



## Career and Technical Education Skill Centers: *Describing Programs, Students, and Student Outcomes*

The Washington State Institute for Public Policy (WSIPP) receives annual funding from the legislature to conduct research on K-12 education topics. In this report, we examine Washington’s Career and Technical Education (CTE) skill centers and the students who attend them.

First, we describe CTE programming in skill centers. Next, we examine which students can and do attend skill centers, with a particular focus on understanding student access. Finally, we describe high school transition outcomes (e.g., graduation, postsecondary enrollment, and employment) for students who attended skill centers during high school.

[Section I](#) provides an overview of the report and main research questions. [Section II](#) summarizes background information on CTE for high school students and describes Washington’s investments in skill centers. [Section III](#) describes the methodological approach we used to address our research questions. [Section IV](#) describes course enrollments in skill centers, and what skill centers are providing to students. [Section V](#) describes skill center access and the characteristics of students attending skill centers. [Section VI](#) describes high school transition outcomes for skill center students over time. Finally, [Section VII](#) details conclusions and limitations.

### Summary

Career and Technical Education skill centers are regional secondary schools that provide hands-on learning environments. In this report, we describe skill centers and examine patterns in who can and does access skill centers. We also describe high school transition outcomes for students who have attended skill centers.

We find that, in some districts, skill centers expand the programming that is offered in high schools. However, we observe uneven availability of CTE programming across districts and programs.

Our analysis of skill center access indicates that 86% of students are in districts with access to a skill center. Male, Hispanic, and low-income students are more likely to attend a skill center in districts with skill center access. Skill center directors report that demand for programs exceeds capacity in the majority of programs.

Analysis of high school transition outcomes shows that most skill center students (80%) earn a high school diploma. Less than 40% have earned a post-secondary credential five years after graduation, but nearly 90% are employed in that time frame. Only 10% of skill center students are not in education or employment five years after graduation.

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## I. Introduction

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WSIPP receives funding from the legislature to study K-12 education topics.<sup>1</sup> During Fall 2023, we conducted outreach with nonpartisan legislative staff to identify research questions for consideration. Out of these conversations, we identified CTE skill centers as a priority topic and developed a study focused on CTE skill center student access and outcomes.

Skill centers are regional schools that serve high school students across multiple districts.<sup>2</sup> Washington invested in CTE skill centers in the 1970s, with capital funding provided by the legislature. More recently, in 2008, the legislature directed feasibility studies for satellite and branch skill center campuses and stated the intent for skill centers to “reach into rural and remote districts, as well as high-density, urban districts with the same quality services as are offered at current regional skill centers.”<sup>3</sup> Standards formalized in 2010 define skill centers and set prototypical average class size and per-pupil funding allocations.<sup>4</sup>

A small number of skill centers currently serve a fraction of Washington’s high school students. Legislative staff expressed interest in the adequacy of skill center access to meet student demand. Staff were interested in access both across Washington State and within population-dense areas.

Legislative staff also emphasized the value of observing outcomes for skill center students. In other words, what do graduation rates, engagement in postsecondary education, and labor market outcomes look like for students who attended a skill center during high school?

This study will begin to address these issues of access and outcomes. In this report, we address the following overarching research questions:

- 1) What are CTE skill centers providing to students?
- 2) Which students can and do access CTE skill centers?
- 3) What do high school transition outcomes look like for CTE skill center students?

We answer the first two questions using both administrative data and information from a WSIPP survey of Washington’s skill center directors.

To answer the third question, we use administrative data over the five years following students’ high school graduation. We also address the short-term impacts of the COVID-19 pandemic on student outcomes where possible.

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<sup>1</sup> [Engrossed Substitute Senate Bill 6386, Chapter 372, Laws of 2006.](#)

<sup>2</sup> [Washington Office of Superintendent of Public Instruction, Career and Technical Education website.](#)

<sup>3</sup> [Second Substitute Senate Bill 5790, Chapter 463, Laws of 2007.](#)

<sup>4</sup> [RCW 28A.150.260.](#)

## II. Background

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In this section, we provide background information on CTE in high schools and skill centers in Washington.

### CTE for High School Students

#### What is CTE?

High school CTE courses allow students to explore career interests and gain career skills for specific jobs or fields after graduation.<sup>5</sup> Focusing on CTE in high school can also lead to employment or apprenticeships after graduation or to postsecondary certificates or degrees.

As the demand for skilled workers continues to grow, CTE has increasingly become seen as an option to build students' career readiness and has become common in high school curricula.<sup>6</sup> Many students are required to enroll in at least one credit of CTE before graduating. Among U.S. high school graduates in 2019, 85% earned at least one CTE credit.<sup>7</sup>

The federal Carl D. Perkins Career and Technical Education Act of 2006 (Perkins IV) and 2018 reauthorization (Perkins V) dictates funding and regulations for CTE programming at the secondary and postsecondary levels, such as requirements regarding academic standards, course alignment with academic, technical, and workforce skills, and pathways to industry-recognized credentials.

#### Research on CTE and Student Outcomes

There is an extensive body of research examining links between high school CTE and student outcomes. The research generally shows positive associations between CTE and high school graduation, postsecondary enrollment, and workforce outcomes.<sup>8</sup> We caution, however, that conclusions from many of these studies may be limited by their methods. Students with particular characteristics may choose to participate in CTE, and adequately controlling for the differences between CTE and non-CTE students is challenging. As a result, differences between students—rather than CTE participation itself—may explain differences in outcomes.

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<sup>5</sup> National Center for Education Statistics. [About CTE Statistics website](#).

<sup>6</sup> Hodes, C., & Kelley, P. (2017). [Closing the skills gap through technical excellence](#). *Athens Journal of Education*, 4(3), 253-270 and Jacob, B.A. (2017). [What we know about career and technical education in high school](#). Brookings.

<sup>7</sup> National Center for Education Statistics. (2021). [Percentage of public and private high school graduates who earned at](#)

[least one Carnegie credit in selected career/technical education courses in high school, by selected student and school characteristics: 2019](#). Digest of Education Statistics.

<sup>8</sup> Measures of CTE participation varied across studies reviewed, including overall participation in CTE courses or number of CTE courses enrolled in during high school, standalone technical high schools, and career academies within high schools.

We generally find positive results among recent rigorous evaluations that account for differences between students. In terms of high school outcomes, the rigorous studies we reviewed reported that CTE participation is associated with lower dropout rates, fewer absences, higher graduation rates, and an increased likelihood of earning industry-recognized credentials.<sup>9</sup> However, one study we reviewed did not find a relationship between CTE and high school graduation.<sup>10</sup>

Rigorous research on postsecondary outcomes suggests that CTE is associated with an increase in postsecondary enrollment, particularly in community colleges.<sup>11</sup> However, this increased enrollment may be concentrated among male and low-income students, as well as among students dually enrolled in CTE courses in high schools and local colleges.<sup>12</sup> A few studies reported null or negative impacts on postsecondary enrollment.<sup>13</sup>

Several studies also reported a positive association between CTE participation in high school and postsecondary credential accumulation, though these studies were less rigorous.<sup>14</sup>

With respect to labor market outcomes, several studies reported that CTE students were more likely to be employed and have higher earnings after high school compared to similar students who did not participate in CTE or took fewer CTE classes.<sup>15</sup> Some of these studies found larger labor market outcomes for male students, low-income students, students who take two or more CTE courses, and students at risk of dropping out of high school.<sup>16</sup>

### CTE in Washington's High Schools

Most public school students in Washington take at least one CTE course to fulfill Graduation Pathway and High School and Beyond Plan graduation requirements.<sup>17</sup>

<sup>9</sup> Bonilla, S. (2020). [The dropout effects of career pathways: Evidence from California](#). *Economics of Education Review*, 34; Hemelt, S., Lenard, M., & Paeplow, C. (2017). [Building better bridges to life after high school: Experimental evidence on contemporary career academies](#). National Center for Analysis of Longitudinal Data in Education Research; Dougherty, S., Gottfried, M., & Sublett, C. (2019). [Does increasing career and technical education coursework in high school boost educational attainment and labor market outcomes?](#) *Journal of Education Finance*, 44, 423-447; Brunner, E., Dougherty, S., & Ross, S. (2023). [The effects of career and technical education: Evidence from the Connecticut Technical High School System](#). *The Review of Economics and Statistics*, 105(4), 867-882.

<sup>10</sup> Kemple, J. (2008). [Career academies: long-term impacts on labor market outcomes, educational attainment, and transitions to adulthood](#). MDRC.

<sup>11</sup> Cellini, S. (2006). [Smoothing the transition to college? The effect of tech-prep programs on educational attainment](#). *Economics of Education Review*, 25(4), 394-411; Dougherty, S. (2016). [Career and technical education in high school: does it improve student outcomes?](#) Thomas Fordham Institute; Dougherty et al. (2019); and Hemelt et al. (2017).

<sup>12</sup> Hemelt et al. (2017); Dougherty (2016); Dougherty, S. (2018). [The effect of career and technical education on human capital accumulation: causal evidence in Massachusetts](#). *Education Finance and Policy*, 13(2), 119-148.

<sup>13</sup> Kemple (2008) and Brunner et al. (2023).

<sup>14</sup> Cowan, J., Goldhaber, D., Holzer, H., Naito, N., Xu, Z. (2020). [Career and technical education in high school and postsecondary career pathways in Washington State](#). Institute of Labor Economics; Plasman, J., Gottfried, M., & Sublett, C. (2017). [Are there academic CTE cluster pipelines? Linking high school CTE coursetaking and postsecondary credentials](#). *Career and Technical Education Research*, 42(3), 219-242.

<sup>15</sup> Brunner et al. (2023); Dougherty et al. (2019); Dougherty (2016); and Kemple (2008).

<sup>16</sup> Brunner, E., Dougherty, S., & Ross, S. (2023). [The effects of career and technical education: evidence from the Connecticut technical high school system](#). National Bureau of Economic Research; Dougherty (2016); Kemple (2008); Carl D. Perkins Career and Technical Education Act of 2006.

<sup>17</sup> Washington Office of Superintendent of Public Instruction (OSPI). [Graduation](#); RCW 28A.230.090; RCW 28A.230.122; and WAC 180-51-210.

Beginning with the Class of 2020, students may meet graduation requirements through the CTE graduation pathway option,<sup>18</sup> which requires completing two or more CTE credits in the same CTE program area.<sup>19</sup> These students are sometimes referred to as “CTE concentrators.”

CTE courses in Washington high schools are organized into 16 career clusters that encompass a wide range of career paths and industries. Some examples of clusters include *Architecture & Construction, Business Management & Administration, Science, Technology, Engineering, & Mathematics, and Health Science.*<sup>20</sup>

Beyond federal requirements, the Washington State Office of Superintendent of Public Instruction (OSPI) outlines CTE program standards, which define CTE courses as either preparatory or exploratory and are used by OSPI to approve CTE courses and ensure continuous improvement over time.<sup>21</sup>

### Washington’s CTE Skill Centers

Students in Washington may access CTE courses in their home high schools, in local community or technical colleges (CTCs), and in skill centers. Students taking CTE courses at a local CTC or skill center will typically also enroll in courses at their home high school. In the 2023 academic year (AY), about 3% of Washington’s high school students (11,507) enrolled in a skill center.

Skill centers are regional secondary schools that serve high school students across multiple school districts.<sup>22</sup> According to OSPI, skill centers provide hands-on learning environments and academic instruction in preparatory courses in programs that are too expensive or specialized for school districts to operate individually (e.g., automotive technology, cosmetology, dental, teaching academy). According to OSPI and the Washington State Skill Center Association, students attending preparatory skill center programs will also learn leadership and employment readiness skills and be prepared for postsecondary education.<sup>23</sup>

A recent report focused on the economic impacts of Washington’s skill centers estimated that students who completed a program at a skill center were expected to earn more than they would have had they not completed a program.<sup>24</sup> Further, researchers estimated that the increase in earnings among skill center completers could lead to substantial benefits to Washington’s overall economy. However, we note that this report relies on many assumptions that may impact the specific estimates presented.

<sup>18</sup> RCW 28A.655.250 and WAC 180-51-230. Engrossed Second Substitute House Bill 1599, Chapter 252, Laws of 2019 removed the testing requirement and replaced it with a set of graduation pathway options.

