post-school wages is by far the greatest among students whose highest level of education is grade 12 (26 percent). This means that any analyses of post-school earnings for this sample must be interpreted with caution.

Table 30. Distribution of earnings categories based on earnings in the highest quarter during the first four quarters following leaving school, by highest level of education completed

	No earnings		Part-time earnings		Full-time earnings	
	Number	Percent	Number	Percent	Number	Percent
Grade 12, no college enrollment	8,072	26%	12,327	40%	10,172	33%
No credential, no longer enrolled	5,587	17%	6,891	22%	19,567	61%
Certificate	161	10%	179	11%	1,328	80%
Associate's Degree	1,090	18%	869	14%	4,073	68%
Bachelor's Degree	2,750	20%	1,322	10%	9,554	70%
All Students	17,660	21%	21,588	26%	44,694	53%

SOURCE: Florida K-20 data warehouse (authors' calculations)

[27] Florida unemployment insurance wage records cover earnings from virtually all private for-profit employers in the state, but exclude self-employment and most governmental employment. Overall, about 90 percent of all employment is covered. A small number of students had postschool earnings greater than $62,500 per quarter ($250,000 per year). Earnings for these students were recoded at $62,500 so that extreme outlier values would not disproportionately affect the results of the analysis.

The second assumption is that we should include all earnings, despite not knowing whether workers were employed full-time or part-time. One alternative method of estimating the status of earnings is to assume that anyone with earnings below minimum wage (hourly minimum wage rate * 40 hours per week * 13 weeks per quarter) is employed part-time. However, some students with high hourly wages who work part-time may be incorrectly classified as full-time employees if they earn more than this amount.

The third assumption is that we should look at high-quarter earnings rather than average earnings in the period shortly after leaving school. The rationale is that students may initially take a little time after exiting school to find a job that uses the skills acquired in school. Thus, averaging wages over the first year or two after leaving school would underestimate the effect of schooling.

A separate weakness of our database is an inability to observe wages over a long period after leaving school. Table 31 shows that the average follow-up period after exiting school is less than two years (eight quarters) for students with certificates, associate's degrees, and bachelor's degrees. This average suggests that earnings results after the first year (four quarters) post-school may not be representative of the entire population since many students do not have a follow-up period longer than four quarters. Ideally, we would want to see how wages change over at least four years to get an idea of short-term and long-term effects, but this is not possible with the available data.

Table 31. Number of quarters between leaving school and the end of the follow-up period (third quarter of 2007), by highest level of education completed

Number of quarters	Certificate		Associate's Degree		Bachelor's Degree		No credential, no longer enrolled		Grade 12, no college enrollment		All students	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<4	745	31%	1,936	24%	631	4%	0	0%	4	0%	3,316	4%
4–7	471	20%	2,797	35%	5,572	39%	5,329	17%	22	0%	14,191	16%
8–11	376	16%	1,238	16%	4,669	33%	4,711	15%	223	1%	11,217	13%
12–15	283	12%	946	12%	2,913	20%	5,037	16%	201	1%	9,380	11%
16–19	229	9%	664	8%	235	2%	5,532	17%	506	2%	7,166	8%
20–23	194	8%	172	2%	19	0%	5,885	18%	3,793	12%	10,063	12%
24–27	77	3%	28	0%	10	0%	4,461	14%	24,298	79%	28,874	33%
28–31	30	1%	171	2%	200	1%	772	2%	1,233	4%	2,406	3%
32–35	5	0%	7	0%	3	0%	235	1%	206	1%	456	1%
36–39	3	0%	3	0%	2	0%	72	0%	77	0%	157	0%
≥40	0	0%	6	0%	3	0%	11	0%	8	0%	28	0%
Total number of students	2,413		7,968		14,257		32,045		30,571		87,254	
Average number of quarters	7.6		6.4		7.2		14.4		27.6		16.8	

As a sensitivity test, we used three different specifications of post-school earnings to obtain a range of estimates that deal with database limitations in different ways. As shown in Table 32, the "high" specification uses wage records from the highest quarterly post-school earnings in 2004–2007, excluding cases where high-quarter earnings are zero or less than the full-time minimum wage. The "moderate" specification identifies the highest quarterly earnings in the first four post-school quarters, excluding cases where earnings are zero, but including cases where they are below the full-time minimum wage. The "low" specification identifies average quarterly earnings over all of the first four quarters after leaving school, including quarters where earnings are zero or below the full-time minimum wage.

Table 32. Comparison of criteria for three different specifications of earnings for high, moderate, and low estimates

Criteria	High estimate: Highest quarterly non-zero full-time post-school earnings 2004–2007	Moderate estimate: Highest quarterly non-zero earnings 4 quarters post-school	Low estimate: Average quarterly zero and non-zero earnings 4 quarters post-school
Limits follow-up period to four quarters post-school	No	Yes	Yes
Includes part-time earnings	No	Yes	Yes
Includes zero earnings	No	No	Yes
Average instead of high-quarter earnings	No	No	Yes

As discussed in greater detail below, we used each of the earnings estimates (high, moderate, and low) with three different regression models to estimate the effect of CTE on post-school earnings. Model 1 looks at the overall difference in earnings between students with CTE concentrations relative to students with academic concentrations. Model 2 examines the differences in the returns to concentrations in 12 CTE program areas and seven academic fields. Model 3 examines the returns per credit for each course completed in the 12 CTE program areas and the seven academic fields for all students, regardless of the type of concentration completed. A separate set of models is estimated for students at each level of education attainment: (1) no college; (2) college but no credential; (3) certificate; (4) associate's degree; and (5) bachelor's degree.

In many cases the results are broadly similar regardless of which earnings measure (high, moderate, or low estimate) is used, especially when the confidence intervals surrounding the point estimates are taken into account. While the effect of CTE under all three estimates is in the expected direction, the magnitude of the difference across the three estimates depends on how earnings (wage rates times hours worked) varies for the CTE concentrators and for the comparison group of nonconcentrators included in the sample for each estimate. In most cases, the earnings differential between CTE concentrators and academic concentrators is greatest under the moderate estimate of post-school earnings and lowest under the low estimate of post-

school earnings. There is one notable exception: the CTE earnings differential for students with bachelor's degrees is greatest under the high estimate of post-school earnings. This might be because the high estimate includes the highest quarterly earnings at any time during 2004 to 2007 (instead of within the first four quarters after exiting school, as used in the moderate and low estimates), and the earnings of CTE concentrators may increase at a faster rate over time for students with bachelor's degrees than for concentrators in other groups.

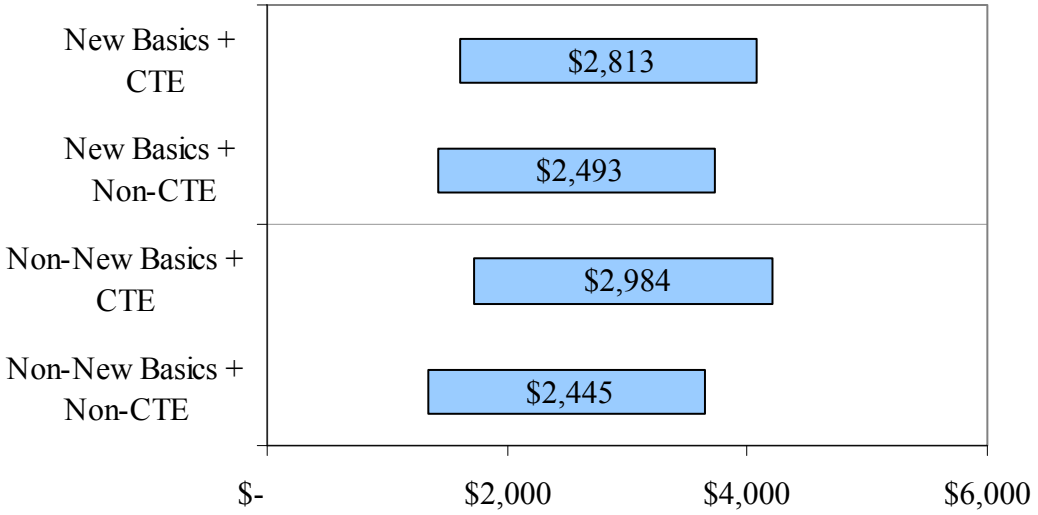
We feel that the specifications for the moderate estimates take into account important limitations of the data while producing the least biased estimates. As a result, we present the moderate estimates in the main body of the report while briefly noting any changes in the findings under the high and low estimates of post-school earnings. Appendix E includes tables with regression results under all three specifications. The end of the chapter also includes a brief discussion of how the difference in earnings between CTE and academic concentrators changes over time for students with multiple years of post-school earnings.

4.6.4 Post-School Earnings by High School Concentration for Students Who Did Not Attend College

Overall, median post-school earnings for students who did not attend college were $7,646 per quarter for CTE concentrators and $6,974 for non-CTE concentrators, a difference of $672. Figure 13 illustrates the distribution of post-school earnings by New Basics and CTE concentration status for students who reached grade 12 but did not attend college. The solid bar represents the range of the 25th to 75th percentile of students' highest quarterly non-zero earnings four quarters post-school, and the median value is labeled. Median quarterly earnings are highest for students who completed a CTE concentration ($2,984 for non-New Basics and $2,813 for New Basics). While earnings are slightly lower for students who did not complete a CTE concentration ($2,493 for non-New Basics and $2,445 for New Basics), it is important to note the considerable overlap between the 25th and 75th percentiles across all four high school concentration types.

Breaking down the results shown in Figure 13 by locale indicates the patterns are similar across the three area types, but in general earnings are lower in rural areas than in urban and suburban areas by about $220 per quarter (see Table 33). The earnings differential between rural students and students in urban and suburban areas is smaller among CTE concentrators (rural students earn approximately $120 less per quarter than urban students) than nonconcentrators (rural students earn $219 to $293 less per quarter than urban students).

Figure 13. Distribution of the 25th to 75th percentile (median value is labeled) for highest quarterly earnings four quarters after high school for students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college, by high school concentration type



NOTE: The solid bar represents the range of the 25th to 75th percentile of students' highest quarterly non-zero earnings four quarters post-school, and the median value is labeled.
SOURCE: Florida K-20 data warehouse (authors' calculations)

Table 33. Median of highest quarterly earnings four quarters after high school among students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college, by high school concentration type, overall New Basics and CTE status, and school locale

	All	Rural	Suburban	Urban
All students	$2,585	$2,435	$2,651	$2,659
High school concentration type:				
Non-New Basics + Non-CTE	$2,445	$2,222	$2,519	$2,407
Non-New Basics + CTE	$2,984	$2,925	$2,921	$3,057
New Basics + Non-CTE	$2,493	$2,245	$2,551	$2,504
New Basics + CTE	$2,813	$2,690	$2,867	$2,810
Overall New Basics & CTE status:				
Non-New Basics completers	$2,560	$2,517	$2,625	$2,513
New Basics completers	$2,599	$2,412	$2,660	$2,594
Non-CTE concentrators	$2,472	$2,242	$2,535	$2,461
CTE concentrators	$2,865	$2,766	$2,884	$2,888

SOURCE: Florida K-20 data warehouse (authors' calculations)

There are also differences in median earnings among high school CTE concentrators by program area. For high school CTE concentrators who did not complete a New Basics curriculum, median quarterly earnings range from $2,415 for consumer and culinary services to $3,311 for computer and information sciences (see Table 34). Among students who completed both a New Basics curriculum and a CTE concentration, the median quarterly earnings range between $2,402 for computer and information sciences to $3,464 for agriculture and natural resources.

Table 34. Median of highest quarterly earnings four quarters after high school for students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college, by New Basics completion status, high school CTE concentration status, and CTE program area

	All	Non-New Basics	New Basics
No high school CTE concentration	$ 2,472	$ 2,445	$ 2,493
High school CTE concentration			
Agriculture & Natural Resources	$ 3,321	$ 3,192	$ 3,464
Business	$ 2,810	$ 2,831	$ 2,809
Communications & Design	$ 2,487	$ 2,733	$ 2,440
Computer & Information Sciences	$ 2,677	$ 3,311	$ 2,402
Construction & Architecture	$ 3,070	$ 3,083	$ 3,067
Consumer & Culinary Services	$ 2,528	$ 2,415	$ 2,584
Engineering Technologies	$ 2,872	$ 3,187	$ 2,781
Health Sciences	$ 2,671	$ 2,739	$ 2,636
Mfg, Repair & Transportation	$ 3,306	$ 3,310	$ 3,306
Marketing	$ 3,155	$ 3,163	$ 3,145
Public Services	$ 2,834	$ 2,711	$ 2,898

SOURCE: Florida K-20 data warehouse (authors' calculations)

4.6.5 The Association Between Completing a High School CTE Concentration and Post-School Earnings for Students Who Did Not Attend College, Holding Other Factors Constant

Multivariate regression analysis was used in conjunction with three different models to estimate the effect of CTE course taking on post-school earnings. Each model controls for student demographic characteristics, student performance in high school, high school characteristics, work experience, and labor market characteristics (see Table 35). Model 1 estimates the differences in earnings among students in each of the four broad high school concentration categories based on New Basics completion and CTE concentration status among students who reached grade 12 but did not attend college. Relative to non-New Basics + non-CTE concentrators, quarterly earnings tend to be $318 higher for non-New Basics + CTE concentrators, $87 higher for New Basics + non-CTE concentrators, and $178 higher for New Basics + CTE concentrators when other factors are held constant. These estimates of the

differences in earnings among the various types of high school concentrations are much smaller than the non-regression-adjusted differences in median earnings presented in Figure 13. This indicates that much of the earnings differential between the groups is attributed to external factors (e.g., differences in the amount of work experience or student performance), rather than the completion of a CTE concentration. When the models are replicated using the alternate specifications of the dependent variable, the findings are similar but still show slight differences in the magnitude of the earnings differentials between the various types of high school concentrations (see Appendix E, Table E1).

Model 2 estimates the effect on post-school earnings of completing high school CTE concentrations in each program area. Relative to students who did not complete a high school CTE concentration, post-school earnings tend to be $486 per quarter higher for agriculture and natural resources concentrators, $350 per quarter higher for construction and architecture concentrators, $179 per quarter higher for health sciences concentrators, and $275 higher for manufacturing, repair and transportation concentrators, when other factors are held constant.[28] For the other seven CTE program areas, there are no statistically significant differences between CTE concentrators and nonconcentrators after controlling for the other characteristics in the model.

Model 3 estimates the effect on post-school earnings of completing a credit in each type of CTE program area or academic subject, regardless of whether students completed a CTE concentration in high school. This indicates whether completing certain types of high school courses among students with a similar level of education leads to any additional value. When other factors are held constant, each credit completed in agriculture and natural resources, business, construction and architecture, and manufacturing, repair and transportation is associated with an increase in earnings that ranges from $30 to $99 per quarter.[29] Among the liberal arts courses, each additional credit in English is associated with an increase in earnings of $29 per quarter, while credits in fine arts are associated with a decrease in earnings of $19.

Across all three models, there is no statistically significant difference in post-school earnings by school type. In addition, there is no statistically significant difference in post-school earnings by high school locale in two of the three models. However, in Model 3, students in both rural and suburban schools tend to have higher post-school earnings than students in urban schools, other factors held constant.

[28] When the model is replicated with the low estimate of postschool earnings, concentrators in the same CTE program areas have significantly higher earnings. Under the high estimate of postschool earnings, concentrators in two of these program areas (agriculture and natural resources and manufacturing, repair, and transportation) have significantly higher earnings, while concentrators in engineering technologies also have significantly higher earnings.

[29] Across the three specifications (low, moderate, and high postschool earnings), agriculture and natural resources and manufacturing, repair, and transportation are the only program areas where an additional credit is consistently associated with higher postschool earnings.

Table 35. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after high school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college

	Model 1			Model 2			Model 3		
	β		S.E.	β		S.E.	B		S.E.
Type of high school concentration									
Non-New Basics + Non-CTE (reference)	†								
Non-New Basics + CTE	317.87	*	45.15						
New Basics + Non-CTE	87.42	**	30.15						
New Basics + CTE	178.23	**	35.83						
Type of high school CTE concentration									
No CTE concentration (reference)				†					
Agriculture & Natural Resources				486.28	**	57.09			
Business				96.03		60.96			
Communications & Design				−6.52		57.90			
Computer & Information Sciences				−132.12		106.88			
Construction & Architecture				349.64	**	94.16			
Consumer & Culinary Services				−6.34		52.10			
Engineering Technologies				38.90		79.14			
Health Sciences				179.08	*	84.41			
Mfg, Repair & Transportation				275.18	**	55.94			
Marketing				35.58		101.02			
Public Services				37.45		98.25			
New Basics status									
Non-New Basics completer (reference)									
New Basics completer				33.83		25.97			
# HS credits in CTE									
Agriculture & Natural Resources							92.30	**	9.54
Business							29.51	*	12.62
Communications & Design							12.94		11.86

(continued)

Table 35. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after high school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college (continued)

	Model 1		Model 2		Model 3		
	β	S.E.	β	S.E.	B		S.E.
# HS credits in CTE (con't)							
Computer & Information Sciences					−9.76		21.82
Construction & Architecture					98.66	**	19.13
Consumer & Culinary Services					6.71		11.73
Engineering Technologies					28.69		18.82
Health Sciences					35.66		19.82
Mfg, Repair & Transportation					68.38	**	11.39
Marketing					−6.54		21.16
Public Services					−10.28		20.66
# HS credits in liberal arts							
Math					−18.60		13.54
Science					−13.16		12.73
English					28.66	*	12.55
Social Studies					13.40		14.03
Fine Arts					−18.90	**	6.22
Foreign Language					−5.65		12.86
High school characteristics							
High school locale: urban (reference)	†		†		†		
High school locale: rural	−70.75	55.78	−108.71	55.94	136.25	*	56.02
High school locale: suburban	40.42	27.25	33.48	27.24	155.99	**	54.23
High school type: comprehensive (reference)	†		†		†		
High school type: CTE magnet	9.16	33.47	12.38	33.45	15.39		33.55
High school type: separate CTE school	67.57	71.58	59.81	72.02	−1.87		72.44
High school type: other/alternative	−81.74	135.73	−96.26	135.55	−93.73		135.87

(continued)

Table 35. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after high school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college (continued)

	Model 1		Model 2		Model 3	
	β	S.E.	β	S.E.	B	S.E.
N	20942		20942		20942	
R-squared	0.28		0.28		0.28	

† Not applicable

** p < 0.05, ** p < 0.01.*

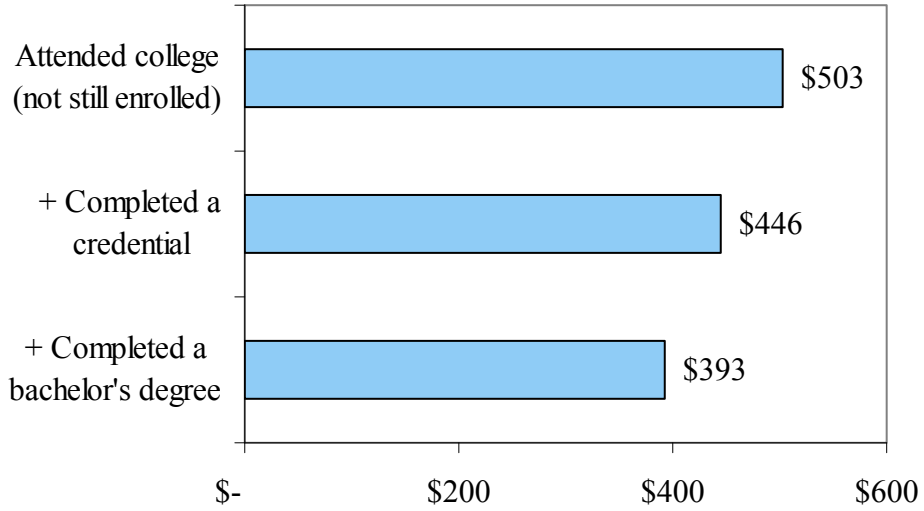
All models include controls for student characteristics (gender, race, age, FRL status, LEP status, SWD status), student performance (grade 9 GPA, grade 9 absentee rate), school characteristics (percent of students reaching grade 12, percent of black students, percent of Hispanic students, percent of FRL students, school size), work experience (number of quarters of work experience in high school, number of quarters of post-school work experience, average earnings in high school), and labor market characteristics (distribution of employees across industries in the local labor market, average monthly wages for all workers in the workforce).

4.6.6 Post-School Earnings by Type of High School Concentration for Students Who Did Attend College

The advantage in median earnings for high school CTE concentrators over nonconcentrators is greatest among students who reached grade 12 and completed no further education, and declines as students completed further educational milestones (see Figure 14). Among high school students who reached grade 12 and completed no further education, CTE concentrators have median earnings that are $503 per quarter higher than nonconcentrators (a difference of 12 percent). Among students who attended college, did not obtain a credential, and were not still enrolled, high school CTE concentrators earn $446 per quarter (or 8 percent) more than nonconcentrators. The CTE concentrator/nonconcentrator median earnings gap is further reduced to $393 per quarter (a 5 percent difference in earnings) among students who completed a postsecondary credential.

Unobserved student characteristics may contribute to the differences in post-school earnings by high school CTE concentration status in the above figure. The regression models in section 4.6.8 provide estimates of the effect of high school CTE concentrations on post-school earnings for students with different levels of postsecondary education, after controlling for differences in student characteristics, school characteristics, work experience, and labor market characteristics.

Figure 14. Difference in median of highest quarterly earnings four quarters after leaving school between high school CTE concentrators and nonconcentrators among students in the 1996 Florida grade 9 cohort who reached grade 12, by educational milestones reached



SOURCE: Florida K-20 data warehouse (authors' calculations)

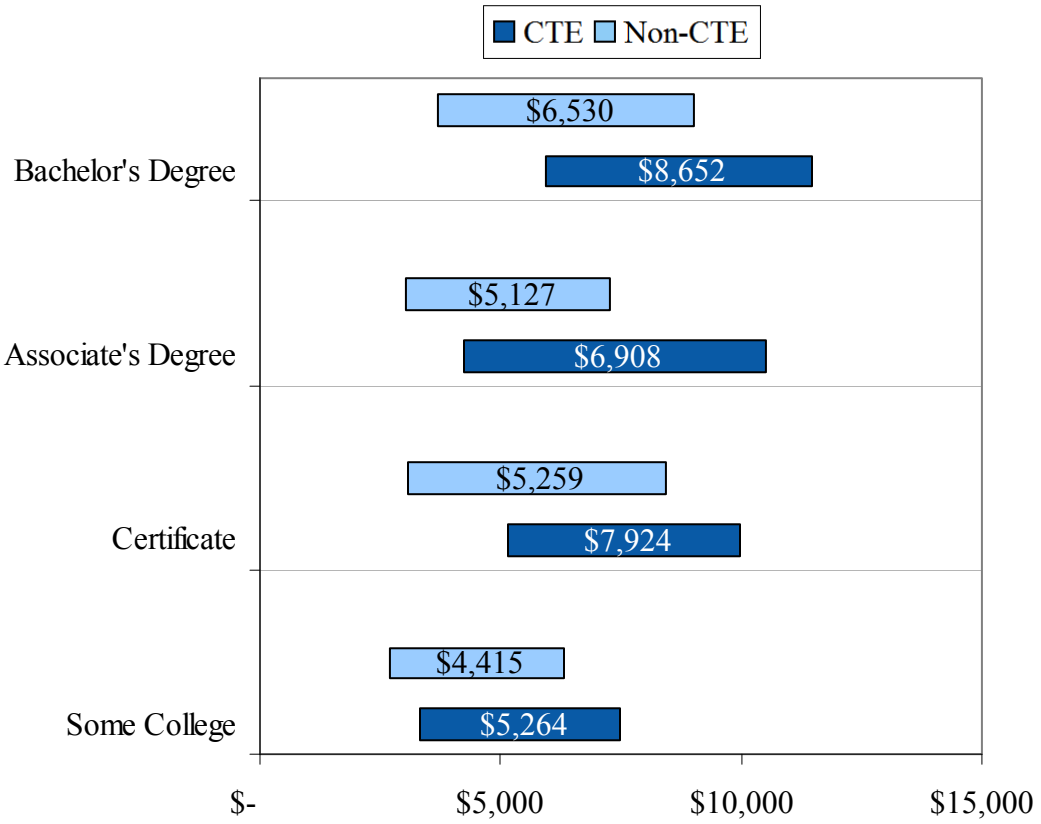
4.6.7 Post-School Earnings of Postsecondary CTE Concentrators and Nonconcentrators for Students Who Completed Different Levels of College Education

Completing a CTE concentration at the postsecondary level has a much larger effect on post-school earnings than completing a high school CTE concentration (see Figure 15). The earnings gap between the two groups is greatest at the certificate level, where postsecondary CTE concentrators with only a certificate have median earnings that are $2,665 greater per quarter than the earnings of nonconcentrators. Median earnings for postsecondary CTE concentrators with certificates are $7,924 compared to $5,259 for nonconcentrators with certificates.

There is also a large earnings gap between postsecondary CTE concentrators and nonconcentrators among students with bachelor's degrees and associate's degrees. Postsecondary CTE concentrators with bachelor's degrees have median earnings per quarter of $8,652 compared to $6,530 for nonconcentrators, a difference of $2,122. Among students with associate's degrees, there is a smaller difference between the groups, with median earnings of $6,908 for postsecondary CTE concentrators compared to $5,127 for nonconcentrators, a difference of $1,781.

The distribution of earnings is similar for postsecondary CTE concentrators and nonconcentrators who attended some college but did not complete a credential (and were no longer enrolled). Median earnings per quarter are $4,415 for concentrators and $5,264 for nonconcentrators with some college. In addition, the 25th and 75th percentiles of earnings for the two groups overlap to a large extent. This suggests that completing a postsecondary CTE concentration has little effect on earnings unless students also completed a postsecondary credential.

