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FULL REPORT No. 2:

Work-Based Learning in Pennsylvania:

The WBL Opportunities Associated with Secondary CTE Career Pathways and Resulting Postsecondary Perkins Industry Credentials

Candy M. Miller, Rosemary Riccardo, and Brian Hutchison

Pennsylvania Department of Education

Office of Administration

This report is the second in a series of research related to work-based learning (WBL) in Pennsylvania (PA) secondary schools. This report identifies the WBL opportunities that were most often associated with particular Career and Technical Education (CTE) career pathways/clusters for two cohorts of recent PA high school graduates. Results also expand upon the findings from report 1 of this series by following secondary CTE students to a postsecondary Perkins program to examine which students continued their career pathway/cluster and ultimately earned a postsecondary Perkins industry credential (PIC).

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Julie Patton | Director of Compliance
Phone: 717.346.1085 | jupatton@pa.gov

Candy M. Miller | Research and Evaluation Manager
Phone: 717.705.6499 | c-candmill@pa.gov

Pennsylvania Department of Education | Office of Administration
607 South Drive | Harrisburg, PA 17120
Phone: 717.705.6499 | Fax: 717.787.3148

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ABSTRACT:

2019 cohort % – 2020 cohort %

The first research report in this Commonwealth series on work-based learning (WBL) identified several outcomes of interest for secondary CTE students in PA, including postsecondary fall enrollment and non-degree credential earning by high school graduation (Miller, Riccardo, & Hutchison, 2023). Following these same cohorts of PA graduates, the current study sought to answer two research questions related to the WBL opportunities associated with secondary CTE career pathways/clusters and pathway alignment from high school to a postsecondary Perkins program. Two cohorts of secondary CTE students from the graduating classes of 2019 (*N* = 22,412) and 2020 (*N* = 22,501) were followed to potential enrollment in a postsecondary Perkins program through the 2021-22 SY. Results showed that although CTE students in each career cluster participated in a variety of WBL opportunities during high school, opportunities were more often taken in certain career clusters than others. Expanding on previously reported outcomes (Miller, Riccardo, & Hutchison, 2023), secondary CTE students were also tracked into postsecondary to measure Perkins industry credential (PIC) earning and career cluster alignment between their high school and postsecondary programs. Results indicated that 11.7% – 8.2% of the secondary CTE population of both cohorts enrolled in a postsecondary Perkins program (respectively), while 9.3% – 8.6% of postsecondary Perkins students ultimately earned a PIC as a result of a postsecondary program. Finally, descriptive results showed that just under half (48.4% – 48.5%) of all postsecondary Perkins students and more than half (60.4% – 50.0%) of PIC earners enrolled in postsecondary programs aligning to their high school CTE career clusters. Results are discussed in relation to previous and future reports in this series.

KEY FINDINGS:

2019 cohort % – 2020 cohort %

- Secondary CTE students in the following career clusters had notably lower participation in WBL opportunities during high school: Science, Technology, Engineering & Mathematics (14.3% – 26.4%), Manufacturing, Sales & Service (13.7% – 32.4%) and Law, Public Safety and Security (15.0% – 31.4%). In contrast, students in Human Resources (42.7% – 50.1%) and Agriculture, Food & Natural Resources (52.7% – 56.2%) programs were most likely to participate in at least one WBL opportunity.
- The job exploration WBL opportunity was taken by secondary CTE students in most career clusters, especially Health Science (16.2% – 10.7%), Human Resources (12.7% – 11.1%), and Law, Public Safety, and Security (8.6% – 13.1%).
- School-sponsored enterprise opportunities were predominantly taken by secondary CTE students in Hospitality & Tourism programs (23.4% – 21.8%), while work-based experiences were most common among students in the Human Resources cluster (15.7% – 14.6%).
- The highest participation rates in a cooperative work experience were among secondary CTE students in Manufacturing (20.9% – 19.2%), Transportation, Distribution & Logistics (20.8% – 19.4%), and Architecture & Construction (17.4% – 15.4%) programs.
- A total of 2,632 secondary CTE students enrolled in a postsecondary Perkins program in the 2019 cohort while 1,847 students enrolled in the 2020 cohort, amounting to 11.7% – 8.2% of the secondary CTE population, respectively. Additionally, 9.3% of postsecondary Perkins students in the 2019 cohort and 8.6% in the 2020 cohort ultimately earned a PIC as a result of their postsecondary program.
- Just under half (48.4% – 48.5%) of all postsecondary Perkins students and more than half (60.4% – 50.0%) of PIC earners enrolled in postsecondary programs that aligned to the CTE career clusters they participated in during high school.

Previous research for the Commonwealth (Miller, Riccardo, & Hutchison, 2023) found that roughly 16% of students in the graduating cohorts of 2019 and 2020 participated in some form of WBL opportunity by high school graduation.

Literature

Work-based learning (WBL) in Pennsylvania provides students with "an opportunity to connect academic and technical skills to real-world settings" (Pennsylvania Department of Education, 2021-a). A previous report in this series (Miller, Riccardo, & Hutchison, 2023) provided descriptive statistics for two cohorts of PA high school graduates, examining rates of participation in WBL opportunities and outcomes like postsecondary enrollment and non-degree credential earning by high school graduation. This report expands upon these findings by answering two research questions related to participation in WBL by CTE career pathway/program and "pathway alignment" from high school to postsecondary education.

Work-Based Learning in Pennsylvania: Descriptive Findings for CTE and Non-CTE Secondary Students (2023)

Previous research for the Commonwealth (Miller, Riccardo, & Hutchison, 2023) found that roughly 16% of students in the graduating cohorts of 2019 and 2020 participated in some form of WBL opportunity by high school graduation. This first study reported descriptive statistics for both CTE and non-CTE students, finding that over 50% of CTE students in both cohorts earned an industry-recognized credential (ICN) by high school graduation and approximately 30% enrolled in postsecondary education by the following fall semester. The current study builds upon these descriptive findings for secondary CTE students, utilizing the same cohorts of PA high school graduates.

CTE Career Clusters – "Pathways to Postsecondary and Workforce Entry"

In Pennsylvania, secondary CTE 'career pathways' (or programs) aggregate to 'career clusters' which reflect the "work-related tasks and assessments that connect with workforce demands" of each industry (Pennsylvania, Department of Education, 2023-b). Program participation within each career cluster can be found in report 1 of this series (Miller, Riccardo, & Hutchison, 2023). Findings from that report indicated that the most popular pathways for CTE students from the 2019 and 2020 graduate cohorts were Health Science and Architecture & Construction programs, while the least popular pathways were Business, Management, & Administration, Marketing, Sales & Service, and Science, Technology, Engineering, & Mathematics. Program participation also differed by student gender in notable ways. The most male-dominated CTE career clusters were Architecture & Construction, Manufacturing, and Transportation, Distribution, & Logistics, while female CTE students most commonly participated in Health Science and Human Resources programs. Given the differences in student demographics and rates of participation between career clusters, a goal of this report is to investigate differences in WBL participation across secondary CTE programs/subjects.

Recent research outside of the Commonwealth has identified a significant link between CTE career cluster engagement in high school and the subsequent earning of a postsecondary credential in that same cluster (Plasman, Gottfried, & Sublett, 2017). Federal Perkins legislation aligns the meaning of 'recognized postsecondary credential' to that defined in section 3 of the Workforce Innovation and Opportunity Act (WIOA) (29 U.S.C. 3102): "a credential consisting of an industry-recognized certificate or certification, a certificate of completion of an apprenticeship, a license recognized by the State involved or Federal Government, or an associate or baccalaureate degree". The current report seeks to determine how many secondary CTE students from recent cohorts "follow their pathway" from a high school CTE program to postsecondary, resulting in a postsecondary industry credential aligned to the WIOA definition.

With the methodologies and results of previous research in mind, the current study addresses the following two research questions adapted from the **PDE research agenda**:

1. What career pathways/clusters are more likely to have WBL opportunities associated with them?
2. How many students follow their "pathway" to a postsecondary Perkins program and ultimately earn a postsecondary industry credential?