<sup>19</sup> This includes either a dual credit course, course that leads to an industry-recognized credential, or a Core Plus program. OSPI. *Graduation Pathways.*

<sup>20</sup> OSPI. *CTE Program of Study and Career Clusters.*

<sup>21</sup> OSPI. *Career and Technical Education Program Standards.*

<sup>22</sup> OSPI. *Career & Technical Education (CTE).*

<sup>23</sup> Washington State Skill Center Association. *FAQs*; OSPI. *Career and Technical Education Program Standards.*

<sup>24</sup> Grandbouche, J., King, B., & Boyle, M.S. (2021). *Skill centers economic impacts. Center for Economic and Business Research.* Western Washington University.

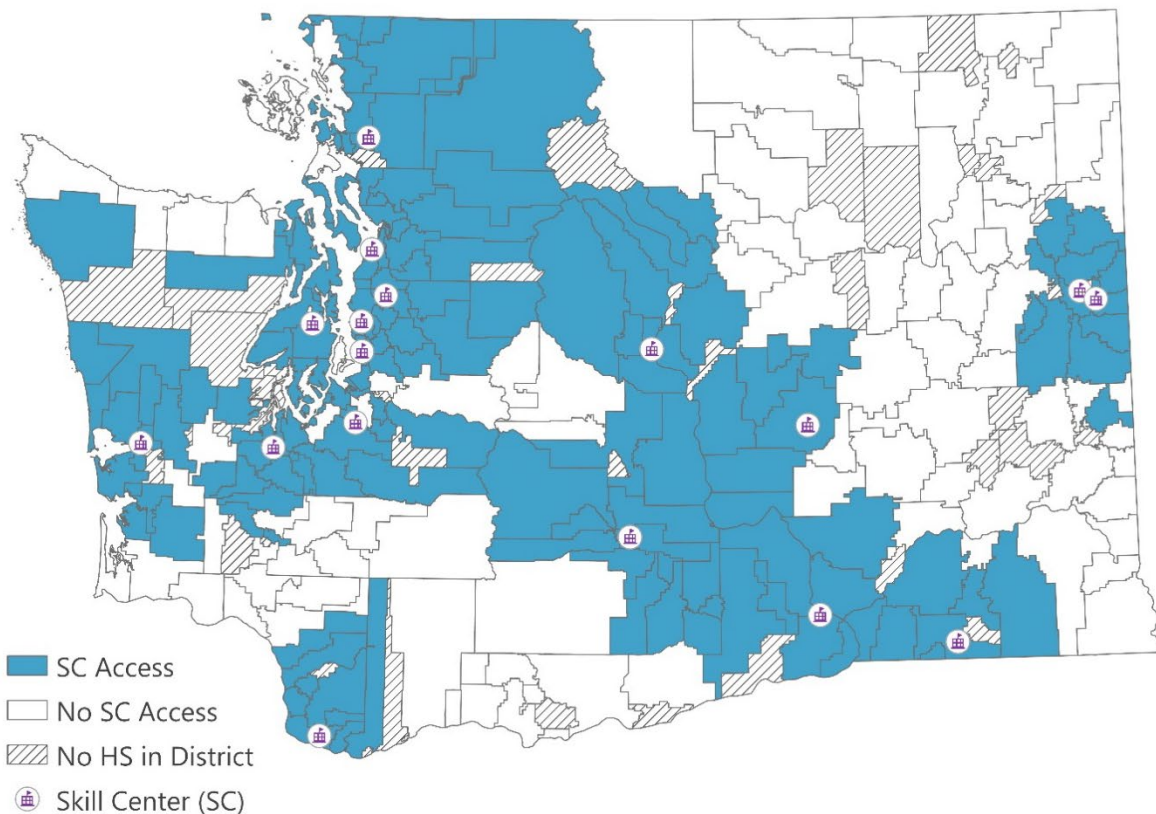
### CTE Skill Center Locations

The number of skill centers in Washington has increased over the past two decades, from only 10 in 2008 to the 17 core and branch campuses currently located throughout the state. Additionally, some skill centers also operate smaller satellite sites that offer courses in only one or two programs.

Most skill centers have an administrative governing body made up of skill center consortium member districts. Skill centers may also serve students from districts that are not consortium members. [Exhibit 1](#) maps the core and branch campus site locations and indicates all school districts with access (districts that sent students to a skill center) in 2023-24.<sup>25</sup>

### Exhibit 1

Washington's Skill Centers and 2023-24 Access by School District



**Note:**

Some school districts (N=18) can send students to multiple skills centers. Additionally, four skills centers serve students in tribal compact schools.

Source for identifying districts with skill center access is Washington State Skill Center Association records.

<sup>25</sup> In [Appendix I](#) we include a map indicating locations of all main and branch campus skill centers alongside locations of Washington's community and technical colleges (CTCs).

Where available, students may access CTE courses through CTCs.



### Funding for CTE Skill Centers and Students

The legislature funds minor and major works for physical buildings through capital grants for skill centers administered by School Facilities and Organization (SFO) funds. The school district hosting a skill center must pay costs upfront and is then reimbursed from SFO funds.<sup>26</sup> In fiscal years 2021-22 and 2022-23, districts' expenditures for skill center facility upgrades totaled \$77,500 and \$157,000, respectively.<sup>27</sup>

As part of Washington's program of basic education, skill centers are also funded using the state's distribution formula. This formula estimates resources needed to operate schools based on grade levels and full-time equivalence student enrollments (FTE). Student FTE is divided so both the skill center and home high school receive funds. The skill center and high school both claim FTE based on a student's course enrollments.<sup>28</sup> Students typically attend a morning or afternoon skill center block. On average, student enrollment at a skill center is counted as 0.54 FTE.

The average prototypical class size is smaller for skill centers than for CTE classes in traditional high schools.<sup>29</sup> As outlined in the 2023 state operating budget,<sup>30</sup> the per-student FTE materials, supplies, and operating costs (MSOC) are the same for CTE students in both skill centers and high schools. Certificated instructional staff and building-level administrative staff units are allocated at a slightly higher rate per student FTE for skill center students than for non-skill center CTE students. [Exhibit 2](#) compares prototypical class size and select allocations by setting.

In addition to these two main funding sources (i.e., capital grants and funding for student FTE), the legislature also makes periodic grants to start or enhance programs at one or more skill centers to address specific needs or requests. For example, in the 2013 through 2019 operating budgets, the legislature allocated funds for aerospace and manufacturing programs at four skill centers to purchase equipment, professional development, and curriculum.

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<sup>26</sup> OSPI. [Skill Centers Capital Funding](#).

<sup>27</sup> OSPI. [2021-22 Financial Reporting Summary](#). Table 2: General fund total expenditures by program, activity, and object; OSPI. [2022-23 Financial Report Summary](#). Table 2.

<sup>28</sup> The skill center and home high school can both claim up to 1.0 FTE per student, but the combined claim cannot exceed 1.6 FTE.

<sup>29</sup> [RCW 28A.150.260](#).

<sup>30</sup> [Engrossed Substitute Senate Bill 5187, Chapter 475, Laws of 2023](#).

The 2023 operating budget allocated funds to support two programs (criminal justice and fire science) at a specific skill center and also funded OSPI to administer grants to skill centers for nursing program equipment purchases.

A proportion of funds distributed to the K-12 system are allocated to skill centers based on enrollment and, in some cases, the proportion of students eligible for Free and Reduced-Priced Meals.<sup>33</sup>

Finally, Washington receives federal funding for CTE programming through Perkins V.<sup>31</sup> For fiscal year 2024, Washington received \$25.9 million in Perkins funds, which is distributed to the Washington Workforce Training & Education Coordinating Board, CTCs, and the K-12 education system.<sup>32</sup>

Based on Washington’s Workforce Innovation and Opportunity Act (WIOA) state plan, skill centers were allocated almost \$640,000 in Perkins funds for program years 2020-2023.<sup>34</sup>

### Exhibit 2

2023-24 Prototypical CTE and High School Class Size and Selected Allocations

	CTE in Skill Centers	CTE in High Schools	Grades 9-12
Prototypical class size	19	23	28.74
Certificated instructional staff units (per 1000 students)	3.98	3.65	6.85
Building-level administrative staff units (per 1000 students)	2.25	1.93	1.88
Total student FTE materials, supplies, and operating costs	\$1,724.62	\$1,724.62	\$1,683.67

**Notes:**

Certificated instructional staff units include teacher librarians, school nurses, social workers, school psychologists, and guidance counselors. For Grades 9-12 we added ratios for these positions for a prototypical high school (600 students) in AY 2024 and convert the ratio for 1000 students to maintain an equivalent metric across categories.

Sources: Operating Budget, [Engrossed Substitute Senate Bill 5187, Chapter 475, Laws of 2023](#) and Washington State Legislature. (2024). [A Citizen's Guide to Washington State K-12 Finance](#).

<sup>31</sup> Carl D. Perkins Career and Technical Education Act of 2006.

<sup>32</sup> U.S. Department of Education. (2024). *Program memo: Estimated fiscal year state allocations under Perkins V* and Washington Workforce Training and Education Coordinating Board. [Carl D. Perkins Career and Technical Education Act](#).

<sup>33</sup> Washington Workforce Training and Education Coordinating Board. (2024). [Washington's Perkins V Plan](#).

<sup>34</sup> Workforce Innovation and Opportunity Act. [Washington's state plan, program year 2020-2023](#). Perkins Career and Technical Education Program.



## III. Method

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The purpose of this study is to describe Washington’s CTE skill centers and students, including student outcomes over time. Where possible, we used state administrative data. We collected survey data from skill center directors to provide information not available in administrative records. We focus on answering the following questions:

- 1) What are CTE skill centers providing to high school students?
- 2) Which students can and do access CTE skill centers?
- 3) What do high school transition outcomes look like for CTE skill center students?

### Data Sources

#### Administrative Data

The Education Research and Data Center (ERDC) provided WSIPP with OSPI data on CTE course enrollments for high school students, including those in skill centers.<sup>35</sup> We used these data to answer question one, as well as to clarify student access patterns in questions two and three.

Additionally, ERDC provided us with OSPI data on student demographic characteristics and program participation. We used this information to answer question two regarding student access patterns.

Finally, ERDC provided student outcomes data linked across K-12, post-secondary, and labor market sectors. We used these data sources to address question three.

#### Skill Center Survey

During Spring 2024, WSIPP distributed an online survey to directors of all 17 skill centers. Directors reported on a range of topics, including industry partnerships, credentials, student access, and the degree to which skill centers can meet student demand for CTE programming. We received complete responses from 15 of 17 skill center directors. We summarize survey responses to answer questions one and two.

### Analysis Samples

#### Enrollments and Student Population

To understand what skill centers provide and which students can and do access skill centers, we focus on a “snapshot” of the 2022-23 school year, the most recent year with complete data. For these analyses, we identify all CTE skill center course enrollments during the 2022-23 school year. For student-level analyses, we include all students with a CTE skill center enrollment in 2022-23, regardless of students’ grade level or expected graduation year.<sup>36</sup>

Our 2022-23 course enrollment sample comprises 801,841 CTE enrollments, 4% of which were in a skill center. We present additional information about course enrollments in [Section IV](#).

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<sup>35</sup> See [Appendix II](#) for a detailed list of administrative data and description of the ERDC.

<sup>36</sup> [Appendix III](#) includes additional information about our methodology for identifying students enrolled in skill centers.

Our 2022-23 student sample includes 365,149 high school students. We describe these students in [Section V](#).

### Student Outcomes

We take a longitudinal approach for all skill center student outcomes analyses. We observe outcomes over time for eleven cohorts of students with expected graduation from 2013 through 2023. We observe high school graduation outcomes for all cohorts. We report outcomes for one to five years following high school, depending on the cohort.<sup>37</sup>

Our full longitudinal sample comprises 1,050,072 high school students who were expected to graduate between academic years 2013 through 2023. Nine percent of this sample enrolled in a skill center at some point during their high school careers (we refer to this population as “skill center students” or “SC students”). An additional 82% of students enrolled in at least one CTE course between 9<sup>th</sup> and 12<sup>th</sup> grade but never attended a skill center. The remaining 9% of students did not enroll in a CTE course and never enrolled in a skill center during their high school career. In [Section VI](#), we describe skill center students and their outcomes in greater detail. We note that this analysis is descriptive only. We cannot interpret students’ outcomes as being caused by skill center enrollment.

