Dual Enrollment in Arizona High Schools

Participation Rates and Effects on College-Going Patterns

February 2023







ASU • Helios Decision Center for Educational Excellence

Helios Education Foundation Board of Directors

Vince Roig, Founding Chairman Jane LaRocca Roig, Vice Chair Don Aripoli, Ph.D., Director Mark Fernandez, Director Tom Herndon, Director Chevy Humphrey, Director Paul J. Luna, President & CEO Vada O. Manager, Director Ioanna T. Morfessis, Ph.D., Director Larry Rice, Ed.D., Director Maria Sastre, Director Jim Swanson, Director Steven Wheeler, Director

Project Leads

Paul G. Perrault., Ph.D. Helios Education Foundation

Joseph O'Reilly, Ph.D. Arizona State University

Authors

Kimberly Lent Morales Helios Education Foundation

Eric Hedberg, Ph.D. Abt Associates

Momoko Rai Arizona State University

Rebecca McKay Arizona State University

Ian Hickox Collaborative Communications

About Helios Education Foundation

Helios Education Foundation exists to support postsecondary attainment for low-income and underrepresented communities in Arizona and Florida. Driven by our fundamental beliefs of Community, Equity, Investment, and Partnership, Helios has invested nearly \$300 million in partnerships and initiatives focused on improving education outcomes in the two states we serve.

We take a multi-pronged approach—working across four domains, including performance-based community investments, systemic public policy efforts, research and data, and impact-driven communications—that together support the significant changes required to foster equitable progress across the education continuum.

About ASU Helios Decision Center for Educational Excellence

The vision of ASU Helios Decision Center for Educational Excellence is to empower all Arizona students to maximize their potential, experience an excellent quality of life, and contribute to healthy and vibrant communities.

Acknowledgments

Helios Education Foundation is grateful to the Arizona Department of Education for its ongoing partnership and support of our research through data sharing and collaboration.

Dear Education Partner,

Equitable education systems provide all students with the array of supports and learning opportunities they need to be successful, both in K-12 and after high school.

Ensuring students have access to accelerated coursework—including Advanced Placement, International Baccalaureate, dual enrollment, or other types, like the Cambridge Curriculum is a powerful way for districts and states to increase postsecondary readiness, participation, and attainment.

Dual enrollment stands out in the way that it provides students with an immersive experience of what it is like to take postsecondary courses and what it takes to be successful in them. This experience has real benefits.

As the findings in this brief show, students who participate in dual enrollment are more than two times as likely to attend college when compared to their peers who do not participate in dual enrollment. They also have an increased likelihood of persisting in their postsecondary studies.

For Arizona, finding ways to increase participation in dual enrollment for student groups that have been historically underrepresented remains a significant challenge. There has been important growth in dual enrollment participation among students who are Black, Hispanic/Latino, and low-income, but students from these groups nonetheless participate at lower rates than their White and more affluent counterparts.

But it is a challenge we must accept. Dual enrollment offers clear benefits to those who participate and, given how it helps to increase rates of postsecondary readiness, represents an important strategy in our collective efforts to increase postsecondary attainment statewide.

Sincerely,



nice Rong

Vince Roig Founding Chairman



Paul J. Luna President & CEO



Introduction

States often address the imperative to cultivate a skilled, future-ready workforce through policies and programs designed to increase postsecondary readiness, participation, and attainment. Increased attainment provides clear benefits for the state and helps Arizonans thrive. Residents with higher levels of education have greater lifetime earnings, better health outcomes, and are more resilient to changes and disruptions in the economy, as the disparate outcomes during pandemic have so pointedly demonstrated.

Arizona's low postsecondary attainment rate means that the state—and many residents, as individuals are missing out on these benefits. Only 38.8 percent of working-age Arizonans have a two-year degree or higher, with attainment rates varying widely among racial/ethnic groups. Especially notable is the significant gap between the attainment rates for White and Hispanic/Latino residents; more than twice as many White Arizonans hold a postsecondary degree compared to Hispanic/Latino Arizonans.



*American Indian/Alaska Native

Efforts to increase postsecondary participation and attainment in Arizona must start before students even reach college. Students need quality early learning and K-12 pathways and supports that increase college readiness and prepare them to transition successfully from high school to college and then, eventually, into the workforce.

With this goal in mind, facilitating participation in accelerated coursework—including Advanced Placement (AP), International Baccalaureate (IB), and dual enrollment (dual enrollment) courses—is a bedrock strategy in many states. Such courses expose high school students to college–level curriculum before they receive their high school diploma. If students are successful in the accelerated courses, then they often have the opportunity to earn college credit which, in turn, can reduce eventual college tuition costs.

