



CTE Dual Credit Participation and Postsecondary Outcomes in Washington

A descriptive analysis using data from the Statewide Enrollment and Reporting System (SERS)

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About the ERDC

The research presented here uses data from the Education Research and Data Center, located in the Washington Office of Financial Management. ERDC works with partner agencies to conduct powerful analyses of learning that can help inform the decision-making of Washington legislators, parents and education providers. ERDC's data system is a statewide longitudinal data system that includes de-identified data about people's preschool, educational and workforce experiences. In Fiscal Year 2019, ERDC was awarded a five-year Statewide Longitudinal Data System (SLDS) Grant, which involves using our data system to examine educational equity issues in Washington's public educational systems. ERDC is one of 28 grantees across the country who are participating in the FY19 SLDS Grant Program.

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Executive summary

As in many other states, Washington’s education leadership sees dual credit as a strategy to increase postsecondary education attainment and career readiness for all students and is taking steps to increase equitable access to dual credit courses for all students. CTE Dual Credit, with its high participation rate among all student groups, is a key component of the state’s dual credit options. However, little is known about the extent to which Washington students complete CTE Dual Credit course articulations¹ and earn college credit, or the relationship between college credit earning and postsecondary outcomes. This descriptive study uses data from the State Board of Community and Technical College’s Statewide Enrollment and Reporting System (SERS) linked to the state’s P20W longitudinal education data to answer these questions. Using a cohort of students with expected high school graduation year of 2015, completion and college credit earning from CTE Dual Credit courses are examined. Results are broken out by student demographic and K-12 program participation characteristics to identify whether inequities exist.

Key findings

1. Data from the SERS can be used for statewide research on CTE Dual Credit for limited years (2010-11 through 2014-15), after which it should be used for case studies only.
2. Nearly three quarters of the cohort enrolled in one or more CTE Dual Credit courses and nearly a third of them completed the courses and earned college credit — far more than previous reports have indicated.
3. Students who identify as American Indian/Alaska Native are least likely to participate in CTE Dual Credit and are least likely to earn college credit from CTE Dual Credit courses.
4. Although Black students are most likely to enroll in CTE Dual Credit courses, they are among the least likely to earn college credit from CTE Dual Credit courses.
5. Male students are more likely than female students to enroll in CTE Dual Credit, but female students are more likely to complete the courses and earn college credit.
6. CTE Dual Credit participants who earn college credits have higher postsecondary enrollment and completion rates than those who participate but do not earn college credits. This relationship is most prominent among students of color, male students and students who are multilingual learners, are eligible for free or reduced-price meals, have a disability, experienced homelessness, or are served by the Migrant Education program.

¹ “Articulation,” as used in this report, refers to one or more high school courses that result in credit for a course at a community or technical college, when students earn the minimum grade and follow required steps, in accordance with a CTE Dual Credit articulation agreement. See Box 1, “What is CTE Dual Credit?” below.

Why is it important to use data from the Statewide Enrollment and Reporting System to understand CTE Dual Credit course taking patterns and outcomes?

Dual credit programs — where students take courses that provide the opportunity to earn college credits while in high school — support preparation for postsecondary education and career pathways and can also decrease college costs. ERDC is legislatively mandated to complete annual dual credit reports (Weaver Randall, Pyle, & Nelson, 2022; Dehlbom, et al., 2023). This report complements the annual reports with a focus on CTE dual credit.

Recent research suggests that dual credit programs have positive impacts on postsecondary enrollment and completion for students of color, low-income students and those underrepresented in postsecondary education (Henneberger, Witzten, & Preston, 2022.; Hughes, Rodriquez, Edwards, & Belfield, 2012; Taylor et al., 2022). Washington’s Legislature embraced dual credit as a key to improving equity of access to educational attainment and career pathways as it strives toward the goal of 70% of Washington adults aged 22-44 earning a postsecondary credential (Washington Student Achievement Council, 2016). Recent legislation ([ESSHB 1546](#), passed in 2015 and [HB 1599](#), passed in 2019; and [SSSB 5048](#) and [HB 1316](#), passed in 2023) is intended to increase equitable access to opportunities for students to participate in dual credit courses.

Washington has two types of dual credit programs:

Box 1. What is CTE Dual Credit?

CTE Dual Credit, formerly called “Tech Prep”, provides students with the opportunity to earn college credit at a community or technical college through courses taught by high school instructors certified to teach college-level content. Taken by students in grades 9 – 12, the courses prepare students to enter programs that lead to an associate degree or a technical certificate. Courses cover both academic and technical knowledge and skills and align with employer needs. An **articulation agreement** between the high school or skills center and a community or technical college, administered through a formal partnership called a consortium, determines what and how many college course credits can be earned from completing high school courses. In many cases, a single high school course aligns (articulates) to a single college course, but sometimes multiple high school courses must be taken to get credit for one college course. The agreements also specify the minimum high school grade needed (usually B or higher) and steps students must take to have credits added to a college transcript (referred to as “transcription”) (Washington State Board for Community and Technical Colleges, 2022). Direct-funded high schools operated by community and technical colleges, where students can earn both high school and college credits, are not considered CTE Dual Credit and are not included in this report.

- Course-based: Most commonly Running Start, College in the High School and Career and Technical Education (CTE) Dual Credit; and
- Exam-based: Advanced Placement, International Baccalaureate and Cambridge International.²

Of the programs offered in Washington, CTE Dual Credit has the highest annual participation rate overall and historically underserved students of color and low-income students are well represented among participants (Weaver Randall, Pyle, & Nelson, 2022). Because of their comprehensive reach, CTE Dual Credit courses are well positioned to enhance equitable access for all Washington students to earn college credit while in high school. However, little is known about which students and how many receive college credit from CTE Dual Credit and whether students go on to college after high school. Recent reports on CTE Dual Credit in Washington only include participation rates and high school course completion rates, broken out by student demographic characteristics (Washington Student Achievement Council, 2021). The primary reason for this lack of information on CTE Dual Credit is that readily available student data do not allow us to answer critical research questions regarding equity in course-taking and post-high school outcomes.

Box 2. How do students receive college credits from taking CTE Dual Credit courses?

Students must earn the minimum grade for the course or courses taken, as required in the articulation agreement. Most consortia also require students to register in the Statewide Enrollment and Reporting System (SERS), where high school and consortium staff can track high school course registrations, grades earned and whether students meet the prerequisites for earning credit for college courses. Through 2016, nearly all consortia used automatic transcription where, upon completion of an articulation, credits are added to a college transcript without the student needing to take separate action. Currently, most consortia require students to enroll in the college associated with the articulation agreement and/or explicitly request that the credits be added to their transcript. Students can also transfer earned credits from the college with the articulation agreement to another community or technical college. College credits earned may or may not be recorded in the SERS system, depending on the consortium's local practice. In addition, some consortia charge a fee for transcription, usually waived for low-income students (SBCTC, 2021).

² For more about Washington's dual credit programs, see Office of Superintendent of Public Instruction's [Dual Credit Programs](#).

The state's P20W data warehouse³, which links K-12 student data to the state's public postsecondary student data, can identify students who enrolled in CTE Dual Credit courses and whether they earned high school credit for the courses. However, P20W data cannot tell us if the student completed all high school courses with the minimum grade required for completion of a CTE Dual Credit articulation to the college course. In terms of transcribed college credits, current limitations with the P20W data also do not allow for identification of credits obtained through CTE Dual Credit course taking unless the student subsequently attends the college where they received the credit (Weaver Randall, Pyle, & Nelson, 2022). An analysis of the on-time graduates from the class of 2017, which used only the data included in the P20W system, could only identify community and technical college credits for 3% of the students who took CTE Dual Credit courses and later enrolled in a community or technical college (Washington Student Achievement Council, 2021). It is likely that far more than 3% of those who enrolled in a CTE Dual Credit course actually earned college credit.

However, the state does have a system in which transcription of college credits earned from CTE Dual Credit courses is recorded. The Statewide Enrollment and Reporting System (SERS), maintained by the State Board for Community and Technical Colleges (SBCTC), is used by most CTE Dual Credit consortia, community and technical colleges, and associated high schools to record student completions of CTE Dual Credit articulations and, for some, resulting college credits. The SERS system was first implemented in the 2009-10 (2010) school year. Using this online system, students select and sign up for CTE Dual Credit classes taken in the high school that are part of articulations that lead to credit for college courses. SERS shows the student what college courses they could get credit for by taking one or more high school classes. School staff use SERS to track the status of students' completion of classes and associated articulations. SERS is also used by college staff to record the credits earned by the student (referred to as "transcription"). By combining SERS data with K-12 and postsecondary data through the P20W data warehouse, students who complete CTE Dual Credit articulations and earn college credits⁴ from CTE Dual Credit can be identified, allowing examination of which students complete articulations, earn college credit and the relationship between college credit earning and postsecondary outcomes.

³ The P20W data warehouse, a statewide longitudinal data system (SLDS), includes information on Washington students from these public education sectors: early learning, K-12, post-secondary, and workforce.

⁴ For the purposes of this report, 'earning college credit' means the student met all requirements of the CTE Dual Credit articulation agreement and credits were added to a college transcript, whether or not the student enrolled in the college or took any action to have the credits added to the transcript.

There are challenges to using SERS data for research. First, although SERS is still used by most schools that offer CTE Dual Credit courses for registering students in courses and recording grades, most community and technical colleges no longer use it to record college credit earning. Second, the web-based, transactional SERS system was not designed for research or evaluation and the data behind it has never been explored for analytic purposes. Therefore, it is critical to assess whether SERS data quality is adequate, and usage is complete enough to use for statewide analysis and if so, for which school years. This study includes a data quality analysis that demonstrates the usefulness of SERS data for research for selected school years. This study then uses the SERS data to answer the following research questions:

- 1) To what extent are students with different characteristics enrolling in CTE Dual Credit, registering in SERS, completing course articulations, and earning college credit from CTE Dual Credit?**
- 2) How does college credit earning from CTE Dual Credit impact postsecondary outcomes and how does this vary among different student groups?**

Data and analytical approach

Data

Student data for this report came from the ERDC P20W data warehouse, which links administrative records from several contributing education state agencies. Data sources for this report include the following:

- Office of Superintendent of Public Instruction (OSPI): Comprehensive Education Data and Research System (CEDARS) — For data on enrollment, student characteristics and K-12 program participation.
- Washington State Board for Community and Technical Colleges (SBCTC) — For data on credits earned in a CTC for CTE Dual Credit and enrollment and enrollments and completions in community and technical colleges.
- Public Centralized Higher Education Enrollment System (PCHEES) housed at the Office of Financial Management (OFM) — For data on enrollments and completions in Washington public four-year institutions.

Data from out-of-state and Washington private postsecondary institutions are not included in this study. Additionally, direct-funded high schools operated by community and technical colleges, where students can earn both high school and college credits, are not considered CTE Dual Credit and are not included in this report.

SBCTC annually extracts key data for ERDC from the SERS database that sits behind the web-based interface used by students, teachers and colleges. SERS data used for this study covers the 2012 through 2020 school years. Its quality, reliability and completeness were examined, and results are included in Appendix A. The following key data elements were found to be valid and complete and were included in analysis: student identifiers (used for identity resolution); student registrations for articulations and associated classes; course registration dates and college credit transcription dates; schools and districts where the students registered for high school courses; and high school class, college course and articulation completion statuses. Number of credits earned and date they were transcribed, and which college and consortium is associated with the college courses and college credits were also used.

Student records in SERS were joined to ERDC's P20W data warehouse through identity resolution⁵. Students found in the OSPI CEDARS Student Grade History file as taking CTE Dual Credit courses were matched to SERS data for the 2010 through 2020 school years.

Cohort

This study examines a cohort of high school students who were expected to graduate in 2015⁶ and follows them after high school graduation into postsecondary education, through the 2021 academic year. The choice of cohort is a compromise between the years when SERS was used by most CTE Dual Credit consortia (see Appendix A) and the quality of CEDARS Student Grade History data, which improved over time after CEDARS launched in 2010 (Chen, Pyle, & Weller, 2018).

The cohort of 71,935 students was created by selecting students in the starting cohort who began ninth grade in a Washington public school before October of the 2012 school year. This was done to ensure that students included had full opportunity to enroll in CTE Dual Credit courses while in high school. Students who transferred out of Washington public K-12 or died before graduating were excluded.

SERS data completeness. As reported in Appendix A, SERS coverage was incomplete during the years when this cohort attended high school, when it was used for recording both registrations

⁵ Through the identity resolution process, ERDC links data files from contributing agencies and institutions to facilitate longitudinal analysis. Identity resolution is the process of identifying records that belong to the same entity (person). The purpose of identity resolution is to create linkages across multiple data sources so that students' early learning records are linked to their K-12, postsecondary, and workforce records ([Washington State P20W Longitudinal Data System Research Handbook](#)).

⁶ The measure for expected graduation year used in this report is the Graduation Requirements Year, which is four years after the student enters 9th grade. It is the year for which the student is held accountable for meeting the requirement for graduation (OSPI [CEDARS Manual](#)).

and college credit earning by between 80% and 88% of school districts that had CTE Dual Credit participation. However, examination of student-level SERS data for the cohort indicates that most of the students who enrolled in CTE Dual Credit courses had access to the SERS system in their school. Analysis of SERS data combined with CEDARS course data indicate that the vast majority (95%) of the CTE Dual Credit participants in the study cohort had SERS registrations during at least one of the years they took CTE Dual Credit courses. The remaining 5% either did not have access to SERS in their school, or they had SERS in their school but did not use it to record credit transcription. For the latter students, we do not know if they completed CTE Dual Credit articulations or earned college credits, unless they happened to enroll in the college where the credits were earned. As a result, this study underestimates the completion and credit earning rates, likely by a very small amount.

