Preparing for Career Success

A landscape analysis of secondary CTE and career pathways data

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GreatSchools | July 2022

Executive Summary

It's long been understood that college and career readiness is essential to any robust K-12 education system that prepares all students for the 21st century. The current need is particularly acute given the damage wrought by COVID-19 on students' education. But too often college and career readiness initiatives focus principally on college.

Success in college remains critical to many young people's life outcomes. And we’ve seen that indicators of college success (such as enrollment, persistence, and remediation) have value for parents and students in helping them understand what's working in high schools. But college-related outcome metrics do not capture all the educational experiences that can set students on the road to successful and fulfilling careers. In fact, evidence suggests that students exposed to career and technical education courses and work-based learning experiences are not only more likely to complete high school, but they may also be more likely to enroll in college and earn more over their lifetime. Despite this promising evidence, there remains little information accessible to families about the availability and quality of career pathways at the secondary level.

This is likely the result of both the simple fact that a college degree remains the goal for most students and their families, as well as the unfortunate reality that data on the availability and caliber of career and technical education (CTE) programs and career pathways is uneven at best. To understand what information is available and if it can be used to assess high schools' CTE and pathway programs, GreatSchools conducted a national landscape analysis of publicly available, school-level, career-specific data.

We found that despite all states providing at least some foundational level of career-specific programming, school-level data on student participation and performance in CTE and career pathways programs is severely limited. In most cases, schools do not report career-specific outcome metrics (such as earning an industry credential) at the school-level. Moreover, there is rarely information on student participation in CTE or pathways programs. Even though the federal Perkins law requires participating states to report participation and performance outcomes, most states do not publicly share that information at the school-level. Finally, when these data are provided, they typically are not disaggregated by race and ethnicity. Without disaggregated data, inequities in access, participation, and performance may persist without stakeholders' or the public's knowledge.

Specifically, we found that:

- 14 states report career-specific CTE or pathway outcome measures at the school-level. These data are disaggregated by race and ethnicity in 6 states;
- 22 states report an aggregate or composite outcome measure at the school-level that can
include career-specific information (e.g., a college and career readiness measure that combines industry credential earners with college enrollees). These data are disaggregated by race and ethnicity in 10 states;

- 10 states report student participation in CTE or pathway programs at the school-level. These data are disaggregated by race and ethnicity in 6 states; and,

- 10 states provide lists of the CTE and pathways programs available at specific schools.

In short, only about 28 percent of states collect and report publicly school-level information about student performance in their CTE and career pathways programs. Based on our analysis, only Kentucky and Michigan provide school-level data on program availability, as well as student participation and outcomes for career-specific programming. These data, combined with college enrollment and persistence measures, allow for a comprehensive assessment of how well a school prepares students for life after high school graduation.

To fulfill the promise of high-quality career preparation programming, states must undertake greater data collection, publication, and transparency efforts at the school-level. These data are critical components of evaluating the quality and equitable access to CTE and career pathways programs. Moreover, students rely on information about these programs to make decisions about their academic and professional futures.

Building on best practices revealed from the landscape analysis, we recommend states undertake the following steps to improve the availability, quality, and transparency of school-level data about their CTE and pathways programs:

- Collect and publish school-level data on student participation in CTE and pathway programs;
- Collect and publish school-level outcome data (such as pathway completion rates) specifically for CTE and pathway programs;
- To the extent possible, disaggregate all data by race and ethnicity, socioeconomic status, and gender;
- Publish the CTE and pathway programs available by school, as well as metrics concerning the jobs and sectors for which these pathways prepare students (e.g., average entering salary, number of projected jobs);
- To the extent possible, report data on student performance in other academic subjects (i.e., academic growth in ELA and math) separately for CTE and pathway concentrators;
- Publish in a clear and readily accessible format all relevant state standards, approved industry certifications, and other credentialing information for all CTE and pathways programs; and,
- Publish in a clear and readily accessible format the processes, steps, and results of any effort to ensure CTE and pathways programs are aligned with industry needs and standards, as well as with in-demand, well-paying occupations.
To determine if a school provides high-quality options for students to pursue college and career, states must publish participation and performance data at the school-level in both areas, for example sharing information on students completing pathways as well as students enrolling in college. Indeed, doing one without the other is problematic. Providing robust data on CTE and pathways programs will not alone ensure that they are high-quality or that students are well-served. For this to happen there needs to be robust efforts to define and moderate pathway quality and provide equitable access to those high quality pathways where they exist. Greater data transparency is a critical first step toward ensuring all students have multiple, effective pathways to college and career after high school graduation. As the examples of Kentucky and Michigan make clear, states can develop the infrastructure necessary to collect and report this vital information.