Method

This project utliizes the same cohorts of secondary CTE students described in report 1 in this series on WBL in PA.

Two cohorts of CTE students from the high school graduating classes of 2019 (*N* = 22,412) and 2020 (*N* = 22,501) were included for analysis in the present study. Data followed secondary CTE students from their last two years of high school to potential enrollment in a postsecondary Perkins program by the 2021-22 school year (SY). All 44,913 students across both graduating classes attended a public Pennsylvania local education agency (LEA), which may include school districts, career and technical centers, intermediate units, charter schools, or cyber charter schools.

Research questions were answered through the analysis of several linked datasets from Pennsylvania's Information Management System (PIMS) which contained both secondary and postsecondary data on PA's students[1]. Secondary PIMS data records were obtained for school years 2017–18 through 2019–20 to determine students' CTE program involvement during their last two years of high school and affiliated career pathways/clusters. Postsecondary PIMS data allowed researchers to track the secondary CTE populations to potential participation in a postsecondary Perkins program in the 2019-20 through 2021-22 SYs. Table 1 details the years of data utilized for each cohort.

Descriptive analyses in this report address two research questions. The first question examines the link between CTE career clusters and the WBL opportunities in which CTE students engaged during their last two years of high school. These descriptive analyses take each CTE WBL opportunity in turn to examine which opportunities are most commonly associated with programs in each career cluster. Descriptive analyses which answer the second question expand upon the outcomes detailed in a previous report by detailing how many secondary CTE students followed their career pathway/cluster to a postsecondary Perkins program and ultimately earned a Perkins industry credential (PIC).

Data followed secondary CTE students from their last two years of high school to potential enrollment in a postsecondary Perkins program by the 2021–22 school year.

TABLE 1. Years of Secondary and Postsecondary Data Used by High School Graduate Cohort

	2017–18	2018–19	2019–20	2020–21	2021–22
2019 Cohort (*N* = 22,412)	X	X	O	O	O
2020 Cohort (*N* = 22,501)		X	X	O	O

X = Secondary PIMS Data O = Postsecondary PIMS Data

1 Secondary data comes from the PIMS Student and PIMS CTE Student Fact. Postsecondary data comes from the PIMS Campus Student Program Fact.

Results

What career pathways/clusters are more likely to have WBL opportunities associated with them?

Analyses in this section address whether secondary CTE student participation in WBL differed by CTE program/subject[2]. All CTE students can be classified as following a "career pathway" determined by their **Classification of Instructional Program (CIP) code**, which can then be aggregated by subject into "career clusters." A previous descriptive report in this series broke down the CTE population of both cohorts by career cluster and highlighted notable demographic differences between clusters. The current report expands analysis to consider whether CTE students in particular career clusters are more likely to participate in WBL opportunities than others[3]. Percentages reported in text are for the 2019 and 2020 cohort, respectively.

Table 2 shows the percentage of secondary CTE students in both the 2019 and 2020 graduate cohorts who participated in programs within each career cluster. The most popular clusters were Health Science (15.3% – 15.9%) and Architecture & Construction (14.4% – 14.4%). Programs within the Business, Management & Administration (2.8% – 2.6%), Marketing, Sales & Service (1.5% – 1.7%), and Science, Technology, Engineering & Mathematics (2.1% – 2.2%) clusters had the lowest participation.

Most popular ***career clusters were:***

- *Health Science (15.3% – 15.9%)*
- *Architecture & Construction (14.4% – 14.4%)*

Least popular ***career clusters were:***

- *Business, Management & Administration (2.8% – 2.6%)*
- *Marketing, Sales & Service (1.5% – 1.7%)*
- *Science, Technology, Engineering & Mathematics (2.1% – 2.2%)*

2 Similar analyses for non-CTE students can be found in the first report in this WBL series, detailing the relative popularity of WBL opportunities by career cluster. Note that non-CTE data differ from CTE data and analyses are therefore not comparable.

3 Although student outcomes by career cluster are beyond the focus of the current research, notable differences in postsecondary enrollment and high school non-degree credential earning by CTE career cluster can be found in Appendix A of this report.

TABLE 2. Secondary CTE Students by Career Cluster: 2019 and 2020 Cohorts

	2019 Cohort		2020 Cohort	
Career Cluster	**N**	%	**N**	%
Agriculture, Food & Natural Resources	2,122	9.5%	2,108	9.4%
Architecture & Construction	3,237	14.4%	3,251	14.4%
Arts, A/V Technology & Communications	1,335	6.0%	1,361	6.0%
Business, Management & Administration	624	2.8%	586	2.6%
Health Science	3,429	15.3%	3,580	15.9%
Hospitality & Tourism	1,763	7.9%	1,668	7.4%
Human Resources	2,773	12.4%	2,840	12.6%
Information Technology	1,236	5.5%	1,233	5.5%
Law, Public Safety and Security	794	3.5%	858	3.8%
Manufacturing	2,043	9.1%	2,114	9.4%
Marketing, Sales & Service	335	1.5%	383	1.7%
Science, Technology, Engineering & Mathematics	462	2.1%	493	2.2%
Transportation, Distribution & Logistics	3,025	13.5%	2,798	12.4%
TOTAL (All Secondary CTE Students)*	**22,412**		**22,501**	

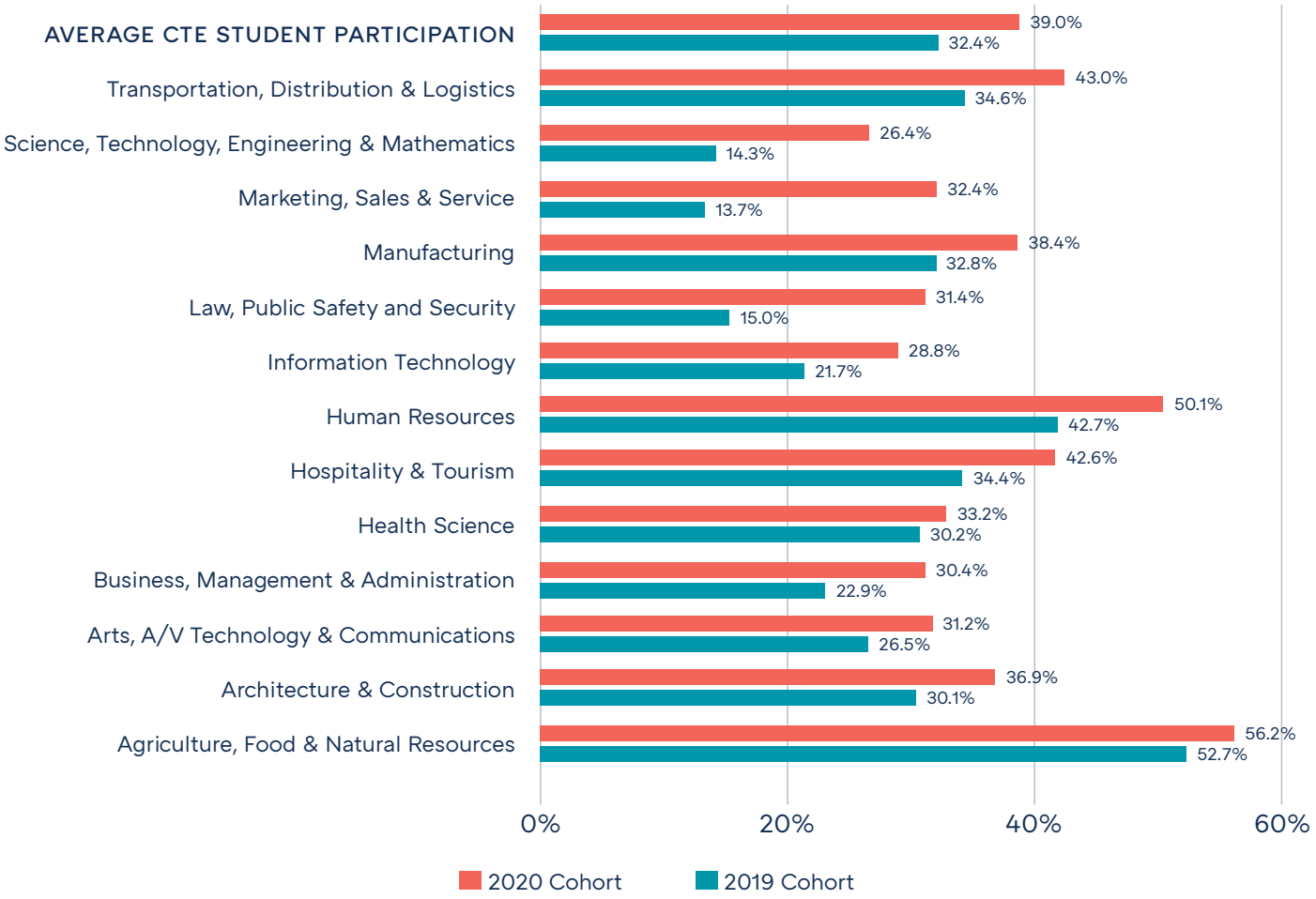
**Note. Percentages do not add to 100% because students may have participated in multiple CTE programs in multiple career clusters.*

