



Pennsylvania
Department of Education

FULL REPORT Nº. 5:

Work-Based Learning in Pennsylvania:

An Executive Summary of Reports 1-4

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Pennsylvania Department of Education

Office of Administration

This report is the fifth in a series of research reports regarding work-based learning (WBL) in Pennsylvania (PA) secondary schools. This report synthesizes and highlights findings from four previous reports which utilized Pennsylvania Information Management Systems (PIMS) data to investigate WBL, geographical access to opportunities, and WBL's association with student outcomes.



Pennsylvania
Department of Education
Research and Evaluation

FEBRUARY 2025



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The Pennsylvania Department of Education (PDE) Evaluation and Research project is an effort that was established through a State Longitudinal Data System (SLDS) Grant from the Institute of Education Sciences (IES), National Center for Education Statistics (NCES), awarded in October 2015. The Research and Evaluation project is an initiative to make full use of the P-16+ system data and other data sources to answer priority questions from the PDE research agenda, to form collaborative research partnerships, and to increase PDE's capacity to conduct research. Our mission is to evaluate and analyze data to provide insight that can be used to positively impact policy, inform decision making and lead to improved student outcomes.

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The mission of the Department of Education is to ensure that every learner has access to a world-class education system that academically prepares children and adults to succeed as productive citizens. Further, the Department seeks to establish a culture that is committed to improving opportunities throughout the commonwealth by ensuring that technical support, resources, and optimal learning environments are available for all students, whether children or adults.

Key Findings

- Students in Pennsylvania can participate in work-based learning (WBL) both inside and outside of CTE programs.

[EXPLORE FINDING >](#)

- Participation in WBL is associated with positive outcomes in several cases but the relationship between WBL and student outcomes differs between the CTE and non-CTE student populations.

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- Within the CTE population, WBL opportunities are taken more often in certain career clusters than others.

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- CTE students were enrolled in CTE programs at 182 public-school districts/career and technical centers in Pennsylvania. Among these LEAs, 162 enrolled at least one student who participated in a WBL opportunity.

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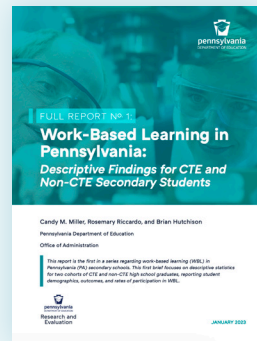
- Participation in and access to WBL differed notably by region and WBL opportunity.

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- The demographics of WBL participants in each region highlight potential issues in equity of access to WBL opportunities across the state.

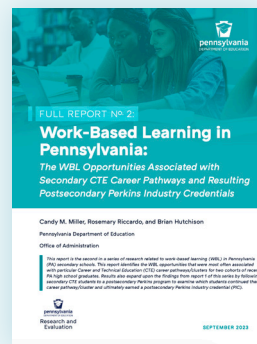
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Read The Series



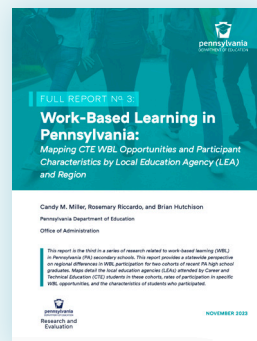
NO. 1

WBL in PA:
Descriptive Findings
for CTE and non-CTE
Students
January 2023



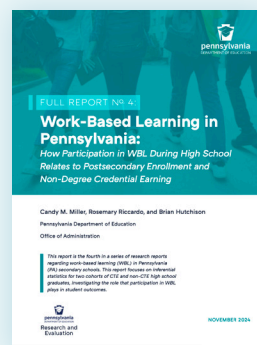
NO. 2

WBL in PA: The WBL
Opportunities Associated
with Secondary CTE
Career Pathways and
Resulting Postsecondary
Perkins Industry
Credentials
September 2023



NO. 3

WBL in PA: Mapping CTE
WBL Opportunities and
Participant Characteristics
by Local Education Agency
and Region
November 2023



NO. 4

WBL in PA: How
Participation in WBL
During High School
Relates to Postsecondary
Enrollment and Non-
Degree Credential Earning
February 2025