AP and IB classes rely on a credit-by-examination model to assess student achievement. Students must receive a satisfactory score, typically set by the postsecondary institution, to receive college credit. This means that student knowledge and the ability to translate the course to college credit relies on a single examination, typically at the end of the academic year.

Helios has previously studied the effect of AP course-taking on college-going behaviors of students in Arizona. In early 2021, we partnered with five school districts (Mesa Public Schools, Tempe Union High School District, Tucson Unified School District, Phoenix Union High School District, and Yuma Union High School District) to assess the impact of AP course-taking on college-going and persistence. That study found strong evidence of the positive effect of AP coursetaking on college-going rates but no effect on college persistence.

Unlike AP and IB, though, dual enrollment is the only accelerated option that fully immerses high school students in the traditional method of college course delivery, and the money invested in dual enrollment stays in Arizona. It is also an educational option that students commonly access. The most recent national data indicate that roughly one in three students took at least one dual enrollment course before completing high school.¹ Previous research has shown that dual enrollment students are more likely to attend college, have a higher college GPA, and complete a degree.² Additionally, dual enrollment has been demonstrated to help students balance school and life challenges once they get to college, as well as make better choices in their school and program of study selections.^{3,4}

Nationally, education institutions offer dual enrollment in various settings. Most students report participation in at least one dual enrollment course taught at their high school (80 percent); comparatively, only 17 percent report taking classes on a college campus and just eight percent of participants took an online dual enrollment course.⁵

> In 2020, 9,999 high school graduates (13.9%) in Arizona took a combination of AP and dual enrollment classes."

In Arizona, students primarily take dual enrollment courses in one of three ways: on their high school campuses with a dual enrollment-certified high school teacher, on their high school campuses taught by college faculty, or on a college campus with college faculty (also referred to as concurrent enrollment). In keeping with national patterns, most students in Arizona take dual enrollment courses on their high school campus with a certified high school teacher.

¹Shivji, A., & Wilson, S. (2019). Dual Enrollment: Participation and Characteristics. Data Point. NCES 2019–176. National Center for Education Statistics.

²An, B. P., & Taylor, J. L. (2019). A review of empirical studies on dual enrollment: Assessing educational outcomes. Higher education: Handbook of theory and research, 99–151.; An, B. P. (2013). The impact of dual enrollment on college degree attainment: Do low-SES students benefit?. Educational Evaluation and Policy Analysis, 35(1), 57–75.

³Bailey, T. R., Hughes, K. L., & Karp, M. M. (2002). What Role Can Dual Enrollment Programs Play in Easing the Transition between High School and Postsecondary Education?.

⁴There is a likely selection bias that readers should consider when interpreting the impact of dual enrollment on postsecondary outcomes. Students who self-select into accelerated courses are likely to be more academically inclined than their non-accelerated coursetaking peers. Of note, there is overlap within accelerated course taking. In 2020, 9,999 high school graduates (13.9%) in Arizona took a combination of AP and dual enrollment classes. ⁵Shivji & Wilson, 2019. Op cit.

About this Brief

Developed in coordination with the Arizona Department of Education, this brief examines the landscape of dual enrollment coursetaking through community colleges in Arizona from 2017 to 2020, as well as the relationship between dual enrollment course-taking and college access and success for high school graduates. More specifically, the brief focuses on the following questions:

- How many public-school graduates attempted dual enrollment courses in Arizona?
- 2. How does dual enrollment participation vary among student populations, specifically for Hispanic/Latino and low-income students?
- How does dual enrollment success (attaining a "C" or better) influence college-going?
- 4. How does dual enrollment success (attaining a "C" or better) influence college persistence?

Finally, the brief offers a set of recommendations—based on the findings—for policymakers to consider in the context of statewide efforts to increase postsecondary access, participation, and attainment.

Unless otherwise noted, all data included in the analysis were furnished by the Arizona Department of Education.



Dual Enrollment Course Taking

How Many Public-School Graduates Attempted Dual Enrollment Courses in Arizona?

Since 2017, the rate of dual enrollment course-taking in Arizona has steadily increased. In 2020, 17,504 (24.4 percent) of high school graduates in Arizona took at least one dual enrollment course and they were most likely to take an English and Math course (this is true across the 2017–2020 timeframe).



Percentage of Dual Enrollment Participants Enrolled in an English, Math, or Career and Technical Education Course, 2017-2020



How Does Dual Enrollment Participation Vary Among Student Populations, Specifically for Hispanic/Latino and Low-Income Students?

While the state has experienced an increase in dual enrollment course-taking, the degree of growth varies across student demographic groups. Notably, the most significant increases from 2017 to 2020 were among female, low-income, and White students.