Analytical Approach

This longitudinal, descriptive study examines a cohort of students expected to graduate in 2015 who enrolled in one or more CTE Dual Credit courses and determined if they registered in the SERS system, completed articulations, or earned college credit. This work sheds light on what proportion of CTE Dual Credit students registered in the SERS system, completed course articulations, and earned college credit from CTE Dual Credit broken out by demographic characteristics and K-12 program participation—something that has never been measured in Washington. Students who participated in CTE Dual Credit are then followed through the 2021 school year to determine their high school or GED completion and postsecondary outcomes. In the outcome analysis, results are shown for all CTE Dual Credit participants, those who earned college credit and those who did not earn college credit. To identify potential inequities, all results are broken out by race/ethnicity, gender, participation in the Migrant Education program, multilingual learner status, homeless status, disability status, and eligibility for free or reduced-price meals.

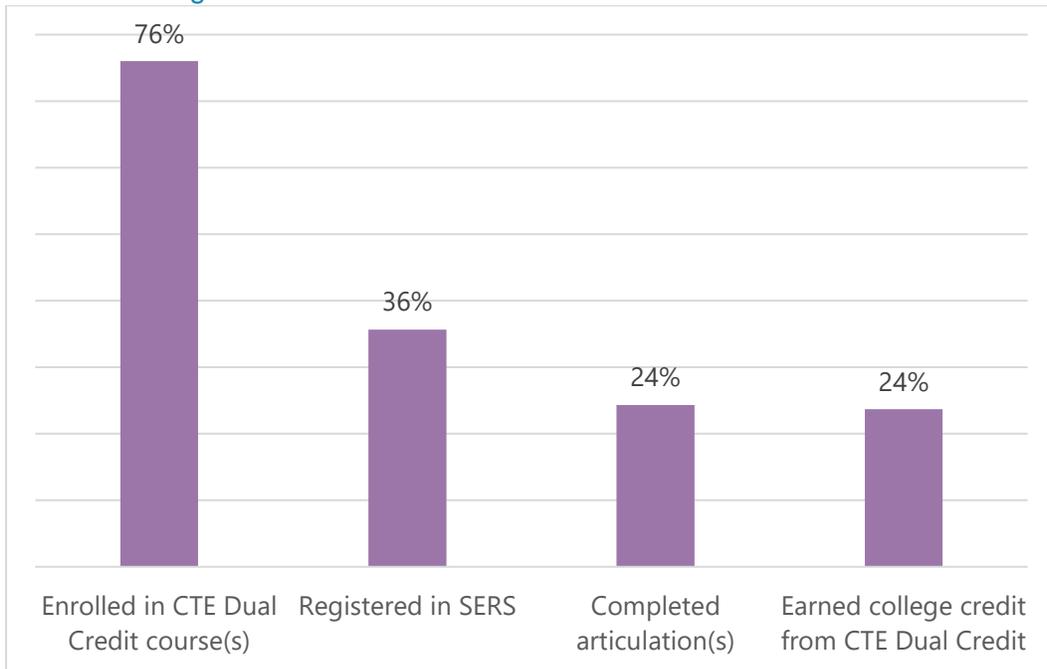
What did we learn?

Participation in CTE Dual Credit, SERS and college credit earning

What proportions of the cohort enrolled in CTE Dual Credit courses, registered in SERS, completed articulations, and earned college credit?

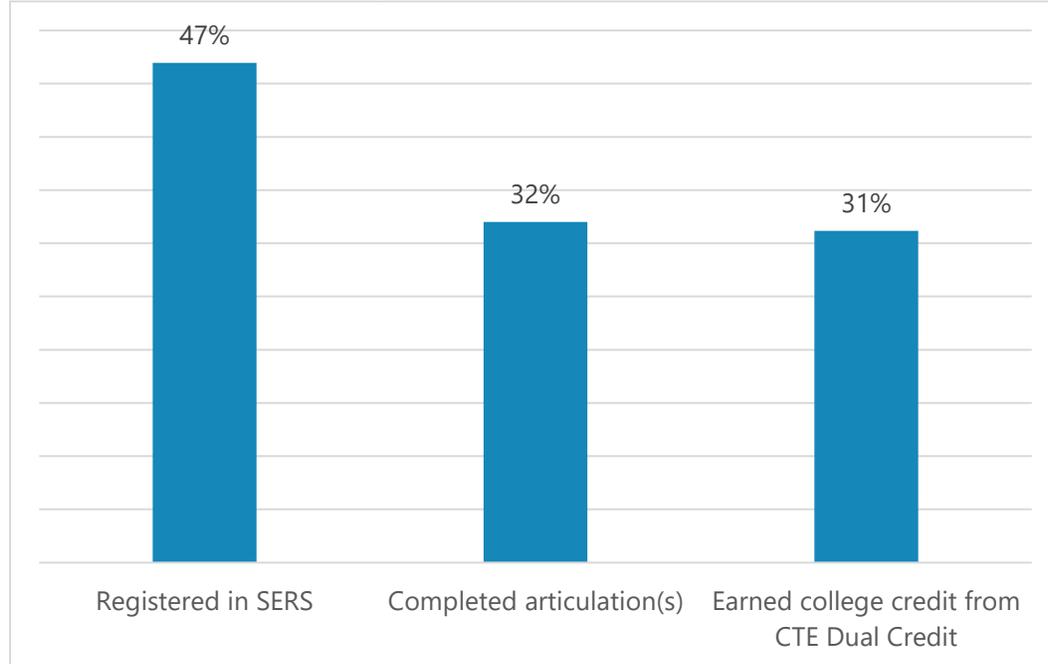
Similar to previous reports on dual credit in Washington, this report shows that a majority of the cohort participates in CTE Dual Credit (Weaver Randall, Pyle & Nelson, 2022). Figure 1 shows that of all students in the cohort, 76% enrolled in at least one CTE Dual Credit course. Thirty-six percent of the cohort registered in the SERS system and 24% completed articulations and earned college credit from CTE Dual Credit course taking, as recorded in SERS and/or identified in SBCTC transcript data.

Figure 1: Percent of all students in the 2015 cohort who participated in CTE Dual Credit courses, registered in SERS, completed articulations, or earned college credit in a community or technical college from CTE Dual Credit courses



Looking at just the CTE Dual Credit participants, Figure 2 shows that nearly a third of participants earned college credit for completed articulations, as recorded in SERS and/or identified in SBCTC transcript data. Although nearly all students in the cohort attended schools where SERS was used during at least one of the years when they took CTE Dual Credit, just under half of them registered their CTE Dual Credit courses in SERS.

Figure 2: CTE Dual Credit participants only: Percent who registered in SERS, completed articulations, or earned college credit



What can be said about the 53% of CTE Dual Credit participants who did not register in SERS? As noted above, a majority of CTE Dual Credit students in the cohort had some access to SERS in their school. And since registration in SERS was a prerequisite for earning college credit for nearly all students throughout 2012 through 2015, it is tempting to assume that the act of registering indicates a student's intent or desire to earn college credit. For some students, that is probably true. For that to be the case across the board, all schools offering CTE Dual Credit would inform all students about college credit earning and provide every student with the same access to register in the SERS system. However, a recent report on CTE Dual Credit found that student advising on dual credit and implementation of CTE Dual Credit by schools and within schools varies as there are few state statutes, regulations or policies that govern the program (Staklis, Zinth & Rasmussen Foster, 2022). Furthermore, many students take CTE Dual Credit to fulfill the one credit of CTE required for graduation, with no intention to use earned college credit. However, their teacher may instruct all students to register in SERS as part of the curriculum, regardless of student intent. Due to these factors, SERS registration cannot be used to identify students aiming for college credits. SERS registration only indicates that the student has taken one step toward earning college credit, either on their own or because a teacher required it. If a student did not register in SERS, the option to earn credit is either eliminated or requires them to take additional steps on their own to receive the college credits they earned from completing an articulation.

What are the demographic and program participation characteristics of cohort members who enrolled in CTE Dual Credit courses and those who also registered in SERS, completed articulations, and earned college credit compared to the overall cohort?

Over three-quarters of the cohort enrolled in CTE Dual Credit courses, and their characteristics vary little from those of the overall cohort (see Appendix B, Table 1). The exceptions are students who identify as Black or as Asian; these students are slightly overrepresented in CTE Dual Credit participation compared to their representation in the overall cohort. Students who identify as American Indian/Alaska Native or as White are slightly underrepresented. In terms of registration in SERS, the pattern differs in that nearly all historically underserved student groups and male students are underrepresented among those who register in SERS and who earn college credits from CTE Dual Credit courses.⁷ This is especially true for students who identify as American Indian/Alaska Native. This suggests that there are inequities in the use of the SERS system and attainment of college credit from CTE Dual Credit course taking. Equity gaps are explored further in the following analysis of SERS registration and college credit-earning rates of the student groups.

How do rates of CTE Dual Credit participation, SERS registration, completion of articulations, and college credit earning differ by student characteristics?

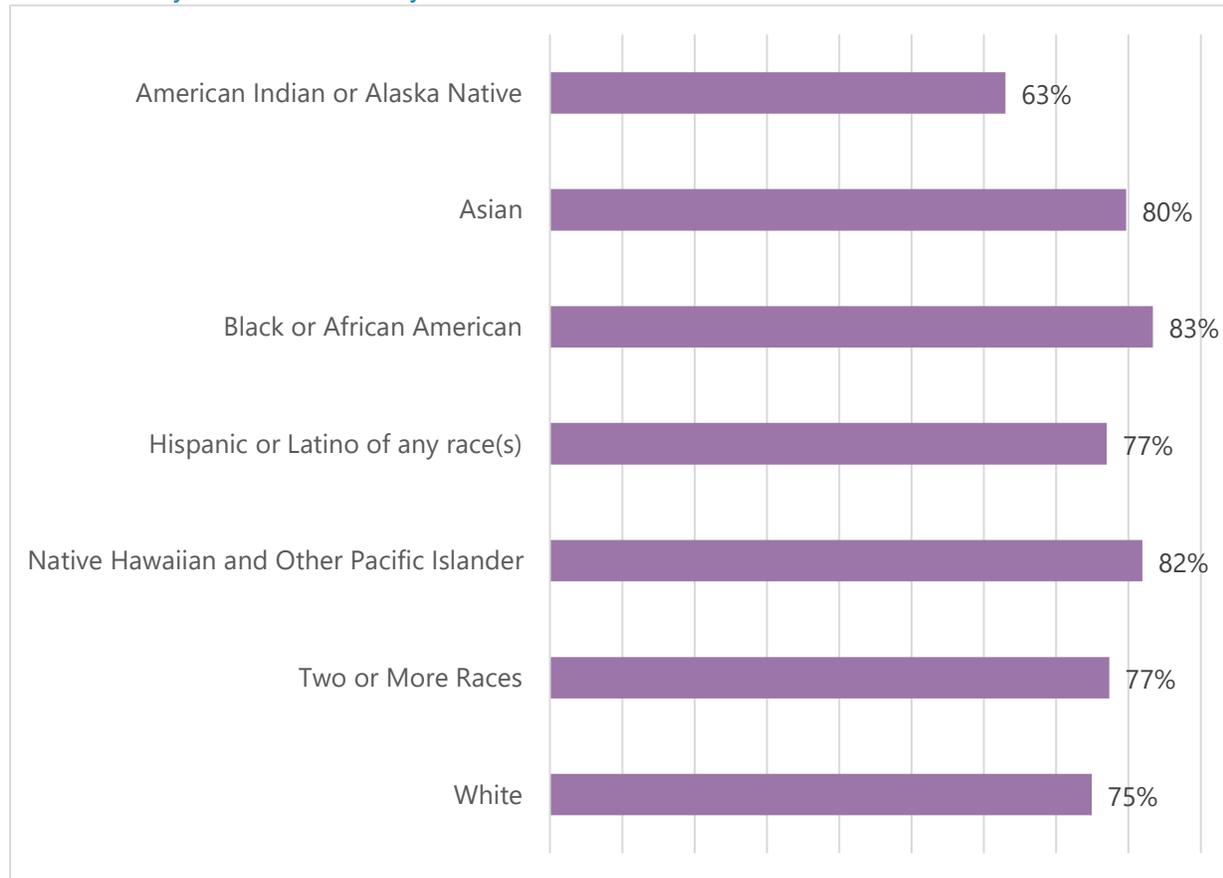
Race and Ethnicity

CTE Dual Credit courses were taken by over half of students in every race/ethnicity group (Figure 3). More than 75% of students in each race/ethnicity group enrolled in at least one CTE Dual Credit course, except for American Indian/Alaska Native students, who had a 63% participation rate. Students who identified as Black or as Native Hawaiian/Pacific Islander were most likely to enroll in CTE Dual Credit.⁸

⁷ “Historically underserved” refers to students who have been excluded from or lacked access to the educational opportunities available to others including, but not limited to, students of color, students from low-income backgrounds, multilingual learners, students experiencing homelessness, students in the foster care system, and students with disabilities.