Introduction

The Pennsylvania Department of Education (PDE) recognizes that career readiness is an essential goal of K-12 education (PDE, 2024). The Department’s [published research agenda](#), which identifies research questions aligned with PDE’s priorities, acknowledges work-based learning (WBL) as a crucial aspect of developing students’ career readiness. WBL generally features three major components: a combination of classroom and workplace education, the application of work skills in a supervised work setting, and mentoring from experienced professionals (U.S. Department of Education, 2024). While previous research has documented numerous benefits of WBL participation, including skill development, college degree and credential earning, and career advancement (Cahill, 2016), a detailed examination of WBL in Pennsylvania is required to better understand its benefits for the Commonwealth’s students.

In response to these priorities, the PDE research team has published a series of four research reports designed to collectively provide an overview of WBL in Pennsylvania (Table 1). These reports address various topics related to WBL in secondary schools, including descriptive statistics related to participation in WBL and CTE career clusters, geographic data related to WBL access, and logistic regression results establishing associations between WBL participation and student outcomes. The objective of this report is to summarize and synthesize results from these previous WBL projects and to record their major findings in one place. In addition, this report allows for the discussion of new conclusions based on synthesized findings across all four reports.

TABLE 1. List of Reports from the *Work-Based Learning in Pennsylvania* Series

Report Title	Publication Date
Work-Based Learning in Pennsylvania: Descriptive Findings for CTE and non-CTE Students (PDF)	January, 2023
Work-Based Learning in Pennsylvania: The WBL Opportunities Associated with Secondary CTE Career Pathways and Resulting Postsecondary Perkins Industry Credentials (PDF)	September, 2023
Work-Based Learning in Pennsylvania: Mapping CTE WBL Opportunities and Participant Characteristics by Local Education Agency and Region (PDF)	November, 2023
Work-Based Learning in Pennsylvania: How Participation in WBL During High School Relates to Postsecondary Enrollment and Non-Degree Credential Earning (PDF)	February, 2025

Method

Two cohorts of PA high school graduates from school years 2018-2019 (N = 121,895) and 2019-2020 (N = 125,143) were followed for analyses in each report. Among these graduates, 17.9% - 18.5% (2019% - 2020%) were involved in career and technical education (CTE) programs and 16.7% - 16.4% participated in some form of WBL during their last two years of high school. All students were tracked from their last two years of high school enrollment (when students typically participate in WBL opportunities) to potential enrollment in postsecondary education during the fall semester after their

high school graduation. Each report followed the maximum number of students possible based on the scope of the addressed research questions; reports 1 and 4 followed all CTE and non-CTE students from each cohort, while reports 2 and 3 only studied secondary CTE students from each cohort. For report 3, Tableau software was an essential component of analyses and was utilized in map generation, allowing for a geographic overview of WBL in Pennsylvania.

To answer research questions across reports, data was obtained from a variety of Pennsylvania Information Management Systems (PIMS) data collections. These data allowed for students to be followed over time, utilizing information related to students' individual characteristics, including gender, race, special education, English Learner (EL), and economically disadvantaged statuses. Students' participation in CTE and WBL was tracked over time, as well as individual outcomes of interest (such as non-degree credential earning and postsecondary enrollment) according to data from the National Student Clearinghouse (NSC).

Results

Students in PA can participate in WBL both inside and outside of CTE programs.

WBL opportunities reported for CTE students in Pennsylvania included internships, registered apprenticeships, simulated work environments*, job exploration, school-sponsored enterprises, and cooperative work, agriculture, and work-based experiences. Among the 44,913 CTE students followed for study, 16,036 (35.7%) participated in a WBL opportunity as part of their CTE program. Non-CTE students can also participate in WBL outside of a PDE-approved CTE program, although the available data does not report the type of opportunity in which they participated. Among 202,125 non-CTE students, 23,511 (11.6%) participated in a WBL opportunity. In total, 40,874 (16.5%) of the combined graduate cohorts of 2019 and 2020 (N = 247,038) participated in some form of WBL opportunity during their junior and/or senior year.