The following charts show 2017-20 trends in dual enrollment participation by gender, income status, race/ethnicity, and school geographic area.⁶



⁶In addition to race/ethnicity, gender, and income status, Helios examined dual enrollment trends for high school graduates with an Individual Education Program (IEP) and without an IEP. While college–going and persistence results for these students are reported elsewhere in this brief, summary data are not included in this section due to small sample sizes and student privacy concerns.

⁷In addition to student characteristics, it is important to examine dual enrollment course-taking by school geographic area (city, suburb, or rural). Schools are categorized based on definitions established by the National Center for Education Statistics: <u>https://nces.ed.gov/surveys/annualreports/topical-studies/locale/definitions</u>



Dual Enrollment and Postsecondary Success

To assess the impact dual enrollment has on students' postsecondary outcomes, we performed a causal analysis comparing successful dual enrollment students (attaining a "C" or better) with non-dual enrollment students. In creating these comparison groups, dual enrollment students were matched with non-dual enrollment students on the following characteristics:

- Race
- Gender
- English language learner status
- IEP status
- Income status

- AP course-taking
- SAT test-taking
- ACT test-taking
- State achievement test-taking

This matching procedure made it possible to control for any impact of student characteristics and target the effect of dual enrollment on student postsecondary outcomes. For more details on the match and analysis procedures, see appendix.

In What Ways Does Dual Enrollment Success Influence College-Going for High School Graduates?

Our analyses found that dual enrollment students were more likely to go to college than their non-dual enrollment peers. These findings were true for all examined populations. This increased likelihood was greatest for students who are male, Hispanic/Latino, low-income, and special education students who have an IEP. Compared to their peers who did not participate successfully in dual enrollment, dual enrollment students in the class of:

- 2017 were 2.3 times more likely to attend college
- 2018 were 2.3 times more likely to attend college
- 2019 were 2.1 times more likely to attend college

Additionally, across the years, the type of dual enrollment course students took impacted their likelihood of going to college. For example, for the class of 2019, dual enrollment students who successfully took an English or Math course were more likely than their peers to attend college (2.4 times as likely and 2.2 times more likely, respectively). For full college-going analysis findings with effect sizes and confidence intervals, see appendix.



In What Ways Does Dual Enrollment Success Influence College Persistence for High School Graduates?

With respect to the impact of dual enrollment on persistence from year one to year two of college, the analysis found that the greatest effects were for male, Hispanic/Latino, non-low-income, and non-IEP dual enrollment students. Overall, the effects on persistence were not as strong as those for college enrollment.

For the graduation classes of 2017 and 2018, dual enrollment students were 1.2 times more likely to persist in college, and the class of 2019 was 1.2 times more likely than their non-dual enrollment peers. For full college persistence analysis findings with effect sizes and confidence intervals, see appendix.



Dual Enrollment Students' Likelihood of Persisting in College (Compared to Non-Dual Enrollment)







Call to Action

Building on prior research on the impact of dual enrollment and the results from this research, several recommendations emerged. While not exhaustive, these strategies can help practitioners and decisionmakers adapt current policies and practices to help all students benefit from dual enrollment. While these recommendations relate to our findings from these analyses on dual enrollment, they also apply to broader efforts for all students' postsecondary success. Our recommendations fall into three categories.

Equitable Access to Dual Enrollment

Dual enrollment plays an important role in the postsecondary success of Arizona students. However, access to dual enrollment coursework is not equitable across the state. In 2020, students in approximately 200 local education agencies did not participate in dual enrollment, likely due to inequitable access.

Barriers to access take many forms. These barriers may include the absence of a systematic policy to help students and their families pay for dual enrollment courses. For example, some districts have partnerships with local colleges to eliminate (or at least minimize) the cost of dual enrollment to students and families. Others require students and families to cover all tuition and fees associated with dual enrollment, making it challenging to afford for many.

Additionally, in Arizona there is no standardized way to determine eligibility for dual enrollment. Many institutions rely on college readiness exams—such as the PSAT, SAT, or ACT—or, alternatively, state accountability assessments, to determine eligibility. This lack of coordination among institutions may create confusion for some students, at a minimum, or a significant barrier to access for others (e.g., if they have not completed college readiness exams or cannot afford to do so). In recognition of this challenge, states across the nation have adopted alternative eligibility requirements for participation. For example, in Florida (Helios's other priority state), policymakers recently enacted legislation to allow alternative methods to assess dual enrollment readiness (e.g., performance in select end-of-course exams, GPA, or teacher recommendation).