Detailed descriptions of the WBL opportunities reported for secondary CTE students can be found in Appendix B of this report. Figure 1 displays the percentage of CTE students in each career cluster that participated in at least one WBL opportunity during a PDE-approved CTE program. These descriptive results show that although 32.4% – 39.0%[4] of the overall CTE population participated in CTE WBL during high school, students in certain career clusters were more or less likely to participate in WBL opportunities than others. Participation in WBL was notably lower in the Science, Technology, Engineering & Mathematics (14.3% – 26.4%), Marketing, Sales & Service (13.7% – 32.4%) and Law, Public Safety and Security (15.0% – 31.4%) clusters, particularly among the 2019 cohort. In contrast, students in Human Resources (42.7% – 50.1%) and Agriculture, Food & Natural Resources (52.7% – 56.2%) programs were most likely to participate in at least one WBL opportunity.

Although 32.4% – 39.0% of the overall CTE population participated in CTE WBL during high school, students in certain career clusters were more or less likely to participate in WBL opportunities than others.

4 Notably, a greater proportion of CTE students from the 2020 cohort participated in WBL (39.0%) during their CTE program compared to the 2019 graduate cohort (32.4%). This difference in CTE WBL participation rates may be attributed to the addition of the simulated work environment WBL opportunity for the graduates of 2020, in which 42.6% of CTE WBL participants engaged. In fact, if participation in the simulated work environment experience is excluded for the graduates of 2020, the overall CTE WBL participation rate is 32.3%, which is very similar to the participation rate for the graduates of 2019.

FIGURE 1. Participation in CTE WBL by Career Cluster and Cohort

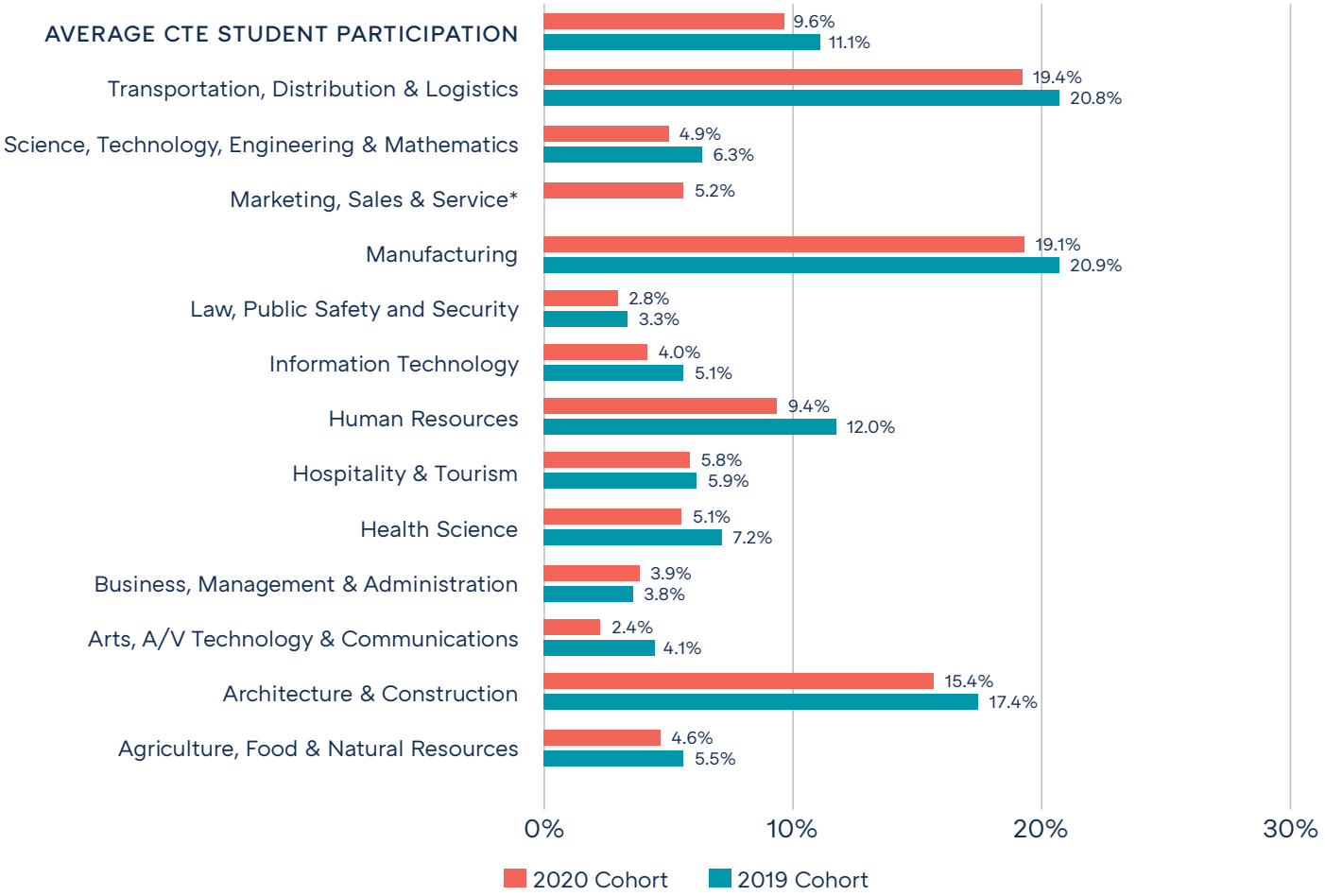


Note: % participation by career cluster is calculated using the Ns in Table 2 as denominators.

Figures 2–8 detail the rate of participation in each CTE WBL opportunity[5] by career cluster and cohort. Although some proportion of students in all career clusters participated in a cooperative work experience, Figure 2 shows that the highest participation rates were among students in Manufacturing (20.9% – 19.1%), Transportation, Distribution & Logistics (20.8%- 19.4%), and Architecture & Construction (17.4% – 15.4%) programs. These programs had participation rates well above the average rate for CTE students (11.1% – 9.6%).

5 Apprenticeships by career cluster are not depicted due to low overall CTE student participation. A figure would show that apprenticeship opportunities were primarily taken in the Manufacturing cluster for 2019 cohort (1.4% participate in Apprenticeships) and the Architecture & Construction cluster for the 2020 cohort (0.8% participate in Apprenticeships).

