

**Research Study of Texas Dual Credit
Programs and Courses:
Executive Summary**

**Submitted to: Texas Education Agency
March 2011**



AMERICAN
INSTITUTES
FOR RESEARCH®

CREDITS

American Institutes for Research

20 North Wacker Drive, Suite 1231`
Chicago, IL 60606-2901
800-356-2735 • 312-288-7600
www.air.org

Gibson Consulting Group, Inc.

1221 South MOPAC Expressway, Suite 355
Austin, TX 78746
512-328-0884
www.gibsonconsult.com

Contributing Authors

American Institutes for Research

Lawrence B. Friedman, Ph.D.
Lisa Hoogstra, Ph.D.
Andrew Swanlund
Shazia Miller, Ph.D.
Manyee Wong, Ph.D.
Daniel O'Brien
Natalie Tucker

Gibson Consulting Group, Inc.

Greg Gibson
Joseph Shields
Cheyanne Rolf
Elissa Yeates

Submitted to

Texas Education Agency
1701 North Congress Avenue
Austin, Texas 78701-1494
Phone: 512-463-9734

Copyright © Notice: The materials are copyrighted © and trademarked ™ as the property of the Texas Education Agency (TEA) and may not be reproduced without the express written permission of TEA, except under the following conditions:

- 1) Texas public school districts, charter schools, and Education Service Centers may reproduce and use copies of the Materials and Related Materials for the districts' and schools' educational use without obtaining permission from TEA.
- 2) Residents of the state of Texas may reproduce and use copies of the Materials and Related Materials for individual personal use only without obtaining written permission of TEA.
- 3) Any portion reproduced must be reproduced in its entirety and remain unedited, unaltered and unchanged in any way.
- 4) No monetary charge can be made for the reproduced materials or any document containing them; however, a reasonable charge to cover only the cost of reproduction and distribution may be charged.

Private entities or persons located in Texas that are not Texas public school districts, Texas Education Service Centers, or Texas charter schools or any entity, whether public or private, educational or non-educational, located outside the state of Texas MUST obtain written approval from TEA and will be required to enter into a license agreement that may involve the payment of a licensing fee or a royalty.

For information contact: Office of Copyrights, Trademarks, License Agreements, and Royalties, Texas Education Agency, 1701 N. Congress Ave., Austin, TX 78701-1494; phone 512-463-9270 or 512-936-6060; email: copyrights@tea.state.tx.us.

Texas Assessment of Knowledge and Skills™ (TAKS™) and The State of Texas Assessments of Academic Readiness™ (STAAR™) are registered trademark of the Texas Education Agency. Other product and company names mentioned in this report may be the trademarks of their respective owners.

This report is available online at the Texas Education Agency's website:
http://www.tea.state.tx.us/index2.aspx?id=2147495222&menu_id=949

Executive Summary

As part of Texas' efforts to promote high school success and college readiness, legislation was passed in 2006 (HB1, §5.01, 79th Texas Legislature, 3rd Called Session) that requires each local education agency (LEA) to implement a program under which students may earn the equivalent of at least 12 semester credit hours of college credit in high school. The result of that legislation, Texas Education Code (TEC) §28.009, was amended in 2007 to stipulate that the college credit may be earned through Advanced Placement (AP) courses, International Baccalaureate (IB) courses, local and statewide articulated courses, and courses for dual credit.

In Texas, courses for dual credit are college courses offered by an institution of higher education (IHE) for which high school students receive simultaneous academic credit from both the college and the high school upon course completion. Texas LEAs and IHEs create contractual agreements to offer courses for dual credit. These contracts vary in their details and degree of specificity. Moreover, an IHE may have separate agreements with multiple LEAs, each with different terms. Similarly, an LEA may have agreements with more than one IHE. Currently, more than 90% of courses for dual credit are offered by Texas community colleges.

