

Enhancing Educational Accountability

Building an Evaluation System for Rhode Island's Career and
Technical Education (CTE) Programs

Silvie Senauke and Kanika Singh

Harvard Kennedy School
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Prepared for: Spencer Sherman, Rhode Island Department of Education (RIDE)

Advisors: Professor Joshua Goodman, Professor Julie Boatright Wilson

This PAE reflects the views of the authors and should not be viewed as representing the views of the PAE's external client, nor those of Harvard University or any of its faculty.

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Executive Summary

Across the country, schools are shifting away from traditional vocational technical (“vo-tech”) programs and towards new programs that integrate academics and career preparation to ready students for college and career. Rather than tracking low-performing students into low-wage, low-opportunity fields, new programs attempt to move students into high-demand, high-wage, high-skill jobs. In Rhode Island, as in many other states, the Rhode Island Department of Education (RIDE) has invested significant resources into developing and approving Career and Technical Education (CTE) programs in secondary schools to meet these goals.

The Problem

Over the past few years, RIDE and the CTE Board of Trustees have developed minimum standards for individual programs of study and a new program approval process. However, RIDE lacks a comprehensive, ongoing evaluation and accountability process to ensure that the more than 150 programs across the state continue to offer high-quality education after they are approved. RIDE also lacks a program renewal system, of which the evaluation proposals presented here should play an integral role.

Central Research Questions

How can RIDE design and implement an evaluation system for CTE programs that incentivize rigorous programming and successful outcomes for students?

- A. What metrics should RIDE use to evaluate CTE programs?
- B. How should RIDE use these measures to evaluate CTE programs?

We Recommend a Report Card Model Covering Key Measures

We recommend RIDE create an annual CTE program “report card,” similar to the practice in Ohio and Tennessee. This report card should report a letter grade or star rating for each of the following five categories of outcomes. This information can then be used to inform program renewal decisions.

- 1. Persistence:** A successful CTE program will support students to complete the program course sequence and graduate from their secondary institution.
- 2. Credentials:** A successful program will enable students to obtain a portable credential of some sort, giving them a leg up in the next step of their career.
- 3. Post-CTE achievement:** A successful program will move students into postsecondary education and training or well-paying employment.
- 4. Costs:** A successful program will make efficient use of available financial resources.
- 5. Equity:** A successful program will be demographically representative of the school and region it serves.

Background and Statement of the Problem

In 2016, Rhode Island was awarded a New Skills for Youth grant and launched the statewide PrepareRI initiative to address its workforce development challenges. PrepareRI is designed to bring together stakeholders from the government, education, non-profit, and business sectors to prepare all Rhode Island youth for well-paying jobs.ⁱ Providing high-quality technical education to students through CTE programs is one component of the initiative.

Schools and governments are turning to CTE programs to provide students with industry-relevant education and credentials that can help them succeed in both postsecondary education and the labor market. An ideal CTE program complements students' traditional academic education with technical skills and training in a specific field, provides the opportunity to earn credentials in that field and participate in work-based learning, and offers academic credits accepted at postsecondary education institutions.

RIDE oversees the administration of CTE programs serving mostly high-school aged students. CTE programs operate throughout Rhode Island in more than 10 CTE Centers and 54 high schools and other educational settings and provide training for industries ranging from culinary and pastry arts to construction technology to biomanufacturing.ⁱⁱ RIDE has developed an approval process for new CTE programs to ensure that new programs meet both academic standards and industry expectations. However, the department lacks a comprehensive ongoing evaluation process to ensure that CTE programs across the state continue to offer rigorous, high-quality education after they are approved.

Problem Statement

How can RIDE design and implement an evaluation system for CTE programs that incentivizes rigorous, cost-effective programming and successful outcomes for students?

What metrics should RIDE use to evaluate CTE programs?

How should RIDE use these measures to evaluate CTE programs?

Methodology

To address our research questions, we started with a literature review of both academic articles and reports by non-profits and states regarding CTE accountability. We determined a "dream list" of outcomes for an effective and fair accountability system. As far as we could find, there exists no academic literature specifically on evaluating CTE programs at the individual level. We thus relied on the academic literature to support the theory of change behind CTE, and looked to an overview of performance measurement literature for a discussion of evaluation systems for public programs more generally. Our literature review also contains guidelines on CTE-specific program evaluation from the Perkins Career and Technical Education Act of 2006 and the national non-profit Advance CTE.

The core of our research consists of ten interviews and two working groups with RIDE employees and 12 interviews with practitioners in other states, academic experts, non-profit leaders, and senior staff at CTE programs in Rhode Island. We also attended two meetings of CTE stakeholders in Rhode Island to present our proposal and solicit their feedback. In these meetings, we discussed the national landscape of CTE evaluation and what metrics would be relevant and measurable. To determine whom to speak with, we used snowball sampling, leveraging referrals from initial conversations. In conjunction with RIDE staff, we developed six criteria to evaluate any metrics proposed. Also, RIDE provided previous analyses conducted on the state's CTE programs and the sources used for that work. We compared these existing systems with national best practices and determined what should be retained, removed, and added.