[COVID-19](#). Our longitudinal cohorts span before and after the COVID-19 pandemic and related school closures during the 2019-20 and 2020-21 school years.

Although COVID-19 is not the focus of this report, the resulting variation over time in students’ educational experiences and outcomes should be considered.<sup>38</sup>

High school graduation rates, postsecondary engagement, and labor market outcomes shifted during the pandemic.<sup>39</sup> When study follow-up periods are long, there is a higher likelihood that a given cohort went through the pandemic at some point during the follow-up period. This means the results for longer follow-up periods are more influenced by the pandemic.<sup>40</sup> [Section VI](#) summarizes trends over time for outcomes for skill center students at one-year post-high school to observe COVID-19 impacts.

Finally, we note that most of our longitudinal study cohorts (7 of 11) did not experience COVID-19 during high school. We cannot speak to the impacts of COVID-19 school closures or changes to education during high school because not enough time has passed to measure long-term outcomes.

<sup>37</sup> Postsecondary employment and apprenticeship outcomes do not include out-of-state enrollments or employments.

<sup>38</sup> Given the impact of the pandemic on students’ education experiences in general—and the potential for impacts on CTE programming in particular—we reviewed the literature regarding pandemic impacts on CTE programming, teaching, and learning. We summarize this literature in [Appendix IV](#).

<sup>39</sup> U.S. Bureau of Labor Statistics. (2022). [Labor market dynamics during the COVID-19 pandemic](#) and Harris, D., & Chen, F. (2022). [How has the pandemic affected high school graduation and college entry?](#) Brookings.

<sup>40</sup> See [Appendix IV](#) for additional detail.

## IV. What do Skill Centers Provide to Students?

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In this section, we describe what skill centers provide to Washington’s high school students. We summarize information from 2022-23 student course enrollment data and from skill center director survey responses to address the following questions:

- Do skill centers extend the availability of CTE?
- Which CTE clusters are most widely available in skill centers?
- What role do work-based learning and industry partnerships play in skill centers?
- Are skill center students earning dual credit or credentials during high school?

### Do Skill Centers Extend CTE Availability?

#### Career Clusters

As described in [Section II](#), CTE courses are organized into 16 career clusters. We used student enrollment records to examine where clusters were represented across school districts in the 2022-23 school year. [Exhibit 3](#) shows the proportion of school districts that have students enrolled in each cluster and whether enrollments are in a skill center, in high schools, or in both settings. For each cluster, we also show the proportion of districts with no enrollments.<sup>41</sup>

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<sup>41</sup> We address enrollments in the state K-12 system only. Students may enroll in CTE courses through a local CTC, which is not captured in high school course enrollment records.

<sup>42</sup> A barrier to this type of analysis is that program and course names vary considerably across skills centers and high schools. Programs or courses with different names

For all clusters, CTE enrollments are concentrated in high schools. This is unsurprising given the large number of high schools offering CTE courses. There are very few districts where we observe enrollments for a given cluster *only* through a skill center. This is most common—but still infrequent—for the *Transportation, Distribution & Logistics* and *Architecture & Construction* clusters.

We note, however, that this is a high-level analysis of course enrollments at the cluster level. Analysis of whether skill centers extend access to specific programs, courses, or types of content was outside this study’s scope and was not feasible using available administrative data.<sup>42</sup>

#### Exploratory and Preparatory CTE Courses

OSPI differentiates between exploratory and preparatory CTE.<sup>43</sup> Exploratory courses represent the first level of CTE; they cover occupational skills to meet specific industry standards and allow students to explore careers and industries of interest. Preparatory courses expand on exploratory courses; they support further skill development and allow students to demonstrate mastery of occupational skills for a specific career or pursuit of post-secondary options. The vast majority of CTE courses that students enroll in at skill centers are preparatory. In AY 2023, 99% of CTE enrollments in a skill center were preparatory courses. In high schools, about 40% of CTE course enrollments were preparatory, and 60% were exploratory.<sup>44</sup>

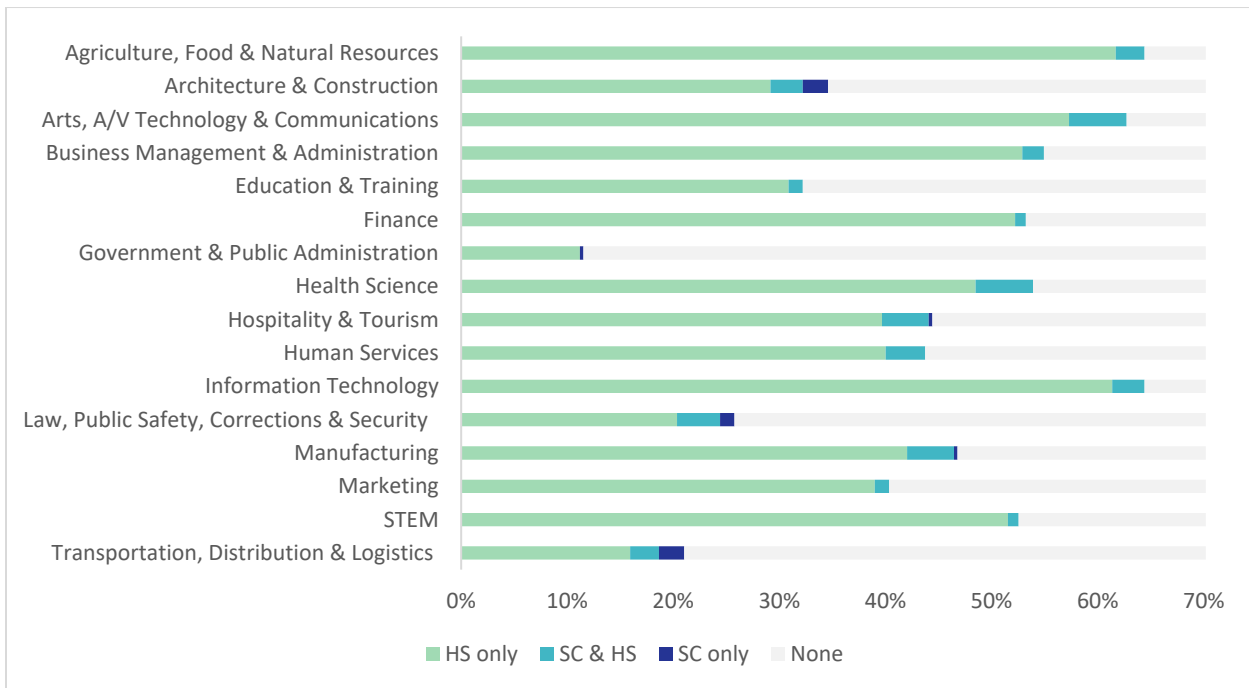
could be equivalent, sharing learning objectives and course content. Alternatively, programs or courses with different learning objectives and content could have the same name in different schools.

<sup>43</sup> OSPI. (2023). *Career and Technical Education Program Standards*.

<sup>44</sup> WSIPP analysis of CTE course data.

### Exhibit 3

% of School Districts with Enrollments in CTE Clusters by Setting



**Notes:**

SC = Skill center.

HS = High school.

We did not observe any CTE courses in the course enrollment data for 60 of Washington’s 295 school districts.

Source is WSIPP analysis of OSPI course enrollment data. We calculate the percentage of school districts out of 295.

### CTE Cluster Availability in Skill Centers

Based on course enrollment data for AY 2023, we found that 82% of skill centers had course enrollments in eight or more cluster areas. However, no single skill center had enrollments in all 16 areas. Exhibit 4 shows the clusters most represented across skill centers, including common courses within each of these clusters.

For example, 94% of skill centers showed enrollment in courses that fall within the *Architecture & Construction* cluster, and the most frequently represented course titles representing that cluster were *Construction* and *Construction Careers*.

For context, we compared these high-frequency enrollment clusters to those in high schools. Only two clusters—*Arts, A/V Technology & Communications* and *Health Science*—were among the most widely available in both skill centers and high schools.

## Exhibit 4

Most Frequently Observed Clusters and Courses Within Those Clusters, in Skill Center Enrollments

Cluster (% of SCs)	High-frequency enrollment courses
Architecture & Construction (94%)	Construction; construction careers
Arts, A/V Technology & Communications (94%)	Computer graphics; computer programming; computer game design
Health Science (94%)	Nursing; medical assisting; dental science
Law, Public Safety, Corrections & Security (94%)	Criminal justice; fire science
Transportation, Distribution & Logistics (88%)	Automotive mechanics; autobody repair; marine mechanics
Hospitality & Tourism (82%)	Restaurant, food, & beverage service; culinary arts; restaurant management
Manufacturing (82%)	Welding; electronics; metal processing

**Notes:**

STEM = Science, Technology, Engineering, & Mathematics.  
 For skill centers, the reported percentages are out of 17.  
 Source is WSIPP analysis of OSPI enrollment records.

### Work-Based Learning and Industry Employer Partnerships

#### Work-Based Learning

OSPI defines work-based learning as an instructional strategy that provides students with career exploration opportunities and hands-on learning.<sup>45</sup> Work-based learning includes a range of activities, such as job shadowing, job site field trips, internships, and service learning.

Work-based learning is a primary focus of skill centers, and all skill center directors reported that students in the 2023-24 school year participated in a range of work-based learning opportunities with industry employer partners.

Worksite learning (WSL), where students learn in the context of an industry workplace, is a more comprehensive and structured type of work-based learning.<sup>46</sup> Relative to work-based learning, a smaller proportion of skill center students are enrolled in WSL. Although high schools can also support WSL, according to skill center directors, this is happening in larger proportions at skill centers.<sup>47</sup>

<sup>45</sup> OSPI. (2023). *Work-based & worksite learning guide: career and technical education*.

<sup>46</sup> WSL can be instructional or cooperative. Instructional WSL is under the educational direction of a teacher (e.g., nursing clinical setting with clear learning objectives). Cooperative WSL is paid employment that may be connected to coursework but is not under the educational direction of a

teacher. To claim student FTE from worksite learning, skill centers must have a worksite learning coordinator or endorsed teacher to check and approve worksite learning placements for work conditions such as safety, appropriateness, or hours worked.

<sup>47</sup> Administrative data on work-site learning is currently not available to study this.

## Industry Partnerships

We asked skill center directors about their programs' connections to industry partners.<sup>48</sup>

Directors reported that industry partners are engaged with skill centers at many levels. Types of engagement ranged from supporting organization and infrastructure (e.g., advisory committee membership, course and curriculum planning) to working directly with students in various capacities (e.g., hosting work-site learning, providing guest speakers, conducting mock interviews, engaging in research partnerships).

Nearly half of skill center directors noted that industry partners provide financial or material support, including donations through foundation memberships, inclusion in grant funding, equipment, and staffing.

### *Program Areas with Strong Partnerships.*

Directors reported which program areas had strong industry partnerships. The most frequently mentioned program areas include the following:

- *Health science* (e.g., nursing) (53%)
- *Construction trades* (53%)
- *Fire science/firefighting* (40%)
- *Automotive/auto repair* (33%)
- *Criminal justice* (33%)

*Barriers to Strong Partnerships.* Additionally, directors reported on program areas for which it has been challenging to find industry partners. Of note, nearly half of respondents (47%) did not list any program areas for which forging industry partnerships is a challenge.

The areas identified by multiple skill centers as challenging to find partners include animation & videogame development, automotive technology, and culinary arts.

Directors also described why they believed strong industry partnerships were challenging in these areas. Reasons included age requirements for internship or employment, concerns about hosting students on-site, lack of relevant local industry, shared vision for making internships a learning opportunity, industry non-disclosure agreements, and existing demands on small businesses (e.g., time and work hours, operational needs).

## Dual Credit and Credentials in Skill Centers

Washington's students may earn dual credit (i.e., post-secondary credit) and industry-recognized credentials (IRC) during high school. All approved preparatory CTE programs must either a) allow students to earn dual credit or b) lead to an IRC.<sup>49</sup> This section summarizes available information about dual credit completion for skill center students. Additionally, we detail directors' reports of IRC availability at their skill centers.