Cost agreements also vary from LEA to LEA. Some IHEs support dual credit programs by reducing or waiving tuition and fees for dual credit students; some LEAs pay for the students, either out of local funds or from their high school allotment; and some communities have established privately funded scholarship programs for dual credit activities. When these funding sources are not available, students and parents pay out-of-pocket for the courses.

Study Purpose and Research Objectives

The Texas Education Agency (TEA), in collaboration with the Texas Higher Education Coordinating Board (THECB), contracted with American Institutes for Research (AIR) and Gibson Consulting Group, Inc. to conduct a research study of dual credit programs and courses in Texas. The study has three primary objectives, which are to:

1. Investigate the state context for dual credit programs and courses delivered during the 2009–10 academic year.
2. Conduct an analysis of the how the delivery of courses for dual credit are funded in Texas and determine the cost of dual credit programs and courses.
3. Make action-oriented, pragmatic policy recommendations to the 82nd Texas Legislature regarding dual credit programs and courses.

Data and Methods

Data from several sources were used to address these research objectives, including (1) extant data from TEA on student enrollment in courses for dual credit throughout the state and the

characteristics of these students and their high schools; (2) data obtained from telephone surveys of responding key administrators or staff from a purposive sample of IHEs, LEAs, and high schools, the design for which involved sampling from 12 dual enrollment “clusters” made up of IHEs, LEAs, and high schools throughout the state that supply and make use of courses for dual credit through contractual relationships with each other; (3) extant data from THECB on the number of student semester credit hours attempted by high school students enrolled in college courses for dual credit; and (4) supplementary course and financial data on dual credit program costs and revenues collected from the study sample of IHEs, LEAs, and high schools.

A total of 15 IHEs were sampled—12 community colleges, and three universities that are major providers of courses for dual credit within the state; 48 high schools and their corresponding LEAs also were sampled. Administrators from all 15 sampled IHEs completed surveys. A total of 36 administrators from sampled LEAs and 34 administrators or staff from sampled high schools completed surveys. For the supplemental course and financial data collection, 14 IHEs (11 community colleges and three universities), 22 LEAs, and 24 high schools provided usable data (defined as data that were complete and reasonable).

To examine the state context of dual credit programs and courses (research objective 1), statewide data from the 2007–08, 2008–09, and 2009–10 academic years were analyzed to determine the extent to which there has been growth in enrollments in courses for dual credit. Additional analyses examined the characteristics of students who enrolled in courses for dual credit; the school characteristics that are predictive of enrollment in courses for dual credit; the types of courses that available to, and taken by, students for dual credit; and the performance of students in these courses and on the 2010 Texas Assessment of Knowledge and Skills (TAKS). Survey data from sampled IHEs, LEAs, and high schools provided additional data on the perceived quality of courses taken for dual credit; the various modes of delivery for these courses (e.g., at a community college, four-year university, high school, or via distance education); and the institutional policies and requirements that exist with regard to dual credit student eligibility and supports (e.g., student advising/counseling, financial support) and dual credit faculty benefits.

To examine the funding for and cost of dual credit programs and courses during the 2009–10 academic year (research objective 2), extant data from THECB and supplemental course and financial data from sampled IHEs, LEAs, and high schools were examined to (1) provide statewide funding estimates for courses for dual credit; (2) identify the instructional cost of courses for dual credit per student credit hour; (3) examine the variance in the cost of courses for dual credit by type of IHE and various attributes of high schools; and (4) determine the cost effectiveness of courses for dual credit by delivery mode.

A summary of key findings from the study is presented below. A set of policy recommendations on dual credit programs and courses that are based on these findings (research objective 3) is then presented.

Summary of Key Findings

The State Context of Dual Credit Programs and Courses

Statewide Enrollment Patterns. Findings from statewide data on enrollment in courses for dual credit indicate growth in enrollments over time. Total state enrollment in courses for dual credit rose from 71,803 in 2007–08 to 94,232 in 2009–10, an increase of 31%. An examination of enrollment in courses for dual credit by student characteristics revealed different patterns of participation among student subgroups. For example, male students were underrepresented among students who were enrolled in courses for dual credit relative to their representation within the high school population as a whole; white students were overrepresented, and other racial/ethnic groups, particularly African-American students, were underrepresented relative to their representation within the high school population as a whole.