FIGURE 2. Participation in Cooperative Work Experiences by Career Cluster and Cohort

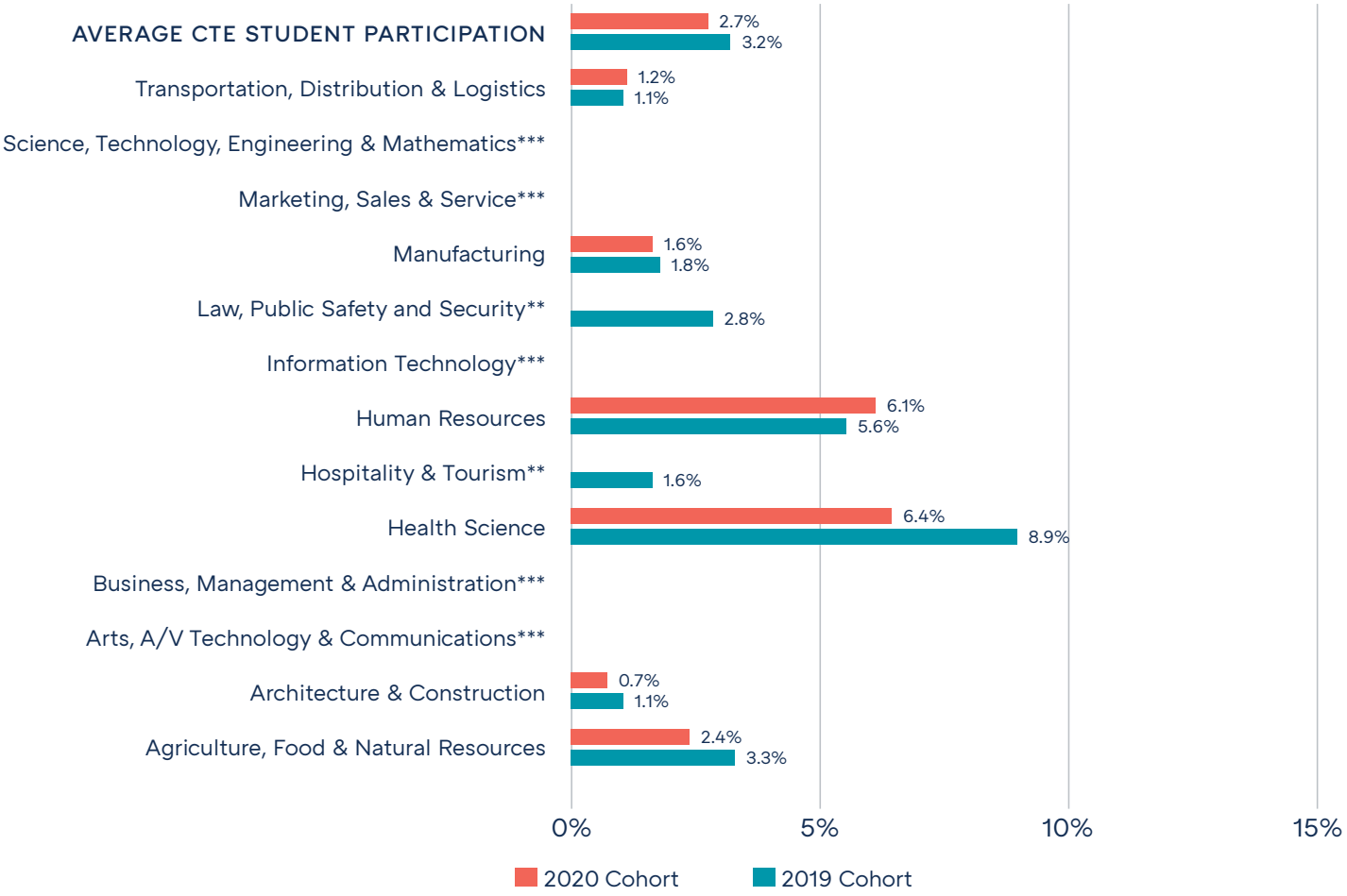


**2019 cohort did not meet minimum reporting requirements.*
Note: % participation by career cluster is calculated using the Ns in Table 2 as denominators.

A smaller proportion of the overall CTE population participated in internships (3.2% – 2.7%). Figure 3 breaks this down further to show that participation was relatively low across all clusters, except Health Science (8.9% – 6.4%) and Human Resources (5.6% – 6.1%). In contrast, about 10% of CTE students in both cohorts participated in job exploration (Figure 4). With the exception of the Marketing, Sales, and Service career cluster, job exploration was well populated in all clusters, especially Health Science (16.2% – 10.7%), Human Resources (12.7% - 11.1%), and Law, Public Safety, and Security (8.6% – 13.1%).

The highest participation rates in cooperative work experiences were among students in Manufacturing (20.9% - 19.1%), Transportation, Distribution & Logistics (20.8% - 19.4%), and Architecture & Construction (17.4% - 15.4%) programs.

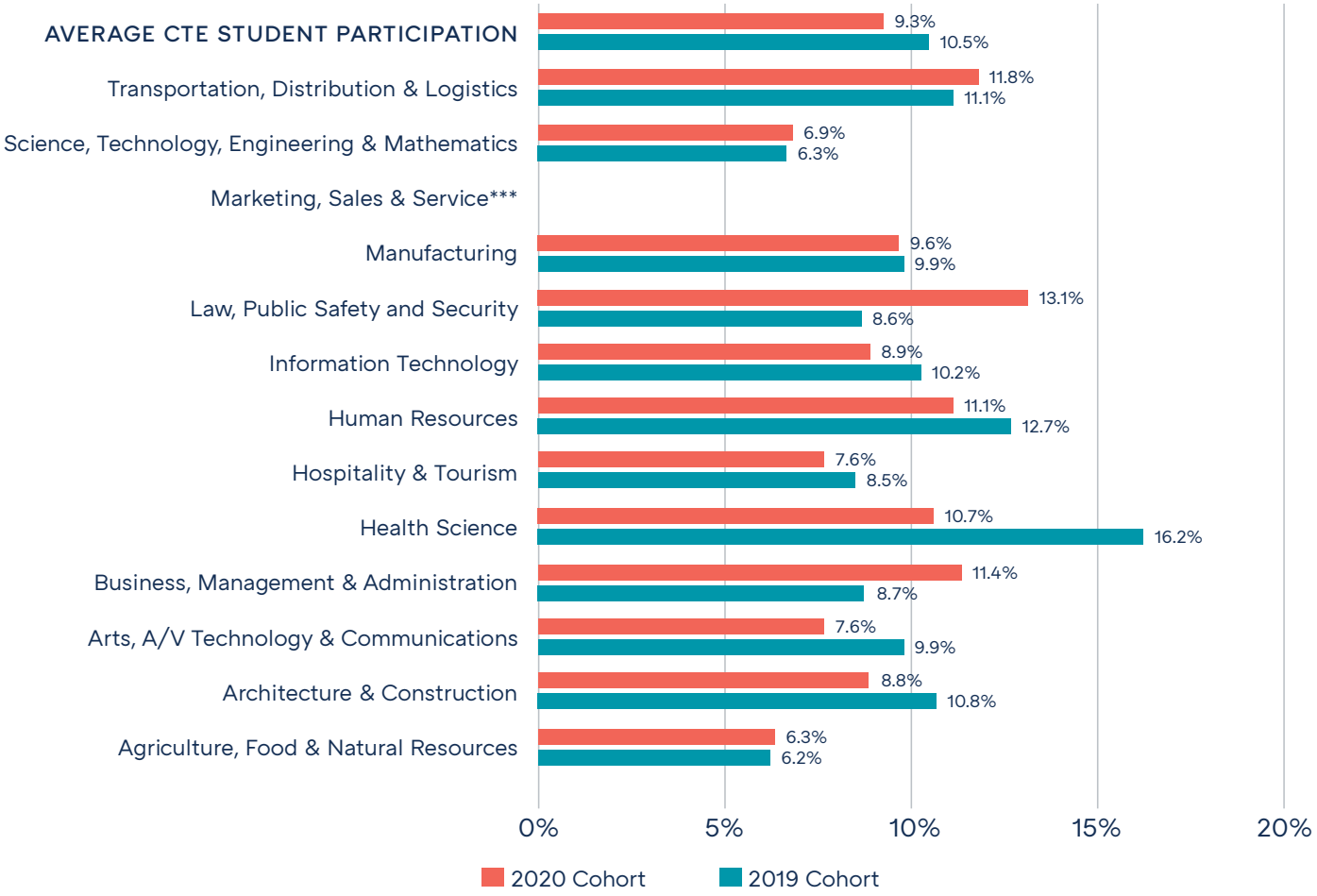
FIGURE 3. Participation in Internships by Career Cluster and Cohort



***2020 cohort did not meet minimum reporting requirements.*
****Both cohorts did not meet minimum reporting requirements.*
Note: % participation by career cluster is calculated using the Ns in Table 2 as denominators.