Lastly, students can only take dual enrollment courses if there are certified teachers to offer such classes. To help meet the need for more certified educators, The Arizona Board of Regents' Arizona Teachers Academy program provides scholarships to support the attainment and maintenance of dual enrollment certification for high school teachers through partnerships with Northern Arizona University and Arizona State University. The state could increase its investment in this program to enable more high school teachers to become and remain certified. Additionally, the state can explore an incentive model—a common practice across the nation—to increase teacher and school interest.

Finally, to further expand access to dual enrollment, especially in rural communities, the state can also look to scale up existing models, such as the Arizona Student Opportunity Collaborative (AZSOC). AZSOC leverages a multi-institution partnership to combine resources and expand dual enrollment opportunities.



Targeted Advising for Priority Student Groups

Enrolling in dual enrollment courses can be difficult for students and families with limited understanding of or information about how dual enrollment works or the institutions involved. Providing targeted awareness efforts to families, especially for historically underrepresented populations (e.g., Hispanic/Latino, low-income, and first-generation students), helps students make better decisions about the accelerated coursework options available to them. To effectively do this, school counselors and teachers, both of whom who play a crucial influencer role, must receive training about dual enrollment, the course options available to students, and how to help students navigate the enrollment process.

Although most Arizona students take dual enrollment courses on their high school campus, a small subgroup takes dual enrollment on college campuses. In these cases, students are interacting with both the K–12 and postsecondary system. Given that postsecondary institutions have their own corps of college advisors, these advisors should coordinate with high school counselors to ensure consistent, reliable support for students and their families.

Integration of Dual Enrollment with Student-Centered K-20 Pathways

Across the country, a growing number of community colleges and states are implementing guided pathways to ensure students have a clear understanding of their degree requirements and remain on track toward completion. The postsecondary guided pathways framework has four pillars⁸:

- 1. Mapping pathways to student end goals
- 2. Helping students choose and enter a pathway
- 3. Ensuring students stay on their pathway
- 4. Ensuring students are learning and building necessary skills

Recently states have begun to explore extending this framework down into high school as a student-centered K-12 pathway. In such a model, systems may operate as if accelerated coursework—especially dual enrollment is the default pathway for all students. Students are provided with a clear, understandable K-20 map to see how college credit earned in high school will articulate to their postsecondary institution. Additionally, the guided pathways approach ensures high schoolers take the right dual enrollment courses at that right time. This includes taking courses that will satisfy core courses of their college degree requirements and that are necessary for the student's chosen degree.



⁸ American Association of Colleges and Universities. (n.d.) "Strengthening Guided Pathways and Career Success by Ensuring Students Are Learning."

APPENDIX: Methodology

To assess the potential impact of a program or intervention that was not randomly assigned, researchers must use quasiexperimental techniques that attempt to recover the properties of random assignment studies. The key characteristic of a randomized study that makes the estimated difference between treatment and comparison students so powerful is how randomization ensures that exposure to the program is uncorrelated with any other factor that may also influence the dependent variable. The typical property of the data in which this lack of correlation can be seen is the fact that the means and variances of other spurious factors are equal for the treatment and comparison students.

For example, dual enrollment programs in which students with higher achievement are more likely to participate will generally be associated with higher college matriculation rates. How much this impact is due to the dual enrollment program itself and how much is due simply to the higher levels of achievement can be difficult to disentangle, even with advanced covariance adjustment.⁹ Statisticians have developed several methodologies to render data in which the means and variances of observed spurious factors are equal for the treatment and comparison students.

For this brief, we employed coarsened exact matching¹⁰ utilized in the *MatchIt* package¹¹ for *R* (R Core Team 2021). In coarsened exact matching, several factors are entered into an algorithm—such as gender, race, socioeconomic status, and academic achievement—and matched groups are generated. For factors with relatively small numbers of categories, exact groups are formed. For other factors with numeric data, the algorithm works to find ranges of these values to convert the variables into categorical factors for further exact matching. In our analyses, several thousand small, matched groups were formed. Students were matched exactly across the following variables:

- Race
- Gender
- English learner status (ever during high school)
- Having an IEP during high school
- Free or reduced lunch status during high school
- Cohort year

- Taken any AP courses
- Taken the SAT (Math and English)
- Taken the ACT (Math and English)
- Taken the state achievement test (AIMS or AzMerit), Math and English
- If test scores were available for SAT, ACT, and state achievement tests, then students were matched via an algorithm on their English and Math scores on SAT, ACT, and proficiency levels (categories 1 through 4) on the state tests.

For our analyses, the CEM algorithm generated weights for each student to be incorporated into the analysis. Through the weights, the means and variances of students who did or did not take a dual enrollment course (and earned an A, B, or C grade) were rendered quite similar (the largest difference was less than one-twentieth of a percent of a standard deviation for any one covariate, 100 times smaller than the typical threshold of five percent for matched studies¹²). To achieve a robust level of matching, some dual enrollment students were excluded from the analysis, as were some comparison students.