### Dual Credit in Skill Centers

Dual credit courses in skill centers prepare students with knowledge and skills to work in specific fields. Students can also earn college credits that can be applied toward an associate degree or technical certificate at a CTC. CTE dual credit courses are taught by high school teachers who have been certified to teach college-level content.

<sup>48</sup> We have no comparable information for high schools' partnerships.

<sup>49</sup> OSPI. (2023). *Preparatory courses update: Guidance related to hours and criteria.*



Although we could not access all relevant records, we present a limited examination of high school CTE dual credit enrollments and completions at skill centers.<sup>50</sup> Overall, CTE dual credit courses make up a large proportion of CTE courses in the state. In AY 2023, nearly 70% of CTE course enrollments in both high school and skill center settings were for CTE dual credit.<sup>51</sup>

We observed that all 17 skill centers had students enrolled in dual credit CTE courses in AY 2023 and that students in skill centers generally enrolled in more dual credit CTE courses than students in high schools. On average, students enrolled in about three CTE dual credit courses at skill centers, compared to fewer than two courses at high schools.

Enrollment in a CTE dual credit course does not necessarily mean students earn college credits. Students must earn a minimum grade in the course, usually a B or higher, to earn college credits that can be transferred to a specific CTC.<sup>52</sup> Because of this, we also examined the proportion of students who enrolled in CTE dual credit courses and earned credits, both in skill center and high school settings.

Among students who enrolled in CTE dual credit courses in AY 2023, approximately 21% of skill center students completed at least one course and were therefore eligible to earn college credit, compared to 10% of students in high schools.

### Industry Recognized Credentials

IRCs are credentials that demonstrate preparation for working in specific industries when students enter the workforce (e.g., Food Handlers Permit or Certified Medical Assistant credential).

Skill center directors reported on IRCs available for students to earn through their skill center.<sup>53</sup> All skill centers reported offering students the opportunity to earn credentials, although there was wide variation in the type and number of credentials each skill center offers. [Exhibit 5](#) shows the percentage of skill centers offering one or more credentials, by cluster. Across skill centers, credentials were most widely offered in the *Health Science* and *Architecture & Construction* clusters. Some examples of IRCs in these areas include Certified Nursing Aid, Clinical Medical Assistant Certification, and Forklift Operator Certificate.

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<sup>50</sup> We did not have data on students who enrolled in CTE courses at community or technical colleges (CTCs) or students in skill centers who participated in other dual credit programs (e.g., College in the High School).

<sup>51</sup> In 9 out of 17 skill centers, more than 50% of course enrollments were dual credit courses.

<sup>52</sup> OSPI. [Course-Based Dual Credit](#). An articulation agreement between a high school or skill center and CTC dictates which credits and how many can be transferred to the college.

<sup>53</sup> Skill Center directors identified available credentials by cluster from the [2023-24 State-Approved Industry Recognized Credentials](#) list, and were also invited to write in other credentials where relevant.

We report only on credentials offered in skill centers because no comparable administrative data exist to describe credentials offered for CTE students in high schools.

We do not report on IRCs *earned* by skill center students relative to other high school students. For overall context, however, OSPI reports that 27,202 Washington students earned 36,222 industry certifications in CTE courses during AY 2022, 19,843 of which were state-approved.<sup>54</sup> These figures likely include IRCs earned in high schools, skill centers, and CTCs.<sup>55</sup>

### Exhibit 5

#### Percentage of Skill Centers Offering One or More Credentials by Cluster

Cluster	% of SCs
Agriculture, Food, & Natural Resources	40%
Architecture & Construction	93%
Arts, A/V Technology & Communications	40%
Business Management & Administration	33%
Education & Training	33%
Finance	0%
Government & Public Administration	0%
Health Science	100%
Hospitality & Tourism	53%
Human Services	53%
Information Technology	47%
Law, Public Safety, Corrections & Security	67%
Manufacturing	73%
Marketing	7%
STEM	27%
Transportation Distribution & Logistics	73%
Other	40%

Notes:

STEM = Science, Technology, Engineering, & Mathematics.

The "Other" category includes credentials that are not on the "Industry Recognized List" but were written in by respondents.

Source is WSIPP analysis of skill center director survey responses. Reported % is out of 15 survey responses.

<sup>54</sup> OSPI. (2023). *Kickstarting college and career readiness by eliminating financial barriers to dual credit: 2023-25 biennial operating budget decision package.*

<sup>55</sup> Data limitations prevent us from reporting on IRCs earned by skill center students in comparison to credentials earned in the same cohorts by high school students not attending a skill center.

## V. Who Can and Does Access Skill Centers?

In this section, we summarize key findings from our analysis of skill center access in AY 2023. First, we use administrative and public data to compare the characteristics of school districts that have skill center access with those of school districts that do not have skill center access. Second, within districts with skill center access, we compare students enrolled in skill centers with those who are not. Finally, we use survey data to describe additional factors related to access from the perspective of skill center directors (e.g., enrollment patterns and demand barriers).

### School Districts and Skill Center Access

Exhibit 6 compares school districts with and without skill center access in 2022-23. Student characteristics in districts with and without skill center access were similar. Districts with skill center access had on average, a slightly higher proportion of Hispanic students and a lower proportion of White students compared to students in districts that did not have skill center access.

Although average student characteristics were similar between districts with and without skill center access, districts with skill center access had higher enrollments and more schools, on average, than other districts. The higher number of full-time teachers, higher pupil-teacher ratio, and lower expenditures per pupil are consistent with these districts being larger than districts without skill center access.

### Exhibit 6

#### District Characteristics by School Districts' Skill Center Access Status

District students	District skill center access status	
	No SC	SC
Avg total enrollment	1,127	5,982
<b>Gender</b>		
Female (%)	48	48
<b>Race &amp; ethnicity</b>		
AI/AN (%)	6	2
Asian (%)	1	4
Black (%)	1	2
NHPI (%)	0	1
Multiracial (%)	6	7
White (%)	67	56
Hispanic (%)	17	29
<b>Program status</b>		
FRPM (%)	56	53
ELL (%)	6	13
SPED (%)	16	16
Migrant (%)	3	4
Homeless (%)	4	3
Districts	No SC	SC
Avg public schools	3.67	12.77
Avg FT teachers	66.51	343.99
Pupil-teacher ratio	14.04	16.64
\$ per student	\$24,276	\$19,057
Med. family income	\$82,585	\$100,085
Poverty rate	12.88%	10.41%
Sample Ns	139	156

**Notes:**

AI/AN = American Indian and Alaska Native.

NHPI = Native Hawaiian and Pacific Islander.

FRPM = Free or reduced-priced meals.

ELL = English language learner.

SPED = Special education.

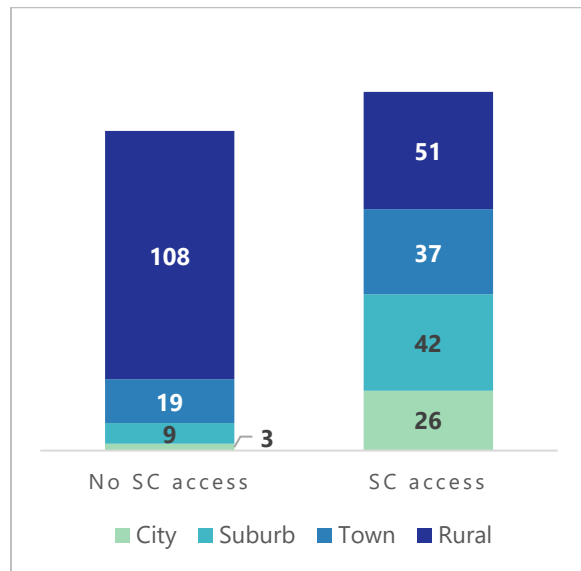
Skill center access status is based on 2023-24 Washington State Skills Center Association records.

Student characteristic comparisons are for averages weighted by total district enrollment. Sources include OSPI Report Card data from 2023, ELSI school data from 2023, and U.S. Census Bureau data from 2022.

Economic measures from U.S. Census data indicate that districts with skill center access had higher median family incomes and lower poverty rates than districts without access.

Exhibit 7 shows school district skill center access status by geographic locale. The majority of school districts classified as city, suburb, or town locales have skill center access. Although approximately 33% of districts with access are rural, the majority of school districts in rural locales do not have skill center access.

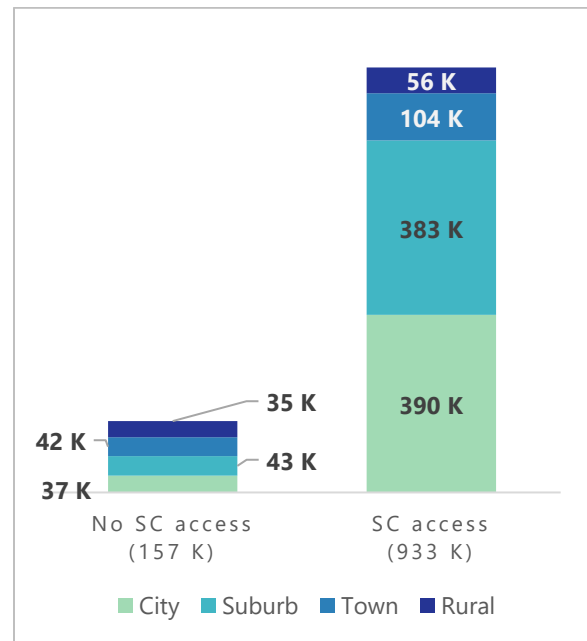
**Exhibit 7**  
School Districts' Geographic Locale and Skill Center Access Status, 2023-24



**Note:**  
Source is WSIPP analysis of skill center access status in 2023-24 records from the Washington State Skills Center Association and ELSI 2023 locale data.

Exhibit 8 shows the proportion of the statewide student population in AY 2022-23 with access to skill centers by geographic locale. In AY 2023, a total of 1 million students were enrolled in public schools in Washington. The majority of students (86%) were in districts with access to a skill center, mostly concentrated in city and suburb locales. Approximately 14% of students were in districts without access to a skill center (or in districts with only grades K-8).

**Exhibit 8**  
Students' Skill Center Access by Geographic Locale, 2023-24



**Note:**  
Source is WSIPP analysis of skill center access status in 2023-24 records from the Washington State Skills Center Association and ELSI 2023 locale data.

## 2022-23 Skill Center Students

We identified 11,507 skill center students in the 2022-23 school year and summarized their demographic characteristics in [Exhibit 9](#). To better understand which students are enrolling in skill centers when available, we also compare skill center students with all students in skill center consortium districts.

Male and Hispanic students are both slightly over-represented in skill centers. Female and Asian students are slightly under-represented. Skill centers have a slightly higher proportion of students enrolled in the Free/Reduced Price Meals (FRPM) program and a higher proportion of students in the Special Education (SPED) program when compared to all students in districts served by skill centers.

## Skill Center Directors' Perspectives on Access

We asked skill center directors about eligibility criteria, program demand, and barriers for additional context regarding student skill center access.

## **Exhibit 9**

AY 2023 Sample: Student Characteristics for Skill Center Students and All Students in Districts With Skill Center Access

	Skill center students	Students in districts served by skill centers
<b>Gender</b>		
Female (%)	44	48
<b>Race &amp; ethnicity</b>		
AI/AN (%)	1	1
Asian (%)	4	9
Black (%)	3	5
NHPI (%)	1	1
Multiracial (%)	6	8
White (%)	52	50
Hispanic (%)	33	26
<b>Program status</b>		
FRPM (%)	54	47
ELL (%)	12	11
SPED (%)	18	13
Migrant (%)	5	3
Homeless (%)	4	4
Sample Ns	11,507	309,057

Notes:

AI/AN = American Indian/Alaska Native.

NHPI = Native Hawaiian/Other Pacific Islander.

FRPM = Free or reduced-priced meals.

ELL = English language learner.

SPED = Special education.

Source is WSIPP analysis of OSPI student demographic and program data for 2022-23.

### Student Eligibility

Most skill center directors report that school counselors or administration must provide approval early in the process for students to be eligible to attend.

