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CCRC COMMUNITY COLLEGE RESEARCH CENTER
Teachers College, Columbia University

Promising Combinations of Dual Enrollment, AP/IB, and CTE

The College and Earnings Trajectories of Texas High School Students Who Take Accelerated Coursework

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Using detailed administrative data from Texas on students who were expected to complete high school in 2015-16 and 2016-17 (with additional data from 2019-20 and 2022-23 cohorts), this report examines how students combine dual enrollment (DE), Advanced Placement (AP) or International Baccalaureate (IB), and career-and-technical-education (CTE)-focused coursetaking in high school and how different combinations of such coursetaking relate to students' postsecondary attainment and earnings trajectories at one, three, and six years from expected high school completion. We construct six distinct accelerated coursework profiles and describe differences in their associated average outcomes across student demographics. Students are categorized into one of these six profile groups:

1. Students taking DE alone.
2. Students taking DE in combination with a high school CTE focus (10 or more CTE courses).
3. Students taking DE in combination with AP/IB.
4. Students taking AP/IB without taking DE.
5. Students with a high school CTE focus alone.
6. No college-and-career acceleration (i.e., none of the above).

Our analysis focuses on whether and how college-and-career-accelerated coursework explains differences in college degree completion and earnings gains six years after high school, at the time students are roughly 24 years old. By taking into account how students combine multiple types of accelerated offerings, this study provides new insights into how various accelerated coursetaking patterns may contribute to students' educational and workforce outcomes. We also document the characteristics and outcomes of students who do not take accelerated coursework and of DE students in Early College High Schools. Findings from this analysis can help college, K-12, and state system leaders rethink how they design and support opportunities for students to take accelerated courses, with the goal of motivating and preparing them to pursue career-connected postsecondary education and training after high school. Our analysis does not account for unobserved factors that may influence how students select into different coursetaking profiles and student outcomes, so the results do not represent the causal effects of each profile.

Findings Summary

- Students who take accelerated coursework have much stronger postsecondary and earnings outcomes in their early 20s than those who do not take any accelerated coursework.
- Students who combine dual enrollment and AP/IB are less diverse in terms of income and race/ethnicity, but, by age 24, they have the strongest outcomes.
- Fewer than 5% of students combine a CTE focus with dual enrollment, but those who do exhibit strong gains in their postsecondary and earnings trajectories.
- Early College High School students are more diverse in terms of income and race/ethnicity, complete college at higher rates, and earn more, but they represent fewer than 5% of high school students statewide.

Recommendations Summary

1. Expand dual enrollment participation.
2. Dual enrollment should complement—rather than compete with—AP/IB offerings.
3. Expand access to dual enrollment for students in high school CTE programs.
4. Expanding access to dual enrollment is not enough; additional supports are needed to promote student success.

In this executive summary of the report, we provide an overview of Texas students in different college-and-career-accelerated coursetaking profiles; the representation of gender, income, and racial identities across these profiles; and the average postsecondary and earnings trajectories associated with each profile. We conclude with recommendations for practice and policy. The full report explains the data and methods used in the analysis and offers additional findings.

