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Staffing and Resource Allocation in College Access Reform: How Dual Credit Shifts Educational Costs

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Objective. Dual credit (DC), or dual enrollment, is college-level coursework that confers credit towards both high school graduation and a postsecondary degree. As DC has grown rapidly across the country, this study provides needed evidence about how these courses shift resources and cost burdens among community colleges, school districts, and families.

Methods. We use economic evaluation methods to assess the cost of DC across three delivery models, where DC is administered in (a) traditional comprehensive high schools; (b) Early College High Schools (ECHS); and (c) school-within-school ECHSs. We draw on statewide administrative datasets combined with a smaller qualitative data sample.

Results. We find that implementation of DC requires substantial investment in existing staff personnel time as well as new staff positions, professional development costs, and other costs, across both K-12 and postsecondary sectors. In addition to requiring new resources, DC shifts the cost burden of educating high school students from school districts to community colleges. We find community colleges bear a disproportionate share of costs, especially in delivery models where community college faculty serve as the instructor of record – a model that is more common in ECHSs.

Contributions. The study informs the design of tuition agreements and instructor and student course assignment policies that promote equitable and sustainable distribution of costs and resources for students, school districts, and community colleges. Future research may explore how costs compare to measures of impact, especially for low-income and global majority students, who are historically underrepresented in higher education.

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Staffing and Resource Allocation in College Access Reform:

How Dual Credit Shifts Educational Costs

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Abstract

Objective. Dual credit (DC), or dual enrollment, is college-level coursework that confers credit towards both high school graduation and a postsecondary degree. As DC has grown rapidly across the country, this study provides needed evidence about how these courses shift resources and cost burdens among community colleges, school districts, and families.

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Contributions. The study informs the design of tuition agreements and instructor and student course assignment policies that promote equitable and sustainable distribution of costs and resources for students, school districts, and community colleges. Future research may explore how costs compare to measures of impact, especially for low-income and global majority students, who are historically underrepresented in higher education.

Keywords: dual enrollment, early college high schools, college access, cost analysis, education finance.

Postsecondary attainment is associated with a host of benefits, from higher earnings to greater civic engagement to better health outcomes, but completion rates remain stratified by race/ethnicity and class (Carnevale et al., 2024). One strategy states and institutions have embraced to increase college access and completion among historically underrepresented students is dual enrollment, or dual credit (DC; Taylor et al., 2022). DC is college-level coursework taken during high school that confers credit towards high school graduation and a postsecondary degree. While DC was relatively rare two decades ago, the most recent national survey data, from 2017-18, show that 82 percent of high schools nationally offer DC coursework (National Center for Education Statistics, 2020), with over 90 percent of courses provided through community colleges (Texas Association of Community Colleges, 2023). DC enrollment has continued to grow during the COVID-19 period, even as community college enrollments have lagged from pre-pandemic trends (Ison et al., 2022). Numerous studies show DC participation increases postsecondary enrollment and completion (An & Taylor, 2019; Blankenberger et al., 2017; Lichtenberger et al., 2014; Moreno et al., 2021; Wang et al., 2015).

State education leaders have multiple options through which to expand DC offerings. DC implementation can differ by instructional modality (face-to-face, online, or hybrid), instructor of record (high school or postsecondary instructor), and location of course (high school campus including proctored online classes or a postsecondary campus). Across these design components, DC can be delivered via three delivery models: (a) one-off courses in traditional high schools; (b) stand-alone Early College High Schools (ECHSs); or (c) school-within-school ECHSs. ECHSs feature a comprehensive DC curriculum that allows high school students to complete up to an associate degree, or 60 college credits, most often through a partnering community college. Stand-alone ECHSs function as separate schools on their own campuses, while school-within-

school ECHSs operate as programs within comprehensive high schools. Districts have used the school-within-school model to expand ECHS access when creating stand-alone campuses is not feasible. Multiple experimental studies show ECHSs have strong positive effects on postsecondary outcomes, but the model may be a costly approach to scaling DC. While studies show ECHSs have lower teacher turnover, potentially reducing costs (Knight et al., 2025), they maintain smaller enrollment levels and provide extra supports such as academic advising and summer programs, which may drive up costs (Atchison et al., 2021; Edmunds et al., 2017; 2020; Knight, 2012).

Implementation of a DC program requires school districts to form partnerships with community colleges that result in shared resources and agreements about tuition, fees, and textbooks (Atchison et al., 2021; Thomas et al., 2013). These agreements are important for equitable access to DC and for the sustainability of a DC program. Yet, surprisingly little evidence exists on how DC models shift resources and cost burden between community colleges, school districts, and families (Blankenberger et al., 2017; Bransberger et al., 2021; Duncheon et al., 2026; Taylor et al., 2014). As a result, there is minimal guidance regarding how to expand DC equitably and effectively. Policymakers and institutional leaders would benefit from greater understanding of how different DC models alter both overall costs and the distribution of those costs across students, school districts, and community colleges.

To that end, this study examines resource allocation strategies and staffing models used in alternate DC delivery models. Specifically, we compare the cost and staffing patterns of DC delivered in (a) traditional high schools; (b) stand-alone ECHSs; and (c) school-within-school ECHSs based on data from Texas. Texas is an ideal setting because the state has been a leader in expanding DC access and participation and serves a diverse population of students (Fink et al.,

2023). Two research questions guide our empirical work:

1. To what extent do DC courses increase the cost of K-12 education over a typical high school course, and how do costs differ across three delivery models (traditional comprehensive high schools, stand-alone ECHSs, and school-within-school ECHSs)?
2. To what extent does DC shift the cost of K-12 education among community colleges, high schools, and families? How do shifts in costs differ across different delivery models and tuition agreements?

Below, we synthesize extant DC literature and then describe the Texas policy context. We then discuss our data and analytic approach, findings, and implications for policy and future research.

Background Literature

Supported in part by investments from state education agencies and private philanthropies such as the Bill and Melinda Gates Foundation (Walk, 2020), enrollment in DC programs has grown exponentially in the last two decades, both nationally (Taylor et al., 2022) and in Texas in particular (Miller et al., 2018).

Impacts of Dual Credit on Student Outcomes

Research on DC finds positive effects on postsecondary enrollment and completion (Cowan & Goldhaber, 2015; Grubb et al., 2017; Ison, 2022; Lee et al., 2022; Speroni, 2011a; Taylor, 2015). It is important to note, however, that students self-select into DC programs, which means DC students may have greater motivation or support with postsecondary planning (Duncheon, 2020b), even relative to their peers with similar prior test scores. Thus, simple comparisons of outcomes between DC students and non-DC students may be biased. To minimize this bias, some studies leverage exogenous variation in students' DC course taking to estimate credibly causal estimates (Allen & Dadgar, 2012; Hemelt et al., 2020). Using a

regression-discontinuity approach based on a placement exam for DC, Speroni (2011b) finds students taking a DC algebra course had better college outcomes compared to similar students who scored just below the placement cutoff and did not take that course. Miller et al. (2018) use an instrumental variables approach based on a measure of access to DC (prior cohort DC enrollments). They find DC increases two-year degree enrollment and completion and reduces time to degree among four-year degree completers.

