



## The Impact of Dual Credit as a School District Policy on Secondary and Postsecondary Student Outcomes

Michael U. Villarreal, PhD

April 2018

### What We Studied

The surest path to the middle class in today's global economy comes from an education that goes beyond high school. In Texas, as in the nation, economic forecasts expect the number of jobs requiring a post-secondary credential to continue to increase, while the pool of jobs requiring at most a high school diploma will continue to decline. The challenge and promise of postsecondary education is greater in a large, fast-growing, diverse state like Texas where the fastest-growing segments of the population are economically disadvantaged and come from communities historically underserved by higher education institutions. Recognizing this reality, the Texas Higher Education Coordinating Board set a goal to raise the percent of 25- to 34-year-olds in Texas with a certificate or degree to 60 percent by 2030. In 2015, it was 41 percent. (Carnevale, 2013; Murdock et al, 2014; THECB, 2015).

To achieve this goal, a study of more than 3 million Texas high school students who entered 9th grade in 2001 to 2011 recommends an expansion of college credit offered within Texas high schools, through a model known as dual credit. Dual credit programs involve a collaboration between a school district and a college. They allow high school students to enroll in college-level courses and simultaneously earn college and high school credit. This study represents the largest and most comprehensive study of dual credit to date.

The study found that dual credit increases high school graduation, four-year college enrollment, and shortens the time to graduation for both two-year and four-year college students. The report recommends that state agencies work with institutions of higher education and school districts to (1) expand dual credit to every high school student; (2) raise the amount of dual credit earned per student to 30 semester credit hours (SCH); and (3) prioritize English and social science dual credit followed by math, science, foreign languages, and computer science dual credit to improve dual credit programs. It also recommends that the state pursue policies to overcome the current shortage of teachers who are qualified to teach dual credit and that community colleges faculty embrace their role as partners with faculty of high schools and four-year colleges in creating guided pathways from high school bachelor's degree programs.

The purpose of the study was to estimate the effects of dual credit on a broad set of student outcomes that trace a student's journey from high school to college graduation. A second purpose of the study was to investigate the potential for improving the design of dual-credit programs to strengthen their impact. To accomplish this second objective, the study examined dual-credit effect sizes by program attributes such as subject matter taught, the teacher's highest degree held, mode of instruction, and location of instruction.

In summary, an increase in a cohort's share of students earning at least one dual credit increases a high school cohort's rate of four-year college application, admission, and enrollment; timely degree completion; and an increase in associate and bachelor's degrees earned. Furthermore, high schools that increase the average dual credit earned up to 30 SCH improve student outcomes with each added credit. High schools can further amplify dual credit effects by prioritizing

certain English and social science dual credit followed by math, science, foreign languages, and computer science dual credit. Finally, in a comparison between dual credit and Advanced Placement (AP) courses, dual credit is the only one to improve the timely completion of degree programs and to produce profound increases in bachelor's degree completion rates with increases in average credit earned.

## How We Analyzed the Data

The study analyzed dual credit as a policy adopted and implemented at school district administrators. Its research design, therefore, operates at the school district level. Using school- district fixed effects regression analysis, it estimates the change in student outcomes of a given school caused by changes in dual-credit participation at the same school. Because each school district serves as its own control group, this approach controls for unchanging school district attributes such as location and type. It also controls for relatively stable attributes, such as the demographic and socioeconomic composition of the study body. Dual-credit effects presented below represent the marginal effect of a school increasing dual-credit participation in two ways: by breadth of participation measured by percent of a cohort who earned one or more dual credit; and by depth of participation measured by average number of dual credit earned of a cohort. All effect sizes given below are statistically significant at a 0.05 p-value threshold.