⁸ These numbers are slightly higher than those in the 2022 ERDC Dual Credit report (Weaver Randall, Pyle & Nelson, 2022) because the cohort in this report was limited to students who started 9th grade in WA public schools and the cohort used in the 2022 report included all students in the cohort.

Figure 3: Percentage of students who enrolled in one or more CTE Dual Credit course(s), broken out by race and ethnicity



Gender, disability, homelessness and K-12 program participation

Appendix Table B-2 shows that the CTE Dual Credit course taking rate is high for both males and females and for the additional student groups included in this study. Male students (77%) are slightly more likely to enroll in CTE Dual Credit courses than female students (75%). Among the other student groups, those experiencing homelessness (73%), students with a disability (74%) and migrant education students (74%) were slightly less likely to enroll in a CTE Dual Credit course than students with low incomes (76%) and multilingual learners (77%).

How do rates of SERS registration, completion of articulations, and college credit earning differ by student characteristics among CTE Dual Credit participants?

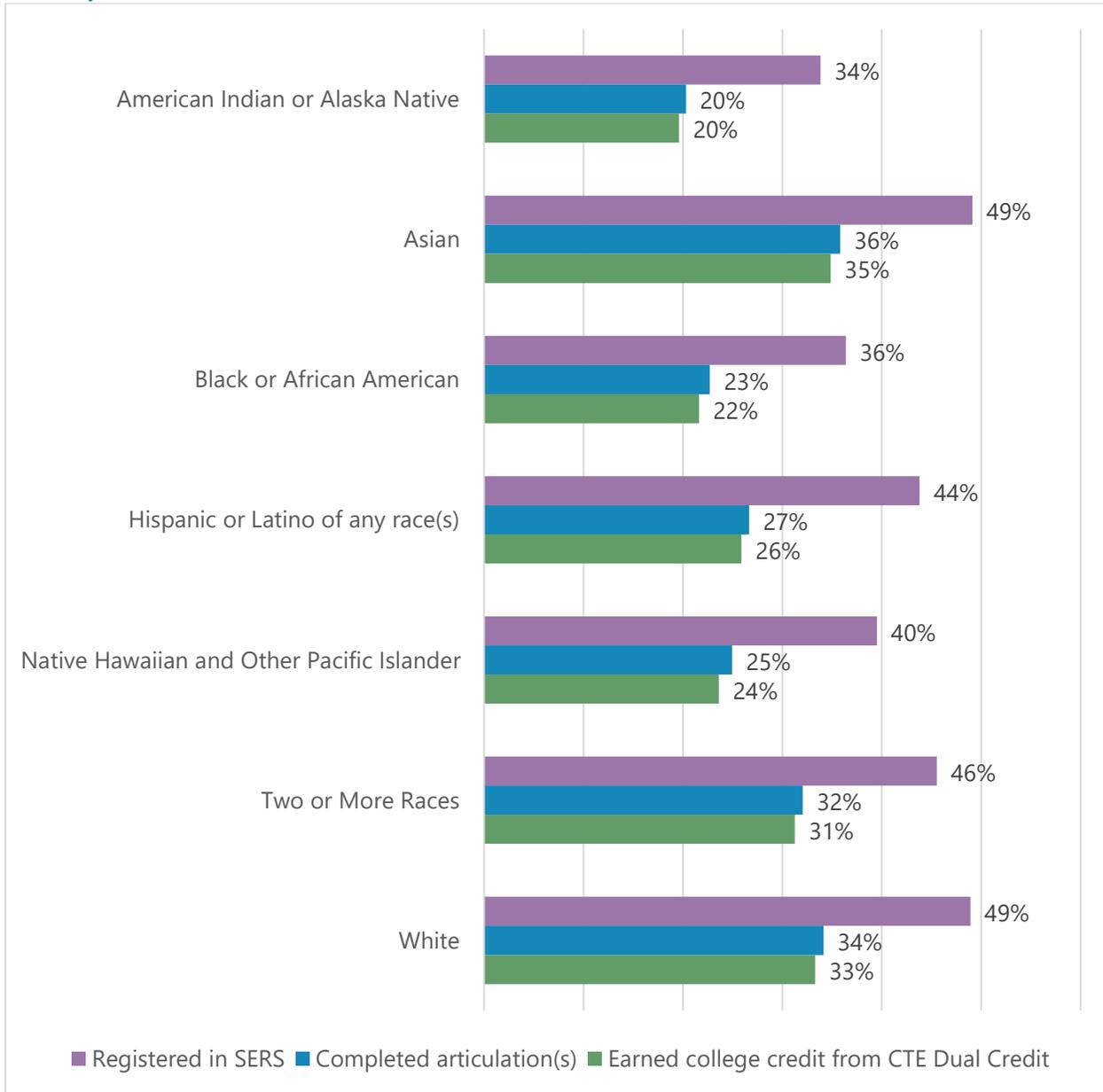
Race and Ethnicity

Among students who participated in CTE Dual Credit, Figure 4 shows that although Black and Native Hawaiian/Pacific Islander students have the highest rates of participation in CTE Dual Credit courses, they are less likely to have registered in SERS than most other race/ethnicity

groups. American Indian/Alaska Native CTE Dual Credit students had the lowest rate of registration in SERS, at 34%, which is potentially due to lack of access to SERS in their schools. Asian students had the highest SERS registration rate (49%) followed by White, Multiracial and Hispanic/Latino students.

Also in Figure 4, college credit earning shows a similar pattern to SERS registration. Black and Native Hawaiian/Pacific Islander students had the highest rate of CTE Dual Credit course taking, but they were near the bottom of college credit earning rates, at 22% and 24%, respectively. Although Hispanic/Latino CTE Dual Credit students registered in SERS at the relatively high rate of 44%, only 26% of the CTE Dual Credit students earned college credit. Asian, White, and multiracial students were the most likely to earn college credit from CTE Dual Credit course taking. American Indian/Alaska Native students who enrolled in CTE Dual Credit courses had the lowest college credit earning rate (20%).

Figure 4: CTE Dual Credit participants only: Percent who registered in SERS, completed one or more articulations, or earned college credit from CTE Dual Credit, broken out by race and ethnicity



Gender, disability, homelessness and K-12 program participation

When looking only at CTE Dual Credit participants, there is more variation in rates of registration, completion, and credit earning among these student groups than was seen in Appendix Table B-2. Regarding gender, female students are more likely than male students to register in SERS, complete articulations, and earn college credit, as shown in Figure 5.⁹

Figure 5: CTE Dual Credit participants only: Percent who registered in SERS, completed one or more articulations, or earned college credit from CTE Dual Credit, broken out by gender

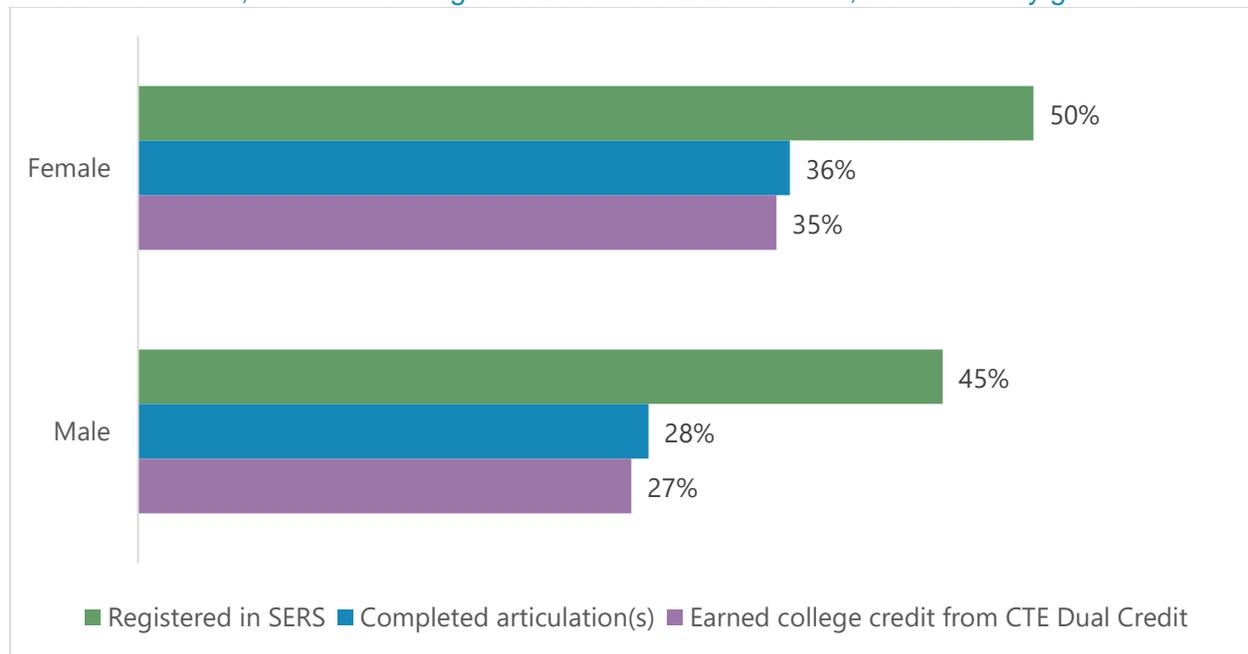
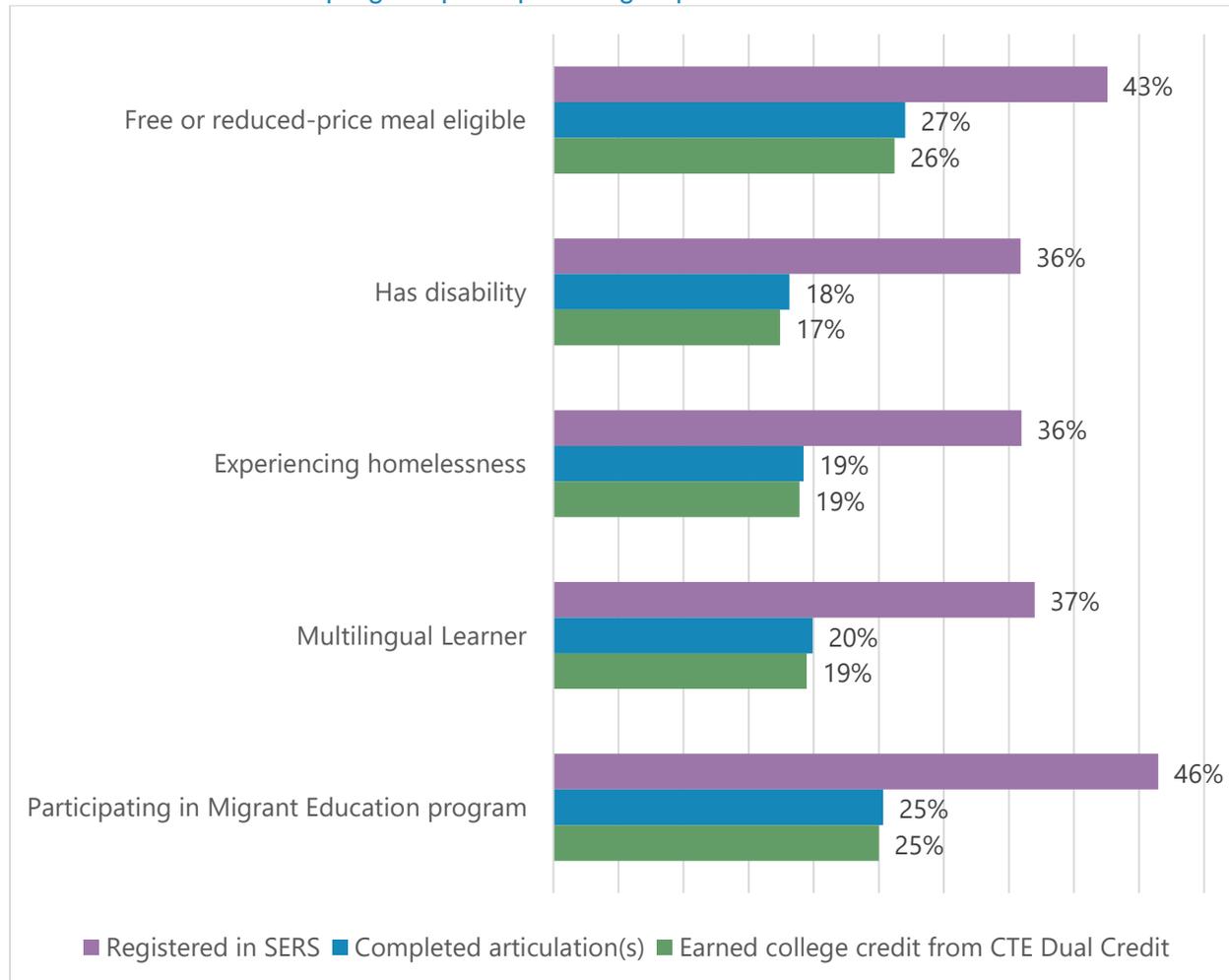


Figure 6 shows a pattern similar to that seen for students from historically underserved racial and ethnic groups. Students with a disability, those experiencing homelessness, and multilingual learners are far less likely than all CTE Dual Credit students in the cohort to register in SERS, complete articulations, or earn college credits. Students in the Migrant Education program register in SERS at nearly the same rate as all students, but they are less likely to complete articulations or earn college credits. Free or reduced-price meal eligible students fare the best of these groups and are the most likely to complete articulations and earn college credit, although still at a lower rate than that of the overall cohort.