Finally, we analyzed program-level quantitative data from 2014-15 to model how the largest 20 programs perform when evaluated based on our proposed measures.¹

¹ For a more thorough description of our methodology, see Appendix I

The Case for Career and Technical Education (CTE) Programs

A 2017 Brookings report titled “What we know about Career and Technical Education in high school” explains that academic research has “not kept pace with policy interest.”ⁱⁱⁱ This section highlights findings from the extant literature about the positive benefits accrued by students who participate in these programs.

Higher graduation rates: Shaun M. Dougherty has studied the outcomes of students in sequenced, industry-sanctioned high school CTE programs in Arkansas, New York City, and Massachusetts. Dougherty found that CTE students in Arkansas were more likely to graduate from high school by three to five percentage points for higher income students and seven percentage points for their lower income peers. Students who “concentrated” (taking a minimum threshold of courses in the program sequence) were more likely to graduate high school by 21 percentage points compared to otherwise similar students.^{iv}

Higher post-secondary enrollment rates: According to Dougherty’s research in Arkansas, CTE students are more likely to enroll in a two-year college or just as likely to pursue a four-year degree as their peers.^v Further, according to research by Andrew Carnevale, there are 30 million “good jobs” in the United States that pay an average of \$55,000 annually that do not require a Bachelor’s degree. However, they do need an Associate’s degree or advanced credential, suggesting that labor market findings support the increased push to two-year degrees.^{vi}

Better labor market outcomes: In Massachusetts, Dougherty found that the more CTE courses students take, the better their labor market outcomes. This finding holds true especially for male and low-income students. Daniel Kreisman and Kevin Stange found CTE participation is associated with higher wages: each additional year of upper-level vocational coursework is associated with a nearly two-percent wage increase.^{vii}

Limited evidence of tracking: Dougherty found there was limited evidence of “tracking,” the harmful measure by which schools shift low-income and minority students into vocational training instead of academically rigorous courses.^{viii}

Although there does not appear to exist academic research on the effects of CTE programs on Rhode Island’s students’ outcomes, we believe the findings from this research likely hold mostly true for our target demographic. There is no evidence that the quality of Rhode Island’s CTE programs, aggregated at the state level, differ significantly from programs studied in this literature.

Current Status of Program Evaluation

The Perkins Career and Technical Education Act of 2006 (Perkins IV) is the guiding federal legislation that oversees Career and Technical Education in the US. Perkins established performance measures that states have to report on for their CTE programs. These measures include: 1) Academic achievement in reading and language arts, 2) Secondary school completion, 3) Student graduation rate, 4) Technical skill attainment, 5) Student placement after completing the program, and 6) Participation and completion by non-traditional students (such as how many women complete programs in historically male occupations).^{ix}

However, these broad criteria are not necessarily sufficient for program evaluation at the individual program level. A 2009 report by the US Government Accountability Office (GAO) noted that, at the time, few states had added performance measurements to those laid out in the Act.^x GAO found that one of the leading obstacles states face when setting up evaluation systems is a lack of data—including data on skill attainment within the program and data on longer-term outcomes such as wage data. A few specific problems included states' lack of data-sharing agreements with third-party assessment providers and a lack of inter-state data sharing agreements that would enable monitoring outcomes for students who move across state lines after graduating.^{xi} At this time, Rhode Island is still at the forefront of this work as only a handful of states, like Delaware and Ohio, are thinking about program-level accountability for their CTE systems.

Nonprofit Guidance on CTE Evaluation

In September 2017, Advance CTE, an organization focused on expanding and improving CTE programs across the nation, released a “Policy Benchmark Tool” for states to use as they update their program approval systems. One section of this tool provides guidelines on CTE evaluation processes, with a series of logistical, implementation, and design questions to guide agencies as they develop an evaluation system:

- How often will each program undergo evaluation?
- Will evaluations involve in-person site visits? If not, how will agencies gather relevant and accurate information and data?
- If a program does not meet requirements, what steps will the agency take to help the program improve or to close the program?
- What data are available, including data on labor market demand, student outcomes, and student participation in CTE programs?
- Is the agency able to design a process to collect data that are currently unavailable?
- What data can be a proxy for currently unavailable information?^{xii}

The Policy Benchmark Tool also lays out six core evaluation elements. Advance CTE suggests states use these elements to ensure high-quality programming from CTE programs and recommends incorporating them into the renewal decision process. The six core elements are as follows:

1. Rigorous course standards and progressive, sequenced courses
2. Secondary and postsecondary alignment and early postsecondary offerings
3. Industry involvement
4. Labor market demand
5. High-quality instruction
6. Experiential learning^{xiii}

Similarly, Pathways to Prosperity, an initiative by Jobs for the Future and the Harvard Graduate School of Education, set out policy priorities to encourage quality CTE program development. First, states should establish systems that support and enable dual enrollment and dual credits for students enrolled in CTE programs. Second, states should develop policies that permit high school students to enroll in college courses free of tuition. Finally, course content must be aligned so that students taking CTE courses such as math for engineering can receive course credit that transfers to their other requirements.^{xiv}

Measuring Performance

As we consider how to establish the best outcomes and metrics to evaluate the performance of CTE programs, we take some critical lessons from performance management literature. As Harvard Kennedy School's Bob Behn states, "there exists *no perfect performance measure*."^{xv} However, he stresses the importance of measuring outcomes, instead of inputs, processes, activities, or outputs.^{xvi} This focus on outcomes is because, despite what we may believe we know about how inputs like certified instructors affect long-term student outcomes, that causal link is almost always a hypothesis. Behn acknowledges that outcomes are almost always hard to observe. Thus, in establishing performance measurements we must balance the value of measuring outcomes with the difficulty of observing and documenting them.

Finally, Behn argues that any type of performance measurement program should be more about learning than accountability per se: programs should help managers improve, instead of shaming them. A good system will find "positive deviants" (programs or departments that are performing better) and determine what makes them work.^{xvii} Informed by this literature, RIDE should wrap performance measures into a leadership strategy that changes how programs think about their practices, processes, and goals.^{xviii} Merely selecting the right measures is insufficient: implementing the system well is crucial.

Case Studies

We spoke with representatives from Delaware, Tennessee, Ohio, and Nevada, states identified by nonprofits and industry experts as leading the nation in developing CTE accountability systems. In all four cases, the state Department of Education is the locus of responsibility for their accountability systems. The figures below summarize the bases of CTE accountability in each state. The case studies that follow provide unique aspects of each of the accountability systems.



Delaware holds programs accountable based on their demonstrated ability to offer:

- Opportunities to earn early college credit;
- Opportunities to earn credentials; or
- Opportunities to gain work experience while completing the CTE program.



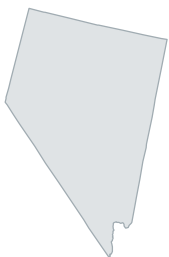
Ohio has a two-tiered accountability system. First, the state looks at data on student outcomes for individual programs in schools, which they evaluate by:

1. Technical skill attainment, as measured by end-of-course tests, developed by Ohio State University.¹ Students take a test at the conclusion of a sequence of courses. They aggregate the scores on the individual tests into one result.
2. Test participation rate: proportion of students completing tests.
3. Placement rate in the second quarter after leaving secondary institute.

Second, the State provides assessment for each of their 91 Career-Technical Planning Districts, comprising multiple schools and programs.



Tennessee does not conduct program-level evaluation. The Tennessee Department of Education reviews their 16 courses of study annually to ensure they align with labor market demand and that curriculum for each course of study is up to date and relevant.



Nevada bases its evaluations on the federally required Perkins IV measures, complemented by their qualitative program standards. Nevada's DoE developed these measures, and representatives visit districts and schools to walk through the standards—which include career guidance and leadership development—with them. They then share the subsequent report with the school.

Delaware

Scope of CTE

14 programs of study

Basis of Evaluation

Sequence of courses. Delaware created 14 State Model of Study Programs that serve as exemplars, detailing labor market demand, a specific sequence of courses, the content of those courses, and the appropriate industry-recognized credential towards which students should be working. Individual programs are evaluated based on whether they comply with these sequences and meet the goals outlined below.

Public Reporting

None

Goals for Students in CTE Programs

Delaware articulates its goals (opportunities to earn early college credit, credentials, or work experience) in the application process, and programs must demonstrate how they offer students such opportunities. The state not only provides financial incentives to programs for successful provision but also funds courses that do so at a higher rate.

Evaluation Timeline

Seven-year increments, with applications for approval due one year in advance of the 7-year deadline.

Unique Features of Evaluation System

- Models of study are released to the public so any school can pick them up off the shelf and build the program.
- The state requires that schools identify an aligned program at the postsecondary level, either at a two or four-year institution, that would allow students to continue their career pathway.
- Programs that don't spend their allotted money will get less money in the future. When they observe this problem, state CTE administrators help individual schools build budgets. Schools also submit quarterly financial reports, enabling the state to flag outliers.