Despite overall positive effects, disparities exist in both DC access and impacts for historically underrepresented students (Xu et al., 2021). While students of color and low-income students who participate in DC have better postsecondary outcomes than their counterparts who do not participate (Henneberger et al., 2020; Lee et al., 2022), some studies suggest DC participation produces smaller positive effects for students from these subgroups than for students who are White and/or from higher income families (Fink et al., 2017; Miller et al., 2018; Taylor, 2015). In some contexts, DC offers less support to students than they might receive in other courses (Spencer & Maldonado, 2021). As a result, students with less academic preparation may not benefit from DC as much as more academically prepared students.

In contrast to one-off DC courses offered in traditional high schools, ECHS programs target historically disadvantaged students, and in some cases limit admission to these student populations (Atchison et al., 2019; Berger et al., 2010; Song et al., 2021). ECHSs provide more intensive resources for students, including academic assistance and social and emotional supports (Duncheon, 2020a). Based on a multisite randomized trial, studies by Edmunds et al. (2017; 2020) find that ECHSs increase rates of postsecondary access and degree completion for students on average, with larger effects for students of color, first-generation collegegoers, low-income students, and those classified as “academically underprepared” for ninth grade. ECHS have

greater teacher retention on average, even as lower-income students and students of color are disproportionately exposed to chronically high turnover and under-resourced schools (Alemán, 2007; 2009; Baker et al., 2020; Knight, 2017; 2019; 2020; Knight & Mendoza, 2019). As DC has expanded in Texas and nationally, school districts and colleges have recognized the important role of ECHS to expand DC access and equity (Duncheon & Hornbeck, 2023).

Yet scaling up DC, whether one-off courses or ECHS, requires the sharing of resources across the secondary and postsecondary sectors via partnerships between K-12 districts and 2- and 4-year institutions (Duncheon & DeMatthews, 2023). Extant studies do not consider how DC shifts educational costs between school districts and colleges, information that is critical to inform DC policy designs. Below, we turn to costs and resource considerations related to DC.

Dual Credit Costs and Resource Allocation

Research on the cost of DC has primarily focused on the relative monetary returns, startup costs of ECHS, or funding and state policy issues (Leonard, 2013; Roza, 2017; Webb, 2004). For example, in addition to assessing the causal impacts of DC, Miller et al. (2018) examine the costs and consider how they compare to the monetized benefits. The authors show that DC implementation requires resources over and above typical high school courses that result in costs of about $111 per credit hour per student (or about $333 per student for a single three-credit DC course). Results showed community colleges incurred a larger share of overall costs, but the authors did not examine how different delivery models shift costs for individual districts or schools, including for school-within-school ECHS models – a key element for understanding how to scale DC equitably and sustainably. The study connected these costs with impact estimates, concluding that the positive impacts of participation in DC produce monetary benefits that exceed costs by a factor of 4.98 to 1. Benefit-cost studies of ECHSs have reached findings

within this range, or larger (e.g., Atchison et al., 2021; Berger et al., 2014).

None of the above studies consider how implementation of DC under different course delivery models shifts costs among school districts, partnering postsecondary institutions, and other stakeholders such as students or external funders, within specific school contexts. Yet related studies indicate DC has implications for resource allocation within and across systems. Hornbeck and Malin (2019) survey school district superintendents in Ohio, who report that DC potentially redirects funds away from existing programs because districts incur costs to implement DC. In many states, including Texas, DC students generate both the same K-12 funding for school districts as non-DC students, and semester credit hour funding for community colleges (Roza, 2017). States often cover the tuition fees on behalf of students, but programs vary widely (ECS, 2016; Pierce, 2017). Determining equitable approaches to structuring cross-sector postsecondary partnerships requires greater understanding of shifts in cost burden. Such evidence can provide policy guidance for scaling up DC, choosing DC delivery models, negotiating tuition arrangements with postsecondary partners, and determining what share of high school tuition to cover for students and in what contexts. Below we elaborate on our research design, describing first the DC context of Texas, then our data, and finally our approach to assessing the costs of DC under different delivery models.

Research Design

Texas DC Policy Context

Texas law requires high schools to offer at least 12 credits of DC courses to eligible high school students[1], which means all students in the state are legally guaranteed access to one-off

[1] Texas administrative code defines DC 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).

DC courses. The state's ECHS Blueprint codifies the required design elements of ECHSs, both stand alone and school-within-school, such as recruiting and enrolling historically underserved students and using lottery-based admissions in over-enrolled schools (Texas Education Agency [TEA], 2021). Table 1 shows summary statistics for Texas DC courses disaggregated by the three delivery models—traditional high school, stand-alone ECHS, and school-within-school ECHS—for school years 2015-16 to 2017-18, the focal years for our study. As shown in Panel A, an average of about one million semester credit hours were granted each year across 1,365 high schools in Texas. Most DC is offered in traditional high schools (73%), but 64 stand-alone ECHSs and 84 school-within-school ECHSs were in operation during our data frame.

The bottom panel of Table 1 shows how DC is delivered across the three models in terms of modality, location, and instructor of record. Most DC is administered in a face-to-face or hybrid setting (87%), and online DC is slightly more common in traditional high schools as compared to ECHSs. The location is approximately split between high school and community college campuses, but about three-fourths of DC in ECHS is delivered on the college campus. About three-fourths of all DC courses are taught by community college instructors, and college instructors are more common within ECHSs than in comprehensive high schools, reflecting the fact that ECHS students are more likely to take the course on a college campus.

< INSERT TABLE 1 AROUND HERE >

Analytic Approach

We use the ingredients method to estimate cost (Levin et al., 2018). First, we identify all resources involved in DC implementation. As with most educational programs, the largest resource is personnel time, including community college and school district staff time, faculty training, certification, and professional development. Other "ingredients" required to implement

DC include curriculum materials and textbooks, and travel costs for instructors and students. Tuition payments between school districts and community colleges as well as faculty stipends are not considered resources or costs. Instead, we account for these funds as cash transfers in our analysis of how the costs of DC are distributed among stakeholders. State and local tax revenues for school districts and community colleges also represent cash transfers rather than ingredients or resources, but we exclude these costs from our analysis entirely since they do not shift the DC cost burden among stakeholders in the same way as tuition policies.

Some personnel, such as a Dean of Dual Credit, allocate all their time to implement DC; however, many other staff at both community colleges and school districts, such as building deans, counselors, principals, associate superintendents, and associate deans, allocate only a portion of their time to DC. In these cases, we relied on interview data to determine the proportion of time assigned to DC. For example, for a community college administrator who estimated they spent 20 percent of their time on DC, we included 20 percent of their total annual salary and compensation as a cost. If that individual spent an even share of their time across all DC at their respective community college district, then that cost was prorated across all school districts to determine a per-student and per-semester credit hour annual cost. If that individual reported allocating additional time to particular schools, such as ECHSs, we allocated their FTE costs accordingly. We interviewed multiple administrators in each of the two community college districts and five partnering school districts, for a total of 14 interviews across all school sites.