Introduction & Overview

The COVID-19 pandemic caused an education calamity for millions of students across the country. The crisis revealed and deepened structural inequities in health, employment, housing, broadband access, and other key aspects of American life. In education, months of shuttered schools caused severe learning loss and the urgent need to accelerate learning after the pandemic. At the same time, schools and districts across the country are seeing dramatic enrollment declines, and college enrollment is plummeting.

These challenges have reinvigorated and refocused state and local efforts to increase the number and quality of career pathways available to students during their K-12 education. The hope is that providing students with high-quality pathways to careers in well-paying, in-demand fields can help to mitigate the consequences of the pandemic. Indeed, high-quality career pathways and CTE programs increase student engagement in school, graduation, and enrollment in a postsecondary institution. One causal study of an Information Technology program in North Carolina found that participants had fewer absences and were more likely to graduate and enroll in a postsecondary institution (the effects were

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most pronounced for male students). Another analysis of high schools in New York City found a causal link between attending a Pathways in Technology Early College High School (P-TECH) and higher achievement compared with other schools.

Given these benefits, policy organizations across the political spectrum are advocating for increasing the availability of career pathways and states and districts are marshaling federal COVID-19 relief funds as well as new philanthropic dollars to improve and expand their pathways programs.

Career and technical education programs are by no means new innovations. Nevertheless, CTE and pathway programs have evolved in recent years and are expected, indeed required if supported by federal Perkins V funds, to align with high-demand and high-paying industries and occupations. In short, the standards for what constitutes a high-quality CTE or pathways program have risen in recent years. These recent trends raise critical questions:

1. What CTE and pathway programs are available to students?
2. What are the student-level outcomes (such as pathway completion or earning industry certifications) for pathways programs?

Due to inconsistent data collection and public reporting, it is difficult to answer these questions. GreatSchools conducted a landscape analysis to assess the availability of school-level career pathway information and student participation and outcome data, as well as to identify best practices in data transparency. We found:

- All states are engaged, to varying degrees, in CTE and career pathways programs.
- Not all states rely on and publish state standards, curricula, and course sequences for CTE and pathway programs.
- Availability of pathway programs vary by state and by community within the same state.
- Alignment with high-demand, well-paying careers is not always evident.
- There is insufficient publication of student participation and outcome data for CTE and career pathway programs.

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It is difficult to identify how CTE and pathway outcomes align with or diverge from college-readiness and outcomes measures.

Service delivery varies. Some programs are available at the high schools, while others require attending a specialized school such as a district consortia or regional center. As such, we cannot determine the availability and efficacy of school-level programs in these states.

The inconsistent patchwork of publicly available school-level data undermines the ability of students, parents, policymakers, and industry leaders to assess the quality and equitable access to CTE programs and career pathways. To build effective pathways through high school and to support students beginning their career in high-demand well-paying industries, states must do more to collect and report all relevant program offerings, participation, performance, and outcome data for their CTE programs and career pathways.

Pathways Landscape

Preparing all students for college and career is the central goal of both federal and state education law and policies. The parameters governing college-readiness are generally well-defined. States have adopted college-ready academic standards aligned with entrance requirements for state public colleges and universities without the need for remediation. States also established a standardized testing regimen to assess how well districts and schools are preparing students to meet those standards. Additionally, as a part of their accountability systems, many states collect and publicly report a wide range of student-level, college-ready metrics, such as participation and performance in Advanced Placement or International Baccalaureate classes, as well as on college entrance exams such as the ACT and SAT. Of course there is variation among states on the exact standards and assessments, as well as the metrics used to assess college-readiness. Yet as a general rule, state education systems have tended to focus on student measures of college-readiness.

Career-readiness, however, is far less defined and the data available to assess access, quality, and outcomes are far less robust. Even on the foundational question of state standards for CTE and pathways programs, state practices are uneven across the country. In 2013, Advance CTE studied state career and technical education standards and their alignment with career and technical benchmarks. The analysis found that although a majority of states had established secondary CTE standards, many did not. Nearly a decade later, the problem persists and many states still have not set standards for career and technical education pathways.