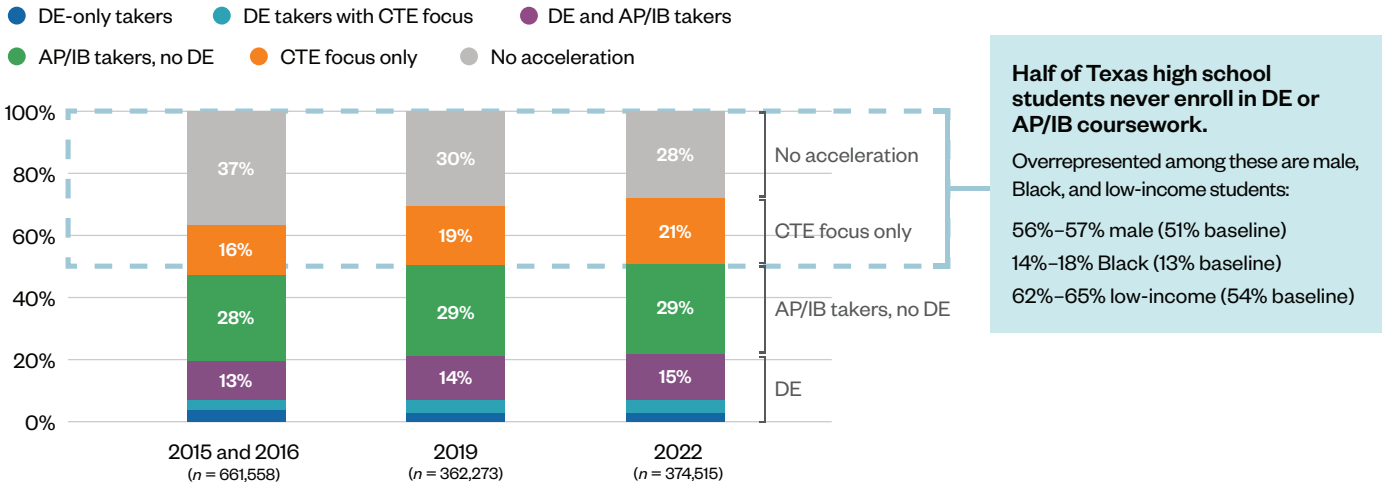
Key Findings

1. **Students who take accelerated coursework have much stronger postsecondary and earnings outcomes in their early 20s than those who do not take any accelerated coursework.** Students with no accelerated coursework have the weakest outcomes and lowest earnings by age 24. Representation by student race/ethnicity, gender, and income is not equal across the different acceleration profiles.
    - **Participation and representation.** Figure ES1 shows that the share of Texas high school students who took various combinations of accelerated coursework has changed over several years. While the number of students participating in

any college-and-career-accelerated coursework in Texas has increased, 28% of high school students expected to graduate in 2022 did not take any accelerated coursework in high school. Men, low-income, Black, and Hispanic students were overrepresented in this group. Overall, about one in every five students attempted a DE course, either alone or in combination with AP/IB or a CTE focus, and nearly a third attempted AP/IB with no DE. Participation in CTE has been growing: A fourth of students in the 2022 cohort had a CTE focus with or without DE, and a fifth had a CTE focus only.

Figure ES1.