Table A details the percent of the total student sample matched in this process. For the statewide tests, nearly all students who took any dual enrollment course were included in the analysis. They were matched, with weights, to nearly 90 percent of students who did not take any dual enrollment courses (and earned an A, B, or C).

- ⁹ Rubin, D. B. (2006). *Matched sampling for causal effects*. Cambridge University Press.
- ¹⁰ Iacus, S. M., King, G., & Porro, G. (2011). Multivariate matching methods that are monotonic imbalance bounding. Journal of the American Statistical Association, 106, 345–361.
- ¹¹ Stuart, Elizabeth A., Gary King, Kosuke Imai, and Daniel Ho. 2011. Matchlt: Nonparametric preprocessing for parametric causal inference. Journal of Statistical Software 42, no. 8.
- ¹² Stuart, E. A. (2010). Matching methods for causal inference: A review and a look forward. Statistical science: a review journal of the Institute of Mathematical Statistics, 25(1), 1.



The analysis model for overall main effects based on the matched data used a multi-level probit model where the chance of enrollment into any postsecondary program (transformed into standard units) is a function of a random intercept and fixed treatment effect

 Φ^{-1} (Pr(Y_{ii} =1))= β_{0i} + β_1 T_{ii},

where Φ^{-1} is the inverse cumulative normal distribution function, and

 $\beta_{0j} = \gamma_{00} + u_{0j}$

and

 $\beta_1 = \gamma_{10},$

which used the CEM weights. The model was fit with the *LME4* package in R.¹³

The effect size is γ_{10} which is the difference in the standard normal score of the chance of matriculation for the matched treatment group compared to the standard normal score of the chance of matriculation for the matched comparison group.

The presented matriculation rates are computed with the cumulative normal distribution function, where the rate for matched treatment students is $\Phi(\gamma_{00} + \gamma_{10})$ and the rate of the matched control students is $\Phi(\gamma_{00})$.

Models for subgroups included an indicator variable for the subgroup, where

X_{ij}={(1 "if student " *i* "was a member of group X 0 otherwise.

The model is then

$$\Phi^{-1} (\Pr(Y_{ij}=1)) = \beta_{0j} + \beta_1 T_{ij} + \beta_2 X_{ij} + \beta_3 T_{ij} X_{ij},$$

where

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

and the rest of the effects are fixed,

$\beta_p = \gamma_{p0}$.

The presented matriculation rates for members of each subgroup are computed with the cumulative normal distribution function, where the rate for matched treatment students is $\Phi(\gamma_{00} + \gamma_{10} + \gamma_{20} + \gamma_{30})$ and the rate of the matched control students of each subgroup is $\Phi(\gamma_{00} + \gamma_{20})$. The presented matriculation rates for students who are not members of each subgroup are computed as $\Phi(\gamma_{00} + \gamma_{10})$ and the rate of the matched control students who are not members of each subgroup is $\Phi(\gamma_{00})$.



¹³ Bates, D. M. (2010). Ime4: Mixed-effects modeling with R.

12 Dual Enrollment in Arizona - Participation Rates and Effects on College-Going Patterns

TABLE A	Sample Sizes and Percent Matched in the Analysis					
		N		Percent Matched		
Analysis	Total	Non-Takers	Takers	Total	Non-Takers	Takers
Any Dual Enrollment Course (2017 cohort)	99,846	85,652	14,194	91.2	89.8	99.7
Any Dual Enrollment Course (2018 cohort)	100,867	85,940	14,927	90.1	88.5	99.6
Any Dual Enrollment Course (2019 cohort)	102,107	86,464	15,643	90.6	89.0	99.5
English Subject Dual Enrollment Course (2017 cohort)	99,846	93,042	6,804	80.3	78.9	99.8
English Subject Dual Enrollment Course (2018 cohort)	100,867	93,617	7,250	73.9	71.9	99.6
English Subject Dual Enrollment Course (2019 cohort)	102,107	94,653	7,454	77.1	75.3	99.7
Mathematics Subject Dual Enrollment Course (2017 cohort)	99,846	93,791	6,055	73.8	72.1	99.7
Mathematics Subject Dual Enrollment Course (2018 cohort)	100,867	94,771	6,096	75.5	73.9	99.7
Mathematics Subject Dual Enrollment Course (2019 cohort)	102,107	95,533	6,574	76.5	74.9	99.5
Any Dual Enrollment Course; Students from Mesa Unified District (2017-2019 cohorts)	14,590	11,891	2,699	71.6	66.2	95.1
Any Dual Enrollment Course; Students from Phoenix Union High School District (2017– 2019 cohorts)	19,732	18,272	1,460	65.2	62.6	97.3
Any Dual Enrollment Course; Students from Tempe Union High School District (2017– 2019 cohorts)	10,495	6,953	3,542	75.0	65.4	93.7
Any Dual Enrollment Course; Students from Tucson Unified District (2017-2019 cohorts)	10,666	9,830	836	59.0	56.0	95.0
Any Dual Enrollment Course; Students from Yuma Union High School District (2017–2019 cohorts)	8,919	8,240	679	61.0	58.0	96.9