Figure 15. Distribution of the 25th to 75th percentile (median value is labeled) for highest quarterly earnings four quarters after leaving school among students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college (but were not still enrolled), by postsecondary CTE concentration status



NOTE: The solid bar represents the range of the 25th to 75th percentile of students' highest quarterly non-zero earnings four quarters post-school, and the median value is labeled.
SOURCE: Florida K-20 data warehouse (authors' calculations)

Table 36 shows how the median quarterly post-school earnings for postsecondary CTE concentrators differ by program area at each level of education. Notably, median earnings for all CTE program areas at the bachelor's degree level are significantly higher than the median earnings of $6,522 for academic concentrators with a bachelor's degree. Yet there is still significant variation across the different types of program areas for CTE concentrators with bachelor's degrees. Median quarterly earnings range from $6,759 for students in legal services to $11,663 for students in engineering and architectural sciences (a difference of $4,904). There is similar variation in median earnings among academic concentrators with bachelor's degrees, with a range of values from $4,986 for humanities to $9,008 for math (a difference of $4,022).

Table 36. Median value for highest quarterly earnings four quarters after leaving school for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college (but were not still enrolled), by highest level of education completed and type of postsecondary concentration

	Some college	*Certificate*	*Associate's Degree*	*Bachelor's Degree*
All students	$4,527	$7,816	$5,758	$7,995
All CTE	$5,264	$7,924	$6,908	$8,652
Legal Services	$6,136	‡	$6,139	$6,759
Public, Social, & Human Services	$4,877	‡	$4,024	$7,424
Agriculture & Natural Resources	$5,379	‡	$6,133	$7,104
Protective Services	$6,160	$8,502	$7,494	$7,451
Communications	$4,870	‡	$5,613	$7,188
Personal & Consumer Services	$4,222	$4,746	‡	$7,068
Business & Marketing	$6,112	$6,057	$6,393	$8,876
Health Care	$4,815	$6,903	$10,953	$9,566
Education	$5,240	‡	$5,011	$10,121
Trade & Industry	$5,304	$7,412	$6,502	$9,864
Computer Sciences	$4,808	‡	$5,097	$9,182
Engineering & Architectural Sciences	$5,068	$5,643	$5,610	$11,663
All Academic	$4,894	$6,488	$5,058	$6,522
English	$5,014	‡	$5,042	$7,128
Fine & Performing Arts	$4,079	‡	$4,199	$5,931
Humanities	$4,634	‡	$5,028	$4,986
Interdisciplinary	$4,334	‡	‡	$6,551
Math	$5,115	‡	$5,283	$9,008
Science	$4,979	‡	$4,887	$5,971
Social Sciences	$4,996	$6,838	$5,318	$6,648
Multiple Concentrations	$4,768	$5,954	$5,332	$7,451
No Concentration (less than 12 credits)	$3,991	N/A	N/A	N/A

‡ Reporting standards not met. (Too few cases for a reliable estimate)
SOURCE: Florida K-20 data warehouse (authors' calculations)

For CTE concentrators with associate's degrees, median quarterly earnings range between $4,024 for public, social and human services to $10,953 for health care. These CTE concentrators with associate's degrees in health care have higher median earnings than health care concentrators at any other level of education. Post-school earnings are also high for protective services concentrators with associate's degrees, with median earnings of $7,494.

Median earnings for academic concentrators with associate's degrees range between $4,199 for fine and performing arts to $5,318 for social sciences.

In five of the 12 CTE fields and six of the seven academic fields, too few CTE concentrators completed certificates and had post-school earnings to accurately compute median earnings. Among the program areas with enough observations, median earnings are highest for CTE concentrators in protective services at $8,502 and lowest for CTE concentrators in personal and consumer services at $4,746. The median earnings for academic concentrators with certificates are $6,488. However, there are too few academic concentrators with certificates to disaggregate these results by academic subject area.

There is much less variation in median earnings by program area for students who attended college but did not complete a postsecondary credential. Median quarterly earnings range from $4,222 for CTE concentrators in personal and consumer services to $6,160 for CTE concentrators in protective services. Academic concentrators who attended college but did not complete a credential have median earnings of $4,894 per quarter. Among this group of academic concentrators, median earnings are lowest for students in fine and performing arts ($4,079) and greatest for students in math ($5,115).

For almost all program areas, students with bachelor's degrees have higher median earnings than students who completed a lower level of education in the same program area. Two exceptions are health sciences, where students with associate's degrees tend to earn more than students with bachelor's degrees, and protective services, where students with certificates and associate's degrees earn more than students with bachelor's degrees.

4.6.8 The Association Between Completing a Postsecondary CTE Concentration and Post-School Earnings, Holding Other Factors Constant

Multivariate regression analysis is used to estimate the effects of postsecondary course taking and the completion of postsecondary CTE concentrations on post-school earnings after controlling for differences in student demographic characteristics, student high school performance, high school characteristics, work experience, and labor market experience. The sample is limited to students who reached grade 12 and completed a credential or were no longer enrolled in college.

Since the effect of CTE course taking may differ by level of education completed, separate models are estimated for students whose highest level of education is some college, a certificate, an associate's degree, or a bachelor's degree (students with graduate degrees are excluded from the analyses due to the small number of students who completed this type of credential during the timeframe). This approach allows for a comparison of earnings outcomes among similar students who completed the same level of education, but pursued different patterns of postsecondary course taking.

4.6.8.1 Post-School Earnings Effects for Students with Bachelor's Degrees

The regression results for students with bachelor's degrees indicate that students with a postsecondary CTE concentration earn $1,673 more per quarter, on average, than students with

an academic concentration, holding other factors constant (see Model 1 in Table 37).[30] However, the effect of completing a postsecondary CTE concentration on post-school earnings shows considerable variation across program areas.

Model 2 in Table 37 shows that relative to humanities concentrators with similar characteristics, earnings tend to be between $3,500 to $5,000 per quarter higher for CTE concentrators in computer sciences, education, engineering and architectural services, trade and industry, and health care. Earnings tend to be $1,000 to $2,500 per quarter higher in agriculture and natural resources, business and marketing, communications, personal and consumer services, and protective services. There are no statistically significant differences in earnings for legal services and public, social, and human services concentrators. However, academic concentrators in areas other than humanities also have higher earnings than humanities concentrators. Holding other factors constant, earnings tend to be between $3,500 to $5,000 per quarter higher for math concentrators, $1,000 to $2,500 per quarter higher for English and science, and less than $1,000 per quarter higher for social sciences.[31]

Model 3 was used to estimate the effect of each successive course in the same subject or program area for students with bachelor's degrees, regardless of whether they completed a postsecondary CTE concentration. Each additional credit in agriculture and natural resources, business and marketing, computer sciences, education, engineering and architectural services, health care, and trade and industry is associated with a positive effect on post-school earnings. The magnitude of the effect ranges from $20 per credit (protective services) to $59 per credit (education). Each additional credit completed in the liberal arts subjects of English, fine/performing arts, and social sciences was associated with an increase in earnings of $8 to $19 per quarter. Each additional credit in humanities is associated with a $12 *decrease* in earnings when other factors are held constant.[32]

All the models indicate that after holding other factors constant, there is no statistically significant difference in post-school earnings between students who attended rural or urban high schools prior to completing a bachelor's degree. In addition, there is no statistically significant difference in earnings by type of high school concentration or high school type for students who completed bachelor's degrees.

[30] When the models are replicated using the alternate specifications for the dependent variables, quarterly earnings for CTE concentrators are $1,869 higher under the high estimate of postschool earnings and $978 higher under the low estimate of postschool earnings (see Appendix E, Table E2).

[31] When the models are replicated using the alternate specifications of the dependent variable, almost all the same CTE program areas have earnings that are significantly higher than humanities (see Appendix E, Table E2). The only program areas without significantly higher earnings across all three specifications are agriculture and natural resources and protective services, where the differences are insignificant in the model with the high estimate of postschool earnings.

[32] Across the three specifications (low, moderate, and high postschool earnings) an additional credit is consistently associated with higher postschool earnings in the program areas of business and marketing, computer sciences, education, engineering and architectural services, health care, and trade and industry (Appendix E, Table E2).

Table 37. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after leaving school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed bachelor's degrees

	Model 1		Model 2		Model 3	
	β	S.E.	β	S.E.	β	S.E.
Type of postsecondary concentration						
Academic Concentration (reference)	†					
CTE Concentration	1673.06 **	108.47				
Multiple Concentrations	569.97	413.99				
Postsecondary subject or program area						
Humanities (reference)			†			
Agriculture & Natural Resources			1558.03 **	549.29		
Business & Marketing			2490.93 **	420.80		
Communications			1270.92 **	440.97		
Computer Sciences			3716.44 **	567.83		
Education			3961.14 **	438.27		
Engineering & Architectural Sciences			4792.29 **	465.56		
Health Care			3620.55 **	442.56		
Legal Services			1060.61	679.75		
Personal & Consumer Services			1877.63 **	672.62		
Protective Services			1329.52 **	456.75		
Public, Social, & Human Services			816.93	564.54		
Trade & Industry			4182.07 **	565.95		
English			1433.19 **	473.97		
Fine & Performing Arts			899.67	486.00		
Interdisciplinary			795.01	723.89		
Math			3407.62 **	825.02		
Science			1343.53 **	481.24		
Social Sciences			977.78 *	424.08		
Multiple Concentrations			1616.90 **	567.92		

(continued)

Table 37. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after leaving school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed bachelor's degrees (continued)

	Model 1		Model 2		Model 3	
	β	S.E.	β	S.E.	β	S.E.
# College credits in CTE						
Agriculture & Natural Resources					23.70 **	8.79
Business & Marketing					33.48 **	3.41
Communications					7.38	5.02
Computer Sciences					56.50 **	9.15
Education					59.09 **	3.58
Engineering & Architectural Sciences					56.28 **	4.11
Health Care					52.27 **	3.59
Legal Services					5.65	10.57
Personal & Consumer Services					4.03	13.19
Protective Services					19.51 **	5.02
Public, Social, & Human Services					0.04	8.77
Trade & Industry					55.93 **	6.83
# College credits in liberal arts						
English					18.89 **	6.30
Fine & Performing Arts					10.45 *	4.17
Humanities					−12.42 *	6.20
Interdisciplinary					8.66	13.37
Math					16.00	8.77
Science					6.09	4.13
Social Sciences					7.92 *	3.89
Type of high school concentration						
Non-New Basics + Non-CTE (reference)	†		†		†	
Non-New Basics + CTE	−135.07	364.71	−207.72	357.93	−229.58	355.22
New Basics + Non-CTE	220.82	200.49	130.11	196.68	119.97	195.21
New Basics + CTE	262.62	211.62	155.66	207.72	68.15	206.43

(continued)

Table 37. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after leaving school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed bachelor's degrees (continued)

	Model 1		Model 2		Model 3	
	β	S.E.	β	S.E.	β	S.E.
High school characteristics						
High school locale: urban (reference)	†		†		†	
High school locale: rural	247.98	236.60	203.34	232.26	179.81	230.46
High school locale: suburban	170.32	105.83	188.99	103.84	158.23	103.11
High school type: comprehensive (reference)	†		†		†	
High school type: CTE magnet	15.78	121.20	23.54	118.94	43.56	118.12
High school type: separate CTE school	7.70	889.51	−226.05	872.28	−53.10	865.39
High school type: other/alternative	224.97	2709.18	450.00	2656.46	736.01	2635.53
N	9,303		9,303		9,303	
R-squared	0.21		0.24		0.26	

† Not applicable

** p < 0.05, ** p < 0.01.*

All models include controls for student characteristics (gender, race, age, FRL status, LEP status, SWD status), student performance (grade 9 GPA, grade 9 absentee rate, college cumulative GPA), school characteristics (percent of students reaching grade 12, percent of black students, percent of Hispanic students, percent of FRL students, school size), work experience (number of quarters of work experience in high school, number of quarters of post-school work experience, average earnings in high school, average earnings in college), and labor market characteristics (distribution of employees across industries in the local labor market, average monthly wages for all workers in the workforce).

4.6.8.2 Post-School Earnings Effects for Students with Associate's Degrees

Completing a postsecondary CTE concentration also has a positive effect on post-school earnings for students with associate's degrees. Holding other factors constant, students with associate's degrees who completed a postsecondary CTE concentration have post-school earnings that are $1,743 per quarter higher than students with associate's degrees who completed a postsecondary academic concentration, on average (see Model 1 in Table 38).[33]

The regression results for Model 2 in Table 38 compare the earnings of CTE concentrators in each program area with academic concentrators in humanities for students whose highest level of education is an associate's degree. Relative to humanities concentrators with similar characteristics, quarterly post-school earnings for health care tend to be $4,206 higher per quarter. When other factors are held constant, there are no statistically significant differences in earnings between concentrators in humanities and any other program area.[34]

Model 3 in Table 38 estimates the effect of each credit in CTE program areas and liberal arts subjects for students with associate's degrees, regardless of whether they completed a postsecondary CTE concentration. Holding other factors constant, each credit completed in agriculture and natural resources, business and marketing, communications, engineering and architectural sciences, health care, protective services, and trade and industry is associated with an increase in earnings. The magnitude of the effect ranges from $18 per credit for communications to $105 per credit for health care, on average. For all the liberal arts subjects, there is no statistically significant effect on earnings for the completion of each additional credit after holding other factors constant.[35]

Across all three models, there are no statistically significant differences in post-school earnings by type of high school concentration, high school locale, or type of high school for students with associate's degrees.

[33] When the models are replicated using the alternate specifications for the dependent variables, quarterly earnings for CTE concentrators are $1,560 higher under the high estimate of postschool earnings and $1,343 higher under the low estimate of postschool earnings (see Appendix E, Table E3).

[34] Appendix E, Table E3 replicates the models using the alternate specifications of the dependent variables. Health care concentrations have a positive, significant effect on postschool earnings in all three models. For the high estimate only, quarterly earnings relative to humanities are also significantly higher for concentrators in business and marketing ($856), engineering and architectural services ($945), and protective services ($1,284). For the low estimate only, quarterly earnings relative to humanities are significantly higher for protective services concentrators ($589) and significantly lower for public, social, and human services concentrators (-$1,202).

[35] Across the three specifications (low, moderate, and high postschool earnings) an additional credit is consistently associated with higher postschool earnings in the program areas of business and marketing, engineering and architectural services, health care, and protective services (see Appendix E, Table E3).

Table 38. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after leaving school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed associate's degrees

	Model 1			Model 2			Model 3	
	β		S.E.	β		S.E.	β	S.E.
Type of postsecondary concentration								
Academic Concentration (reference)	†							
CTE Concentration	1743.41	**	115.57					
Multiple Concentrations	−94.36		183.08					
Postsecondary subject or program area								
Humanities (reference)				†				
Agriculture & Natural Resources				536.05		513.23		
Business & Marketing				372.38		310.88		
Communications				185.68		387.23		
Computer Sciences				907.07		490.37		
Education				9.52		365.90		
Engineering & Architectural Sciences				583.89		406.48		
Health Care				4205.98	**	309.11		
Legal Services				642.09		635.32		
Personal & Consumer Services				165.36		997.77		
Protective Services				690.20		377.22		
Public, Social, & Human Services				−1207.49		707.26		
Trade & Industry				625.15		559.81		
English				−169.06		361.23		
Fine & Performing Arts				−342.89		363.67		
Interdisciplinary				786.75		1042.72		
Math				−54.14		360.75		
Science				−422.42		321.49		
Social Sciences				−282.79		297.37		
Multiple Concentrations				−366.98		313.27		

(continued)

Table 38. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after leaving school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed associate's degrees (continued)

	Model 1		Model 2		Model 3		
	β	S.E.	β	S.E.	β		S.E.
# College credits in CTE							
Agriculture & Natural Resources					26.75	*	11.02
Business & Marketing					24.30	**	5.64
Communications					18.45	*	9.28
Computer Sciences					17.31		11.79
Education					14.49		7.44
Engineering & Architectural Sciences					24.50	**	7.82
Health Care					105.24	**	3.38
Legal Services					30.54		17.52
Personal & Consumer Services					5.70		20.63
Protective Services					29.32	**	8.07
Public, Social, & Human Services					−47.24		34.71
Trade & Industry					32.53	**	11.37
# College credits in liberal arts							
English					5.53		12.48
Fine & Performing Arts					−4.15		6.39
Humanities					−6.00		10.58
Interdisciplinary					−56.02		39.49
Math					−4.57		10.51
Science					−10.08		5.76
Social Sciences					5.25		6.34
Type of high school concentration							
Non-New Basics + Non-CTE (reference)	†		†		†		
Non-New Basics + CTE	248.04	319.35	232.48	300.90	203.02		290.76
New Basics + Non-CTE	245.16	189.31	113.81	178.46	100.87		172.24
New Basics + CTE	239.98	202.38	177.36	190.71	110.03		184.29

(continued)

Table 38. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after leaving school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed associate's degrees (continued)

	Model 1		Model 2		Model 3	
	β	S.E.	β	S.E.	β	S.E.
High school characteristics						
High school locale: urban (reference)	†		†		†	
High school locale: rural	80.57	234.82	−38.06	221.25	−42.53	213.97
High school locale: suburban	92.00	125.14	114.71	118.04	128.77	114.01
High school type: comprehensive (reference)	†		†		†	
High school type: CTE magnet	−7.07	147.81	−47.02	139.03	−61.42	134.52
High school type: separate CTE school	410.32	623.21	−153.57	586.97	−320.31	568.13
High school type: other/alternative	−1368.42	1539.73	−1440.03	1450.34	−1098.17	1400.83
N	4,045		4,045		4,045	
R-squared	0.37		0.44		0.48	

† Not applicable

** p < 0.05, ** p < 0.01.*

All models include controls for student characteristics (gender, race, age, FRL status, LEP status, SWD status), student performance (grade 9 GPA, grade 9 absentee rate, college cumulative GPA), school characteristics (percent of students reaching grade 12, percent of black students, percent of Hispanic students, percent of FRL students, school size), work experience (number of quarters of work experience in high school, number of quarters of post-school work experience, average earnings in high school, average earnings in college), and labor market characteristics (distribution of employees across industries in the local labor market, average monthly wages for all workers in the workforce).

4.6.8.3 Post-School Earnings Effects for Students with Certificates

Among students with postsecondary certificates, postsecondary CTE concentrators tend to earn $1,386 per quarter more than academic concentrators when other factors are held constant (see Model 1 in Table 39).[36] Due to the small number of concentrators in some program areas, the magnitude of the effect is estimated for only six of the 12 program areas relative to academic concentrations in any subject.

The multivariate regression results from Model 2 in Table 39 indicate that earnings tend to be $1,609 per quarter higher for health sciences concentrators and $1,656 per quarter higher for protective services concentrators relative to academic concentrators, holding other factors constant.[37] There are no other statistically significant differences in earnings by concentration type. As indicated in Model 3, each credit completed is associated with an increase in earnings of $55 per quarter for health care, $64 per quarter for protective services, and $11 per quarter for trade and industry. Among the liberal arts subjects, each credit completed in science is associated with a $59 decrease in earnings per quarter, on average.[38] In all three models, there is no statistically significant effect on earnings of type of high school concentration, school locale, or school type.

[36] When the models are replicated using the alternate specifications for the dependent variables, quarterly earnings for CTE concentrators are $833 higher under the low estimate of postschool earnings. There is no statistically significant difference between academic and CTE concentrators under the low estimate of postschool earnings (see Appendix E, Table E4).

[37] Quarterly earnings for health science concentrators tend to be higher by $1,096 under the low estimate of postschool earnings and by $1,209 under the high estimate of postschool earnings. Quarterly earnings for protective services concentrators tend to be higher by $1,136 under the low estimate of postschool earnings and by $1,049 under the high estimate of postschool earnings (Appendix E, Table E4).

[38] Across the three specifications (low, moderate, and high postschool earnings) an additional credit is consistently associated with higher postschool earnings in the program areas of health care and protective services, while an additional credit in science is consistently associated with a decrease in postschool earnings (see Appendix E, Table E4).

Table 39. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after leaving school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed certificates

	Model 1		Model 2		Model 3	
	β	S.E.	β	S.E.	β	S.E.
Type of postsecondary concentration						
Academic Concentration (reference)	†					
CTE Concentration	1386.29 **	446.29				
Multiple Concentrations	−18.88	659.37				
Postsecondary subject or program area						
Academic-any (reference)			†			
Business & Marketing			774.76	804.05		
Engineering & Architectural Sciences			477.71	778.56		
Health Care			1609.94 **	497.19		
Personal & Consumer Services			421.15	608.77		
Protective Services			1655.65 **	501.47		
Trade & Industry			281.71	591.19		
# College credits in CTE						
Agriculture & Natural Resources					−42.87	27.83
Business & Marketing					−5.41	16.22
Communications					2.69	52.18
Computer Sciences					15.82	49.05
Education					108.91	56.35
Engineering & Architectural Sciences					8.32	6.94
Health Care					55.06 **	6.50
Legal Services					324.63	300.64
Personal & Consumer Services					6.22	8.72
Protective Services					63.13 **	8.48
Public, Social, & Human Services					470.73	450.56
Trade & Industry					10.83 *	4.18

(continued)

Table 39. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after leaving school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed certificates (continued)

	Model 1		Model 2		Model 3	
	β	S.E.	β	S.E.	β	S.E.
# College credits in liberal arts						
English					−0.74	43.56
Fine & Performing Arts					−13.77	48.29
Humanities					−6.30	44.12
Interdisciplinary					−398.69	315.19
Math					4.17	49.76
Science					−58.87 *	28.01
Social Sciences					43.41	28.36
Type of high school concentration						
Non-New Basics + Non-CTE (reference)	†		†		†	
Non-New Basics + CTE	−111.62	465.34	−49.41	483.60	113.05	446.07
New Basics + Non-CTE	126.71	312.99	78.28	329.95	142.35	299.88
New Basics + CTE	148.26	329.49	137.55	346.78	180.07	317.07
High school characteristics						
High school locale: urban (reference)	†		†		†	
High school locale: rural	−467.50	428.56	−460.34	442.01	−442.50	411.14
High school locale: suburban	89.87	248.16	49.62	260.15	45.50	238.31
High school type: comprehensive (reference)	†		†		†	
High school type: CTE magnet	−169.53	287.32	−129.50	301.88	−165.64	277.27
High school type: separate CTE school	677.08	647.76	789.97	659.87	668.78	626.32
High school type: other/alternative	2286.53	3083.94	1980.29	3109.20	1962.19	2946.83

(continued)

Table 39. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after leaving school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed certificates (continued)

	Model 1		Model 2		Model 3	
	β	S.E.	β	S.E.	β	S.E.
N	950		894		950	
R-squared	0.49		0.49		0.55	

† Not applicable

** p < 0.05, ** p < 0.01.*

All models include controls for student characteristics (gender, race, age, FRL status, LEP status, SWD status), student performance (grade 9 GPA, grade 9 absentee rate, college cumulative GPA), school characteristics (percent of students reaching grade 12, percent of black students, percent of Hispanic students, percent of FRL students, school size), work experience (number of quarters of work experience in high school, number of quarters of post-school work experience, average earnings in high school, average earnings in college), and labor market characteristics (distribution of employees across industries in the local labor market, average monthly wages for all workers in the workforce).

4.6.8.4 Post-School Earnings Effects for Students Who Attended Some College, But Did Not Complete a Credential

The last set of regression models examining post-school earnings are for students who attended college but did not complete a postsecondary credential. For this group, comparing CTE concentrators and academic concentrators is more complex since students who intended to complete a CTE concentration may have dropped out of college before completing enough CTE courses to be identified as a CTE concentrator in the data. As a result, the effect on earnings of completing a CTE concentration may be overestimated, so this discussion will focus more on the significance of the variables in the models instead of the magnitude of the coefficients.

The regression results for Model 1 in Table 40 indicate that post-school earnings for students with some college, but no credential, tend to be higher for CTE concentrators than academic concentrators when other factors are held constant. In particular, Model 2 indicates that post-school earnings tend to be higher for CTE concentrators in business and marketing, education, and protective services, than for humanities concentrators.[39] The only significant difference in earnings among academic concentrators is that fine and performing arts concentrators tend to have lower post-school earnings than academic concentrators in humanities. Model 3 estimates the successive effect of each credit hour completed in CTE program areas or liberal arts subjects for all students, regardless of concentration status. On average, earnings tend to be higher with each CTE credit completed in agriculture and natural resources, business and marketing,

[39] When the models are replicated using the alternate specifications for the dependent variables, the same program areas have significantly higher earnings under the low estimate of postschool earnings. In the high estimate of postschool earnings, communications is the only CTE concentration with quarterly earnings significantly higher than humanities concentrations (see Appendix E, Table E5).

education, health care, legal services, and protective services. Among the liberal arts subjects, social studies credits are associated with a positive effect on earnings.[40]

Across all three models, there are no statistically significant differences in post-school earnings by type of high school concentration, high school locale, or type of high school for students who attended college but did not complete credentials.

Table 40. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after leaving school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college but did not complete a credential (and were not still enrolled)

	Model 1			Model 2			Model 3	
	β		S.E.	β		S.E.	β	S.E.
Type of postsecondary concentration								
Academic Concentration (reference)	†							
CTE Concentration	416.41	**	65.14					
Multiple Concentrations	81.98		64.03					
No Concentration (<12 credits)	−46.95		59.14					
Postsecondary subject or program area								
Humanities (reference)				†				
Agriculture & Natural Resources				12.00		360.85		
Business & Marketing				647.38	**	182.40		
Communications				228.00		244.12		
Computer Sciences				32.24		193.83		
Education				535.49	*	241.61		
Engineering & Architectural Sciences				236.62		241.21		
Health Care				66.52		194.03		
Legal Services				469.46		412.87		
Personal & Consumer Services				−84.47		306.22		
Protective Services				591.98	*	202.08		
Public, Social, & Human Services				616.16		509.94		

(continued)

[40] Across the three specifications (low, moderate, and high postschool earnings) an additional credit is consistently associated with higher postschool earnings in the program areas of agriculture and natural resources, business and marketing, education, health care, and protective services (see Appendix E, Table E5).

