



Dual-Credit Education Programs in Texas: Phase II

JULY 2018

Authors:

Trey Miller | Holly Kosiewicz | Courtney Tanenbaum | Drew Atchison
David Knight | Beth Ratway | Scott Delhommer | Jesse Levin

Contributors:

Maryan Carbuccia Abbott | Hana Gebremariam | Kendall Holley | Nicholas Kean
Rex Long | Salma Mohammed | Todd Nobles | Christine Pham | Joseph Shields

MAKING RESEARCH RELEVANT

Dual-Credit Education Programs in Texas

Phase II

JUNE 2018

Authors:

Trey Miller, American Institutes for Research
Holly Kosiewicz, Texas Higher Education Coordinating Board
Courtney Tanenbaum, American Institutes for Research
Drew Atchison, American Institutes for Research
David Knight, University of Texas at El Paso
Beth Ratway, American Institutes for Research
Scott Delhommer, University of Texas at Austin
Jesse Levin, American Institutes for Research

Contributors:

Maryan Carbuccia Abbott, American Institutes for Research
Hana Gebremariam, American Institutes for Research
Kendall Holley, American Institutes for Research
Nicholas Kean, American Institutes for Research
Rex Long, Gibson Consulting
Salma Mohammed, American Institutes for Research
Todd Nobles, American Institutes for Research
Christine Pham, Gibson Consulting
Joseph Shields, Gibson Consulting

This material is based upon work supported by the Texas Higher Education Foundation, the non-profit fundraising arm of the Texas Higher Education Coordinating Board (THECB). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the THECB.



AMERICAN INSTITUTES FOR RESEARCH®

1000 Thomas Jefferson Street NW
Washington, DC 20007-3835
202.403.5000

www.air.org

Copyright © 2018 American Institutes for Research. All rights reserved.

Contents

	Page
Executive Summary.....	1
Key Findings	2
Policy Recommendations.....	6
Introduction	7
About This Report	8
Overview of Dual-Credit Education in Texas	9
Defining Dual-Credit Education in Texas	10
Debates Around Dual-Credit Education in Texas.....	10
Summary of Phase I Findings	11
Overview of Phase II	12
Chapter 1: Quantitative Findings.....	19
Background and Policy Context	19
Organization of Chapter	20
Data.....	20
Approach to Questions 1 and 2	21
Racial Disparities.....	22
HB 505 Study.....	35
Changes in Dual-Credit Participation Since HB 505.....	36
Changes in Dual-Credit Context Since HB 505.....	39
Changes in Academic Preparation of Dual-Credit Participants	44
Changes in Dual-Credit Course Performance	47
Causal Impact Study.....	49
Limitations	65
Summary, Limitations, and Conclusions.....	67
Additional Analyses.....	69
Chapter 2. Dual-Credit Advising Practices and Models	71
Background and Policy Context	71
Data Collection and Analysis.....	73
Organization of Chapter	75

Findings.....	76
Students Targeted for Dual-Credit Education	76
Coordination of Advising Activities.....	86
Course-Taking Considerations	88
Advising Challenges	92
Suggestions to Improve Student Advising	95
Conclusions	99
Chapter 3. The Academic Rigor of Dual-Credit Courses	101
Organization of This Chapter	102
Research Design.....	102
Instructional Strategies.....	109
The Assessment of Student Learning and Performance	111
Assessment of Student Performance	113
Data Analysis.....	116
Limitations	117
Findings.....	117
Conclusion.....	125
Chapter 4: The Costs of Delivering Dual-Credit Education	127
Purpose	128
Cost Study Methodology	129
Cost of Providing Dual-Credit Courses in Texas.....	135
Funding for School Districts and Community Colleges.....	151
Benefits of Dual-Credit Course Taking.....	154
Chapter Conclusion.....	162
Chapter 5: Conclusion.....	164
Policy Recommendations.....	172
References	174
Appendix A. Data and Methods.....	180
Appendix B: Advising Data Collection Instruments	214
Appendix C. Advising Interview Sample	222
Appendix D. Advising Interview Codebook.....	225

Appendix E: Detailed Cost Descriptions for Traditional Dual-Credit Models by Community College.....	230
Costs for Community College A and Its District Partners	230
Costs for Community College B and Its District Partners	235
Costs for Community College C and Its District Partners	242
Costs for Community College D and Its District Partners	247
Costs for Community College E.....	251
Appendix F. English Language Arts Protocol.....	253
Appendix G. Mathematics Protocol.....	264

Tables

	Page
Table 1.1. Most Common Dual-Credit Courses for All Students (2012–17).....	39
Table 1.2. Most Common Dual-Credit Courses Before and After HB 505, by Grade (Percent of All DC SCH Represented by Course).....	41
Table 1.3. Mean Student Outcomes by Dual-Credit Participation (2001–16).....	51
Table 3.1. Total Amount of Participants for Each Course Type	103
Table 3.2. Instructor Materials Collected for Study.....	105
Table 3.3. Data Collected From Participants	105
Table 3.4. Mathematics and English Content Areas	107
Table 3.5. Mathematics and English Content Skills	108
Table 3.6. Novice-to-Expert Continuum (Conley, 2013).....	115
Table 3.7. Weighted Average of Instructor Reported Use of Class Time	122
Table 3.8. Weighted Average of Instructor Reported Use of Assessment Strategies	124
Table 3.9. Counts of Assignments by Grade and Rating on Novice-to-Expert Continuum	125
Table 4.1. Sample of Community Colleges	136
Table 4.2. Average dual-credit costs per semester credit hour to colleges, school districts, and students pre- and post-tuition across five colleges	138
Table 4.3. Average Costs for Different Cost Categories Applied for the Calculation of Statewide Costs.....	146
Table 4.4. Statewide Costs per SCH and Total Costs	147
Table 4.5. Average Costs per SCH According to Predominant Instructor Type.....	149
Table 4.6 Average Costs per SCH According to Predominant Instructor Type.....	151
Table 4.7. Effects of Dual-Credit Course Taking on Credits and Time to Degree	155