An analysis of school characteristics that were predictive of enrollment in courses for dual credit also revealed differences in participation rates among schools with students who were enrolled in courses for dual credit. For example, schools located in rural areas and schools that had higher percentages of African-American students, limited English proficient (LEP) students, and students taking AP/IB exams had lower enrollment rates in courses for dual credit, controlling for school size and other school characteristics included in the analysis. Differences in participation rates in courses for dual credit may reflect differences in academic achievement among various subgroups. Because students must meet academic eligibility requirements to enroll in courses for dual credit, student subgroups that have lower average achievement are likely to be underrepresented among students who enroll in courses for dual credit.

Course Availability and Course-Taking Patterns. Within the state as a whole, a wide variety of courses for dual credit is available to students in both academic and career or technical areas. An analysis of enrollment in courses for dual credit by subject area revealed that approximately 70% of courses taken by high students were in core academic subject areas such as social studies/history (31%), English language arts (26%), mathematics (8%), and science (4%); 20% of courses were in career or technical education and computer science. Approximately 6% of the courses fell into the category of “other.”

An examination of enrollment in specific types of dual enrollment courses by student characteristics revealed different patterns of course enrollment by student subgroups. For example, African-American and Hispanic students took greater concentrations of coursework for dual credit in career or technical education and computer science and lower concentrations in core academic subjects such as social studies/history and English language arts compared with white and Asian students. Economically disadvantaged students also took greater concentrations of coursework in career or technical education and computer science than students who were not economically disadvantaged. Such differences may reflect long-standing achievement gaps among students in these subgroups. The student eligibility requirements for career or technical education courses are lower than those for core academic courses. To qualify to enroll in career or technical education courses or computer science courses, students only have to meet the passing standard on the Texas Assessment of Knowledge and Skills (TAKS); to qualify to

enroll in academic courses, students must satisfy the more rigorous dual credit eligibility standards on TAKS or meet Texas Success Initiatives (TSI) requirements.¹

Student Performance. The findings regarding student performance in courses for dual credit were generally positive. Virtually all students (99.9%) who enrolled in courses for dual credit were reported as completing these courses, and most (94% or more across different subject areas) also received passing grades for the affiliated high school course. At least 95% of students who were enrolled in courses for dual credit in 2009–10 also met basic TAKS proficiency standards in all subject areas on the 2010 TAKS.

The percentage of students who were enrolled in courses for dual credit in 2009–10 and were commended on the 2010 TAKS varied both by course type and TAKS subject area. Overall, a smaller percentage of students who were enrolled in computer science courses and career or technical courses for dual credit received a commended rating on TAKS subject area assessments compared with students who were enrolled in other courses. For example, among students who were enrolled in career or technical courses, 29% were commended in reading, 27% were commended in math, 18% were commended in science, and 54% were commended in social studies. In contrast, among students who were enrolled in mathematics courses, 67% were commended in reading, 70% were commended in math, 48% were commended in science, and 85% were commended in social studies. These differences again reflect differences in student eligibility requirements between academic courses and career or technical courses and computer science courses.

The percentage of students who were enrolled in courses for dual credit and who met dual credit eligibility standards or TSI exemption standards in English language arts and mathematics also varied by course type and TAKS subject area. Dual credit eligibility standards and TSI exemption standards are defined in relation to student performance on the TAKS. In particular, to meet standards to take academic courses for dual credit in reading- and writing-related areas, students need to score at least 2200 on TAKS-English Language Arts and receive a score of at least 3 on their written essay. To take mathematics courses for dual credit, students need to score at least 2200 on TAKS-Math. Overall, the percentage of students who met these standards in academic courses was higher for students who were enrolled in core academic courses (English language arts, mathematics, science, and social studies/history) than for students who were enrolled in career or technical courses and computer science courses. For example, among students who were enrolled in career or technical courses, 60% met eligibility standards for academic courses on TAKS-English Language Arts, and 66% met eligibility standards for academic courses on TAKS-Math. In contrast, among students who were enrolled in mathematics courses, 86% met eligibility standards in English language arts and 97% met eligibility standards in mathematics. Again, differences in the percentage of students meeting eligibility standards reflect differences in requirements between academic courses and career or technical courses and computer science courses.