Accelerated Coursetaking Profiles by High School Completion Cohort

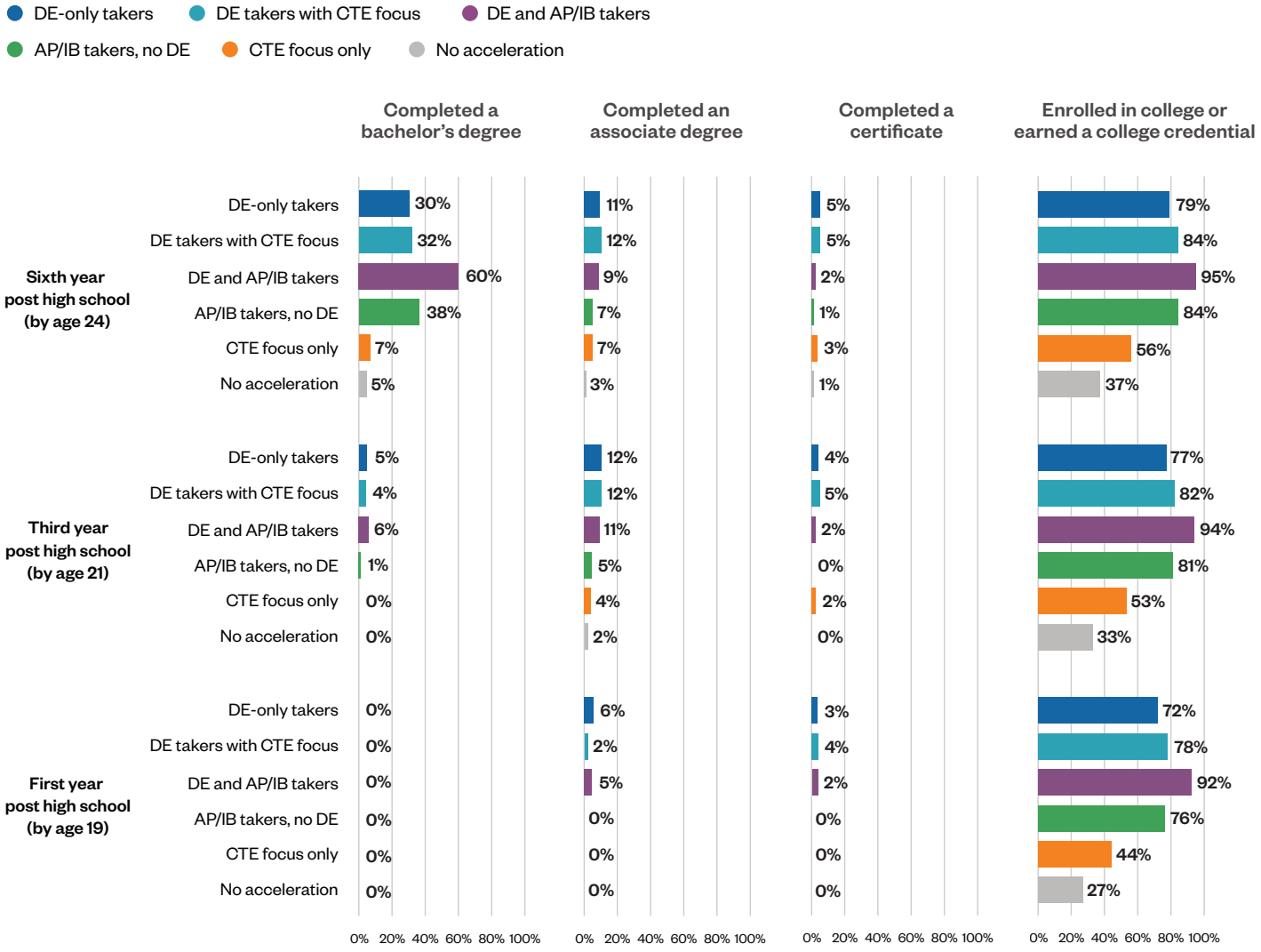


Note. Cohorts defined based on the expected academic year of high school completion: 2015-16 and 2016-17, 2019-20, and 2022-23. For simplicity, we call these the 2015 & 2016, 2019, and 2022 completion cohorts.

- **Postsecondary trajectories.** By age 24, more than 60% of students with no accelerated coursework had never enrolled at a postsecondary institution, and only 10% completed a postsecondary credential (see Figure ES2). The low credential completion rate was even lower among men (8%), low-income (6%), and Black and Hispanic students (8% each). In contrast, by age 24 (six years after expected high school graduation), the rate of credential completion was over 45% both among students who took DE—alone or combined with other accelerated coursework—and among students who took AP/IB without DE. Students with a high school CTE focus alone had a credential completion rate of 17% by age 24, which is well below that of DE and AP/IB takers but above students who took no accelerated coursework. And students who took DE alone or in combination with AP/IB or with a CTE focus had higher completion rates than students without DE coursework in the relatively short three-year period after high school (by age 21).

Figure ES2.