Table 4.8. Benefits Attributed to Dual-Credit Enrollment Resulting From Reduced Time to Degree	158
Table 4.9. Lifetime Benefits of a Two-Year Credential	160
Table A.1. Key Variables by Student and Course File	183
Table A.2. Definition of Outcomes.....	186
Table A.3. Summary Statistics.....	188
Table A.4. First Stage for Average Effects.....	191
Table A.5. Second Stage for Average Effects	192
Table A.6. First-Stage for Dosage Effects.....	197
Table A.7. Second Stage for Dosage Effects	198
Table A.8. Heterogeneous Effects of DC for Students Eligible and Ineligible for Free or Reduced-Price Lunch.....	202
Table A.9. Heterogeneous Effects of DC for Students by Eighth-Grade Test Scores	204
Table A.10. Heterogenous Effects of DC for Students by Race	206
Table A.11. Heterogeneous Effects of DC for Students by Eligibility for Free/Reduced Price Lunch and Eighth-Grade Reading Test Scores	209
Table A.12. Heterogeneous Effects of DC for Students by Eligibility for Free/Reduced Price Lunch and Eighth-Grade Math Test Scores.....	210
Table A.13. Determinants for Racial Disparities of DC Participation by Race	213
Table C1. IHE and High School Characteristics of the Interview Sample.....	222
Table E.1. Costs per semester credit hour for three school districts partnering with Community College A.....	235
Table E.2. Costs per Semester Credit Hour for Three School Districts Partnering With Community College B.....	242
Table E.3. Costs per Semester Credit Hour for Two School Districts Partnering With Community College C.....	247
Table E.4. Costs per Semester Credit Hour for Three School Districts Partnering With Community College D	251
Table E.5. Costs per Semester Credit Hour at the College Level for Community College D	252

Figures

	Page
Figure 1.1. Dual-Credit Participation Rates by Race/Ethnicity (2001–15).....	22
Figure 1.2. Dual-Credit Participation by Race/Ethnicity (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–16; $n = 3,422,095$).....	23

Figure 1.3. Dual-Credit Participation by Race/Ethnicity, Adjusting for Differences in Dual-Credit Access (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–16; <i>n</i> = 3,422,095)	25
Figure 1.4. Dual-Credit Participation by Race/Ethnicity, Adjusting for Differences in Eighth-Grade Achievement Test Scores (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–16; <i>n</i> = 3,422,095).....	26
Figure 1.5. Dual-Credit Participation by Race/Ethnicity, Adjusting for Differences in Free or Reduced-Price Lunch Eligibility (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–16; <i>n</i> = 3,422,095).....	28
Figure 1.6. Dual-Credit Participation by Race/Ethnicity, Adjusting for Differences in Access to AP and IB Courses (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–16; <i>n</i> = 3,422,095).....	29
Figure 1.7. Dual-Credit Participation by Race/Ethnicity, Adjusting for Differences in Where Students Attended High School (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–16; <i>n</i> = 3,422,095).....	31
Figure 1.8. Dual-Credit Participation by Race/Ethnicity, Adjusting for Differences in Dual-Credit Tuition and Fee Waivers (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2016; <i>n</i> = 311,383).....	33
Figure 1.9. Dual-Credit Participation by Race/Ethnicity, Adjusting for Differences in All Factors Considered Previously (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–16; <i>n</i> = 3,422,095).....	34
Figure 1.10. Dual-Credit Participation Rate Among All Texas Public High School Students (2012–17; <i>n</i> = 8,580,735).....	36
Figure 1.11. Dual-Credit Participation Among Texas Public High School Students by Grade (2012–17; <i>n</i> = 8,580,735).....	37
Figure 1.12. SCH of Dual Credit Taken Among Dual-Credit Participants by Grade (2012–17; <i>n</i> = 673,151)	38
Figure 1.13. Delivery of Dual-Credit Courses Among Dual-Credit Participants Before and After HB 505 (2012 –17; <i>n</i> = 1,868,920)	42
Figure 1.14. Type of Dual-Credit Courses Among Dual-Credit Participants (2012–17; <i>n</i> = 1,868,920)	43
Figure 1.15. Faculty Characteristics of Dual-Credit Courses at Two-Year Colleges (2012–17; <i>n</i> = 1,268,365)	44
Figure 1.16. Average Score on the Eighth-Grade Standardized State Assessment (TAKS and STAAR Examinations) Among Dual-Credit Participants (2012–17; <i>n</i> = 620,716)	45
Figure 1.17. Average Score on the Eighth-Grade Standardized State Assessment (TAKS and STAAR Examinations) Among Dual-Credit Participants by Grade (2012–17; <i>n</i> = 620,716)	46
Figure 1.18. Share of Dual-Credit Course Grades That Were As by Grade (2012–17; <i>n</i> = 1,868,920)	47