¹ Beginning in the 2011–12 academic year, TEA will begin implementation of the State of Texas Assessments of Academic Readiness (STAAR) in place of the current TAKS assessment. This shift will necessitate a reformulation of the eligibility standards for enrolling in courses for dual credit.

It should be noted that beginning in the 2011–12 academic year, TEA will begin implementation of the State of Texas Assessments of Academic Readiness (STAAR) in place of the current TAKS assessment. This shift will necessitate a reformulation of the current benchmarks for determining college readiness and dual credit eligibility standards. Therefore, these impending changes should be considered before any policy changes are implemented based on student performance findings.

Survey Findings from Sampled IHEs, LEAs, and High Schools

Findings from surveys of sampled IHEs, LEAs, and high schools are consistent with the statewide findings with regard to the types of courses that are available to high school students for dual credit (e.g., core academic courses; electives in fine arts, foreign languages, and computer science; and career or technical education courses). Most respondents reported that courses for dual credit were offered in core academic subjects such as social studies/history. The majority of respondents from IHEs, LEAs, and high schools also reported that career or technical education courses were offered for dual credit. Respondents from IHEs more frequently reported that elective courses were offered than respondents from LEAs and high schools, perhaps because of the greater availability of qualified faculty at IHEs to teach these courses.

Respondents generally reported that several measures were taken to ensure the quality of courses for dual credit, including coordination between IHEs and LEAs to align courses for dual credit with Texas Essential Knowledge and Skills (TEKS) standards. Respondents from LEAs and high schools also reported monitoring teacher quality, the curriculum, and pedagogy of courses offered for dual credit to ensure course quality.

Overall, respondents reported that courses for dual credit were consistently rigorous across courses and that courses for dual credit offered on high school campuses were as rigorous as those offered on college campuses. Among high school respondents who provided comparative ratings of AP courses and courses for dual credit, 42% reported that AP courses and courses for dual credit were equally rigorous, 45% reported that AP courses were more rigorous than courses for dual credit, and 13% reported that courses for dual credit were more rigorous than AP courses. Among high school respondents who provided comparative ratings of IB courses and courses for dual credit, 50% reported that IB courses and courses for dual credit were equally rigorous, 38% reported that IB courses were more rigorous than courses for dual credit, and 13% reported that courses for dual credit were more rigorous than IB courses.

Survey respondents reported that a variety of institutional policies and requirements exist with regard to student eligibility for enrollment in courses for dual credit and student support services for enrollees. Consistent with state requirements for enrollment in courses for dual credit, most respondents indicated that students had to receive a minimum score on a standardized test and be at a specific grade level (e.g., Grade 11 or 12) before they could enroll in a course for dual credit. Most respondents also reported that students had to receive approval from their school and meet the IHE's standard admission requirements to enroll in courses for dual credit.

Respondents indicated that several types of information and supports were made available to students who enrolled in courses for dual credit or were considering enrolling, including publicizing the availability of their dual credit programs to all students and providing counseling specific to courses for dual credit. Most IHEs also reported that they provided specialized training to high school staff related to the dual credit program.

