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Does Concurrent Enrollment Improve College Access, Success, Time-To-Degree and Earnings?

A Quasi-Experimental Analysis of Colorado Students

REPORT HIGHLIGHTS:

This study shows Concurrent Enrollment to be highly effective in increasing college graduation for high school students in Colorado. The sample included students across different demographics and academic abilities. Compared to students who did not take college courses while in high school, students who took Concurrent Enrollment courses were more likely to:

- Attend college within one year following high school graduation;
- Earn a college degree on time or early; and
- Have higher workforce earnings after five years.

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Abstract

Colorado has set the [goal of reaching 66 percent](#) postsecondary educational attainment among adults age 25 to 34 by 2025, a target that would require an increase of [approximately 10 percentage points](#) over five years. Concurrent Enrollment refers to Colorado's statewide dual enrollment program created by House Bill 09-1319 and detailed in the Concurrent Enrollment Programs Act (C.R.S. §22-35-101 et seq.), where high school students earn credit for college-level courses. This study shows Concurrent Enrollment to be highly effective in increasing college graduation for high school students in Colorado. The sample includes students across different demographics and academic abilities. Compared to students who did not take college courses while in high school, students who took Concurrent Enrollment courses were more likely to: (1) attend college within one year following high school graduation, (2) earn a college degree on time or early, and (3) have higher workforce earnings after five years. Increasing awareness about the effectiveness of the Concurrent Enrollment program is important so that families make informed choices for high school students. Concurrent Enrollment can boost students' confidence in their ability to attend college, resulting in matriculation and completion. It can also reassure families that college can be more affordable with tuition-free Concurrent Enrollment courses reducing the cost and time it takes to earn a degree. Thus, Concurrent Enrollment has an important role to play in increasing the number of Coloradans that graduate from college as young adults.

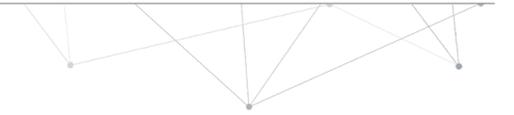


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Data Sources

The study uses data from four sources:

1. CDHE provided student-level Concurrent Enrollment course-taking information as well as matriculation and completion for in-state colleges and universities.
2. National Student Clearinghouse provided student-level matriculation and completion data for out-of-state colleges and universities.
3. Colorado Department of Education (CDE) provided student-level demographic and ninth grade achievement data. School-level data from CDE were used to identify comparison schools.
4. Colorado Department of Labor and Employment (CDLE) provided student-level quarterly earnings through their unemployment insurance data.

This work was made possible by integrating data from CDE, CDHE, and CDLE under CDHE's statutory authority from CRS 22-35-112 mandating the annual Concurrent Enrollment report, CRS 23-1-113 mandating the annual Postsecondary Progress and Success of High School Graduates report, and CRS 23-1-135 mandating the annual Return on Investment report.

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Introduction

Colorado has set the goal of 66 percent postsecondary educational attainment among adults age 25 to 34 by 2025, a target that would require an increase of [approximately 10 percentage points](#) over five years. The Colorado Commission on Higher Education issued *Colorado Rises*, the state's "[Master Plan](#)," which lays out four strategies that drive toward this goal: (1) Increase credential completion; (2) Erase equity gaps; (3) Improve student success, including timely completion through new practices; and (4) Invest in affordability, including encouraging models that reduce costs and time-to-degree. Additionally, the Colorado Department of Higher Education's (CDHE's) "[Roadmap to Containing College Costs and Making College Affordable](#)" highlights the ways for the state to advance affordability through institutional cost containment and innovative practices. This research informs Colorado's understanding of Concurrent Enrollment as a driver of efficiency in getting to on-time credential completion and improved earnings.

"Dual enrollment" refers to the broad array of programs available to high school students that allow them to take college-level courses for credit. Concurrent Enrollment refers to Colorado's statewide program created by House Bill 09-1319 and detailed in the Concurrent Enrollment Programs Act (C.R.S. §22-35-101 et seq.).

Launched in the 2009-2010 school year after passage of Colorado HB09-1319 and SB09-285, the Concurrent Enrollment Programs Act created Colorado's present program, defined as "the simultaneous enrollment of a qualified student in a local education provider and in one or more postsecondary courses, including academic or career and technical education courses, which may include course work related to apprenticeship programs or internship programs, at an institution of higher education." High school students who participate in Concurrent Enrollment may enroll tuition-free in postsecondary courses and earn college credits that are transferable to any Colorado public university.