## What We Discovered

In 1995, the Texas legislature authorized institutions of higher education to offer dual credit in partnership with local school districts. As of 2014, Texas community colleges acted as the higher education sponsor in all but 5 percent of dual-credit programs. Dual credit participation has grown in Texas. By 2014, 72 percent of public high schools offered dual credit. Within dual-credit high schools, 27 percent of their students earned dual credit. Of these dual-credit students, the median number of dual credits earned doubled, from three SCH for the cohort that entered high school in fiscal year 2001 to six SCH for the cohort that entered high school in fiscal year 2011.

The study first estimated the effects of all high school students within a cohort earning one or more dual credit. The results affirm the consensus of existing research (Allen and Dadgar, 2012; An, 2013; Hughes, 2016; Giani et al, 2016; Karp et al, 2007; Speroni, 2011; Swanson, 2008). When the percent of students who earn at least one dual credit increases by 10 percentage points, the cohort's four-year high school graduation rate increases by 0.6 percentage points, up from 73 percent. Its percent of students applying to a four-year college while in high school increases by 0.1 percentage points, up from 26 percent. It's percent of students admitted to a private or public Texas four-year college while in high school increases by 1 percentage points, up from 22 percent. Its percent enrolling in a four-year college the year following high school increases by 0.8 percentage points, up from 20 percent. And, its percent enrolling in a community college the year following high school was positive by not statistically significant.

Dual credit also shortened the time to degree completion. When the percent of students who earn at least one dual credit increases by 10 percentage points, a cohort's share of students who complete an associate within two years after high school graduation increased by 0.2 percentage points, up from 0.8 percent—a growth rate of 25 percent. The share of students who earn a bachelor's degree within four, six, and eight years after high school graduation increases by 0.51, 0.56, and 0.63 percentage points, up from 7.0, 15.5, and 18.0 percent, respectively. These are growth rates of 7.0, 3.6, and 3.5 percent, respectively.

Dual credit appears to also produce positive effects on graduate degree completion. When the percent of students who earn one or more dual credit increased by 10 percentage points, a cohort's share of students who earn a graduate degree within eight years after high school graduation increased by 0.08 percentage points, up from 2.2 percent.

## **Is More Dual Credit Better?**

The study also investigated the effects of increasing the number of successfully completed dual-credit courses. It did this by estimating predicted outcomes when a cohort's average dual credit earned ranged from 0 to 30 SCH. It found that some outcomes peaked at a low dose of dual credit; while others increased with each increase of average dual credit earned as show in Figure 1 below.

A cohort's high school graduation plateaued at 77 percent when a cohort's average dual credit earned reached 6 SCH.

A cohort's share of students that apply to, are admitted to, and enroll in a four-year college all continuously increased and reached 43, 38, 39.5 percent, respectively, when average dual credit earned increased from 0 to 30 SCH.

Increased levels of dual credit shifted college enrollment from community colleges to four- year colleges. A cohort's share of students that enrolled in a community college the year following high school dropped from 31.2 percent to 16.8 percent when a cohort's average dual credit earned increased from 0 to 27 SCH. A cohort's share of students that enrolled in a four- year college the year following high school increased from 20.1 percent to 39.5 percent when a cohort's average dual credit earned increased from 0 to 30 SCH.

A cohort's share of students that earned an associate degree within two years from high school graduation continuously increased and reached 48 percent when average dual credit earned increased from 0 to 30 SCH.

A cohort's share of students that earned a bachelor's degree within four years from high school graduation continuously increased and reached 52 percent when average dual credit earned increased from 0 to 30 SCH. And, within six years from high school graduation, it continuously increased and reached 77 percent when average dual credit earned increased from 0 to 30 SCH.

A cohort's share of students that earned a graduate degree within eight years from high school graduation continuously increased and reached 5.1 percent when average dual credit earned increased from 0 to 12 SCH.

These results suggest that a blanket policy capping dual credit enrollment per student at less than 30 SCH would reduce rates of college enrollment and degree completion.

## **Dual Credit Effects Compared to Advanced Placement (AP)**

School leaders often question which type of early college coursework is most likely to help prepare students to succeed in college, dual credit or AP. The findings suggest that school leaders should provide a balance of both that includes more dual credit. While both improve four-year college enrollment and graduation rates, dual credit is the only college-prep curriculum to improve outcomes for community college students – Texas's largest share of college students.