The inconsistency is not limited to standards. In 2020, the Education Commission of the States (ECS) conducted a scan of state CTE and pathway policies and found considerable variability in how states establish and approve of CTE programs, the pathways they provide, and if the state established a CTE

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diploma or badge to append the typical high school diploma.\textsuperscript{13} Analyses from the Foundation for Excellence in Education similarly found state policies and practices concerning CTE and career pathways are inconsistent. This uneven policy landscape makes it difficult to understand the quality of state CTE and career pathway systems.

GreatSchools adds to this evidence base by conducting a landscape analysis of the student participation and outcomes data generated by state CTE and pathway systems. This information is necessary to assess pathways programs to determine how well they serve students and provide opportunities to earn valuable credentials and to access high-quality careers. Our analysis focused on school-level, publicly available data. There may be other information generated by the state that is not readily available to the public. We found:

- **28 states publicly report school-level CTE or pathway outcome data**, such as industry certifications earned, pathways completed, or credits earned.

- **Of those, 14 report only aggregate or composite measures** that obscure specific student outcomes and potentially include career and college readiness, such as the percent of students who are college and career ready (e.g., a college and career readiness measure that combines industry credential earners with college enrollees).

- **28 states report school-level postsecondary enrollment data**. In most cases this data is not disaggregated by institution. This makes it impossible to know if students are enrolled in four-year, two-year, community college, or technical institutions.

- **10 states report student participation in CTE or pathway programs at the school-level.** Without participation data, even with information about outcomes, it is difficult to assess how effectively these programs meet student needs.

- **10 states provide lists of each school’s available CTE and pathways programs.** This information is important to students and families making decisions about their schooling. Moreover, these data are necessary to assess whether these programs can be accessed equitably across the state.

While CTE and career pathways programming are increasingly commonplace across the country, it is difficult to know whether these programs are effective and meet student needs after they graduate.

Only 14 states — less than half — collect and report publicly school-level CTE and pathways outcomes data that are specific to CTE and pathways (such as pathway completion) and not combined into a composite measure of college and career readiness. These data are crucial for students, families, as well as state and local education systems to understand the caliber of career programming offered to students. These data are necessary to determine if students are indeed offered multiple, robust, high-quality pathways after high school. Making matters worse, most states do not provide the other

data elements necessary to gauge the quality and equity of these programs.

It is also important that data be collected and published to allow comparisons between students participating in CTE and pathways programs and those preparing for enrollment in a four-year college or university. For instance, states could share cross-tabulated data on college enrollment and pathway completion. This is critical to determine whether schools are providing equitable options to students rather than tracking students into college bound and non-college bound tracks.

Unfortunately, most states do not provide publicly sufficient data to make such comparisons between schools possible. States that participate in GreatSchools' College Success Award and provide school-level college preparation, enrollment, and performance data offer a starting point to begin to understand the career and college pathways schools provide.\(^{14}\) In the next section, we analyzed the CTE and career pathways framework and data in the eight states that participated in all four years of the College Success Award.

**Findings**

The good news is that we found that most states collect and report at least some data regarding their CTE and pathways programs. The unfortunate reality, however, is that in nearly every state, the information provided about these programs is insufficient. From state-to-state, the data on CTE and pathways programs is an inconsistent patchwork. Often, the data cannot be readily compared from one state to the next. Within most states, the publicly available data on CTE and pathways participation and performance does not allow for meaningful insight into the type and quality of career pathways available to students.

School-level CTE and pathways data is most often reported — when it is shared at all — through an aggregate indicator that includes other postsecondary measures. For instance, some college and career readiness measures combine counts of students who complete a pathway with those who meet an exam score threshold or earn dual enrollment college credit. Reporting the share of student participation and performance in a CTE, pathway, or college-ready course can be a useful measure of how well a school prepares its students for life after high school. However, these combined measures of ‘college and career readiness’ can obscure the particular opportunities, experiences, and successes of students enrolled specifically in career-ready pathways. In short, states that strictly report CTE and pathways data through aggregate measures do not provide discernable information about those programs.

In states that do report CTE or pathways specific information, they most often publish strictly outcomes data, such as the number of students who complete a pathway. While this approach is preferable to publishing only participation information, it is nevertheless limiting. Without participation data, it is difficult to get a sense of how many students begin but ultimately do not complete a CTE program or career pathway. This makes it difficult to assess the quality and effectiveness of the programs.