Participation in internships was relatively low across all clusters, except Health Science (8.9% - 6.4%) and Human Resources (5.6% - 6.1%).

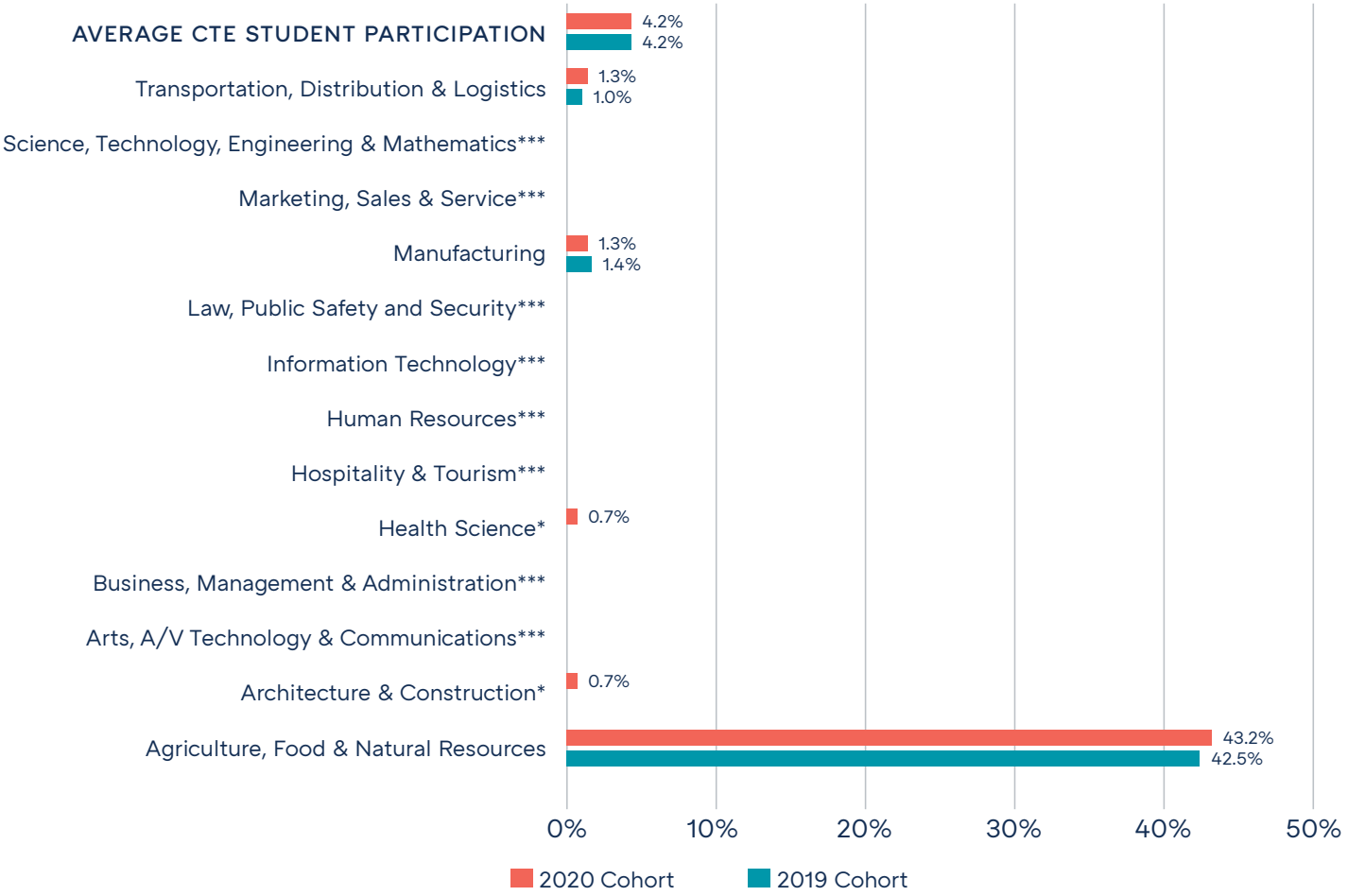
FIGURE 4. Participation in Job Exploration by Career Cluster and Cohort



****Both cohorts did not meet minimum reporting requirements.*
Note: % participation by career cluster is calculated using the Ns in Table 2 as denominators.

As depicted in Figure 5, agriculture experiences were only meaningfully taken in the Agriculture, Food & Natural Resources cluster (42.5% – 43.2%). Very small proportions of students in Manufacturing (1.4% – 1.3%) and Transportation, Distribution, & Logistics (1.0% – 1.3%) programs participated in agriculture experiences, but this may be due to overlap (e.g., students who may be in both Agriculture and Manufacturing programs). This finding clarifies that although 4.2% of CTE students in both cohorts were reported to participate in agriculture experiences, this proportion primarily consists of students in Agriculture, Food & Natural Resources programs.

FIGURE 5. Participation in Agriculture Experiences by Career Cluster and Cohort

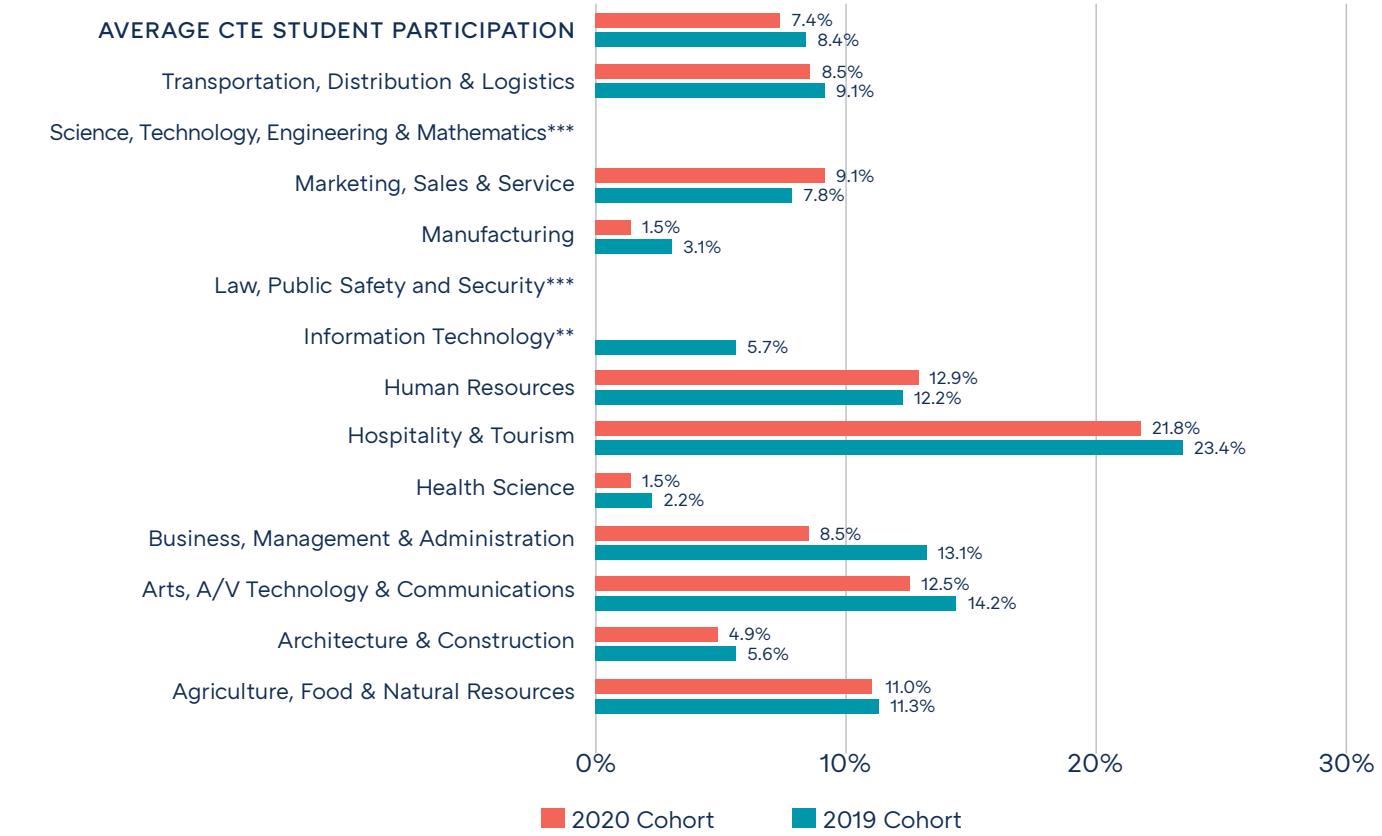


**2019 cohort did not meet minimum reporting requirements.*
****Both cohorts did not meet minimum reporting requirements.*
Note: % participation by career cluster is calculated using the Ns in Table 2 as denominators.