In the second step, we assign prices to each ingredient. Cost of personnel time is based on total salary and fringe benefits for each given occupation title, based on the Bureau of Labor Statistics Occupational Outlook Handbook (2017), which provides national average compensation levels. We use a national average so that costs are reflective of typical settings, but

results are not substantially different when we use local salaries and benefits. Costs for materials and travel are taken directly from publicly available budget data or from national sources. In the last step of our analysis, we assess how costs are distributed among stakeholders, including community colleges, school districts, external philanthropic funders, and students and their families. We report cost as an annual total amount and on a per-semester credit hour (SCH) basis and adjust values to 2016-17 dollars to account for inflation. Community college and school districts' total investment in personnel and non-personnel resources for DC largely depends on the amount of DC being offered, where institutions generally need more resources to offer more dual credit SCH. Our primary outcome measure, then, is the annual cost of DC per SCH, but we also report total annual costs and annual costs per student for clarity.

Data

Our analysis combines statewide longitudinal datasets with a smaller qualitative data sample covering two community college districts. Statewide data are provided through data sharing agreements with the Texas Higher Education Coordinating Board and include information about the number of DC taken at each community college and partnered high school, and various features of the course including the location and instructor type. We combine these data with publicly available datasets from the Texas Education Agency that examine per-student staffing levels and average class sizes for all high schools in Texas. Both datasets cover three years, 2015-16, 2016-17, and 2017-18.

Qualitative data were collected during the fall and spring of the 2016-17 school year. To obtain a qualitative sample that reflects the broader DC policy context, we used the quantitative data to determine dominant approaches to DC delivery. We first identified community college districts partnering with at least one district that offered DC coursework in both traditional high

school and an ECHS setting. Of the 50 community college districts operating in Texas during our study period, 29 fell into this category, and these districts tended to be larger, awarding an average of 42,000 semester credit hours per year on average compared to about 12,000 for community college districts not offering DC through both traditional high schools and ECHSs. Within the group of 29, community colleges varied widely in the percent of courses taught on high school or college campuses and by high school or college instructors. We sought two community college districts that offered contrasting DC instructor types and locations, in addition to including multiple delivery models (traditional high school, and ECHSs). We selected two community college districts, based on a convenience sample of districts with whom we have conducted research in the past, that each relied primarily on one of two DC instructor types, high school versus college.

Within each community college district, we identified two to three K-12 school districts to serve as case studies. We chose school districts that had both traditional high schools and ECHS, established partnerships with community colleges for at least five years, and were among the larger districts partnering with the community colleges, as these districts were most likely to reflect the broader patterns of resource allocation. These selection criteria reduced potential school districts down to three to four, and from there we selected districts with whom we had strong existing relationships, where we felt we would be able to obtain the most reliable and valid data.

Summary statistics for our two selected community college districts are shown in Table 2. The first college, Mountainview Community College (MCC, a pseudonym) partners with about 40 high schools across about seven school districts. MCC is in an urban area serving primarily low-income students. MCC's DC model emphasizes ECHSs, face-to-face instruction

provided primarily by high school teachers on high school campuses. Students attending one of the region's nine ECHSs are far more likely to travel to a community college campus and receive DC instruction from community college faculty (see Panel B of Table 2). Our second community college district, Riverview Community College (RCC), uses a different approach. RCC partners with 64 high schools across about 20 school districts, including both higher-poverty districts and a small number of more affluent districts. Both MCC and RCC are community college districts with multiple campuses. RCC's DC model includes only two stand-alone ECHSs, but partners with seven school-within-school ECHSs. RCC relies primarily on community college faculty to teach DC. While most courses are taught on high school campuses, many students travel to local RCC campuses for classes, especially students enrolled in the region's ECHSs. Figure 1 plots the percent of DC courses at each school taught on a high school campus (rather than community college campus or other location) and taught by a high school teacher. The graph shows a similar pattern as in Tables 1 and 2, in which the two colleges provide contrasting approaches to implementing DC and most schools in the state adopt some mix of these approaches. At the time of the study, districts partnering with both community colleges were actively expanding DC offerings and opening new ECHSs.

< INSERT TABLE 2 and FIGURE 1 AROUND HERE >

Findings

Findings are shown in Tables 3 to 5 and Figure 2 and are organized into two sections, in line with our two research questions. We first describe the annual cost of DC across delivery models and then explore how those costs are shared across stakeholders.

Annual Costs Per Semester Credit Hour

Table 3 shows a summary of cost estimates of DC for all five school districts in our

sample. Cost estimates for DC that takes place within *traditional high schools* range from $116 to $122 per semester credit hour (SCH) in MCC but are lower in the two districts in our sample partnering with RCC, $98 and $59 in School Districts 2A and 2B, respectively. RCC's lower per-SCH cost in traditional high schools stems from differences in the instructor of record, the central office staffing models (what central office departments and administrators are involved in DC implementation), and the scale of implementation (number of SCH per student). Different tuition agreements affect how costs are distributed among stakeholders, but do not affect the overall societal costs. RCC costs in traditional high schools are lower per-SCH than MCC because (a) a greater number of full-time community college instructors teach courses; and (b) because the college has a more diffuse and less robust DC administration compared to MCC, as described further below. A larger scale of operation also helps reduce per-SCH costs at the school level; however, there are few fixed costs at the school or student level other than student testing and transportation. Some district and college-level administrative positions that are full-time assigned to DC represent fixed costs in that their time allocation to DC does not vary with SCH; however, school-based administrators and counselors reported allocating their time to DC commensurate with DC enrollment levels, implying that most school-level costs vary with SCH. As a result, there is only moderate savings available from a larger scale of operation at any given school, whereas greater economies of scale exist at the district and college level.

The second set of columns in Table 3 shows cost estimates for DC in stand-alone Early College High Schools (ECHSs), which are present in MCC, but not RCC. For all three districts, the *total* costs in stand-alone ECHSs are significantly higher, an average of about $340,000 per year across the three districts, resulting from a larger total number of annual SCH at the school, but the cost *per SCH* is lower than in the traditional high schools in the same districts, ranging

from $75 up to $96 per SCH. As we describe further below, lower per-SCH costs in stand-alone ECHSs result in part because a greater proportion of costs are fixed and do not increase with increases in SCH, suggesting ECHSs likely benefit from economies of scale for DC coursework. Cost estimates are generally higher for DC delivered through school-within-school ECHSs, shown in the final set of columns in Table 3.

< INSERT TABLE 3 AROUND HERE >

Costs Generated from Community Colleges

Community colleges invested personnel time of administrators and instructors and provided stipends to community college instructors to conduct peer-evaluation of high school DC teachers. For DC delivered in traditional high schools, the per-SCH cost just for MCC is similar across the partnering districts 1A, 1B, and 1C, amounting to $54, $59, and $64 per SCH, respectively (see Table 4). Community college costs were higher for RCC, at $72 per SCH in both school districts 2A and 2B due primarily to instructional models, where RCC has greater reliance on full-time college faculty, rather than administrative costs, which are lower in RCC. Administrators in both community colleges reported allocating time to support implementation of DC roughly equally across specific K-12 school districts and schools, commensurate with the amount of SCH completed at each school. For example, both colleges maintain Dean of DC who allocates 100% of their time to DC, so we prorate their time cost evenly across all schools commensurate with the proportion of SCH.