⁹ Gender X was not part of the OSPI or SBCTC data collection during the period covered by this study. Future reports might report outcomes for other genders if the data are available and of sufficient size to protect student privacy.

Figure 6: CTE Dual Credit participants only: Percent who registered in SERS, completed one or more articulations, or earned college credit from CTE Dual Credit, broken out by disability, homelessness and K-12 program participations groups



Relationship between CTE Dual Credit course taking and student outcomes

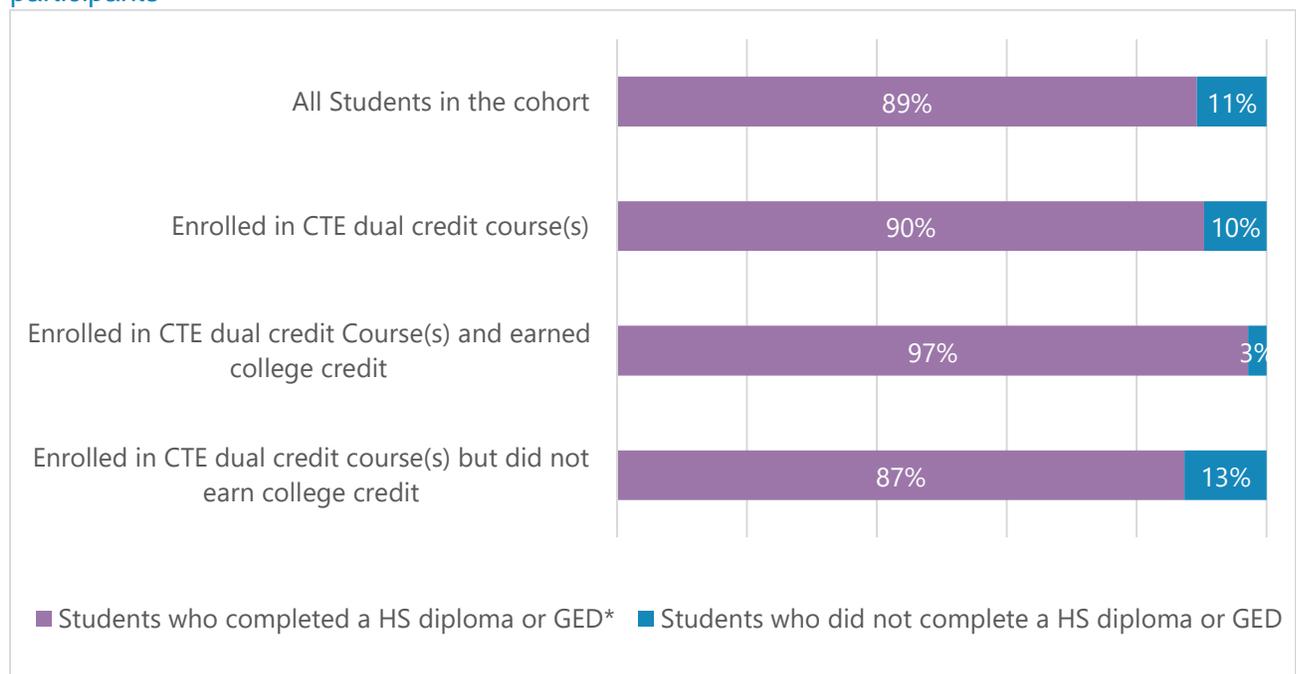
To explore the relationship between earning college credit from CTE Dual Credit course taking and high school completion and postsecondary outcomes, results for students who participated in CTE Dual Credit and earned college credits were compared to those who did not earn college credit. Note that this study cannot determine if college credit earning has a causal effect on outcomes, since it does not eliminate factors that are related to both student outcomes and credit earning such as academic performance. It is possible that these factors differ between those who do and do not earn credit and could be the cause of any observed differences rather than earning college credit.

What are the High School or GED completion rates for CTE Dual Credit groups?

All students

Rates of completing a high school diploma from a Washington public high school, a community or technical college or earning a GED were compared across the different CTE Dual Credit groups. Figure 7 shows that students who earned college credit from CTE Dual Credit courses were more likely than their peers who did not earn college credit to complete a high school diploma or GED.

Figure 7: High school and GED completion rates for the different groups of CTE Dual Credit participants*

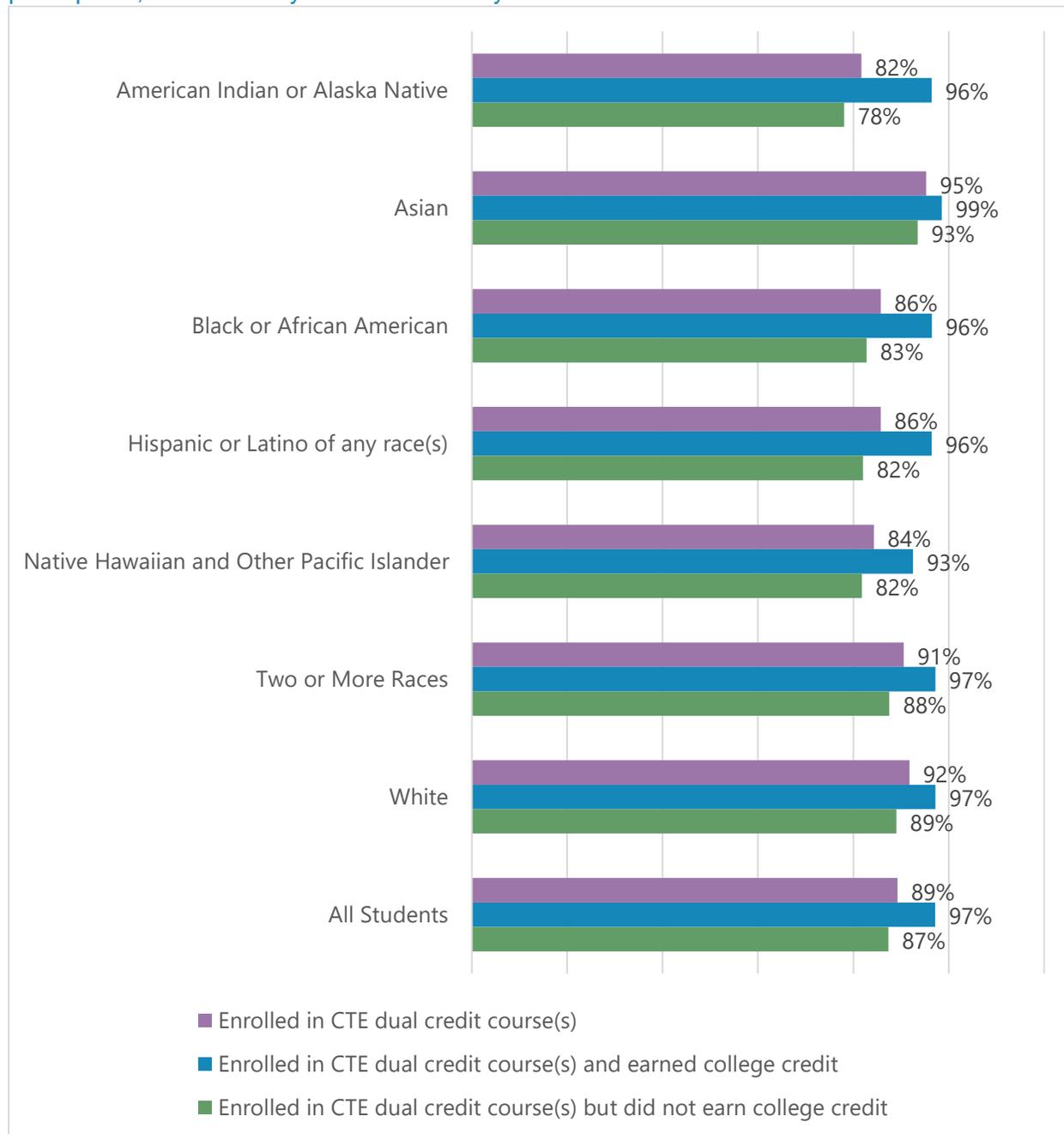


*Includes students who completed a high school diploma through a community or technical college high school completion program.

Race and Ethnicity

Figure 8 indicates that, although there is a positive relationship between college credit earning and high school or GED completion for all racial and ethnic groups, it is strongest for American Indian/Alaska Native students, followed by Black and Hispanic/Latino students. For these groups, high school and GED completion rates are about 10 percentage points higher among students who enrolled in CTE Dual Credit course and earned college credit as compared to students who enrolled but did not earn college credit.

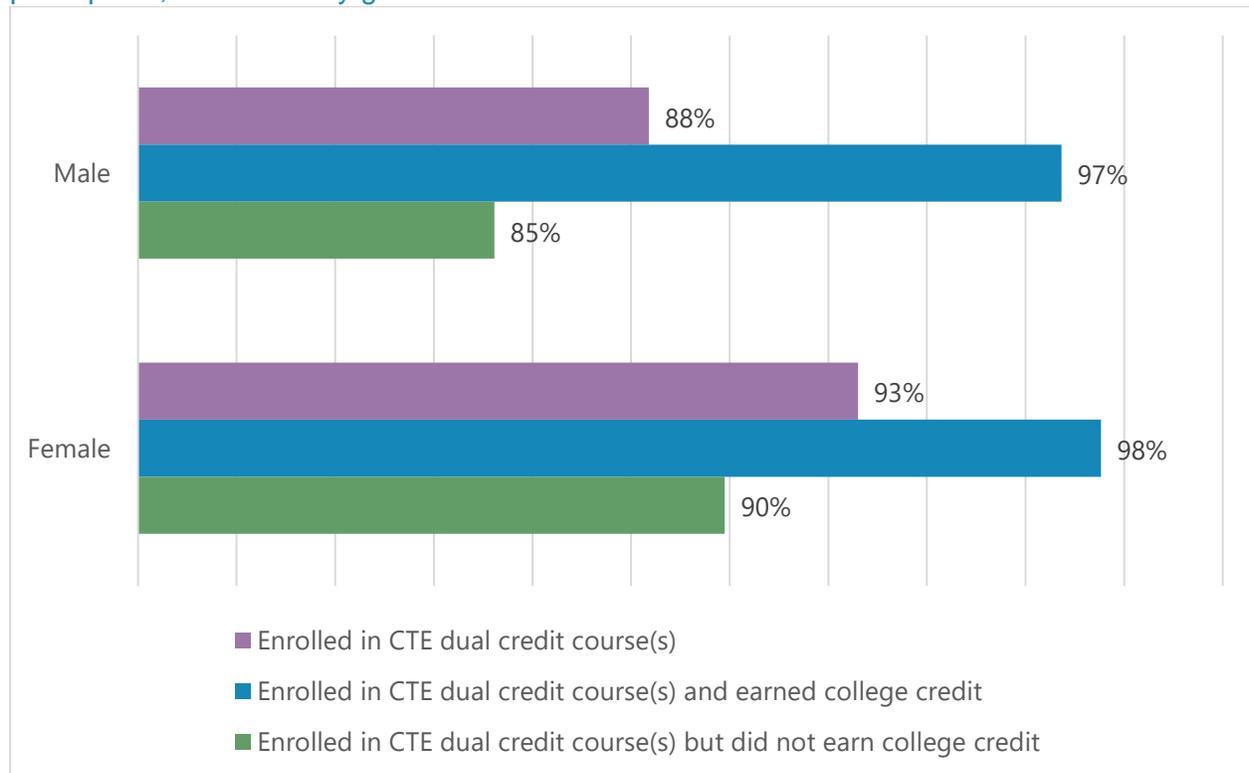
Figure 8: High school and GED completion rates for the different groups of CTE Dual Credit participants, broken out by race and ethnicity



Gender

As seen in Figure 9, female students enrolled in CTE Dual Credit courses have a higher high school/GED completion rate than male students. However, males who complete CTE Dual Credit and earn college credit are nearly as likely as females to earn a high school credential.