Ohio

Scope of CTE

3000 individual CTE programs engaging 20% of 9-12th-grade students; 8 programs of study

Basis of Evaluation

Ohio has a *two-tiered accountability system*. First, the state looks at data on student outcomes for individual programs in schools (technical skill attainment measured by end-of-course tests, test participation rate, and placement rate in the second quarter after leaving secondary institution).^{xix} Second, the State provides assessments for each of the 91 Career-Technical Planning Districts on how the district is comprehensively meeting students' career and technical education needs.

Public Reporting

*Annual report card*²

Goals for Students in CTE Programs

Ohio wants to prepare students for whatever comes after high school, be that two- or four-year college, the workforce, or the military.

Evaluation Timeline

Annual, required by state law.

Unique Features of Evaluation System

- Ohio has divided its 600+ school districts into 91 Career-Technical Districts. They designate a lead school in each Planning District, and that school district holds initial approval power for all new programs within the Planning District.
- After three consecutive years of not meeting benchmarks, programs must complete a corrective action plan outlining how they will address the deficiencies. If the program remains out of compliance in year four, they will receive on-site visits. Continued lack of compliance for five years would lead to the withdrawal of funding, although the accountability system is too young to have reached this point.
- The Department is currently in discussion with Ohio State University to create a data-sharing program to track longer-term student outcomes, to be housed at the university.
- The Department of Education has chosen not to employ any methods to attempt to “control” for student characteristics when evaluating each program's outcomes.

² See Appendix II for a sample report card

Tennessee

Scope of CTE

16 programs of study

Basis of Evaluation

The state oversees *programs of study* (the pre-defined course sequence of a CTE program) but does not conduct program-level evaluation.

Public Reporting

Annual report card, which shows data about participation in individual CTE programs. However, they do not publish indicators for accountability.

Goals for Students in CTE Programs

The Department of Education's "career cluster consultants" look to ensure that courses of study meet specific goals:

- All students who concentrate in CTE can access high-quality instruction.
- All students who concentrate in CTE will be able to progress through seamless pathways leading to their chosen career.
- All students who concentrate in CTE will be able to demonstrate mastery of course and/or program of study content through a system of course exams or industry certifications.

Evaluation Timeline

Annual. Six full-time career cluster consultants within DoE review CTE programs of study annually; they look at standards, industry certifications, and stackable courses.

Unique Features of Evaluation System

- Tennessee monitors districts on a rolling risk-based compliance format, based on a specific list of quality performance indicators.
- Report cards are generated based on students' home school (where students are registered), instead of the service school (where classes may be housed).
- All CTE programs offering the same program of study must provide the same sequencing of courses and course standards

Nevada

Scope of CTE

77 pre-approved programs in 6 areas of study (“career clusters”)

Basis of Evaluation

Quality program standards and Perkins Accountability standards. Nevada’s State Board of Education developed standards to measure programs qualitatively, including factors such as career guidance, program and instruction, and leadership development. This qualitative measurement complements the quantitative performance indicators required by Perkins IV that they report.

Public Reporting

DoE posts its quality standards on its website and works closely with districts to enact these standards. They publish an annual report on Perkins IV measures and promote the fact that CTE has higher graduation rates among all students. They also disseminate CTE fact cards to districts and students to show annual state-level Perkins indicators.

Goals for Students in CTE Programs

Nevada hopes that students will complete programs in career pathways aligned with the state’s economic and workforce development goals.

Evaluation Timeline

Perkins requires annual review, and Nevada conducts qualitative standards reviews in a cycle. Newer programs of study, such as IT and cybersecurity, are reviewed and updated more often than traditional industries such as welding.

Unique Features of Evaluation System

- Only use Perkins measures for quantitative accountability measures.
- They are in the process of developing systems to track high-school students after they leave school through data-sharing agreements.
- DoE has tight control over what programs of study schools can choose to offer.

Implementing an Effective Accountability System

While the bases of accountability are different in the four states, our conversations showed that states had created similar structures and processes to implement their systems effectively. The key similarities in implementation are summarized in the table below:

	Delaware	Tennessee	Ohio	Nevada
DoE-defined industry clusters	✓	✓	✓	✓
Industry Councils give feedback about courses of study and credentials	✓	✓	✓	✓
Articulation agreements with higher education institutions	✓	✓	x	✓
Public report card with CTE measures	x	✓	✓	x
Financial penalty (threat of funding removal)	✓	✓	✓	✓
Data-sharing agreements with third-party agencies	✓	✓	✓	✓
Focus on concentrators (not completers or participants)	✓	x	✓	✓ ³
Legal mandate for data	x	x	✓	x

³ Technically, Nevada focuses on both concentrators and completers in line with Perkins IV guidelines.

