Career and Technical Education: College Readiness and Cost-Effectiveness, 2013–2014

Department of Research and Evaluation
Austin Independent School District

How was the success of the Career and Technical Education (CTE) program measured?

The Austin Independent School District (AISD) CTE program provides opportunities for students to acquire 21st century academic and technical skills needed for entry into the global workforce and into postsecondary education. College readiness is the most accurate measure the district has for measuring CTE program success for the purpose of the cost-effectiveness analysis. Of the 4,209 seniors in 2013–2014 with college-readiness and CTE status data available, 2,603 (62%) were college ready. The Texas standards for college readiness are provided at the end of this report.

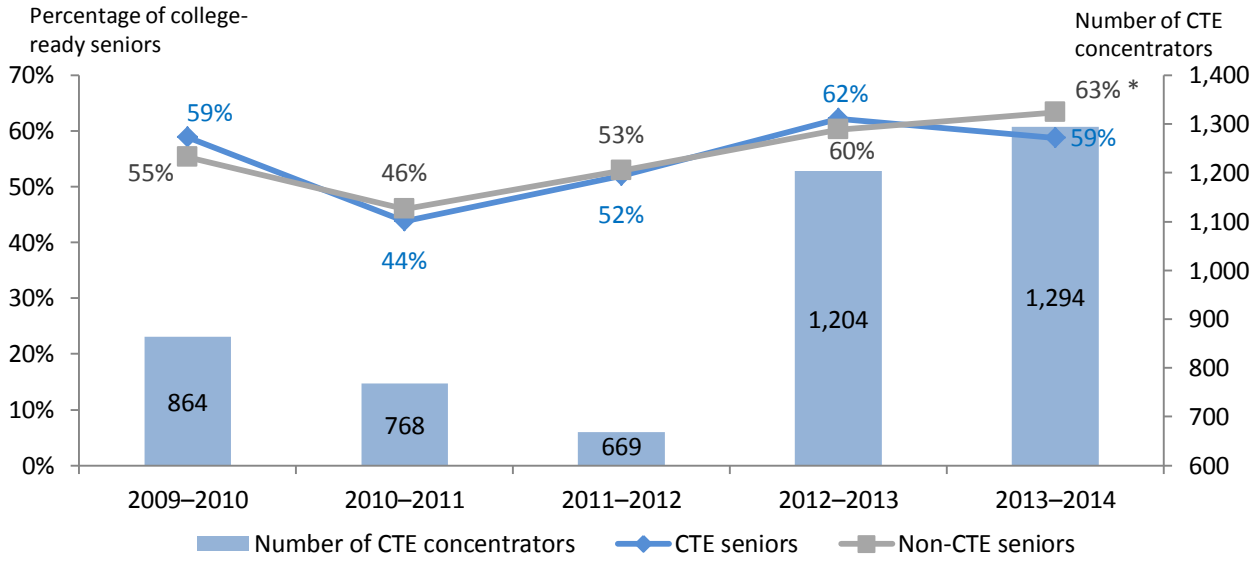
Seniors Included in the College Readiness Analysis

During the 2013–2014 school year, 4,876 seniors were enrolled. Only 4,209 (86%) of all seniors had available CTE status data, as well as Texas Assessment of Knowledge and Skills (TAKS) scores in English language arts (ELA), composition, and mathematics and/or SAT, ACT, Compass, or Texas Success Initiative (TSI) scores, from which to calculate college readiness. Of the seniors with both CTE status and college readiness data available, 1,294 (31%) were CTE concentrators, also referred to as CTE seniors in this report.

What were college readiness results over time?

A significant difference existed in the college readiness of seniors, based on CTE status, for the first time since 2009–2010, when the district began to study the cost-effectiveness of the CTE program, based on college readiness (Figure 1). In 2013–2014, a significantly smaller percentage of CTE seniors than of non-CTE seniors were college ready. This difference occurred in the year with the highest number of CTE concentrators, almost twice the number compared with that in 2011–2012.