Several departments within the MCC and RCC central offices are involved in the implementation of DC, in addition to instructional personnel and the Offices of the Dean of DC. These include, for example, the Office of Student Services, Academic Counseling Department, Offices of Instructional Deans, Office Instructional Technology, and the Testing Center

(department names are pseudonyms to protect anonymity). The Dean of DC's Office, Office of Student Services, and the Counseling Office at both colleges all had specific staff members devoted exclusively to DC administration, with administrative assistants supporting these roles. Faculty coordinators at both community colleges conduct instructor evaluations, paid for through course releases to more senior college instructors. MCC incurred greater costs specifically for faculty evaluation and certification because most DC at MCC is administered by high school instructors who are more likely to be newer and require initial certifications and annual evaluations. Unlike RCC, MCC also assigned a campus dean and full-time administrative liaison to work with each school district's ECHSs, increasing costs in those schools. RCC did not allocate additional personnel resources for DC delivered at ECHSs, but they did use different tuition agreements and textbook arrangements than MCC, which we discuss in greater detail in the next section discussing cost burden.

Costs Generated from School Districts

School district central office and school-based personnel invest salaried work time to implement DC, and ECHSs maintain extra staffing levels to support DC implementation, both of which result in additional costs for DC. Districts incur *non*-personnel costs including college textbooks, student and staff travel costs, materials for Texas Success Initiative (TSI) Assessment bootcamps, and payments to College Board for TSI testing units (which students need to be eligible for college-level coursework). Some districts also pay stipends to their DC teachers and pay tuition on behalf of students, and these expenses represent costs to the district, but because these expenses represent cash transfers across stakeholders, rather than actual resource use resulting in additional costs to society to implement DC. Districts do not incur additional costs for allocating teacher instructional time, because DC courses also count as high school courses,

and high schools do not need to provide extra staffing for regular high school classes.[2]

School district staffing and resource use for DC varied widely across districts and within districts across delivery models (traditional high school, stand-alone ECHS, or school-within-school ECHS). Costs related to district central office administration ranged from as low as $4,744 for DC in Districts 2B's traditional high schools, or about $3 per SCH, up to $18,911 in District 1B's school-within-school ECHSs, or about $40 per SCH. Higher administrative costs relate to higher staffing levels. For example, District 1B allocated a full time DC liaison, and that individual allocated extra time to ECHSs, whereas in District 2B, the associate superintendent for high schools was not involved in DC and the DC coordinator was funded only at 0.50 FTE. As reported in district interviews, district central office staff who allocate time to support DC implementation include TSI bootcamp administrator and test proctors, associate superintendents, assistant directors of warehouse, directors of Language Proficiency Advisory Committees, and district instructional specialists.

The overall cost per SCH for districts also varied widely across delivery models. For DC delivered in traditional high schools through MCC, Districts 1A, 1B, and 1C incurred similar per-SCH costs of $55, $52, and $52, respectively, but district costs for traditional DC in districts partnering with RCC (Districts 2A and 2B) incurred costs of $7 and -$37. Negative costs for districts result from students receiving instruction from community college instructors during regular school days. During interviews, principals reported increased DC enrollments allowing for lower teacher staffing needs and quantitative administrative data show reduced teacher-

[2] When a high school teacher teaches a DC course, the high school does not incur additional teacher time costs. Districts could incur teacher time costs to implement DC if, for example, teachers were reallocating their planning periods or non-student time to focus on DC instruction, or if DC courses necessitated smaller class sizes. In our interviews with principals, none reported that teachers were substantially reallocating their non-student time in response to implementing DC, and DC implementation did not require reduced class sizes.

student ratios in schools with a greater number of students taking DC from community college instructors. In other words, the negative costs experience for some schools represents genuine cost savings, rather than simple reallocation of resources for other purposes. Contexts where a greater number of DC courses are taught by community college instructors typically result in fewer costs incurred for school districts, a topic we discuss in a greater detail below.

To teach DC courses, teachers are required to hold a master's degree in the subject area, or a master's degree and 18 credits in the subject area (Horn et al., 2018), so hiring high school teachers to teach DC courses can require new investments in teacher training. At MCC, a local philanthropic group provided funding to support scholarships for teacher credentialling, to encourage a greater number earn their master's degree. Given the large number of students these teachers serve, these cost estimates are relatively low, ranging from $2 to $7 per SCH.

Student Transportation Costs

Finally, students generate costs to participate in DC due to a need for transportation. School district leaders reported providing some transportation to students, typically from the high school to the community college, but noted that some students preferred to provide their own transportation. Stand-alone ECHSs avoid transportation costs because ECHS campuses are located within walking distance to a community college as part of the design. Transportation costs are generally lower in MCC because a greater share of DC courses is taught in the high school by high school teachers. School districts partnering with RCC more often have college instructors teaching courses in high schools, but a relatively larger number of courses are taken at one of the RCC community college campuses (see Figure 1 and Table 2). Among schools partnering with RCC, transportation costs are largest at District 2B's traditional high school, where fewer DC courses are offered on campus. District 2A's traditional high school offered

more DC courses on campus, resulting in lower transportation costs, while District 2A school-within-school ECHS made a more concerted effort to transport students to community college campuses, resulting in greater transportation costs. Students receiving DC through RCC also incurred textbook costs as described above, and paid tuition. Tuition payments do not result in new costs, but affect the distribution of the cost burden, a topic to which we turn next.

Distribution of the Cost Burden

Table 4 shows the distribution of costs for community colleges, school districts, external funders, and students, and Figure 2 displays those results visually. In the two subsections below, we describe how costs are distributed differently for each of the three delivery models.

Distribution of Costs for DC in Traditional High Schools

Results for DC in traditional comprehensive high schools are shown in the first three columns of Table 4 labeled. We find the share of costs differs depending on both local policy and DC delivery model. For the three sample districts in MCC, School District 1A, 1B, and 1C, community colleges bear 47%, 51%, and 52% of total costs, while school districts account for 48%, 44%, and 43%, respectively. External grants account for most of the remaining costs, resulting from philanthropic donations that support teacher credentialing. Students at MCC incur no costs other than transportation to community colleges, representing less than one percent of total costs (and typically just a few dollars per student per course). The distribution of costs for DC in traditional comprehensive high schools is similar across the three school districts in MCC because each has similar tuition agreements, district staffing models, and DC instructor roles (primarily high school teachers).