**Note. Simulated work environment was available for the 2020 cohort only.*

Although participation in WBL is associated with positive outcomes in several cases, the relationship between WBL and student outcomes differs between the CTE and non-CTE student populations.

In general, non-CTE students enrolled in postsecondary education at higher rates than CTE students, while CTE students earned non-degree credentials at higher rates than non-CTE students. Logistic regression analyses modeled the odds of achieving these outcomes, controlling for CTE student status as well as student- and school-level characteristics like gender, race/ethnicity, economic disadvantage, and school urbanicity. Among the

full cohort, students who participated in WBL during high school had almost 7% higher odds of enrolling in postsecondary education when compared to students who did not participate. Notably, CTE students had over 24 times higher odds of earning an industry credential than non-CTE students. Participation in WBL was not a significant predictor of students’ likelihood of earning an industry-recognized credential (ICN) among the combined full graduate cohorts. However, when examining CTE and non-CTE student populations separately, associations between WBL participation and ICN earning were found.

Among the CTE student population, students who did not participate in WBL during their CTE program had 9% higher odds of enrolling in postsecondary than WBL participants. CTE students who participated in WBL had 43% higher odds of earning an industry-recognized credential (ICN) by graduation compared to non-participating CTE students. CTE students who participated in WBL had approximately 40% higher odds of earning an occupational competency certificate (OCC) via achievement on a NOCTI/ NIMS credentialing test compared to other test-takers. Outcomes differed depending on the specific WBL opportunities in which students participated (Table 2). For example, among CTE WBL participants, internship participation was associated with higher odds of postsecondary enrollment, ICN, and OCC earning, while students participating in an agricultural experience had the lowest odds of all outcomes.

Among non-CTE students, participation in WBL was associated with 15% higher odds of postsecondary enrollment. However, students who did not participate in WBL had almost two times higher odds of earning an industry credential. The dosage of WBL also affected outcomes; among WBL participants, the odds of earning an industry credential increased by 21% with each additional opportunity taken. WBL dosage was not associated with odds of postsecondary enrollment beyond the initial benefit that participation in one WBL opportunity provides.

Among the full cohort, students who participated in WBL during high school had almost 7% higher odds of enrolling in postsecondary education when compared to students who did not participate.

TABLE 2. Direction of Significant CTE WBL Opportunities by Outcomes, from Final Logistic Regression Models

	Internship	School-sponsored Enterprise	Work Based Experience	Cooperative Work Experience	Job Exploration	Agricultural Experience
Enrolled in Postsec	↑	↓		↑		↓
Earned ICN	↑	↓	↑		↑	↓
Earned OCC	↑			↑		↓