College Enrollment and Highest Postsecondary Attainment by Coursetaking Profile



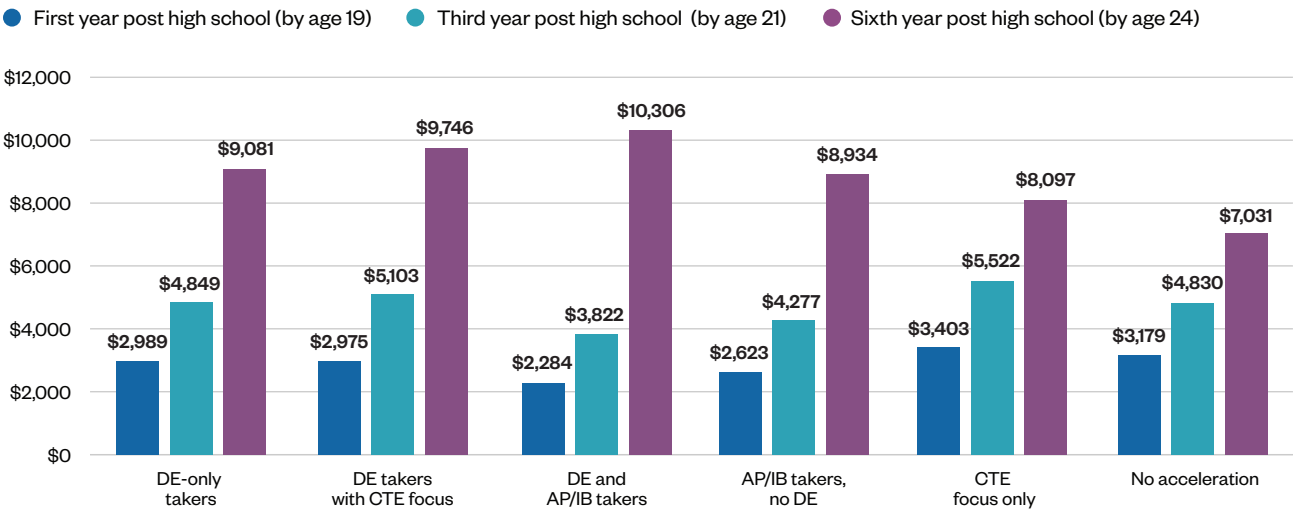
Note. Data are from the 2015 and 2016 high school completion cohorts. Outcomes are shown at the first, third, and sixth year after expected high school graduation, which corresponds to the approximate ages of 19, 21, and 24, respectively.

- **Earnings trajectories.** While students with no accelerated coursework had, on average, relatively high earnings in the first year post high school, their earnings advantage relative to other groups disappeared by age 24 (see Figure ES3). Students with no accelerated coursework reported the lowest average quarterly earnings of all students ($7,031)—20% less than the profile group with the next lowest earnings, CTE-focus-only students, even after accounting for student demographic characteristics, academic performance, and school characteristics (see full report for regression-adjusted differences in earnings). In contrast, DE students in general, and especially those who combined DE with AP/IB, had low earnings in the three years post high school. But by the time they were 24, their average quarterly earnings (ranging from between $9,081 and $10,306) were well above those of students who took no accelerated coursework. Regression-adjusted estimates controlling

for student demographic characteristics, academic performance, and high school characteristics indicate that DE students' earnings were 27% to 40% higher than the earnings of students with no accelerated coursework, with higher earnings gains among students who took DE in combination with AP/IB or with a CTE focus.

Figure ES3.

Quarterly Earnings by Coursetaking Profile



Note. Data are from the 2015 and 2016 high school completion cohorts. Results show average non-zero quarterly earnings in the first, third, and sixth year post expected high school completion in 2023 dollars. Students with no reported earnings in a given year are excluded from the analysis.

- **Interpreting these findings.** Our findings align with prior research documenting the positive impacts of DE participation on postsecondary enrollment, degree attainment, shortened time to degree completion (Institute of Education Sciences,2017; Schaller et al.,2023), and earnings (Dhaliwal et al., 2025; Henneberger et al., 2020). When implemented well, DE can help students who otherwise would not go to college aspire to, apply at, and enroll in a postsecondary institution and complete a credential (Fink & Jenkins, 2023). The fact that DE students are more likely to earn a bachelor's degree within three years post high school suggests that DE helps students to quickly enroll in college, transfer credits, and complete a program of study.

2. **Students who combine dual enrollment and AP/IB are less diverse, but by age 24, have the strongest outcomes.** After controlling for student demographics, test scores, and school characteristics and for credentials completed, DE and AP/IB takers earn significantly more than the students who take AP/IB without DE. Fewer than 5% of students take DE alone; they have postsecondary outcomes and earnings trajectories similar to those students who take AP/IB without DE.