Description of the Study

This project examined the following research question for all 11th graders in the study:

1. Is participation in Concurrent Enrollment related to college access, as measured by matriculation to college one year post expected date of high school graduation?

For 11th graders who matriculated to college within one year of expected high school graduation:

1. What is the impact of Concurrent Enrollment on earning a two-year degree within two years of expected high school graduation?
2. What is the impact of Concurrent Enrollment on earning a four-year degree within four years of expected high school graduation date? Within three years of expected high school graduation date?
3. What is the impact of Concurrent Enrollment on earnings five years after expected high school graduation date?

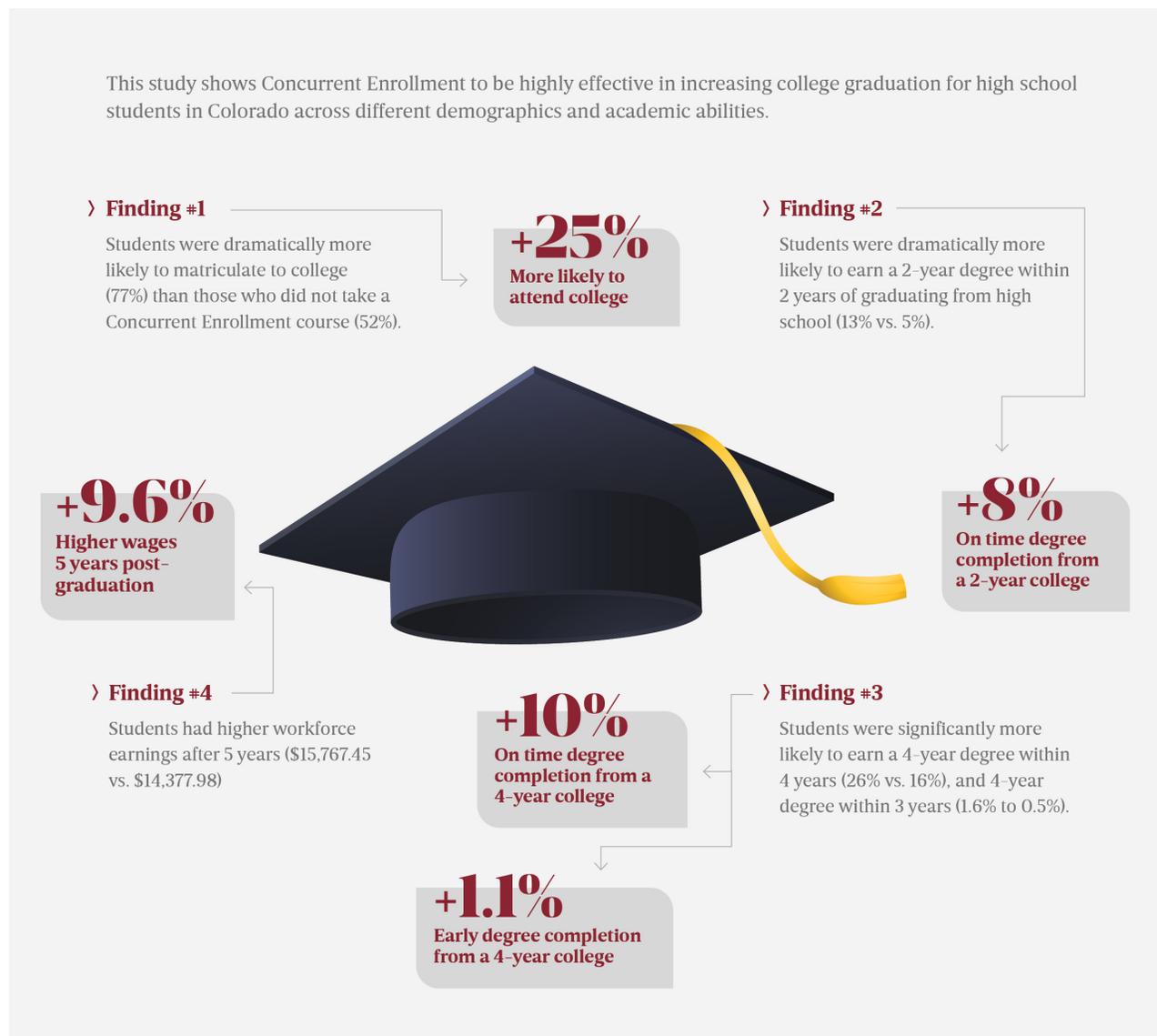


Additional analyses considered how results of each research question differed by race, income, gender, and achievement level.