Most skill center directors (80%) reported setting eligibility criteria, and 40% reported that some schools set their own eligibility criteria. The most commonly mentioned criteria were grade level (11<sup>th</sup> or 12<sup>th</sup> grade), age (16-21 years old), student performance (e.g., grades, attendance, behavior), and that attending a skill center would not jeopardize students' status as being "on track" for on-time high school graduation.

### Demand for Skill Center Programs

Students' access to skill centers is also impacted by the demand for programs and courses relative to their availability. On average, across all skill centers and all programs, directors reported that typical student demand exceeds the number of available seats for 62% of skill center programs. This estimate varied by skill center, ranging from 33% to 88% of programs.

*Demand by Geography.* No skill centers are in locales designated as rural. However, we examined program demand for skill centers that serve a relatively high proportion of rural districts.<sup>56</sup>

In the four skill centers, where over 50% of districts are rural, demand exceeds the number of available seats for 53% of programs. This figure is 65% for the 11 skill centers serving a smaller proportion of rural school districts.

<sup>56</sup> Rural districts make up between 0% and 64% of the districts within a skill center consortium.

<sup>57</sup> In completed surveys we did not identify any programs in the Finance or the Government and Public Administration

*Demand by Cluster.* We also examined demand by cluster. Exhibit 10 summarizes the percentage of programs in each cluster that were reported by skill center directors to have demand exceeding available seats.<sup>57</sup> Human Services, Marketing, Architecture & Construction, and Transportation Distribution & Logistics clusters were in highest demand.

### Exhibit 10

Skill Center Programs with Demand Exceeding Capacity by Cluster

Cluster	% of programs
Agriculture, Food, & Natural Resources	75%
Architecture & Construction	81%
Arts, A/V Technology & Communications	33%
Business Management & Administration	50%
Education & Training	0%
Health Science	51%
Hospitality & Tourism	72%
Human Services	100%
Information Technology	44%
Law, Public Safety, Corrections & Security	64%
Manufacturing	68%
Marketing	100%
STEM	60%
Transportation Distribution & Logistics	79%

Notes:

STEM = Science, Technology, Engineering, and Mathematics. Government & Public Administration and Finance clusters were not represented in survey responses.

Source is WSIPP analysis of skill center director survey responses.

clusters, so cannot speak to demand for skill center programs in these areas.



### Managing Skill Center Demand

*Strategies.* Skill centers report combining a range of strategies to manage high enrollment demand. Most (67%) use district slot assignments (where each consortium member district is initially allocated a set number of seats), and one additional district uses a similar strategy to allocate seats proportionally based on school size. Some skill centers use the order of enrollment or a lottery to manage demand within slot assignments. Most skill center directors (67%) reported adding additional staff or teaching classes with an overload to accommodate student demand.

*Student Characteristics.* Approximately 33% of skill center directors reported prioritizing students or allocating seats based on student characteristics. They consider returning student status, grade level, attendance history, High School and Beyond Plan focus area, whether the student's sending school is a consortium member, and whether the student is a member of an underrepresented population for the program.

*Waitlists and Closed Enrollments.* All 15 skill center directors report that they maintain a waitlist to place students if a seat opens during the current term. Two reported that they also use waitlists to prioritize students for enrollment in a subsequent term.

However, waitlists may not accurately reflect demand, given that 60% of skill center directors also reported that they close enrollments, at least for some high-demand programs and/or classes—specific criteria for closing enrollments varied by skill center and by program. Closures were generally based on specific enrollment windows (e.g., closing enrollment after the first ten days of the semester) or the length of the waitlist (e.g. when the waitlist is over twice the maximum enrollment).

### Barriers to Access

We asked skill center directors open-ended questions regarding perceived barriers to student access and what they believe would improve student access. [Exhibit 11](#) summarizes the main themes that we identified in the directors' responses, and related themes regarding improving access. Transportation issues were the most frequently mentioned barrier, followed by a range of issues around support from students' home high schools.

In addition, two directors noted that they need support to serve students who must travel long distances to attend. These directors noted that distance and time are barriers for students because transportation takes away time from maintaining course load/credits. However, they still regularly serve students whose home school is over one hour away.

## Exhibit 11

### Skill Center Directors' Perspectives on Barriers to Access

What barriers to skill center access do students experience? (% of skill centers)	What would improve student skill center access?
Transportation (73%)	<ul style="list-style-type: none"> <li>– Increase state funding for transportation;</li> <li>– Clarify school districts' legal requirements on transportation;</li> <li>– Require school districts to offer transportation for both AM and PM sessions;</li> <li>– Offer better training and pay for bus drivers to reduce shortage;</li> <li>– Fund districts to provide shuttles from home schools to skills centers, and incentives for districts to find drivers</li> </ul>
Home school support (53%)	<ul style="list-style-type: none"> <li>– Communicate consistently with multi-lingual/504/IEP teams;</li> <li>– Educate schools and districts to better understand the CTE</li> <li>– Graduation pathway and dual credit at skill centers;</li> <li>– Address funding for small school districts that lose a higher proportion of student FTE when students attend a skill center</li> </ul>
Resources (facility & staff) (47%)	<ul style="list-style-type: none"> <li>– Increase capital funding for more facility space and program expansion;</li> <li>– Increase staffing;</li> <li>– Allow funding model to support instructional assistants to increase enrollment in high-demand programs</li> </ul>
Schedule misalignment (40%)	<ul style="list-style-type: none"> <li>– Support students who want to attend a skill center to build a class schedule at their home high school which allows for skill center attendance;</li> <li>– Require districts and schools to coordinate scheduling with skill centers</li> </ul>

Notes:

The percentage of skill centers is out of 15 surveys.

Source is WSIPP analysis of skill center director survey responses.

## VI. High School Transition Outcomes for CTE Skill Center Students

In this section, we examine high school graduation, postsecondary enrollment and completion, and labor market outcomes for students who were enrolled in skill centers. We first present results averaged across all cohorts in our analysis sample. We conclude this section with a summary of trends in outcomes over time, pre- and post-COVID.

### Student Outcomes Sample

Exhibit 12 shows gender, race, ethnicity, and program participation information for skill center students, as well as for all students in our sample, which includes students who enrolled in a skill center and those who did not, in districts with and without skill center access. Slightly more male students (and fewer female students) participated in skill centers than the overall population of students. A larger proportion of Hispanic students enrolled in skill centers compared to the overall population of students (29% vs 21%, respectively). In terms of program participation, most notably, there was a larger proportion of students in skill centers eligible for free or reduced-priced meals (FRPM) and in special education than all students in the sample.

### High School Graduation

Among students who enrolled in a skill center, 80% graduated from high school. Of this population, 89% graduated on time, 1% graduated earlier than expected, and 10% graduated later than expected.

### Exhibit 12

Student Outcomes Sample: Student Demographics and Program Participation for Skill Center Students and All Students

	Skill center students	All students
<b>Gender</b>		
Female (%)	45	49
<b>Race &amp; ethnicity</b>		
AI/AN (%)	1	2
Asian (%)	4	8
Black (%)	4	5
NHPI (%)	1	1
Multiracial (%)	5	6
White (%)	56	58
Hispanic (%)	29	21
<b>Program status</b>		
FRPM (%)	65	51
ELL (%)	11	8
SPED (%)	21	12
Migrant (%)	5	3
Homeless (%)	10	7
Sample Ns	94,621	1,050,072

Notes:

AI/AN = American Indian/Alaska Native

NHPI = Native Hawaiian/Other Pacific Islander

FRPM = Free or reduced-priced meals

ELL = English language learner

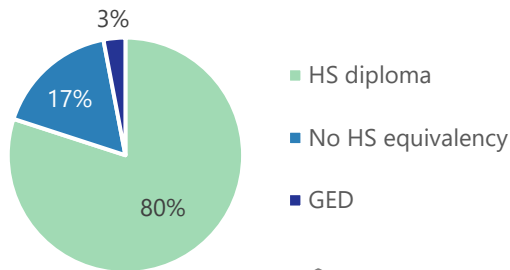
SPED = Special education

Source is WSIPP analysis of OSPI student demographic and program data for 2022-23.

Exhibit 13 shows the proportion of skill center students who graduated with a diploma, earned a GED, or did not earn a high school equivalency. Compared to all students in our sample (described in the text box of Exhibit 13), skill center students had a slightly higher graduation rate. For skill center students who did not graduate, 3% obtained a GED, and 17% did not obtain any high school equivalency (i.e., diploma or GED).<sup>58</sup>

### Exhibit 13

% of Skill Center Students with a High School Diploma, GED, or No High School Equivalency



Compared to skill center students shown in figure, 74% of *all* students in our sample graduated from high school, 3% earned a GED, and 23% did not obtain any high school equivalency.

**Notes:**

N=94,621 skill center students; 1,050,072 students overall. Source is WSIPP analysis of OSPI graduation data, 2013 to 2023.

### Postsecondary Enrollments

Next, we examined the proportion of skill center students enrolled in postsecondary institutions within one, three, and five years of graduation. About 34% of students enrolled in a postsecondary institution within one year of graduation, 38% enrolled within three years, and 39% enrolled within five years. We observed that skill center students mostly enrolled in community and technical colleges rather than four-year institutions.<sup>59</sup>

When we focused on skill center students who had earned postsecondary credentials prior to graduation (fewer than 100 students), we found that 50% enrolled in a postsecondary institution after graduation. Among this small population, 80% of students obtained a certificate before graduation, and 20% obtained an associate degree.

### Postsecondary Credentials

We also examined the proportion of skill center students who earned postsecondary credentials like certificates or associate and bachelor's degrees after graduating high school. Within one year of graduating, 2% of former skill center students had earned a postsecondary credential. Within three years of graduating, 7% had achieved a credential, and 9% of students had a credential within five years. Among skill center students who had earned a credential before graduation, 25% obtained a postsecondary credential within one year of graduation.<sup>60</sup>

<sup>58</sup> We cannot observe if students graduated from high school in another state and therefore, this figure may underestimate the proportion of students who graduated and overestimate the proportion without any high school equivalency.

<sup>59</sup> On average, over the five-year period, 77% of students enroll in a two-year institution and 23% in a four-year institution.

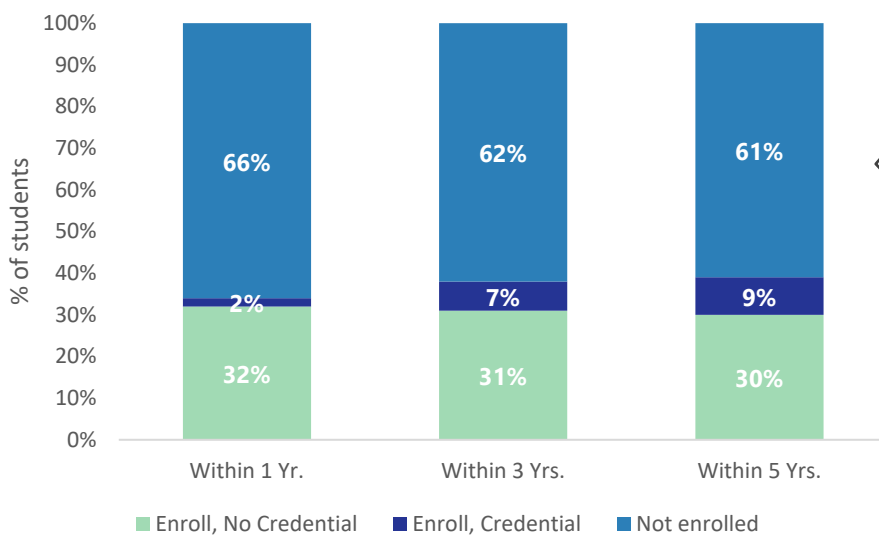
<sup>60</sup> Postsecondary certificates may include IRCs but due to data limitations, we could not observe if skill center students earned IRCs prior to graduation.

Exhibit 14 shows skill center students' progression into postsecondary institutions (primarily two-year colleges) after graduation, including the proportion of students who enroll and earn a credential or do not earn a credential and the proportion of students who do not enroll.

For context, skill center students had lower postsecondary credential achievement rates than all students in the sample (see Exhibit 14 text box).