In contrast, we find the two districts partnering with RCC, School District 2A and 2B, have substantially different distributions of costs. Most DC at RCC is taught by community

college instructors, which increases the proportion of costs borne on the community college. RCC also waives tuition payments on the first 12 credits of DC a student receives in traditional high schools, further reducing the share of costs for school districts. In School District 2A, community college resources account for 73% of costs, the district accounts for 7%, and the remaining 19% of costs fall on students and families. While School District 2A's costs are considerably lower than the districts partnering with MCC, the district incurs some costs. District 2A covers half the cost of textbooks for students in traditional high schools and allocates specific staff members to DC at both high schools and the central office. District 2A's high schools include college advisors and an academic dean, who devote a portion of their time to DC. Within District 2A's central office, instead of a DC Liaison (employed in the central office of Districts 1A, 1B, and 1C), the district assigns about 0.25 FTE of the College and Career Readiness Senior Director to work on DC, and an associate superintendent for high schools, a district registrar, and a group of TSI exam proctors also allocate a portion of time to DC.

District 2B employs TSI proctors and allocates a small portion of time of the College and Career Transitions Senior Director but does not allocate any other central office staff to DC. Instead, District 2B uses a part time DC coordinator, a position that requires fewer qualifications (and receives a lower salary) compared to an Associate Superintendent. In each high school, District 2B employs a DC coordinator, but the district does not employ college advisors for DC (like District 2A) and academic deans and assistant principals are not involved in any aspect of DC implementation or coursework. District 2B does not cover the cost of textbooks but benefits from the tuition remissions that RCC provides for all partnering districts. As with District 2A, District 2B reduces teacher FTE when students take DC coursework taught by RCC instructors. These cost savings, combined with limited investments in DC, result in District 2B incurring a

negative proportion of DC costs (i.e., cost savings). As shown in the first set of columns in the bottom panel of Table 4, of the total per-SCH cost of DC in District 2B, $59, RCC devotes $72 per SCH worth of resources (123%), the school district saves $37 per SCH (-63%), and students account for $24 (41%).

Distribution of Costs for DC in Early College High Schools

The next two sets of columns in Table 4 show the costs for DC in stand-alone ECHSs and in school-within-school ECHSs. As noted earlier, each district partnering with MCC operates one stand-alone ECHS and multiple school-within-school ECHSs. MCC waives tuition for DC in ECHSs, but charges $100 per SCH for all other DC and all three districts in our sample pay those fees on behalf of students. Neither School District 2A or 2B operates a stand-alone ECHS, but District 2A supports several school-within-school ECHSs. RCC waives tuition for DC in traditional high schools, but not for DC in ECHSs (the reverse of MCC). Stand-alone ECHSs are generally located on or near a community college campus, making it possible for high school students to take much of their high school credit bearing coursework on the community college campus, in classes taught by community college instructors. Our data show that, as a result, while school districts provide additional resources to support ECHS students, such as extra college counselors, districts are better positioned to send students to a neighboring community college (often across the parking lot), allowing ECHSs to reduce teacher staffing levels even more so than in traditional comprehensive high schools. Across the three districts in our sample partnering with MCC, for stand-alone ECHSs, the community college accounted for the majority of DC costs, 93%, 77%, and 112% in Districts 1A, 1B, and 1C, respectively. The costs borne on the community college for DC in District 1C's stand-alone ECHSs is $85 per SCH, which exceeds the per-SCH cost of all resources allocated for DC administered in that school. This

happens because the district has negative costs that result from reduced teacher staffing and tuition waivers that MCC provides to all ECHSs in the region.

< INSERT TABLE 4 and FIGURE 2 AROUND HERE >

The distribution of costs for DC administered in school-within-school ECHSs is similar for districts in our sample partnering with MCC except districts take on slightly more of the costs than in stand-alone ECHS because more of the courses are taught by high school teachers (rather than MCC instructors). In contrast, for school-within-school ECHSs in School District 2A, which partners with RCC, the majority of costs are borne on the school district, 56%, while the community college accounts for 38%, and students are relatively shielded from costs (unlike for DC in traditional high schools in the same district), paying only 6% of costs, or about $7 per SCH. Districts in this context pay a higher share of costs because more of the courses are taught by high school instructors. Students pay a much smaller proportion of costs because District 2A elected to cover the cost of textbooks in ECHSs (but not in their comprehensive high schools) and pays tuition on behalf of its students (RCC only grants tuition waivers for DC in comprehensive high schools). In short, the two community colleges in our sample have reverse tuition policies, with one granting waivers for DC only in ECHSs and the other granting waivers for DC only in comprehensive high schools. Then, districts vary by whether they cover textbooks and tuition – the districts partnering with MCC cover tuition and textbook costs for students in all schools. In RCC, District 2A pays for textbooks for ECHS students and any tuition fees beyond the 12 credits that RCC waives, but only pays half of textbook costs and no additional tuition fees for students in comprehensive high schools. District 2B does not cover tuition or textbook costs for DC in comprehensive high schools and does not operate any ECHSs.

Discussion and Implications

This study assessed the cost of DC under different delivery models, including traditional high schools, ECHSs, and school-within-school ECHSs. We find both models of ECHS utilize more support staffing and are generally more costly overall; however, students in stand-alone ECHSs complete a larger number of SCH than those in traditional high schools or the school-within-school model, both on average across the state, and for the schools in our sample, and as a result, the per-SCH cost in stand-alone ECHSs is the lowest among the three delivery models. Rather than focus on statewide per-SCH costs, we designed the analysis as a multi-case study, allowing us to describe specific examples of how district-community college DC partnerships shift the costs of K-12 education. Using this approach, we find that when DC is administered in traditional high schools, with a large share of courses taught by high school teachers, and districts covering the cost of tuition, partnering school districts and community colleges share a similar share of the overall costs. However, ECHSs tend to shift costs toward community colleges and away from school districts, primarily because a greater share of classes is taught on college campuses, by community college instructors, and tuition models are not necessarily sensitive to changes in cost burden associated with different delivery models. The study provides insights for policy and practices along several lines, including DC funding policies, tuition agreements, student fiscal equity, and economies of scale. We expand on each of these below.

Funding Policies

While DC students generate the same regular K-12 formula funding as non-DC students, districts rarely receive *extra* funds for DC, despite incurring additional costs.[3] But the amount of additional costs incurred depends on the DC delivery model. For high schools in which

[3] Some DC courses are career and technical education (CTE) and many states including Texas provide additional funding for CTE coursework (Ryu et al., 2024). Students must spend at least four hours per day on their high school campus to generate full K-12 funding (TTARA, 2022), and almost all DC students meet this requirement.

community college instructors teach most DC courses, such as in the District 1A's stand-alone ECHS, or District 2B's traditional high school, the school district can reduce staffing and incur negative costs through DC. The case study examples presented in this study highlight the complexity of designing equitable funding policies, but also provide some guidance. In particular, states could consider providing extra funding for DC courses taught by high school teachers on high school campuses. Alternatively, states could provide extra funds for student textbooks and transportation to DC courses. States may consider avoiding allocating extra funds to school districts for DC courses taught on college campuses by college instructors, a model common in ECHS. Texas legislators have typically allocated block grants to ECHSs, rather than designing a specific formula tailored to student SCH type or student need (TEA, 2021).