Overall, the survey findings indicate that IHEs, LEAs, and high schools use multiple means to ensure the quality and rigor of courses for dual credit and have established policies to ensure that students meet dual enrollment eligibility requirements and are provided with information and counseling supports specific to courses for dual credit. However, among respondents who provided comparative ratings of AP, IB, and dual credit courses, a sizeable percentage viewed AP courses as more rigorous than courses for dual credit; a similar percentage viewed IB courses as more rigorous than courses for dual credit. These findings suggest that there may be a need for greater monitoring of the quality and rigor of courses for dual credit. In addition, responses to questions about student eligibility requirements for enrolling in courses for dual credit suggest that some administrators of dual credit programs may not be familiar with all state eligibility requirements. For example, although the state requires students to meet dual credit eligibility standards by achieving a minimum score on a standardized test such as TAKS, only 80% of administrators at IHEs reported that students must meet this requirement to enroll in courses for dual credit. As indicated in a recent audit report on dual credit programs in Texas (Texas State Auditor's Office, 2010), some IHEs and LEAs may need to improve both their monitoring and evaluation of courses for dual credit and as well as their procedures for ensuring compliance with state eligibility requirements.

The Cost of Dual Credit Programs

Statewide Funding Estimates for Courses for Dual Credit in Texas. Based on an exploratory analysis of revenue and expenditures data for the delivery of courses for dual credit to high school students at LEAs and community colleges in Texas, dual credit program funding/revenue are estimated at approximately \$180 million for the 2009–10 academic year. The state of Texas covered for the majority (61%) of costs associated with courses for dual credit for high school students through state funding (e.g., Foundation School Program, State Compensatory Education funds, High School Allotment funds, formula and discretionary grants, etc.) to LEAs (36%) and state appropriations to community colleges (25%). A substantial proportion (32%) of state funds used by LEAs to support dual credit programs went toward tuition and fees (19%) and textbooks (13%) for courses for dual credit.

Revenue generated from students and their families through the payment of tuition and fees to community colleges and the purchase of course textbooks accounted for just over 18% of the 2009–10 funding for courses for dual credit delivered to students at LEA and community college campuses. Due to LEA subsidies of tuition/fees and textbook costs (described above) and community college tuition waivers documented in articulation agreements with LEAs, this figure of 18% for high school students enrolled in courses for dual credit is substantially lower than the estimated 36% of course costs (excluding textbook costs) that are covered by community college students in general.

Almost 13% of the funding for dual credit programs was accounted for by local and other funds used by IHEs, and approximately 6% of the funding came from local and other funding sources used by LEAs. Federal funding accounted for a small proportion of funding for dual credit programs in Texas (2%), and this funding came primarily in the form of grants to LEAs.

Instructional Cost Per Student Credit Hour. For the study sample, the average program cost per credit hour attempted for dual credit courses at IHEs was approximately \$125, with 87% representing course delivery costs and 13% representing program administration costs. The vast majority of course delivery costs are accounted for by instructional payroll (62%) and textbooks (37%). At high schools, the average program cost per credit hour was \$149, virtually all of which related to instructional payroll (85%) and textbooks (15%). Instructional costs per credit hour varied widely—from \$80.11 to \$280.74 among sampled high schools and from \$88.70 to \$235.33 among sampled IHEs. The most significant factor contributing to higher costs at high schools was average class/section size, which was 15.7 for sampled high schools and 28.4 for sampled IHEs.

Variance in the Cost of Courses for Dual Credit by Type of IHE and Various Attributes of High Schools.

Within the study sample, program cost per credit hour for courses for dual credit were substantially higher at four-year universities (\$189) than at community colleges (\$120). This variation was largely due to higher professor salaries and administrative costs at four-year universities, and partially offset by larger classes at four-year universities. At the high schools sampled, cost data were analyzed for lower level groupings based on enrollment, percentage of economically disadvantaged students, and state accountability ratings. The costs per credit hour was slightly lower for larger high schools (\$145) than smaller high schools (\$154) in the sample. High schools with higher proportions of economically disadvantaged students than the state average had lower costs per credit hour attempted for dual credit courses (\$138) compared with campuses with smaller proportions of economically disadvantaged students (\$162). There was an inverse relationship between high school accountability ratings and cost per credit hour – the higher the rating, the lower the cost. Average class size was the most dominant factor in explaining variances of all high school costs. Also, several high schools with larger dual credit programs reported zero costs for textbooks.