While our matching approach (or any matching approach) can balance the treatment and comparison samples on observed characteristics, we must acknowledge that this does not necessarily mean we have matched on all critical factors. For example, while our analysis matches on ability and background, we cannot match a student's inclination to attend a college. Thus, some of our impacts may represent the difference between two high achieving students of similar backgrounds, with some students taking dual enrollment courses because they wish to attend a college and the other students not taking dual enrollment courses simply because they do not plan to attend college.



TABLE B	Full Results from the College-Going Analysis					
Test	Population	Rate of comparison	Rate of treatment	Rate Ratio	Effect size (Probit Coef.)	SE (Effect size)
	All students	0.28	0.63	2.25	0.90	0.05
	Males	0.23	0.57	2.48	0.91	0.06
	Females	0.33	0.68	2.06	0.89	0.06
Impact of Any Dual Enrollment	Non-Hispanic	0.29	0.64	2.21	0.89	0.06
Course on Any Postsecondary	Hispanic	0.26	0.61	2.35	0.92	0.06
College Attendance (2017)	Low SES	0.24	0.58	2.42	0.90	0.06
	High SES	0.35	0.69	1.97	0.90	0.06
	No IEP	0.31	0.64	2.06	0.86	0.06
	IEP	0.12	0.49	4.08	1.17	0.07
	All students	0.26	0.60	2.31	0.89	0.05
	Males	0.22	0.54	2.45	0.88	0.06
	Females	0.32	0.66	2.06	0.88	0.06
Impact of Any Dual Enrollment	Non-Hispanic	0.28	0.62	2.21	0.87	0.06
Course on Any Postsecondary	Hispanic	0.24	0.59	2.46	0.93	0.06
College Attendance (2018)	Low SES	0.23	0.56	2.43	0.89	0.06
	High SES	0.33	0.68	2.06	0.90	0.06
	No IEP	0.29	0.63	2.17	0.87	0.06
	IEP	0.11	0.39	3.55	0.93	0.07
	All students	0.25	0.52	2.08	0.74	0.04
	Males	0.20	0.43	2.15	0.66	0.05
	Females	0.30	0.60	2.00	0.78	0.05
Impact of Any Dual Enrollment	Non-Hispanic	0.27	0.53	1.96	0.69	0.05
Course on Any Postsecondary	Hispanic	0.23	0.52	2.26	0.79	0.05
College Attendance (2019)	Low SES	0.21	0.48	2.29	0.74	0.05
	High SES	0.31	0.58	1.87	0.70	0.05
	No IEP	0.28	0.56	2.00	0.73	0.05
	IEP	0.10	0.28	2.80	0.72	0.06
	All students	0.33	0.81	2.45	1.33	0.06
	Males	0.28	0.79	2.82	1.39	0.07
	Females	0.38	0.84	2.21	1.28	0.07
Impact of English Dual Enrollment	Non-Hispanic	0.35	0.81	2.31	1.28	0.07
Course on Any Postsecondary	Hispanic	0.31	0.81	2.61	1.37	0.07
College Attendance (2017)	Low SES	0.29	0.80	2.76	1.39	0.07
	High SES	0.39	0.81	2.08	1.13	0.07
	No IEP	0.34	0.82	2.41	1.32	0.06
	IEP	0.18	0.71	3.94	1.44	0.12
	All students	0.35	0.82	2.34	1.31	0.06
	Males	0.30	0.78	2.60	1.29	0.07
	Females	0.39	0.85	2.18	1.33	0.07
Impact of English Dual enrollment	Non-Hispanic	0.37	0.85	2.30	1.36	0.07
Course on Any Postsecondary	Hispanic	0.32	0.78	2.44	1.24	0.07
College Attendance (2018)	Low SES	0.31	0.79	2.55	1.29	0.07
	High SES	0.39	0.85	2.18	1.31	0.07
	No IEP	0.36	0.82	2.28	1.28	0.06
	IEP	0.17	0.71	4.18	1.49	0.11