Table 40. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after leaving school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college but did not complete a credential (and were not still enrolled) (continued)

	Model 1		Model 2		Model 3	
	β	S.E.	β	S.E.	β	S.E.
Trade & Industry			235.90	272.70		
English			−91.34	156.02		
Fine & Performing Arts			−449.36 *	185.69		
Interdisciplinary			−291.53	483.77		
Math			−136.11	177.88		
Science			−109.50	171.17		
Social Sciences			−13.81	151.11		
Multiple Concentrations			−17.61	147.21		
No Concentration (<12 credits)			−154.68	145.17		
# College credits in CTE						
Agriculture & Natural Resources					56.24 **	15.56
Business & Marketing					35.03 **	4.69
Communications					14.84	7.89
Computer Sciences					18.63	9.62
Education					37.15 **	6.91
Engineering & Architectural Sciences					11.43	5.82
Health Care					26.39 **	5.04
Legal Services					47.17 **	14.51
Personal & Consumer Services					3.38	10.80
Protective Services					42.85 **	6.97
Public, Social, & Human Services					34.66	23.79
Trade & Industry					8.08	7.43
# College credits in liberal arts						
English					5.53	6.46
Fine/Performing Arts					−4.68	4.59
Humanities					−4.55	7.25
Interdisciplinary Studies					−5.00	19.65
Math					2.26	7.11

(continued)

Table 40. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after leaving school on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college but did not complete a credential (and were not still enrolled) (continued)

	Model 1		Model 2		Model 3		
	β	S.E.	β	S.E.	β		S.E.
Science					−2.08		4.52
Social Studies					13.80	**	3.95
Type of high school concentration							
Non-New Basics + Non-CTE (reference)	†		†		†		
Non-New Basics + CTE	114.79	109.86	120.23	109.88	84.76		109.33
New Basics + Non-CTE	26.26	64.34	24.82	64.34	9.65		64.02
New Basics + CTE	40.42	72.33	35.42	72.37	9.66		72.05
High school characteristics							
High school locale: urban (reference)	†		†		†		
High school locale: rural	−151.39	98.47	−157.21	98.49	−110.70		98.09
High school locale: suburban	−8.92	48.20	−10.03	48.21	−13.71		47.96
High school type: comprehensive (reference)	†		†		†		
High school type: CTE magnet	63.65	55.55	64.86	55.54	66.54		55.27
High school type: separate CTE school	−288.47	192.17	−292.49	192.15	−252.83		191.22
High school type: other/alternative	−284.96	396.20	−270.82	396.18	−259.68		394.14
N	17,713		17,713		17,713		
R-squared	0.37		0.37		0.38		

† Not applicable

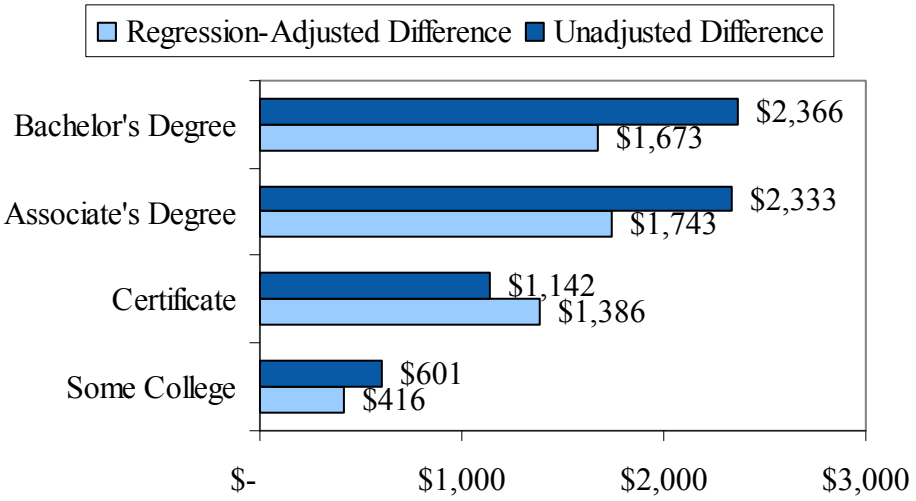
** p < 0.05, ** p < 0.01.*

All models include controls for student characteristics (gender, race, age, FRL status, LEP status, SWD status), student performance (grade 9 GPA, grade 9 absentee rate, college cumulative GPA), school characteristics (percent of students reaching grade 12, percent of black students, percent of Hispanic students, percent of FRL students, school size), work experience (number of quarters of work experience in high school, number of quarters of post-school work experience, average earnings in high school, average earnings in college), and labor market characteristics (distribution of employees across industries in the local labor market, average monthly wages for all workers in the workforce).

4.6.9 Comparison of Unadjusted and Regression-Adjusted Earnings Gaps Between Postsecondary CTE and Academic Concentrators

Figure 16 compares the earnings advantage of postsecondary CTE concentrators, relative to academic concentrators, before and after controlling for student demographic characteristics, student performance, school characteristics, work experience, and labor market characteristics.[41] The dark blue bar represents the unadjusted difference in the mean annual wages between the two groups, and the light blue bar represents the regression-adjusted difference. Even after controlling for observable differences between the two groups, earnings are still substantially higher for postsecondary CTE concentrators. The earnings advantage of postsecondary CTE concentrations tends to increase at higher levels of educational attainment.

Figure 16. Unadjusted and regression-adjusted average difference of highest quarterly earnings four quarters after leaving school between postsecondary CTE concentrators and academic concentrators for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college (not still enrolled), by highest level of education completed



NOTE: Regression-adjusted differences represent the value of the coefficient for CTE concentrators from Tables 37–40.
SOURCE: Florida K-20 data warehouse (authors' calculations)

Overall, the results suggest that postsecondary CTE concentrations may provide students with skills that employers value highly. However, we should also consider that some unobserved differences between CTE and academic concentrators may contribute to the earnings gap between these two groups. Further, it is not possible to determine if earnings for academic concentrators would have been higher had they completed a CTE concentration. The CTE concentrators may have different innate abilities and interests that give them an advantage in the labor market. This means that the earnings for CTE concentrators may be overestimated.

[41] We compared the log-likelihood statistics from the unadjusted and adjusted regression models for each level of education. In all cases, there is a significant difference ($\chi^2 < 0.05$), indicating that the additional variables contribute to improving the overall fit of the model.

4.6.10 Trends Over Time in the Regression-Adjusted Earnings Gap Between Postsecondary CTE and Academic Concentrators

The regression results reported up to this point have been limited to earnings in the first four quarters after exiting school. This section examines trends over time in the regression-adjusted earnings gap between postsecondary CTE and academic concentrators for students with at least a three-year (12-quarter) follow-up period after exiting school. These findings must be interpreted with caution as they may not be representative of trends over time for the entire population. Less than one quarter of students with bachelor's degrees, associate's degrees, and certificates have a follow-up period of at least 12 quarters. Moreover, for bachelor's degree students the year 1 earnings differential shown in Table 41 for students with at least 12 quarters of follow-up earnings was $330 higher than for students with at least four quarters of follow-up shown in Table 38. For African American students the differential was $720 higher. For certificate students the differential was $590 lower, and for some college students the differential was $180 lower. Thus, it appears that the earnings effects differed substantially for students with at least 12 quarters of follow-up versus those with at least four quarters of follow-up.

Table 41. Regression-adjusted difference in highest quarterly earnings four quarters after leaving school between postsecondary CTE concentrators and academic concentrators for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college (not still enrolled), by highest level of education completed and years of follow-up after exiting school

Highest level of education	Number of students with at least 3 years of post-school follow-up	Year 1	Year 2	Year 3
Bachelor's degree	3,232	2006.88 **	2043.36 **	2956.07 **
		(231.52)	(290.55)	(417.02)
Associate's degree	1,829	2468.27 **	2302.90 **	2116.07 **
		(192.26)	(257.16)	(289.52)
Certificate	596	812.51	1431.69	476.20
		(663.92)	(947.13)	(1091.57)
Some college	16,728	240.84 **	296.15 *	336.95 *
		(81.58)	(122.17)	(152.18)

** p < 0.05, ** p < 0.01.*
NOTE: Standard errors in parentheses.
SOURCE: Florida K-20 data warehouse (authors' calculations)

For students with bachelor's degrees and some college, the earnings differential between postsecondary CTE concentrators and academic concentrators tends to increase over time (see Table 41). The quarterly earnings differential for students with bachelor's degrees increases from $2,007 in year 1 to $2,956 in year 3, while the earnings differential for students with some

college increases from $241 in year 1 to $337 in year 3. The trend differs for students whose highest level of education is an associate's degree. For these students, the earnings differential between CTE and academic concentrators decreases from $2,468 in year 1 to $2,116 in year 3.

There are no statistically significant differences in earnings between CTE and academic concentrators among students with certificates when the sample is restricted to those who have a follow-up period of at least three years. This might be related to the comparison group being students with a different mix of academic concentrations than academic concentrators in the other groups. The earnings differential between postsecondary CTE concentrators and academic concentrators were small, but grew modestly over time, for students who attended college, but did not receive a credential.

4.6.11 The Relationship Between Industry of Employment and CTE Program Area

The wage-record data also include the industry of the employer, as categorized by the North American Industry Classification System (NAICS). This industry categorization does not directly correspond to the CTE program areas, but researchers for this study developed a taxonomy to align the NAICS codes as closely as possible with the CTE program areas (see Table C11 in Appendix C). Some program areas could be straightforwardly aligned with related industries. For example, the CTE program area in education aligns closely with the NAICS industries for "educational services" and "administration of education programs." For other CTE program areas, determining if students were employed in a related industry was more difficult. For example, some CTE concentrators in business management may be employed in an industry such as "finance and insurance," while others may perform similar work for a company in a different industry. Results relating to the extent to which students' industries of employment are related to their program areas, therefore, should be interpreted with caution, because the number of students actually employed in a job using skills developed in a CTE program may be underestimated or overestimated in different cases. It is also important to note that the record used to determine whether a student is employed in a related industry corresponds to the highest quarterly non-zero earnings in four quarters post-school. Some students may have been employed in a related industry at another point during their time in the workforce, but this is not reflected in the results.

Overall, 31 percent of students with a high school CTE concentration are employed in an industry related to the program area of their CTE concentration after exiting school (see Table 42). However, the extent to which high school CTE concentrators are employed in related industries varies widely by program area. The majority of students in business (61 percent), consumer and culinary services (58 percent), and marketing (63 percent) are employed in a related industry. This corresponds with a broader trend across all types of high school concentrators, as over half of all high school students who reached grade 12 but did not attend college are employed in the "eating and sleeping" or "retail trade" industries. (Appendix C, Table C12 provides additional details about the percentage distribution of employment sectors for students who reached grade 12 but did not attend college.) For program areas including agriculture and natural resources, communications and design, and computer and information sciences, only 10 to 12 percent of high school CTE concentrators are employed in a related industry.

Table 42. Percentage of high school CTE concentrators who are employed in an industry related to the program area of their high school CTE concentration, for students in the 1996 Florida grade 9 cohort who reached grade 12, by CTE program area and college attendance status

	All Students	Did Not Attend College	Attended College		
			Part-time	Full-time	All
All High School CTE Concentrations	31%	34%	30%	28%	29%
Agriculture & Natural Resources	10%	10%	9%	9%	9%
Business	61%	69%	58%	58%	58%
Communications & Design	11%	10%	10%	13%	12%
Computer & Information Sciences	12%	11%	10%	14%	13%
Construction & Architecture	31%	34%	31%	25%	29%
Consumer & Culinary Services	58%	72%	48%	46%	47%
Engineering Technologies	22%	16%	22%	27%	25%
Health Sciences	29%	22%	35%	28%	31%
Mfg, Repair & Transportation	27%	31%	22%	19%	21%
Marketing	63%	70%	60%	55%	58%
Public Services	25%	14%	26%	34%	30%

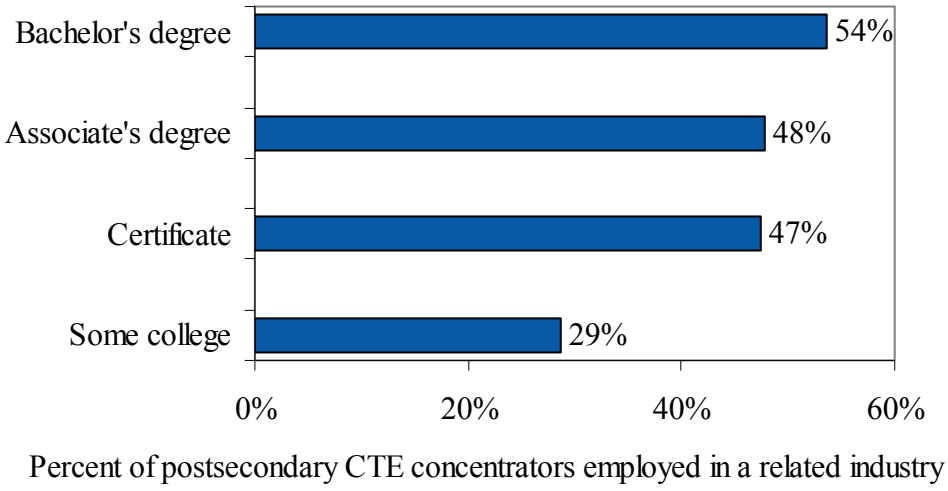
SOURCE: Florida K-20 data warehouse (authors' calculations)

The percentage of high school CTE concentrators employed in a related industry also varies depending on whether students attended college. While the overall percentage of high school CTE concentrators employed in a related industry is similar for both college attendees and non-attendees (29 percent and 34 percent, respectively), variation by program area is substantial. In some program areas, students who attended college are more likely to be employed in an industry related to their high school concentration. For example, the percentage of students in an industry related to public services is only 14 percent for students who did not attend college compared to 30 percent for students who did attend college. In contrast, in program areas such as consumer and culinary services, the percentage of students employed in a related industry is higher for students who did not attend college (72 percent versus 47 percent). Among students who attended college, the percentage of concentrators employed in a related industry are within 5 percentage points for part-time and full-time college students in most program areas. However, CTE concentrators who attended college part-time are more likely to be employed in a related industry in the program areas of construction and architecture and health sciences, and less likely to be employed in a related industry in the program areas of marketing and public services.

Among postsecondary CTE concentrators, approximately 47 percent of students are employed in an industry related to the program area of their postsecondary CTE concentration. However, there are differences by the highest level of education completed (see Figure 17). Postsecondary CTE concentrators who attended college but did not receive a credential are the least likely to be employed in an industry related to their program area (29 percent). The percentage of postsecondary CTE concentrators employed in a related industry is similar for students whose highest level of education is a certificate or an associate's degree (47 percent and 48 percent,

respectively). Students with bachelor's degrees are the most likely to be employed in a related industry, with 54 percent of students working in the same program area as their postsecondary CTE concentration.

Figure 17. Percentage of postsecondary CTE concentrators employed in an industry related to their program area, for students in the 1996 Florida grade 9 cohort who reached grade 12 and were not still enrolled in college, by highest level of education completed



SOURCE: Florida K-20 data warehouse (authors' calculations)

The association between highest level of education and industry-related employment varies across CTE program areas (see Table 43). For example, postsecondary CTE concentrators in personal and consumer services with certificates are at least two times more likely to be employed in a related industry than concentrators in the same program area with bachelor's degrees. In other program areas, students with higher levels of education are substantially more likely to be employed in a related industry. For example, the percentage of education concentrators employed in a related industry is 16 percent for students with some college education, 23 percent for students with associate's degrees, and 83 percent for students with bachelor's degrees. A complete distribution of employment sectors for postsecondary CTE concentrators in each program area is provided in Appendix C, Table C13.

Table 43. Percentage of postsecondary CTE concentrators employed in an industry related to the program area of their postsecondary CTE concentration, for students in the 1996 Florida grade 9 cohort who reached grade 12 and were not still enrolled in college, by highest level of education completed and CTE program area

	All college students	*Some college*	*Certificate*	*Associate's degree*	*Bachelor's degree*
All PS CTE Concentrations	47%	29%	47%	48%	54%
Agriculture & Natural Resources	10%	6%	‡	16%	9%
Business & Marketing	67%	65%	74%	65%	67%
Communications	19%	10%	‡	12%	22%
Computer Sciences	9%	6%	‡	5%	20%
Education	66%	16%	‡	23%	83%
Engineering & Architectural Sciences	42%	23%	56%	26%	54%
Health Care	50%	25%	36%	74%	54%
Legal Services	45%	23%	‡	44%	45%
Personal & Consumer Services	63%	71%	77%	‡	37%
Protective Services	29%	15%	46%	21%	24%
Public, Social, & Human Services	31%	24%	‡	35%	30%
Trade & Industry	44%	38%	56%	24%	44%

‡ Reporting standards not met. (Too few cases for a reliable estimate)
SOURCE: Florida K-20 data warehouse (authors' calculations)

4.6.12 Comparison of Median Earnings for Postsecondary CTE Concentrators Employed in a Related or Non-Related Industry

Median earnings for students with associate's and bachelor's degrees tend to be higher for postsecondary CTE concentrators employed in an industry related to their program area compared to postsecondary CTE concentrators employed in a non-related industry. Postsecondary CTE concentrators employed in a related industry have median earnings 54 percent higher than concentrators employed in a non-related industry among students with associate's degrees, and 30 percent higher than concentrators employed in a non-related industry among students with bachelor's degrees (see Table 44). However, there is considerable variation by program area. Median earnings are more than twice as high for students employed in a related industry (relative to those employed in a non-related industry) in the engineering and architectural science program than for students with bachelor's degrees, as well as in the health care program area for students with associate's degrees. Further, students with bachelor's degrees who are employed in a related industry also have median earnings at least 50 percent higher in the program areas of computer science (58 percent), education (96 percent), and health care (79 percent). Students with associate's degrees who are employed in a related industry have higher median earnings at least 50 percent higher in the program areas of engineering and architectural services (77 percent). Yet students in some program areas have lower median earnings when employed in a related industry than students employed in a non-related industry. Among students with bachelor's degrees, CTE concentrators employed in a related industry have median earnings 8 percent lower than those employed in a non-related industry for the

agriculture and natural resources program area, and 19 percent lower than those employed in a non-related industry for the personal and consumer services program area. Students with associate's degrees concentrating in two CTE areas have slightly lower median earnings when employed in a related field than those employed in a non-related field: business and marketing (−5 percent) and trade and industry (−1 percent).

Among students with certificates, median earnings tend to be 9 percent higher for postsecondary CTE concentrators employed in a related industry relative to those employed in a non-related industry. For most program areas there are too few cases to reliably estimate the difference in median earnings between concentrators employed in related and non-related industries. In trade and industry, concentrators employed in related industries had earnings that were 44 percent higher than those employed in non-related industries, while there were few differences in earnings for concentrators in personal and consumer services and protective services. In the health care program area median earnings were 22 percent lower for CTE concentrators employed in a related industry. This finding is surprising, especially given the large positive association between health care concentrations and earnings for those in a related industry at the bachelor's and associate's degree levels. We examined the distribution of industries of employment for health care concentrators with certificates employed in a non-related industry and found that approximately half of these students were employed in a government industry. Within the government industry health-care-related jobs may include emergency medical technicians (EMTs) or paramedics, so this difference in industry categorization may reflect the limitations of using industries of employment to determine whether students are working in their program area.

For postsecondary CTE concentrators who attended some college but did not complete a credential, median earnings are 1 percent higher for students employed in a related industry, but earnings vary by program area. CTE concentrators employed in a related industry have median earnings at least 50 percent higher in the program areas of communications (60 percent), engineering and architectural services (57 percent), and protective services (59 percent). However, these results must be interpreted with caution because the total number of credits completed by students who attended some college but did not complete a credential varies greatly. Students may be more likely to find employment in a related industry if they were close to finishing a credential before leaving college.

Table 44. Percentage difference in median post-school earnings between postsecondary CTE concentrators employed in related industries and non-related industries for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college (not still enrolled), by highest level of education completed

	Some college	*Certificate*	*Associate's Degree*	*Bachelor's Degree*
All CTE	1%	9%	54%	30%
Agriculture & Natural Resources	‡	‡	‡	-8%
Business & Marketing	-12%	‡	-5%	1%
Communications	60%	‡	39%	7%
Computer Sciences	41%	‡	‡	58%
Education	19%	‡	7%	96%
Engineering & Architectural Sciences	57%	‡	77%	140%
Health Care	17%	-16%	102%	79%
Legal Services	‡	‡	39%	19%
Personal & Consumer Services	-22%	-2%	‡	-19%
Protective Services	59%	0%	32%	8%
Public, Social, & Human Services	‡	‡	‡	5%
Trade & Industry	20%	44%	-1%	43%

‡ Reporting standards not met. (Too few cases for a reliable estimate)

SOURCE: Florida K-20 data warehouse (authors' calculations)

NOTE: Positive values indicate higher earnings for CTE concentrators employed in a related industry.

4.6.13 Summary

Our analysis of the effect of completing a CTE concentration on post-school employment and earnings indicates the following:

- Postsecondary CTE concentrators have slightly more work experience during college and are more likely to work full-time than nonconcentrators with similar levels of education.
- Overall, 31 percent of high school CTE concentrators and 47 percent of postsecondary CTE concentrators are employed in an industry related to their CTE program area. The extent to which high school and postsecondary CTE concentrators are employed in related industries varies widely by program area.
- Among students who did not attend college, high school CTE concentrators have median post-school earnings that are $672 per quarter higher than nonconcentrators, but much of the earnings differential between the groups is attributed to external factors (e.g., differences in the amount of work experience or student performance).
  - Relative to non-New Basics + non-CTE concentrators, earnings for students who did not attend college tend to be $318 per quarter higher for New Basics + non-CTE

concentrators and $178 per quarter higher for New Basics + CTE concentrators when other factors are held constant.

- For students who complete a postsecondary credential, there is no statistically significant effect on earnings from type of high school concentration, holding other factors constant.

- Completing a postsecondary CTE concentration has a much greater effect on earnings than completing a high school CTE concentration.

- Among students with postsecondary credentials, postsecondary CTE concentrators have median earnings that are $849 to $2,665 more per quarter than academic concentrators with similar levels of education. Part of the earnings gaps is associated with differences in student, school, and workforce characteristics. But a significant difference remains between postsecondary CTE concentrators and academic concentrators in many program areas.

- For students who attended college but did not complete a credential, post-school earnings tend to be higher for CTE concentrators in business and marketing, education, and protective services than for humanities concentrators.

- Holding other factors constant, completing postsecondary CTE credits in many types of program areas has a positive effect on earnings for all students who attend college, regardless of postsecondary concentration.

- Overall, there are very few differences in post-school earnings by high school locale or high school type after controlling for differences in other factors that may affect earnings.

- For students with bachelor's degrees and some college, the earnings differential between postsecondary CTE concentrators and academic concentrators tends to increase over time. For students with associate's degrees, the earnings differential declines slightly over time.

- For students with associate's and bachelor's degrees, median earnings tend to be higher for CTE concentrators employed in an industry related to their program area compared to CTE concentrators employed in a non-related industry.

5.0 CONCLUSIONS

This report examined CTE and academic course taking in high school and college. It also examined how completing a CTE concentration in high school affected high school course taking, transitions after high school, college course taking, attainment, and employment and earnings. We used a unique database that tracked all 84,700 first-time students in grade 9 who attended Florida public schools in 1996 and reached grade 12 through public high schools and colleges and into the Florida workforce.

Because of the size and detail of the database we were able to examine program participation and earnings impacts for concentrations in 12 high school CTE program areas (combined into 11

CTE program areas at the postsecondary level) and in seven academic areas. We also were able to examine differences in course taking, college attendance, credential attainment, and earnings for students who attended rural, urban, and suburban high schools, as well as comprehensive high schools, magnet high schools with CTE academies, and CTE high schools.

Our findings are consistent with earlier research about the role of CTE course taking (Silverberg, Warner, Fong, & Goodwin, 2004). However, we were able to delve more deeply into how outcomes differ among CTE concentrators and nonconcentrators with similar academic backgrounds. In the following summary we describe how CTE course taking was associated with key variables, but cannot say CTE course taking *caused* differences in particular outcomes.

5.1 High School Course Taking

Florida high school students in rural areas differed in several important ways from students in urban and suburban areas. Rural students who reached grade 12 were more likely to be high school CTE concentrators than urban students (39 percent versus 26 percent), and they took more CTE courses (the equivalent of 3.7 year-long courses) compared to urban students (the equivalent of 2.8 year-long courses).

There was a statistically significant difference in the likelihood of completing a New Basics curriculum between high school CTE concentrators and nonconcentrators, but the magnitude of the difference was small. The predicted probability of completing a New Basics curriculum is 82 percent for concentrators versus 79 percent for nonconcentrators.

5.2 Transitions

About 75 percent of grade 12 students who completed the New Basics curriculum attended college, compared to 50 percent who did not complete this curriculum. The likelihood of attending college after high school (relative to entering the workforce) was similar for high school CTE concentrators and nonconcentrators with similar academic backgrounds.

Rural students were more likely to come from low-income families (39 percent receive free and reduced price lunch, compared to 33 percent of urban students). This difference between rural and urban students contributed to the differences in the likelihood of attending college. About 65 percent of rural students attended college, which is 9 percentage points less than urban students. However, when we took demographic and other differences into account, the differential dropped to 2 percentage points.

5.3 College Course Taking

A much higher percentage of students completed CTE concentrations in college relative to high school (only 19 percent of high school students were CTE concentrators, compared to 38 percent of college students). The percentage of CTE concentrators also varied among students who earned certificates, associate's degrees, and bachelor's degrees. The highest proportion, 87 percent, was among students who obtained certificates, as most certificate programs are in career-related fields. The lowest proportion, 17 percent, was among students who attended college, but did not obtain a credential. The percentage of CTE concentrators was much higher among students with bachelor's degrees than students with associate's degrees (67 percent versus 44 percent). A key reason for this result is that most students with associate's and bachelor's

degrees focus mainly on completing the requirements for a liberal arts degree in their first two years. Thus, students with associate's degrees who do not enter four-year programs are less likely to become CTE concentrators.

Among students who reached grade 12 and attended college, high school CTE concentrators were only slightly more likely than nonconcentrators to complete a postsecondary CTE concentration, especially after taking into account New Basics completion status in high school. Among New Basics completers, 45 percent of high school CTE concentrators completed a postsecondary CTE concentration, compared to 40 percent of students who were not CTE concentrators in high school. Among students who did not complete a New Basics curriculum, 38 percent of high school CTE concentrators had a postsecondary CTE concentration, compared to 32 percent of students who were not CTE concentrators in high school.