The research questions were addressed by comparing the outcomes of high school students who took at least one Concurrent Enrollment course with those of students at different (but similar) schools who did not have the same opportunity to participate in the program.

Key Findings

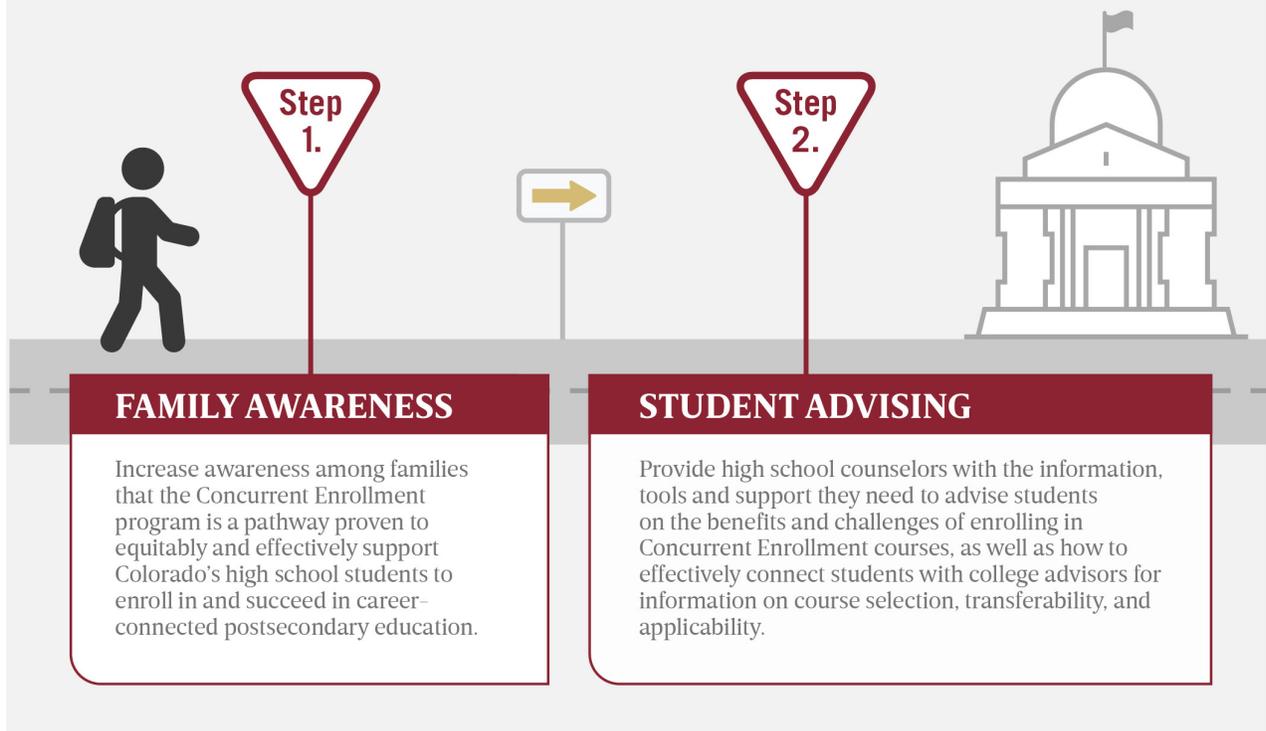
Concurrent Enrollment improved the odds of college entrance, success, and earnings by similar amounts regardless of student income, minority status, gender, or ninth grade reading test scores.





Implications

This study shows Concurrent Enrollment to be highly effective in increasing college graduation for high school students in Colorado across different demographics and academic abilities. Knowing the effectiveness of this approach in increasing educational attainment for Colorado students, two important steps can be taken by educators, administrators, policy leaders and allies to boost the number of students across the state that benefit from the Concurrent Enrollment program.