Figure 1.19. Distribution of Dual-Credit Course Grades in College Algebra (Math 1314/1414) (2012–17; $n = 87,853$)	48
Figure 1.20. Distribution of Dual-Credit Course Grades in English Composition I (English 1301) (2012–17; $n = 192,174$).....	49
Figure 1.21. Causal Impact of Dual-Credit Participation on High School Completion (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–16; $n = 3,411,286$)	53
Figure 1.22. Causal Impact of Dual-Credit Participation on College Enrollment (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–15; $n = 3,223,430$)	54
Figure 1.23. Causal Impact of Dual-Credit Participation on Two- Versus Four-Year College Enrollment (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–15; $n = 3,223,430$)	55
Figure 1.24. Causal Impact of Dual-Credit Participation on College Completion (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–08; $n = 1,542,629$)	57
Figure 1.25. Causal Impact of Dual-Credit Participation on Two- Versus Four-Year College Completion (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–13; $n = 2,754,765$)	58
Figure 1.26. Causal Impact of Dual-Credit Participation on SCH-to-Degree (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade Who Graduated From a Four-Year College: 2001–08; $n = 384,658$).....	59
Figure 1.27. Causal Impact of Dual-Credit Participation on Time-to-Degree (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade Who Graduated From a Four-Year College: 2001–08; $n = 375,715$).....	60
Figure 1.28. Causal Impact of Dual-Credit Participation on Key Outcomes by Race/Ethnicity (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–08; $n = 1,542,068$)	61
Figure 1.29. Causal Impact of Dual-Credit Participation on Key Outcomes by Free or Reduced-Price Lunch Eligibility (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–08; $n = 1,542,068$).....	63
Figure 1.30. Causal Impact of Dual-Credit Participation on Key Outcomes by Eighth-Grade Reading TAKS and STAAR Scores (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–08; $n = 1,542,068$).....	64
Figure 1.31. Causal Impact of Dual-Credit Participation on Key Outcomes by Eighth-Grade Mathematics TAKS and STAAR Scores (Student Cohorts of Juniors Enrolled in Dual-Credit Education in 11th and / or 12th Grade: 2001–08; $n = 1,542,068$)	65
Figure 4.1. Illustration of Sampling Plan for Cost Analysis	131

Executive Summary

This report presents findings and offers key takeaways from the second phase of a two-year study of dual-credit education programs in Texas. Phase II extends and expands research conducted by the RAND Corporation during Phase I and provides more in-depth analysis of dual-credit education programs, specifically: (1) the impact of dual-credit education programs on college access and college completion; (2) patterns in student participation and course grades in dual-credit education and delivery of dual-credit education programs before and after 2015 legislative efforts to expand access to dual-credit education; (3) factors contributing to racial disparities in dual-credit participation; (4) dual-credit advising practices; (5) similarities and differences in the academic rigor of dual-credit and college-credit only courses; and (6) the costs of delivering dual-credit education.

Analyses conducted for this report focus primarily, though not exclusively, on “traditional” dual credit education programs delivered by community colleges. By “traditional” dual credit education programs, we mean academic dual credit courses that are delivered through regular high schools (i.e. not Early College High Schools (ECHS)) that offer dual credit courses. The decision to focus on this type of model was based on evidence from Phase I showing that it was the predominant model to deliver dual credit education across the state. Moreover, a number of rigorous experimental studies of ECHS that include some Texas ECHS programs demonstrate the effectiveness of well-implemented ECHS programs for a wide range of students, including those who are traditionally underrepresented in postsecondary education. A consequence of this focus is that Phase II lends less insight into the effectiveness and the implementation of ECHS, career and technical (CTE) dual credit education, and dual credit education delivered by four-year institutions. We note throughout the report where analyses could not examine less common dual credit delivery models.

This report is organized as follows:

- **Chapter 1** examines the impact of dual-credit education programs on student success and efficient degree completion prior to the passage of House Bill (HB) 505 (2015). It also examines changes in student participation and course grades and in the delivery of dual-credit education programs before and after the passage of HB 505. Finally, this chapter examines the factors that contribute to racial and ethnic gaps in dual-credit education participation. All analysis draws on administrative records collected by the Texas Higher Education Coordinating Board (THECB) and the Texas Education Agency (TEA).

- **Chapter 2** investigates how high school students are advised relative to dual-credit education and through dual-credit courses, as well as how dual-credit education partners work together to provide advising services based on interviews with high school guidance counselors and college advisors.
- **Chapter 3** explores whether there are systematic differences in content, instructional strategies, student assignments, and grading practices between dual-credit and college-level courses by analyzing syllabi, assignments, graded student work products, and survey data from high school teachers and college faculty providing instruction in College Algebra (Math 1314/1414) and English Composition (Engl 1301).
- **Chapter 4** quantifies the costs of delivering dual-credit education; examines how these costs are shared among community colleges, school districts, and students and their families; and considers how the costs of delivering dual-credit education compare to state funding that school districts and community colleges receive for delivering dual-credit courses. The study also compares the costs of delivering dual-credit programs against the benefits that are reaped from them. The analysis employs the *Ingredients Approach* and draws on administrative records from THECB and TEA and interview data from secondary and postsecondary administrators.
- **Chapter 5** concludes with key findings from Phase II and describes the process that will be used to inform policy recommendations based on stakeholder feedback on this draft report.

Key Findings

The Impact of Dual-Credit Education Programs on Student Outcomes

- On average, participation in traditional dual-credit programs prior to the passage of HB 505 modestly improved a range of student outcomes, including college enrollment and completion.
 - This finding suggests that previous estimates of the impact of dual-credit programs on student outcomes, including the descriptive findings reported in Phase I, were probably too high because they were unable to fully account for all systematic differences (such as academic preparation, motivation, and other factors) in dual-credit participants and nonparticipants.

- The effect of participating in traditional dual-credit programs prior to HB 505 on student outcomes was more positive for traditionally advantaged student groups (e.g., White students); the effect was negative in some cases for less advantaged groups (e.g., low-income students).
 - The negative results for free and reduced price lunch eligible students were likely due to the fact that free and reduced price lunch eligible students were more likely than ineligible participants to have lower 8th grade standardized test scores that hindered their success in dual credit education courses. In particular, we found that the impact of dual credit education for free and reduced price lunch eligible students with 8th grade standardized tests scores that were one standard deviation above the mean was positive for all postsecondary outcomes, while the impact for those with average standardized test scores was largely negative.