   - **Participation and representation.** The largest accelerated coursetaking profile group was composed of students who took AP/IB courses without DE, representing nearly one third of the high school cohorts. Taking AP/IB coursework was also common among DE students, with most of them combining DE with AP/IB courses. However, there were differences in representation between DE and AP/

IB takers and those who took AP/IB without DE. AP/IB takers without DE were more representative of the overall Texas high school population compared to other accelerated coursework groups. Among DE and AP/IB takers, low-income, male, Hispanic, and Black students were underrepresented (comprising 42%, 35%, 42%, and 7% of such students, respectively, compared to 51%, 54%, 47%, and 13% of Texas students overall).

- **Postsecondary trajectories.** Combining DE with AP/IB was associated with the highest postsecondary outcomes, particularly for bachelor's degree completion. More than 90% of DE and AP/IB takers enrolled in college or completed a credential by the first year after high school; 19% earned a credential by the third year; and 71% earned a credential by the sixth year, including 60% who completed a bachelor's degree. In comparison, among AP/IB takers who did not take DE coursework, 76% enrolled by the first year, 6% earned a credential by the third year, and 47% earned a credential by the sixth year, with only 38% completed a bachelor's degree in that time. The gains associated with combining DE and AP/IB hold after accounting for student demographic characteristics, academic performance, and high school characteristics.
- **Earnings trajectories.** Taking AP/IB without DE or taking DE alone was associated with moderate earnings gains by age 24, but students with the strongest earnings gains were those who combined DE and AP/IB. Students combining DE and AP/IB earned an average of $10,306 per quarter at age 24, compared to $9,746 per quarter for students who took only DE and $8,934 per quarter for students who took AP/IB but not DE. DE and AP/IB takers hold a 14% advantage over students who took AP/IB without DE, even after accounting for student and school characteristics. DE and AP/IB takers held an earnings advantage compared to AP/IB takers without DE even among students who completed an associate or bachelor's degree. Notably, the gains associated with combining DE and AP/IB were significantly smaller among low-income students, especially among those who had completed a bachelor's degree.
- **Interpreting these findings.** A number of prior studies examine post-high-school outcomes of students who take AP courses and generally find positive effects, though with inequities in access to AP (Evans, 2019; Owen, 2024; Smith et al., 2017). However, few studies explore how combining DE with AP affects postsecondary outcomes, and those that do often grapple with the distinction between taking a course or passing the relevant AP exam. In general, these studies find that students who combine DE with AP courses or who pass an AP exam have higher postsecondary enrollment—especially at four-year institutions—and higher bachelor's completion rates than students who take DE alone (Speroni, 2011; Wyatt et al., 2015). Our results are consistent with these findings, suggesting that combining DE with AP (or IB) can amplify the benefits of each form of accelerated coursework. While both DE and AP/IB typically involve some eligibility barriers, our findings hold even after accounting for student characteristics, including test scores. Our findings suggest that combining DE with AP/IB increases the chances of degree completion by age 24, particularly among AP/IB students who would not

otherwise take DE coursework. By helping students complete college degrees faster, the combination of DE and AP/IB may lead to earlier employment in good jobs associated with credential completion and to higher earnings over time.

3. **Fewer than 5% of students combine a CTE focus with dual enrollment, but those who do have strong and sustained postsecondary and earnings outcomes.** Students who combine DE with a CTE focus have sustained postsecondary attainment and earnings gains up to age 24 compared to students with a CTE focus only or those taking no accelerated coursework.

   - **Participation and representation.** Participation in CTE-focused coursework, either alone or in combination with DE, increased over time among Texas public high school students—from 19% in the 2015 and 2016 cohorts to 25% in the 2022 cohort. However, the share of students who combined a CTE focus with DE remained low, at fewer than 5%. Low-income, male, and Black students were underrepresented among those who combined a CTE focus with DE (48%, 42%, and 6%, respectively, compared to overall Texas averages of 51%, 54%, and 13%), but they were overrepresented among students with a CTE focus only.