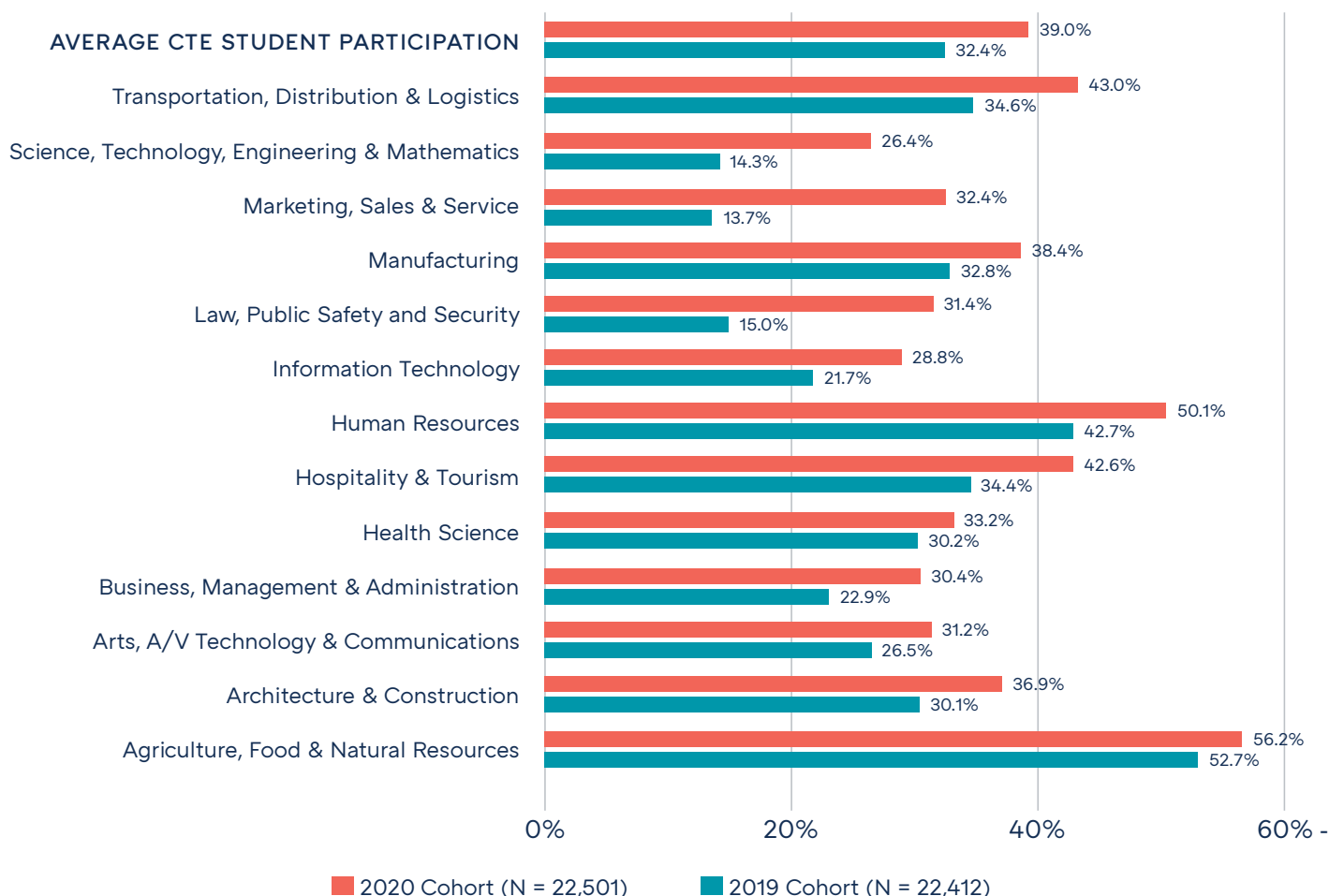
↑ WBL opportunity is associated with higher odds of outcome
↓ WBL opportunity is associated with lower odds of outcome

Within the CTE population, WBL opportunities are taken more often in certain career clusters than others.

Figure 1 details the percentage of CTE students in each career cluster who participated in at least one WBL opportunity. Specifically, students in Human Resources or Agriculture, Food & Natural Resources programs had the highest rates of participation in at least one WBL opportunity. Additionally, certain career clusters tended to have higher rates of participation in specific WBL opportunities when compared to other career clusters. For example, school-sponsored enterprise opportunities were predominantly taken by 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. Likewise, job exploration was relatively common 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%).

These differences in WBL participation between career clusters suggest that although participation in WBL was associated with student outcomes among the overall CTE population, the role of WBL may be different for students in various career clusters. Future research should disaggregate CTE students by career cluster to better estimate the role of WBL on outcomes for these different student trajectories.