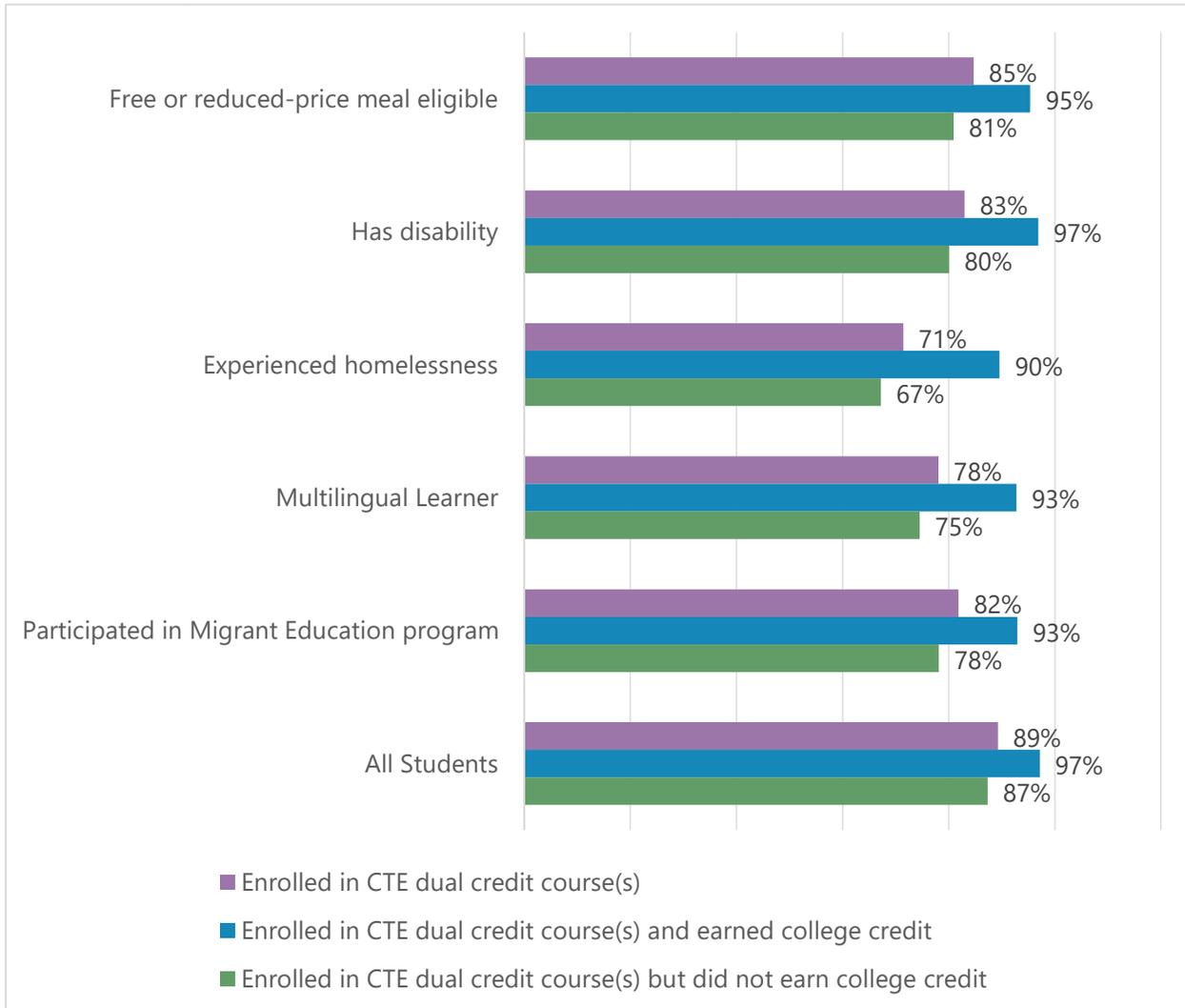
Figure 9: High school and GED completion rates for the different groups of CTE Dual Credit participants, broken out by gender



Disability, homelessness and K-12 program participation

Looking at other student groups in Figure 10, the strong, positive relationship between earning college credits for CTE Dual Credit and high school/GED completion is present for all groups. This is especially true for students experiencing homelessness and multilingual learners where high school or GED completion rates are 19 and 15 percentage points higher, respectively, for students who enroll in a CTE Dual Credit program and earn college credit.

Figure 10: High school and GED completion rates for the different groups of CTE Dual Credit participants, broken out by disability, experiencing homelessness, and K-12 program participations groups



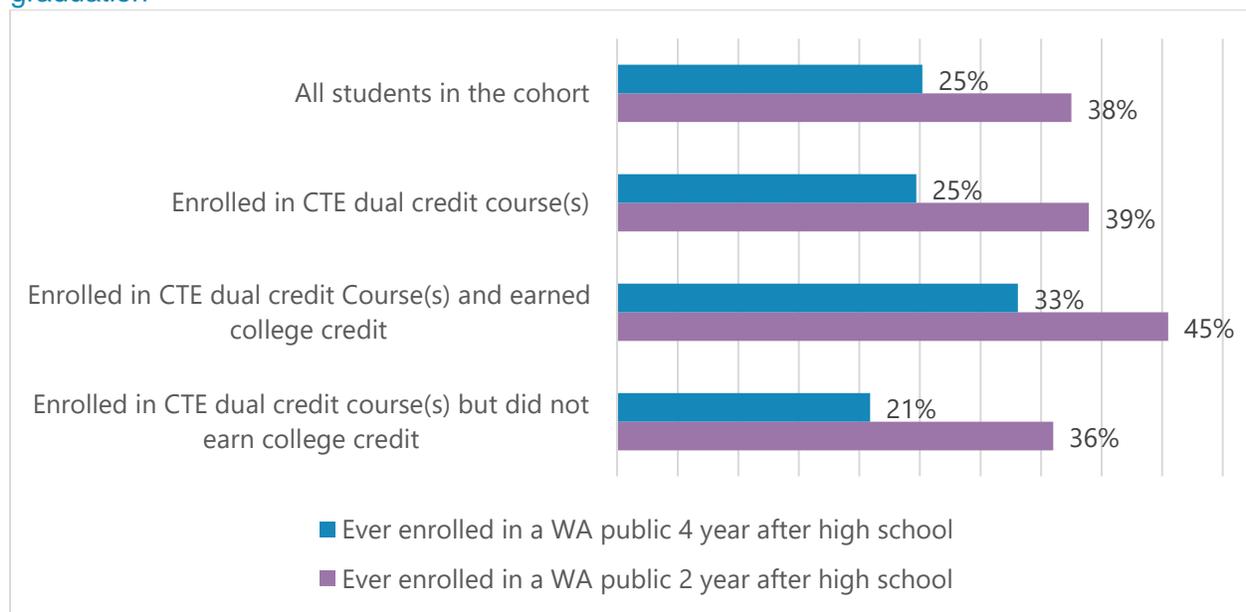
What are the postsecondary enrollment outcomes of CTE Dual Credit groups?

Cohort members, including those who graduated on time in 2015, those who dropped out, and any who graduated early or late, were followed from when they left high school through the 2021 academic year to determine if the students ever enrolled in a Washington public four-year institution or community or technical college. In addition, for students who ever enrolled in a Washington public postsecondary institution, the highest credential earned was tracked. These outcomes were examined in relation to college credit earning from CTE Dual Credit course taking. Postsecondary enrollment and credential earning were further broken out by race/ethnicity, gender, and other selected student characteristics.

Postsecondary enrollment and CTE Dual Credit participation and credit earning - All students

Among the CTE Dual Credit groups, Figure 11 shows that CTE Dual Credit participants who earned college credits from CTE Dual Credit courses were most likely to enroll in a Washington public two-year community or technical college after leaving high school (45%). Students who took CTE Dual Credit but did not earn college credits were the least likely to do so, at 36%. This pattern holds for enrollment in Washington’s public four-year institutions. The gap between those who earned college credits and those who did not is even larger.

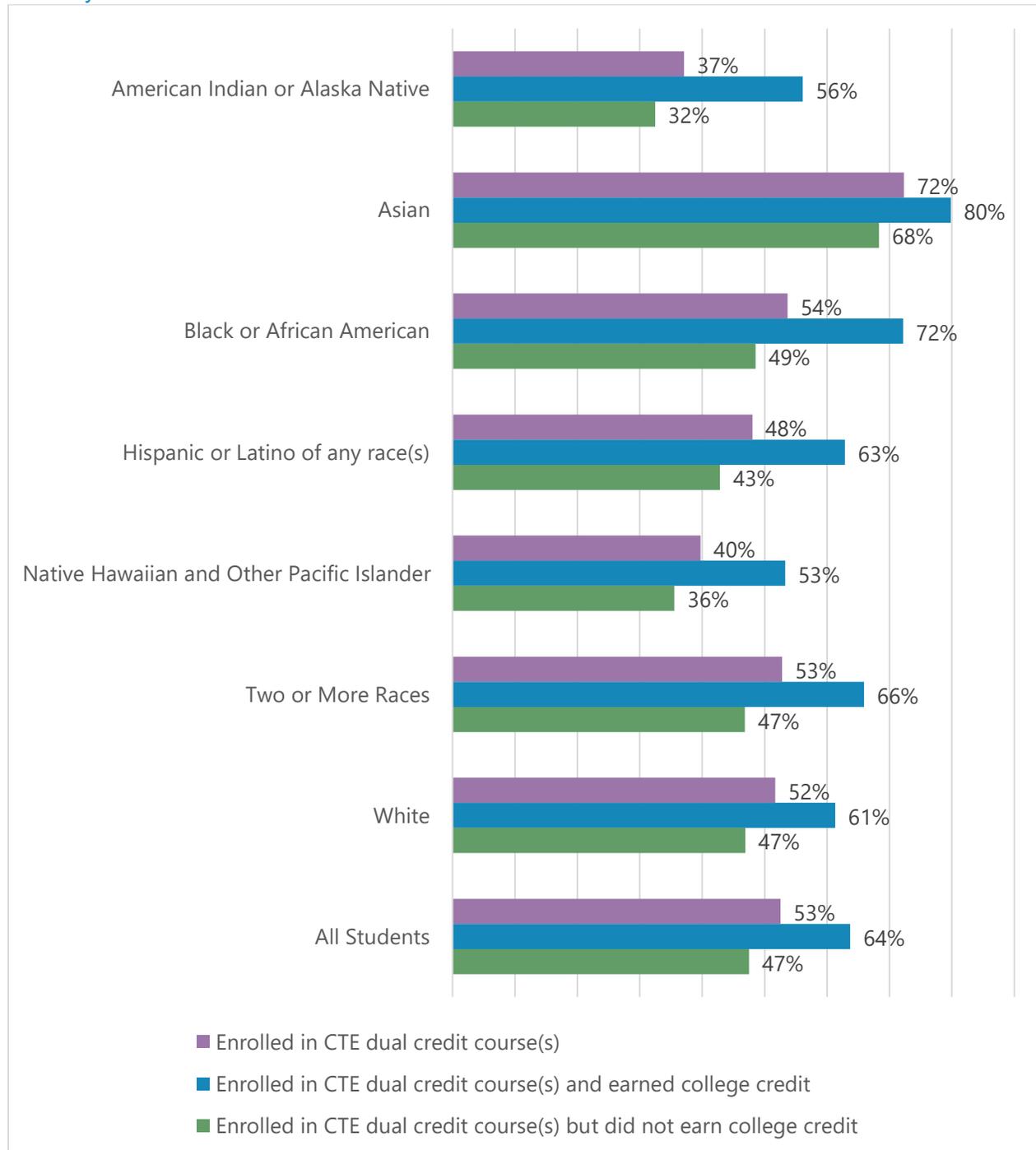
Figure 11: Percentage of each CTE Dual Credit group who ever enrolled in a Washington public 4-year institution or 2-year community or technical college during the six years after expected graduation



Postsecondary enrollment and CTE Dual Credit participation and credit earning by race and ethnicity

Enrollment in any Washington public postsecondary institution (2-year or 4-year) was examined by racial and ethnic groups for CTE Dual Credit participants only. Enrollment rates of students who earned college credit from CTE Dual Credit and those who did not is displayed, along with all students who enrolled in a CTE Dual Credit course. The results in Figure 12 suggest that earning college credits from CTE Dual Credit courses has a strong association with postsecondary enrollment for historically underserved racial groups. The effect appears to be greatest for American Indian/Alaska Native and Black students. American Indian/Alaska Native students who enroll in a CTE Dual Credit course and earn college credits have a postsecondary enrollment rate 24 percentage points higher than American Indian/Alaska Native students who enrolled but did not earn college credit. For Black students, this difference is 23 percentage points. Differences in postsecondary enrollment rate between those who earn college credit from CTE Dual Credit and those who do not are smaller for the other racial and ethnic groups, with gaps ranging between 12 and 20 percentage points.

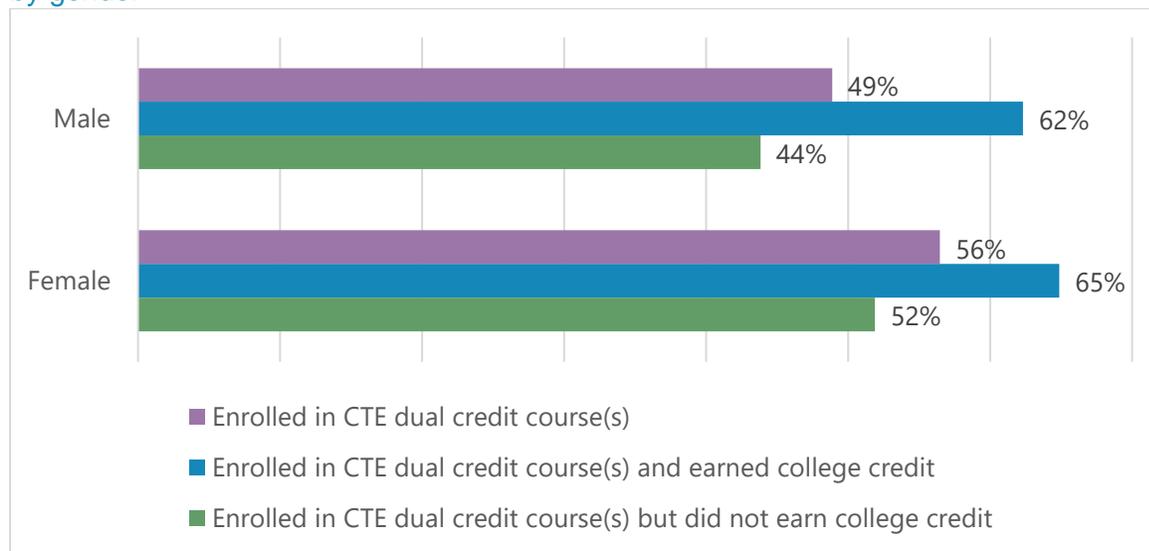
Figure 12: Percentage of each CTE Dual Credit group who ever enrolled in a Washington public postsecondary institution during the six years after expected graduation, broken out by race and ethnicity



Postsecondary enrollment and CTE Dual Credit participation and credit earning by gender

Overall, female students who enrolled in at least one CTE Dual Credit course had postsecondary enrollment rates that were 7 percentage points higher than that of males. This difference reduced to 3 percentage points for students who earned college credits.