Most notably, increased levels of dual credit earned produce a more profound impact on college graduation. A cohort's share of students that earned an associate's degree within two years from high school graduation reached 48 percent when average dual credit earned reached 30 SCH; while it only reached 1.1 percent when average AP credit earned reached 3 SCH. A cohort's expected share of students that earn a bachelor's degree within six years from high school graduation reached 77 percent when average dual credit earned reached 30 SCH; while it peaked at 19.4 percent when average AP credit earned reached 9 SCH.

## **Dual Credit Effects by Subject**

Not all dual credit courses are equally beneficial. English and social science dual credit produced the most pronounced effects, followed by math, science, foreign language and computer science dual credit.

## Conclusion

For Texas to increase college attainment of 25- to 34-year-olds to 60 percent by 2030, it needs to advance policies that support the creation of guided pathways that link high school students to their college and career goals. Evidence suggests dual credit is a type of guided pathway that can deliver this magnitude of change. The state should support high schools and colleges in aggressively expanding dual credit to all high school students, increasing the amount of dual credit earned per student, and prioritizing dual credit courses that produce the largest effects. Any policy capping dual credit enrollment at less than 30 SCH should be rejected.

For high school and college leaders, the findings suggest that they create dual-credit programs that are broad and deep in student participation. Programs should allow for no less than 30 SCH and prioritize English and social science dual credit, followed by math, science, foreign language and computer science dual credit.

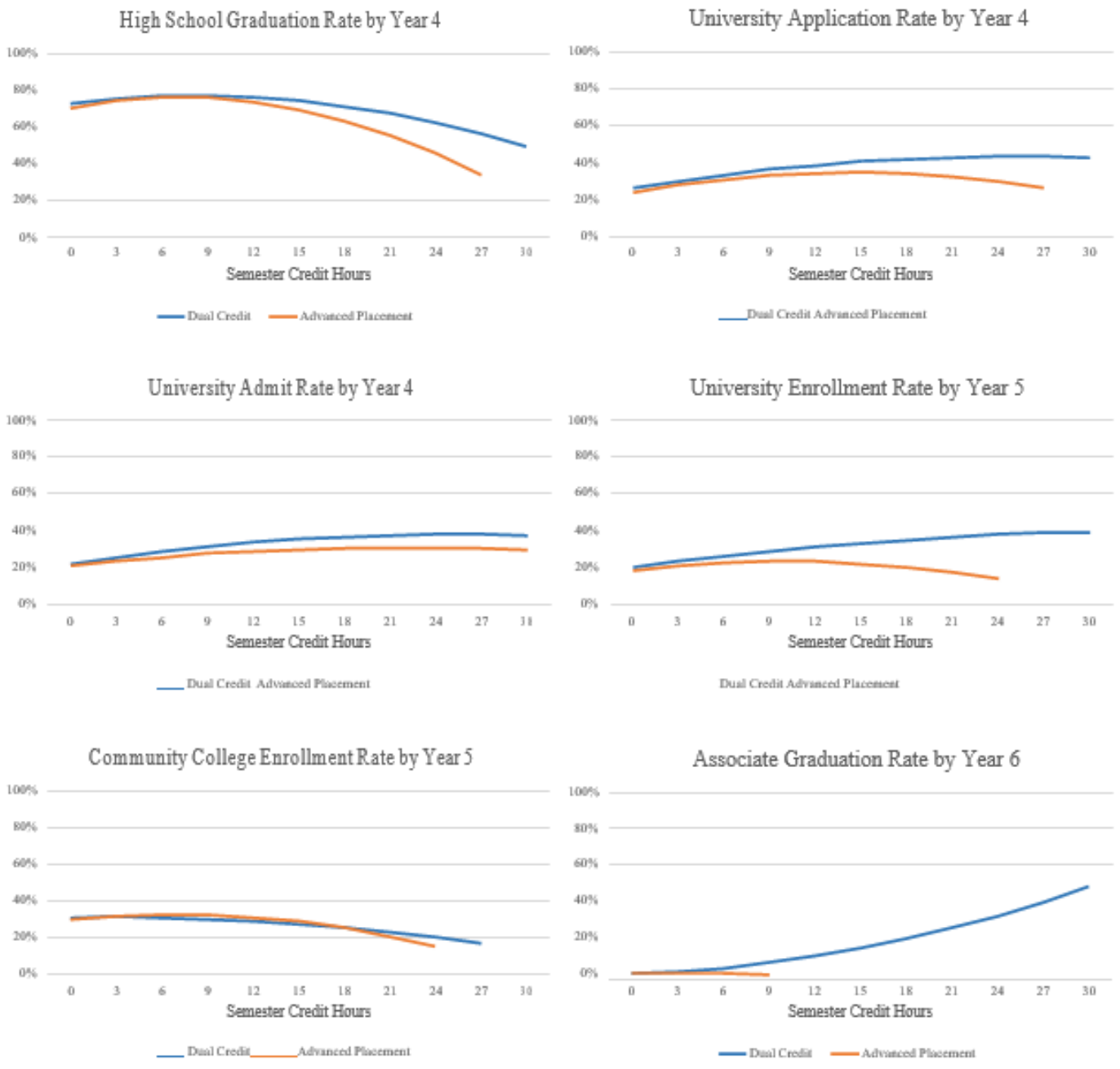
**Table 1.**  
**School-District Fixed Effects Regression Results Relating Changes in Dual Credit (DC) and Advanced Placement (AP) Participation to Student Outcomes**