Participation, Outcome, and Delivery Patterns Before and After Passage of HB 505

- Overall, the percentage of students participating in dual-credit programs modestly increased after passage of HB 505.
 - Growth in dual-credit participation after HB 505 was higher among ninth and 10th graders. Starting from a low base, the dual-credit participation rate more than doubled (from 1.0% to 2.1%) among ninth graders and increased by 60% (from 2.7% to 4.3%) among 10th graders.
- The academic preparation of ninth- and 10th-grade dual-credit participants declined after the passage of HB 505, while dual-credit pass rates increased for those groups. This suggests that the academic rigor of dual-credit courses may have declined for ninth and 10th graders since HB 505.

Factors Contributing to Racial and Ethnic Gaps in Dual Credit Education Participation

- Differences in observable student factors account for most, but not all, of the difference in dual-credit participation across race and ethnicity.
 - For example, the black dual credit participation rate was 10.6%, while that of white students was 24.7%. Our analysis indicated that if blacks had the same characteristics as the average white student, then their participation rate would be 22.7%, which is quite close to the 24.7% for white students. We found similar patterns for Hispanic students.

- Differences in academic preparation, family income, and the type of high school that a student attended served as the most significant contributors to disparities in dual-credit participation by race and ethnicity.
 - Differences in access to dual-credit programs, access to Advanced Placement and International Baccalaureate (AP / IB) coursework, and access to tuition and fee waivers explained little of the gap in dual-credit participation by race and ethnicity.

Dual Credit Education Advising Practices

- The extent to which high school counselors and college advisors actively encouraged students to participate in dual-credit education varied based on several factors, including state and district policies and school philosophies about which students could benefit from and succeed in dual-credit courses.
- Most high school guidance counselors played the primary role in advising dual-credit students, with one quarter sharing this responsibility with college advisors.
 - College advisors typically played a secondary role, serving as the key point of contact for high school counselors and sharing information about dual credit with prospective students and their families, except in special circumstances.
- High school students' academic and emotional readiness to participate in dual-credit education, the latitude given to students in dual-credit course selection, and the limited time advisors had to fulfill their dual-credit advising responsibilities were reported as major challenges to adequate advising.
- To improve dual-credit advising, high school counselors and college advisors most commonly sought greater clarity on credit-transfer policies, dedicated and well-trained dual-credit staff, and early advising.

The Academic Rigor of Dual-Credit Education Courses

- In the limited sample of College Algebra (Math 1314/1414) and English Composition (English 1301) courses we examined, we identified more similarities than differences in dual-credit courses taught by high school teachers (HSDC), dual-credit courses taught by college faculty (DC), and college-credit only courses taught by college faculty (CC).
 - No discernable differences existed in the content covered, the level of cognitive complexity demanded by student assignments, and the way in which instructors graded student work across HSDC, DC, and CC courses.

- The skills students were required to master varied slightly by instructor type.
 - HSDC, DC, and CC instructors required students to master similar skills in ENGL 1301.
 - Math 1314/1414 CC instructors required students to master general mathematics skills and more so than their HSDC and DC counterparts.
- Instructors across HSDC, CC, and DC courses reported using different instructional strategies to teach students college-level material.
 - HSDC and DC instructors were more likely to report using computers as instructional tools.
 - CC instructors were more likely to report requiring students to work more on their own, summarizing and analyzing information from a variety of sources, and using whole-group discussion.

The Costs of Delivering Dual-Credit Education

- In 2016–17, we estimate that the overall cost of providing dual-credit instruction was \$111 per semester credit hour for each participating student, or \$121.7 million statewide.
 - The incremental revenue generated consisted primarily of funding based upon semester credit hours (SCHs) and averaged just \$38 per SCH.
- Tuition and fees arrangements varied widely across the state and had significant effects on the distribution of costs.
- The strongest predictor of overall costs and how costs were distributed across stakeholders was the type of instructor—HSDC, DC, or CC—teaching the course.
- Our estimates suggest that the costs of dual credit delivered through ECHSs was greater overall but was similar on a per-semester credit hour basis as traditional dual credit programs.
- Overall, our estimates suggest that, on average, the benefits of dual-credit education far exceeded the costs.
 - The short-term benefits (e.g., lower state expenditures for higher education) related to reduced time to degree were 1.18 times the cost of dual credit. In other words, each dollar invested in dual credit returned \$1.18 from students spending less time in college and entering the workforce earlier. Long-term monetary benefits (e.g., tax revenues) associated with a greater number of college graduates were almost five times the estimated cost of dual credit.

Policy Recommendations

In this draft report for public comment, we do not make recommendations to develop or reform current statutes or policies that govern the delivery of dual-credit education. We recognize that deciding how policy and practice should change based on our research is a nuanced and complicated process that requires input from stakeholders representing various perspectives and opinions. Although we have engaged stakeholders in this research on an informal basis (e.g., meetings with THECB leadership, a webinar for dual-credit administrators and faculty), we are using a public comment period to more formally gather feedback on this draft report and the presented findings. The feedback we receive will play a vital role in shaping how we translate the study's findings into recommendations to reform policy and practice.

Formal Feedback Process

This draft report was released for public comment at the THECB Board Meeting on July 26, 2018. The research team also will host a webinar for interested stakeholders in early August and will present detailed findings at the Texas Association of Community Colleges (TACC) annual conference in Corpus Christi, Texas, on August 2, 2018. The American Institutes for Research (AIR), which drafted this report, welcomes comments and suggestions to help contextualize the findings and develop practical policy recommendations grounded in the research that is presented in this report and elsewhere. The public comment period will be open through August 27, 2018.

The research team will host a second webinar in late September 2018 to summarize the comments and suggestions we received through the public comment period. At this time, we also will share a draft set of policy recommendations that are grounded in the research and informed by the feedback received through the public comment period. Interested stakeholders will have the opportunity to submit feedback on the draft recommendations through October 9, 2018. The research team will then revise its recommendations based on feedback received and will present a final report at the October 25, 2018, THECB Board Meeting.