   - **Postsecondary trajectories.** Students who combined DE with a CTE focus had significantly stronger postsecondary enrollment and attainment rates than those with a CTE focus only, even after accounting for student and school characteristics. By age 24, 32% of DE takers with a CTE focus earned a bachelor's degree, compared to only 7% of students with a CTE focus only. DE takers with a CTE focus also earned credentials at a faster rate: By the third year post high school, 21% of them earned a credential (12% earned an associate degree), compared to 6% of CTE-focus-only students (of whom 4% earned an associate degree).

   - **Earnings trajectories.** Students with a CTE focus only had the highest average quarterly earnings within the first three years post high school compared to any other coursetaking profile group ($5,522 in year three, compared to $5,103 for DE takers with a CTE focus, and $3,822 for DE and AP/IB takers). However, by age 24, the earnings of DE takers with a CTE focus jumped to an average of $9,746 per quarter—well above the earnings of CTE-focus-only students ($8,097) and below the earnings of only one other profile group, the DE and AP/IB takers ($10,306). After accounting for student and school characteristics, we find that combining CTE with DE is associated with a 16% gain in earnings at age 24 compared to students with a CTE focus only, and with substantial gains among students with a certificate (17%) or an associate degree (13%). Young men with a high school CTE focus (with or without DE), particularly those who completed a certificate, had notably higher earnings by age 24 than women, whereas low-income students had lower earnings compared to higher income students.

   - **Interpreting these findings.** Our findings are generally consistent with prior research examining the effects of taking CTE coursework. Overall, students who take CTE courses in high school are more likely to enroll in college and earn a credential—typically at two-year colleges and at the associate level rather than at the bachelor's level—than students who do not participate in CTE (Dietrich et al., 2017; Dougherty

et al., 2019; Lindsay et al., 2024). Research also consistently finds that students who take CTE coursework have higher rates of postsecondary employment (Lindsay et al., 2024). However, earnings vary substantially depending on the type and field of the credential earned (Dougherty et al., 2019; Soliz, 2023; Stevens et al., 2019) and by whether students complete a credential in their CTE field (Plasman et al., 2017). The higher short-term earnings, particularly among men, may be explained by these students completing certificates and associate degrees in workforce-oriented fields rather than in general studies or liberal arts, which are associated with lower earnings (Jenkins et al., 2025). Our findings suggest that adding DE coursework may help counteract some of the downsides of a CTE focus alone in terms of bachelor's degree completion and sustained earnings gains by age 24, suggesting a promising path for extending the benefits of high school CTE.

4. **Early College High School (ECHS) students are more diverse, complete college at a higher rate, and earn more than Texas students overall by age 21, but they represent only 5% of high school students statewide.** Due to data limitations, we are able to track ECHS students for only three years after their expected high school completion. Future research should examine whether earnings gains persist by age 24.

   - **Participation and representation.** ECHS students comprised only 5% of the 2019 and 2022 cohorts in our study, and they were more likely to be low-income or from other groups underrepresented in postsecondary education. The majority of ECHS students took some form of college-and-career-accelerated coursework, with the most popular being a combination of DE and AP/IB. A CTE focus, alone or in combination with DE, was less prevalent among ECHS students compared to all students.

   - **Postsecondary trajectories.** ECHS students exhibited relatively strong early postsecondary and earnings outcomes in the early years after high school. By age 21, about 30% of ECHS students who took DE alone or in combination with AP/IB earned an associate degree, compared to 11–12% of high school students generally who took DE alone or in combination with AP/IB or a CTE focus.

   - **Earnings trajectories.** At age 21, ECHS students earned more than high school students generally in most accelerated profile groups.