Key Takeaways from Case Studies

All the Department of Education representatives we spoke with emphasized that their CTE accountability systems were still in their nascent stages. For example, Ohio's system is only three years old and its first year of deployment was a "no consequences" trial year. The relative recentness of this work means that Rhode Island is still among the first states to think about CTE accountability, and there will likely be unique pain points as RIDE establishes their evaluation and accountability system. It seems that Rhode Island's CTE stakeholders are thinking about the right features of implementing their accountability system: industry-informed standards, work-based learning, state-defined industry clusters, and transparency for students, teachers, and parents.

Based on insights from other states, we recommend RIDE considers:

1. Public, online report cards, as those appear to be easier to read and interpret than more complex scoring systems.
2. Data-sharing agreements with industry groups that provide credentials, to take some of the onus of reporting away from schools and to increase data accuracy.
3. The threat of financial penalties for programs that are under-performing, after providing multiple chances for feedback to occur and programs to incorporate it to address their challenges.

Criteria

To evaluate the universe of potential outcomes RIDE could track and measure as part of the proposed accountability system, we worked with CTE RIDE staff to come up with the following criteria for indicators and outcomes measures:

- 1. Incentivize excellence:** Any performance or process measure should reflect RIDE’s goals and help programs strive to exceed minimum requirements and reach for “excellence.”
- 2. “Un-game-able”:** Programs must not be able to adjust their practices to appear more successful according to the metric than they are, or submit incomplete data that biases their performance. Outcomes must be easy to understand to assist in this goal.
- 3. Transparent:** Students, families, programs, and the business community should be on the same page regarding how the state evaluates programs so each of these parties can make informed decisions. Thus, outcome measures should be easy to understand: not overly complicated or jargon-filled and tied to goals that students, parents, teachers, industry, and administrators share.
- 4. Operationally feasible:** Many outcomes would be incredibly helpful in creating a robust accountability system, but are not easy to measure or collect or require data owned by other state agencies. Any outcome should be straightforward to acquire, either publicly or through data-sharing agreements with other organizations and state agencies.
- 5. Politically feasible:** Any outcome must be aligned with the priorities of RIDE, students and families, schools, and industry to prevent alliances in opposition.
- 6. Coherent in message:** CTE is part of a larger educational fabric and framework, and thus cannot act apart from other RIDE policies and initiatives. Many states have folded CTE accountability into their larger public education accountability frameworks to ensure consistency and drive all students towards career and college readiness, regardless of what type of program they attend. Evaluating outcomes based on this consistency criteria will help programs work towards RIDE’s overarching goals and make the accountability system easier to implement.

Recommendations

Learnings from the four state case studies, as well as the literature on both CTE and performance management, suggest that creating a system to measure the success of Rhode Island's CTE offerings is a critical tool for RIDE. An evaluation system holds the promise of informing RIDE, families, and industry about the best programs available to students, while simultaneously allowing RIDE to identify programs that need additional support or intervention. An evaluation system that fulfills both these goals will be key to ensuring that all students in the state have access to high-quality CTE programs that successfully prepare them for their next step, whether it be employment or further education and training.

This section lays out recommendations for constructing an evaluation system in Rhode Island. These recommendations include a set of outcomes CTE programs should aim for, as well as individual measures RIDE can use to evaluate how well programs promote each outcome. We considered a wide range of potential outcomes and measures, using the criteria described in the previous section to determine these recommendations. Information on the additional outcomes and measures considered, as well as the reasons we ultimately deprioritized them, can be found in Appendix III.

Persistence	<ul style="list-style-type: none">• Do students remain in their CTE program and in secondary?
Credentials	<ul style="list-style-type: none">• Do students receive some type of portable credential• certificate, credit, or advanced standing?
Achievement	<ul style="list-style-type: none">• How do students do after leaving secondary?
Cost	<ul style="list-style-type: none">• What does it cost to educate students in the program?
Equity	<ul style="list-style-type: none">• Does the program reflect the school's population?

1. Measure Persistence in Program and Secondary School






A successful CTE program will support students so they complete the academic components of the CTE program and graduate from their secondary institution.

Our proposal begins with two measures to capture CTE students' *persistence* or the act of continuing towards a specific educational goal. These two measures capture two significant persistence goals:

- A. Whether students who begin CTE programs with the intention of finishing them successfully do so⁴
- B. Whether students in CTE programs graduate from high school

The first of these goals is fairly straightforward and reflects CTE's philosophy of providing students with concrete skills to advance them in their career or college. The second is important because a high school degree is often the minimum requirement for jobs and college. Capturing this measure will allow RIDE to compare CTE students' persistence rates to those of all students. There is reason to believe that CTE can have a positive impact on secondary persistence. Many CTE professionals have noted that CTE students are often more engaged in classrooms, and Dougherty's work has shown that engagement in CTE programs increases the likelihood of graduation.^{xx} Further, Perkins IV includes secondary school completion as an indicator of performance.