Increasing awareness about the effectiveness of the Concurrent Enrollment program can:

- Increase exposure to a program that may boost student confidence in their ability to attend college, resulting in more high school students taking Concurrent Enrollment courses, and subsequently attending college;
- Reassure families that college can be more affordable with tuition-free Concurrent Enrollment courses reducing the cost and time it takes to earn a degree; and
- Play an important role in increasing the number of Coloradans that graduate from college as young adults.



Methods

This section summarizes the methods used to conduct the present study. A full technical report can be located here: <https://coloradolab.org/wp-content/uploads/2020/09/Concurrent-Enrollment-Technical-Report.pdf>.

Design

This research was structured using a two-stage, quasi-experimental propensity score matching design. Students who attempted one or more Concurrent Enrollment courses (treatment group) were matched to students that did not participate in Concurrent Enrollment (business-as-usual comparison group).

The research design involved a two-stage matching process at both the school and student level to ensure findings more confidently reflected the causal impact of Concurrent Enrollment rather than pre-existing differences in the types of students who took Concurrent Enrollment.

First, schools that provided lots of Concurrent Enrollment opportunities for students were matched with schools providing few such opportunities. Treatment and comparison schools were crudely matched on three school-level variables: a) free and reduced lunch status (FRL), b) average ninth grade reading achievement, and c) college-going rates. In addition, rural high schools were only matched to other rural high schools.

Next, students who took Concurrent Enrollment classes at schools with lots of Concurrent Enrollment opportunities were matched with students who did not take Concurrent Enrollment classes at schools with few such opportunities. One-to-one, nearest neighbor propensity score matching without replacement was used to match students by cohort, FRL status, gender, ninth grade reading achievement, minority status, and English language learner status.

As a result of this process, treatment and comparison students were never drawn from the same school. By selecting comparison students from schools offering fewer dual enrollment opportunities, findings more confidently reflected the causal impact of Concurrent Enrollment rather than pre-existing differences in the types of students who took Concurrent Enrollment.

Overall, this two-stage matching process resulted in a comparison group that was very similar to the treatment group at both school and student levels. Baseline equivalence results are reported in the technical report.

Our state continues to be on the leading edge of research in ways to best support the success of our students. Higher rates of college going, degree completion and higher wage outcomes all showcase how Colorado's Concurrent Enrollment program provides students with a highly effective pathway to gain experience and college credit while in high school.

- Dr. Angie Paccione, Executive Director, Colorado Department of Higher Education



All analyses used multi-level models with students nested in the high school they attended in 11th grade and controlled for ninth grade reading achievement, FRL status, gender, minority status, and English language learner status. Students who attended an Early College High School during the period of the study, ASCENT students, and “Other dual” students (i.e., those taking a course outside of Concurrent Enrollment) were excluded from the study.

Cohorts and Samples

This longitudinal study followed five cohorts of 11th grade students who had an expected high school graduation date between 2010-2011 and 2014-2015. Students were followed for up to five years depending on their high school graduation date—through the fall of 2015 for academic outcomes and through 2018 for the earnings outcome.

Five cohorts were followed for up to five academic years depending on students’ expected high school graduation dates, and sample sizes were larger for outcomes with more years of available data.

Table 1 displays which outcomes were examined for each cohort of students. The sample size is larger for outcomes with more years of available data and therefore more cohorts included.

Table 1: Outcomes assessed by cohort

Cohort (Expected High School Graduation Year)	RQ1	RQ2	RQ3	RQ4	RQ5
	(n = 25,262) Matriculate to College within 1 YR of EHSG	(n = 4,206) 2 YR Degree in 2 YRs	(n = 4,687) 4 YR Degree in 4 Yrs	(n = 7,090) 4 YR Degree in 3 Yrs	(n = 8,866) Earnings within 5 years of EHSG
2011	✓	✓	✓	✓	✓
2012	✓	✓	✓	✓	✓
2013	✓	✓		✓	✓
2014	✓	✓			
2015	✓	✓			

Notes. EHSG – Expected high school graduation date. RQ – Research Question.

Postsecondary data encompass academic year (AY) 2011-12 through AY 2015- 2016. Earnings data encompass calendar year (CY) 2011 through CY 2018.