Figure 1. For the first time in 2013–2014, a significantly smaller percentage of Career and Technical Education (CTE) concentrators were college ready, compared with the percentage of their peers. This difference in college readiness occurred in the year with the largest number of CTE concentrators, compared with other school years.



Source. AISD student course enrollment, exit-level Texas Assessment of Knowledge and Skills, ACT, SAT, Compass, and Texas Success Initiative test files prepared by the Department of Research and Evaluation

* Difference is statistically significant at $p < .01$

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What accounts for the difference in college readiness, based on CTE status?

A few factors may explain the difference in college readiness rates, based on CTE status in 2013–2014. These include (a) an increase in the level of concentration of Hispanic and economically disadvantaged students among CTE seniors, compared with the level in previous years; (b) a decrease in college readiness rates among these students groups in CTE; (c) an increase in college readiness rates among Hispanic students who were not CTE concentrators; and (d) a lower rate of college readiness among female students in CTE than among those not in CTE.

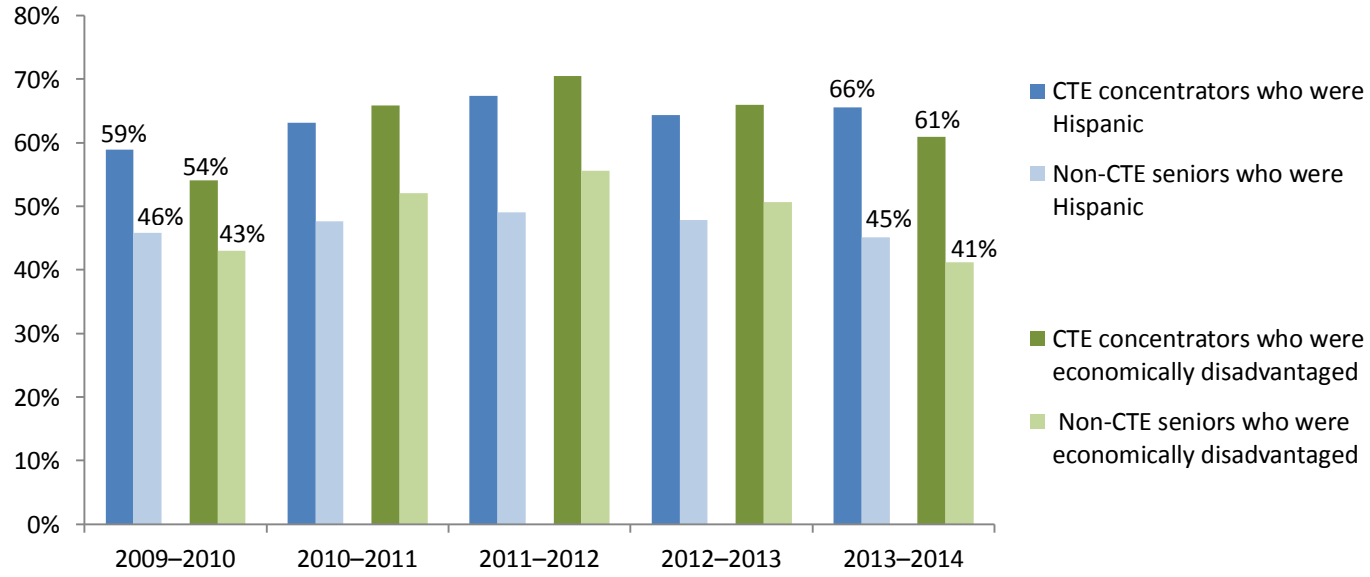
CTE Concentrators

The seniors in this study were considered CTE concentrators or CTE seniors if (a) their 4-year plan of courses reflected the intent to take a sequence of two or more CTE courses for three or more credits, (b) they took one of the CTE courses in the sequence prior to their senior year, and (c) they took an upper-level CTE course in the sequence during their junior or senior year that met the credit requirement.