High school CTE concentrators who attended college were more likely to complete a postsecondary concentration in a new program area than to continue in the same program area as their high school CTE concentration. For high school New Basics + CTE concentrators, 29 percent of students had a postsecondary CTE concentration in a new program, and 16 percent continued in the same program area. For high school non-New Basics + CTE concentrators, 24 percent of students had a postsecondary CTE concentration in a new program area and 12 percent continued in the same program area. The low continuation rates from high school CTE program areas to postsecondary CTE program areas suggest that students may pursue courses of greater vocational interest in college while focusing more on areas of avocational interest in high school. In addition, students may have a broader range of CTE courses available to choose from in college.

Remedial course taking in college was similar for high school CTE concentrators versus nonconcentrators, and for rural versus urban students.

5.4 Attainment

Just under one-third of students who reached grade 12 received some form of postsecondary credential, regardless of school locale. However, the percentage of students receiving bachelor's and graduate degrees is greater among students from urban schools than rural schools. Florida only has nine four-year colleges (relative to 28 two-year colleges), so rural students may face geographic barriers to attending institutions that award baccalaureate and post-baccalaureate degrees.

High school students in grade 12 who completed the New Basics Academic curriculum (which is required to enter a four-year college), were more likely than students who did not complete this curriculum to attend college, stay long enough in college to become a college CTE concentrator, and attain a credential. These important education outcomes differ very little between CTE high school concentrators and nonconcentrators once we take into account whether or not they completed the New Basics curriculum. College enrollment and credential attainment rates were almost identical for high school CTE concentrators and for nonconcentrators who completed the New Basics curriculum; and the rates were almost identical for CTE concentrators and nonconcentrators, who did not complete the New Basics curriculum.

Students took the bulk of their CTE courses towards the end of their enrollment in college. College students often need to take a substantial number of core courses both to satisfy degree requirements and to have the prerequisites for taking certain CTE courses, especially those in technical fields such as engineering, computer science, and health care.

The pattern of first completing a lot of academic core courses and prerequisites means that postsecondary CTE concentrators (students concentrating the majority of their courses in one CTE program area) are likely to attain one or more credentials.

5.5 Employment and Earnings

Among students who did not attend college, post-school earnings averaged about $220 per quarter less for rural students than for urban students. Earnings of high school CTE concentrators who reached grade 12 but did not go to college are about 14 percent greater than those of nonconcentrators in the first quarter after exiting school, but much of the earnings differential between the groups is attributed to external factors (e.g., differences in the amount of work experience or student performance), rather than the completion of a CTE concentration.

Among students who did attend college, large earnings differences are associated with being a postsecondary CTE concentrator versus an academic concentrator in the first four quarters after exiting school. Relative to academic concentrators, postsecondary CTE concentrators have median earnings that are about $2,000 per quarter greater for students with bachelor's and associate's degrees, $2,500 per quarter greater for students with certificates, and $1,000 per quarter for students with some college but no credential. Large earnings differences remain even after controlling for differences in student demographic characteristics, student performance, school characteristics, work experience, and labor market characteristics. For students with bachelor's degrees and students who attended some college, the earnings differential between postsecondary CTE concentrators and academic concentrators tends to increase over time. For students with associate's degrees, the earnings differential declines slightly over time.

There also is substantial variation in post-school earnings across CTE program areas in the first four quarters after exiting school. Average earnings are higher by approximately $3,500 to $5,000 per quarter for students with bachelor's degrees who completed postsecondary CTE concentrations in computer sciences, education, engineering and architectural services, trade and industry, and health care than for humanities concentrators with the same credential and similar high school backgrounds. Average earnings are higher by $1,000 to $2,500 per quarter for CTE students with bachelor's degrees concentrating in agriculture and natural resources, business and marketing, communications, personal and consumer services, and protective services compared to academic concentrators in humanities. For students with associate's degrees, earnings tend to be around $4,000 per quarter higher for health sciences concentrators relative to academic concentrators in humanities, when other factors are held constant. For students with certificates, earnings tend to be approximately $1,500 higher for health care and protective services concentrators relative to academic concentrations.

For students with bachelor's degrees, there also is variation in earnings among academic concentrators with similar credentials and similar high school backgrounds in different program areas in the first four quarters after exiting school. However, even the highest paying academic concentrations have average earnings below that of many postsecondary CTE concentrations.

Holding other factors constant, earnings at the bachelor's degree level tend to be between $3,500 to $5,000 per quarter higher for math concentrators; $1,000 to $2,500 per quarter higher for English and science, and less than $1,000 per quarter higher for social sciences. Among students with associate's degrees, certificates, and some college, there are no academic concentrations associated with significantly higher earnings.

Approximately 47 percent of postsecondary CTE concentrators are employed in industries where the skills they acquired in school are most likely to be useful, and holding jobs in these industries substantially increases their earnings. In the first four quarters after exiting school, earnings are close to 50 percent higher among CTE concentrators employed in a related industry relative to CTE concentrators employed in unrelated industries for students with certificates, associate's degrees, and bachelor's degrees.

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Appendix A: Replication of Tables Using an Alternate Definition of a Secondary CTE Concentrator

All of the tables in the report have been replicated using the definition of secondary career and technical education (CTE) concentrator used by the National Center for Education Statistics (NCES) rather than the definition used by the Office of Vocational and Adult Education (OVAE). In these tables, a CTE concentrator at the secondary level is defined as a high school student who earned at least two CTE credits in the same occupational area

Table A1. Percentage distribution of New Basics and CTE concentrator status, by whether the student left prior to grade 12 or reached grade 12

	All Students	Left Prior to Grade 12	Reached Grade 12
All Students	100.0%	41.4%	58.6%
High school concentration type:			
Non-New Basics + Non-CTE	45.8%	90.0%	14.6%
Non-New Basics + CTE	8.2%	7.5%	8.7%
New Basics + Non-CTE	24.0%	1.7%	36.7%
New Basics + CTE	22.0%	0.9%	37.0%
Overall New Basics & CTE:			
New Basics completers	46.0%	2.5%	76.7%
CTE (3+) concentrators	30.2%	8.3%	45.7%

SOURCE: Florida K-20 data warehouse (authors' calculations)

Figure A1. Percentage of students who are New Basics completers or CTE concentrators, by school locale

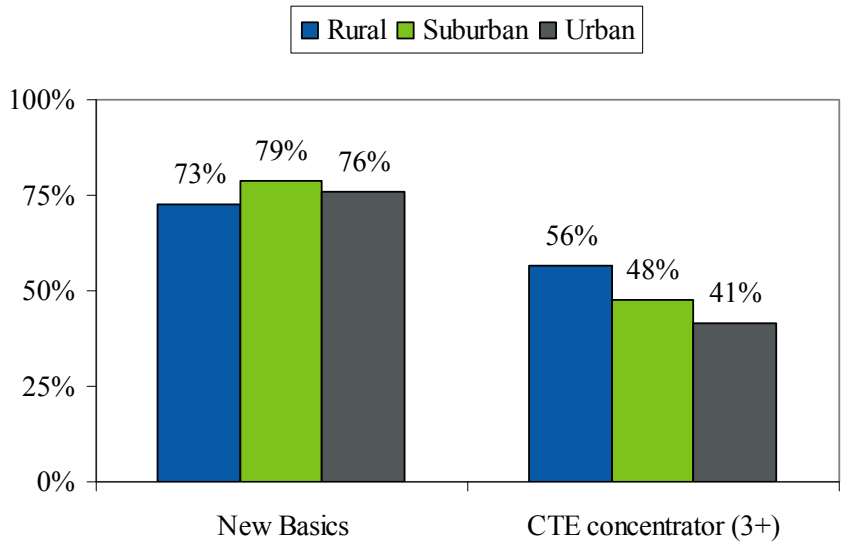


Figure A2. Percentage of students who are New Basics completers or CTE concentrators, by school type

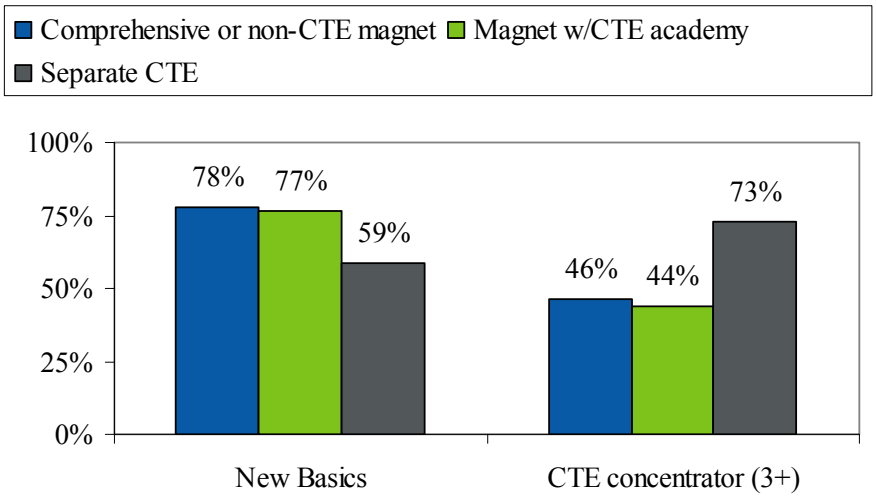


Table A2. Predicted probability of completing each type of high school concentration, by school locale and school type

		School locale			School type		
	All	Rural	Suburban	Urban	Compre-hensive or non-CTE magnet	Magnet w/CTE academy	Separate CTE
Non-New Basics + Non-CTE							
Predict prob. (no controls)	12.4%	11.4%	10.8%	14.3%	11.8%	13.0%	11.1%
Predict prob. (with controls)	12.4%	9.4%	11.1%	14.5%	12.3%	12.4%	7.9%
Percentage point difference	0.0	1.9	-0.4	-0.2	-0.5	0.6	3.2
Non-New Basics + CTE							
Predict prob. (no controls)	8.2%	12.2%	8.0%	7.5%	7.9%	8.0%	28.7%
Predict prob. (with controls)	8.2%	9.8%	8.3%	7.6%	7.9%	8.4%	19.9%
Percentage point difference	0.0	2.4	-0.3	-0.2	0.1	-0.4	8.8
New Basics + Non-CTE							
Predict prob. (no controls)	41.0%	31.0%	40.6%	43.6%	41.1%	42.4%	15.1%
Predict prob. (with controls)	41.0%	33.2%	40.5%	43.2%	41.4%	41.3%	18.6%
Percentage point difference	0.0	-2.2	0.2	0.5	-0.3	1.1	-3.5
New Basics + CTE							
Predict prob. (no controls)	38.4%	45.4%	40.6%	34.6%	39.2%	36.6%	45.1%
Predict prob. (with controls)	38.4%	47.6%	40.2%	34.7%	38.4%	37.9%	53.6%
Percentage point difference	0.0	-2.2	0.4	-0.1	0.8	-1.2	-8.6

SOURCE: Predicted probability values are from a multinomial logistic regression model using the Florida K-20 data warehouse.

Table A3. Percentage distribution and average of selected student characteristics, by type of high school concentration

	All	Non-New Basics + Non-CTE	Non-New Basics + CTE	New Basics + Non-CTE	New Basics + CTE
Percent female	52.3%	46.9%	45.8%	54.8%	53.2%
Percent by race					
White	54.8%	47.5%	58.5%	53.3%	58.4%
Black	22.7%	29.7%	22.1%	22.4%	20.4%
Hispanic	12.8%	13.7%	12.7%	13.1%	12.2%
Other	9.7%	9.2%	6.7%	11.2%	9.0%
Percent by age in grade 9					
Less than 14	4.6%	3.3%	3.3%	5.3%	4.6%
14 or 15	91.3%	90.1%	91.3%	92.8%	93.7%
16 or older	4.1%	6.7%	5.4%	1.9%	1.7%
Average age in grade 9	14.4	14.6	14.5	14.4	14.4
Percent Free & Reduced Priced Lunch (FRL)	29.6%	37.2%	33.4%	28.2%	27.2%
Percent Limited English Proficiency (LEP)	11.5%	12.4%	10.6%	12.5%	10.3%
Percent Students With Disabilities (SWD)	15.8%	30.1%	22.1%	13.9%	10.8%

NOTE: Detail may not sum to totals because of rounding
SOURCE: Florida K-20 data warehouse (authors' calculations)

Table A4. Average high school GPA and absentee rate in grade 9, by New Basics and CTE concentrator status

	Average high school cumulative GPA	Average high school absentee rate
All students	2.7	4.5%
High school concentration type:		
Non-New Basics + Non-CTE	2.3	6.7%
Non-New Basics + CTE	2.4	5.6%
New Basics + Non-CTE	2.7	4.1%
New Basics + CTE	2.8	3.9%
Overall New Basics & CTE:		
Non-New Basics completers	2.3	6.3%
New Basics completers	2.8	4.0%
Non-CTE concentrators	2.6	4.8%
CTE concentrators	2.7	4.2%

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table A5. Predicted probability of completing a New Basics curriculum, by school locale and school type

	Predicted Probability		Percentage Point Difference
	No Controls	With Controls	
All students	79.4%	79.4%	0.0
High school CTE concentration			
No	75.6%	76.6%	1.0
Yes	83.2%	82.3%	-0.9
School locale			
Rural	76.3%	80.1%	3.8
Suburban	81.2%	80.5%	-0.7
Urban	78.2%	78.1%	-0.2
School type			
Comprehensive or Non-CTE Magnet	80.3%	79.8%	-0.5
Magnet with CTE Academy	79.0%	79.2%	0.2
Separate CTE School	60.0%	70.2%	10.2

SOURCE: Predicted probability values are from a logistic regression model using the Florida K-20 data warehouse.

Table A6. Distribution and average number of high school CTE credits completed each term by high school CTE concentrators, by grade

	Grade 9	Grade 10	Grade 11	Grade 12
0 CTE credits	40%	22%	17%	16%
0.5 CTE credits	14%	8%	4%	5%
1.0 CTE credit	29%	37%	34%	23%
1.5 CTE credits	7%	8%	7%	7%
2.0 CTE credits	7%	17%	23%	23%
More than 2.0 CTE credits	3%	8%	14%	27%
Total	100%	100%	100%	100%
Average number of CTE credits	0.7	1.1	1.4	1.7

NOTE: Detail may not sum to totals because of rounding
SOURCE: Florida K-20 data warehouse (authors' calculations)

Table A7. Top five most common program areas for CTE concentrations, by type of high school concentration and school locale

	Non-New Basics + CTE		New Basics + CTE	
All	Communications & Design	20%	Communications & Design	27%
	Business	18%	Business	21%
	Agriculture & Natural Resources	15%	Consumer & Culinary Services	13%
	Consumer & Culinary Services	15%	Engineering & Technologies	10%
	Mfg, Repair & Transportation	15%	Health Sciences	9%
Rural	Agriculture & Natural Resources	34%	Agriculture & Natural Resources	23%
	Business	17%	Business	24%
	Communications & Design	14%	Communications & Design	20%
	Mfg, Repair & Transportation	14%	Health Sciences	10%
	Consumer & Culinary Services	10%	Consumer & Culinary Services	10%
Suburban	Business	18%	Communications & Design	28%
	Communications & Design	18%	Business	21%
	Agriculture & Natural Resources	17%	Consumer & Culinary Services	14%
	Mfg, Repair & Transportation	16%	Mfg, Repair & Transportation	10%
	Consumer & Culinary Services	15%	Engineering & Technologies	10%
Urban	Communications & Design	24%	Communications & Design	29%
	Business	17%	Business	21%
	Consumer & Culinary Services	16%	Consumer & Culinary Services	12%
	Mfg, Repair & Transportation	14%	Engineering & Technologies	11%
	Engineering & Technologies	9%	Mfg, Repair & Transportation	9%
Comprehensive	Agriculture & Natural Resources	20%	Communications & Design	28%
Non-CTE	Communications & Design	19%	Business	22%
Magnet	Business	17%	Consumer & Culinary Services	13%
	Consumer & Culinary Services	14%	Engineering & Technologies	10%
	Mfg, Repair & Transportation	13%	Agriculture & Natural Resources	9%
Magnet w/	Communications & Design	23%	Communications & Design	28%
CTE Academy	Business	20%	Business	21%
	Mfg, Repair & Transportation	16%	Health Sciences	14%
	Consumer & Culinary Services	15%	Consumer & Culinary Services	11%
	Health Sciences	10%	Mfg, Repair & Transportation	11%
Separate	Mfg, Repair & Transportation	32%	Mfg, Repair & Transportation	32%
CTE School	Consumer & Culinary Services	19%	Consumer & Culinary Services	17%
	Agriculture & Natural Resources	16%	Engineering & Technologies	13%
	Construction & Architecture	14%	Construction & Architecture	12%
	Engineering & Technologies	9%	Agriculture & Natural Resources	10%

SOURCE: Florida K-20 data warehouse.

Table A8. Average high school GPA and absentee rate in grade 9, by program area for non-New Basics completers and New Basics completers

	Non-New Basics		New Basics	
	Average high school cumulative GPA	Average high school absentee rate	Average high school cumulative GPA	Average high school absentee rate
All program areas	2.36	6%	2.79	4%
Agriculture & Natural Resources	2.35	5%	2.71	4%
Business	2.50	5%	2.93	3%
Communications & Design	2.48	5%	2.89	4%
Computer & Information Sciences	2.51	5%	2.93	3%
Construction & Architecture	2.14	6%	2.50	4%
Consumer & Culinary Services	2.22	6%	2.55	5%
Engineering Technologies	2.44	5%	2.86	3%
Health Sciences	2.54	5%	2.94	4%
Marketing	2.61	6%	2.67	4%
Mfg, Repair & Transportation	2.11	6%	2.45	4%
Public Services	2.48	6%	2.79	4%

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table A9. Predicted probability of enrolling in college after high school (relative to entering the workforce)

	Predicted Probability		Percentage Point Difference
	No Controls	With Controls	
All students	71.6%	71.6%	0.0
High school concentration type			
Non-New Basics + Non-CTE	47.8%	59.8%	12.0
Non-New Basics + CTE	51.0%	60.5%	9.5
New Basics + Non-CTE	77.4%	75.1%	-2.3
New Basics + CTE	76.4%	73.9%	-2.5
School locale			
Rural	64.8%	71.5%	6.7
Suburban	71.6%	70.4%	-1.2
Urban	73.0%	72.6%	-0.4
School type			
Comprehensive or Non-CTE Magnet	71.4%	70.6%	-0.8
Magnet with CTE Academy	74.0%	74.6%	0.6
Separate CTE School	42.2%	58.6%	16.4

SOURCE: Predicted probability values are from a logistic regression model using the Florida K-20 data warehouse.

Table A10. Average number of postsecondary courses completed in academic, CTE, remedial, other, and total courses; and percentage of courses taken in CTE, by high school CTE concentrator status

	Academic	CTE	Remedial	Other	Total	% CTE
All students	14.7	8.9	1.1	0.8	25.5	35%
High school non-CTE concentrator	15.0	8.5	1.1	0.8	25.5	34%
High school CTE concentrator	14.4	9.4	1.1	0.8	25.6	37%
Students starting at 2-yr colleges	11.9	7.0	1.5	0.6	21.1	33%
High school non-CTE concentrator	11.9	6.6	1.6	0.6	20.7	32%
High school CTE concentrator	11.9	7.5	1.5	0.6	21.5	35%
Students starting at 4-yr colleges	21.0	13.2	0.1	1.1	35.4	37%
High school non-CTE concentrator	21.6	12.7	0.1	1.1	35.5	36%
High school CTE concentrator	20.2	13.8	0.2	1.1	35.3	39%

SOURCE: Florida K-20 data warehouse.

Table A11. Percentage distribution of the number of college remedial courses attempted and average number of college remedial courses attempted, by high school CTE concentrator status

	Number of remedial courses				
	None	One to two	Three to four	Five or more	Average number
All students	63%	13%	11%	13%	1.5
High school non-CTE concentrator	63%	12%	10%	14%	1.6
High school CTE concentrator	62%	14%	11%	13%	1.5
2-year college starters	49%	17%	15%	19%	2.1
High school non-CTE concentrator	49%	16%	15%	20%	2.2
High school CTE concentrator	49%	18%	16%	18%	2.0
4-year college starters	92%	5%	2%	1%	0.2
High school non-CTE concentrator	93%	4%	2%	1%	0.2
High school CTE concentrator	91%	6%	2%	1%	0.2

NOTE: Detail may not sum to totals because of rounding

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table A12. Percentage of students categorized as postsecondary CTE concentrators and postsecondary CTE explorers, by high school concentration, high school locale, and high school type

	Postsecondary CTE concentrator	Postsecondary CTE explorer
All students	41%	15%
High school concentration		
High school non-CTE concentrator	38%	15%
High school CTE concentrator	43%	15%
High school locale		
Rural	40%	16%
Suburban	41%	15%
Urban	42%	13%
High school type		
Comprehensive or non-CTE magnet	41%	15%
Magnet with CTE academy	39%	16%
Separate CTE school	35%	14%

SOURCE: Florida K-20 data warehouse (authors' calculations)

Figure A3. Percentage of students with a postsecondary CTE concentration in a new program area or same program area as their high school concentration, by type of high school concentration

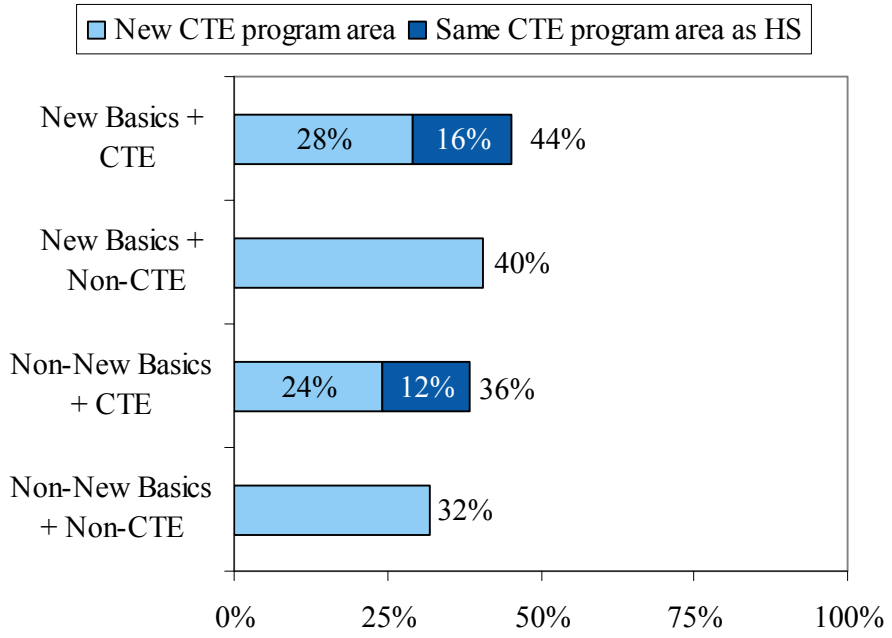


Table A13. Percentage of students with a postsecondary CTE concentration in a new program area or same program area as their high school program area, by high school CTE concentrator status and two-year or four-year college starters

	New CTE program area	Same CTE program area as HS	Total CTE concentrations
All students	36%	5%	41%
High school CTE concentrator	28%	15%	43%
High school non-CTE concentrator	38%	0%	38%
2-Year college starters	30%	4%	34%
High school CTE concentrator	24%	13%	37%
High school non-CTE concentrator	32%	0%	32%
4-Year college starters	48%	7%	55%
High school CTE concentrator	36%	22%	58%
High school non-CTE concentrator	52%	0%	52%

SOURCE: Florida K-20 data warehouse (authors' calculations)

Figure A4. Percentage of students with a postsecondary CTE concentration in a new program area or same program area as their high school program area, by program area

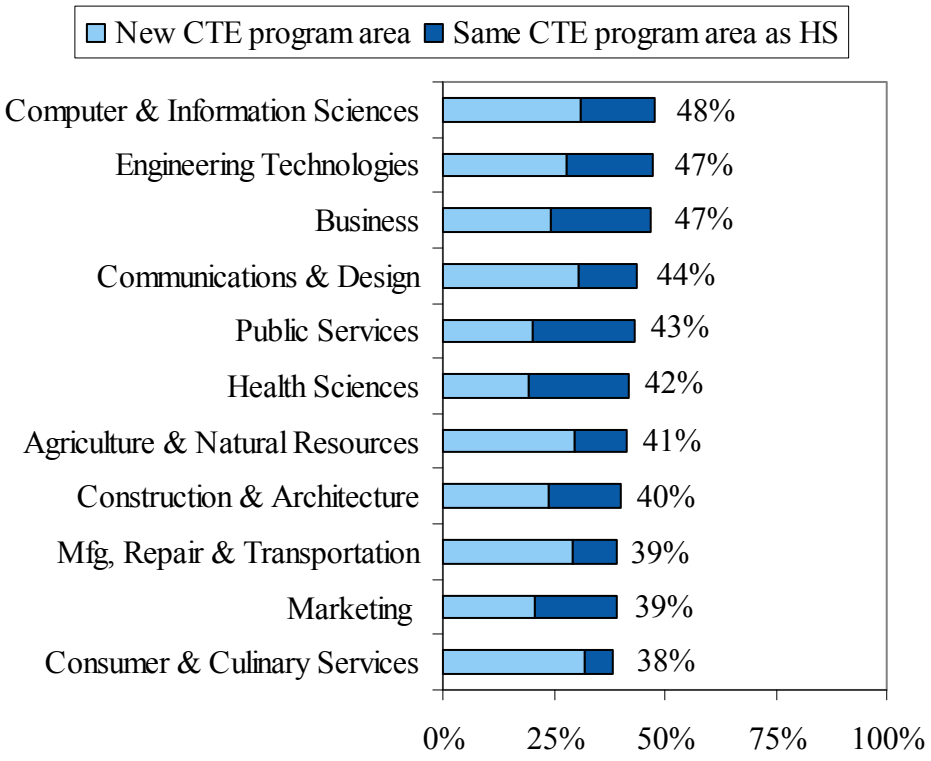


Figure A5. Average number of postsecondary credits completed by students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college, by type of high school concentration