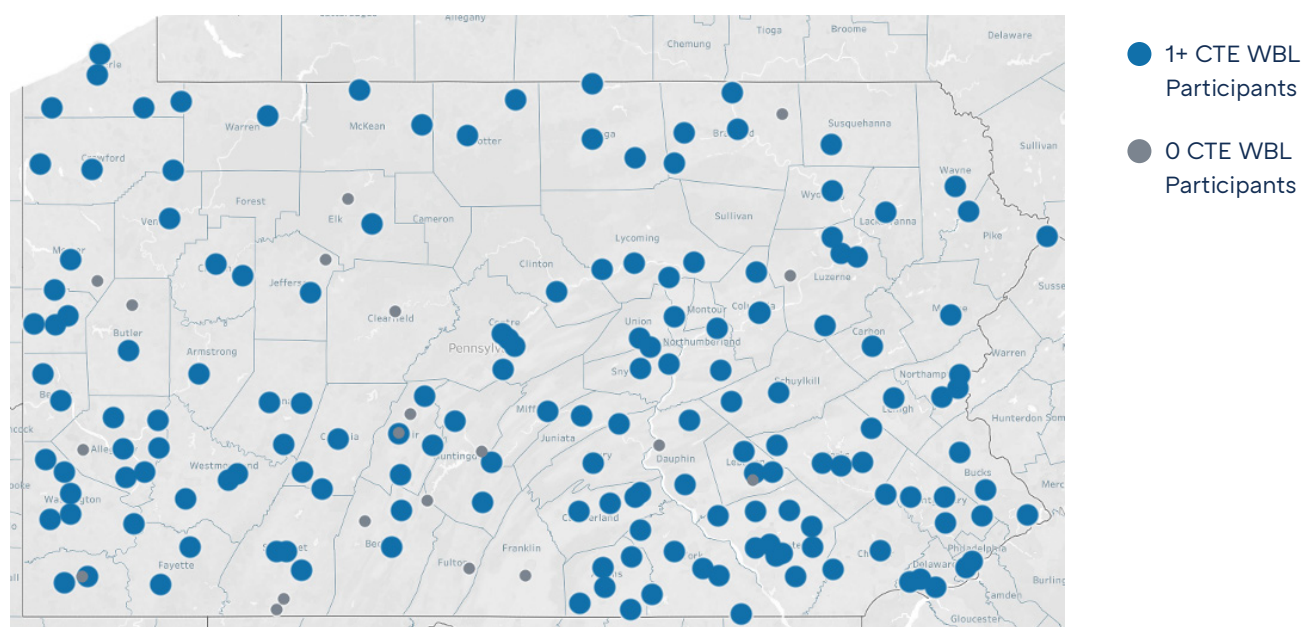
FIGURE 1. Participation in CTE WBL by Career Cluster and Cohort



CTE students were enrolled in CTE programs at 182 public-school districts/Career and Technical Centers in PA. Among these LEAs, 162 enrolled at least one student who participated in a WBL opportunity.

In lieu of data describing where WBL opportunities were available to students across the state, participation in WBL was used as a proxy to represent WBL availability across the Commonwealth. Among the 182 LEAs attended by CTE students in the combined graduate cohorts, Figure 2 shows that the majority enrolled at least one student who participated in a WBL opportunity during their CTE program. Note that Forest, Cameron, and Sullivan counties had zero CTE students (and therefore zero WBL participants) in the 2019 and 2020 graduate cohorts.

FIGURE 2. Map of 182 Total LEAs that Enrolled CTE Students in the Combined Cohorts



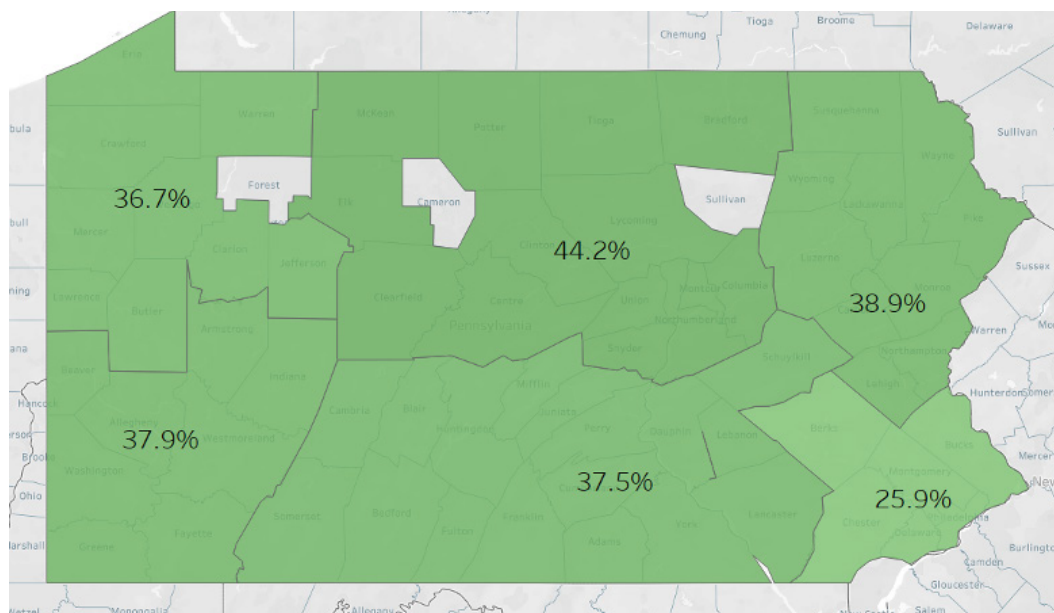
Participation in and access to WBL differed notably by region and WBL opportunity.