CTE concentrator seniors were chosen as a unit of study for CTE program evaluation because the sequential course of study provided them with a foundation for a career, while seniors who took random CTE courses and seniors who did not take any CTE courses did not have that foundation.

For the past 5 years, the group of CTE seniors has included a significantly higher percentage of Hispanic and economically disadvantaged students than has the group of non-CTE seniors (Figure 2). In 2013–2014, the difference in the percentage of these student groups, based on CTE status, reached 20 percentage points for both Hispanic and economically disadvantaged seniors, the largest difference in the past 5 years.

Figure 2. Career and Technical Education (CTE) seniors consistently have included a higher percentage of Hispanic and economically disadvantaged students than have non-CTE seniors. The largest differences for these two student groups, based on CTE status, occurred in 2013–2014.



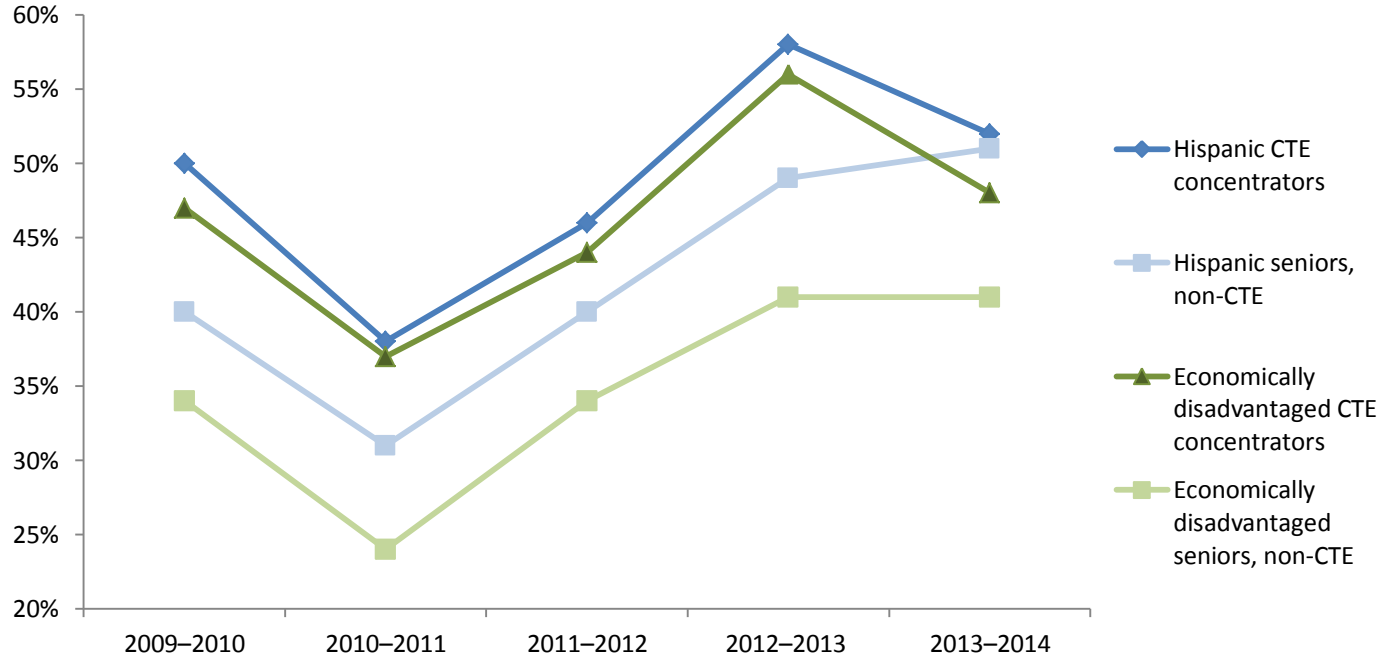
Source. AISD student enrollment and PEIMS files prepared by the Department of Research and Evaluation

According to Texas Education Agency (TEA, 2007, 2009, 2011, 2013) accountability reports, both Hispanic and economically disadvantaged students historically have had lower college readiness rates than their counterparts have had. Thus, one would expect the percentage of CTE seniors who were college ready to be lower than that of non-CTE seniors. In previous years, both Hispanic and economically disadvantaged seniors were more likely to be college ready if they were in CTE. These CTE concentrators' high college readiness rates helped close the gap in college readiness based on CTE status.