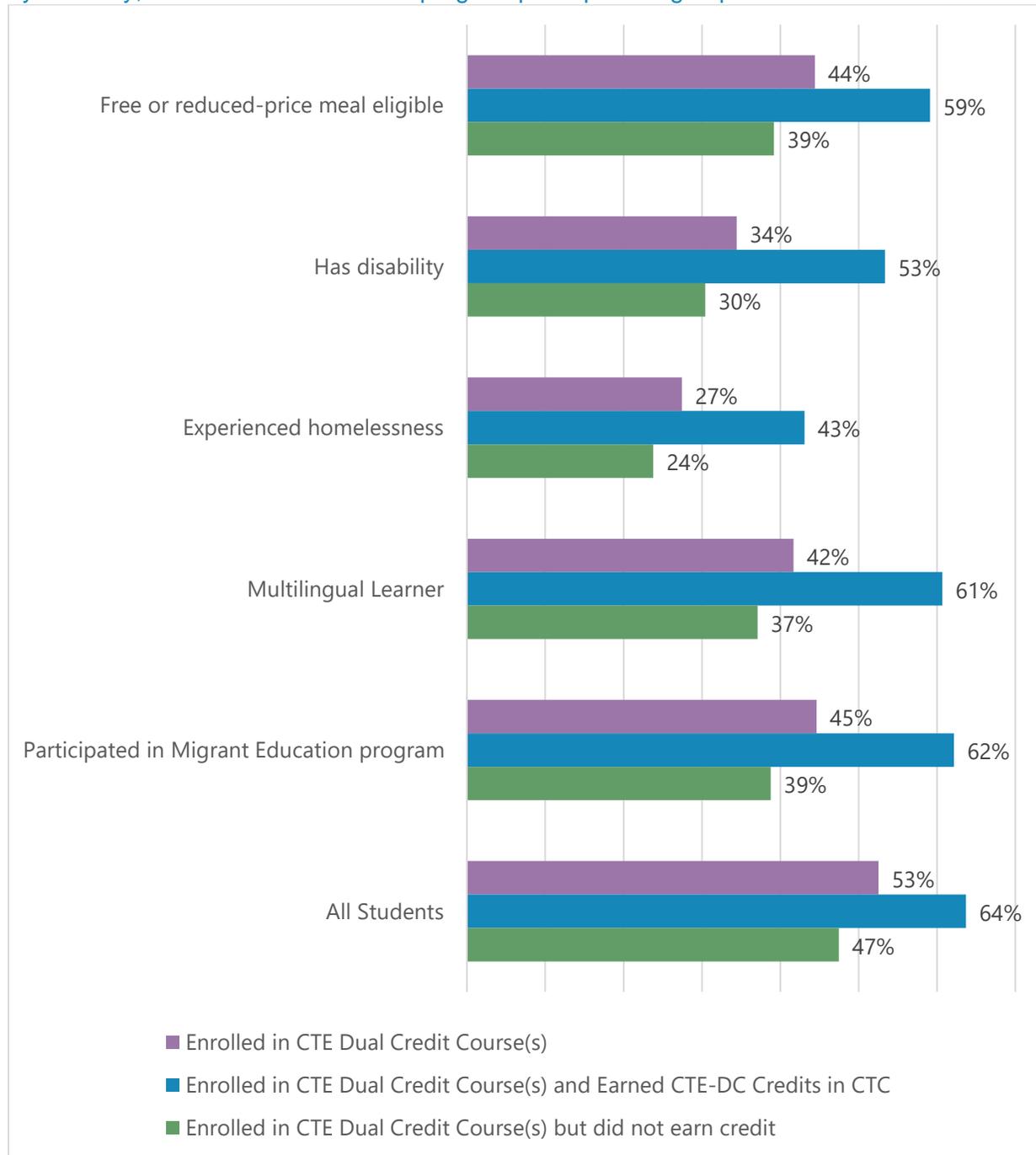
Figure 13: Percentage of each CTE Dual Credit group who ever enrolled in a Washington public postsecondary institution during the six years after expected high school graduation, broken out by gender



Postsecondary enrollment of CTE Dual Credit participants credit earning by student groups

With an average of 22%, the differences in postsecondary enrollment rates between CTE Dual Credit students who earn college credits and those who do not are large for each of the student groups examined in Figure 14. The difference is largest for students who participated in the Migrant Education program, multilingual learners and students with a disability, where CTE Dual Credit students who earned college credits were 23 to 24 percentage points more likely to enroll in a postsecondary institution than CTE Dual Credit students from these groups who did not earn college credit.

Figure 14: Percentage of each CTE Dual Credit group ever enrolled in a Washington public postsecondary institution during the six years after expected high school graduation, broken out by disability, homelessness and K-12 program participations groups



Postsecondary completion rates by CTE Dual Credit participation and credit earning – all students

Among all students in the cohort who ever enrolled in a Washington public two-year or four-year postsecondary institution, students who earned college credit from CTE Dual Credit were more likely to complete a postsecondary certificate or degree (64%) than those who did not earn college credits (47%) (Figure 15). This same group also was most likely to achieve a bachelor’s degree or higher, as illustrated in Figure 16 (29% compared to 21%).

Figure 15: Degree or certificate completion rates of students who ever enrolled in a Washington public postsecondary institution during the six years after expected high school graduation, broken out by CTE Dual Credit group

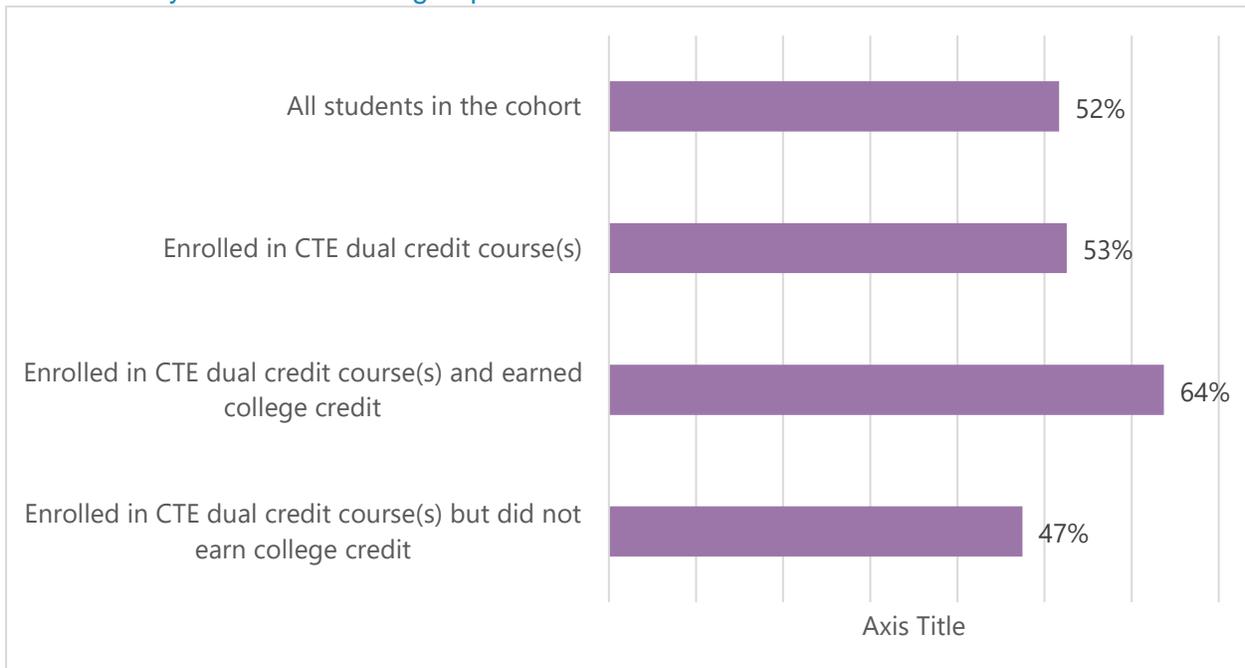
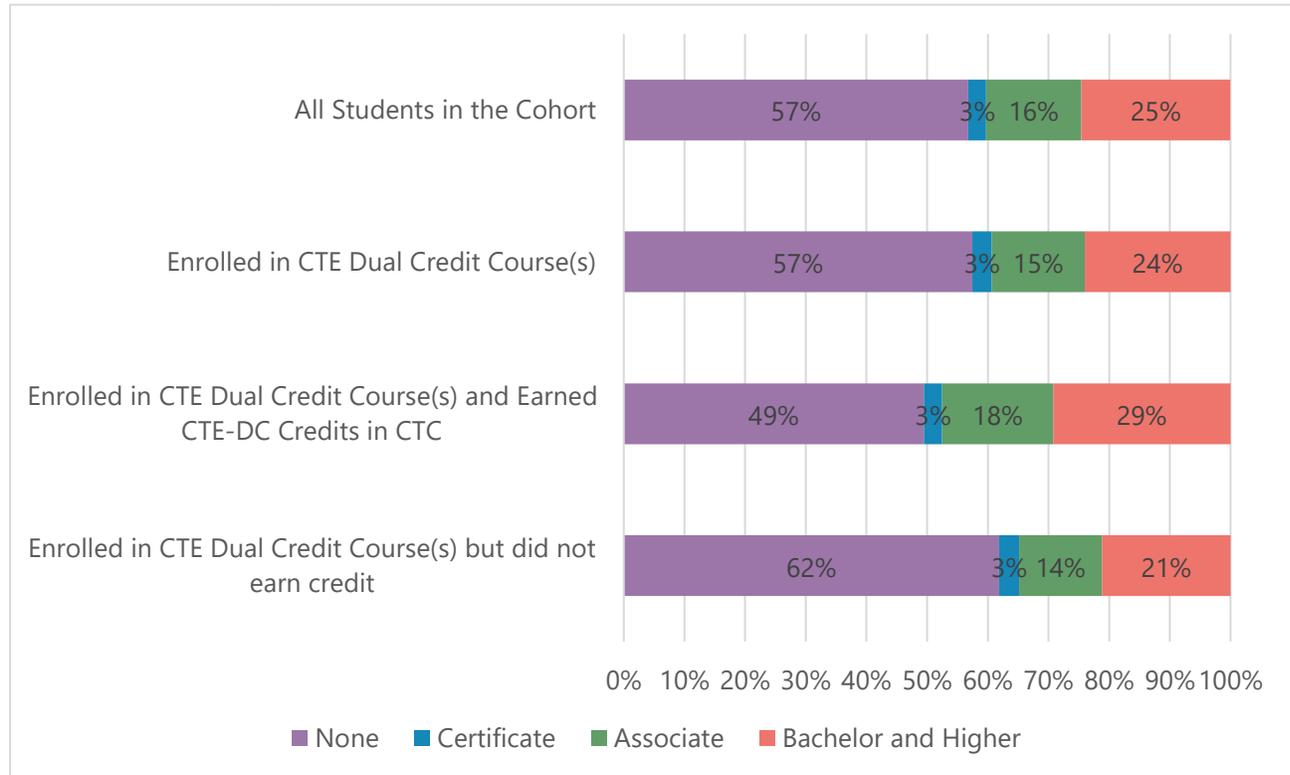


Figure 16: Highest award type completed by students who ever enrolled in a Washington public postsecondary institution, during the six years after expected high school graduation, broken out by CTE Dual Credit group*