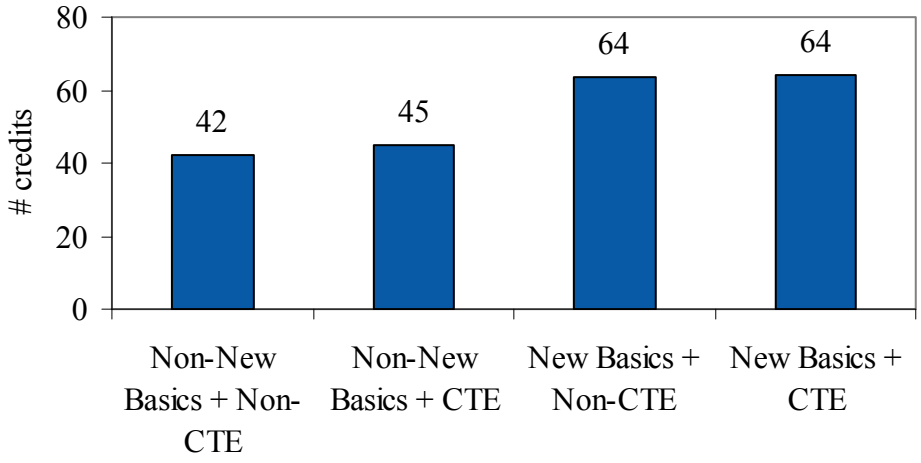


Figure A6. Percentage of students who attain a credential, are still enrolled, or have no credential (no longer enrolled), by high school CTE concentration status

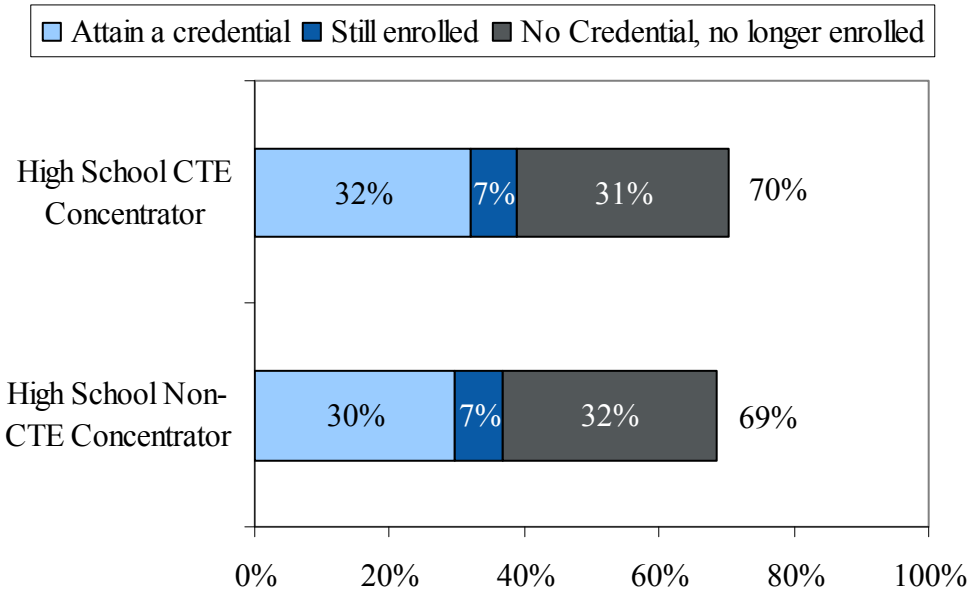


Table A14. Coefficients and standard errors from an ordinary least squares (OLS) regression of number of postsecondary credits completed on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college

	β		S.E.
High school concentration (relative to non-New Basics+ non-CTE)			
Non-New Basics + CTE	−1.70674		0.99
New Basics + Non-CTE	2.55917	**	0.72
New Basics + CTE	1.76188	*	0.73
Student characteristics:			
Gender (relative to male)			
Female	1.39	**	0.41
Race (relative to white)			
Black	0.84		0.61
Hispanic	−0.61		0.81
Other	8.68	**	1.21
Age	−2.12	**	0.32
Free and Reduced Lunch (FRL)	−6.65	**	0.53
Limited English Proficiency (LEP)	0.47		0.83
Students With Disabilities (SWD)	−4.61	**	0.6
High school performance:			
Cumulative GPA	41.52	**	0.42
Absentee rate	−0.66	**	0.05
School characteristics:			
School locale (relative to rural)			
Urban	3.88	**	0.81
Suburban	1.42		0.79
School Type (relative to Comprehensive or non-CTE magnet)			
Magnet school with a CTE academy	3.67	**	0.48
Separate CTE school	−3.07		1.93
Other school	−21.56	**	4.26
School % reaching grade 12	17.53	**	2.17
School % black	13.67	**	1.66
School % Hispanic	29.39	**	1.84
School % FRL	−36.15	**	2.19
School size (# students in grade 9 cohort)	0.01	**	0
Work experience:			
Number of quarters employed in HS	−0.14	*	0.06
Constant	−41.24	**	5.24
Number of observations	49,845		
R^2	0.27		

** p < 0.05, ** p < 0.01.*

SOURCE: Florida K-20 data warehouse.

Table A15. Percentage distribution of postsecondary credential attainment and enrollment status, by high school concentration type, high school locale, and high school type

	Attainment and enrollment status						
		Highest credential attained					
	Achieved a credential or were still enrolled	Any credential	Certificate	Associate's degree	Bachelor's or graduate degree	No credential, still enrolled	No credential, not enrolled
All students	38%	31%	2%	9%	19%	7%	62%
High school concentration type							
Non-New Basics + Non-CTE	21%	15%	2%	5%	8%	7%	79%
Non-New Basics + CTE	23%	17%	3%	6%	8%	7%	77%
New Basics + Non-CTE	42%	35%	2%	10%	23%	7%	58%
New Basics + CTE	43%	35%	3%	11%	22%	7%	57%
High school locale							
Rural	34%	28%	5%	10%	13%	6%	66%
Suburban	38%	31%	2%	9%	20%	7%	62%
Urban	39%	31%	2%	9%	20%	8%	61%
High school type							
Comprehensive or non-CTE magnet	38%	32%	2%	9%	20%	7%	62%
Magnet with CTE academy	38%	30%	2%	9%	19%	8%	62%
Separate CTE school	20%	12%	4%	5%	4%	7%	80%

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table A16. Percentage of high school CTE concentrators who are employed in an industry related to their program area, for students in the 1996 Florida grade 9 cohort who reached grade 12, by CTE program area and college attendance status

	All Students	Did Not Attend College	Attended College		
			Part-time	Full-time	All
All High School CTE Concentrations	33%	36%	31%	31%	31%
Agriculture & Natural Resources	14%	14%	13%	13%	13%
Business	62%	70%	57%	59%	58%
Communications & Design	17%	18%	15%	17%	17%
Computer & Information Sciences	17%	15%	18%	19%	19%
Construction & Architecture	34%	36%	34%	31%	32%
Consumer & Culinary Services	61%	72%	51%	50%	50%
Engineering Technologies	25%	22%	24%	30%	27%
Health Sciences	30%	25%	35%	29%	32%
Mfg, Repair & Transportation	29%	33%	25%	23%	24%
Marketing	66%	76%	61%	60%	60%
Public Services	30%	20%	28%	39%	34%

SOURCE: Florida K-20 data warehouse (authors' calculations)

Figure A7. Distribution of the 25th to 75th percentile (median value is labeled) for highest quarterly earnings four quarters after high school for students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college, by high school concentration type

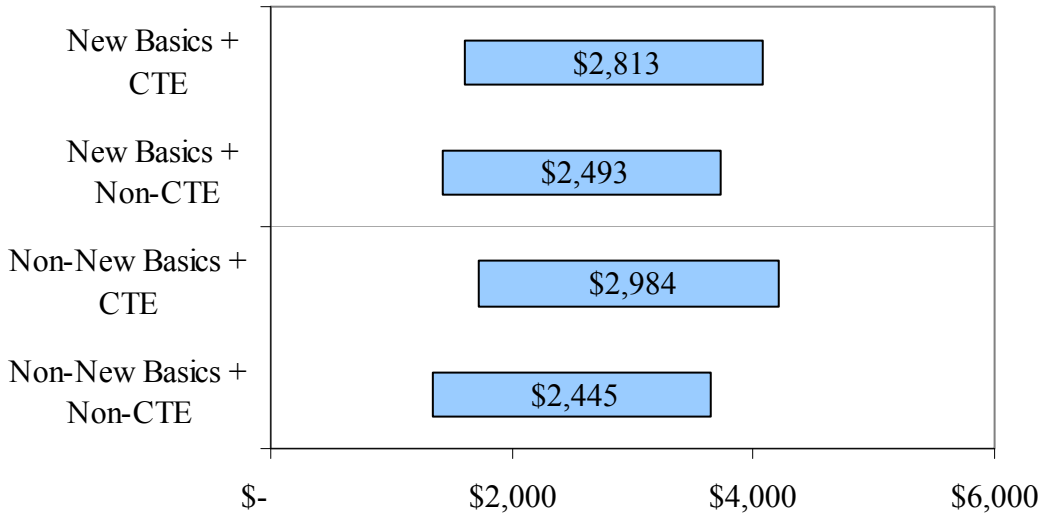


Table A17. Median of highest quarterly earnings four quarters after high school among students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college, by high school concentration type, overall New Basics and CTE status, and school locale

	All	Rural	Suburban	Urban
All students	$ 2,585	$ 2,435	$ 2,651	$ 2,569
High school concentration type:				
Non-New Basics + Non-CTE	$ 2,392	$ 2,198	$ 2,463	$ 2,370
Non-New Basics + CTE	$ 2,866	$ 2,729	$ 2,887	$ 2,873
New Basics + Non-CTE	$ 2,432	$ 2,145	$ 2,515	$ 2,431
New Basics + CTE	$ 2,769	$ 2,561	$ 2,805	$ 2,739
Overall New Basics & CTE status:				
Non-New Basics completers	$ 2,560	$ 2,517	$ 2,625	$ 2,513
New Basics completers	$ 2,599	$ 2,412	$ 2,660	$ 2,594
Non-CTE concentrators	$ 2,416	$ 2,165	$ 2,483	$ 2,408
CTE concentrators	$ 2,792	$ 2,612	$ 2,828	$ 2,805

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table A18. Median of highest quarterly earnings four quarters after high school for students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college, by New Basics completion status, high school CTE concentration status, and CTE program area

	All	Non-New Basics	New Basics
No high school CTE concentration	$ 2,472	$ 2,445	$ 2,493
High school CTE concentration			
Agriculture & Natural Resources	$ 3,245	$ 3,039	$ 3,329
Business	$ 2,717	$ 2,691	$ 2,724
Communications & Design	$ 2,635	$ 2,840	$ 2,574
Computer & Information Sciences	$ 2,725	$ 3,426	$ 2,409
Construction & Architecture	$ 3,114	$ 3,015	$ 3,202
Consumer & Culinary Services	$ 2,549	$ 2,454	$ 2,604
Engineering Technologies	$ 2,902	$ 3,287	$ 2,793
Health Sciences	$ 2,681	$ 2,792	$ 2,640
Mfg, Repair & Transportation	$ 3,128	$ 3,070	$ 3,178
Marketing	$ 3,029	$ 3,074	$ 3,018
Public Services	$ 2,669	$ 2,477	$ 2,704

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table A19. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after high school, by characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college

	Model 1			Model 2			Model 3		
	β		S.E.	β		S.E.	β		S.E.
Type of high school concentration									
Non-New Basics + Non-CTE (reference)	†								
Non-New Basics + CTE	253.27	**	40.39						
New Basics + Non-CTE	98.72	**	33.59						
New Basics + CTE	171.54	**	34.32						
Type of high school CTE concentration									
No CTE concentration (reference)				†					
Agriculture & Natural Resources				460.55	**	50.23			
Business				11.94		44.78			
Communications & Design				37.09		41.22			
Computer & Information Sciences				−51.84		72.66			
Construction & Architecture				383.28		76.00			
Consumer & Culinary Services				3.50		44.28			
Engineering Technologies				75.47		61.47			
Health Sciences				142.09	*	71.97			
Mfg, Repair & Transportation				217.36	**	45.49			
Marketing				−14.50		73.25			
Public Services				−4.08		72.25			
New Basics status									
Non-New Basics completer (reference)				†					
New Basics completer				32.40		26.02			
# HS credits in CTE									
Agriculture & Natural Resources							92.30	**	9.54
Business							29.51	*	12.62
Communications & Design							12.94		11.86
Computer & Information Sciences							−9.76		21.82
Construction & Architecture							98.66	**	19.13
Consumer & Culinary Services							6.71		11.73
Engineering Technologies							28.69		18.82
Health Sciences							35.66		19.82
Mfg, Repair & Transportation							68.38	**	11.39
Marketing							−6.54		21.16
Public Services							−10.28		20.66
# HS credits in liberal arts									
Math							−18.60		13.54
Science							−13.16		12.73
English							28.66	*	12.55
Social Studies							13.40		14.03
Fine Arts							−18.90	**	6.22
Foreign Language							−5.65		12.86

(continued)

Table A19. Coefficients from an ordinary least squares (OLS) regression of highest quarterly earnings four quarters after high school, by characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college (continued)

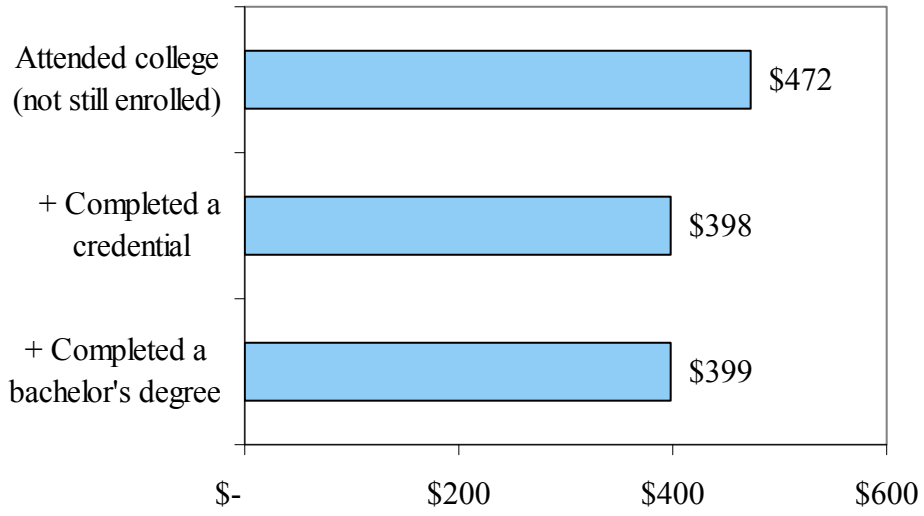
	Model 1		Model 2		Model 3	
	β	S.E.	β	S.E.	β	S.E.
High school characteristics						
High school locale: urban (reference)	†		†		†	
High school locale: rural	−69.15	55.79	−121.2 5 *	56.01	136.25 *	56.02
High school locale: suburban	40.79	27.26	28.56	27.25	155.99 **	54.23
High school type: comprehensive (reference)	†		†		†	
High school type: CTE magnet	8.95	33.48	11.30	33.45	15.39	33.55
High school type: separate CTE school	83.36	71.46	57.39	71.72	−1.87	72.44
High school type: other/alternative	−65.45	135.86	−84.68	135.53	−93.73	135.87
N	20942		20942		20942	
R-squared	0.28		0.28		0.28	

† Not applicable

** p < 0.05, ** p < 0.01.*

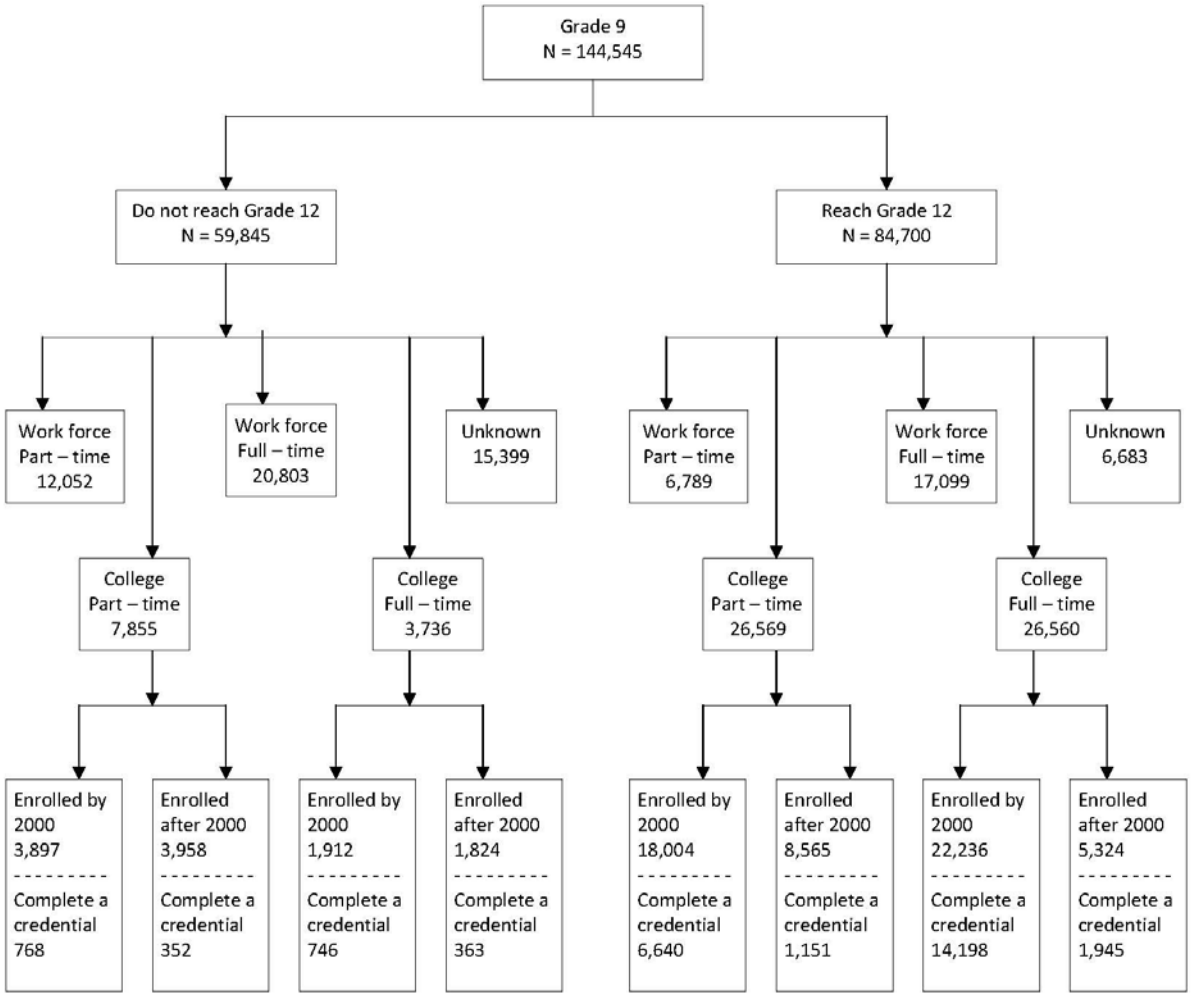
All models include controls for student characteristics (gender, race, age, FRL status, LEP status, SWD status), student performance (grade 9 GPA, grade 9 absentee rate), school characteristics (percent of students reaching grade 12, percent of black students, percent of Hispanic students, percent of FRL students, school size), work experience (number of quarters of work experience in high school, number of quarters of post-school work experience, average earnings in high school), and labor market characteristics (distribution of employees across industries in the local labor market, average monthly wages for all workers in the workforce).

Figure A8. Difference in median of highest quarterly earnings four quarters after leaving school between high school CTE concentrators and nonconcentrators among students in the 1996 Florida grade 9 cohort who reached grade 12, by educational milestones reached



Appendix B: Outcomes for Public School Students in the 1996 Florida Grade 9 Cohort

Figure B1. Diagram of outcomes for all public school students in the 1996 **Florida grade 9 cohort**



NOTE: Students are classified as unknown if they had no college transcripts at any time after leaving high school and no wage records between 2000 and 2004. Students who attend college and work (full-time or part-time) after high school are categorized as attending college since the primary transition of interest is college attendance. The number of students who complete a credential is based on college records up to fall 2006, which represents the latest year of college data available. N=number of students.

Table B1. Percentage of students who reached grade 12, attended college, and completed a college credential for Florida public school students in the 1996 Florida grade 9 cohort; by student demographic characteristics

	Reach Grade 12	Attend College	Complete a college credential
All	59%	45%	18%
Gender: Male	56%	39%	14%
Gender: Female	65%	53%	23%
Race: White	61%	50%	22%
Race: Black	58%	35%	10%
Race: Hispanic	56%	44%	14%
Race: Other	50%	43%	19%
FRL: Yes	55%	36%	10%
FRL: No	62%	51%	22%
LEP: Yes	55%	42%	13%
LEP: No	59%	46%	19%
SWD: Yes	53%	31%	12%
SWD: No	60%	49%	19%

NOTE: Detail may not sum to totals because of rounding

SOURCE: Florida K-20 data warehouse (authors' calculations)

Appendix C: Supplemental Tables

Table C1. Total employment and percentage distribution of Florida workers employed in each industry in the local labor market, by school locale: 2001, 2006, and change from 2001 to 2006

	Rural			Suburban			Urban		
	2001	2006	Change	2001	2006	Change	2001	2006	Change
Total employment	229,090	258,732	12.9%	471,693	516,594	9.5%	480,152	513,902	7.0%
Agriculture, Forestry, Fishing, Hunting	4.0%	3.1%	-0.9%	1.4%	1.2%	-0.1%	1.6%	1.0%	-0.6%
Mining	0.2%	0.2%	0.0%	0.1%	0.1%	-0.1%	0.1%	0.1%	-0.1%
Utilities	0.7%	0.6%	-0.1%	0.5%	0.4%	-0.1%	0.5%	0.4%	-0.1%
Construction	6.4%	8.5%	2.1%	6.4%	8.3%	1.9%	6.2%	8.4%	2.2%
Wholesale Trade	3.0%	2.9%	0.0%	4.2%	4.0%	-0.2%	4.0%	4.1%	0.1%
Retail Trade	14.0%	13.5%	-0.5%	13.9%	13.1%	-0.9%	13.6%	13.3%	-0.3%
Transportation & Warehousing	2.7%	2.9%	0.2%	3.7%	3.4%	-0.3%	3.7%	3.4%	-0.3%
Information	1.8%	1.5%	-0.3%	2.5%	2.0%	-0.5%	2.5%	2.1%	-0.5%
Finance & Insurance	3.3%	3.4%	0.2%	4.4%	4.6%	0.2%	4.4%	4.6%	0.2%
Real Estate, Rental, Leasing	1.5%	1.8%	0.3%	2.0%	2.2%	0.2%	1.9%	2.3%	0.4%
Professional, Scientific, and Technical Services	3.3%	3.8%	0.5%	5.0%	5.4%	0.4%	5.0%	5.5%	0.5%
Management of Companies & Enterprises	0.4%	0.4%	0.0%	0.9%	0.9%	0.0%	0.8%	1.0%	0.2%
Administration and Support	5.1%	4.8%	-0.4%	9.1%	8.2%	-0.9%	9.2%	8.5%	-0.6%
Educational Services	9.4%	8.8%	-0.6%	7.2%	7.6%	0.4%	7.8%	7.2%	-0.6%
Health Care & Social Assistance	12.7%	13.2%	0.4%	11.6%	12.0%	0.5%	11.6%	12.0%	0.3%
Arts, Entertainment, and Recreation	1.7%	1.7%	0.0%	2.4%	2.1%	-0.3%	2.2%	2.3%	0.2%
Accommodation & Food Services	8.1%	8.7%	0.6%	8.9%	9.3%	0.4%	8.6%	9.5%	0.9%
Other Services	2.8%	2.7%	-0.2%	3.3%	3.2%	-0.1%	3.3%	3.2%	-0.1%
Public Administration	11.2%	10.3%	-0.9%	6.0%	6.4%	0.4%	6.7%	5.7%	-0.9%
Unclassified	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.1%	0.0%
Durable Goods Manufacturing	4.2%	4.0%	-0.1%	4.3%	3.7%	-0.6%	4.2%	3.7%	-0.5%
Nondurable Goods Manufacturing	3.5%	3.1%	-0.4%	2.1%	1.7%	-0.4%	2.1%	1.7%	-0.4%

NOTE: Detail may not sum to totals because of rounding

SOURCE: Florida Unemployment Insurance System (author's calculations)

Table C2. Percentage distribution of program areas for non-New Basics + CTE and New Basics + CTE concentrators in the 1996 Florida grade 9 cohort who reached grade 12, by school locale and school type

		School Locale			School Type		
	All	Rural	Suburban	Urban	Compre-hensive or non-CTE magnet	Magnet w/CTE academy	Separate CTE
Non-New Basics + CTE							
Agriculture & Natural Resources	18%	35%	20%	8%	23%	5%	16%
Business	14%	11%	14%	14%	13%	18%	7%
Communications & Design	14%	9%	13%	18%	14%	19%	5%
Computer & Information Sciences	3%	1%	3%	3%	3%	4%	1%
Construction & Architecture	5%	9%	5%	3%	5%	3%	15%
Consumer & Culinary Services	16%	11%	16%	18%	15%	16%	20%
Engineering Technologies	6%	3%	5%	8%	6%	6%	6%
Health Sciences	8%	10%	8%	7%	7%	12%	2%
Mfg, Repair & Transportation	14%	13%	14%	15%	12%	15%	31%
Marketing	4%	3%	5%	4%	5%	3%	2%
Public Services	5%	5%	5%	4%	5%	4%	1%
New Basics + CTE							
Agriculture & Natural Resources	9%	27%	8%	4%	11%	3%	11%
Business	17%	14%	16%	18%	17%	18%	8%
Communications & Design	22%	15%	23%	23%	22%	22%	6%
Computer & Information Sciences	5%	3%	5%	5%	5%	6%	2%
Construction & Architecture	3%	5%	2%	3%	3%	2%	12%
Consumer & Culinary Services	14%	10%	15%	13%	14%	12%	18%
Engineering Technologies	10%	6%	10%	11%	10%	8%	8%
Health Sciences	11%	11%	11%	12%	9%	18%	5%
Mfg, Repair & Transportation	9%	8%	9%	9%	8%	9%	33%
Marketing	4%	2%	5%	4%	4%	3%	2%
Public Services	5%	9%	5%	5%	6%	4%	4%

Rounds to zero.