Figure 3 shows that, as a proportion of total CTE enrollments in the region, students in the Central/North Central region of Pennsylvania had the highest rate of participation in WBL (44.2%), while students in the Southeast region had the lowest (25.9%). Still, one hundred percent of the LEAs attended by cohort graduates in the Southeast region ($n = 20$) enrolled at least one WBL participant, compared to 82.3% of LEAs in South Central PA. This suggests that the Southeast student population's relatively low participation in WBL cannot be attributed to a lack of access to opportunities in the region.

Regional access also differed by the type of WBL opportunity. The percentage of LEAs with at least one agriculture experience participant was higher in the two central regions of Pennsylvania, but lower in the east and west. Rates were especially low in the Northeast region, where CTE students in the combined cohort participated in agriculture experiences at only 5.9%

(1 out of 17) of the LEAs they attended. The Southeast region had the highest percentage of LEAs which taught one or more internship students from the present cohorts (55%), while the Northwest region had the lowest percentage (13.6%). A greater proportion of LEAs in the Southwest region (44.4%) enrolled at least one job exploration participant compared to other regions of the state, especially the Northwest region (13.6%).

FIGURE 3. Participation in WBL as a Proportion of Total CTE Enrollments by Region



The demographics of WBL participants in each PA region highlight potential issues in equity of access to WBL opportunities across the state.

Nearly half (47.2%) of all WBL participants in the Southeast region were students of color, compared to only 4.8% in the Northwest region. WBL participants in the Northwest, Southeast, and Southwest territories experienced economic disadvantage at rates above the statewide average for WBL participants. WBL participants in the Central/North Central region had notably lower than average involvement in Special Education (19.5%). In contrast, 30.5% of WBL participants in the Southeast region had IEPs.

Regionally, the demographics of WBL participants described above generally aligned with the demographics of the greater CTE population in that region. Regions where demographic rates among WBL participants differed from rates among the CTE population point to potential issues of equity. In the Southwest region, 55.1% and 32.5% of CTE students experienced economic disadvantage or had an IEP, respectively, compared to only 50.4% and 27.4% of WBL participants. Likewise, a notably lower proportion of WBL participants (47.6%) in the Northeast region experienced economic disadvantage compared to CTE students (52.4%). Finally, 51.7% of CTE students in the Southeast region were students of color, compared to only 47.2% of WBL participants. These differences may be attributable to barriers to accessing WBL opportunities for these student groups.

Conclusion

The aim of this report was to synthesize results from a collection of four completed research papers which investigated the state of WBL in PA. Analyses followed two cohorts of recent PA high school graduates to answer several research questions related to the potential benefits and differences in access to/ participation in WBL. Results found that participation in WBL may benefit student academic outcomes like postsecondary enrollment and earning a non-degree credential, although the effect differs between CTE and non-CTE student populations. Additionally, outcomes differ by the type of WBL opportunity in which students participate. Within the CTE population, it is of note that these WBL opportunities more likely to be taken in certain CTE programs than others. Finally, the majority of LEAs in PA enrolled at least one CTE student who participated in WBL during their program, a proxy for access to WBL across the state. However, WBL access differed by region and the demographic characteristics of WBL participants give a clue as to potential barriers to participation for certain student groups. Identifying and alleviating these barriers can help to reduce equity gaps so all PA learners can experience the benefits of WBL participation.

Participation in WBL may benefit student academic outcomes like postsecondary enrollment and earning a non-degree credential, although the effect differs between CTE and non-CTE student populations.

References

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