   - **Interpreting these findings.** Prior experimental and observational studies show that nearly a quarter of ECHS students complete an associate degree by high school graduation (Berger et al., 2013; Webb & Gerwin, 2014). Experimental studies examining outcomes post high school completion find that ECHS participants are more likely to enroll in college and complete a degree than non-ECHS participants (Berger et al., 2013; Edmunds et al., 2020; Song et al., 2021). Our results suggest that ECHS students in Texas may follow similar trends. Our analysis can examine outcomes up to only three years post high school completion; it is worth emphasizing that the extent to which these students can continue to have an earnings advantage by age 24 depends on whether participating in ECHS increases students' chances of earning associate and bachelor's degrees in fields with high earnings. The associate degrees ECHS students commonly earn are in liberal arts/general studies, which have limited labor-market value unless students also complete bachelor's degrees (Jenkins et al., 2025).

Accelerated Coursework in Texas:
Eligibility, Funding, and Participation

Dual Enrollment

Under dual enrollment—referred to as dual credit in Texas—students take college credit courses that confer both high school and college credit. These courses may be offered at the high school or a college campus and are taught by either a qualified high school teacher or a college instructor. They may be academic or technical in nature (Texas Education Agency [TEA], n.d.-d). To enroll in most academic courses, students must meet college readiness standards by passing the Texas Success Initiative assessment or qualifying for an exemption (Texas Higher Education Coordinating Board, 2018). While some students or school districts pay for dual credit, the State of Texas provides funding to colleges and universities to offer these courses at no cost to economically disadvantaged students. As of 2024, nearly a quarter-million Texas high school students were enrolled in dual credit, accounting for 18% of the state's total public higher education enrollment (Decker, 2025).

Advanced Placement (AP) / International Baccalaureate (IB)

AP and IB programs offer standardized college-level courses in high schools, allowing students to earn college credit by achieving qualifying scores on end-of-course exams (College Board, n.d.). Students who complete the full IB course sequence may also earn an IB diploma (International Baccalaureate Organization, n.d.). Both programs offer a range of academically rigorous courses. Typically, AP courses have no formal eligibility requirements beyond the completion of prerequisite coursework, but students must pass an AP exam in order for the credits to be transferable to college. IB programs may require an application or prior coursework. The State of Texas provides funding to support exam fees and teacher training for AP and IB programs (TEA, n.d.-a). In the 2022-23 school year, approximately 185,000 Texas 11th and 12th graders took an AP or IB exam—nearly one-quarter of students statewide (TEA, 2025).

High School Career-and-Technical Education (CTE)

CTE programs offer high school students the opportunity to take career-focused courses that support preparation for both postsecondary education and the workforce. Students are encouraged to complete a sequence of courses within a program of study, which may span fields such as agriculture, information technology, and transportation. Completing a CTE pathway may lead to an industry-based certification. CTE programs generally have no eligibility requirements. Schools in Texas may apply for Perkins funding to support or expand CTE offerings (TEA, n.d.-b), and districts receive additional state funding based on student CTE participation (TEA, n.d.-c). In Texas, most high school students take at least one CTE course, and about 25% are considered CTE concentrators, having completed two or more courses within a program of study (O'Hara et al., 2024).

Early College High School (ECHS)

ECHSs are programs within Texas high schools that enable students to simultaneously earn a high school diploma and either an associate degree or up to 60 hours of transferable college credit. Designed to increase college readiness among disadvantaged students, ECHSs are rigorous, no-cost academic pathways that offer additional student support (TEA, n.d.-e). While there are no strict eligibility criteria to enroll, students must meet college readiness standards—typically by passing the Texas Success Initiative assessment—to take college-level academic courses. For districts that use applications to manage ECHS enrollment, open-access lotteries are encouraged (TEA, 2024). The Texas Education Agency provides grants to support schools in launching ECHS programs. As of 2019, about 65,000 students were enrolled in ECHS programs across 182 Texas high schools (TEA, n.d.-e).

Recommendations for Policy and Practice

Drawing on the study's findings illustrating both the potential benefits of college-and-career-accelerated courses as well as overall participation rates and differences by student group, we offer the following recommendations to further strengthen DE and other accelerated coursework as an on-ramp to college and career opportunity for students after high school.