\(^{14}\) GreatSchools, “College Success Awards: Celebrating High Schools that Prepare Students to Succeed in College,” available at: https://www.greatschools.org/gk/csa/.
Further complicating matters, most states do not report school-level information on the performance of CTE concentrators — students who commit to a specific pathway by taking multiple courses in a single pathway sequence — in traditional subjects, such as reading and math. Although this information is required through the federal Perkins V law, states rarely report it publicly at the school-level. This raises the specter of tracking — of setting certain students on a path toward college and other students, most often low-income students and students of color, on a different track. Without information about the general academic performance of CTE concentrators and students on a career pathway, it is impossible to know if participating in these programs prepares them for a successful career without foreclosing the opportunity for postsecondary education down the road.

Finally, most states do not provide the information necessary to determine if they provide equitable access to CTE programs and career pathways. This is a problem in a few ways. For one, there may be inequitable access to programs generally, wherein some communities simply do not have the opportunity to enroll in these programs. For example, there may be few science, technology, engineering, and math (STEM) related pathways available at schools in a given region. Alternatively, there may be a number of programs available, but some students are concentrated in particular pathways. For example, girls may be underrepresented in STEM pathways. A few states sought to address this issue directly by preparing and publishing equity plans. However, given the lack of data, we don't know how well these endeavors have been implemented or how successful they have been.

Despite the uneven collection and publication of CTE programs and pathway participation and performance data across the country, Kentucky and Michigan do provide the information necessary to present a data-driven analysis of the kind and caliber of career-ready programs offered to students. These states collect and publish a variety of career-specific indicators that capture participation and performance. Kentucky publishes a robust set of readiness and performance metrics, including school-level academic achievement for CTE concentrators. Michigan disaggregates its postsecondary enrollment information by school type (e.g., four-year college, technical program), which allows for a more nuanced understanding of how well their CTE and pathways programs prepare students for postsecondary education. While neither state's data reporting system is perfect, they nevertheless offer an example to other states of what is possible.

**Recommendations**

School-level data on student participation and performance in CTE programs and career pathways is unacceptably scarce. Even in those few states with more robust collection and reporting systems, locating school-level information was unduly challenging. As the prevalence and importance of career-readiness programs continues to increase within K-12 education, states must also invest in increasing transparency through data collection and public reporting. It is important for students and families to have access to information about these programs to allow them to make informed decisions about their K-12 pathway and plans after high school graduation.

Due to the gaps in the data landscape for CTE programs and career pathways, as well as based on state best practices, we recommend states take the following steps to improve the data and
transparency of their career readiness programs. Some states have already implemented some of these strategies. A robust system would attempt to include as many as possible.

1. Collect and publish school-level CTE and pathway participation data, such as: CTE concentrators and specific CTE and pathway course enrollment.

2. Collect and publish school-level CTE and pathway specific outcome data, such as: Industry certifications earned, pathway programs completed, career-specific dual enrollment credits earned.

3. Disaggregate all data by race and ethnicity, socioeconomic status, and gender while complying with student privacy laws and state n-size requirements.

4. Publish the CTE and pathway programs available by school, as well as metrics concerning the jobs and sectors for which these pathways prepare students (e.g., average entering salary, number of projected jobs).

5. To the extent possible, report student performance data separately for CTE and pathway concentrators, including state standardized assessments, graduation rates, school discipline, and any other data reported as part of the state report card process. This information is required under Perkins V, and states should make these data publicly available at the school-level.

6. Clearly publish all relevant state standards, approved industry certifications, and other credentialing information. Include as a part of this information on how programs are approved and what quality control there is for any locally-developed pathway program.

7. Clearly publish processes, steps, and results of state efforts to ensure CTE and pathway programs are aligned with industry needs and standards, and are aligned with in-demand, well-paying occupations.

Taken together, these steps would help states better understand the experiences, opportunities, and outcomes of students participating in their CTE programs and career pathways. These data are necessary for students and families to make informed decisions about their K-12 education, as well as what they plan after graduation. This information is necessary for schools, districts, and states to improve the quality and reach of their pathways programs. In short, greater transparency and information about the quality and availability of school CTE and pathways programs is necessary to build multiple, robust pipelines from secondary school to careers that support students' short-and long-term professional ambitions.
Appendix A

State-Level Deep Dives

GreatSchools’ College Success Award began in 2018 as an effort to recognize high schools that excel in preparing students for college. The Award is based on state collected and shared data on college preparation, college enrollment, and college success. In 2018, only 9 states provided sufficient data for this analysis. By 2019, that number grew to 25 states. In 2020, 29 states participated. However, only 8 states provided college success data across all four years that GreatSchools conducted its College Success Award.