Student Outcomes	DC	AP	Baseline	Obs	ISD's	Rho
	Coeff/(SE)	Coeff/(SE)	Estimate			
High School Grad Rate Year 4	0.066 (0.011)***	<b>0.123</b> (0.011)***	0.729 (0.164)	12,021	1,173	0.93
Univ App Rate Year 5	0.100 (0.014)***	<b>0.160</b> (0.015)***	0.260 (0.195)	12,021	1,173	0.90
Univ Admit Rate Year 5	0.096 (0.015)***	0.117 (0.013)***	0.221 (0.210)	12,021	1,173	0.89
Univ Enroll Rate Year 5	0.082 (0.010)***	0.079 (0.009)***	0.200 (0.146)	12,021	1,173	0.89
Comm College Enroll Rate Year 5	0.023 (0.012)*	<b>0.064</b> (0.011)***	0.309 (0.176)	12,021	1,173	0.90
Associates Grad Rate Year 6	<b>0.021</b> (0.004)***	-0.002 (0.004)	0.008 (0.049)	10,916	1,166	0.71
Associates Grad Rate Year 8	0.018 (0.005)***	0.005 (0.004)	0.033 (0.051)	8,708	1,140	0.81
Bachelor's Grad Rate Year 8	<b>0.051</b> (0.005)***	0.029 (0.004)***	0.070 (0.055)	8,708	1,140	0.84
Bachelor's Grad Rate Year 10	0.056 (0.009)***	<b>0.097</b> (0.009)***	0.155 (0.071)	6,535	1,122	0.88
Bachelor's Grad Rate Year 12	0.063 (0.014)***	<b>0.115</b> (0.012)***	0.180 (0.083)	4,344	1,115	0.90
Graduate Degree Grad Rate Year 12	0.008 (0.004)**	<b>0.024</b> (0.004)***	0.022 (0.021)	4,344	1,115	0.71
Graduate Degree Grad Rate Year 13	0.003 (0.004)	<b>0.029</b> (0.006)***	0.028 (0.022)	3,250	1,107	0.76

Note: The above results were produced by a school-district fixed effects regression model using school district-level panel data with probability weights that equal a district's average student population as a percent of the total average statewide population of students. ISD's represents the number of unique school districts. Obs represents total number of pooled observations. Standard errors were clustered by school district. Dual credit (DC) and Advanced Placement (AP) represent the percent of students earning at least one DC and AP credit per cohort per school district, respectively. Baseline estimates represent the average of expected outcomes when participation in dual credit is zero. For all models, the hypothesis that coefficients were jointly equal to zero could be rejected with a p-value less than 0.001. Bolded effects were statistically distinct from a majority of the other effect sizes based on a two-tailed t-test and a p-value of less than 0.05.