Introduction

Increasing enrollment and graduation rates in higher education, particularly among historically underserved students, represents an enduring challenge among educators and policymakers. Although evidence shows that college has become more accessible to low-income students and students of color over time, the college enrollment rate for these students has not grown at a rate comparable to that of traditionally more advantaged students (Perna, 2006). This widening gap has led to an overwhelming consensus among policymakers, practitioners, and researchers that not enough improvement has been made relative to college enrollment among disadvantaged students (Perna, 2006). What is even more troubling is that the overall U.S. college enrollment rate has recently declined (National Student Clearinghouse Research Center, 2017), and racial and ethnic disparities in college completion are widening (Pfeffer, 2018), despite efforts to make college more affordable and more responsive to student needs. While some states, like Texas, have managed to increase college enrollment and completion among students who are less likely to enroll in college (e.g., low-income students), the continuing increase in the number of poorer-resourced residents has highlighted a need to develop specific interventions to help future students pursue and finish higher education.

Identifying and scaling what works to guide more traditionally underrepresented students to and through college has been problematic for policymakers. One theory of why interventions have failed to achieve expectations cites a lack of coherence between secondary and postsecondary education systems (Kirst & Venezia, 2004). Indeed, numerous scholars have identified the misalignment of academic standards, curricula, assessment, pedagogy, and expectations between high schools and colleges and universities as putting students at risk of failing to succeed in college (Carnevale & Desrochers, 2002; Goldrick-Rab, 2010; Harvey & Houseman, 2004). Low-income students and students of color are disproportionately affected because they have fewer resources to draw upon to address this disparity (Dounay, 2008).

Dual-credit education is one alternative to business-as-usual practice that has the potential to integrate secondary and postsecondary sectors, widen college opportunities, and boost college completion as a result. Dual-credit education programs, which are jointly delivered by high schools and postsecondary education institutions, concomitantly award high school and college credit to high school students who enroll in college-level coursework (Bragg & Kim, 2005).

While originally developed to provide academically challenging content to high-achieving students, dual-credit education programs across the United States now enroll high school students with varying degrees of academic preparation and exposure to college and with an

array of postsecondary education goals and expectations. In 2013, the U.S. Department of Education reported that four of five U.S. high schools offered at least one dual-credit course (Thomas, Marken, Gray, & Lewis, 2013), illustrating that access to this intervention has become widespread across U.S. secondary schools. Bailey, Hughes, and Karp (2002) contend that the strong link between rigorous academic coursework and success in higher education has served as an impetus for enrolling mid-range and lower achieving students in dual-credit coursework.

About This Report

This report presents findings and offers key takeaways from the second phase of a two year study on dual-credit education programs in Texas. Phase II extends research conducted by the RAND Corporation (RAND) in Phase I that, during the 86th Texas Legislature, Regular Session (2017), provided Texas policymakers and practitioners with an initial appraisal of the effectiveness and implementation of dual-credit education programs.

Phase II conducts a more in-depth analysis of dual-credit education programs than Phase I, specifically investigating core issues at the heart of current debates about dual-credit education in Texas, a state that has rapidly scaled dual-credit education programs. This report builds on the Phase I study findings to provide Texas decision makers greater insight into questions about (1) the impact of dual-credit education programs on college access and college completion; (2) the quality of advising and the rigor of academic content, instructional strategies, and assessment practices; (3) the costs of delivering dual-credit education; (4) factors that contribute to racial disparities in dual-credit participation; and (5) changes in patterns of student participation in dual-credit education, the outcomes of dual-credit students, and the delivery of dual-credit coursework after the passage of legislative efforts to expand access to dual-credit education programs. The focus of this study is on “traditional: academic dual credit education delivered by community colleges. Consequently, results from Phase II lend less insight into the effectiveness and the implementation of Early College High Schools (ECHS), career and technical dual credit education, and dual credit education delivered by four-year universities and colleges. Findings developed during Phases I and II of this study provide Texas policymakers and stakeholders a more informed understanding of dual-credit education and will offer an evidence-based roadmap to guide reform intended to improve the effectiveness and cost-efficiency of dual-credit programs after the public comment period.

In the narrative that follows, we provide a brief overview of the dual-credit education landscape in Texas and describe Texas’ definition of dual-credit. We also identify the issues at the core of the current debate surrounding dual-credit education in the state. We then

summarize findings from Phase I research conducted by Miller and colleagues (2017) and describe the research conducted for Phase II. Chapters 2 through 4 present the findings from Phase II, and the report concludes with a synthesis of findings from both phases.

Overview of Dual-Credit Education in Texas

Since 2000, Texas has witnessed an unprecedented increase in the number of high school students enrolling in dual-credit education programs and in the number of public higher education institutions (HEIs) delivering dual-credit education in partnership with public high schools. Between 2000 and 2016, the count of high school students taking at least one dual-credit course rose from approximately 18,524 to 204,286, an increase of more than 1,100%. During the same period, the number of HEIs delivering dual-credit education increased from 52 to 108. At present, 79 community colleges (99%), 29 universities (59%), and 1,650 high schools (93%) provide dual-credit education in Texas.

Two major factors explain why dual-credit education has scaled so quickly in Texas:

- Since 1995, Texas has enacted legislation that has made it easier for students to participate in dual-credit courses and for HEIs to offer dual-credit education programs. The architects of these laws not only created explicit funding streams for the delivery of dual-credit courses but also required high schools to offer students the opportunity to take at least 12 hours of advanced coursework that may include dual-credit courses. In 2015, the legislature took an additional step to broaden access by passing HB 505, a bill that prohibits THECB from limiting dual-credit participation exclusively to high school juniors and seniors and from limiting the number of dual-credit courses a student can take while enrolled in high school. Nevertheless, HEIs and school districts still can implement these restrictions if they wish to do so. Based on data from fiscal year 2017, roughly half (1,545) of institutional partnerships delivered dual-credit education to ninth- and 10th-grade students.¹
- Higher education institutions, particularly community colleges, have taken advantage of new laws expanding access to college-level coursework. Many institutions promote dual-credit education as a promising strategy to increase college access and completion rates. Advocates have drawn on existing research to successfully argue that dual-credit education addresses many barriers that prevent students from accessing and

¹ It is important to note that this statistic does not reveal the amount of dual credit education delivered to ninth- and 10th-grade students. For more information about dual-credit dosage, please refer to Technical Appendix A.

succeeding in college. They argue that dual-credit education exposes students to the academic and behavioral demands of college, offers an opportunity to align curricula and content standards across secondary and postsecondary education by increasing communication and collaboration between the two sectors, and saves students time and money relative to degree attainment (Bailey et al., 2002; Edwards & Hughes, 2011; Hoover & Vargas, 2016).