The sample size for each outcome also differed because the criteria for inclusion differed across each research question. For example, the matched sample measuring college matriculation included students across all five cohorts (n = 25,262 students from 172 high schools). Of the 25,262 students, 12,631 students from 86 high schools had participated in Concurrent Enrollment and 12,631 students from 86 schools did not take college classes in high school. “Matched Sample” refers to the analytic sample of students who met inclusion criteria for the research question and were retained in the sample after using propensity score matching at the student level to ensure Concurrent Enrollment students closely matched those who did not take college credits in high school in terms of their income level (FRL status) and ninth grade reading test scores.



For the college completion and earnings outcomes, matched samples were based on students who matriculated to college within one year of their expected high school graduation. For those who matriculated to college, the study examined the impact of Concurrent Enrollment on:

- **Earning a two-year degree within two years of expected high school graduation.** This matched sample included four cohorts of students who matriculated to college within one year of their expected high school graduation and had two years of postsecondary data available in the data set (n = 4,206 students).
- **Earning a four-year degree within four years of expected high school graduation.** This matched sample included two cohorts of students who matriculated to college within one year of their expected high school graduation and had four years of postsecondary data available in the data set (n = 4,687 students).
- **Earning a four-year degree within three years of expected high school graduation.** This matched sample included three cohorts of students who matriculated to college within one year of their expected high school graduation and had three years of postsecondary data available in the data set (n = 7,090 students).
- **Earnings five years after students' expected high school graduation date.** This matched sample included three cohorts of students who matriculated to high school within one year of their expected high school graduation and reported employment earnings within the state of Colorado five years after their high school graduation date (n = 8,866 students). To calculate earnings, data were summed for the fifth calendar year after a student's expected high school graduation date. For example, for students whose expected high school graduation date was May 2012, their earnings were summed for all of 2017.

Table 2 provides the characteristics of each matched sample in this study. The matched samples included students across different demographics and academic abilities.

Table 2: Average Matched Sample Characteristics

	RQ1: College Matriculation (n = 25,262)	RQ2: 2 Year Degree/2 Years (n = 4,206)	RQ3: 4 Year Degree/4 Years (n = 4,687)	RQ4: 4 Year Degree/3 Years (n = 7,090)	RQ5: Earnings 5 Years Post-HS (n = 8,866)
Minority	0.40	0.46	0.27	0.28	0.35
Free/Reduced Lunch	0.38	0.45	0.25	0.26	0.32
English Learner	0.05	0.05	0.01	0.02	0.03
Female	0.47	0.45	0.43	0.42	0.43
Test score percentile	60.0	48.2	75.1	75.1	66.6
+1 standard dev'n	89.7	77.3	93.9	93.9	90.7
-1 standard dev'n	27.3	22.6	45.8	45.8	35.6

Note. For indicator variables, the reported value represents the proportion of the sample reporting a one. Test score is Colorado's state-mandated ninth grade reading standardized test score. The data includes raw test scores which are used to calculate the mean and standard deviation. These are then converted to percentiles in the state distribution for ease of interpretation.



Matched students included in the analytic sample were broadly representative of students in Colorado high schools, representing a wide array of socioeconomic backgrounds and achievement levels. For example, students included in the matriculation sample:

- Scored on average at the 60th percentile in terms of ninth grade reading achievement. This is above the statewide median—the 50th percentile—but not dramatically so. And the majority of the sample scored, on average, between the 27th and 90th percentile in terms of ninth grade reading achievement, which reflects a sample of students across different academic abilities.
- Were slightly more likely to be male (47% female students in the matriculation sample vs. 49% statewide).
- Were unlikely to be English language learners (5% in the matriculation sample vs 14% statewide).
- Represented a large share of low income and minority students (40% in the matriculation sample vs. 44% statewide).

Conclusion

Colorado is leveraging Concurrent Enrollment as a key strategy to reach its ambitious attainment goals. This study affirms that, regardless of academic ability or demographics, Concurrent Enrollment is effective in increasing college graduation rates. Compared to students who do not take college courses while in high school, students who take Concurrent Enrollment courses are more likely to:

- Attend college within one year following high school graduation,
- Earn a college degree on time or early, and
- Have higher workforce earnings after five years.

By working together, school districts and institutions of higher education can ensure that high school counselors have the information they need to effectively advise students about Concurrent Enrollment. Schools can also grow enrollment in Concurrent Enrollment courses by proactively sharing news about its effectiveness with students and families.