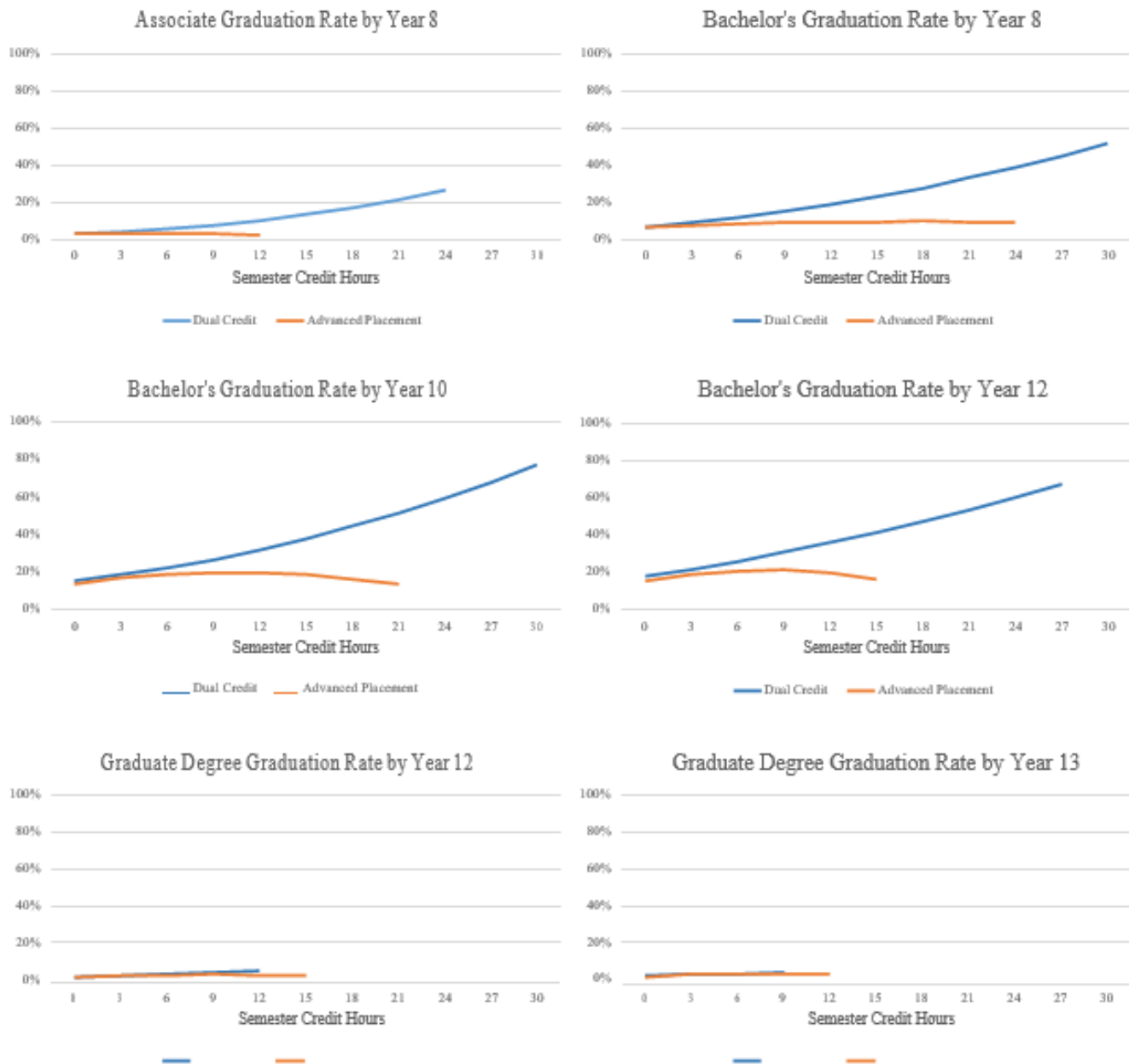
P-value thresholds were represented at the following levels: <.001 \*\*\*, <.05\*\*, <.1\*.