Defining Dual-Credit Education in Texas

THECB defines dual-credit education as “a process by which a high school student enrolls in a college course and receives simultaneous academic credit for the course from both the college and the high school” (Texas Administrative Code [TAC], Title 19, Part I, Chapter 4, Subchapter D, Rule 4.83). This definition includes the different ways in which dual-credit education is implemented in practice. For example, we know from the Phase I study that HEIs delivered dual-credit education programs on high school and college campuses, using high school teachers and college faculty, and through face-to-face and online instruction, among other approaches. In Texas, institutions also administer dual-credit education programs in ECHS, which, according to the TEA, are secondary institutions that offer dual-credit courses that can lead to either an associate degree or at least 60 semester credit hours toward a baccalaureate degree for ninth-, 10th-, 11th-, and 12th-grade students at risk of dropping out of high school. To be considered enrolled in a dual-credit education program, dual-credit partners (i.e., the high school and the HEI) must confer *both* high school and college credit for performance in a dual-credit course. Partnerships that award either high school or college credit (but not both) for college-level coursework are not defined as dual-credit programs according to Texas law.

Debates Around Dual-Credit Education in Texas

Texas policymakers and practitioners have begun to express reservations about whether dual-credit education can deliver on its promise to narrow gaps in college enrollment and completion. Chief among these concerns is the long-held assumption that dual-credit courses are not as academically rigorous as college-credit only courses. Some dispute the notion that dual-credit instructors can or will teach courses at a level of rigor equal to that of college-level courses, given that they face enormous pressure to graduate high school students in order to meet accountability mandates.

In addition, some concerned stakeholders question whether all high school students are academically and emotionally prepared to meet the performance criteria of college-level

courses; and many have questioned how dual-credit partners select students to participate in dual-credit education programs, how they advise students regarding academic and career and technical dual-credit courses, and the extent to which high school students benefit academically from such educational programming. Because Texas does not have a uniform model to fully fund the implementation of dual-credit education programs, lawmakers also seek basic knowledge about who bears the costs of delivering dual-credit education and the extent to which stakeholders are being adequately compensated for their investment.

Summary of Phase I Findings

In July 2017, RAND published findings from Phase I of this study in an interim report on dual-credit education programs in Texas. For that report, Miller and colleagues (2017) conducted descriptive quantitative and qualitative analyses examining four focal areas of dual-credit education of interest to dual-credit stakeholders. Those areas of focus included: (1) academic achievement and degree attainment of dual-credit students versus nondual-credit students, (2) participation of different student groups in dual-credit education programs, (3) instructional and advising practices of community colleges that deliver dual-credit education, and (4) the number of credits and semesters in which dual-credit students enroll to earn a bachelor's degree. Key findings from the study's Phase I research are summarized below.

High school graduates who participated in dual-credit education programs outperformed students who did not.

- Measures of performance included grades in dual-credit courses and follow-on college-credit only courses, college remediation, enrollment, persistence, and completion.

Instructional and advising practices used to deliver dual-credit education programs were not uniform and varied across community colleges.

- Resource constraints, geographic proximity to high schools, and institutional latitude over academic matters contributed to differences in delivery approaches.

Despite notable gains among historically underserved student groups, disparities in dual-credit education by race/ethnicity, income, gender, and academic background persisted over time.

- Traditionally advantaged students (e.g., Whites, gifted, academically talented) stood a much greater chance of participating in dual-credit education than historically disadvantaged students (e.g., Black, Hispanic, economically disadvantaged).

Dual-credit students did not progress more efficiently toward a bachelor’s degree than nondual-credit students.

- High school graduates who participated in dual-credit education took about 142 credits, including credits earned in dual-credit education programs, to complete a bachelor’s degree. That average was similar to the number of credits earned by high school graduates who did not enroll in dual-credit education. Nevertheless, dual-credit students generally graduated one semester sooner than did their nondual-credit peers.

Overview of Phase II

Objective of Phase II Research

In April 2017, AIR was awarded funding to conduct Phase II of this research. The purpose of Phase II was to examine areas of dual-credit education that Phase I was unable to explore but that remained of interest to Texas state and local education decision makers. Unlike the fast turnaround (approximately six months) and relatively narrow research focus of the study’s first phase, Phase II was conducted over the course of a year and included six specific study components: (1) a causal impact study, (2) a racial disparities study, (3) an HB 505 study, (4) an advising study, (5) an academic rigor study, and (6) a cost study. In its design, Phase II intentionally provided stakeholders a more in-depth understanding of how well dual-credit education programs were working, how they were delivered to students in practice, and who bore the costs of delivering dual-credit education. Decision makers will be able to link the overall effectiveness and cost of dual-credit education with specific features of how dual-credit programs are delivered by connecting the results of all six components. This, in turn, will facilitate the identification of areas in need of support or reform.

Phase II Research Methods

Phase II was a multicomponent study that employed the concurrent mixed-model design approach. This design allowed the research team to conduct parallel quantitative and qualitative studies that, together, will help decisionmakers understand the relationships between several aspects of dual-credit education, such as its effectiveness and the ways it is delivered to high school students. To answer research questions (RQs) from Phase II, AIR drew on a range of analytical techniques and data sources. In each of the subsequent chapters of this report and in the technical appendices, we detail the methods and data used to conduct each study component.