### Exhibit 14

% of Skill Center Students Enrolling in a Postsecondary Institution and Earning Credentials Within One, Three, and Five Years after Graduation



Compared to skill center students in figure, among *all* students in our sample, 47% enrolled in a postsecondary institution within one year of graduating; half of students enrolled within five years. About half of these enrollments were in CTCs. About 6% of all students earned a postsecondary credential within one year of graduating; 19% had achieved a credential within five years.

**Notes:**

The skill center sample includes 75,669 students who graduated from high school.  
 The "all students" reference sample includes 779,586 who graduated from high school.  
 The composition of cohorts observed at each follow-up period varies; this should not be interpreted as change over time for one set of skill center student cohorts.  
 Longer follow-up periods are more impacted by COVID-19.

### Labor Market Outcomes

We also examined labor market outcomes among skill center students after graduation, including participation in apprenticeships, employment, and earnings.

*Apprenticeships.* Among skill center students, 1% enrolled in an apprenticeship within five years of graduating high school.<sup>60</sup> Most apprenticeship participants (80%) enrolled in construction programs, while the remaining participants enrolled in healthcare, installation and repair, building and grounds maintenance, and production-related programs like machine assembly and operators.

Similar to skill center students, a small proportion of the overall population of students in our sample (less than 1%) participated in an apprenticeship after high school. These students enrolled in similar programs as skill center students, like construction, healthcare, and installation and repair.<sup>62</sup>

*Employment & Earnings.* Next, we examined the proportion of skill center students employed after graduating from high school, their quarterly earnings, and their employment sector.<sup>63</sup>

Exhibit 15 illustrates the proportion of skill center students employed each quarter over a five-year period after graduating from high school. Over this period, an average of 69% of students were employed. While we observe employment rates as low as 65% and as high as 72% in some quarters, the overall trend in employment remains fairly constant over the years.

Within the first year of graduating high school, skill center students who were employed earned an average of \$4,274 per quarter (in 2023 dollars). Five years after graduation, employed individuals were earning an average of \$7,922 per quarter.<sup>64</sup>

Over this five-year period, we observed the largest proportion of individuals employed in retail, food services, health care and assistance, construction, and manufacturing sectors.

Skill center students had slightly higher employment rates and quarterly earnings than the overall population of students in our sample (see Exhibit 15 text box).

<sup>61</sup> About 983 students. We report across the five-year period only because the 1% rate is the same for all observed years.

<sup>62</sup> About 4,657 students.

<sup>63</sup> Employment rates include individuals employed in wage-paying positions in Washington State, with some exclusions.

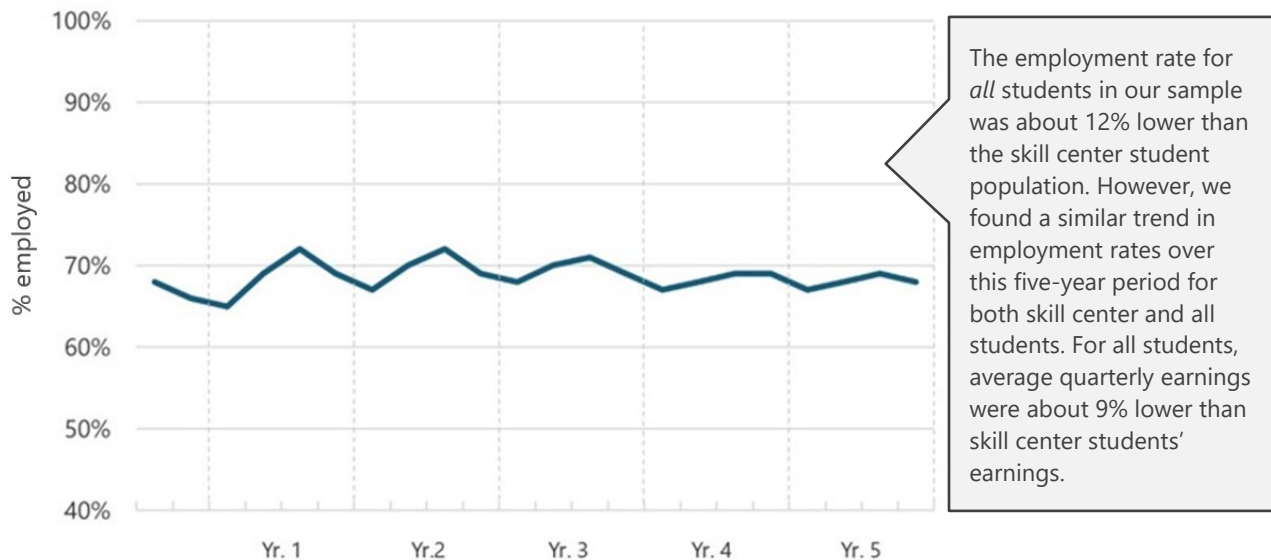
ERDC. (2024). *Washington State P20W Longitudinal Data System Research Handbook*.

<sup>64</sup> Quarterly earnings are adjusted to reflect 2023 dollars.



## Exhibit 15

### % of Skill Center Students Employed after Graduation



#### Notes:

Horizontal axis: Yr.1 represents the first year after graduation, and tick marks represent quarters within the year.

Sample includes 75,669 skill center students who graduated from high school.

The "all students" reference sample includes 779,586 who graduated from high school.

Earnings represent the average quarterly earnings over the year, adjusted to 2023 dollars.

The composition of cohorts observed at each follow-up period varies; this should not be interpreted as change over time for one set of skill center student cohorts. Longer follow-up periods are more impacted by COVID-19.

### Not Enrolled, Employed, or in Training After Graduating High School

Finally, we wanted to observe skill center student outcomes after high school more comprehensively across contexts. To do this, we examine what proportion of skill center students were not enrolled in a postsecondary institution, employed, or in an apprenticeship program one, three, and five years after graduating from high school. We sometimes refer to this as NEET (never enrolled, employed, or in training).

Overall, a small proportion of skill center students did not experience any outcomes after graduation, though this proportion slightly decreases over time, likely as students begin to seek education, training, and employment opportunities.

Among skill center students, 13% were not enrolled in a postsecondary institution, employed, or in an apprenticeship within one year of graduating ([Exhibit 16](#)). By five years after graduation, the proportion decreased to 10%. A slightly higher proportion of the overall population of students in our sample did not experience any of these outcomes over this period, compared to skill center students (see [Exhibit 16](#) text box).

It is important to note that an individual’s postsecondary enrollment, apprenticeship, and employment status can fluctuate over time. This analysis does not reflect continuous status over time but rather a snapshot at specific periods after graduation.

[COVID-19 Impacts on CTE Education and Student Outcomes](#)

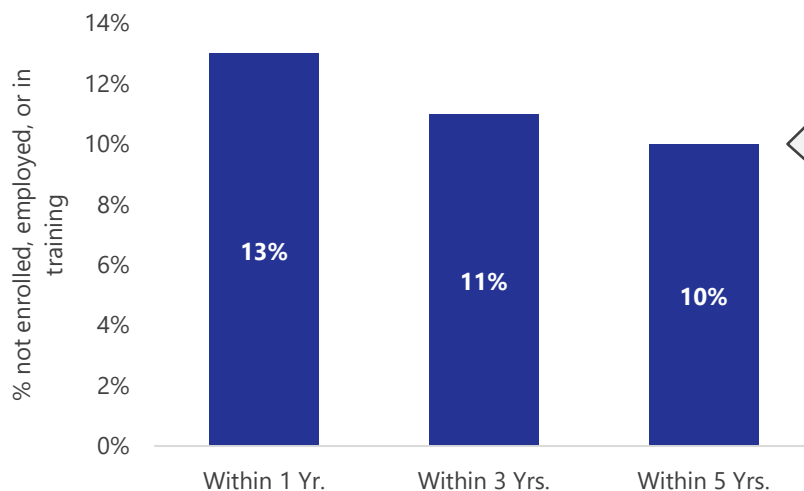
Throughout [Section VI](#) of this report, outcomes reflect averages across all study cohorts for students expected to graduate between academic years 2013 and 2023. Because the COVID-19 pandemic had a significant impact on education and society at large, we examine data on education and student outcomes across pre- and post-COVID-19 periods.

**Enrollments**

CTE enrollments in high schools and skill centers had been steadily increasing prior to the pandemic, with most enrollments (96%) in high schools and 4% in skill centers. During the pandemic, CTE course enrollments sharply declined at both high schools (a 70% decline) and skill centers (a 33% decline). As of 2023, CTE enrollments are still lower than pre-pandemic levels, though the proportion of total CTE enrollments in skill centers has grown. In 2023, 8% of CTE course enrollments are in skill centers, and 92% are in high schools.

**Exhibit 16**

**% of Skill Center Students Not Enrolled in a Postsecondary Institution, Employed, or in an Apprenticeship Program Within One, Three, and Five Years After Graduation**



Compared to skill center students shown in figure, among *all* students who graduated high school in our sample, 15% were not enrolled in a postsecondary institution, employed, or in an apprenticeship within one year of graduation. Within five years of graduation, 12% of students were not enrolled, employed, or in an apprenticeship.

Notes:

Sample includes 75,669 skill center students who graduated from high school.  
 The “all students” reference sample includes 779,586 who graduated from high school.  
 The composition of cohorts observed at each follow-up period varies; this should not be interpreted as change over time for one set of skill center student cohorts. Longer follow-up periods are more impacted by COVID-19.

Generally, changes in enrollments in each of the 16 career clusters mirror overall enrollment trends. Clusters that tend to have the highest enrollments, like *Arts, A/V Technology & Communications; Health Sciences; Agriculture, Food & Natural Resources; and Information Technology* experienced the largest drops in course enrollments during the pandemic. In four cluster areas (*Finance; Hospitality & Tourism; Architecture & Construction; and Law, Public Safety, Corrections & Security*), enrollments slightly increased from 2020 to 2021 before decreasing in the following years.

### Outcomes

In [Exhibit 17](#), we illustrate trends in study outcomes over time. The horizontal axis represents the years students are expected to graduate from high school. Graphs depicting postsecondary enrollment, employment, and NEET outcomes (reversed here for consistency with other outcomes) show measures one year after graduation. Red vertical lines represent the pandemic years.

**High School Graduation.** Between 2013 and 2019, the high school graduation rate increased for skill center students. Rates increased in 2020 with the pandemic and have remained high and even increased in the past two years. This contrasts with graduation rates among all students in our sample which increased over time prior to 2019, rose slightly for 2020 and 2021 but have since returned to pre-pandemic levels.

Several factors may contribute to this recent difference in graduation rates for skill center students relative to the population. Directors reported that to be eligible, skill center students must be on track for graduation, and attending a skill center must not jeopardize that status. As a result, the population of skill center students comprises students on track to graduate, while the population of all students includes students who are and are not on track to graduate. Additionally, the CTE graduation pathway option available to students beginning with the 2020 graduating class allows students to satisfy all graduation requirements through their skill center program. Finally, in 2021, legislation authorized the State Board of Education to establish an emergency waiver program.<sup>65</sup> This program allows school districts to waive some graduation requirements on an individual basis to address the continued impacts of pandemic-era disruptions in students' education. The proportion of graduating students receiving waivers has decreased over time, from 11% in 2021 to 9% in 2023. Waivers will not be issued after AY 2024.<sup>66</sup>

**Postsecondary Enrollment.** The rate of enrollment in postsecondary institutions within one year of graduation has decreased over time for skill center students, both leading up to and during the pandemic, which reflects a similar decline in postsecondary enrollments for all students in our sample. The proportion of all students enrolling in postsecondary institutions within one year of graduating high school remains higher than skill center students across all years.

<sup>65</sup> Engrossed House Bill 1121, Chapter 7, Laws of 2021.

<sup>66</sup> Parr, A. (2022). *High school graduation requirements emergency waiver program: graduation class of 2021*. Washington State Board of Education and Parr, A. (2024).

*High school graduation requirements emergency waiver program: graduation class of 2023*. Washington State Board of Education.

Though not depicted in the graph, in terms of credentials achieved, the completion rate among skill center students was flat (at 3%) prior to the pandemic and slightly decreased to 1% after 2019. The trend in completion rates was similar for all students in our sample leading up to and during the pandemic, though overall, a larger proportion of the entire student sample earned a credential within one year of graduating across all years.