School-sponsored enterprises were noticeably more common in the Hospitality & Tourism cluster (23.4% – 21.8%) compared to other clusters depicted in Figure 6 (ranging from 1.5% to 14.2%). This is much higher than the overall rate of participation in school-sponsored enterprises among CTE students (8.4% – 7.4%). Likewise, Figure 7 shows work-based experiences were far more common among students in the Human Resources cluster (15.7% – 14.6%) than other clusters (ranging from 1.2% to 8.5%). Finally, simulated work environments were relatively popular experiences among all career clusters in 2020 (Figure 8). The highest rates of participation were among students in the Law, Public Safety and Security (20.5%) and Marketing, Sales & Service (20.1%) clusters; the lowest was in Business, Management & Administration (13.0%).

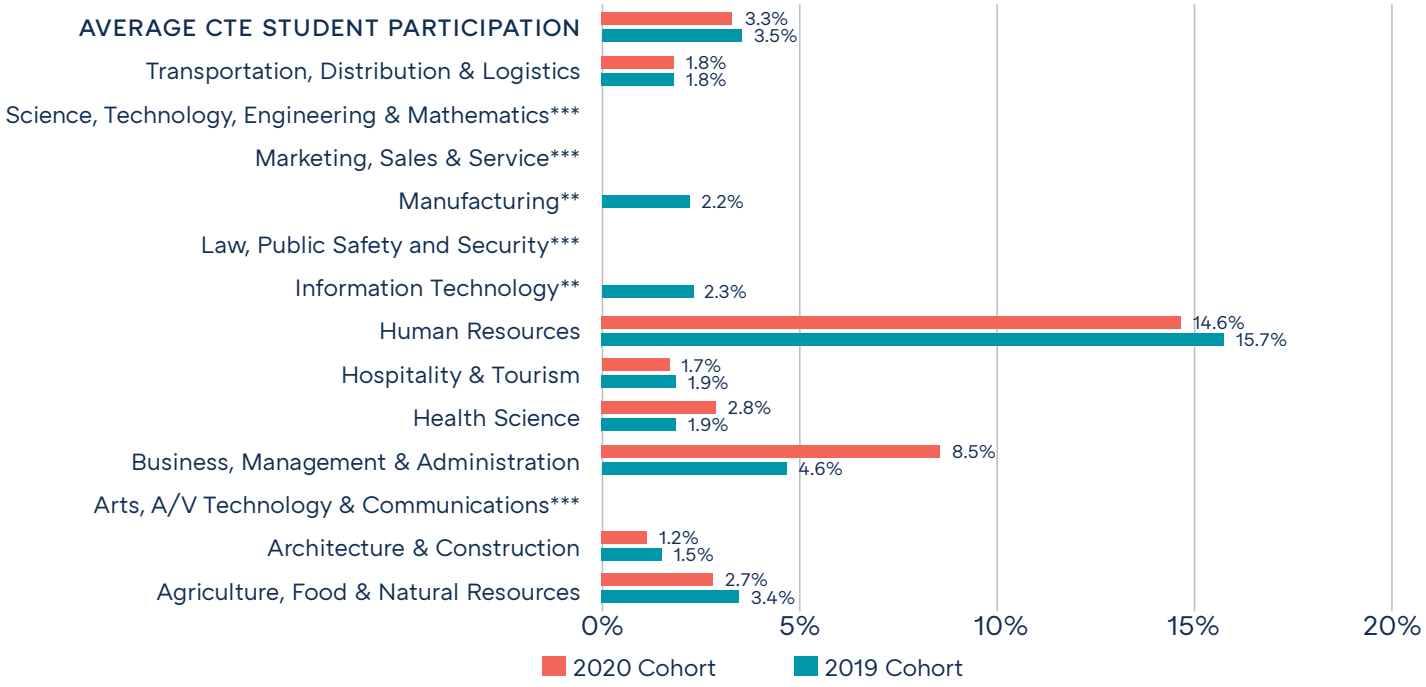
School-sponsored enterprises were noticeably more common in the Hospitality & Tourism cluster compared to other career clusters, while work-based experiences were far more common among students in the Human Resources cluster when compared to others.

FIGURE 6. Participation in School-Sponsored Enterprise by Career Cluster and Cohort



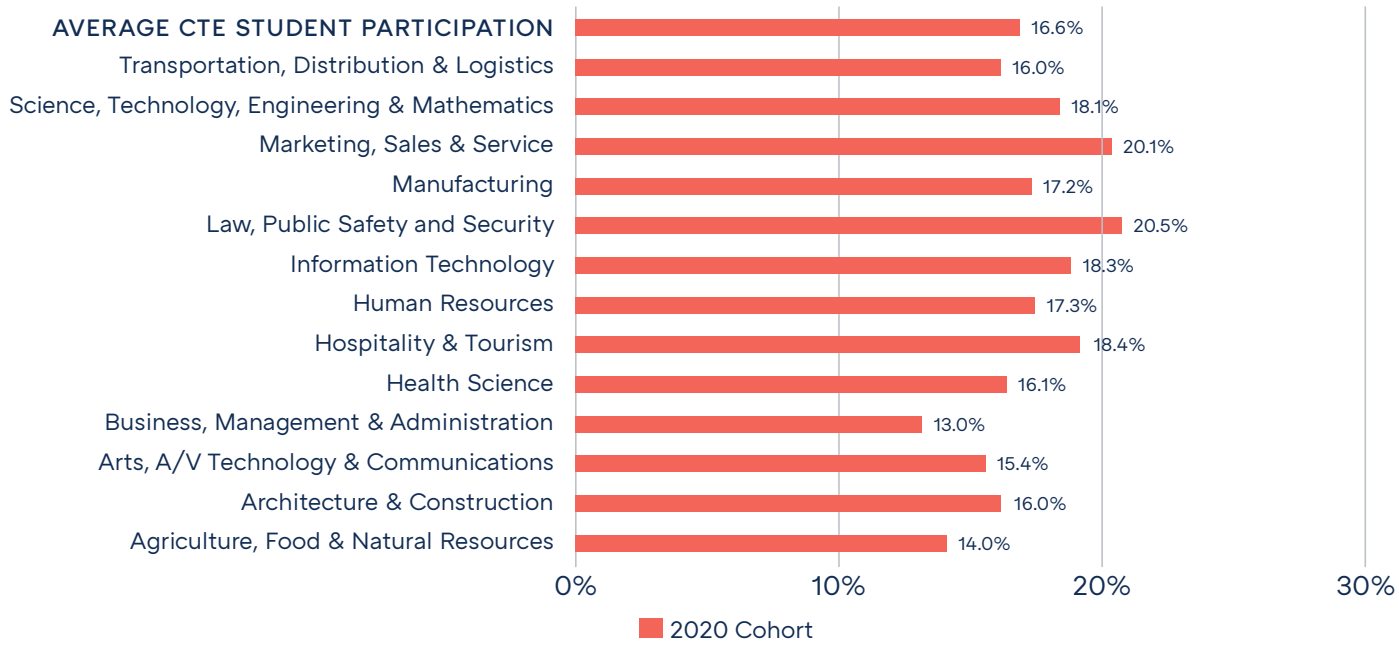
***2020 cohort did not meet minimum reporting requirements.*
****Both cohorts did not meet minimum reporting requirements.*
Note: % participation by career cluster is calculated using the Ns in Table 2 as denominators.