Persistence Measures are Transparent, Coherent and Operationally Feasible

Criteria	Rating (out of 5)	Motivation
Incentivize Excellence		Motivates programs to support students in completing course sequence
Un-game-able		Some risk of gaming as programs can define concentrators to inflate apparent success
Transparent		Similar to often-reported statistics
Operationally Feasible		Easily computed using available data
Politically Feasible		Aligned with many stakeholders' goals; Programs may resist being measured by graduation rates
Coherent		Fully aligned with RIDE messaging, including the definition of a concentrator

⁴ Some students “dabble” and take introductory CTE courses without intentions of completing the sequence. These students are not the target of this proposal.

2. Measure Credential Obtainment

A successful program will enable students to obtain a portable credential of some sort, giving them a leg up in the next step of their career







The 2012 CTE regulations released by RIDE lay out a clear set of expectations around what students leaving CTE programs will have accomplished. The 2017 CTE Board of Trustees program standards, which set out the specific goals and intended outcomes for each CTE program of study in Rhode Island, reiterates these goals. The 2-12 regulations state that RIDE-approved career preparation programs must:

"Provide participating students the opportunity to earn industry-recognized credentials whenever applicable to the program, and/or postsecondary credits, and/or advanced standing in training programs or jobs" ^{xxi}

These three goals also align with the Perkins IV requirement that states report on technical skill attainment. Unlike Ohio, Rhode Island has not developed comprehensive test-based assessments to measure technical skill attainment. The three goals in the CTE regulations, however, provide a useful proxy. This measure will therefore capture:

- A. Number of students who obtain industry-recognized credentials; OR
- Number of students who earn transferrable^{xxii} post-secondary credits; OR
- Number of students who earn advanced standing credits for a registered apprenticeship

Credentials Measure Incentivizes Excellence, is Un-game-able and Coherent

Criteria	Rating (out of 5)	Motivation
Incentivize Excellence		Focuses on meaningful benefits rather than course completion
Un-game-able		Some risk programs will limit admission; other risk mitigated by pre-defined credentials
Transparent		Somewhat complex, but could be used to focus RIDE's message
Operationally Feasible		Current data inconsistently reliable
Politically Feasible		Builds on prior agreements with stakeholders
Coherent		Highly aligned with RIDE and PrepareRI

3. Measure Post-Secondary Achievement

A successful program will move students into postsecondary education and training or well-paying employment







The main goal of CTE is to prepare students for college and career. One of RIDE’s core tenets is to “support students’ postsecondary success.”^{xxiii} Measuring post-secondary achievement meets both of these goals. Similar measures are a component of both the Perkins IV requirements and other states’ CTE evaluation systems. Perkins IV requires that states report on secondary placement as part of their core indicators of performance. Tennessee measures the number of CTE graduates who pursue further education or employment.^{xxiv}

In addition to the binary measure of whether or not students obtain a job, RIDE should also capture the quality of the work that students pursue. This measure will help align RIDE's practices with PrepareRI’s goal “to prepare all Rhode Island youth with the skills they need for jobs that pay.”^{xxv}

Given the different potential student paths, we propose two measures to capture students’ post-secondary achievement:

- A. Whether students either enroll in postsecondary education and training or obtain jobs
- B. Whether students who do not enroll in post-secondary training obtain well-paying jobs

Achievement Measure Incentivizes Excellence, is Un-game-able and Coherent

Criteria	Rating (out of 5)	Motivation
Incentivize Excellence		Encourages schools and programs to ensure students are on successful tracks
Un-game-able		Uses third-party reported data that is difficult to game
Transparent		Basic concept is clear and easy to explain; nuances of wage reporting may complicate
Operationally Feasible		Essential data-sharing established; inability to track some graduates moving out of state
Politically Feasible		Will likely face resistance; recommend using as a bonus score for programs
Coherent		Highly aligned with RIDE and PrepareRI

4. Measure Cost

A successful program will make efficient use of available financial resources







While our recommendations incentivize programs to invest significantly in students, the fact is that RIDE and schools have limited resources for CTE. One of the goals of a balanced evaluation system should be to identify which programs have the highest potential for impact. Identifying which programs deliver the best outcomes in exchange for the lowest investment of resources will allow RIDE to better understand each program’s potential for impact.

Measuring cost is difficult. For one thing, there are drastically different costs associated with different programs of study. A training program in Machine Technology will require capital investments for large manufacturing equipment that program in Hospitality will not require. Furthermore, when students change schools to attend a specific program, there are important questions regarding what costs in the new school should be attributed to the CTE program.