*Employment and Earnings.* The rate of employment for skill center students was slightly increasing in earlier years but has been generally decreasing since 2017. The employment rate for skill center students remained steady during the pandemic years but, more recently, has decreased, which reflects the same trend for all students in our sample. For all years though, the rate of employment remains slightly higher among skill center students than the overall student sample.

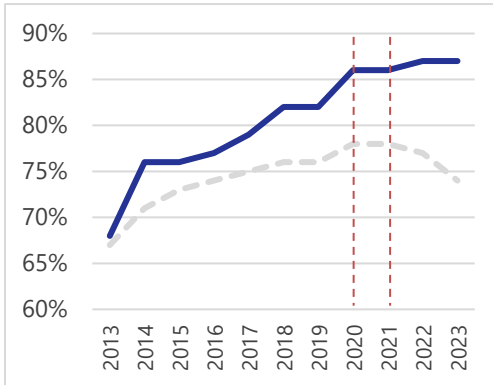
For most years, average quarterly earnings (within one year of graduation) have increased for skill center students. However, earnings decreased for both the skill center and all students in our sample between 2021 and 2022.

*Enrolled, Employed, or in Training.* Between 2013 and 2016, the proportion of skill center students enrolling in postsecondary education, employed, or participating in an apprenticeship program within one year of graduating high school increased, but in more recent years and through the pandemic, this rate has been declining. The proportion and trend over time are similar for both skill center and overall students, though the proportion of skill center students remains slightly lower than the population of all students in our sample across all years.

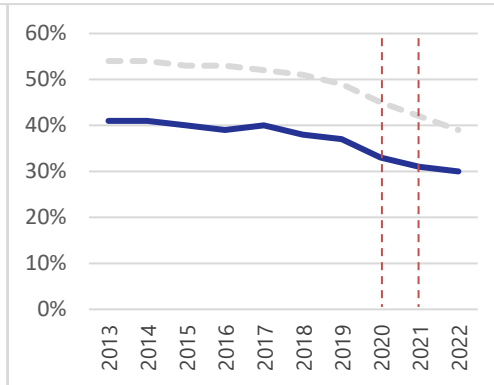
### Exhibit 17

#### Trends in Outcomes Across Graduation Cohorts

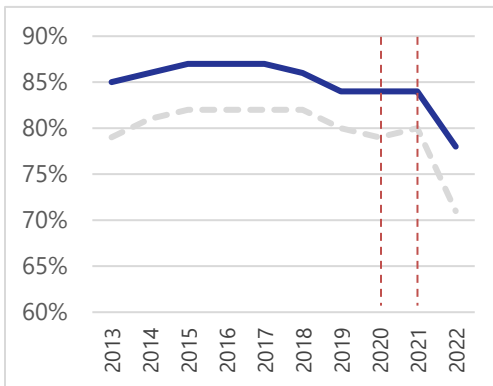
I. High School Graduation Rates



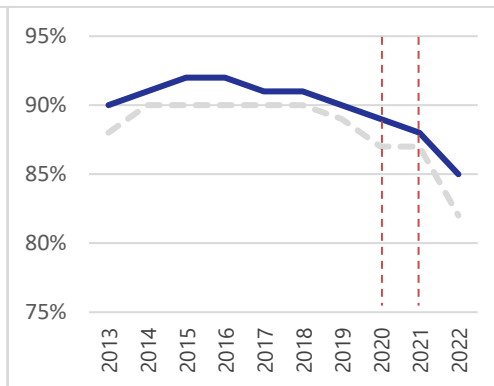
II. Postsecondary Enrollment Rates at +1 Year



III. Employment Rates at +1 Year



IV. Enrolled, Employed, or in Training at +1 Year



## VII. Conclusion and Limitations

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In this study we described Washington’s skill centers, what they are providing to high school students, and details about access to skill centers. Additionally, we examined high school transition outcomes over time for skill center students who graduated between 2013 and 2023.

### Conclusions

#### What do Skill Centers Provide?

Based on 2022-23 course enrollment records, CTE courses are mostly provided by high schools. Given the small number of skills centers relative to the number of high schools, this is unsurprising. For a small number of districts, programs within certain clusters are only accessible through a skill center (e.g., there are seven districts with *Transportation, Distribution, & Logistics* clusters *only* in skill centers). For a larger number of districts, skill centers expand on programming that is available in high schools.

However, the nature of students’ courses may differ in these two settings. Programming available at skill centers is nearly all preparatory, while less than half of CTE courses in high schools are preparatory. Further, although a large proportion of CTE courses are dual credit, course enrollment data suggest that, proportionally, more skill center students enroll in CTE dual credit courses and are therefore eligible to earn college credits than students participating in CTE courses in high schools.

Beyond course enrollments, we learned from skill center directors that work-based learning is the primary focus of skill centers. All skill center directors report opportunities for students to engage with industry employers in a variety of settings and to earn a range of credentials.

#### Who Can and Does Access Skill Centers?

At the district level, most urban districts have access to a skill center, and the majority of rural districts do not have access. At the student level, about 3% of students in rural districts do not have access to a skill center. We heard from some skill center directors that skill centers are particularly important for students in rural areas since those districts may not have the same level of staffing and resources to offer CTE programming as districts do in more urban areas.

Districts with skill center access have larger student populations, on average. Aside from population size, districts with and without skill center access are largely similar with respect to the student population served. However, districts with skill center access do have a larger percentage of Hispanic students and students in special education relative to districts without skill center access.

Within districts that have skill center access, male students and low-income students in the FRPM program are slightly overrepresented relative to other CTE students in their districts, on average. These students are more likely to access skill centers than female students and students not in the FRPM program.

We learned from skill center directors that access is limited by high demand relative to available seats. The extent to which demand exceeds availability varies by cluster/program. Beyond this, skill center directors most commonly identified transportation as a barrier to student access and offered a range of specific proposals. Additional barriers identified included a lack of home school understanding and support, as well as skill center facility and staff resources.

### High School Transitions for Skill Center Students

We examined graduation rates, as well as post-secondary and labor market outcomes over a five-year period after graduation, for skill center students graduating between 2013 and 2023. Most skill center students (80%) earned a high school diploma and largely graduated on time.

Less than 40% of skill center students enrolled in post-secondary education during the five years after graduation; most of these enrollments were in community or technical colleges. Most skill center students who enrolled did so in the first years after high school. The number of students earning a post-secondary credential increased from one to five years post-graduation. Still, less than 10% of skill center students earned a credential within five years after graduation. Postsecondary enrollment and credential rates are higher among the small population of skill center students who earned a postsecondary credential while in high school.

A higher proportion of skill center students were employed following high school. On average, about 70% of former skill center students were employed within the five-year period after graduating high school and earning an average of \$6,063 per quarter. Finally, we note that our observations of student outcomes at all follow-up periods—and especially the five-year follow-up—are influenced by COVID-19.

### COVID-19

To learn about the potential impacts of COVID-19, we examined graduation rates and outcomes one year after high school for all study cohorts (2013 through 2023).

On average, for skill center students, we observe an increase in high school graduation rates corresponding to the onset of COVID-19 in the 2019-20 school year, and the rate remained high in 2021. We see a similar pattern through 2021 for all students in our sample. This pandemic-era bump in graduation rates is consistent with national trends. There may be multiple factors influencing graduation over this period, but some research suggests that graduation rates increased during the pandemic because states relaxed graduation requirements.<sup>67</sup> In Washington, OSPI offered eligible seniors impacted by the pandemic the ability to waive graduation credit and pathways requirements.<sup>68</sup>

<sup>67</sup> Harris, D., Chen, F., Martin, R., Bernhardt, A., Marsicano, C., & von Hippel, P. (2024). [The effects of the COVID-19 pandemic on educational attainment](#). *The Russell Sage Foundation Journal of the Social Sciences*, 10(1), 152-180.

<sup>68</sup> Washington State Board of Education. [Graduation Requirement Emergency Waiver Program](#).



Post-pandemic graduation rates diverge, with skill center students showing increases in 2022 and 2023, while graduation rates for all students in our sample have roughly returned to pre-pandemic levels. This is consistent with the tapering off of pandemic-era emergency graduation requirement waivers, described in the previous section.

Additionally, beginning with the 2020 graduating class, introduction of the CTE pathway option for meeting all graduation requirements has likely contributed to the increasing difference in graduation rate for skill center students relative to all students in Washington.<sup>69</sup>

We also observe an accelerated decrease in post-secondary enrollments and an increase in the share of students not enrolled, employed, or in training following the onset of COVID-19 in 2019-20. Employment rates appeared to remain relatively steady across 2018-19 through 2020-21 but decrease sharply in 2021-22. Generally, these trends are similar to those observed for non-skill center CTE course-taking students.

It is important to note here that this analysis is limited by the number of years of data available post-COVID-19. We observe trends at one-year post-high school. We cannot draw conclusions about longer-term trajectories associated with experiencing COVID-19 during high school. Three- and five-year post-secondary and labor market outcomes for these student cohorts will not be available for several years.

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<sup>69</sup> [E2SHB 1599](#).

## Limitations

With respect to student access, this study describes districts with current access and students who have accessed the skill center. We cannot address the reasons why students do or do not access skill centers.

We focus on CTE enrollments offered in skill centers and in high schools. This does not provide a comprehensive look at all CTE programming available to students in any given program or cluster. Additionally, we focus on programming available through the public K-12 school system and do not include CTE programs that students may access through the community and technical colleges (CTCs). In some districts, CTCs may fill gaps in CTE programming (see [Appendix I](#)). This was outside the scope of the current report but may be important for future inquiries regarding CTE access.

Further, although we learned from skill center directors about the demand for programs, data are not available to accurately estimate the number of students who want to enroll in skill centers relative to the number of seats, overall or by program.

With respect to our outcomes analysis, this study can only describe outcomes for students who enrolled in a skill center during high school. We cannot interpret outcomes as being caused by skill center enrollment. Particularly since we do not have comprehensive information on reasons that students may enroll in skill centers, we cannot account for other factors that may predict differences in outcomes for skill center students and non-skill center students.

Nonetheless, our descriptive analysis focusing on skill center students' outcomes during their transition into adulthood provides insight into the trajectories of these students in the years following high school.

# Appendices

Career and Technical Education Skill Centers: *Describing Programs, Students, and Student Outcomes*

## Appendices

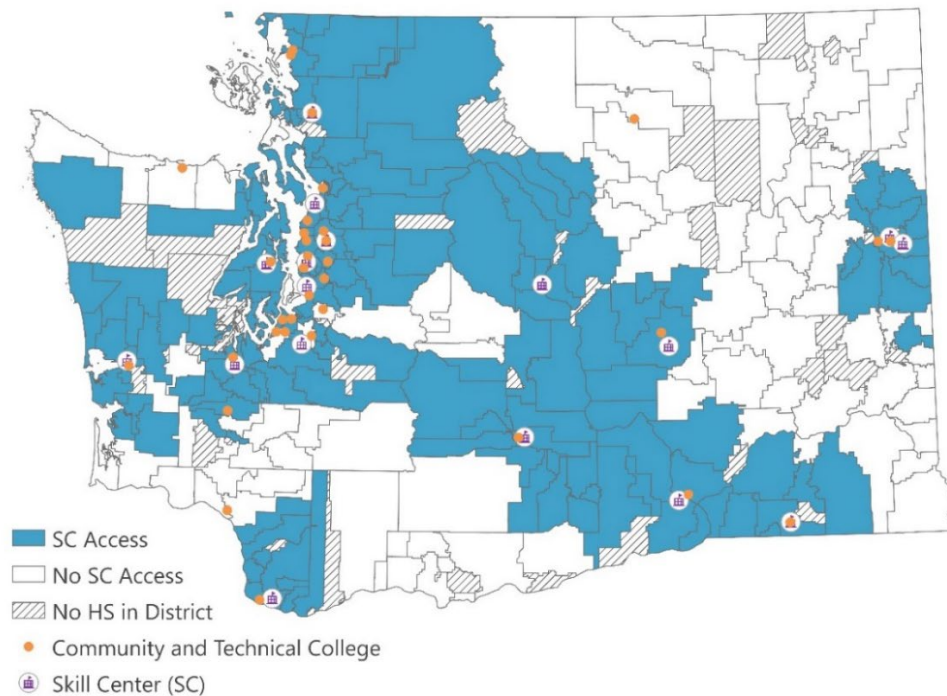
I.	Map of Skills Centers and Community and Technical Colleges.....	36
II.	Data .....	37
III.	Identifying Skill Center Student Enrollments.....	38
IV.	COVID-19.....	40

## I. Map of Skills Centers and Community and Technical Colleges

In [Exhibit A1](#), we map skill center main and branch campus locations, along with the locations of Washington’s Community and Technical Colleges (CTCs). High school students may have access to CTE courses through a local CTC, in addition to courses in high schools and skill centers. Although outside the scope of the present study, a comprehensive examination of CTE access should account for courses available through CTCs.