In 2013–2014, differences in college readiness rates from the previous school year for both CTE and non-CTE seniors changed that dynamic. For economically disadvantaged seniors, the college readiness rate of those in CTE remained higher than the rate for non-CTE seniors (Figure 3). However, the difference between the rates decreased compared with the difference in previous years. This narrowing of the difference in college readiness rates appears to be due to a significant decrease in the college readiness rate of economically disadvantaged seniors in CTE, from 56% to 48%; the rate for economically disadvantaged non-CTE seniors remained constant.

Regarding Hispanic seniors, for the first time in 5 years, no significant difference existed in college readiness based on CTE status (Figure 3). The college readiness rate for Hispanic seniors in CTE decreased significantly from the rate the previous year, from 58% to 52%. Hispanic seniors not in CTE experienced an increase in their college readiness rate over the same period, from 49% to 51%.

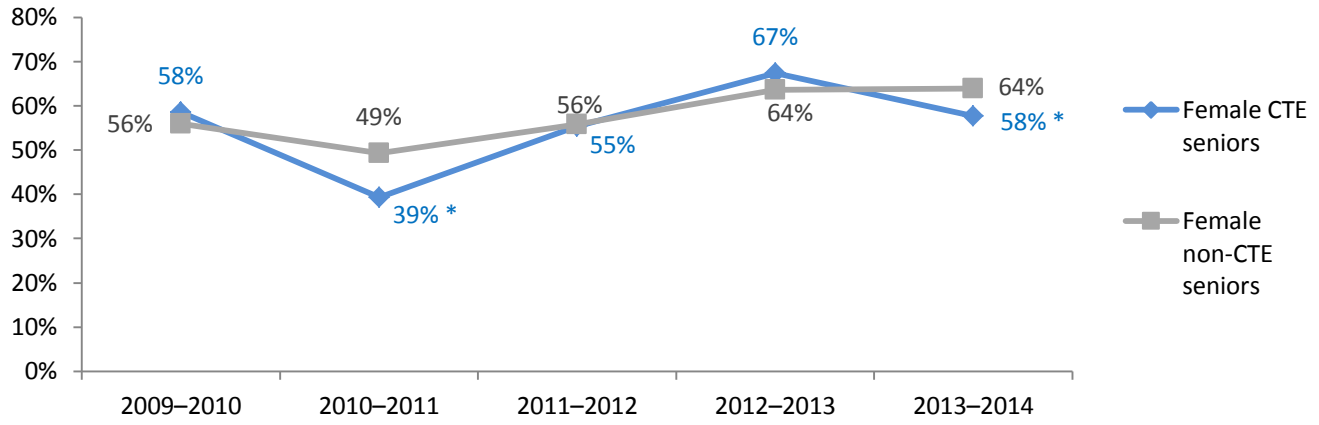
Figure 3. The difference in college readiness rates between Career and Technical Education (CTE) and non-CTE seniors who were Hispanic or economically disadvantaged decreased in 2013–2014 from the previous year because of a significant decline in college readiness rates of CTE seniors in these student groups.