NOTE: Totals sum to more than 100% because some students completed 3+ occupational courses in more than 1 subject area.

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table C3. Percentage distribution of post-high school transitions for the students in the 1996 Florida grade 9 cohort who reached grade 12, by student characteristics

	Workforce part-time	Workforce full-time	College part-time	College full-time	Unknown
All students	8%	20%	31%	33%	8%
Gender					
Male	9%	24%	28%	29%	9%
Female	7%	17%	34%	35%	6%
Race					
White	7%	20%	32%	35%	6%
Black	12%	23%	27%	28%	10%
Hispanic	6%	21%	39%	25%	10%
Other	7%	14%	31%	37%	11%
Age in grade 9					
Less than 14	9%	13%	30%	43%	5%
14 or 15	8%	20%	32%	33%	8%
16 or older	13%	34%	24%	13%	16%
Free & Reduced Priced Lunch (FRL)					
Yes	11%	26%	29%	24%	9%
No	7%	18%	32%	36%	7%
Percent Limited English Proficiency (LEP)					
Yes	6%	20%	39%	23%	12%
No	8%	20%	30%	34%	7%
Students with Disabilities					
Yes	14%	26%	22%	25%	12%
No	7%	19%	33%	34%	7%

NOTE: Detail may not sum to totals because of rounding
SOURCE: Florida K-20 data warehouse (authors' calculations)

Table C4. Percentage distribution of post-high school transitions for students in the 1996 Florida grade 9 cohort who reached grade 12, by high school concentration

	Workforce part-time	Workforce full-time	College part-time	College full-time	Unknown
All Students	8%	20%	31%	33%	8%
High school concentration type:					
Non-New Basics + Non-CTE	14%	30%	25%	19%	12%
Non-New Basics + CTE	11%	35%	27%	20%	7%
New Basics + Non-CTE	7%	16%	33%	37%	7%
New Basics + CTE	5%	19%	34%	36%	6%
Overall New Basics & CTE:					
Non-New Basics completers	13%	31%	25%	19%	11%
New Basics completers	6%	17%	33%	37%	7%
Non-CTE concentrators	9%	20%	31%	32%	9%
CTE concentrators	6%	22%	33%	33%	6%

NOTE: Detail may not sum to totals because of rounding
SOURCE: Florida K-20 data warehouse (authors' calculations)

Table C5. Percentage of students who complete 12 or more credits in each postsecondary CTE program area by type of postsecondary concentration, for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000 (shaded cells indicate that the program area corresponds with the concentration)

	Percent of students with 12 or more credits in each program area											
	AGR	BUS	COM	CSC	EDU	EAS	HLT	LGL	PCS	PRO	PUB	TRD
CTE Concentration:												
Agriculture & Natural Resources (AGR)	83	11	0	0	4	2	3	0	0	1	0	0
Business & Marketing (BUS)	2	93	4	5	1	1	1	0	0	0	0	0
Communications (COM)	1	17	91	2	3	2	2	1	0	1	0	0
Computer Sciences (CSC)	0	13	0	63	0	18	0	0	0	0	0	0
Education (EDU)	1	2	1	0	92	0	4	0	0	0	0	0
Engineering & Architectural Sciences (EAS)	1	6	1	10	0	91	0	0	0	0	0	2
Health Care (HLT)	2	5	0	0	4	0	89	0	0	3	0	0
Legal Services (LGL)	2	18	9	0	4	0	1	89	0	18	0	0
Personal & Consumer Services (PCS)	0	1	0	0	7	0	6	0	76	0	0	0
Protective Services (PRO)	0	2	0	0	2	3	3	1	0	88	1	0
Public, Social, & Human Services (PUB)	0	4	0	8	5	3	2	1	0	1	89	0
Trade & Industry (TRD)	0	14	1	1	0	4	1	0	5	1	0	94
Academic Concentration:												
English	0	2	6	0	3	0	1	0	0	1	0	0
Fine & Performing Arts	0	2	11	1	4	0	1	0	0	0	0	0
Humanities	1	3	1	1	2	1	2	0	0	1	0	0
Interdisciplinary	0	4	8	12	2	1	6	0	0	4	0	1
Math	0	3	0	3	2	1	0	0	0	0	0	0
Science	1	1	0	0	0	0	9	0	0	1	0	0
Social Sciences	1	5	2	0	5	1	3	1	0	3	1	0
Multiple Concentrations	0	4	2	1	2	1	2	0	0	1	0	0
No Concentration (less than 12 credits)	0	0	0	0	0	0	0	0	0	0	0	0

SOURCE: Florida K-20 data warehouse (authors' calculations)

Students were classified into concentrations based on the academic subject or career and technical education (CTE) program area in which they completed the most courses (or the most upper-level courses for students who attended four-year colleges). One concern is that students may be incorrectly classified if they complete a large number of courses in more than one subject area. For example, students in programs leading to a health care credential may be required to take many courses in the CTE program area of health care and the academic subject of science.

Table C5 provides a rough estimate of the extent of possible miscodings by displaying the percentage of students who complete 12 or more credits in each postsecondary CTE program area by type of postsecondary concentration. Among students with CTE concentrations, there is some overlap in course taking across program areas. For example, nearly 20 percent of students with concentrations in communications or legal services also complete 12 or more credits in the business and marketing program area. There is a similar level of overlap between concentrators in computer science and the engineering and architectural services program area, and between

concentrators in legal services and the public, social, and human services program area. However, for most CTE concentrations, less than 5 percent of concentrators complete 12 or more credits in each of the other CTE program areas.

Within the academic concentrations, there are even fewer students who complete 12 or more credits in a CTE program area. The concentration with the most potential overlap is the interdisciplinary concentration, where 12 percent of concentrators complete 12 or more credits in computer sciences, 8 percent of concentrators complete 12 or more credits in communications, and 6 percent of concentrators complete 12 or more credits in health sciences. However, interdisciplinary is a small concentration that consists of only 145 students. There is also some overlap between fine and performing arts and English with the CTE program area of communications (11 percent and 6 percent of concentrators complete 12 or more credits in this program area, respectively). This result is not surprising since communications includes English-related courses such as journalism and art-related courses such as graphic design. In addition, 9 percent of science concentrators complete 12 or more credits in health sciences. For all other academic concentrations, less than 5 percent of students complete 12 or more credits in each of the CTE program areas. For students with multiple concentrations, there are no program areas where students complete 12 or more credits.

Overall, the percent of students completing 12 or more credits in a CTE program area that does not directly correspond to their concentration is small, particularly among students with academic or multiple concentrations. This suggests that the majority of students are accurately categorized into a concentration that represents the program area of their intended or actual postsecondary credential.

Table C6. Percentage of students with a postsecondary CTE concentration in a new program area or same program area as their high school concentration for high school CTE concentrators in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000, by program area for all college students, two-year college starters, and four-year college starters

	All College Students			2-Year College Starters			4-Year College Starters		
	New CTE program area	Same CTE program area as HS	Total	New CTE program area	Same CTE program area as HS	Total	New CTE program area	Same CTE program area as HS	Total
Agriculture & Natural Resources	32%	11%	43%	31%	11%	42%	41%	11%	52%
Business	24%	25%	48%	22%	19%	41%	29%	36%	65%
Communications & Design	31%	14%	45%	28%	10%	38%	36%	21%	57%
Computer & Information Sciences	32%	17%	49%	26%	14%	40%	40%	21%	60%
Construction & Architecture	23%	15%	38%	21%	13%	33%	33%	28%	62%
Consumer & Culinary Services	35%	4%	39%	31%	4%	35%	51%	6%	57%
Engineering Technologies	30%	19%	49%	27%	15%	42%	37%	28%	65%
Health Sciences	20%	22%	43%	16%	22%	38%	29%	23%	53%
Marketing	24%	18%	42%	22%	15%	37%	30%	28%	57%
Mfg, Repair & Transportation	33%	9%	42%	28%	10%	38%	55%	7%	62%
Public Services	20%	22%	42%	18%	18%	36%	27%	30%	57%

NOTE: Detail may not sum to totals because of rounding

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table C7. Percentage distribution of postsecondary credential attainment and enrollment status for students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college by 2000, by postsecondary concentration type

	Attainment and enrollment status						
		Highest credential attained					
	Achieved a credential or were still enrolled	Any credential	Certificate	Associate's degree	Bachelor's or graduate degree	No credential, still enrolled	No credential, no longer enrolled
All students	59%	52%	3%	15%	34%	8%	41%
All CTE	84%	80%	6%	16%	58%	4%	16%
Agriculture & Natural Resources	83%	79%	3%	20%	56%	4%	17%
Business & Marketing	88%	86%	1%	14%	71%	2%	12%
Communications	86%	83%	0%	13%	70%	3%	14%
Computer Sciences	55%	49%	1%	15%	33%	7%	45%
Education	89%	86%	0%	15%	71%	3%	11%
Engineering & Architectural Sciences	82%	78%	2%	14%	62%	4%	18%
Health Care	87%	81%	11%	27%	42%	6%	13%
Legal Services	83%	77%	0%	17%	60%	6%	17%
Personal & Consumer Services	74%	65%	27%	5%	33%	9%	26%
Protective Services	81%	75%	21%	12%	42%	6%	19%
Public, Social, & Human Services	90%	89%	0%	12%	77%	1%	10%
Trade & Industry	77%	70%	20%	13%	37%	7%	23%
All Academic	58%	47%	1%	19%	28%	11%	42%
English	43%	31%	1%	10%	20%	13%	57%
Fine & Performing Arts	59%	51%	0%	20%	30%	8%	41%
Humanities	52%	41%	1%	20%	21%	11%	48%
Interdisciplinary	69%	67%	1%	13%	53%	2%	31%
Math	47%	33%	1%	25%	7%	15%	53%
Science	66%	52%	1%	26%	26%	14%	34%
Social Sciences	65%	55%	1%	19%	35%	10%	35%
Multiple Concentrations	34%	20%	1%	14%	5%	13%	67%
No Concentration (less than 12 credits)	3%	0%	0%	0%	0%	3%	96%

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table C8. School-level mean number of courses offered in each CTE program area for Florida public high schools with at least 25 students in the 1996 grade 9 cohort

		School Locale			School Type			
	All	Rural	Suburban	Urban	Compre-hensive or non-CTE magnet	Magnet w/CTE academy	Separate CTE	Other
Agriculture & Natural Resources	2.0	4.1	2.0	1.1	2.4	1.2	3.2	0.3
Business	5.0	4.4	5.0	5.2	5.1	6.3	4.5	0.8
Communications & Design	5.4	4.3	5.4	5.9	5.6	7.1	3.0	0.6
Computer & Information Sciences	1.7	1.2	1.7	2.0	1.8	2.3	1.7	0.2
Construction & Architecture	1.5	2.5	1.5	1.1	1.4	1.1	6.7	0.4
Consumer & Culinary Services	3.3	3.2	3.3	3.4	3.2	3.9	7.2	0.5
Engineering Technologies	1.6	1.2	1.6	1.7	1.6	1.9	2.8	0.1
Health Sciences	1.2	1.5	1.3	1.1	1.2	1.8	1.7	0.2
Mfg, Repair & Transportation	3.8	4.3	4.1	3.5	3.2	5.0	15.3	0.4
Marketing	0.6	0.3	0.6	0.7	0.6	0.7	0.8	0.0
Public Services	1.4	1.4	1.4	1.4	1.6	1.5	0.4	0.3

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table C9. Percentage of schools that offer 3 or more credits in each CTE program area for Florida public high schools with at least 25 students in the 1996 grade 9 cohort

		School Locale			School Type			
	All	Rural	Suburban	Urban	Compre-hensive or non-CTE magnet	Magnet w/CTE academy	Separate CTE	Other
Agriculture & Natural Resources	26%	60%	25%	13%	31%	18%	29%	3%
Business	53%	58%	56%	50%	57%	63%	50%	7%
Communications & Design	53%	53%	54%	54%	58%	66%	21%	7%
Computer & Information Sciences	26%	15%	27%	30%	27%	36%	25%	0%
Construction & Architecture	15%	23%	15%	11%	15%	11%	58%	2%
Consumer & Culinary Services	39%	42%	54%	36%	42%	42%	58%	3%
Engineering Technologies	22%	15%	22%	26%	22%	31%	29%	0%
Health Sciences	18%	23%	20%	14%	18%	26%	25%	0%
Mfg, Repair & Transportation	35%	41%	34%	34%	34%	42%	83%	5%
Marketing	6%	5%	5%	9%	7%	7%	13%	0%
Public Services	17%	17%	17%	18%	21%	16%	4%	0%

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table C10. Average number of quarters spent enrolled in school or working (part-time or full-time) for students in the 1996 Florida grade 9 cohort that reached grade 12, by highest level of education completed and high school CTE concentrator status

	Enrolled in HS	Working in HS	Working after HS	Enrolled in college	Working in college	Working after college
All Students						
Grade 12, no college enrollment	13.6	5.0	18.9	-	-	-
No credential, no longer enrolled	13.3	4.8	2.9	9.4	7.3	9.9
No credential, still enrolled	13.4	5.0	4.7	20.2	16.0	-
Certificate	13.3	5.5	4.1	14.9	12.5	6.7
Associate's degree	13.2	4.7	1.9	20.5	15.4	4.7
Bachelor's degree	13.1	4.5	1.2	21.0	13.3	4.9
High school non-CTE concentrators						
Grade 12, no college enrollment	13.7	5.0	18.5	-	-	-
No credential, no longer enrolled	13.3	4.7	2.9	9.4	7.2	9.7
No credential, still enrolled	13.4	4.9	4.6	20.1	15.8	-
Certificate	13.3	5.5	4.1	15.3	12.9	6.3
Associate's degree	13.2	4.6	1.9	20.5	15.2	4.6
Bachelor's degree	13.1	4.4	1.2	21.0	13.1	4.8
High school CTE concentrators						
Grade 12, no college enrollment	13.4	5.1	19.9	-	-	-
No credential, no longer enrolled	13.2	5.0	2.9	9.5	7.5	10.4
No credential, still enrolled	13.3	5.1	4.9	20.3	16.6	-
Certificate	13.3	5.4	4.2	14.4	12.0	7.3
Associate's degree	13.2	4.9	1.8	20.4	15.7	5.0
Bachelor's degree	13.1	4.8	1.3	21.0	13.7	5.0

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table C11. Crosswalk of industry of employment and CTE program areas

NAICS Code	NAICS Industry Title	CTE Program Area*											
		AGR	BUS	COM	CSC	EDU	EAS	HLT	LGL	PCS	PRO	PUB	TRD
11	Agriculture, Forestry, Fishing and Hunting	X											
21	Mining						X						
22	Utilities						X						
23	Construction						X						X
31–33	Manufacturing						X						X
42	Wholesale Trade		X										
44–45	Retail Trade		X							X			
48–49	Transportation and Warehousing												X
51	Information			X	X								
52	Finance and Insurance		X										
53	Real Estate and Rental and Leasing		X										
5411	Legal Services								X		X	X	
5412	Accounting, Tax Preparation, Bookkeeping, and Payroll Services		X										
5413	Architectural, Engineering, and Related Services						X						
5414	Specialized Design Services			X			X						
5415	Computer Systems Design and Related Services				X								
5416	Management, Scientific, and Technical Consulting Services		X		X		X						
5417	Scientific Research and Development Services						X						
5418	Advertising and Related Services		X	X									
54191	Marketing Research and Public Opinion Polling		X										
54192	Photographic Services			X									
54193	Translation and Interpretation Services			X									
54194	Veterinary Services	X						X					
54199	All Other Professional, Scientific, and Technical Services	X	X	X	X		X	X					

(continued)

Table C11. Crosswalk of industry of employment and CTE program areas (continued)

NAICS Code	NAICS Industry Title	CTE Program Area*											
		AGR	BUS	COM	CSC	EDU	EAS	HLT	LGL	PCS	PRO	PUB	TRD
55	Management of Companies and Enterprises		X										
56	Administration and Support and Waste Mgt and Remediation Services		X							X			
61	Educational Services					X							
621	Ambulatory Health Care Services							X					
622	Hospitals							X					
623	Nursing and Residential Care Facilities							X		X			
624	Social Assistance									X		X	
71	Arts, Entertainment, and Recreation									X			
72	Accommodation and Food Services		X							X			
811	Repair and Maintenance												X
812	Personal and Laundry Services									X			
813	Religious, Grantmaking, Civic, Professional, and Similar Organizations											X	
814	Private Households									X			
921	Executive, Legislative, and Other General Government Support								X			X	
922	Justice, Public Order, and Safety Activities								X		X		
923	Administration of Human Resource Programs		X										
92311	Administration of Education Programs					X							
92312	Administration of Public Health Programs							X					
924	Administration of Environmental Quality Programs	X					X						
925	Administration of Housing, Urban Planning, and Community Development						X						
926	Administration of Economic Programs		X										
927	Space Research and Technology						X						
928	National Security and International Affairs										X		

(continued)

Table C11. Crosswalk of industry of employment and CTE program areas (continued)

NAICS Code	NAICS Industry Title	CTE Program Area*											
		AGR	BUS	COM	CSC	EDU	EAS	HLT	LGL	PCS	PRO	PUB	TRD

*CTE Program Areas:
AGR=Agriculture & Natural Resources
BUS=Business & Marketing
COM=Communications
CSC=Computer Sciences
EDU=Education
EAS=Engineering & Architectural Sciences
HLT=Health Care
LGL=Legal Services
PCS=Personal & Consumer Services
PRO=Protective Services
PUB=Public, Social, & Human Services
TRD=Trade & Industry

NOTE: An (X) indicates the NAICS industry that is related to each CTE program area.

Table C12. Percentage distribution of employment sectors for highest post-school earnings for students in the 1996 Florida grade 9 cohort who reached grade 12 and did not attend college, by high school concentration category

	All	Non-New Basics + Non-CTE	Non-New Basics + CTE	New Basics + Non-CTE	New Basics + CTE
Agriculture & Mining	1%	1%	1%	1%	2%
Communications	2%	2%	2%	2%	2%
Construction	4%	4%	7%	3%	5%
Eating & Sleeping	19%	22%	18%	20%	16%
Education	1%	1%	2%	2%	2%
Entertainment	2%	2%	2%	3%	2%
Finance & Real Estate	3%	3%	3%	3%	3%
Government	2%	1%	2%	2%	2%
Health Care	6%	7%	7%	5%	6%
Manufacturing	4%	4%	5%	3%	4%
Personal Services	3%	2%	3%	2%	3%
Professional Services	4%	4%	4%	4%	5%
Retail Trade	24%	23%	22%	25%	26%
Support Services	14%	16%	14%	14%	13%
Transportation	1%	1%	1%	1%	1%
Warehouse Delivery	5%	4%	4%	5%	4%
Wholesale Trade	4%	4%	5%	3%	4%
Unclassified	0%	0%	0%	0%	0%

NOTE: Detail may not sum to totals because of rounding

SOURCE: Florida K-20 data warehouse (authors' calculations)

Table C13. Percentage distribution of employment sectors for highest post-school earnings for students in the 1996 Florida grade 9 cohort who attended college but were not still enrolled, by highest level of education completed and type of postsecondary concentration

	Employment Sector																	
	Agriculture & Mining	Communications	Construction	Eating & Sleeping	Education	Entertainment	Finance & Real Estate	Government	Health Care	Manufacturing	Personal Services	Professional Services	Retail Trade	Support Services	Transportation	Warehouse Delivery	Wholesale Trade	Unclassified
All students	1	3	4	11	9	2	8	5	11	2	2	8	15	12	1	2	3	1
CTE Concentrations																		
Agriculture & Natural Resources	4	1	6	9	19	4	5	7	4	3	2	12	8	12	0	1	4	1
Business & Marketing	1	3	4	10	5	2	21	3	3	3	1	12	12	11	1	1	2	3
Communications	0	12	2	11	8	4	7	3	4	2	3	15	12	11	1	1	2	3
Computer Sciences	1	4	2	8	6	2	5	3	6	5	2	12	22	12	2	3	4	1
Education	0	1	1	4	67	1	2	2	6	0	1	2	5	5	0	1	1	1
Engineering & Architectural Sciences	3	2	8	5	7	1	3	3	2	10	2	27	11	9	1	2	2	1
Health Care	0	1	1	5	8	1	3	6	50	1	1	2	10	8	1	1	1	1
Legal Services	0	1	4	7	7	0	8	10	3	0	1	40	7	8	0	0	1	3
Personal & Consumer Services	0	1	3	9	11	3	6	3	17	0	13	6	11	12	1	0	2	1
Protective Services	0	1	2	7	4	2	6	40	6	1	2	4	10	10	1	2	2	1
Public, Social, & Human Services	0	3	1	5	7	1	6	13	36	1	4	6	5	10	0	1	2	2
Trade & Industry	1	1	32	8	2	1	5	1	1	5	5	4	17	13	1	2	2	2
Academic Concentrations																		
English	0	3	3	14	9	2	11	3	8	2	2	6	16	13	1	3	3	1
Fine & Performing Arts	0	4	2	16	12	4	6	2	5	1	2	7	21	11	0	2	2	1
Humanities	1	3	2	14	9	4	9	3	8	2	3	6	18	13	1	3	2	1
Interdisciplinary	0	7	2	4	9	1	4	3	12	1	3	11	24	12	0	3	2	3
Math	1	3	4	13	6	2	9	4	6	3	2	6	18	14	0	4	3	2
Science	0	2	3	10	9	2	6	3	17	1	1	8	17	11	1	3	2	2
Social Sciences	1	3	3	11	11	2	9	5	11	2	2	7	15	12	1	2	2	3
Multiple Concentrations	1	3	4	13	5	2	9	3	11	2	2	7	17	15	1	3	3	1
No Concentration (less than 12 credits)	1	3	4	14	3	2	6	3	9	3	2	6	19	16	1	3	3	1

‡ Reporting standards not met. (Too few cases for a reliable estimate)

NOTE: Detail may not sum to totals because of rounding

SOURCE: Florida K-20 data warehouse (authors' calculations)

Appendix D: Methodology and Results for Regression Models

D.1 Type of High School Concentration Completed

The following multinomial logistic regression model is estimated for individual *i* choosing high school concentration *j* (*New Basics + Non-CTE*) over alternative concentration *k* (*Non-New Basics + Non-CTE, Non-New Basics + CTE, and New Basics + CTE*):

$$P_{ij} \quad \frac{\exp(\beta_0 \quad \beta_1 Student_{ij} \quad \beta_2 Performance_{ij} \quad \beta_3 School_{ij} \quad \beta_4 Work_{ij})}{\sum_{k\ 1}^{m} \exp(\beta_0 \quad \beta_1 Student_{ij} \quad \beta_2 Performance_{ij} \quad \beta_3 School_{ij} \quad \beta_4 Work_{ij})},$$

where $Student_{ij}$ represents student characteristics including gender, race, age, Free and Reduced-Price Lunch (FRL) status, Limited English Proficiency (LEP) status, and Students With Disabilities (SWD status); $Performance_{ij}$ represents high school performance in terms of high school GPA and absentee rate in grade 9; $School_{ij}$ refers to school characteristics, including school locale, school type, percentage of students who reached grade 12, percentage of black students, percentage of Hispanic students, percentage of FRL students, and school size (number of ninth graders, in hundreds); and $Work_{ij}$ represents work experience in terms of number of quarters employed in high school. The results from the model are presented in Table D-1A (using the 3+ credit definition of career and technical education [CTE] concentrators) and Table D-1B (using the 2+ credit definition of CTE concentrators) below.

Table D-1A. Multinomial logistic regression of type of high school concentration on student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12

	Non–New Basics & Non-CTE			Non–New Basics & CTE			New Basics & CTE		
	β		S.E.	β		S.E.	β		S.E.
Student characteristics:									
Gender (relative to male)									
Female	−0.09	**	0.02	−0.10	**	0.03	−0.03		0.02
Race (relative to white)									
Black	−0.01		0.03	−0.65	**	0.05	−0.26	**	0.03
Hispanic	0.07		0.04	−0.36	**	0.07	−0.13	**	0.04
Other	−0.25	**	0.08	−0.71	**	0.15	−0.23	**	0.06
Age	0.23	**	0.02	0.21	**	0.02	0.06	**	0.01
Free and Reduced-Price Lunch (FRL)	0.12	**	0.03	0.05		0.04	0.03		0.02
Limited English Proficiency (LEP)	−0.22	**	0.04	−0.20	**	0.07	−0.19	**	0.04
Students With Disabilities (SWD)	0.85	**	0.03	0.52	**	0.04	−0.33	**	0.03
High school performance:									
Grade 9 GPA	−0.73	**	0.02	−0.69	**	0.02	0.10	**	0.01
Grade 9 absentee rate	0.03	**	0.00	0.02	**	0.00	0.00		0.00
School characteristics:									
School locale (relative to rural)									
Urban	0.20	**	0.04	−0.56	**	0.06	−0.56	**	0.04
Suburban	0.01		0.04	−0.36	**	0.06	−0.32	**	0.03
School Type (relative to Comprehensive or non-CTE magnet)									
Magnet school with a CTE academy	0.03		0.03	0.10	*	0.04	0.03		0.02
Separate CTE school	0.30	**	0.09	1.78	**	0.09	1.12	**	0.08
Other school	1.36	**	0.12	−0.12		0.27	−0.53	*	0.22
School % reaching grade 12	−0.74	**	0.10	−0.87	**	0.16	0.02		0.10
School % black	−0.43	**	0.08	−0.36	**	0.13	0.26	**	0.07
School % Hispanic	−0.24	**	0.09	−0.24		0.15	0.28	**	0.08
School % FRL	0.89	**	0.11	1.37	**	0.17	−0.01		0.10
School size (# ninth graders, in hundreds)	−0.07	**	0.01	−0.04	**	0.01	−0.01		0.01

(continued)

Table D-1A. Multinomial logistic regression of type of high school concentration on student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12 (continued)

	Non–New Basics & Non-CTE		Non–New Basics & CTE		New Basics & CTE	
	β	S.E.	β	S.E.	β	S.E.
Work experience:						
Number of quarters employed in HS	0.01 **	0.00	0.03 **	0.00	0.02 **	0.00
Constant	−2.29 **	0.25	−2.68 **	0.39	−1.56 **	0.23
Number of observations	78,110					
Pseudo R^2	0.06					

** $p < 0.01$, * $p < 0.05$.

SOURCE: Florida K-20 data warehouse.