These eight states — Arkansas, Colorado, Georgia, Indiana, Kentucky, Michigan, Missouri, and Ohio — collect and publish robust data on college readiness and success and demonstrate a sustained commitment to transparency. As such, delving more deeply into the CTE and career data collected and shared by these states provides an opportunity to build on the College Success Award and begin to identify schools that provide high-quality pathways to college and career.

Our analysis examined school-level outcome data on the various pathways provided to students. In this analysis, our focus is on CTE and other career pathways since college access and success metrics, such as college credit accumulation and dual enrollment, are captured as a part of the College Success Award. That said, state practices that are particularly unique with regard to postsecondary measures were included in this study. The analysis does not include district-level data collected as part of the federal Perkins V program. However, some states do present school-level Perkins indicators that are readily accessible on their school report cards. Those data are included in this assessment. Our objective is to identify instances in which states are going above and beyond the school-level student participation and performance data that is minimally required to collect and report.

Arkansas

Outcomes
Arkansas does not publish a career-specific outcome metric. It does, however, provide a measure of community service learning. The metric is based on the share of students participating in approved community service programs. Since the measure does not include participation and outcome measures (unlike the share of AP test takers who score at least a 3), it is difficult to interpret these data. For instance, what school-level community service learning rate suggests high participation and performance? What is the expectation or standard for the program? Moreover, it is unclear how these activities precisely relate to career pathways.

<table>
<thead>
<tr>
<th>Data element</th>
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<tbody>
<tr>
<td>Community service learning</td>
<td>The percentage of students completing at least 75 certified hours of community service in an approved community service learning program.</td>
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</table>
Standards, Alignment, and Equity
Arkansas also reports the approved CTE and pathway programs provided by school. This is important information regarding the equitable access of high-quality career pathway programs. With this data, we can determine if students in low- and high-wealth communities, as well as those in rural, urban, and suburban districts, have equitable access to robust pathway opportunities.

The state established and publishes standards by occupation areas, as well as for career readiness and work-based learning. The state also identifies approved industry certifications. Based on available data, it appears that Arkansas does not collect and share data on student participation in CTE and pathways programs. Moreover, it is unclear how the state ensures its pathways programs are aligned with regional needs and high-demand, well-paying industries and occupations.

Colorado
Outcomes
Colorado does not publish a unique career-specific outcome metric. It does, however, present an aggregate postsecondary and workforce readiness measure. That said, the elements that make up that measure do not include a metric that is specifically aligned with career pathways. In its postsecondary enrollment reporting, Colorado goes a step further than most states and disaggregates the enrollment data by institution. The state reports the percentage of graduates who enrolled in a CTE postsecondary institution. This is strong practice that increases transparency and allows for greater evaluation of school CTE and career pathways programs. Other states should consider adopting this practice.

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<thead>
<tr>
<th>Data element</th>
<th>Description</th>
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<tbody>
<tr>
<td>Postsecondary and workforce readiness</td>
<td>This aggregate measure is based on graduation rates, dropout rates, matriculation rates, and 11th grade results on the Colorado SAT and DLM assessments.</td>
</tr>
<tr>
<td>Percent enrolled in a CTE postsecondary institution</td>
<td>The percentage of students enrolled in a CTE postsecondary institution.</td>
</tr>
</tbody>
</table>

Standards, Alignment, and Equity
Colorado publishes career clusters, scope and sequence for courses, and an essential skills framework in an effort to standardize CTE and pathway courses across the state. The state also operates a number of P-TECH schools. A P-TECH school is a public-private partnership in which students participate in high

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school, college, and industry-based workforce development coursework. Enrolled students earn a high school diploma and a postsecondary degree.\textsuperscript{19}

Colorado does not report available CTE and pathways programs by school. This makes it difficult to determine if the state provides equitable access to these programs. However, the state did publish a report “Building Trust to Promote Equity in CTE,”\textsuperscript{20} and instituted a CTE equity action guide.\textsuperscript{21} While not the same as school-level data on available programming, these equity initiatives are nonetheless encouraging.

It appears that Colorado collects CTE and pathway participation data but does not make it publicly available.\textsuperscript{22} Finally, it is unclear based on available information how the state ensures its pathways programs are aligned with regional needs and high-demand, well-paying industries and occupations.