From the community college perspective, SCH funding may not always be sufficient to cover the basic costs of DC. Community colleges receive about $40 per SCH from the state of Texas for academic courses, which are the majority of courses taken by DC students (Miller et al., 2018). For DC delivered in the context of a traditional high school, community colleges incurred a cost of $54, $59, and $64 in School Districts 1A, 1B, and 1C, and a cost of $72 in both the School Districts 2A and 2B. Community colleges incur greater costs in both ECHSs models, where a greater share of courses are taken on college campuses with college instructors. Engaging with DC may still be beneficial for community colleges as a mechanism for increasing enrollment, including students who may continue their studies beyond high school graduation. To summarize, in Texas as in many states, school districts and community colleges both receive funding for DC students in most cases. Yet, we find that community colleges generally bear a larger portion of costs, especially in DC models where college faculty serve as instructors and where colleges waive tuition agreements.

Tuition Agreements

When school districts and community colleges form partnerships, a key aspect of their formal agreement pertains to the tuition arrangement, where each stakeholder has relatively wide flexibility (Pierce, 2017). Districts can elect to pay for tuition on behalf of students and may choose to differentiate tuition remission based on DC delivery context or student background. Community colleges can reduce or waive tuition charges for DC students, and most have separate tuition schedules depending on whether students live within the community college taxing district. National survey data show that while most school districts provide additional funding for DC, 22% of schools that offer DC provide no funding and instead have agreements that assume students or families, local community colleges, or other entities will incur additional costs (NCES, 2020). The two community colleges in our sample have essentially opposite tuition policies. MCC charges districts $100 per SCH for DC in traditional high schools and waives tuition payments for ECHS students. RCC, in contrast, waives tuition for the first 12 credits of DC in traditional high schools, but charges districts $100 per SCH for DC taken in ECHSs, including school-within-school ECHS. In both contexts, the community colleges waive tuition if the course is taught by a high school teacher, but that approach is far more common at MCC than in RCC. Even when high school faculty teach a DC course, community colleges incur costs, as their faculty coordinators must evaluate both high school teachers and physical classroom spaces such as labs and equipment.

While the data suggest that districts may be considering differences in cost burden when designing tuition agreements, closer alignment between cost burden and tuition policies would prevent one sector from sharing a disproportionate amount of the cost burden relative to funding amounts (Belfield et al., 2023). Our results suggest that under current policies, community

colleges should consider increasing their tuition charges to school districts, particularly for ECHSs where many students take courses on the community college campus. While analysis of state and local tax revenues is beyond our scope, we note that Texas community colleges also receive approximately $38 per semester credit hour through formula funding (Miller et al., 2018), and these funds factor into decisions about whether to introduce or expand DC.

Student Fiscal Equity

We find variation across districts and DC delivery contexts in tuition burden for students, highlighting important equity issues. While DC was initially designed as a mechanism to accelerate high school academics (Taylor, 2015; Taylor et al., 2022; Xu et al., 2021), ECHSs were established to expand access to postsecondary education. The ECHS blueprint requires individualized supports intended to ensure all students have equal opportunity to complete a postsecondary credential (TEA, 2021). A key finding from our study highlights the wide differences in cost burden for students. As noted above, to formalize district-community college partnerships, the two parties sign a Memorandum of Understanding that outlines tuition agreements, instructor policies, and other guidelines for DC implementation. Colleges determine a specific tuition rate for school districts and then districts can decide whether and how to cover student tuition and other fees. Of the two districts in our sample that partnered with RCC, one paid for tuition on behalf of DC students who qualified for free or reduced-price meals, while the other provided no tuition assistance. Districts in our sample that partnered with MCC covered all tuition fees for students. The districts also paid for textbook costs for ECHS students and provided transportation when needed, but not for DC students in traditional high schools. The passing of Texas House Bill 8 in 2023 make substantial improvements in this area by fully subsidizing the costs of dual enrollment courses for lower-income public high school students

(Kaput et al., 2025).

Economies of Scale in ECHS

A final point pertains to the scale of operations for ECHS. Prior research suggests schools and districts benefit from economies of scale, with high schools reaching greater levels of efficiency within approximately 600 to 900 students (Andrews et al., 2002; Duncombe & Yinger, 2007). ECHS are designed to be smaller, serving approximately 500 students, with many taking courses off campus at a nearby community college. Smaller schools often have higher expenditures, and cost function studies suggest those higher expenditures are not associated with greater outcomes, implying smaller high schools are less efficient. However, students attending ECHSs complete a large number of DC courses, lowering the per-SCH cost. This finding highlights a broader argument from literature on small high schools (e.g., Lee et al., 2000; Ravitz, 2010)—that such models are not necessarily inefficient if their resources are leveraged in effective ways. ECHSs may represent an efficient use of resources because they effectively target resources that strengthen instructional rigor and college readiness for students, and inquiry-based professional learning opportunities for teachers (Atchison et al., 2019; 2021; Duncheon & DeMatthews, 2023). ECHSs exhibit greater teacher retention, which strengthens teacher-student relations and lowers costs of teacher recruitment and professional development (Barnes et al., 2007; Levy et al., 2012; Milanowski & Odden, 2007; Ronfeldt et al., 2013).

Limitations and Future Research

Our analysis omits some costs, as well as some societal benefits that could reduce costs. We are not able to assess personal costs for teachers. While we accounted for high school teacher DC stipends and master's degree tuition support, teachers invest extra time into planning for and teaching DC courses, such as designing lessons aligned to two different sets of curricula. DC

also produces benefits that lower societal costs of DC investments, which we do not account for in this study. Many community colleges face fiscal challenges from declining enrollment, especially at the start of the COVID-19 pandemic, and DC provides some enrollment stability (Baker et al., 2024; National Student Clearinghouse, 2023). Other benefits pertain to student outcomes. DC coursework is associated with reduced time to a four-year degree among enrollees (Miller et al., 2018), which reduces costs for both individuals and society. DC could also reduce overall student tuition payments for college enrollees, or reduce college debt, although extant studies have not found significant effects on these outcomes (e.g., Giani et al., 2014; Hu & Ortagus, 2023; Villarreal, 2017). The changes have important cost implications beyond the scope of the current study. Lastly, DC increases students' educational attainment and labor market earnings, and Miller et al. (2018) conclude the monetary societal benefits associated with the increased education attainment exceed the total societal cost of DC. Our focus on how DC shifts the cost burden precludes a benefit cost analysis; however, differential benefits, like costs, will shift how costs are distributed among stakeholders. As a final limitation, the study takes place prior to the COVID-19 pandemic, when most public schools and most DC courses were shifted to online delivery, and it's not clear from extant research how quickly DC shifted back to face-to-face modalities after the initial post-COVID years (Glennie & Smith, 2023).

Future research can build on our work by examining differences in student outcomes across delivery models and linking these outcomes to costs. ECHS require greater investments than traditional high schools; however, these schools implement DC at a lower cost per SCH. Further analyses of the cost of DC might consider whether ECHSs represent a more cost-effective delivery model, and whether school-within-school models maintain these outcomes.