TABLE B	Full Results from the College-Going Analysis					
Test	Population	Rate of comparison	Rate of treatment	Rate Ratio	Effect size (Probit Coef.)	SE (Effect size)
	All students	0.30	0.72	2.40	1.09	0.06
	Males	0.25	0.68	2.72	1.15	0.07
	Females	0.36	0.75	2.08	1.04	0.07
Impact of English Dual Enrollment	Non-Hispanic	0.32	0.72	2.25	1.06	0.06
Course on Any Postsecondary	Hispanic	0.29	0.71	2.45	1.12	0.07
conege Attendance (2019)	Low SES	0.27	0.68	2.52	1.09	0.07
	High SES	0.37	0.76	2.05	1.02	0.07
	No IEP	0.32	0.73	2.28	1.08	0.06
	IEP	0.14	0.47	3.36	1.00	0.10
	All students	0.35	0.83	2.37	1.36	0.06
	Males	0.29	0.78	2.69	1.33	0.07
	Females	0.41	0.88	2.15	1.41	0.07
Impact of Mathematics Dual	Non-Hispanic	0.36	0.88	2.44	1.52	0.08
Postsecondary College	Hispanic	0.34	0.76	2.24	1.14	0.08
Attendance (2017)	Low SES	0.32	0.80	2.50	1.30	0.07
	High SES	0.39	0.88	2.26	1.44	0.08
	No IEP	0.36	0.83	2.31	1.30	0.07
	IEP	0.17	0.91	5.35	2.30	0.13
	All students	0.34	0.76	2.24	1.12	0.07
	Males	0.29	0.68	2.34	1.01	0.08
	Females	0.39	0.83	2.13	1.25	0.08
Impact of Mathematics Dual	Non-Hispanic	0.36	0.76	2.11	1.06	0.08
Enrollment Course on Any	Hispanic	0.32	0.77	2.41	1.20	0.08
Attendance (2018)	Low SES	0.31	0.73	2.35	1.13	0.08
	High SES	0.40	0.81	2.03	1.16	0.08
	No IEP	0.36	0.77	2.14	1.11	0.07
	IEP	0.17	0.61	3.59	1.24	0.10
	All students	0.31	0.68	2.19	0.97	0.06
	Males	0.25	0.59	2.36	0.89	0.07
	Females	0.37	0.76	2.05	1.04	0.08
Impact of Mathematics Dual	Non-Hispanic	0.33	0.65	1.97	0.83	0.07
Enrollment Course on Any	Hispanic	0.29	0.71	2.45	1.13	0.08
Attendance (2019)	Low SES	0.27	0.65	2.41	0.99	0.08
	High SES	0.36	0.68	1.89	0.84	0.08
	No IEP	0.32	0.68	2.13	0.94	0.07
	IEP	0.15	0.58	3.87	1.25	0.11
	All students	0.63	0.74	1.17	0.31	0.03
	Males	0.59	0.71	1.20	0.31	0.04
	Females	0.66	0.76	1.15	0.31	0.04
Impact of Any Dual Encollment	Non-Hispanic	0.65	0.74	1.14	0.26	0.04
Impact of Any Dual Enrollment Course on Postsecondary College	Hispanic	0.61	0.74	1.21	0.37	0.04
Persistence (2017)	Low SES	0.70	0.80	1.14	0.30	0.04
	High SES	0.58	0.70	1.21	0.33	0.04
	No IEP	0.47	0.62	1.32	0.39	0.07
	IEP	0.64	0.75	1.17	0.30	0.04