\textbf{Georgia}

\textbf{Outcomes}

Georgia publishes two aggregate measures that include career readiness: pathway completion and college and career readiness. In total, these measures provide a sense of how well a school prepares its graduates for a variety of postsecondary paths. That said, as aggregate measures that rely principally on college-oriented metrics, they do not provide a clear sense of the breadth, quality, and outcomes of post-graduation pathways schools provide to students.

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<tr>
<th>Data element</th>
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<tbody>
<tr>
<td>Pathway completion</td>
<td>The share of high school seniors who complete an advanced academic; career, technical, and agricultural education; fine arts; or world language pathway.\textsuperscript{23}</td>
</tr>
<tr>
<td>College and career readiness</td>
<td>The share of seniors entering a technical college or university in Georgia without remediation; meeting readiness standards on the ACT, SAT, or two or more AP or IB tests; passing a pathway-aligned final assessment that earns a national or state credential; or completing a work-based learning program.\textsuperscript{24}</td>
</tr>
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\textbf{Standards, Alignment, and Equity}

Georgia publishes career clusters. Each of the 17 clusters includes course sequences of the pathways that make it up. For example, the international business sequence is available through the business, management, and administration pathway.\textsuperscript{25} The state also publishes course standards for each course

\textsuperscript{19} P-TECH, “Learn about P-TECH Schools,” available at: https://www.ptech.org/about/.
\textsuperscript{24} Ibid.
sequence and career cluster. It is unclear based on available information how the state ensures its pathways programs are aligned with regional needs and high-demand, well-paying industries and occupations.

Georgia does not report available CTE and pathways programs by school. This makes it difficult to determine if the state provides equitable access to these programs.

**Indiana**

**Outcomes**

Indiana provides students with three graduation pathways: High school diploma, Learn and Demonstrate Employability Skills, and Postsecondary Ready Competencies. Beginning in 2023, all students must satisfy graduation requirements of all three pathways. Despite offering multiple graduation pathways, the only data reported on school-level CTE and career pathway participation and performance is the percentage of students earning an industry recognized credential.

<table>
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<tr>
<th>Data element</th>
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<tbody>
<tr>
<td>Industry credentials</td>
<td>The percentage of students who earned an industry-recognized credential. These data are reported as a part of Indiana's college and career readiness indicator.</td>
</tr>
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</table>

**Standards, Alignment, and Equity**

Indiana set forth standards for its CTE programs. In addition, the state publishes pathway course sequences and course descriptions. Information on the alignment of CTE and career pathway programs with industry and regional needs is not obvious. Moreover, it is unclear if the state's pathways are aligned with high-demand, well-paying industries and fields. Finally, any equity plans or measures to ensure all students have access to high-quality CTE and career pathway programs are not readily apparent.

**Kentucky**

**Outcomes**

Kentucky publishes an array of specific CTE and pathways data. These data include participation and performance. Also, unlike many states, Kentucky provides school-level Perkins performance data, including CTE concentrators' performance in math and reading, as well as their graduation rate. The publicly available Perkins data also includes school-level information on participants' technical skill attainment.

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26 Ibid.
28 Ibid.
In addition to the Perkins measures, Kentucky provides data on students earning industry certification, performance on a CTE end-of-program assessment, apprenticeship, and work experience. Kentucky reports the percent of students who are transitioning into adult life, which includes college and technical colleges, the military, and the workforce.

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<tbody>
<tr>
<td>Industry Certification</td>
<td>Certifications in approved industries that demonstrate students have the requisite knowledge and skills to perform entry-level functions.</td>
</tr>
<tr>
<td>CTE End-of-Program Assessment</td>
<td>Assessments developed by Kentucky’s Department of Education based on industry standards and employer feedback. The exams are articulated college credit for state institutions.</td>
</tr>
<tr>
<td>Apprenticeship</td>
<td>Students enrolled in a Tech Ready Apprentice for Careers in Kentucky (TRACK) pre-apprenticeship or youth-apprenticeship program that results in earning the TRACK certification. TRACK apprenticeships are registered through the U.S. Department of Labor’s Registered Apprenticeship program.</td>
</tr>
<tr>
<td>Exceptional work experience</td>
<td>Work experience by high school students that demonstrates achievement, growth, and essential skills beyond work-based learning. This is based on skills aligned with Kentucky Workforce Innovation Board approved industry certifications or approved CTE programs.</td>
</tr>
<tr>
<td>Transition readiness – Career Ready</td>
<td>The percentage of students who meet career ready benchmarks, including industry certifications, apprenticeships, and CTE pathway programs. The data is disaggregated by gender, race/ethnicity, socioeconomic status, English learners, and students with disabilities.</td>
</tr>
<tr>
<td>Transition to adult life</td>
<td>The status of students after high school graduation, including: enrollment in college, a technical institution, the military, or the workforce.</td>
</tr>
<tr>
<td>CTE pathway participation</td>
<td>Disaggregated by available programs (e.g., animal science or business and marketing education)</td>
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<td>Disaggregated by available programs (e.g., animal science or business and marketing education)</td>
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**Standards, Alignment, and Equity**