However, we also know that there is great variation in how much similar programs spend per pupil. Endeavoring to measure such variation, then, is essential. We propose the following measure to capture cost:

- A. Amount of money the program spends to educate concentrators

Measuring Cost Incentivizes Excellence and is Un-game-able

Criteria	Rating (out of 5)	Motivation
Incentivize Excellence		Focuses resources on ensuring student success
Un-game-able		Prevents programs from skimming top students out of introductory classes; risk of restricting entry to those classes
Transparent		Concept can be explained. However, nuances of costs are complex
Operationally Feasible		All programs use accounting system to report costs; difficult to capture all nuance
Politically Feasible		Inclusion of Perkins IV funding could be controversial
Coherent		Aligned with RIDE’s goals

5. Measure Equity







A successful program will be demographically representative of the school and region it serves

One of RIDE’s goals is increasing equity in the state’s education system. RIDE’s strategic plan defines equity as a focus “on eliminating disparities around higher education access, affordability, and attainment” with special recognition of the effects of race and ethnicity, socio-economic status, and family educational background on student achievement.^{xvii} In evaluating CTE programs, then, RIDE must have an eye on the equity impact of programs. Stakeholders have emphasized the issue of equity at every step of our research.

We propose adopting Tennessee's method for measuring equity, which compares the composition of students in CTE programs to that of the school and district. This method will allow RIDE to ensure that CTE programs are not segregating students. We propose the following measure to capture equity:

- A. How much the program differs from school and district in gender makeup
- B. How much the program differs from school and district in racial makeup
- C. How much the program differs from school and district in participation of students with disabilities
- D. How much the program differs from school and district in participation of English Language Learners
- E. How much the program differs from school and district in participation of students from low-income backgrounds

Equity Measure Fully Meets All Criteria

Criteria	Rating (out of 5)	Motivation
Incentivize Excellence		Encourages programs to learn to serve all students successfully
Un-game-able		Variety of categories measured and comparing to both school and district decreases the risk of gaming
Transparent		Definitions for categories are clear; no complicated composite score
Operationally Feasible		Schools reliably track demographic data
Politically Feasible		Widespread enthusiasm among stakeholders
Coherent		Aligned with RIDE’s goals

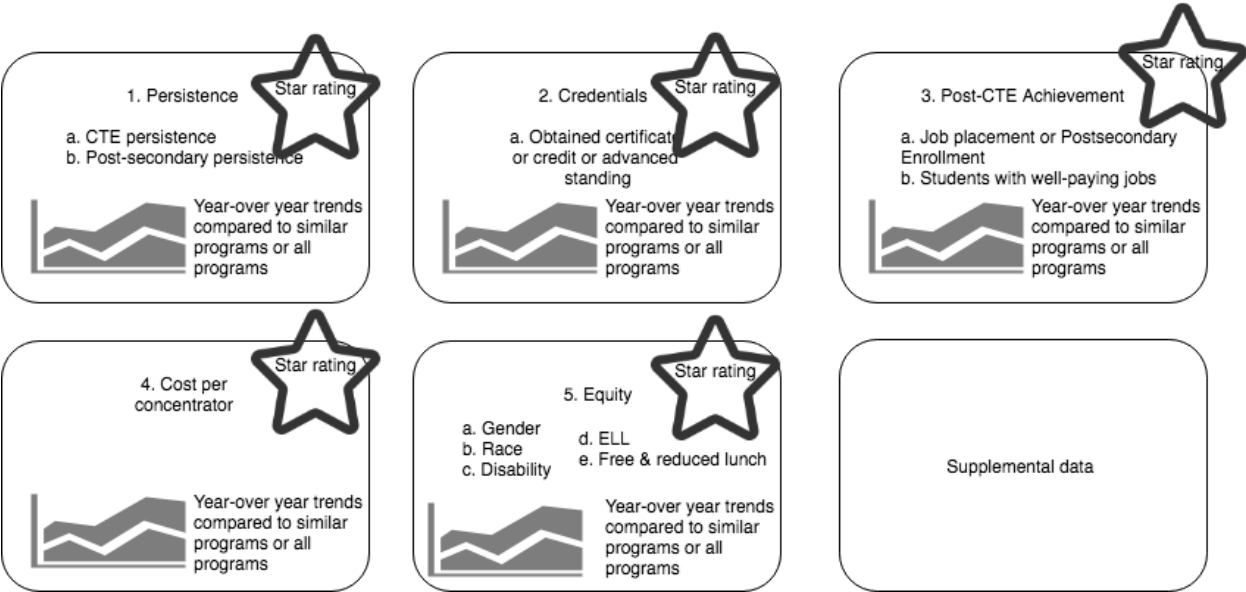
Building a Report Card

Few states are looking seriously at the performance of individual CTE programs within schools. Tennessee has devoted significant energy to ensuring that different programs of study are relevant to labor demand and meet employer needs but is doing less to examine student outcomes on the individual program level. Delaware looks closely at how individual programs perform on the Perkins IV-required metrics and adjusts state funding allocation accordingly, but has not developed a comprehensive scoring system for individual programs. Of the states we researched, Ohio has created the closest system to what we propose here.