How Phase II Research Questions Addressed Current Knowledge Gaps

Phase II was designed to answer six RQs designed to expand knowledge about dual-credit education in Texas beyond what was investigated in Phase I. Following, we list these RQs in the order in which they are presented in the report and briefly describe the knowledge gaps that motivated them, as well as the methods we used to answer them.

RQ 1: To what extent did dual-credit education increase college enrollment, credential attainment, and efficient degree completion?

Phase I found that, on average, dual-credit students outperformed students who did not participate in dual-credit education programs on a wide range of achievement measures. Generally, Texas high school students must meet various eligibility criteria to enroll in dual-credit education. Thus, students who participate in dual-credit education programs are likely different from those who do not. For example, Phase I discovered that dual-credit students were more likely to be identified as gifted, academically talented, and White than were nondual-credit students. Because Phase I did not account for differences between dual-credit and nondual-credit students, estimates measuring the effect of dual-credit education on student success captured not only the effect of dual-credit education but also the effect of individual characteristics that affect how well a student performs in school. Consequently, these measures do not describe the true impact of dual-credit education on college access and college completion.

To assess the extent to which dual-credit education—independent of other factors—affected the chances of a given student achieving academic milestones and reaching them more efficiently, AIR employed a more rigorous research method; specifically, the instrumental variable approach embedded with a difference-in-different framework. Drawing on THECB and TEA administrative data across 16 student cohorts, AIR examined the extent to which improvements in high school and college degree attainment, college enrollment, and efficient degree completion over time occurred in precise relation to when a high school began offering dual-credit courses. AIR started with the cohort of students who were in their junior year of high school in 2000. As part of the analysis, AIR also examined the extent to which participation in dual-credit education had differential impacts on student outcomes for students with varied demographic and academic backgrounds (e.g., race/ethnicity, free or reduced-price lunch status, gifted and academically talented).

Because insufficient time has passed to measure the effectiveness of dual-credit programs since the enactment of HB 505, results from this analysis apply specifically to dual-credit education

programs implemented before 2015. Moreover, our econometric approach required us to exclude dual credit delivered through ECHSs from this component of the study. We do not view this as a major limitation, since a number of rigorous studies that have included ECHS programs in Texas have documented the benefits of ECHS for a wide range of students, including those who are traditionally underrepresented in postsecondary education.

RQ 2: How did high school counselors and college advisors select students for dual-credit education, advise them into enrolling in dual-credit courses, and coordinate advising services?

Because Texas law does not prescribe how HEIs should advise dual-credit students, models of dual-credit advising vary considerably. Qualitative research conducted during Phase I found that some community colleges that delivered dual-credit education relied on high school counselors to advise dual-credit students, while other community colleges employed college advisors. Phase I also found that the degree to which college advisors interacted and engaged with dual-credit students and their families differed depending on resource constraints, geographic proximity to the high school, and the types of courses colleges offered dual-credit students.

Based on Phase I research, it is difficult to discern the extent to which these different approaches adequately support dual-credit students as they navigate the complexities of college. To address this knowledge gap, AIR conducted in-depth, semi-structured interviews with high school guidance counselors and college advisors working with dual-credit students in dual-credit education partnerships that represented the full spectrum of models delivered across the state. These interviews collected information on a range of topics that accurately characterized partnerships' advising approaches and solicited suggestions for how to improve advising processes. The interviews specifically addressed (1) the types of students who were targeted for dual-credit education; (2) the roles of high school guidance counselors and college advisors and how they worked together to coordinate advising activities; (3) the factors that high school counselors and college advisors considered when counseling students regarding specific dual-credit courses; (4) the challenges that dual-credit advisors or counselors encountered when counseling dual-credit students; and (5) suggestions from high school counselors and college advisors for improving dual-credit student advising.

It is important to note that we designed the advising study to include a broad range of DC partnerships, including ECHS, DC delivered by two and four-year colleges in both urban and rural settings, and DC programs that deliver a significant number of CTE dual credit courses.

However, the study provided richer information about advising for academic DC courses delivered by two-year colleges, since such courses represent the vast majority of DC courses delivered in the state.

RQ 3: How were dual-credit students taught and assessed relative to college-credit only students?

Institutions have considerable latitude over how they deliver dual-credit instruction. Phase I found that colleges employed a higher percentage of high school teachers to teach college courses that counted for dual-credit versus those courses counting for college credit only. Further, Phase I discovered that instructors who taught dual-credit courses were more likely to be adjunct professors and were less likely to hold doctoral degrees compared with instructors who taught college-credit only courses.

How do these differences affect the quality of instruction that dual-credit students receive, and to what extent is dual-credit instruction on par with college-credit only instruction in terms of academic rigor? To address these questions, we examined content, instructional strategies, student assignments, and graded student work across three course types: (1) dual-credit courses taught by HSDCs, (2) dual-credit courses taught by DCs, and (3) college-credit only courses taught by CCs. For this analysis, AIR focused on two common courses taken by dual-credit students: College Algebra (Math 1314/1414) and English Composition (English 1301). Using a rubric vetted by content and curriculum experts, AIR assessed the extent to which there were systematic, discernible differences in the rigor and quality of dual-credit versus college-credit only materials, including syllabi, student assignments, and graded work products (e.g., examinations, assignments, portfolios). In addition, AIR administered an instructional survey to participating teachers and faculty to collect information on the use of instructional practices across HSDC, DC, and CC courses.

It is important to note that this component of the study focused only of dual-credit and college-credit only courses delivered by community colleges, and does not distinguish between courses delivered through ECHS versus regular dual credit partnerships.

RQ 4: What were the annual costs of delivering dual-credit education, and how were they distributed among stakeholders? Also, how did these costs compare to the benefits of dual-credit education?