TABLE B	Full Results from the College-Going Analysis					
Test	Population	Rate of comparison	Rate of treatment	Rate Ratio	Effect size (Probit Coef.)	SE (Effect size)
	All students	0.63	0.74	1.17	0.31	0.03
	Males	0.58	0.69	1.19	0.30	0.04
	Females	0.66	0.77	1.17	0.32	0.03
Impact of Any Dual Enrollment	Non-Hispanic	0.65	0.74	1.14	0.27	0.04
Course on Postsecondary College	Hispanic	0.61	0.74	1.21	0.37	0.04
Persistence (2018)	Low SES	0.69	0.77	1.12	0.26	0.04
	High SES	0.58	0.72	1.24	0.37	0.04
	No IEP	0.48	0.58	1.21	0.25	0.06
	IEP	0.64	0.75	1.17	0.31	0.03
	All students	0.61	0.73	1.20	0.34	0.03
	Males	0.56	0.70	1.25	0.37	0.04
	Females	0.65	0.76	1.17	0.33	0.04
Impact of Any Dual Enrollment	Non-Hispanic	0.63	0.75	1.19	0.34	0.04
Course on Postsecondary College	Hispanic	0.58	0.71	1.22	0.36	0.04
Persistence (2019)	Low SES	0.68	0.78	1.15	0.31	0.04
	High SES	0.56	0.70	1.25	0.38	0.04
	No IEP	0.42	0.58	1.38	0.42	0.07
	IEP	0.62	0.74	1.19	0.34	0.03
	All students	0.66	0.81	1.23	0.46	0.04
	Males	0.62	0.79	1.27	0.50	0.05
	Females	0.68	0.81	1.19	0.42	0.05
Impact of English Dual Enrollment	Non-Hispanic	0.67	0.79	1.18	0.37	0.05
Course on Postsecondary College	Hispanic	0.63	0.82	1.30	0.58	0.06
Persistence (2017)	Low SES	0.72	0.85	1.18	0.44	0.05
	High SES	0.61	0.77	1.26	0.49	0.05
	No IEP	0.50	0.67	1.34	0.46	0.13
	IEP	0.66	0.81	1.23	0.45	0.05
	All students	0.65	0.80	1.23	0.45	0.04
	Males	0.60	0.76	1.27	0.46	0.05
	Females	0.69	0.83	1.20	0.44	0.05
Impact of English Dual Enrollmont	Non-Hispanic	0.67	0.79	1.18	0.38	0.04
Course on Postsecondary College	Hispanic	0.64	0.81	1.27	0.53	0.05
Persistence (2018)	Low SES	0.70	0.83	1.19	0.43	0.05
	High SES	0.61	0.77	1.26	0.47	0.05
	No IEP	0.51	0.67	1.31	0.42	0.12
	IEP	0.66	0.80	1.21	0.45	0.04
	All students	0.64	0.80	1.25	0.49	0.04
	Males	0.59	0.78	1.32	0.54	0.05
	Females	0.67	0.82	1.22	0.45	0.04
Impact of English Dual Enrollment	Non-Hispanic	0.66	0.81	1.23	0.47	0.05
Course on Postsecondary College	Hispanic	0.61	0.79	1.30	0.53	0.05
Persistence (2019)	Low SES	0.70	0.82	1.17	0.37	0.05
	High SES	0.59	0.80	1.36	0.62	0.05
	No IEP	0.47	0.79	1.68	0.89	0.14
	IEP	0.64	0.80	1.25	0.48	0.04

TABLE B	Full Results from the College-Going Analysis					
Test	Population	Rate of comparison	Rate of treatment	Rate Ratio	Effect size (Probit Coef.)	SE (Effect size)
	All students	0.67	0.82	1.22	0.49	0.04
	Males	0.63	0.80	1.27	0.50	0.05
	Females	0.69	0.84	1.22	0.49	0.05
Impact of Mathematics	Non-Hispanic	0.68	0.81	1.19	0.43	0.05
Dual Enrollment Course on Postsecondary College	Hispanic	0.65	0.84	1.29	0.60	0.06
Persistence (2017)	Low SES	0.72	0.85	1.18	0.44	0.05
	High SES	0.62	0.80	1.29	0.56	0.05
	No IEP	0.51	0.85	1.67	1.01	0.15
	IEP	0.67	0.82	1.22	0.48	0.05
	All students	0.65	0.81	1.25	0.50	0.04
	Males	0.60	0.77	1.28	0.50	0.05
	Females	0.69	0.84	1.22	0.50	0.05
Impact of Mathematics	Non-Hispanic	0.67	0.81	1.21	0.43	0.05
Dual Enrollment Course on Postsecondary College	Hispanic	0.63	0.83	1.32	0.60	0.06
Persistence (2018)	Low SES	0.70	0.82	1.17	0.36	0.05
	High SES	0.61	0.82	1.34	0.64	0.05
	No IEP	0.51	0.67	1.31	0.43	0.11
	IEP	0.66	0.82	1.24	0.50	0.05
	All students	0.65	0.82	1.26	0.54	0.04
Impact of Mathematics Dual Enrollment Course on Postsecondary College Persistence (2019)	Males	0.59	0.80	1.36	0.60	0.05
	Females	0.68	0.83	1.22	0.49	0.05
	Non-Hispanic	0.67	0.83	1.24	0.50	0.05
	Hispanic	0.62	0.81	1.31	0.59	0.05
	Low SES	0.71	0.84	1.18	0.44	0.05
	High SES	0.60	0.81	1.35	0.63	0.05
	No IEP	0.45	0.70	1.56	0.64	0.12
	IEP	0.65	0.82	1.26	0.53	0.04





www.helios.org

HELIOS EDUCATION CAMPUS 4747 N. 32nd Street Phoenix, AZ 85018 PH: 602-381-2260

TAMPA OFFICE 101 E. Kennedy Blvd., Suite 2050 Tampa, FL 33602 PH: 813-387-0221