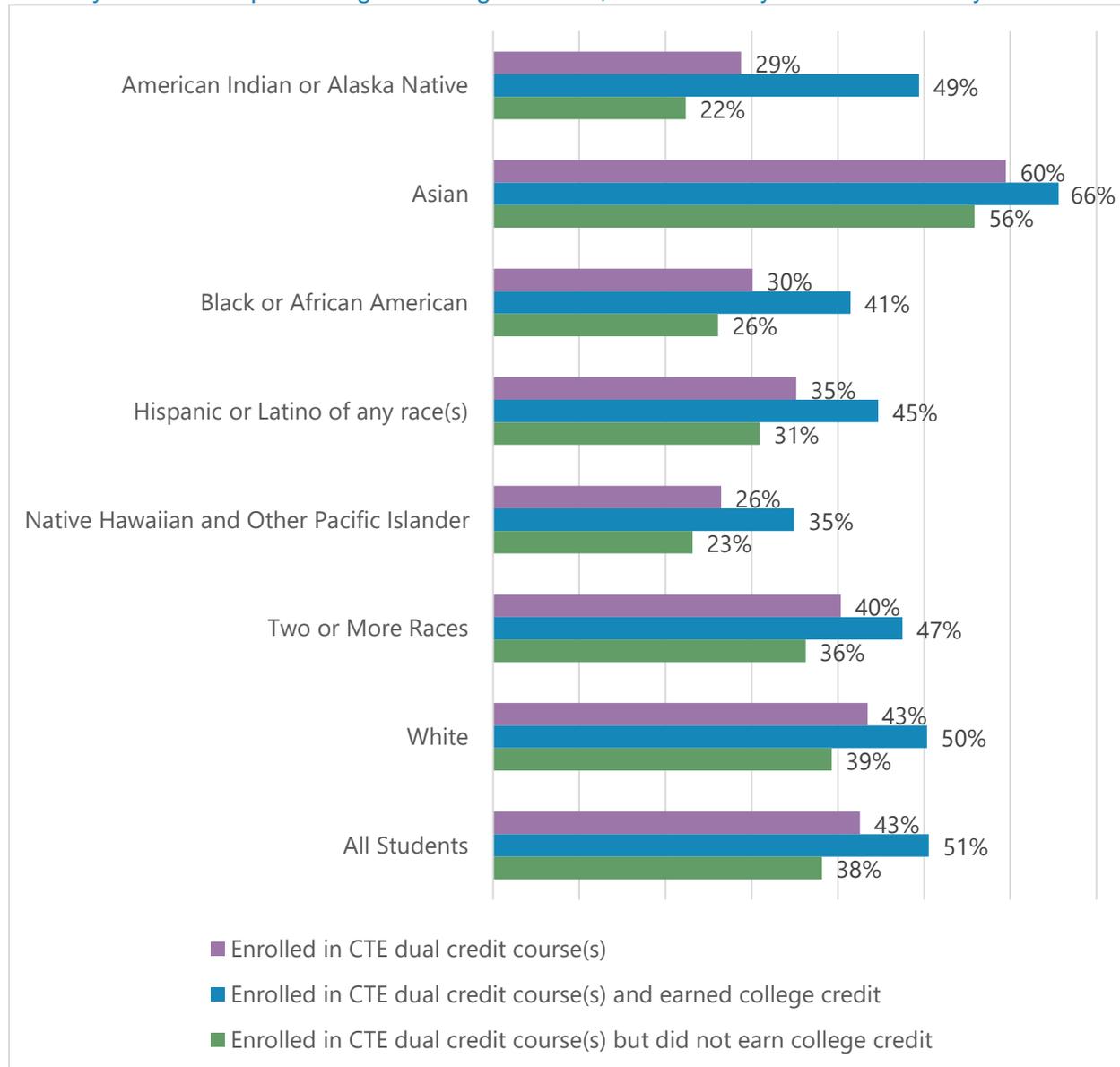


*Only includes awards conferred by Washington public postsecondary institutions.

Postsecondary completion rates by CTE Dual Credit participation and credit earning by race and ethnicity

Figure 17 shows that American Indian/Alaska Native students who enrolled in CTE Dual Credit during high school, completed articulations, and earned college credit are far more likely to have completed a certificate or degree (49%) than their peers who did not complete and earn the credit (22%). This pattern also exists, but to a lesser degree, for Black students (41% compared to 26%) and Hispanic or Latino students (45% compared to 31%).

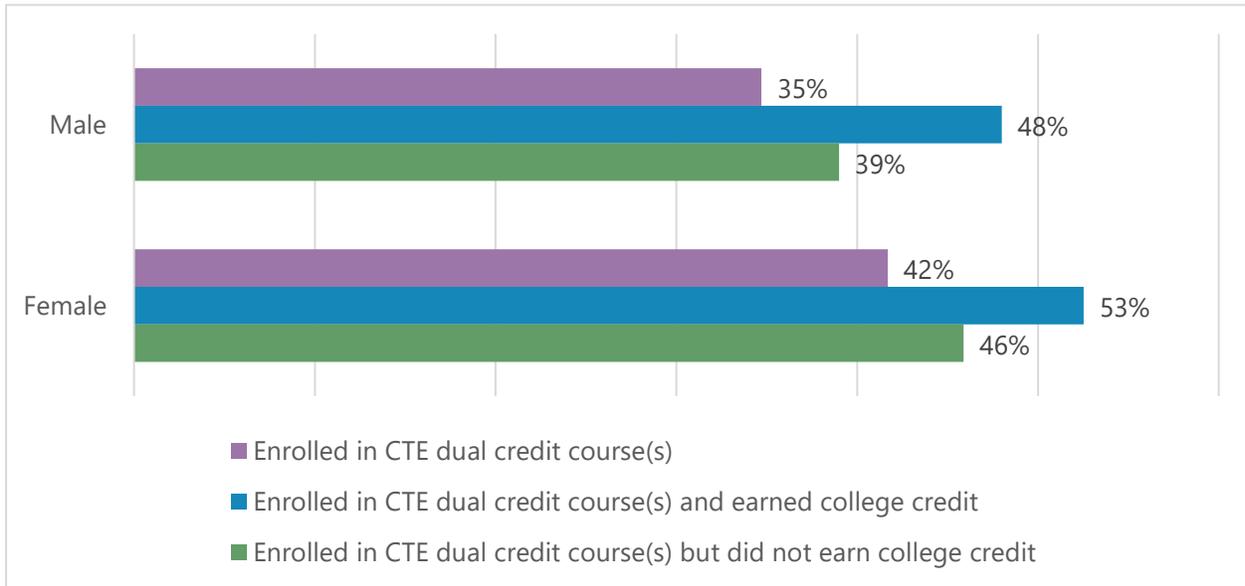
Figure 17: Percentage of each CTE Dual Credit group who were ever enrolled in a Washington public postsecondary institution and completed any postsecondary certificate or degree, during the six years after expected high school graduation, broken out by race and ethnicity*



*Only includes awards conferred by Washington public postsecondary institutions.

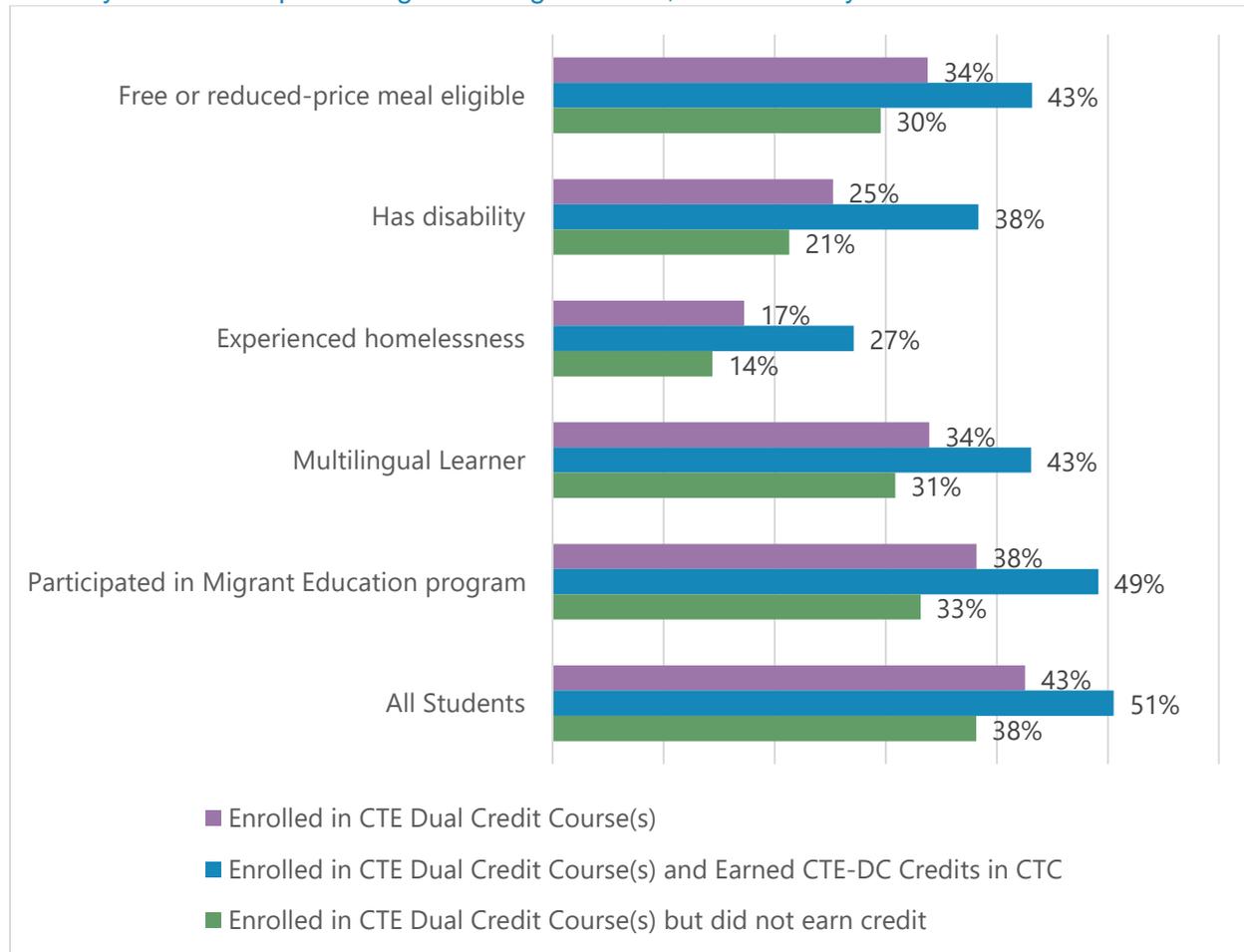
Similar to results for high school completion and college enrollment, Figure 18 shows that earning college credit from CTE Dual Credit appears to decrease the gap in the postsecondary credential completion rate between male and female students.

Figure 18: Percentage of each CTE Dual Credit group who were ever enrolled in a Washington public postsecondary institution and completed any postsecondary certificate or degree, during the six years after expected high school graduation, broken out by gender



Again, as seen with postsecondary enrollment, among the student groups in Figure 19, CTE Dual Credit students who earn college credit are far more likely than those who did not to earn a postsecondary credential from a Washington public postsecondary institution. This is particularly the case for students with a disability and those participating in the Migrant Education program, where CTE Dual Credit students who earn college credit have postsecondary credential attainment rates that are 16 to 17 percentage points higher than CTE Dual Credit students who do not earn college credits.

Figure 19: Percentage of each CTE Dual Credit group who were ever enrolled in a Washington public postsecondary institution and completed any postsecondary certificate or degree, during the six years after expected high school graduation, broken out by other student characteristics



What did we learn from this study?

Due to data limitations, CTE Dual Credit has been mysterious in terms of who and how many earn college credit and what happens to students after they leave high school. This study took advantage of data from the Statewide Enrollment and Reporting System (SERS), never before used for research, to shed light on CTE Dual Credit course participation, completion, and college credit earning patterns and how they differ by student characteristics and K-12 program participation. Linking SERS data to the P20W data warehouse also allowed exploration of high school completion and postsecondary outcomes of CTE Dual Credit participants who earned college credit compared to those who did not.

Findings indicate that although underserved students of color participate in CTE Dual Credit at rates similar to those of White and Asian students, they are less likely to complete courses, earn college credits, or both. However, results suggest that earning college credits from CTE Dual Credit courses is positively related to high school completion, postsecondary enrollment and degree attainment for all student groups, in particular for those who are historically underserved in higher education. In addition, the gap between male and female students in postsecondary outcomes is decreased for males who earn college credit from CTE Dual Credit courses. These findings provide evidence that CTE Dual Credit is a tool for improving equity of access to educational attainment.

Using the early years of SERS data, when nearly all consortia and schools used the system, this study also demonstrates that systemwide data collection on articulation completion and college credit earning can provide valuable insights into which students are benefiting most from CTE Dual Credit and where gaps exist. Currently the state has very limited data on who earns college credit from CTE Dual Credit courses, how many credits they earn, in what subject areas and what happens to those credits once students go on to postsecondary education. With a goal of supporting "...equitable student participation and success in CTE Dual Credit," SBCTC funded a report which — among many other recommendations on policies and practices — made the following recommendations to improve data reporting for CTE Dual Credit (Staklis, Zinth & Rasmussen Foster, 2022):

- In the short term, update the outdated SERS system, maximizing ease of use and cross-system compatibility with OSPI's CEDARS system.
- Future strategy, develop a single course and credit earning management system that could be used for all dual credit programs in the state.

System changes such as these take time and funding. In the meantime, SBCTC and ERDC can continue to work together to identify all transcribed college credits earned through CTE Dual Credit in the student data reported to SBCTC by the community and technical colleges.

Next steps for research

This descriptive study cannot determine the causal impact of CTE Dual Credit participation and college credit earning on postsecondary outcomes, since it does not control for confounding variables that may be associated with both completion of CTE Dual Credit courses and postsecondary outcomes. For example, those who are more likely to earn college credit through CTE Dual Credit courses might also be more likely to be high academic achievers with college aspirations than those who participate but do not earn college credit. Any positive association between earning college credit and college enrollment could be caused by differences in college aspirations rather than earning college credits. A next step would be to conduct quasi-experimental analysis that controls for factors that may influence CTE Dual Credit participation and postsecondary outcomes such as academic ability, student demographic characteristics, absences, discipline actions, school demographics, and school geographic location. Another key factor to include that impacts CTE participation is access to CTE Dual Credit courses in the school, which is not universal.

Before conducting such work, additional descriptive analysis is needed. Researchers and practitioners could conduct case studies using more recent SERS data from schools that still use it to understand the current CTE Dual Credit environment, with caveats about the extent to which results apply statewide. Such studies could track educational pathways of CTE Dual Credit students to see if students enroll in and complete postsecondary programs or continue high school CTE course subject areas in college, determining how college credits are used, and calculating time to degree. Employment outcomes should also be examined. Disaggregation of detailed racial and ethnicity data that has been more recently collected, as well as looking at the intersections of race and gender and race and income status, are also recommended.