Table D-1B. Multinomial logistic regression analysis of type of high school concentration on student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12; CTE concentrations are defined based on 2+ credits in the same program area

	Non–New Basics & Non-CTE			Non–New Basics & CTE			New Basics & CTE		
	β		S.E.	β		S.E.	β		S.E.
Student characteristics:									
Gender (relative to male)									
Female	−0.10	**	0.02	−0.16	**	0.03	−0.08	**	0.02
Race (relative to white)									
Black	0.02		0.03	−0.47	**	0.04	−0.18	**	0.02
Hispanic	0.10	*	0.05	−0.29	**	0.06	−0.11	**	0.03
Other	−0.21	*	0.09	−0.63	**	0.12	−0.15	**	0.05
Age	0.24	**	0.02	0.20	**	0.02	0.05	**	0.01
Free and Reduced-Price Lunch (FRL)	0.14	**	0.03	0.05		0.03	0.02		0.02
Limited English Proficiency (LEP)	−0.24	**	0.05	−0.20	**	0.06	−0.13	**	0.03
Students With Disabilities (SWD)	0.87	**	0.03	0.45	**	0.03	−0.24	**	0.03
High school performance:									
Grade 9 GPA	−0.71	**	0.02	−0.70	**	0.02	0.09	**	0.01
Grade 9 absentee rate	0.03	**	0.00	0.02	**	0.00	−0.01	**	0.00
School characteristics:									
School locale (relative to rural)									
Urban	0.17	**	0.05	−0.51	**	0.05	−0.58	**	0.03
Suburban	−0.03		0.05	−0.37	**	0.05	−0.37	**	0.03
School Type (relative to Comprehensive or non-CTE magnet)									
Magnet school with a CTE academy	0.01		0.03	0.07	*	0.03	−0.01		0.02
Separate CTE school	0.36	**	0.11	1.73	**	0.09	1.13	**	0.08
Other school	1.32	**	0.13	−0.27		0.22	−0.75	**	0.19
School % reaching grade 12	−0.88	**	0.11	−0.89	**	0.13	−0.23	*	0.09
School % black	−0.32	**	0.09	−0.30	**	0.11	0.38	**	0.07
School % Hispanic	−0.16	**	0.10	0.02		0.12	0.50	**	0.08
School % FRL	0.64	**	0.12	1.33	**	0.14	−0.24	**	0.09
School size (# ninth graders, in hundreds)	−0.08	**	0.01	−0.05	**	0.01	−0.01	**	0.00

(continued)

Table D-1B. Multinomial logistic regression analysis of type of high school concentration on student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12; CTE concentrations are defined based on 2+ credits in the same program area (continued)

	Non–New Basics & Non-CTE			Non–New Basics & CTE			New Basics & CTE		
	β		S.E.	β		S.E.	β		S.E.
Work experience:									
Number of quarters employed in HS	0.01	**	0.00	0.03	**	0.00	0.02	**	0.00
Constant	−2.30	**	0.28	−1.71	**	0.34	−0.29		0.21
Number of observations	78,110								
Pseudo R^2	0.06								

** $p < 0.01$, * $p < 0.05$.

SOURCE: Florida K-20 data warehouse.

The following logistic regression model is estimated for individual *i* to predict the likelihood of completing a New Basics curriculum in high school (1 = yes):

$$\Pr(1) \quad \frac{\exp(\beta_0 \quad \beta_1 CTE_i \quad \beta_2 Student_i \quad \beta_3 Performance_i \quad \beta_4 School_i \quad \beta_5 Work_i)}{1 \quad (\beta_0 \quad \beta_1 CTE_i \quad \beta_2 Student_i \quad \beta_3 Performance_i \quad \beta_4 School_i \quad \beta_5 Work_i)},$$

where CTE_i indicates whether the student completed a CTE concentration in high school; $Student_i$ represents student characteristics including gender, race, age, FRL status, LEP status, and SWD status; $Performance_i$ represents high school performance in terms of high school GPA and absentee rate in grade 9; $School_i$ refers to school characteristics, including school locale, school type, percentage of students who reached grade 12, percentage of black students, percentage of Hispanic students, percentage of FRL students, and school size (number of ninth graders, in hundreds); and $Work_i$ represents work experience in terms of number of quarters employed in high school. The results from the model are presented in Table D-2A (using the 3+ credit definition of CTE concentrators) and Table D-2B (using the 2+ credit definition of CTE concentrators) below.

Table D-2A. Logistic regression analysis of New Basics curriculum completion on high school CTE concentration status (3+ credits), student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12

	β		S.E.
High school CTE concentration status (relative to non-concentrators)			
Concentrator	0.28	**	0.02
Student characteristics:			
Gender (relative to male)			
Female	0.08	**	0.02
Race (relative to white)			
Black	0.10	**	0.03
Hispanic	0.01		0.04
Other	0.31	**	0.07
Age	−0.20	**	0.01
Free and Reduced-Price Lunch (FRL)	−0.09	**	0.02
Limited English Proficiency (LEP)	0.17	**	0.04
Students With Disabilities (SWD)	−0.85	**	0.02
High school performance:			
Grade 9 GPA	0.74	**	0.01
Grade 9 absentee rate	−0.03	**	0.00
School characteristics:			
School locale (relative to rural)			
Urban	−0.14	**	0.04
Suburban	0.01		0.03

(continued)

Table D-2A. Logistic regression analysis of New Basics curriculum completion on high school CTE concentration status (3+ credits), student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12 (continued)

	β		S.E.
School Type (relative to Comprehensive or non-CTE magnet)			
Magnet school with a CTE academy	−0.04		0.02
Separate CTE school	−0.50	**	0.06
Other school	−1.31	**	0.11
School % reaching grade 12	0.78	**	0.09
School % black	0.49	**	0.07
School % Hispanic	0.33	**	0.08
School % FRL	−1.03	**	0.10
School size (# ninth graders)	0.06	**	0.01
Work experience:			
Number of quarters employed in HS	−0.01	**	0.00
Constant	1.88	**	0.22
Number of observations	78,110		
Pseudo R^2	0.11		

** $p < 0.01$, * $p < 0.05$.
NOTE: CTE concentrations are defined based on 3+ credits in the same program area.
SOURCE: Florida K-20 data warehouse.

Table D-2B. Logistic regression analysis of New Basics curriculum completion on high school CTE concentration status (2+ credits), student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12

	β		S.E.
High school CTE concentration status (relative to non-concentrators)			
Concentrator	0.35	**	0.02
Student characteristics:			
Gender (relative to male)			
Female	0.09	**	0.02
Race (relative to white)			
Black	0.11	**	0.03
Hispanic	0.02		0.04
Other	0.31	**	0.07
Age	−0.20	**	0.01
Free and Reduced-Price Lunch (FRL)	−0.09	**	0.02
Limited English Proficiency (LEP)	0.17	**	0.04
Students With Disabilities (SWD)	−0.84	**	0.02

(continued)

Table D-2B. Logistic regression analysis of New Basics curriculum completion on high school CTE concentration status (2+ credits), student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12 (continued)

	β		S.E.
High school performance:			
Grade 9 GPA	0.74	**	0.01
Grade 9 absentee rate	−0.03	**	0.00
School characteristics:			
School locale (relative to rural)			
Urban	−0.13	**	0.04
Suburban	0.03		0.03
School Type (relative to Comprehensive or non-CTE magnet)			
Magnet school with a CTE academy	−0.04		0.02
Separate CTE school	−0.52	**	0.06
Other school	−1.26	**	0.11
School % reaching grade 12	0.78	**	0.09
School % black	0.48	**	0.07
School % Hispanic	0.30	**	0.08
School % FRL	−1.02	**	0.10
School size (# ninth graders)	0.06	**	0.01
Work experience:			
Number of quarters employed in HS	−0.01	**	0.00
Constant	1.77	**	0.22
Number of observations	78,110		
Pseudo R^2	0.11		

** $p < 0.01$, * $p < 0.05$.
NOTE: CTE concentrations are defined based on 2+ credits in the same program area.
SOURCE: Florida K-20 data warehouse.

D.3 Type of Post–High School Transition

The following logistic regression model is estimated for individual *i* to predict the likelihood of enrolling in college after high school for students who reached grade 12 (1 = yes):

$$\Pr(1) \quad \frac{\exp(\beta_0 \quad \beta_1 Concentration_i \quad \beta_2 Student_i \quad \beta_3 Performance_i \quad \beta_4 School_i \quad \beta_5 Work_i)}{1 \quad (\beta_0 \quad \beta_1 Concentration_i \quad \beta_2 Student_i \quad \beta_3 Performance_i \quad \beta_4 School_i \quad \beta_5 Work_i)},$$

where $Concentration_i$ indicates the type of concentration completed in high school (Non–New Basics + Non-CTE, Non–New Basics + CTE, New Basics + Non-CTE, or New Basics + CTE); $Student_i$ represents student characteristics including gender, race, age, FRL status, LEP status, and SWD status; $Performance_i$ represents high school performance in terms of high school GPA and absentee rate in grade 9; $School_i$ refers to school characteristics including school locale, school type, percentage of students who reached grade 12, percentage of black students, percentage of Hispanic students, percentage of FRL students, and school size (number of ninth graders, in hundreds); and $Work_i$ represents work experience in terms of number of quarters employed in high school. The results from the model are presented in Table D-3A (using the 3+ credit definition of CTE concentrators) and Table D-3B (using the 2+ credit definition of CTE concentrators) below.

Table D-3A. Logistic regression analysis of postsecondary enrollment (relative to entering workforce) on high school CTE concentration status (3+ credits), student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12

	β		S.E.
High school concentration (relative to Non–New Basics+ Non-CTE)			
Non–New Basics + CTE	−0.02		0.04
New Basics + Non-CTE	0.69	**	0.02
New Basics + CTE	0.59	**	0.03
Student characteristics:			
Gender (relative to male)			
Female	0.29	**	0.02
Race (relative to white)			
Black	−0.08	**	0.03
Hispanic	0.00		0.04
Other	0.48	**	0.07
Age	−0.25	**	0.01
Free and Reduced-Price Lunch (FRL)	−0.46	**	0.02
Limited English Proficiency (LEP)	0.19	**	0.04
Students With Disabilities (SWD)	−0.58	**	0.02
High school performance:			
Grade 9 GPA	0.71	**	0.01
Grade 9 absentee rate	−0.01	**	0.00

(continued)

Table D-3A. Logistic regression analysis of postsecondary enrollment (relative to entering workforce) on high school CTE concentration status (3+ credits), student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12 (continued)

	β		S.E.
School characteristics:			
School locale (relative to rural)			
Urban	0.05		0.03
Suburban	−0.05		0.03
School Type (relative to Comprehensive or non-CTE magnet)			
Magnet school with a CTE academy	0.20	**	0.02
Separate CTE school	−0.51	**	0.06
Other school	−0.58	**	0.13
School % reaching grade 12	0.98	**	0.09
School % black	0.22	**	0.07
School % Hispanic	0.84	**	0.08
School % FRL	−0.62	**	0.09
School size (# ninth graders)	0.03	**	0.00
Work experience:			
Number of quarters employed in HS	0.00		0.00
Constant	1.44	**	0.22
Number of observations	72,277		
Pseudo R^2	0.13		

** $p < 0.01$, * $p < 0.05$.
NOTE: CTE concentrations are defined based on 3+ credits in the same program area.
SOURCE: Florida K-20 data warehouse.

Table D-3B. Logistic regression analysis of postsecondary enrollment (relative to entering workforce) on high school CTE concentration status (2+ credits), student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12

	β		S.E.
High school concentration (relative to Non–New Basics+ Non-CTE)			
Non–New Basics + CTE	0.03		0.03
New Basics + Non-CTE	0.71	**	0.03
New Basics + CTE	0.64	**	0.03
Student characteristics:			
Gender (relative to male)			
Female	0.29	**	0.02
Race (relative to white)			
Black	0.07	**	0.03
Hispanic	0.00		0.04
Other	0.48	**	0.07
Age	−0.25	**	0.01
Free and Reduced-Price Lunch (FRL)	−0.46	**	0.02
Limited English Proficiency (LEP)	0.19	**	0.04
Students With Disabilities (SWD)	−0.58	**	0.02
High school performance:			
Grade 9 GPA	0.71	**	0.01
Grade 9 absentee rate	−0.01	**	0.00
School characteristics:			
School locale (relative to rural)			
Urban	0.06		0.03
Suburban	−0.05		0.03
School Type (relative to Comprehensive or non-CTE magnet)			
Magnet school with a CTE academy	0.20	**	0.02
Separate CTE school	−0.53	**	0.06
Other school	−0.58	**	0.13
School % reaching grade 12	0.98	**	0.09
School % black	0.22	**	0.07
School % Hispanic	0.85	**	0.08
School % FRL	−0.63	**	0.09
School size (# ninth graders)	0.03	**	0.00
Work experience:			
Number of quarters employed in HS	0.00		0.00
Constant	1.43	**	0.22
Number of observations	72,277		
Pseudo R^2	0.13		

** $p < 0.01$, * $p < 0.05$.

NOTE: CTE concentrations are defined based on 2+ credits in the same program area.

SOURCE: Florida K-20 data warehouse.

We also estimated a more complex model about the specific type of post–high school transition completed for students who reached grade 12. The following multinomial logistic regression model is estimated for individual *i* choosing post–high school transition *j* (*entering the workforce full-time*) over alternative transition *k* (*entering the workforce part-time, enrolling in college part-time, and enrolling in college full-time*):

$$P_{ij} \quad \frac{\exp(\beta_0 \quad \beta_1 Concentration_{ij} \quad \beta_2 Student_{ij} \quad \beta_3 Performance_{ij} \quad \beta_4 School_{ij} \quad \beta_5 Work_{ij})}{\sum_{k \ 1}^{m} \exp(\beta_0 \quad \beta_1 Concentration_{ij} \quad \beta_2 Student_{ij} \quad \beta_3 Performance_{ij} \quad \beta_4 School_{ij} \quad \beta_5 Work_{ij})},$$

where $Concentration_{ij}$ indicates the type of concentration the student completed in high school; $Student_{ij}$ represents student characteristics, including gender, race, age, FRL status, LEP status, and SWD status; $Performance_{ij}$ represents high school performance in terms of high school GPA and absentee rate in grade 9; $School_{ij}$ refers to school characteristics including school locale, school type, percentage of students who reached grade 12, percentage of black students, percentage of Hispanic students, percentage of FRL students, and school size (number of ninth graders, in hundreds); and $Work_{ij}$ represents work experience in terms of number of quarters employed in high school. The results from the model are presented in Table D-4A (using the 3+ credit definition of CTE concentrators) and Table D-4B (using the 2+ credit definition of CTE concentrators) below. Table D-5A (using the 3+ credit definition of CTE concentrators) and Table D-5B (using the 2+ credit definition of CTE concentrators) include the predicted probability of each outcome by high school concentration, school locale, and school type.

Table D-4A. Multinomial logistic regression analysis of type of post–high school transition (relative to entering the workforce full-time) on CTE concentration (3+ credits), student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12

	Entered the workforce part-time			Enrolled in college part-time			Enrolled in college full-time		
	β		S.E.	β		S.E.	β		S.E.
High school concentration (relative to Non–New Basics+ Non-CTE)									
Non–New Basics + CTE	−0.40	**	0.06	−0.08	*	0.04	−0.48	**	0.05
New Basics + Non-CTE	−0.19	**	0.04	0.57	**	0.03	0.72	**	0.03
New Basics + CTE	−0.52	**	0.05	0.27	**	0.03	0.48	**	0.04
Student characteristics:									
Gender (relative to male)									
Female	0.14	**	0.03	0.38	**	0.02	0.27	**	0.02
Race (relative to white)									
Black	0.49	**	0.04	−0.06	*	0.03	0.24	**	0.03
Hispanic	−0.16	*	0.07	−0.02		0.04	−0.08		0.05
Other	0.55	**	0.13	0.64	**	0.09	0.69	**	0.09
Age	−0.13	**	0.02	−0.23	**	0.02	−0.36	**	0.02
Free and Reduced-Price Lunch (FRL)	−0.04		0.04	−0.44	**	0.03	−0.50	**	0.03
Limited English Proficiency (LEP)	−0.17	**	0.07	0.22	**	0.04	0.00		0.05
Students With Disabilities (SWD)	0.42	**	0.04	−0.46	**	0.03	−0.43	**	0.03
High school performance:									
Grade 9 GPA	0.30	**	0.02	0.51	**	0.02	1.13	**	0.02
Grade 9 absentee rate	0.00		0.00	−0.01	**	0.00	−0.01	**	0.00
School characteristics:									
School locale (relative to rural)									
Urban	0.02		0.06	0.09	*	0.04	0.03		0.04
Suburban	0.03		0.06	−0.01		0.04	−0.08		0.04

(continued)

Table D-4A. Multinomial logistic regression analysis of type of post–high school transition (relative to entering the workforce full-time) on CTE concentration (3+ credits), student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12 (continued)

	Entered the workforce part-time			Enrolled in college part-time			Enrolled in college full-time		
	β		S.E.	β		S.E.	β		S.E.
School Type (relative to Comprehensive or non-CTE magnet)									
Magnet school with a CTE academy	0.12	**	0.04	0.24	**	0.03	0.23	**	0.03
Separate CTE school	0.04		0.05	−0.39	**	0.08	−0.68	**	0.09
Other school	0.77	**	0.15	−0.09		0.16	−0.60	**	0.21
School % reaching grade 12	0.52	**	0.14	0.90	**	0.11	1.45	**	0.12
School % black	−0.06		0.12	0.16		0.09	0.28	**	0.09
School % Hispanic	0.06		0.14	1.02	**	0.10	0.64	**	0.10
School % FRL	−0.02		0.00	−0.49	**	0.11	−0.78	**	0.12
School size (# ninth graders)	0.00		0.00	0.03	**	0.00	0.03	**	0.01
Work experience:									
Number of quarters employed in HS	−0.09	**	0.00	−0.02	**	0.00	−0.03	**	0.00
Constant	0.13		0.37	1.34	**	0.27	1.31	**	0.28
Number of observations	72,277								
Pseudo R^2	0.09								

** $p < 0.01$, * $p < 0.05$.

NOTE: CTE concentrations are defined based on 3+ credits in the same program area.

SOURCE: Florida K-20 data warehouse.

Table D-4B. Multinomial logistic regression analysis of type of post–high school transition (relative to entering the workforce full-time) on CTE concentration (2+ credits), student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12

	Entered the workforce part-time			Enrolled in college part-time			Enrolled in college full-time		
	β		S.E.	β		S.E.	β		S.E.
High school concentration (relative to Non–New Basics+ Non-CTE)									
Non–New Basics + CTE	−0.35	**	0.05	−0.05		0.04	−0.10	*	0.05
New Basics + Non-CTE	−0.17	**	0.04	0.59	**	0.03	0.74	**	0.04
New Basics + CTE	−0.50	**	0.04	0.47	**	0.03	0.55	**	0.04
Student characteristics:									
Gender (relative to male)									
Female	0.14	**	0.03	0.38	**	0.02	0.27	**	0.02
Race (relative to white)									
Black	0.50	**	0.04	−0.06		0.03	0.24	**	0.03
Hispanic	−0.16	*	0.07	−0.02		0.04	−0.08		0.05
Other	0.55	**	0.13	0.65	**	0.09	0.69	**	0.09
Age	−0.13	**	0.02	−0.23	**	0.02	−0.36	**	0.02
Free and Reduced-Price Lunch (FRL)	−0.04		0.04	−0.44	**	0.03	−0.50	**	0.03
Limited English Proficiency (LEP)	−0.17	*	0.07	0.22	**	0.04	0.00		0.05
Students With Disabilities (SWD)	0.42	**	0.04	−0.46	**	0.03	−0.43	**	0.03
High school performance:									
Grade 9 GPA	0.30	**	0.02	0.51	**	0.02	1.13	**	0.02
Grade 9 absentee rate	0.00		0.00	−0.01	**	0.00	−0.01	**	0.00
School characteristics:									
School locale (relative to rural)									
Urban	0.02		0.06	0.09	*	0.04	0.04		0.04
Suburban	0.03		0.06	−0.01		0.04	−0.08		0.04

(continued)

Table D-4B. Multinomial logistic regression analysis of type of post–high school transition (relative to entering the workforce full-time) on CTE concentration (2+ credits), student characteristics, high school performance, school characteristics, and work experience for students in the 1996 Florida grade 9 cohort who reached grade 12 (continued)

	Entered the workforce part-time			Enrolled in college part-time			Enrolled in college full-time		
	β		S.E.	β		S.E.	β		S.E.
School Type (relative to Comprehensive or non-CTE magnet)									
Magnet school with a CTE academy	0.11	**	0.04	0.24	**	0.03	0.23	**	0.03
Separate CTE school	0.03		0.09	−0.40	**	0.08	0.70	**	0.09
Other school	0.74	**	0.15	−0.10		0.16	−0.61	**	0.21
School % reaching grade 12	0.52	**	0.14	0.90	**	0.11	1.44	**	0.12
School % black	−0.05		0.12	0.16		0.09	0.29	**	0.09
School % Hispanic	0.08		0.14	1.02	**	0.10	0.65	**	0.10
School % FRL	−0.03		0.16	−0.49	**	0.11	−0.79	**	0.12
School size (# ninth graders)	0.00		0.00	0.03	**	0.00	0.03	**	0.01
Work experience:									
Number of quarters employed in HS	−0.09	**	0.00	−0.02	**	0.00	−0.03	**	0.00
Constant	0.19		0.37	1.35	**	0.27	1.32	**	0.28
Number of observations	72,277								
Pseudo R^2	0.09								

** $p < 0.01$, * $p < 0.05$.

NOTE: CTE concentrations are defined based on 2+ credits in the same program area.

SOURCE: Florida K-20 data warehouse.

Table D-5A. Predicted probabilities of completing each type of post–high school transition for students in the 1996 Florida grade 9 cohort who reached grade 12 and had college transcript or wage records after high school, holding constant other variables, by high school concentration, school locale, and school type

	Entered the workforce part-time	Entered the workforce full-time	Enrolled in college part-time	Enrolled in college full-time
All students	7.9%	20.6%	34.4%	37.2%
High school concentration type				
Non–New Basics + Non-CTE	13.3%	26.8%	27.6%	32.4%
Non–New Basics + CTE	10.1%	30.2%	26.0%	33.7%
New Basics + Non-CTE	7.3%	17.7%	37.3%	37.8%
New Basics + CTE	6.1%	20.8%	34.4%	38.7%
School locale				
Rural	7.8%	20.7%	35.3%	36.2%
Suburban	8.3%	21.3%	33.5%	36.9%
Urban	7.6%	19.8%	35.0%	37.6%
School type				
Comprehensive or Non-CTE Magnet	8.0%	21.5%	34.1%	36.4%
Magnet with CTE Academy	7.5%	18.0%	35.8%	38.7%
Separate CTE School	11.5%	29.9%	24.1%	34.4%

NOTE: CTE concentrations are defined based on 3+ credits in the same program area. Regression based on student characteristics, high school performance, school characteristics, and work experience.

SOURCE: Predicted probability values are from a logistic regression model using the Florida K-20 data warehouse. Regression results are presented in Appendix D, Table D-4A.

Table D-5B. Predicted probabilities of completing each type of post–high school transition for students in the 1996 Florida grade 9 cohort who reached grade 12 and had college transcript or wage records after high school, holding constant other variables, by high school concentration, school locale, and school type

	Entered the workforce part-time	Entered the workforce full-time	Enrolled in college part-time	Enrolled in college full-time
All students	7.9%	20.6%	34.0%	37.2%
High school concentration type				
Non–New Basics + Non-CTE	13.8%	26.7%	27.4%	32.2%
Non–New Basics + CTE	10.5%	29.1%	26.9%	33.5%
New Basics + Non-CTE	7.5%	17.4%	37.3%	37.8%
New Basics + CTE	6.2%	20.0%	35.4%	38.4%
School locale				
Rural	7.8%	20.8%	35.3%	36.2%
Suburban	8.3%	21.3%	33.5%	36.9%
Urban	7.6%	19.8%	35.0%	37.6%
School type				
Comprehensive or Non-CTE Magnet	8.0%	21.5%	34.1%	36.4%
Magnet with CTE Academy	7.5%	18.0%	35.8%	38.7%
Separate CTE School	11.5%	30.2%	23.8%	30.2%

NOTE: CTE concentrations are defined based on 2+ credits in the same program area. Regression based on student characteristics, high school performance, school characteristics, and work experience.

SOURCE: Predicted probability values are from a logistic regression model using the Florida K-20 data warehouse. Regression results are presented in Appendix D, Table D-4B.

D.4 Postschool Earnings

The following linear model of postschool earnings is estimated for student *i*:

$$earn_i \quad \beta_0 \quad \beta_1 CTE_i \quad \beta_2 Student_i \quad \beta_3 Performance_i \quad \beta_4 School_i \quad \beta_5 Work_i \quad \beta_6 Market_i \quad \varepsilon_i ,$$

where CTE_i represents a series of dummy variables for whether the student completed a CTE concentration in each program area; $Student_i$ represents student characteristics, including gender, race, age, FRL status, LEP status, and SWD status; $Performance_i$ represents student performance in terms of high school GPA and high school absentee rate in grade 9 and of college GPA (for students who attended college only); $School_j$ refers to high school characteristics, including school locale, school type, percentage of students who reached grade 12, percentage of black students, percentage of Hispanic students, percentage of FRL students, and school size (number of ninth graders); $Work_i$ represents work experience in terms of number of quarters employed in high school, average earnings during high school, number of quarters employed during college (for students who attended college only), average earnings during college (for students who attended college only), and number of quarters of postschool work experience; $Market_j$ refers to labor market conditions, including the percentage of workers employed in each industry at the workforce investment area (WFIA), where the student attends high school (for students who did not attend college) or college (for students who attended college), and average monthly earnings for all employees in the WFIA; and ε_i is the error term which is assumed to be normally distributed.