**Figure 1. Change in Student Outcomes by Increasing Levels of Average Credit Earned in Dual Credit, CTE Dual Credit, and AP (measured in semester credit hours)**



Note: Estimates are derived from a school district fixed effects regression model using school-district level panel data. Relationships are graphed if they are statistically significant based on a two-sided t-test with a p-value of less than 0.05.

**Figure 1 Continued. Change in Student Outcomes by Increasing Levels of Average Credit Earned in Dual Credit, CTE Dual Credit, and AP (measured in semester credit hours)**



Note: Estimates are derived from a school district fixed effects regression model using school-district level panel data. Relationships are graphed if they are statistically significant based on a two-sided t-test with a p-value of less than 0.05.

## References

- Allen, D., & Dadgar, M. (2012). *New Directions for Higher Education*, number 158. “Chapter 2. Does Dual Enrollment Increase Students’ Success in College? Evidence from a Quasi- Experimental Analysis of Dual Enrollment in New York City.” Wiley Periodicals.
- An, B. (2013). The Impact of Dual Enrollment on College Degree Attainment: Do Low-SES Students Benefit? *Educational Evaluation and Policy Analysis*, 35(1), pp. 57–75.
- Carnevale, A., Smith, N., & Strohl, J. (2013). *Recovery: Job Growth and Education Requirements through 2020*. Georgetown Public Policy Institute, Center on Education and the Workforce.
- Giani, M., Alexander, C., & Reyes, P. (2016). Exploring Variation in the Impact of Dual-Credit Coursework on Postsecondary Outcomes: A Quasi-Experimental Analysis of Texas Students. *The High School Journal*, 97(4), 200–218.
- Hughes, T. (2016). *Dissertation: The Impact of High School Dual Enrollment Participation on Bachelor’s Degree Attainment and Time and Cost to Degree*. Old Dominion University.
- Karp, M., Calcagno, J. C., Hughes, K., Jeong, D., & Bailey, T. (2008, February). *Dual Enrollment Students in Florida and New York City: Postsecondary Outcomes*. Community College Research Center.
- Murdock, S. (2014). *Changing Texas: Implications of Addressing or Ignoring the Texas Challenge*. Texas A&M University Press, College Station, Texas.
- Speroni, C. (2011). *Determinants of Students’ Success: The Role of Advancement and Dual Enrollment Programs*. National Center for Postsecondary Education. National Center for Postsecondary Research.
- Swanson, J. (2008). *Dissertation: An Analysis of the Impact of High School Dual Enrollment Course Participation on Post-secondary Academic Success, Persistence and Degree Completion*. The University of Iowa.
- Texas Higher Education Coordinating Board. (2015). *The Texas Higher Education Strategic Plan*.

---

The University of Texas at Austin ERC is a research center and P-20/Workforce Repository site which provides access to longitudinal, student-level data for scientific inquiry and policymaking purposes. Since its inception in 2008, the Texas ERC’s goal is to bridge the gap between theory and policy by providing a cooperative research environment for study by both scholars and policy makers. As part of its mission, the ERC works with researchers, practitioners, state and federal agencies, and other policymakers to help inform upon critical issues relating to education today.

The views expressed are those of the authors and should not be attributed to The University of Texas at Austin or any of the funders or supporting organizations mentioned herein including the State of Texas. Any errors are attributable to the authors.

---