FIGURE 7. Participation in Work-Based Experience by Career Cluster and Cohort



***2020 cohort did not meet minimum reporting requirements*
****Both cohorts did not meet minimum reporting requirements*
Note: % participation by career cluster is calculated using the Ns in Table 2 as denominators.

FIGURE 8. Participation in Simulated Work Environment by Career Cluster and Cohort



Note: % participation by career cluster is calculated using the Ns in Table 2 as denominators.

How many students follow their "pathway" to a postsecondary Perkins program and ultimately earn a postsecondary industry credential?

In report 1 of this series (Miller, Riccardo, & Hutchison, 2023), postsecondary enrollment for CTE and non-CTE students was measured as enrollment by the fall semester immediately after students' high school graduation. With access to the most recent postsecondary PIMS data, the current report continued to follow students' postsecondary Perkins trajectories for two (2020 cohort) or three years[6] (2019 cohort) after high school graduation to determine how many secondary CTE students earned a WIOA aligned postsecondary Perkins industry credential (PIC) and followed their CTE career pathway from high school to college. Given that cohorts were only followed for two or three years after high school graduation, most students did not complete their 2- or 4-year postsecondary programs. Percentages reported in text are for the 2019 and 2020 cohort, respectively.

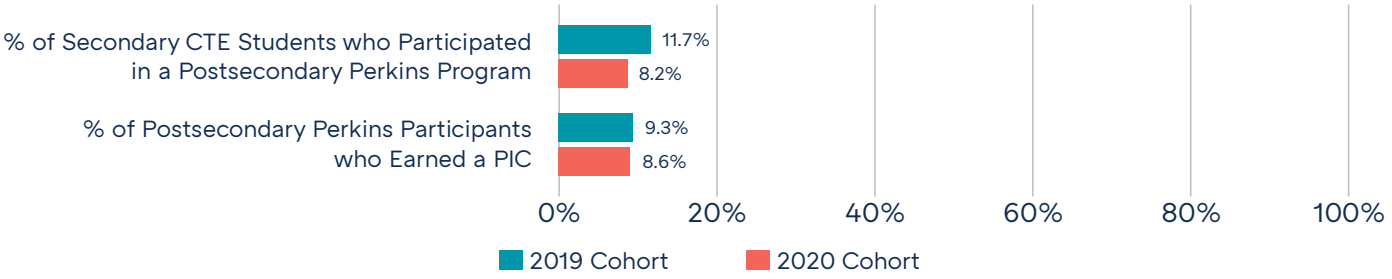
Less than ten percent (9.3% – 8.6%) of postsecondary Perkins students in both cohorts ultimately earned a Postsecondary Industry Credential (PIC) as a result of a postsecondary program.

Results showed that a total of 2,632 secondary CTE students enrolled in a postsecondary Perkins program in the 2019 cohort while 1,847 students enrolled in the 2020 cohort, amounting to 11.7% – 8.2% of the secondary CTE population, respectively (Figure 9). Of these Perkins students, 69.2% – 69.7% were coded in report 1 of this series as fall enrollers according to National Student Clearinghouse (NSC) Student Tracker Services data and 57.0% – 53.1% had earned industry-recognized credentials (ICNs) as a result of their secondary CTE program by high school graduation. Findings from the current report expand on these outcomes for secondary CTE students to include postsecondary Perkins industry credentials as outcomes of interest for the CTE populations. Figure 9 shows that less than ten percent (9.3% – 8.6%) of postsecondary Perkins students in both cohorts ultimately earned a PIC[7] as a result of a postsecondary program. This amounts to a relatively small number of PIC earners in both cohorts (2019 *n* = 245; 2020 *n* = 158).

6 Students in both cohorts may have taken time off after high school graduation before enrolling in postsecondary. This is especially likely for students in the 2019 cohort who were tracked for three years after graduation.

7 The majority of PIC earners in both cohorts (67.8% – 58.9%) were previously reported to have earned an industry-recognized credential (ICN) as a result of a secondary CTE program by high school graduation, making the PIC their *second* recognized postsecondary credential earned according to WIOA definition.

FIGURE 9. Postsecondary Perkins Participants and Perkins Industry Credential (PIC) Earners by High School Graduating Cohort: *Secondary CTE Students Only*



Postsecondary Perkins programs/career pathways align to career clusters by CIP code. Table 3 shows that enrollment in postsecondary Perkins programs spanned all postsecondary career clusters[8]; the most popular programs among postsecondary Perkins students in both cohorts were Health Science (20.3% – 20.6%), Business, Management, & Administration (12.3% – 12.8%), and Information Technology (12.1% – 12.1%). Note that column percentages in Table 3 do not add to 100% because students may have participated in multiple postsecondary programs in multiple career clusters.

TABLE 3. Postsecondary Perkins Enrollment by Career Cluster: 2019 and 2020 Cohorts

	2019 Cohort		2020 Cohort	
Career Cluster	**N**	%	**N**	%
Agriculture, Food & Natural Resources	25	0.9%	20	1.1%
Architecture & Construction	271	10.3%	175	9.5%
Arts, A/V Technology & Communications	134	5.1%	121	6.6%
Business, Management & Administration	323	12.3%	236	12.8%
Education and Training	76	2.9%	67	3.6%
Health Science	533	20.3%	381	20.6%
Hospitality & Tourism	161	6.1%	110	6.0%
Human Services	78	3.0%	50	2.7%
Information Technology	318	12.1%	224	12.1%
Law, Public Safety and Security	208	7.9%	150	8.1%
Manufacturing	256	9.7%	161	8.7%
Marketing, Sales & Service	40	1.5%	*	*
Science, Technology, Engineering & Mathematics	100	3.8%	84	4.5%
Transportation, Distribution & Logistics	188	7.1%	89	4.8%
Finance	0	0.0%	*	*
TOTAL (All Postsecondary Perkins Students)	**2,632**		**1,847**	

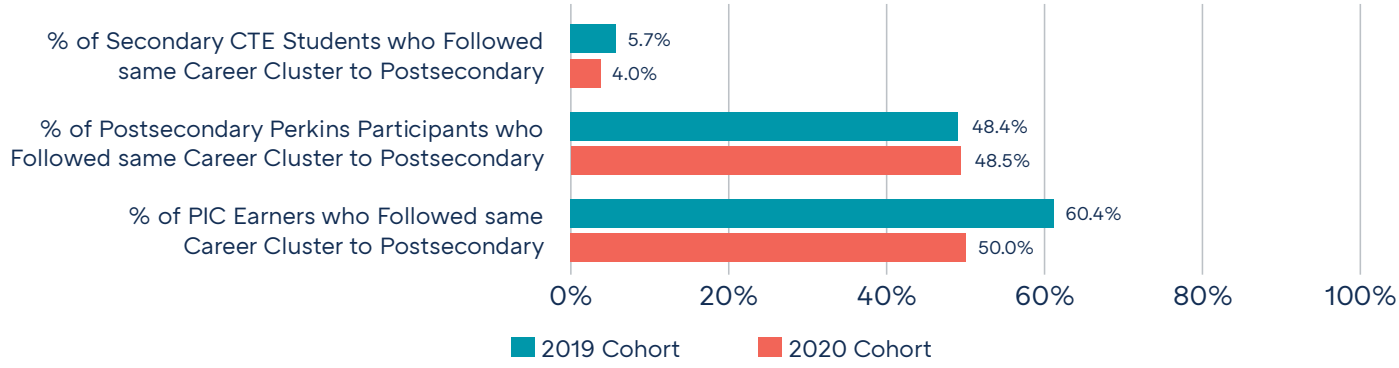
**Note. Percentages do not add to 100% because students may have participated in multiple CTE programs in multiple career clusters.*

8 Notable exception is the postsecondary Finance career cluster. Table 3 reflects that zero secondary CTE students from the 2019 cohort were reportedly involved in postsecondary Finance programs, while the number from the 2020 cohort was too small to report. Also note that secondary CTE career clusters for these cohorts did not include Finance programs, and zero students participated in Education and Training secondary CTE programs. These clusters are therefore excluded from Figures 1–8.