Conclusion

As DC expands in Texas and nationally, education system leaders need to be mindful of how these reforms alter the cost burden of high school or college, for students, school districts, and community colleges. In many documented cases, school districts and community colleges receive adequate funding and provide necessary supports for DC, either through ECHS or traditional high schools, and DC students succeed and go on to further their education. However, cross-sector partnerships require complex agreements that are sensitive to shifts in cost burden. Tuition and staffing agreements must be designed to provide long-term stability to both K-12 school systems and postsecondary institutions. More equitable and sustainable resource policies will help strengthen DC implementation and expansion in the future.

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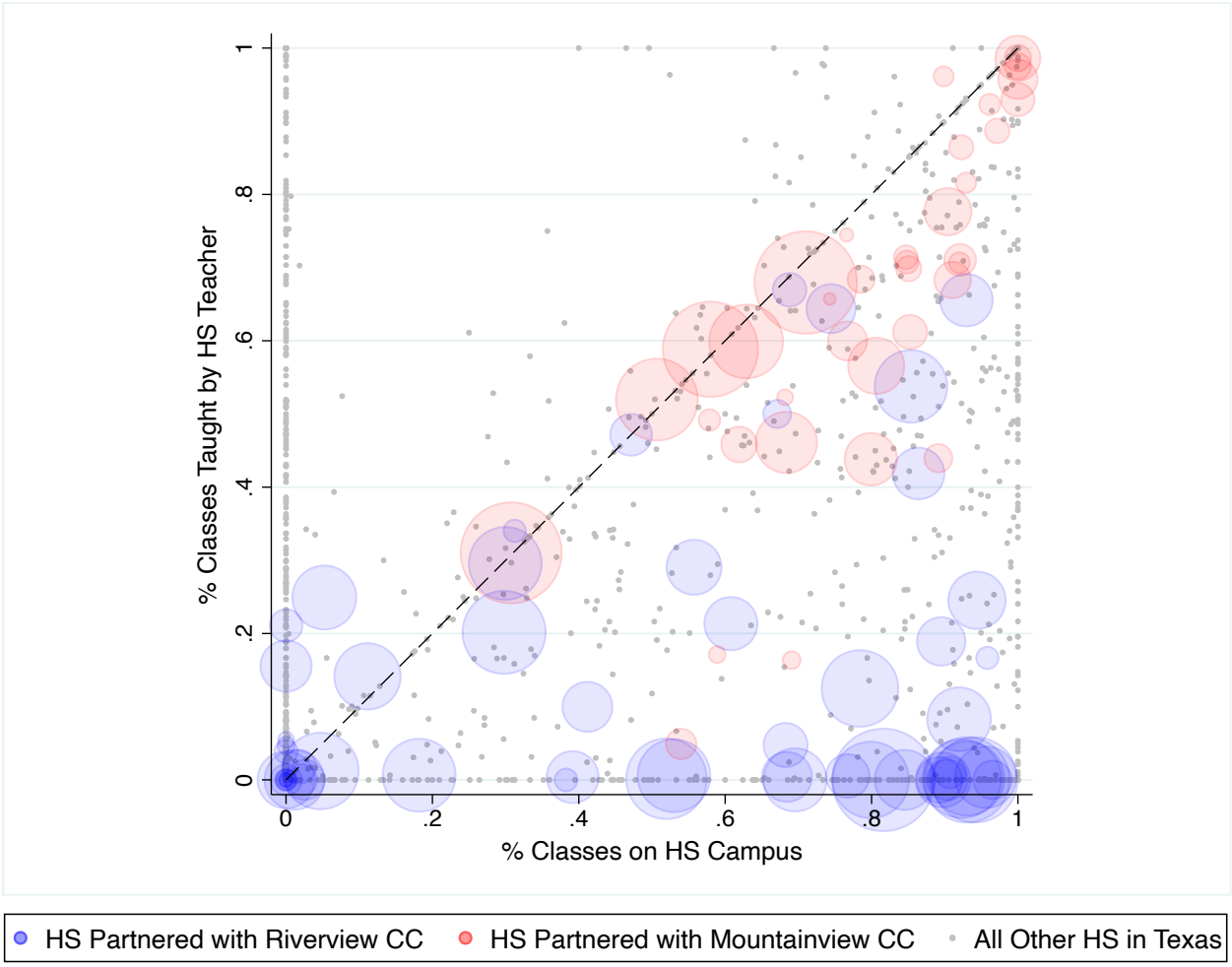
FIGURE 1

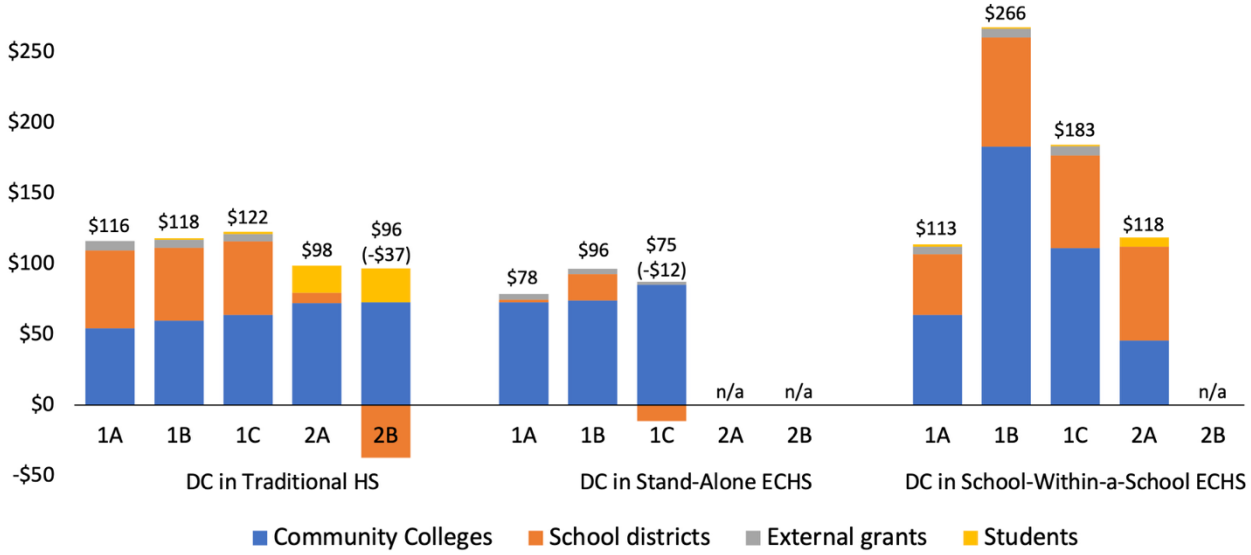
Scatter plot showing the percent of DC courses taught by high school teachers or on high school campus, three-year average, 2015-16 to 2017-18



Note. Each dot represents a high school, with size proportionate to the number of semester credit hours. The dashed line is a 45-degree line indicating schools in which, for most cases, all high school campus-based DC is taught by high school teachers, and no community college instructors teach on the high school campus. For many courses (especially, for example, at RCC), college instructors teach in high school campuses, and in more rare cases, high school teachers teach on college campuses.