A key limitation of the Phase I research was its inability (due to the defined parameters of its focus) to investigate costs related to the delivery of dual-credit education programs. In Texas,

both HEIs and school districts receive formula funding to deliver dual-credit education; but they also rely on other financial sources (e.g., students, families, communities) and employ different staffing structures to support the administration of those programs. Texas lawmakers lack evidence on whether state and local funding sources for HEIs are sufficient to account for the additional costs that HEIs incur through dual-credit education or whether the state's investment in dual-credit education provides monetary returns that exceed associated costs.

Phase II shed light on this particular issue by estimating the overall cost of delivering dual-credit education in the state. It did so by calculating how the cost of delivering dual-credit education was shared among a variety of stakeholders and by conducting an analysis that compared costs of delivering dual-credit education against the monetizable benefits derived from dual-credit programs. In carrying out this study, AIR relied on a mix of data sources, including THECB and TEA administrative records; dual-credit Memoranda of Understanding (MOUs); and interviews with HEI, school district, and high school administrators to uncover the visible and hidden costs of delivering dual-credit education.

The cost study focused only on academic dual-credit courses delivered by community colleges, so the findings cannot speak to costs of CTE dual credit. However, we included a sufficient number of ECHSs in our sample to estimate the costs of DC delivered through regular DC partnerships versus ECHSs. While we purposefully included DC partnerships that deliver DC courses to rural high schools in our sample to make the cost estimates more reflective of the state as a whole, we are unable to provide separate cost estimates for DC delivered in urban versus rural settings.

RQ 5: Which factors contributed to racial and ethnic disparities in dual-credit participation?

Quantitative analyses conducted during Phase I showed that students of color (e.g., Black and Latino students) were less likely to participate in dual-credit courses compared to White students, despite the fact that students in that group experienced the largest gains in dual-credit participation since 2000 among all student groups. These data raised an important question: Why are students of color participating in dual-credit programs at lower rates than White students? Phase II answered this question by drawing on TEA and THECB administrative records to examine the extent to which the following factors could explain these participation rates:

- Differences in the preparation and demand for dual-credit education across demographic groups

- Access to dual-credit education and alternative forms of advanced coursework (e.g., Advanced Placement [AP], International Baccalaureate [IB]) across high schools
- The influence of advising practices on dual-credit participation gaps

The interviews conducted with high school guidance counselors and college advisors as part of the advising component of the study also were used to explore whether implicit bias or discrimination in advising practices might have contributed to these disparities.

RQ 6: What were the patterns in dual-credit participation, success, and delivery before and after HB 505?

Passed in 2015, HB 505 prohibited the state from limiting access to dual-credit education to juniors and seniors or from restricting the number of dual-credit semester credit hours high school students could take. Since then, lawmakers have expressed concern that the rules around who can participate in dual-credit education programs have become too lax, allowing students who are not academically or emotionally prepared to enroll in dual-credit education to do so. Although Phase I descriptively examined changes in dual-credit participation and delivery, as well as the outcomes of dual-credit students, it did so using data compiled only prior to fiscal year 2015. As such, Texas lawmakers had a minimal understanding of whether there were any changes in dual-credit participation, success, and delivery since passage of HB 505.

AIR filled this information gap by drawing on THECB and TEA administrative data to specifically examine the extent to which current dual-credit participation rates overall, by grade, and by various student characteristics (e.g., race/ethnicity, academic background) have changed since passage of HB 505. Complementing this analysis, AIR also investigated changes in college enrollment, course performance, and college completion, as well as the average number of dual-credit semester credit hours with which a student matriculated to complete a four-year degree.

The Role of THECB in Phase II Research

AIR is strongly committed to connect research to improve education policy and practice. Our researchers and technical consultants work closely with state policymakers and local practitioners to identify problems of policy and practice, as well as to address their research needs. In partnership with THECB, AIR determined dual-credit education to be a matter of interest, and THECB staff contributed their expertise to properly contextualize results and to ensure that the study could inform the Board's legislative recommendations. In addition, THECB

staff facilitated access to administrative data collected by the Board and the TEA, supported AIR efforts to collect data, and collected MOUs from Texas dual-credit partnerships. To avoid compromising the objectivity and integrity of the research, however, THECB was not involved in designing the study, gathering primary data, or analyzing primary or secondary data.

Roadmap of This Report

This report is divided into five chapters. Chapter 1 presents research conducted to examine (1) the impact of dual-credit education programs on student outcomes and efficient degree completion, (2) the factors contributing to racial and ethnic disparities in dual-credit education participation, and (3) changes in dual-credit education occurring since passage of HB 505. Chapter 2 examines how students were advised relative to dual-credit education programs and how they were guided through dual-credit education coursework, as well as how HEIs and high schools worked together to deliver dual-credit advising. Chapter 3 examines how dual-credit students are taught and assessed relative to college-credit only students. Chapter 4 quantifies the costs of delivering dual-credit education, explains how these costs are shared among stakeholders, and describes the costs of delivering dual-credit education compared with its benefits. Chapter 5 concludes this report with key findings from each study component.

Acknowledgements

The authors gratefully acknowledge the Texas Foundation for Higher Education, with support from Educate Texas, a public-private initiative of Communities Foundation of Texas, Greater Texas Foundation, Houston Endowment, and the Meadows Foundation, which made this study possible. We also acknowledge the support of THECB and TEA for providing the administrative data that allowed us to conduct this research. We are thankful for feedback received, particularly from Stacey Avery, Linda Battles, Jerel Booker, Julie Eklund, David Gardner, Ginger Gossman, Andrew Lofters, Raymund Paredes, and Rex Peebles who helped us to understand crucial aspects of how dual-credit education programs are delivered to high school students in Texas. Finally, we thank the Publication and Creative Services team at AIR, which edited and formatted this report, as well as Kerstin Le Floch from AIR who provided expertise as an outside reader.