Kentucky has well-defined CTE and pathway programs. The state established CTE programs of study and corresponding standards. It also designates approved industry certifications. The state also created and shares “heat maps” that illustrate the access to high-demand occupations across the state. Additionally, through much of its CTE and pathways literature, the state claims that the programs are aligned with industry standards and expectations. It is unclear if there is a process in place to revisit and revise the certifications or standards as the labor market shifts. Finally, through its educational opportunity

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measures, Kentucky provides a sense of the CTE programs available at the school-level. This is not exactly an equity measure itself, the data nevertheless provides some context to determine if the state provides equitable access to these programs.

**Michigan**

**Outcomes**

Michigan publishes distinct CTE and pathways program participation and outcomes data. The state reports at the school-level CTE enrollment by program, such as the number of students enrolled in the health sciences program. It further disaggregates that data by student and family characteristics. The state also reports by school CTE participants, concentrators, and completers. These data are also disaggregated. Michigan takes the additional step of publishing Perkins V data at the school-level, which reports CTE concentrator performance in math and reading, as well as their technical skill attainment. In most other states, these data are only reported at the district-level.

Finally, the state takes the additional step of publishing disaggregated postsecondary enrollment data by institution type. This is strong practice that increases transparency and allows for greater evaluation of school CTE and career pathways programs. Other states should consider adopting this practice.

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<tr>
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<tr>
<td>CTE enrollment by program (e.g., health sciences)</td>
<td>Data is disaggregated by race and ethnicity, gender, socioeconomic status, disability status, and other student and family characteristics.</td>
</tr>
<tr>
<td>CTE participants</td>
<td>Data is disaggregated by race and ethnicity, gender, socioeconomic status, disability status, and other student and family characteristics.</td>
</tr>
<tr>
<td>CTE concentrators</td>
<td>Data is disaggregated by race and ethnicity, gender, socioeconomic status, disability status, and other student and family characteristics.</td>
</tr>
<tr>
<td>CTE completers</td>
<td>Data is disaggregated by race and ethnicity, gender, socioeconomic status, disability status, and other student and family characteristics.</td>
</tr>
</tbody>
</table>

**Standards, Alignment, and Equity**

Michigan established area CTE centers,\(^{32}\) state CTE standards,\(^{33}\) industry recognized credentials,\(^{34}\) and career clusters.\(^{35}\) The state also set up the Michigan Career Readiness Initiative and Cross Sector Team


\(^{33}\) Michigan Department of Education, “CTE Instructional Resources for All Programs,” available at: https://www.michigan.gov/mde/0,4615,7-140-2629_53968---,00.html.

\(^{34}\) Michigan Department of Education, “CTE Instructional Resources for All Programs,” available at: https://www.michigan.gov/mde/services/octe/educators/cte-instructional-resources-for-all-programs.

to ensure agency collaboration across sectors, facilitate stakeholder engagement, and ensure that funding addresses gaps and inequities. The outcomes of that initiative are unclear.

Missouri

Outcomes

Missouri publishes several measures of students’ CTE and pathway success. However, they are all aggregate metrics that encompass a range of different factors. For example, performance on CTE and pathway courses are integrated into a single measure with the more college-focused performance on AP and IB exams. The individual data elements that comprise these aggregate indicators do not appear to be publicly available.

In its postsecondary enrollment reporting, Missouri goes a step further than most states and disaggregates the enrollment data by institution. The state reports the percentage of graduates who enrolled in a technical institution, a 2-year college, the military, or are employed. This is strong practice that increases transparency and allows for greater evaluation of school CTE and career pathways programs. Other states should consider adopting this practice.