1. **Expand dual enrollment participation.** Given the positive association between taking DE in high school and postsecondary success and higher earnings after high school—and the large gaps in participation and outcomes relative to students who either take AP/IB without DE, are focused on CTE alone, or enroll in no accelerated coursework—Texas colleges and K-12 schools should explore strategies to expand participation to more students who could benefit the most from DE. Only about one fifth of current Texas high school students take DE courses. There seems to be scope to increase participation, particularly among students who take no accelerated courses at all or students in CTE-focused tracks alone. About half of Texas high school students do not take any AP/IB or DE courses, and nearly half of those students are focused on CTE only (defined in our report as taking 10 or more CTE courses). Thus, there are large, untapped segments of the high school population that could benefit from college and career acceleration, including large numbers of students who historically have not been well served in the high-school-to-college-and-career transition.

   Texas House Bill 8, passed in 2023, provides scholarships for low-income high school students to take DE courses that are part of an academic or career pathway, which represents an important investment in expanding access to DE. States can improve access to DE by removing out-of-pocket costs for students, rethinking overly restrictive eligibility requirements, and setting statewide goals for participation (Steiger et al., 2023). Colleges and high schools implementing DE can expand access by increasing outreach to underserved schools and communities, sharing information about DE coursework and how it aligns with postsecondary and career opportunities (Fink et al., 2023).

2. **Complement—rather than compete with—AP/IB offerings.** Advanced Placement and dual enrollment are the largest programs offering high school students early college coursework in Texas and nationally. In fact, we find that many students combine AP/IB and DE coursetaking. Educators should work to better integrate these courses and related CTE offerings to increase the overall number of students who can gain access to them. The mix of courses students take should be based on their individual interests and goals. Ideally, college and K-12 partners help students take well-taught college acceleration courses—whether AP/IB or DE or both—that enable them to begin to explore and pursue postsecondary education and training in fields of interest to them. For this to happen, additional support at the state and local level is needed to help Texas educators guide students on how to mix and match different options (DE, AP, IB, CTE) to explore options and build momentum toward their education and career goals.

3. **Expand access to dual enrollment for CTE students.** We find a substantial advantage on both postsecondary outcomes and earnings among students who combine DE with a CTE focus in high school compared to students who have a CTE focus only and do not take DE coursework. Given the growing interest in career-focused postsecondary education among students and policymakers, college and K-12 leaders should explore ways to expand DE offerings for CTE students. About a fifth of Texas high school students focus on CTE coursework but do not take any DE or AP/IB, and these students are more likely to be low-income, male, and Black. CTE-focus-only students generally have strong earnings gains compared to their high school peers in the first three years post high school, but this advantage disappears by year six. Recent fieldwork on highly effective DE programs suggests that building DE courses into high school CTE programs and career academies represents a replicable strategy for expanding CTE with DE on a substantial

scale. In such an approach, DE coursework is embedded into high school CTE programs such that students are automatically enrolled in DE courses aligned to their CTE program of study and provided advising and guidance on related postsecondary degrees and careers (Fink et al., 2023).

4. **Expanding access to DE is not enough.** Especially for low-income students, taking DE coursework is not enough to achieve college-going and completion rates comparable to those of higher income students. This is consistent with findings from other research showing that, in order to be effective in serving low-income students and students of color, DE partnerships need to invest in extensive supports to help some DE students acclimate to college-level coursework and explore and plan postsecondary pathways with college advisors (Fink et al., 2023; Mehl et al., 2020). This approach to DE is evident in the ECHS model, which we find to be associated with higher degree completion (at least of associate degrees) and significant earnings advantages (at least in the initial years right after high school). However, while ECHS programs have expanded substantially in Texas and other states, they are still limited in scale relative DE coursetaking outside of ECHS programs. State and college leaders should explore how the core practices of ECHSs (e.g., focus on underserved communities, DE-for-all approach, and additional instructional supports) can be implemented to increase access to DE and other accelerated courses for more high school students. To facilitate long-term postsecondary success among underserved students, K-12 and postsecondary partners must take a more purposeful approach to DE, including building a shared vision and making strategic investments to expand high-quality DE offerings that propel students on paths to college attainment and higher earnings in the critical years immediately following high school (Fink et al., 2023).

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