By aggregating high school and postsecondary CIP codes to career clusters by subject, secondary CTE students who continued to postsecondary Perkins programs aligning with their secondary career clusters could be identified. Figure 10 shows that out of the total secondary CTE populations for the 2019 (*N* = 22,412) and 2020 (*N* = 22,501) graduate cohorts, only 5.7% – 4.0% of CTE students continued to a postsecondary Perkins program that aligned with their secondary CTE career cluster. Figure 10 also shows career cluster alignment as a proportion of the CTE students who enrolled in a postsecondary Perkins program (2,632 in the 2019 cohort and 1,847 in the 2020 cohort). Descriptive results show that just under half of all postsecondary Perkins students in both cohorts (48.4% – 48.5%) were enrolled in programs that aligned to the CTE career clusters they participated in during high school. Finally, Figure 10 depicts cluster alignment as a proportion of all PIC earners (245 in the 2019 cohort and 158 in the 2020 cohort), suggesting that PIC earners in both cohorts had slightly higher career cluster alignment (60.4% – 50.0%) than the average student enrolled in a postsecondary Perkins program. These findings are in line with previous literature (Plasman, Gottfried, & Sublett, 2017) suggesting a link between CTE career pathways in high school and subsequent credential earning in the same postsecondary pathway.

Just under half of all postsecondary Perkins students in both cohorts (48.4% – 48.5%) were enrolled in programs that aligned to the CTE career clusters they participated in during high school.

FIGURE 10. CTE Career Cluster Alignment from Secondary to Postsecondary by High School Graduating Cohort



Conclusion

The present study builds upon the results from report 1 of this series (Miller, Riccardo, & Hutchison, 2023) by examining which high school CTE career clusters/pathways were more likely to have WBL opportunities associated with them. Additionally, secondary CTE students were tracked into postsecondary to determine how many students followed their career pathway from high school to postsecondary education and ultimately earned a Perkins industry credential (PIC). Results showed that although CTE students in each career cluster participated in a variety of WBL opportunities during high school, some opportunities were more popular in certain career cluster programs than others. Additionally, results showed that 11.7% – 8.2% of CTE secondary students enrolled in a postsecondary Perkins program during the timeframe studied. Although only 5.7% – 4.0% of the secondary CTE population enrolled in a postsecondary Perkins program that aligned to their high school CTE career cluster, nearly half (48.4% – 48.5%) of all postsecondary Perkins students and more than half (60.4% – 50.0%) of PIC earners followed their career cluster from high school to postsecondary. These findings inform the work of state stakeholders interested in expanding secondary CTE student participation in WBL opportunities and tracking CTE career pathways to postsecondary outcomes. Future reports in this series will focus on geographical access to WBL opportunities across PA and logistic regression results relating participation in WBL opportunities to the student outcomes of report 1.

These findings inform the work of state stakeholders interested in expanding secondary CTE student participation in WBL opportunities and tracking CTE career pathways to postsecondary outcomes.

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Appendix A:

CTE Student Outcomes by Career Cluster

For both cohorts, outcomes for CTE students differed by career cluster in notable ways. Although roughly a third of CTE students overall enrolled in postsecondary by Oct 1 of their graduating year according to National Student Clearinghouse data (31.2% – 28.5%), students in Architecture & Construction (15.0% – 11.1%) and Transportation, Distribution & Logistics (12.2% – 10.3%) programs enrolled at remarkably lower rates. Students in the Business, Management & Administration (54.3% – 55.1%), Health Science (51.2% – 47.7%), and Science, Technology, Engineering & Mathematics (56.7% – 51.5%) clusters enrolled at the highest rates.

Students in the Business, Management & Administration (54.3% – 55.1%), Health Science (51.2% – 47.7%), and Science, Technology, Engineering & Mathematics (56.7% – 51.5%) clusters enrolled at the highest rates.

While students in some clusters were more likely to enroll in postsecondary, others differed notably in rates of earning an industry-recognized credential (ICN) by high school graduation. Roughly half of the overall CTE population earned an ICN as a result of their high school CTE program, but students in the Agriculture, Food & Natural Resources (26.5% – 25.8%), Business, Management & Administration (22.0% – 10.2%), and Marketing, Sales & Service (17.3% – 13.3%) clusters were least likely to earn these credentials. In contrast, students in Health Science (71.9% – 68.3%), Law, Public Safety and Security (73.4% – 68.1%), and Transportation, Distribution & Logistics (68.5% – 66.9%) programs were the most likely to earn an ICN by graduation.

Finally, for CTE students in the 2019 cohort, Occupational Competency Certificate (OCC)[9] earning and NOCTI/NIMS test-taking differed by career cluster. While 57.7% of the overall CTE population earned an OCC by high school graduation via achievement on a NOCTI/NIMS credentialing test, students in Agriculture, Food & Natural Resources (33.5%) and Business, Management & Administration (31.3%) programs earned an OCC at the lowest rates. The most likely clusters to earn an OCC were Human Resources (63.2%), Information Technology (63.8%), and Law, Public Safety and Security (63.5%). Of course, OCC earning is dependent on having taken a NOCTI/NIMS exam, and test-taking likewise differed by career cluster in notable ways. The majority of the CTE population (70.2%) took either a NOCTI or NIMS credentialing test, but students in Agriculture, Food & Natural Resources (45.7%) and Business, Management & Administration (52.1%) programs were the least likely to do so. The career clusters with the highest rates of test-taking were Information Technology (77.0%) and Manufacturing (78.3%), demonstrating how rates of OCC earning are likely linked to test-taking.

9 Occupational Competency Certificates (OCCs) are PDE-awarded certificates for achievement on a National Occupational Competency Testing Institute (NOCTI) or National Institute for Metalworking Skills (NIMS) credentialing test. These include the Pennsylvania Skills Certificate and Pennsylvania Certificate of Competency. Along with industry-recognized credentials (ICNs), report 1 in this series considered OCCs as high school non-degree credentials.

Appendix B:

Definitions for CTE Work-Based Learning (WBL) Opportunities

Note. All definitions in Appendix B are adapted from the PIMS CTE Student Fact template.

Agriculture Experience: An agriculture experience is a "CTE program-related component providing an educational experience, and which operates as an integral part of a CTE agriculture program. These experiences take place at any time during the calendar year and require students to record, summarize, and use supervised agriculture experience record books."

Apprenticeship: An apprenticeship is a "CTE program-related field learning component experience designed to link employers in need of an educated workforce with local education agencies seeking to provide quality work-based education."

Cooperative Work Experience: A cooperative work experience is a "CTE program-related learning component providing on-the-job experience in a CTE program. Through written arrangement between the school and employer, the student receives instruction, including required academic courses and related CTE instruction, by alteration of study in school with a job related to the CTE instruction."

Internship: An internship is a "CTE program-related field that provides planned supervised experiential learning with rotation periods of work observation and work exploration in a variety of employment situations ordinarily for short periods of time. Students are usually not paid for their experience; however, they do receive school credit. These experiences are primarily intended to develop career awareness rather than occupational competence."

Job Exploration: A job exploration experience is a "CTE program-related learning component providing off-campus, credit-bearing exploratory learning activities occurring in the community with the specific intent to provide realistic career exploration experiences for students."

Simulated Work Environment: A simulated work environment is a "CTE program-related learning component providing an immersive experience in a protected educational setting that replicates workplace tools, processes, and/or environments." *Note: Reporting for this data element in PIMS began in 2019-20 SY.*

School-Sponsored Enterprise: A school-sponsored enterprise is a "CTE program-related learning component for small businesses created and operated by students where the school implements a real, economically viable business venture. These typically are non-profit activities and can include activities such as house refurbishing and the repair of parks."

Work-Based Experience: A work-based experience is a "CTE program-related learning component providing off-campus learning gained through training and instruction. Work-based experiences refer to technical skills occurring in a work setting."

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