Source. AISD student course enrollment, exit-level Texas Assessment of Knowledge and Skills, American College Test, SAT, Compass and Texas Success Initiative test files prepared by the Department of Research and Evaluation

Another factor that may have contributed to the lower college readiness rate of CTE seniors than of non-CTE seniors was the difference in rates based on gender and CTE status. In 2013–2014, female students were significantly less likely to be college ready if they were in CTE: 58% of female seniors in CTE were college ready, compared with 64% of female seniors not in CTE (Figure 4). Although a significant difference occurred in 2010–2011 as well, that factor alone was not sufficient to lower CTE seniors' overall college readiness rate to below that of non-CTE seniors in that school year.

Figure 4. The college readiness rate of female Career and Technical Education (CTE) seniors decreased in 2013–2014 from the previous year, while the rate for female non-CTE seniors remained constant. These events resulted in a significant difference in college readiness rates for female seniors, based on CTE status.



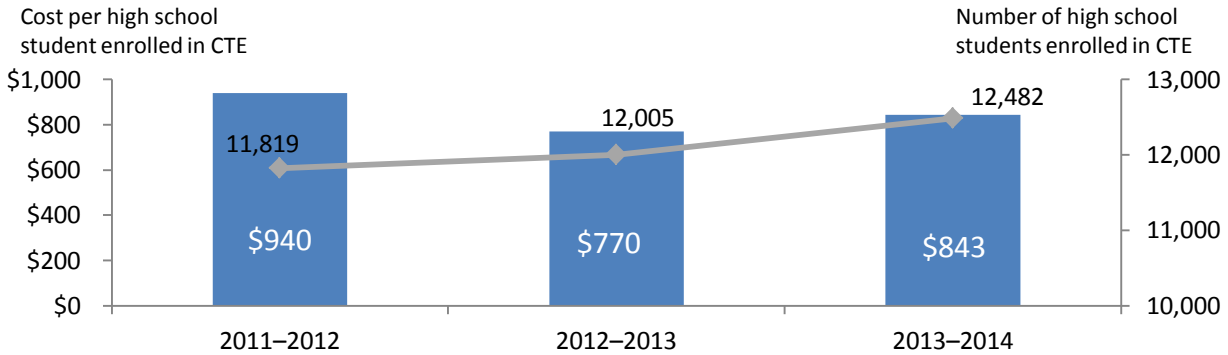
Source. AISD student course enrollment, exit-level Texas Assessment of Knowledge and Skills, American College Test, SAT, Compass and Texas Success Initiative test files prepared by the Department of Research and Evaluation
* Difference is statistically significant at $p < .01$

It appears that a confluence of factors affecting different student groups may have led to the lower college readiness rate of CTE seniors compared with that of their peers. As shown in Figures 1 and 2, the number of CTE seniors grew over time as the disproportionality of Hispanic and economically disadvantaged seniors in CTE also grew. The demographic composition of CTE concentrators will continue to influence college readiness rates until the achievement gap between these student groups and their peers is closed. The significant decrease in college readiness rates for Hispanic, economically disadvantaged, and female CTE seniors compared with the rates for these groups the previous school year is important to investigate further and to remedy.

Is the CTE program cost-effective?

CTE expenditures decreased 5% from 2011–2012 to 2013–2014, from $11.1 million to $10.5 million. Student enrollment in CTE increased 6% during the same period. The average cost per student decreased by 10% (Figure 5).

Figure 5. The number of high school students enrolled in Career and Technical Education (CTE) continued a steady increase in 2013–2014, and the cost per student increased from the previous year.



Source. AISD CTE program budgets and student enrollment data prepared by the Department of Research and Evaluation
Note. CTE high school students include those in grades 9 through 12, and any student enrolled in a CTE course that school year. The cost per CTE high school student was calculated by including actual total expenditures by CTE, divided by the number of students enrolled in CTE.

The unit of effectiveness used for the cost-effectiveness analysis was the college readiness of 2014 seniors who were CTE concentrators. These CTE concentrators were enrolled in AISD for the last 3 years of high school and took at least one CTE course each year. These criteria were specified to include only students whose college readiness CTE had an opportunity to influence. The costs included per student expenditures for 3 school years, using actual annual expenditures.