Since CTE Dual Credit implementation practices vary by consortia and likely among schools within consortia, analysis that includes school-level data such as percent of students who are low-income, geographic location, and student/teacher ratio can further tease out which students benefit most from CTE Dual Credit courses.

Lastly, this analysis was limited to enrollment and completion in Washington public postsecondary institutions only. Including out-of-state and Washington private institutions as well as other sources of post-high school credentials such as private career schools would provide a more complete picture of post high school outcomes.

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Appendix A: SERS Data Quality

Each SERS table included in the data provided to ERDC was analyzed for:

- consistency from year to year, between organizations and among students;
- integrity between related data elements;
- missing data, duplicate records and
- invalid data (e.g., dates out of range).

Internal data quality was found to be adequate for the following key data elements: student identifiers; registrations of student for articulations and associated classes; registration and transcription dates; schools and districts where the students registered; and high school class, college course and articulation completion statuses. Credits earned and transcribed, and which college and consortium is associated with the credits were also adequately complete and accurate.

Course details, such as titles, course identifiers, articulation titles, number of college credits earned per articulation or course were less consistent. Titles are inconsistent in how schools and colleges use them—some include a long list of courses in one entry or words like “inactive” or “deleted.” Course number is also used inconsistently. The system does not allow for changes that retain history, so the snapshot of data provided to ERDC is current as of that date. For example, if a course title changes from one year to the next, only the most recent version is in the data. As such, it is impossible to validate the details of courses and number of credits earned, course for course, against the K-12 or community and technical college course data, due to the lack of common course numbers or titles between the systems and over time. Therefore, this study did not use this course-level data.

One key test of SERS data was to determine if the student names and birthdates were adequate for use for matching to the P20W data warehouse. Of the records submitted to P20W identity resolution, 97% had matches with students in the P20W system. When SERS was joined to K-12 enrollments, 98% of the SERS students were found to be enrolled in K-12 during the same year they had SERS registrations. Combined with the results of the data quality review, this result instilled confidence that the key elements in the SERS data is usable for research.

As another data quality check, comparison was made to another CTE Dual Credit data source, the CEDARS Student Schedule file, which includes all K-12 courses taken by each student. Of the approximately 160,000 SERS students that matched to P20W data, only 7% did not have a CTE Dual Credit course record in ERDC’s CEDARS Student Schedule data. This number looks reasonable since those not found could be missing due to the timing of the CEDARS data

extracted for ERDC or that fact that some students in SERS attended schools that do not report to OSPI (for example, Job Corps sites).

To test whether SERS data could be used for statewide research on college credit earning, comprehensiveness of SERS use in school districts with high schools that offer CTE Dual Credit was reviewed and found to be best between 2012 and 2015. During those years, Figure A-1 shows that the system was used to register student articulations by between 82% (in 2014) and 89% (in 2012) of school districts where CTE DC courses were offered. Use for recording transcription was slightly lower (ranging between 80% and 88%). Each shows the same pattern of decline between 2012 and 2013 followed by steady use for the next two years, with a gradual decline after 2015.

Figure A-1: Coverage of SERS use by school districts with CTE Dual Credit course enrollments: What proportion of districts used SERS to 1) register articulations and 2) record college credits?

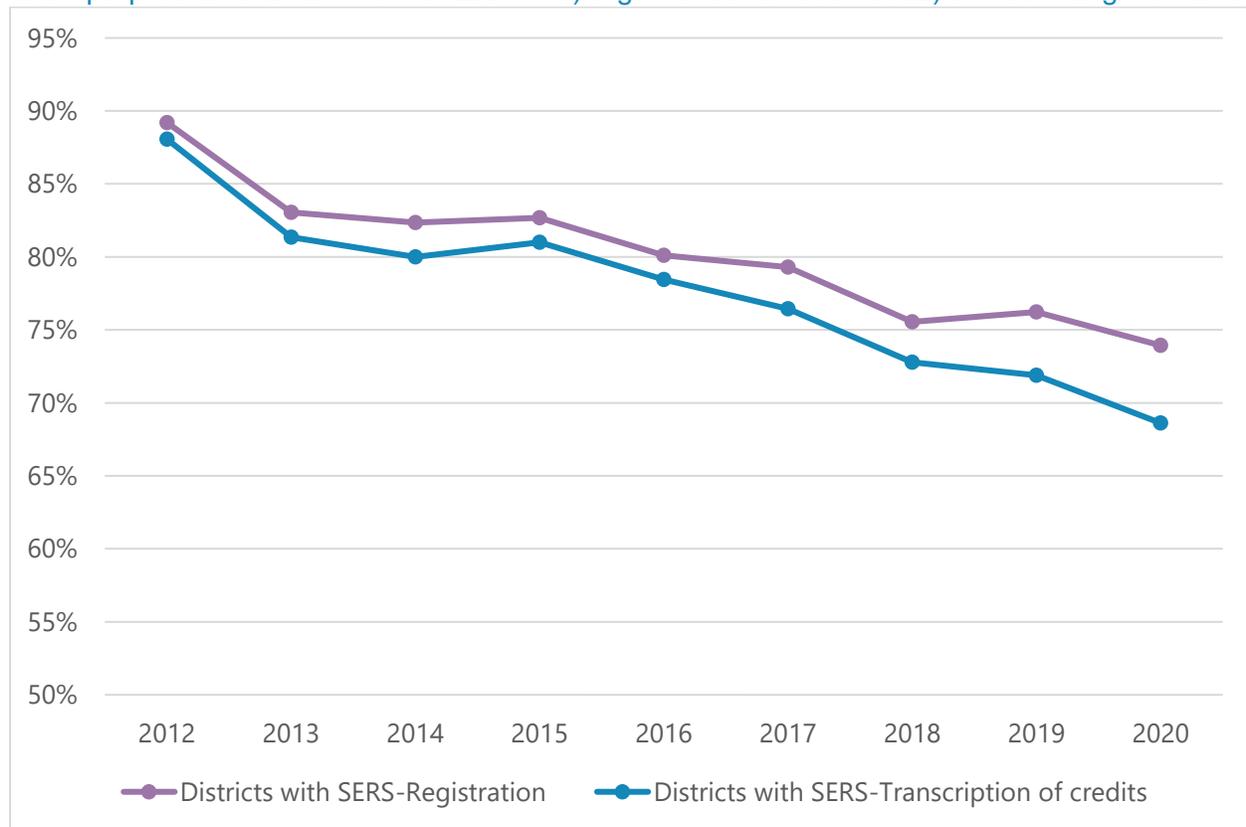
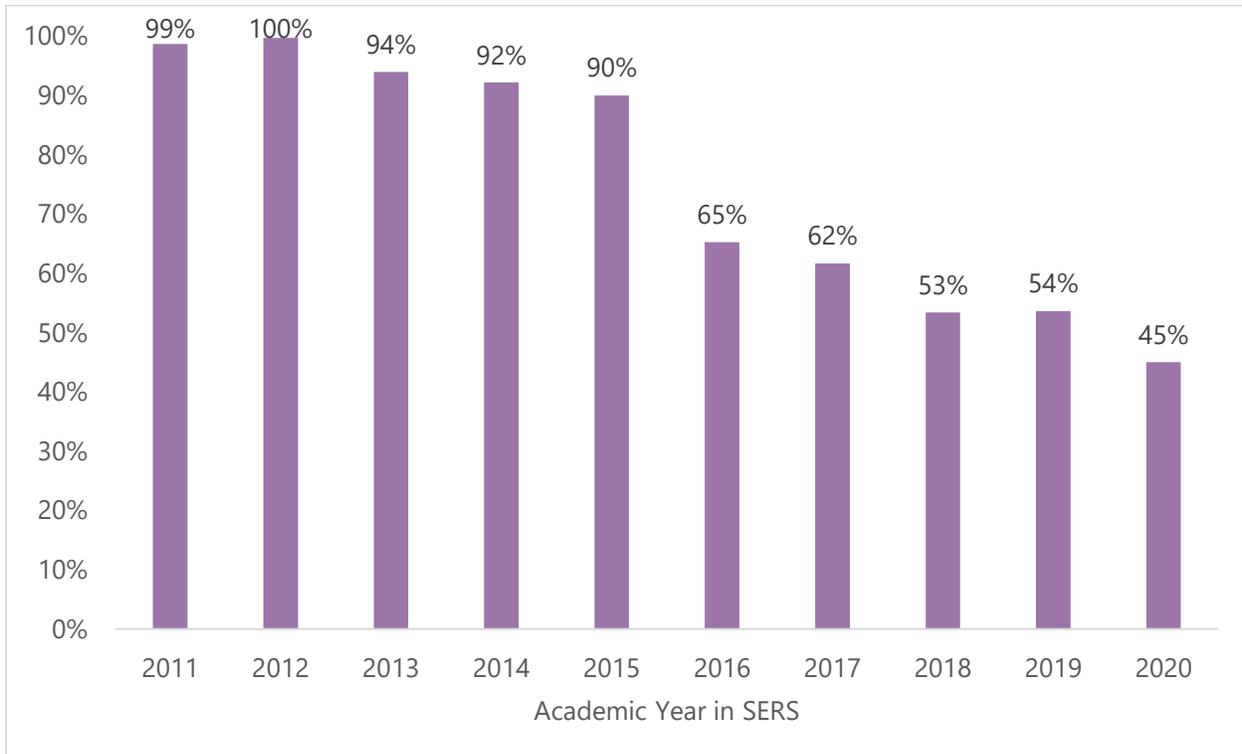


Figure A-2 uses SERS data to measure, for academic years 2011 through 2020, the percentage of completed articulations for which college credits were recorded in SERS. Between 2011 and 2015, an average of 95% of the articulations completed by students had transcription dates recorded in SERS. This percentage dropped to 65% in 2016 and gradually declined to 45% by 2020. Consortia that stopped automatic transcription and recording of credits in SERS over the years typically require students to take some form of action to have credits added to a college

transcript. Some require students to apply for admission and submit a high school transcript while others required them to fill out and submit a form to the college.

Figure A-2: Percent of completed articulations for which transcribed credits were recorded in SERS



Based on the results of this data quality review, this study will use a cohort of students who were expected to graduate from high school in 2015 and whose course taking years correspond to the height of coverage of SERS for recording CTE Dual Credit activities. Most of these students had access to SERS during at least one of the years during which they enrolled in a CTE Dual Credit course.

Appendix B: Tables

Table B-1: Student characteristics of the 2015 cohort and of those who participated in CTE Dual Credit courses, registered in SERS, completed articulations and earned college credit in a community or technical college from CTE Dual Credit courses

Student Characteristic	All students in the cohort	Enrolled in CTE Dual Credit course(s)	Registered in SERS	Completed articulation (s)	Earned college credits
American Indian or Alaska Native	1,126 1.6%	709 1.3%	240 0.9%	144 0.8%	139 0.8%
Asian American	5,472 7.6%	4,360 8.0%	2,141 8.3%	1,562 8.9%	1,521 8.9%
Black or African American	3,126 4.4%	2,606 4.8%	948 3.7%	592 3.4%	564 3.3%
Hispanic or Latino of any race(s)	12,852 17.9%	9,896 18.1%	4,335 16.9%	2,637 7.6%	2,563 15.0%
Native Hawaiian and Other Pacific Islander	553 0.8%	453 0.8%	179 0.7%	113 0.7%	107 0.6%
Two or More Races	4,004 5.6%	3,097 5.7%	1,410 5.5%	993 5.7%	968 5.7%
White	44,802 62.3%	33,555 61.4%	16,413 64.0%	11,456 65.5%	11,176 65.5%
Male	36,566 50.8%	28,318 51.8%	12,607 49.1%	7,995 45.7%	7,731 45.4%
Female	35,369 49.2%	26,358 48.2%	13,059 50.9%	9,502 54.3%	9,307 54.6%
Free or reduced-price meal eligible	36,987 51.4%	28,119 51.4%	11,971 46.6%	7,603 43.5%	7,371 43.3%
Student with Disability	9,283 12.9%	6,835 12.5%	2,453 9.6%	1,240 7.1%	1,190 7.0%

Student Characteristic	All students in the cohort	Enrolled in CTE Dual Credit course(s)	Registered in SERS	Completed articulation (s)	Earned college credits
Experiencing homelessness	4,225 5.9%	3,094 5.7%	1,113 4.3%	595 3.4%	586 3.4%
Multilingual Learner	3,416 4.8%	2,624 4.8%	970 3.8%	523 3.0%	511 3.0%
Participating in Migrant Education program	1,927 2.7%	1,416 2.6%	658 2.6%	359 2.1%	354 2.1%
Total Count	71,935	54,676	25,666	17,497	17,038

Table B-2: CTE Dual Credit participation rate by gender, disability, homelessness and K-12 program participation

	Cohort n	CTE DC participants n	%
Male	36,566	28,318	77.4
Female	35,369	26,358	74.5
Free or reduced-price meal eligible	36,987	28,119	76.0
Has disability	9,283	6,835	73.6
Experiencing homelessness	4,225	3,094	73.2
Multilingual Learner	3,416	2,624	76.8
Participating in Migrant Education program	1,927	1,416	73.5
All students in the cohort	71,935	54,676	76.0