The regression models are estimated using three different specifications of the dependent variable ($earn_i$):

1. High estimate—highest quarterly nonzero full-time earnings in 2004–2007
2. Moderate estimate—highest quarterly nonzero earnings in the first four quarters after exiting school
3. Low estimate—average quarterly zero and nonzero earnings in the first four quarters after exiting school

The main text of the report presents the results based on the moderate estimate of postschool earnings, while noting any differences in the findings from the specifications with the high and low estimates of postschool earnings. Appendix E compares the parameter estimates for the regression results based on the high, moderate, and low estimates of postschool earnings.

Three models are estimated for each analysis. The first model estimates the overall effect of completing a CTE concentration relative to other types of concentrations. For analyses of high school concentration type, this means that the effects are estimated for Non–New Basics + CTE, New Basics + Non-CTE, and New Basics + CTE concentrators relative to Non–New Basics + Non-CTE concentrators. For analyses of postsecondary concentration type, this means that the effects are estimated for students with CTE and multiple concentrations relative to students with academic concentrations. The second model estimates the effect of the specific subject or program area for the concentration completed. The third model estimates the effect of each credit completed in each subject or program area, regardless of the type of concentration completed.

Separate analyses are conducted for students who reached grade 12 but did not attend college, students who attended some college but did not complete a postsecondary credential, students with certificates, students with associate's degrees, and students with bachelor's degrees. The results of these models are presented in Table 37 and Tables 39–42 in the main text.

Appendix E: Sensitivity Analyses for Post-School Earnings Regression Models

This appendix compares the estimates of postschool earnings with the following specifications:

1. High estimate—based on the highest quarterly nonzero full-time earnings in 2004–2007
2. Moderate estimate—based on the highest quarterly nonzero earnings in the first four quarters after exiting school
3. Low estimate—based on the average quarterly zero and nonzero earnings in the first four quarters after exiting school

Table E1. Coefficients from an ordinary least squares (OLS) regression of high, moderate, and low estimates of postschool earnings on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college

	High estimate			Moderate estimate			Low estimate		
	β		S.E.	β		S.E.	β		S.E.
Model 1									
Type of high school concentration									
Non–New Basics + Non-CTE (reference)	†			†			†		
Non–New Basics + CTE	98.54	*	41.38	317.87	**	45.15	206.41	**	27.12
New Basics + Non-CTE	133.34	**	27.89	87.42	**	30.15	48.07	**	17.83
New Basics + CTE	231.68	**	32.70	178.23	**	35.83	89.57	**	21.35
N	17,067			20,942			25,045		
R^2	0.09			0.28			0.41		
Model 2									
Type of high school CTE concentration									
No CTE concentration (reference)	†			†			†		
Agriculture & Natural Resources	270.40	**	51.01	486.28	**	57.09	247.88	**	34.31
Business	23.26		55.28	96.03		60.96	64.97		36.98
Communications & Design	50.78		52.44	−6.52		57.90	8.46		34.13
Computer & Information Sciences	104.16		98.72	−132.12		106.88	−76.80		63.25
Construction & Architecture	103.76		82.99	349.64	**	94.16	184.73	**	55.85
Consumer & Culinary Services	−65.30		47.61	−6.34		52.10	10.55		31.49
Engineering Technologies	192.28	*	73.07	38.90		79.14	11.77		47.27
Health Sciences	85.69		77.29	179.08	*	84.41	139.58	**	50.98
Mfg, Repair & Transportation	128.40	*	49.35	275.18	**	55.94	168.87	**	33.44
Marketing	−1.44		93.41	35.58		101.02	100.56		63.38
Public Services	122.60		89.61	37.45		98.25	−17.85		59.11
N	17,067			20,942			25,045		
R^2	0.09			0.28			0.41		

(continued)

Table E1. Coefficients from an ordinary least squares (OLS) regression of high, moderate, and low estimates of postschool earnings on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 but did not attend college (continued)

	High estimate		Moderate estimate		Low estimate	
	β	S.E.	β	S.E.	β	S.E.
Model 3						
# HS credits in CTE						
Agriculture & Natural Resources	60.55 **	8.47	92.30 **	9.54	50.49 **	5.76
Business	−10.07	11.51	29.51 *	12.62	17.19 *	7.59
Communications & Design	6.57	10.79	12.94	11.86	6.94	7.05
Computer & Information Sciences	70.39 **	19.71	−9.76	21.82	−10.01	12.88
Construction & Architecture	25.44	16.93	98.66 **	19.13	53.97 **	11.35
Consumer & Culinary Services	−17.00	10.74	6.71	11.73	3.17	7.04
Engineering Technologies	38.88 *	17.15	28.69	18.82	10.06	11.22
Health Sciences	10.74	18.05	35.66	19.82	29.30 *	11.99
Mfg, Repair & Transportation	32.47 **	10.01	68.38 **	11.39	39.48 **	6.82
Marketing	25.99	19.83	−6.54	21.16	17.48	13.19
Public Services	42.80	18.69	−10.28	20.66	−25.36 *	12.31
# HS credits in liberal arts						
Math	−1.77	12.51	−18.60	13.54	−25.49 **	8.02
Science	45.36 **	12.40	−13.16	12.73	−13.80	7.44
English	−46.37 **	11.55	28.66 *	12.55	25.80 **	7.31
Social Studies	49.06 **	13.28	13.40	14.03	9.34	8.20
Fine Arts	−14.95 *	5.89	−18.90 **	6.22	−10.33 **	3.64
Foreign Language	74.98 **	11.80	−5.65	12.86	3.19	7.57
N	17,067		20,942		25,045	
R^2	0.10		0.28		0.42	

† Not applicable.

* $p < 0.05$, ** $p < 0.01$.

NOTE: All models include controls for student characteristics (gender, race, age, Free and Reduced-Price Lunch [FRL] status, Limited English Proficiency status, Students With Disability status); student performance (grade 9 GPA, grade 9 absentee rate); school characteristics (percentage of students reaching grade 12, percentage of black students, percentage of Hispanic students, percentage of FRL students, school size); work experience (number of quarters of work experience in high school, number of quarters of postschool work experience, average earnings in high school); and labor market characteristics (distribution of employees across industries in the local labor market, average monthly wages for all workers in the workforce).

SOURCE: Florida K-20 data warehouse.

Table E2. Coefficients from an ordinary least squares (OLS) regression of high, moderate, and low estimates of **postschool earnings on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed bachelor's degrees**

	High estimate			Moderate estimate			Low estimate		
	β		S.E.	β		S.E.	β		S.E.
Model 1									
Type of postsecondary concentration									
Academic Concentration (reference)	†			†			†		
CTE Concentration	7,474.30	**	552.04	1,673.06	**	108.47	977.59	**	62.38
Multiple Concentrations	1,900.63		2,011.76	569.97		413.99	197.24		235.899
N	8,991			9,303			11,499		
R^2	0.21			0.21			0.49		
Model 2									
Postsecondary subject or program area									
Humanities (reference)	†			†			†		
Agriculture & Natural Resources	5,117.16		2,921.34	1,558.03	**	549.29	826.38	**	313.55
Business & Marketing	11,472.26	**	2,258.06	2,490.93	**	420.80	1,223.65	**	234.85
Communications	5,099.13	*	2,354.76	1,270.92	**	440.97	552.62	*	246.38
Computer Sciences	15,333.25	**	2,984.40	3,716.44	**	567.83	1,573.46	**	313.00
Education	18,269.77	**	2,344.70	3,961.14	**	438.27	1,862.06	**	248.01
Engineering & Architectural Sciences	18,730.65	**	2,472.80	4,792.29	**	465.56	2,786.15	**	257.57
Health Care	13,453.28	**	2,364.80	3,620.55	**	442.56	2,244.88	**	248.19
Legal Services	5,292.39		3,568.72	1,060.61		679.75	56.11		376.84
Personal & Consumer Services	8,295.57	*	3,452.76	1,877.63	**	672.62	772.47	*	387.60
Protective Services	4,703.69	*	2,419.67	1,329.52	**	456.75	603.24	*	258.17
Public, Social, & Human Services	1,234.01		2,963.33	816.93		564.54	449.25		323.69
Trade & Industry	17,294.90	**	2,960.10	4,182.07	**	565.95	2,299.31	**	326.10
English	4,942.74	*	2,523.19	1,433.19	**	473.97	572.74	*	266.53
Fine & Performing Arts	2,543.74		2,613.26	899.67		486.00	395.52		271.91
Interdisciplinary	7,989.40	*	3,881.78	795.01		723.89	325.83		419.89
Math	12,722.28	**	4,191.11	3,407.62	**	825.02	1,021.32	*	440.53
Science	5,788.57	*	2,589.89	1,343.53	**	481.24	726.82	**	261.81
Social Sciences	3,714.81		2,277.63	977.78	*	424.08	346.07		236.56
Multiple Concentrations	5,948.57	*	2,923.00	1,616.90	**	567.92	610.83		320.15
N	8,991			9,303			11,498		
R^2	0.20			0.24			0.51		

(continued)

Table E2. Coefficients from an ordinary least squares (OLS) regression of high, moderate, and low estimates of postschool earnings on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed bachelor's degrees (continued)

	High estimate			Moderate estimate			Low estimate		
	β		S.E.	β		S.E.	β		S.E.
Model 3									
# College credits in CTE									
Agriculture & Natural Resources	58.02		45.47	23.70	**	8.79	19.82	**	5.13
Business & Marketing	124.50	**	17.28	33.48	**	3.41	27.43	**	1.96
Communications	−19.97		25.25	7.38		5.02	11.29	**	2.83
Computer Sciences	242.75	**	47.31	56.50	**	9.15	20.95	**	5.05
Education	262.72	**	18.22	59.09	**	3.58	35.00	**	2.13
Engineering & Architectural Sciences	191.36	**	20.90	56.28	**	4.11	39.90	**	2.26
Health Care	175.45	**	18.70	52.27	**	3.59	40.82	**	2.04
Legal Services	43.53		55.25	5.65		10.57	−3.70		5.94
Personal & Consumer Services	−46.39		65.02	4.03		13.19	9.99		7.76
Protective Services	35.66		23.93	19.51	**	5.02	20.62	**	3.00
Public, Social, & Human Services	−77.22		45.07	0.04		8.77	11.19	*	5.16
Trade & Industry	213.07	**	34.31	55.93	**	6.83	39.01	**	4.05
# College credits in liberal arts									
English	39.64		32.41	18.89	**	6.30	20.55	**	3.64
Fine & Performing Arts	−1.55		21.70	10.45	*	4.17	12.80	**	2.36
Humanities	−101.34	**	32.69	−12.42	*	6.20	0.44		3.47
Interdisciplinary	129.61		69.50	8.66		13.37	5.52		7.77
Math	26.95		45.41	16.00		8.77	22.09	**	4.92
Science	−2.00		21.40	6.09		4.13	9.21	**	2.23
Social Sciences	−10.78		19.97	7.92	*	3.89	10.85	**	2.21
N	8,991			9,303			11,499		
R^2	0.17			0.26			0.52		

† Not applicable.

* $p < 0.05$, ** $p < 0.01$.

NOTE: All models include controls for student characteristics (gender, race, age, Free and Reduced-Price Lunch [FRL] status, Limited English Proficiency status, Students With Disability status); student performance (grade 9 GPA, grade 9 absentee rate, college cumulative GPA); school characteristics (percentage of students reaching grade 12, percentage of black students, percentage of Hispanic students, percentage of FRL students, school size); work experience (number of quarters of work experience in high school, number of quarters of postschool work experience, average earnings in high school, average earnings in college); and labor market characteristics (distribution of employees across industries in the local labor market, average monthly wages for all workers in the workforce).

SOURCE: Florida K-20 data warehouse.

Table E3. Coefficients from an ordinary least squares (OLS) regression of high, moderate, and low estimates of postschool earnings on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed associate's degrees

	High estimate			Moderate estimate			Low estimate		
	β		S.E.	β		S.E.	β		S.E.
Model 1									
Type of postsecondary concentration									
Academic Concentration (reference)	†			†			†		
CTE Concentration	1,559.53		129.67	1,743.41	**	115.57	1,342.76		84.41
Multiple Concentrations	37.63		208.31	−94.36		183.08	53.15		134.50
N	4,240			4,045			4,808		
R^2	0.24			0.37			0.48		
Model 2									
Postsecondary subject or program area									
Humanities (reference)	†			†			†		
Agriculture & Natural Resources	1,018.31		579.97	536.05		513.23	385.29		365.82
Business & Marketing	855.64	*	361.56	372.38		310.88	370.92		229.54
Communications	321.70		447.56	185.68		387.23	290.36		287.32
Computer Sciences	813.31		564.60	907.07		490.37	427.48		368.49
Education	−12.65		429.24	9.52		365.90	−44.34		269.54
Engineering & Architectural Sciences	944.70	*	469.55	583.89		406.48	301.69		294.57
Health Care	4,407.11	**	357.66	4,205.98	**	309.11	3,086.60	**	228.22
Legal Services	457.51		664.16	642.09		635.32	728.71		479.74
Personal & Consumer Services	−579.44		1,164.04	165.36		997.77	−449.26		715.88
Protective Services	1,283.84	**	434.06	690.20		377.22	588.52	*	282.29
Public, Social, & Human Services	−937.66		808.18	−1,207.49		707.26	−1,201.76	*	553.20
Trade & Industry	331.90		627.34	625.15		559.81	486.61		430.92
English	218.52		422.15	−169.06		361.23	−96.66		262.42
Fine & Performing Arts	−268.69		429.95	−342.89		363.67	−302.67		263.46
Interdisciplinary	1,646.32		1,352.27	786.75		1,042.72	785.39		769.69
Math	775.16		410.34	−54.14		360.75	−238.02		263.77
Science	385.21		368.80	−422.42		321.49	−442.22		233.81
Social Sciences	168.93		345.62	−282.79		297.37	−240.90		217.27
Multiple Concentrations	262.51		364.72	−366.98		313.27	−206.84		230.70
N	4,240			4,045			4,807		
R^2	0.32			0.44			0.53		

(continued)

Table E3. Coefficients from an ordinary least squares (OLS) regression of high, moderate, and low estimates of postschool earnings on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed associate's degrees (continued)

	High estimate			Moderate estimate			Low estimate		
	β		S.E.	β		S.E.	β		S.E.
Model 3									
# College credits in CTE									
Agriculture & Natural Resources	13.13		12.48	26.75	*	11.02	21.87	**	7.69
Business & Marketing	18.61	**	6.68	24.30	**	5.64	22.73	**	4.30
Communications	−3.75		10.83	18.45	*	9.28	25.74	**	7.05
Computer Sciences	−6.71		13.99	17.31		11.79	15.35		9.04
Education	0.72		8.87	14.49		7.44	13.11	*	5.55
Engineering & Architectural Sciences	21.06	*	9.04	24.50	**	7.82	17.44	**	5.47
Health Care	90.88	**	3.84	105.24	**	3.38	80.29	**	2.55
Legal Services	9.22		17.43	30.54		17.52	31.91	*	13.65
Personal & Consumer Services	−16.03		24.63	5.70		20.63	0.35		14.95
Protective Services	30.02	**	8.72	29.32	**	8.07	30.04	**	6.26
Public, Social, & Human Services	−69.47		37.67	−47.24		34.71	−45.37		27.72
Trade & Industry	10.55		11.98	32.53	**	11.37	23.61	**	8.64
# College credits in liberal arts									
English	−12.97		15.32	5.53		12.48	7.49		9.27
Fine & Performing Arts	−20.70	**	7.92	−4.15		6.39	−1.95		4.62
Humanities	−23.16		12.60	−6.00		10.58	−1.83		7.93
Interdisciplinary	8.49		46.83	−56.02		39.49	−29.75		28.13
Math	5.60		12.49	−4.57		10.51	−1.71		7.77
Science	−15.33	*	6.68	−10.08		5.76	−6.63		4.14
Social Sciences	−5.83		7.63	5.25		6.34	11.05	*	4.69
N	4,240			4,045			4,804		
R-squared	0.35			0.48			0.56		

† Not applicable.

* $p < 0.05$, ** $p < 0.01$.

NOTE: All models include controls for student characteristics (gender, race, age, Free and Reduced-Price Lunch [FRL] status, Limited English Proficiency status, Students With Disabilities status); student performance (grade 9 GPA, grade 9 absentee rate, college cumulative GPA); school characteristics (percent of students reaching grade 12, percentage of black students, percentage of Hispanic students, percentage of FRL students, school size); work experience (number of quarters of work experience in high school, number of quarters of postschool work experience, average earnings in high school, average earnings in college); and labor market characteristics (distribution of employees across industries in the local labor market, average monthly wages for all workers in the workforce).

SOURCE: Florida K-20 data warehouse.

Table E4. Coefficients from an ordinary least squares (OLS) regression of high, moderate, and low estimates of postschool earnings on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed certificates

	High estimate		Moderate estimate		Low estimate	
	β	S.E.	β	S.E.	β	S.E.
Model 1						
Type of postsecondary concentration						
Academic Concentration (reference)	†		†		†	
CTE Concentration	200.22	465.09	1,386.29 **	446.29	833.13 *	378.42
Multiple Concentrations	−62.63	724.36	−18.88	659.37	91.4629	576.41
N	1,121		950		1,052	
R^2	0.43		0.49		0.51	
Model 2						
Postsecondary subject or program area						
Academic-any (reference)	†		†		†	
Business & Marketing	−245.58	725.81	774.76	804.05	−104.62	633.31
Engineering & Architectural Sciences	136.69	831.03	477.71	778.56	260.22	682.15
Health Care	1,208.92 *	504.10	1,609.94 **	497.19	1,095.75 **	420.91
Personal & Consumer Services	−116.89	641.96	421.15	608.77	55.34	503.15
Protective Services	1,048.39 *	507.90	1,655.65 **	501.47	1,135.88 **	425.48
Trade & Industry	−420.51	600.11	281.71	591.19	−208.81	500.71
N	1,064		894		992	
R^2	0.45		0.49		0.52	

(continued)

Table E4. Coefficients from an ordinary least squares (OLS) regression of high, moderate, and low estimates of postschool earnings on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and completed certificates (continued)

	High estimate		Moderate estimate		Low estimate	
	β	S.E.	β	S.E.	β	S.E.
Model 3						
# College credits in CTE						
Agriculture & Natural Resources	−4.94	37.02	−42.87	27.83	−33.08	23.94
Business & Marketing	29.76	16.72	−5.41	16.22	−11.55	14.00
Communications	−11.37	57.44	2.69	52.18	14.91	45.20
Computer Sciences	−15.43	37.79	15.82	49.05	50.71	43.15
Education	−7.89	57.10	108.91	56.35	64.19	49.95
Engineering & Architectural Sciences	9.03	7.61	8.32	6.94	12.34	6.23
Health Care	56.61 **	6.60	55.06 **	6.50	51.40 **	5.52
Legal Services	−59.23	236.78	324.63	300.64	−238.44	192.37
Personal & Consumer Services	8.63	9.83	6.22	8.72	8.67	7.01
Protective Services	62.21 **	8.66	63.13 **	8.48	58.68 **	7.34
Public, Social, & Human Services	494.67	496.13	470.73	450.56	798.01 *	396.40
Trade & Industry	7.30	4.24	10.83 *	4.18	9.19 *	3.60
# College credits in liberal arts						
English	19.80	42.94	−0.74	43.56	15.43	36.37
Fine & Performing Arts	0.02	35.89	−13.77	48.29	−17.60	39.81
Humanities	5.80	45.43	−6.30	44.12	−2.96	38.00
Interdisciplinary	148.29	391.19	−398.69	315.19	−317.88	256.00
Math	−2.44	48.42	4.17	49.76	−13.94	40.77
Science	−62.84 *	27.72	−58.87 *	28.01	−52.06 *	24.33
Social Sciences	52.36	28.42	43.41	28.36	55.53 *	24.52
N	1,121		950		1,052	
R^2	0.48		0.55		0.58	

† Not applicable.

* $p < 0.05$, ** $p < 0.01$.

NOTE: All models include controls for student characteristics (gender, race, age, Free and Reduced-Price Lunch [FRL] status, Limited English Proficiency status, Students With Disabilities status); student performance (grade 9 GPA, grade 9 absentee rate, college cumulative GPA); school characteristics (percentage of students reaching grade 12, percentage of black students, percentage of Hispanic students, percentage of FRL students, school size); work experience (number of quarters of work experience in high school, number of quarters of postschool work experience, average earnings in high school, average earnings in college); and labor market characteristics (distribution of employees across industries in the local labor market, average monthly wages for all workers in the workforce).

SOURCE: Florida K-20 data warehouse.

Table E5. Coefficients from an ordinary least squares (OLS) regression of high, moderate, and low estimates of postschool earnings on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college but did not complete a credential (and were not still enrolled)

	High estimate			Moderate estimate			Low estimate		
	β		S.E.	β		S.E.	β		S.E.
Model 1									
Type of postsecondary concentration									
Academic Concentration (reference)	†			†			†		
CTE Concentration	261.50	**	102.34	416.41	**	65.14	333.68	**	44.26
Multiple Concentrations	−68.89		99.96	81.98		64.03	64.04		43.44
No Concentration (<12 credits)	1.67		91.95	−46.95		59.14	92.16	*	39.40
N	16,824			17,713			20,981		
R^2	0.18			0.37			0.49		
Model 2									
Postsecondary subject or program area									
Humanities (reference)	†			†			†		
Agriculture & Natural Resources	−63.22		574.95	12.00		360.85	332.38		242.6
Business & Marketing	456.93		290.17	647.38	**	182.40	666.99	**	123.3
Communications	792.60	*	396.59	228.00		244.12	180.54		163.2
Computer Sciences	−437.95		304.22	32.24		193.83	140.14		131.8
Education	156.95		380.96	535.49	*	241.61	314.20		162.9
Engineering & Architectural Sciences	671.54		385.71	236.62		241.21	329.26	*	161.2
Health Care	464.56		310.51	66.52		194.03	203.40		129.7
Legal Services	−263.84		655.32	469.46		412.87	611.83	*	278
Personal & Consumer Services	−243.18		490.10	−84.47		306.22	156.68		210.4
Protective Services	383.65		319.36	591.98	*	202.08	613.97	**	137.3
Public, Social, & Human Services	390.09		828.74	616.16		509.94	761.50	*	344.7
Trade & Industry	−338.26		418.45	235.90		272.70	283.02		184.7
English	55.42		248.31	−91.34		156.02	34.87		104.3
Fine & Performing Arts	−766.65	*	299.81	−449.36	*	185.69	−172.69		124

(continued)

Table E5. Coefficients from an ordinary least squares (OLS) regression of high, moderate, and low estimates of postschool earnings on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college but did not complete a credential (and were not still enrolled) (continued)

	High estimate			Moderate estimate			Low estimate		
	β		S.E.	β		S.E.	β		S.E.
Interdisciplinary	−583.88		803.18	−291.53		483.77	26.20		313.2
Math	22.88		282.43	−136.11		177.88	75.94		119.1
Science	161.63		274.49	−109.50		171.17	−42.31		114.1
Social Sciences	−34.90		242.14	−13.81		151.11	124.18		100.9
Multiple Concentrations	−114.28		235.69	−17.61		147.21	101.63		98.35
No Concentration (<12 credits)	−60.14		232.34	−154.68		145.17	124.63		96.67
N	16,824			17,713			20,981		
R^2	0.18			0.37			0.49		
Model 3									
# College credits in CTE									
Agriculture & Natural Resources	60.29	*	24.24	56.24	**	15.56	29.97	**	10.38
Business & Marketing	33.51	**	7.52	35.03	**	4.69	27.95	**	3.19
Communications	29.00	*	13.32	14.84		7.89	10.19		5.32
Computer Sciences	−20.81		15.22	18.63		9.62	10.50		6.48
Education	24.99	*	10.83	37.15	**	6.91	19.91	**	4.64
Engineering & Architectural Sciences	22.89	*	10.09	11.43		5.82	12.87	**	3.92
Health Care	38.65	**	8.30	26.39	**	5.04	13.03	**	3.05
Legal Services	41.89		23.98	47.17	**	14.51	22.30	*	9.39
Personal & Consumer Services	−11.33		16.89	3.38		10.80	7.53		7.41
Protective Services	21.49	*	10.74	42.85	**	6.97	31.94	**	4.82
Public, Social, & Human Services	15.22		37.51	34.66		23.79	41.71	*	16.40
Trade & Industry	−1.72		11.45	8.08		7.43	6.11		5.09
# College credits in liberal arts									
English	16.94		10.37	5.53		6.46	2.31		4.39
Fine/Performing Arts	−23.21	**	7.70	−4.68		4.59	−3.24		3.10
Humanities	−1.22		11.92	−4.55		7.25	1.23		4.86
Interdisciplinary Studies	−21.30		34.02	−5.00		19.65	7.54		13.65
Math	18.91		11.35	2.26		7.11	−3.52		4.76
Science	−1.63		7.48	−2.08		4.52	−3.64		2.90

(continued)

Table E5. Coefficients from an ordinary least squares (OLS) regression of high, moderate, and low estimates of postschool earnings on student and school characteristics: Students in the 1996 Florida grade 9 cohort who reached grade 12 and attended college but did not complete a credential (and were not still enrolled) (continued)

	High estimate		Moderate estimate		Low estimate	
	β	S.E.	β	S.E.	β	S.E.
Social Studies	6.40	6.36	13.80 **	3.95	9.70 **	2.69
N	16,824		17,713		20,981	
R^2	0.19		0.38		0.49	

† Not applicable.
* $p < 0.05$, ** $p < 0.01$.
NOTE: All models include controls for student characteristics (gender, race, age, Free and Reduced-Price Lunch [FRL] status, Limited English Proficiency status, Students With Disabilities status); student performance (grade 9 GPA, grade 9 absentee rate, college cumulative GPA); school characteristics (percentage of students reaching grade 12, percentage of black students, percentage of Hispanic students, percentage of FRL students, school size); work experience (number of quarters of work experience in high school, number of quarters of postschool work experience, average earnings in high school, average earnings in college); and labor market characteristics (distribution of employees across industries in the local labor market, average monthly wages for all workers in the workforce).
SOURCE: Florida K-20 data warehouse.