The program was more cost-effective in 2013–2014 than it was in 2012–2013, despite a lower college readiness rate and an increase in the per student cost from the previous year. Of the 1,043 CTE seniors in CTE for 3 years, 654 (63%) were college ready. The previous year's CTE seniors in the program for 3 years achieved a 65% college readiness rate. In 2013–2014, the cost of educating each of the 1,043 CTE seniors over the 3 years was $2,553, which was $93 less than it was in 2012–2013. The per student cost of getting the "effect" of college readiness after 3 years was $4,072, which was $7 less than the cost the previous year. In other words, it cost the district $7,301 less in 2013–2014 than it would have in 2012–2013 to produce 1,043 college-ready CTE seniors.

Conclusions

Compared with the measure in 2012–2013, the cost-effectiveness of the CTE program improved in 2013–2014. This was CTE's third year of improvement in cost-effectiveness. Two factors influence the cost of getting the effect of college readiness: the cost of educating a CTE student over 3 years, and the college readiness rate. It may be necessary for CTE to reverse the decline in college readiness rates, especially among Hispanic, economically disadvantaged, and female CTE students, to continue to improve its cost-effectiveness. The need to increase these college readiness rates is especially likely if investment in CTE students increases in 2014–2015. Another possible way to continue to increase cost-effectiveness is to actively encourage student groups, in addition to Hispanic and economically disadvantaged students, to become CTE concentrators, so the demographics of CTE concentrators match those of the rest of the student population.

Definition of College Readiness

TEA and the Texas Higher Education Coordinating Board publish standards for college readiness. To be considered college ready in **English**, a student must

- obtain a 2200 scale score or higher on the ELA TAKS and a 3 or higher on the composition; **OR**
- achieve a score of at least 500 on the English portion of the SAT, with a composite score of at least 1070; **OR**
- achieve a score of at least 19 on the English portion of the ACT, with a composite score of at least 23; **OR**
- achieve a score of 81 on the Compass reading test and a 6 in writing (or 5 with an objective score of 59) **OR**
- achieve a score of at least 351 on the Texas Success Initiative (TSI) reading exam, and at least 363 on writing, and 4 or more on the essay (or 351 or higher on reading and 5 or more on the essay)

To be considered college ready in **math**, a student must

- achieve a scale score of at least 2200 on the math TAKS; **OR**
- achieve a score of at least 500 on the math portion of the SAT, with a composite score of at least 1070; **OR**
- achieve a score of at least 19 on the math portion of the ACT, with a composite score of at least 23; **OR**
- achieve a score of at least 39 on the Compass algebra test; **OR**
- achieve a score of at least 350 on the TSI math exam.

For this report, only seniors college ready in both English and math were deemed college ready.

Notes about CTE Budgets and Cost-effectiveness Methodology

Three years of CTE actual expenditures at the high school level were used to calculate the cost per CTE student and cost-effectiveness. Expenditure categories included payroll, contracted services (including construction costs), supplies and materials, professional development opportunities, and capital outlays. Funding sources included local 199 funds, which are state funds that go to the district for CTE and include payroll costs, and the Carl D. Perkins grant, which is federal funding for CTE programs.

To calculate the cost per student, the total number of students enrolled in a CTE course that year was divided into the corresponding year's actual expenditures. The 3 years of per student costs were added to get a single per student cost. For the cost-effectiveness analysis, the per student cost was multiplied by 1,043 to get the total cost of serving all the CTE concentrators who took at least one CTE course during their sophomore, junior, and senior years. That total was divided by the 654 who were college ready, resulting in the cost of producing one college-ready CTE concentrator. Had all the CTE students been college ready, the cost of producing a college-ready CTE concentrator would have equaled the per student cost. Fewer college-ready CTE concentrators resulted in a higher cost to produce one.

Funding Sources

Funding for the development of this report was provided by the CTE program.

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