### Exhibit A1

Washington’s Skill Centers and Community and Technical Colleges,  
and 2023-24 Skill Center Access by School District



Note:

Some school districts (N=18) can send students to more than one skills center. Additionally, four skills centers serve students in Tribal compact schools.

Source for identification of sending school districts is Washington State Skill Center Association records.

## II. Data

In [Exhibit A2](#), we list categories of administrative records that we received for this study from the Education Research and Data Center (ERDC). The research presented here uses confidential data from ERDC located within the Washington State Office of Financial Management (OFM). ERDC’s data system is a statewide longitudinal data system that includes de-identified data about people’s preschool, educational, and workforce experiences. The views expressed here are those of the authors and do not necessarily represent those of OFM or other data contributors. Any errors are attributable to the authors.

### Exhibit A2

#### Administrative Data Types and Years/Cohorts

Type of information	Years/cohorts
Career and technical education (CTE) course enrollments in all high schools and skills centers	<ul style="list-style-type: none"> <li>All CTE enrollments in 2022-23 <sup>b</sup></li> <li>CTE enrollments for all students in 2013 through 2023 graduation cohorts</li> </ul>
Student graduation cohort and demographic information (e.g., gender, race)	<ul style="list-style-type: none"> <li>All students in 2022-23</li> <li>All students in 2013 through 2023 graduation cohorts</li> </ul>
Student programs (e.g., Free and Reduced Price Meals; English Language Learner)	<ul style="list-style-type: none"> <li>All students in 2022-23</li> <li>All students in 2013 through 2023 graduation cohorts</li> </ul>
Student K-12 outcomes (e.g., GPA, graduation)	<ul style="list-style-type: none"> <li>All students in 2013 through 2023 graduation cohorts</li> </ul>
Student post-secondary enrollments by term (in Community and Technical Colleges and four-year institutions) and post-secondary achievements (e.g., major, degree type) <sup>a</sup>	<ul style="list-style-type: none"> <li>All students in 2013 through 2023 graduation cohorts</li> </ul>
Student apprenticeship records from Labor and Industries (e.g., occupation, enrollment dates) <sup>a</sup>	<ul style="list-style-type: none"> <li>All students in 2013 through 2023 graduation cohorts</li> </ul>
Student workforce summary (e.g., quarterly hours, quarterly wages) <sup>a</sup>	<ul style="list-style-type: none"> <li>All students in 2013 through 2023 graduation cohorts</li> </ul>

Notes:

<sup>a</sup> Post-secondary data does not include private or out-of-state enrollments. Apprenticeship and workforce data does not include out-of-state data.

<sup>b</sup> Student CTE course enrollment data was missing from OSPI source data for students in the Spokane School District for AY 2023. To address this missingness in our analyses, we requested CTE course enrollment data for students in the Spokane School District for AY 2022. We used this supplement in place of the missing AY 2023 data to approximate the type and frequency of course enrollments that we would likely observe in AY 2023, had the data been available.

### III. Identifying Skill Center Student Enrollments

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For both analyses focused on “enrollments and student population” and “student outcomes,” we used enrollment data from ERDC to identify if a student had enrolled in a skill center in a given year, regardless of how long they enrolled. For the “enrollments and student population” analysis, which focuses only on annual year (AY) 2023, we identified 11,507 skill center enrollees. For the “student outcomes” analysis, which includes a sample of students expected to graduate between 2013 and 2023, we identified 94,621 skill center enrollees.

Based on conversations with skill center directors regarding how they document student enrollments and concerns over whether administrative data was accurately capturing annual enrollments, we decided to conduct an alternative approach to identifying students in skill centers to compare how skill center enrollments based on the administrative data we used compare to enrollments skill center directors typically observe.

Rather than just including all students who ever enroll in a skill center, we also consider enrollment length and timing. Skill center directors noted that they document an enrollment if a student is enrolled on and after October 1<sup>st</sup> of the academic year. They described this as more accurately including students who are consistently enrolled in the skill center during the year and omitting students with short-term enrollments, like students who enroll during summer programs, which comprise a very small proportion of students served. With this in mind, we identified students who were enrolled on or after October 1<sup>st</sup> of a given academic year and omitted students enrolled during the summer months. Using this approach, we identified 10,176 students in skill centers for our “enrollments and student population” analysis and 82,445 students for the “student outcomes” analysis.

Next, we compared the demographic characteristics of skill center students between our original approach described earlier and this alternative approach for both “enrollments and student population” and “student outcomes” samples. We find that the populations are compositionally the same regardless of how we identify enrollments.

We also conducted our longitudinal outcome analysis examining high school graduation and transition outcomes using the alternative sample of 82,445 skill center students. Overall, we find that outcomes for this alternative sample are mostly the same as our original sample. High school graduation rates, employment rates, and average quarterly wages are slightly higher (by one percentage point) for the alternative sample compared to our original sample ([Exhibit A3](#)).

### Exhibit A3

#### Summary of Outcomes for Original and Alternative Analysis Samples

	Original sample	Alternative sample
<b>Graduation</b>		
HS Diploma (%)	80%	81%
GED (%)	3%	3%
No HSE (%)	17%	16%
<b>Postsecondary</b>		
Enroll, no credential w/in 1 yr (%)	32%	32%
Enroll, credential w/in 1 yr (%)	2%	2%
No credential w/in 1 yr (%)	66%	66%
<b>Apprenticeship</b>		
Enrolled w/in 1 yr (%)	1%	1%
Enrolled w/in 3 yr (%)	1%	1%
Enrolled w/in 5 yr (%)	1%	1%
<b>Employment</b>		
Average employment rate 1 yr (%)	69%	70%
Average employment rate 2 yr (%)	70%	70%
Average employment rate 3 yr (%)	70%	70%
Average employment rate 4 yr (%)	68%	69%
Average employment rate 5 yr (%)	68%	68%
<b>Wages</b>		
Average quarterly wages 1 yr	\$4,274	\$4,352
Average quarterly wages 2 yr	\$5,173	\$5,256
Average quarterly wages 3 yr	\$6,021	\$6,095
Average quarterly wages 4 yr	\$6,928	\$6,994
Average quarterly wages 5 yr	\$7,922	\$7,975
<b>Sample N</b>	<b>94,621</b>	<b>82,445</b>

## IV. COVID-19

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### Research on CTE Programming, Teaching, and Learning During COVID-19

We did not conduct an exhaustive review of all research regarding CTE programming, teaching, and learning during the COVID-19 pandemic, but summarize some of the literature here.<sup>70</sup>

Surveys of U.S. teachers and education administrators indicate that the shift to online learning during the pandemic was difficult because teachers and students had little or no experience teaching and learning online. For CTE programs that require hands-on learning, the shift was particularly difficult. One study reported that programs requiring on-site learning (e.g., health sciences) were more negatively impacted, while other programs (e.g., information technology) were less affected because students already experienced computer-based learning before the pandemic.<sup>71</sup>

One study using administrative data to compare CTE concentration rates before and after the start of the pandemic in five states, including Washington, suggests minimal impacts on CTE concentration rates immediately after the pandemic began.<sup>72</sup>

Although outside the scope of the current study, more research is needed to understand how CTE enrollments, student learning, program offerings, and teaching were impacted during the pandemic and what, if any, existing effects persist for students post-pandemic.

### Impacts of COVID-19 on Outcomes

A separate issue—and more directly relevant to the present study—are the impacts of COVID-19 on observed outcomes. As described in [Section VI](#), trends in all study outcomes at one-year post graduation shifted during and after the pandemic. In general, we can expect outcomes to differ—on average—for cohorts of skill center students observed prior to COVID-19 relative to cohorts of skill center students observed during or after COVID-19.

Because the composition of cohorts that we can observe changes across our follow-up periods, these trends have implications for how we interpret outcomes aggregated *across cohorts* at one, three, and five years following high school graduation. [Exhibit A4](#) illustrates the number of cohorts observed at each outcome follow-up period, and the composition of those cohorts with respect to whether their outcomes were observed before, during, or after the intensive COVID-19 period and related closures.

Briefly, outcomes averaged across cohorts at one-year after high school should be less impacted by trends associated with COVID-19, relative to outcomes at three and five years. This is because the majority of cohorts observed at the one-year mark were observed prior to the pandemic. In contrast, most of the cohorts observed at the five-year mark were observed during or after the pandemic, when rates of post-secondary participation and employment both dropped.

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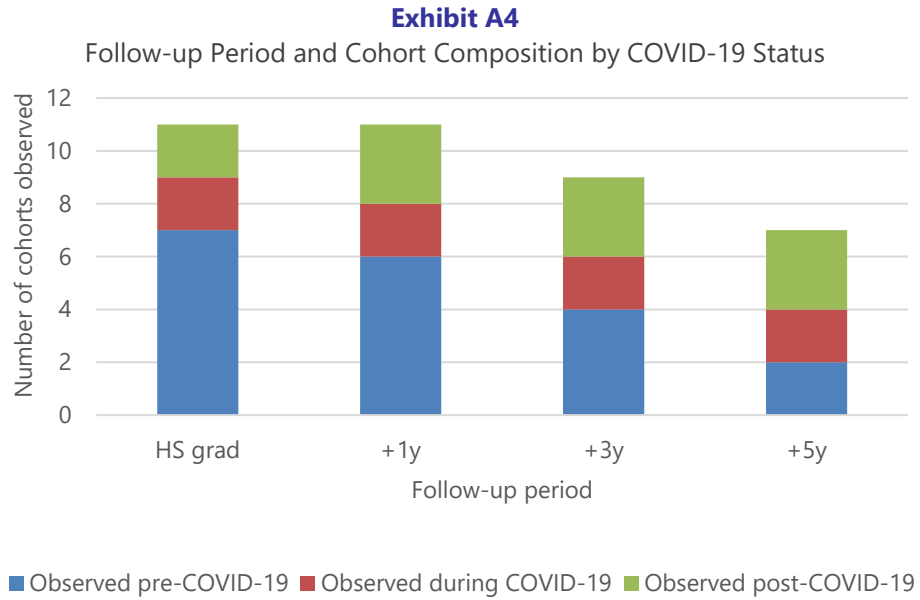
<sup>70</sup> Cannon, J., Self, M., Kitchel, A., Arnett-Hartwick, S., Billing, C., Elliott, K., Bartlett, M., Borr, M., & Jeffery, J. (2024). [COVID-19 global pandemic upheaval: CTE teachers response in the United States](#). *Athens Journal of Education*, *11*, 1-17; Walker, J., Wilson, R., Atkins, C., & Parr, K. (2022). [An investigation into the effect of Covid-19 on career and technical education classrooms](#). *The Journal of Research in Business Education*, *62*(1), 65-76; Smith, T., & Soricone, L. (2021). [CTE programs and the COVID-19 pandemic: Responses, innovations, and implications for future research](#). Career and Technical Education Research Network.

<sup>71</sup> Walker et al. (2022).

<sup>72</sup> Urban, C., Carruthers, C.K., Dougherty, S., Goldring, T., Kreisman, D., & Theobald, R. (2022). [A multi-state analysis of trends in career and technical education](#). Georgia Policy Labs.



Results for outcomes averaged across cohorts at one, three, and five years following high school graduation should be interpreted with these compositional differences in mind. Readers should consider each observation period as a unique set of cohorts and not a representation of change in outcomes over time for the same group of skill center student cohorts. This applies to [Exhibits 14 through 16](#) in [Section VI](#).



## Acknowledgments

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