FIGURE 2

Annual cost of dual credit per semester credit hour and distribution of costs across community colleges, school districts, external funders, and students, 2015-16 to 2017-18



Note. DC = dual credit; ECHS = Early College High Schools. Data reflect school years 2015-16 to 2017-18. Each bar represents a case study high school, corresponding with school district 1A, 1B, and 1C, which partnered with Mountainview Community College and school district 2A and 2B, which partnered with Riverview Community College (RCC). RCC does not have any stand-alone ECHSs and district 2B did not operate any school-within-school ECHSs at the time of data collection. Negative values for two high schools (district 2B's traditional HS and district 1C's stand-alone ECHS) and 1C represent cost saving relative to a traditional non-DC high school course.

TABLE 1

Summary statistics of DC coursework for all high schools in Texas, by DC delivery model, average over three years, 2015-16 to 2017-18

	All high schools	DC Delivery Model		
		Trad. comp. high schools	Early College High Schools	
			Stand alone	SWS
A. Number of schools, students, and semester credit hours				
Number of high schools	1,365	1,217 (89%)	64 (5%)	84 (6%)
Semester credit hours	1,082,741	791,915 (73%)	170,146 (16%)	120,680 (11%)
Average high school enrollment	1,045	1,055	457	1,359
Semester credit hours per HS	793	651	2,659	1,437
Semester credit hours per student	0.8	0.6	5.8	1.1
B. Delivery characteristics				
Instructional modality				
Face-to-face or hybrid	87%	84%	95%	89%
Online	13%	16%	5%	11%
Location of course				
High school campus	46%	55%	22%	26%
College campus	54%	45%	78%	74%
Instructor				
High school teacher	27%	30%	19%	18%
College faculty	73%	70%	81%	82%

Note. HS=high school; SWS=school-within-school; Early College High Schools. In addition to the 79 community college campuses partnering with at least one high school (out of 50 community college districts), the state's DC program includes 14 4-year institutions of higher education that partner with at least one high school, representing 5.1% of all semester credit hours during the timeframe of 2015-16 to 2017-18.

TABLE 2

Semester credit hours by delivery characteristics in two Texas community college districts, average over three years, 2015-16 to 2017-18

	Mountainview Comm. Coll.				Riverview Comm. College			
	All partner HS	Trad. comp. HS	ECHS		All partner HS	Trad. comp. HS	ECHS	
			Stand alone	SWS			Stand alone	SWS
A. Number of schools, students, and semester credit hours								
Number of high schools	39	30 77%	5 13%	4 10%	64	55 86%	2 3%	7 11%
Semester credit hours (SCH)	36,414	12,854 35%	15,750 43%	7,810 21%	58,212	46,437 80%	1,756 3%	10,019 17%
Average high school enrollment	1,368	1,468	400	1,827	1,447	1,453	161	1,582
SCH per high school per year	934	428	3,150	1,953	910	844	878	1,431
SCH per student per year	0.7	0.3	7.9	1.1	0.6	0.6	5.5	0.9
B. Delivery characteristics								
Instructional modality								
Face-to-face or hybrid	85%	68%	98%	70%	92%	91%	99%	97%
Online	15%	32%	2%	30%	8%	9%	1%	3%
Location of course								
High school campus	67%	86%	54%	78%	60%	66%	3%	28%
College campus	33%	14%	46%	22%	40%	34%	97%	72%
Instructor								
High school teacher	58%	68%	53%	58%	10%	11%	2%	7%
College faculty	42%	32%	47%	42%	90%	89%	98%	93%

Note. Mountainview and Riverview Community Colleges are pseudonyms for two of the 50 community college districts in Texas partnering with local high schools to administer dual credit education during three school years, 2015-16 to 2017-18. Some values are rounded to protect anonymity.

TABLE 3

Summary of annual cost of dual credit under three different delivery models across five school districts, 2015-16 to 2017-18

	Traditional High Schools			Stand-Alone ECHS			School-Within-School ECHS		
	Total Cost	SCH	Cost / SCH	Total Cost	SCH	Cost / SCH	Total Cost	SCH	Cost / SCH
Mountainview Community College									
School District 1A	$45,085	389	$116	$351,147	4,486	$78	$116,173	1,024	$113
School District 1B	$99,786	849	$118	$322,342	3,350	$96	$124,793	468	$266
School District 1C	$49,901	408	$122	$344,007	4,558	$75	$91,528	500	$183
Riverview Community College									
School District 2A	$111,151	1,130	$98	--	--	--	$136,612	1,153	$118
School District 2B	$106,102	1,797	$59	--	--	--	--	--	--

Note. ECHS = Early College High School; SCH = semester credit hour.

TABLE 4

Distribution of the annual cost of dual credit by stakeholder in community college districts in Texas, 2015-16 to 2017-18

	DC in Traditional High Schools			DC in Stand Alone ECHS			DC in school-within-school ECHS		
	Total Cost	Cost / SCH	% of total	Total Cost	Cost / SCH	% of total	Total Cost	Cost / SCH	% of total
Mountainview Community College									
School District 1A									
Comm. college	$21,041	$54	47%	$324,833	$72	93%	$64,955	$63	56%
School district	$21,483	$55	48%	$8,144	$2	2%	$44,015	$43	38%
External grant	$2,561	$7	6%	$18,169	$4	5%	$5,566	$5	5%
Students	$0	$0	0%	$0	$0	0%	$1,637	$2	1%
Total	$45,085	$116	100%	$351,147	$78	100%	$116,173	$113	100%
School District 1B									
Comm. college	$50,468	$59	51%	$247,340	$74	77%	$85,596	$183	69%
School district	$43,811	$52	44%	$62,159	$19	19%	$36,072	$77	29%
External grant	$4,898	$6	5%	$12,844	$4	4%	$2,975	$6	2%
Students	$609	$1	1%	$0	$0	0%	$150	$0	0%
Total	$99,786	$118	100%	$322,342	$96	100%	$124,793	$266	100%
School District 1C									
Comm. college	$25,965	$64	52%	$386,768	$85	112%	$55,394	$111	61%
School district	$21,242	$52	43%	-$52,596	-$12	-15%	$32,836	$66	36%
External grant	$2,093	$5	4%	$9,835	$2	3%	$3,271	$7	4%
Students	$600	$1	1%	$0	$0	0%	$27	$0	0%
Total	$49,901	$122	100%	$344,007	$75	100%	$91,528	$183	100%
Riverview Community College									
School District 2A									
Comm. college	$81,237	$72	73%	--	--	--	$52,266	$45	38%
School district	$8,682	$7	7%	--	--	--	$76,664	$66	56%
Students	$21,692	$19	20%	--	--	--	$7,683	$7	6%
Total	$111,151	$98	100%	--	--	--	$136,612	$118	100%
School District 2B									
Comm. college	$130,234	$72	123%	--	--	--	--	--	--
School district	-$67,280	-$37	-63%	--	--	--	--	--	--
Students	$43,149	$24	41%	--	--	--	--	--	--
Total	$106,102	$59	100%	--	--	--	--	--	--

Note. DC = Dual credit; ECHS = Early College High School; SCH = semester credit hour.