<table>
<thead>
<tr>
<th>Data element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced or vocational credit</td>
<td>The percentage of graduation who earned a qualifying score on AP, IB, or Technical Skills Attainment (TSA) assessments. The measure also includes college credit earned through dual enrollment.</td>
</tr>
<tr>
<td>College or career ready</td>
<td>The percentage of graduates who met or exceeded college and career readiness standard on state approved assessments of college readiness, such as: ACT, SAT, ASVAB.</td>
</tr>
<tr>
<td>CTE placement rates</td>
<td>The percentage of graduates who complete postsecondary education, advanced training, or military service, or a service program supported by the National and Community Service Act, or are employed 180 days after high school graduation.</td>
</tr>
<tr>
<td>Percent entering a technical institution</td>
<td>Share of students entering a technical institution within 180 days of graduation.</td>
</tr>
<tr>
<td>Percent entering a 2-year college</td>
<td>Share of students entering a 2-year college within 180 days of graduation.</td>
</tr>
<tr>
<td>Percent entering employment</td>
<td>Share of students employed within 180 days of graduation.</td>
</tr>
<tr>
<td>Percent entering the military</td>
<td>Share of students entering the military within 180 days of graduation.</td>
</tr>
</tbody>
</table>

Standards, Alignment, and Equity

Missouri established career clusters and issues curricula and quality standards for its career education

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programs. It is unclear based on available information how the state ensures its pathways programs are aligned with regional needs and high-demand, well-paying industries and occupations. Finally, based on publicly available data, student participation in CTE and pathways programs is unclear. This makes it difficult to determine if students have equitable access to these programs.

Ohio

Outcomes
Ohio reports school-level data on the number of students who earned industry-recognized credentials in one of the 13 high-demand career fields. The state does collect and publish other important career and postsecondary readiness data, however, it is available only at the district-level (e.g., district career and postsecondary readiness report cards that include: ACT or SAT performance, industry credentials earned, apprenticeships, dual enrollment, and pathway completion).

As with all states that participate in GreatSchools' College Success Award, Ohio reports postsecondary enrollment information. However, the state goes beyond that and disaggregates those data by institution type. This is a strong practice that increases transparency and allows for greater evaluation of school CTE and career pathways programs. Other states should consider adopting this practice.

<table>
<thead>
<tr>
<th>Data element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry recognized credentials</td>
<td>Students earning an industry-recognized credential or group of credentials in one of 13 high-demand career fields.</td>
</tr>
<tr>
<td>Percent enrolled in a 2-year institution</td>
<td>The share of graduates enrolled in a 2-year postsecondary institution after high school.</td>
</tr>
</tbody>
</table>

Standards, Alignment, and Equity
Ohio established career pathways, state CTE content standards, course sequences, and identified 13 industry recognized credentials. State approved programs must be based on industry demand and respond to occupations identified by the Bureau of Labor Market Information.

An equity plan for Ohio was not readily available. The state does, however, publish data on CTE teachers by school, as well as credentialing programs offered by districts. Finally, the state provides wage and job information by career pathway, as well as career exploration and planning resources for students beginning in fifth grade.

Appendix B

Differences in Delivery Across States

Not every state delivers career pathways and CTE programming at the school-level. In some cases, these programs are offered only at the district-level. In others, districts form consortia to deliver services to expand the offerings to as many students as possible. Some states provide some courses at schools, while others are available only at a district or regional level.

While we conducted our analysis with school-level data, we were able to identify several states that provide important information about availability, participation, and performance in career pathways and CTE programs combined across the school and district levels. Here, as with our primary analysis, we did not include federal Perkins data reported at the district-level. This is not an exhaustive list. Rather, it provides a sense of the kind of information available in states that operate different service delivery models.

**Idaho**: The state publishes CTE course availability and college-and career-readiness participation data at the school-level. Student performance on a workplace readiness assessment is available only at the district-level. Career Centers are designed to expand access to a range of program offerings across the state. Missouri publishes data on approved CTE programs, disaggregated postsecondary enrollment, and college and career readiness.

**Missouri**: The state provides some career pathways and CTE programs at the school-level, while others are offered at Area Career Centers.

**Ohio**: Career pathways and CTE programs are delivered through Career Planning Districts (CPDs). These Planning Districts can serve a single, large district, such as Columbus. Or, they can operate as a consortia with multiple districts participating. There is considerable data available about these CPDs, including: industry recognized credentials earned, dual enrollment performance, programs offered, as well as data about CTE educators.