Cost Effectiveness of Courses for Dual Credit by Delivery Mode. For the study sample, the cost per credit hour for courses for dual credit delivered in an IHE classroom was \$103, compared with \$125 for the delivery of IHE online courses. The proportion of time spent by instructors for online courses (reported as a percentage of classroom effort) was actually greater than for face-to-face instruction (perhaps due to greater time spent in individual communication with students taking online courses). Also, the average class/section size for online courses was smaller than for courses offered in the classroom. For high schools, the cost of online delivery was also higher than classroom delivery, primarily due to differences in class/section size.

Recommendations

Based on a review of the study findings, the following policy recommendations about the supply of, demand for, and access to programs and courses for dual credit are offered for consideration by the 82nd Texas Legislature. The recommendations are organized by key policy questions posed by TEA in the request for proposals to conduct the current study of Texas dual credit programs and courses.

1. How can the state provide each student the opportunity to earn 12 semester credit hours of college credit before graduating high school?

This question is primarily about the supply of courses and programs for dual credit needed so that each student has the opportunity to earn 12 semester credit hours of college before graduating high school. Findings suggest that the supply of courses for dual credit was generally adequate for the demand during the three-year-period covered by the study (2007–08, 2008–09, and 2009–10). However, the study also found that enrollment rates varied by subjects, student demographic characteristics and academic performance, and school demographic characteristics and Academic Excellence Indicator System (AEIS) status. These findings suggest the possibility of inadequate supply for the demand where students did not have opportunity to enroll in courses or programs for dual credit in which they wanted to enroll. In other words, enrollment rate differences for courses for dual credit between students from schools differing in location, size, or performance may be due to a difference in course availability or number of openings in courses to students from the differing schools.

It is recommended that the 82nd Texas Legislature consider the state’s role in ensuring that there is an adequate supply of courses and programs for dual credit—adequate in amount and adequately distributed to eligible high schools students in the state—so that each student has the opportunity to earn 12 semester credit hours of college before graduating high school. It is suggested that the state should undertake or encourage the development and implementation of a mechanism to estimate demand for programs and courses for dual credit throughout the state. The state also might play a more extensive role such as developing and providing courses and programs for which there is a need, or encouraging or funding through competitively awarded contracts these and other supply-side activities.

2. How can the state promote the ability of students to access quality dual credit programs and courses?

The evaluation team understands this question to be about high school students’ demand for and access to quality courses and programs for dual credit, in other words, students’ interest in taking advantage of opportunities to enroll in high-quality courses and programs for dual credit, and their ability to do so successfully.

First, the study found no evidence that dual credit courses or programs were perceived to be of lower quality than either similarly titled high school or IHE courses. However, as noted above, the study also found that enrollment rates varied by subjects, student demographic characteristics and academic performance, and school demographic characteristics and AEIS status. These findings suggest the

possibility of inadequate demand for the supply where students did not enroll in courses or programs for dual credit for which they had an opportunity to enroll. For instance, it is likely that the proportion of students in some schools who were not inclined or were not encouraged to enroll in courses for dual credit was higher than the proportion in other schools differing in location, size, or performance.

The state has three areas where it can focus its efforts to promote students' interest in and ability to access quality dual credit programs and courses. It can focus on increasing student interest and ability, on improving high school campuses' activities to increase student interest and support student efforts, and on improving LEAs' support for student and campus efforts. It is suggested that the legislature support the identification and dissemination of promising practices in each of the three areas, and possibly incentivizing implementation of these practices as well. Promising practices worthy of consideration for support in the three areas include the following:

1. Increasing student interest and ability
 - Increasing the proportion of Grade 11 and 12 students who meet or exceed the academic performance standards of the Texas Success Initiative
 - Increasing the knowledge of dual credit value and options, enrollment procedures and timelines, subsidies, and courses available
2. Improving high school campus activities
 - Increasing student interest in courses and programs for dual credit
 - Disseminating dual credit information and counseling students into appropriate courses and programs
 - Scheduling and arranging the logistics of programs and courses for dual credit
 - Increasing student engagement, persistence, and performance in courses and programs for dual credit delivered on campus, online (through LEA-based online programs or the Texas Virtual School Network), and at other locations
3. Improving LEA support
 - Matching the supply of and demand for courses and programs for dual credit through articulation agreements and LEA dual credit offerings
 - Developing strong articulation agreements
 - Developing long-term partnerships with LEAs seeking dual credit courses and programs for their students, and with providers of dual credit courses and programs
 - Subsidizing student costs of enrollment and participation in courses for dual credit

The current financial condition and circumstances of public education in Texas increase the likelihood that existing funding mechanisms for courses and programs for dual credit enrollment will lead to supply outpacing demand. As LEAs face budget shortfalls, the use of state funds (such as the Foundation School Program, High School Allotment, and State Compensatory Education funds) previously used to support

the delivery of courses for dual credit may be diverted to pay for core education services. The state should assess thoroughly the ability of LEAs to continue providing adequate financial support for courses and programs for dual credit during the next two school years, and address issues identified by the assessment.

3. How can the state ensure efficient use of its resources regarding dual credit programs and courses?

This is a question about two kinds of efficiencies: the efficient alignment of the state's supply of high-quality courses and programs for dual credit and its high school students' demand for and access to the courses and programs, and the reduction of delivery and participation costs without reducing effectiveness. The above recommendations responding to research subquestions 1 and 2 will contribute to improvements in efficiency of both kinds. The evaluation team also suggests that the legislature consider the following strategies for increasing both kinds of efficiency:

- Alignment of supply and demand
 - Leveraging and focusing courses and programs for dual credit by aligning dual credit more closely to the state's education reform, especially in the areas of secondary and postsecondary education
 - Increasing the knowledge providers of transferable courses and programs for dual credit have of the demand for the courses and programs by students and their parents and guardians, their high schools, and their LEAs at the state, regional, municipal, and individual levels
 - Increasing the knowledge students, their parents and guardians, their high schools, and their LEAs have of the supply of transferable courses and programs for dual credit and of dual credit providers at the state, regional, municipal, and individual levels
 - Monitoring supply-side performance – how effectively and efficiently courses and programs for dual credit are provided – against criteria established by the state, and making public the results
 - Monitoring demand-side performance – how effectively students perform in courses and programs for dual credit and how effectively and efficiently high schools and LEAs support students' enrollment and participation in the courses and programs – against criteria established by the state, and making public the results
- Reducing costs without reducing effectiveness through:
 - Incentivizing IHEs, LEAs, and other dual credit course providers, where appropriate, to meet minimum instructor/student ratios for courses enrolling students for dual credit²
 - Incentivizing IHEs, LEAs, and other dual credit course providers to meet minimum instruction cost/administration cost ratios for courses and programs enrolling students for dual credit

² The incentive model may need to differ based on the demographics, size, and location of the LEA.

- Incentivizing strategies to reduce the cost for students and their parents or guardians of enrolling and participating in a course for dual credit, such as book recycling programs, bulk purchases of books, carpooling, and discount gas coupons

This study relied extensively on existing data about the courses and programs for dual credit delivery, their providers and participants, and their costs and framing policies from TEA and THECB. Their support for this study is an example of their close and productive relationship in developing, operating, and using the results of their complementary data systems to gain a better understanding of courses and programs for dual credit. The continued successful development and expansion of the courses and programs for dual credit as well as increases in effectiveness and efficiency through the above recommendations or otherwise will require more extensive, robust, and systematic data collection and analysis against performance metrics, and reporting and application of findings from the analysis. A final recommendation is for the legislature to support the further development, analysis, and use of such data.