RIDE has the opportunity to become an innovator in this field. We propose a system that reports each measure rather than collapsing them into one overall score. This approach is similar to how RIDE handles charter school evaluations. Reporting separately on each measure supports the department’s goal of helping the four main stakeholders understand program performance and take action. It also aligns with Tennessee’s practice of providing a suite of data on students in CTE programs as one component of their school report card. Star ratings for each measure may be determined based on absolute standards or relative performance.

To accomplish this, we propose a performance dashboard for each program. A rough sketch of what such a dashboard might look like is below:

2018-2019 Dashboard for Program X at Y School



Insights From Evaluation Data

We calculated the proposed measures for the 20 CTE programs with the highest number of concentrators exiting school between 2015 and 2017.⁵ We found some generalities among these 20 programs, although there are significant exceptions to each finding:

- Almost all CTE concentrators graduate from secondary school, and in many cases the vast majority also finish the full program course sequence. Significant exceptions include programs in law and public safety, engineering technology, and TV production.
- Students in most CTE programs obtain either a credential, credit, or advanced standing in a registered apprenticeship. However, four programs do not have any students attain one of these measures, suggesting that some CTE programs potentially do not share these goals.
- The majority of concentrators move into postsecondary education and training or jobs, but no program has a majority of its students who did not enroll in postsecondary education and training earn a living wage.
- Some racial and gender disparities exist between programs. For example, certain programs are composed of 97% white students, while others are only 3% white. Less than 15% of concentrators in auto careers, engineering, and electrical careers are female.
- The majority of concentrators in most of the 20 CTE programs qualify for free or reduced lunch, the indicator for low-income students. The only cases where this does not appear to be true are in more technical programs such as graphic design, engineering technology, and TV production.
- There is no obvious relationship between the demographic makeup of a program (measure 5) and the program's outcomes (measures 1-3).

We faced several limitations when creating these measures due to inconsistencies in the coding of the data. For example, we believe we have undercounted the number of concentrators because many students did not appear to be coded as having completed the threshold course for concentrator status. Further, many of the same programs were coded with different names in different years. Available data regarding program costs were not disaggregated in a form that allowed us to calculate the cost measure.⁶

⁵ See table in Appendix IV for complete results and Appendix I for technical details on how each measure is calculated.

⁶ See Appendix I for more details.

Next Steps for Implementation

Merely implementing this proposal will not in and of itself transform CTE program performance. Measuring and reporting on performance is only the first step towards performance improvement. Reporting publicly and directly to schools on these evaluation measures should serve as the beginning of a conversation. If RIDE opens the doors to this conversation, programs can tell RIDE what supports they need when they are struggling, and RIDE can elevate programs and practices that prove successful.

Below, we detail some of the next steps in this process based on what we have learned in developing our proposal.

1. Engage school and program leaders formally and informally, individually and in groups

Our discussions with CTE stakeholders—school administrators, industry leaders, and RIDE employees—highlighted the importance of school and program leader participation in this process. School and program leaders must understand what data are being used and why. Perhaps even more importantly, school and program leaders must trust that they will be supported to improve rather than punished unfairly based on the data they supply. RIDE should continue to discuss this proposal and future actions at formal meetings, but should also seek out informal opportunities to discuss their plans with school and program leaders. Soliciting additional ideas and concerns can foster a commitment to a shared vision.

2. Develop a multi-year plan for implementation, in conjunction with these stakeholders

There will likely be some growing pains in implementing a new system of evaluation, and RIDE cannot accomplish this overnight. Thus, we recommend a multi-year rollout plan created with the CTE Board and school administrators. As a part of this rollout plan, RIDE should hold training on data collection and reporting, convene public conversations regarding why the evaluation system is necessary and beneficial, and develop a marketing plan. RIDE should designate a point person to oversee this plan, track successes and failures, and iterate based on feedback.

The implementation plan must provide clear guidance on the “accountability” component of this evaluation system. The current program approval process considers vital information about program inputs. This proposal is designed to supplement that process in the program renewal timeline. Determining timelines for program renewal, as well as graduated levels of oversight based on evaluation history, are essential components of implementation.

3. Foster a system of high-quality data collection and reporting

RIDE employees have shared that CTE program data are often incomplete because there is a disconnect between people who understand the data and those tasked with fulfilling data requests. Ohio requires all programs to provide data by law, which would be the most efficient way for Rhode Island to ensure quality data. However, if a legal mandate is not feasible, we recommend RIDE

offers rigorous training to program administrators about how to collect and report the data.

Our analysis was not able to capture all of the relevant data to analyze these measures robustly. In particular, we were not able to combine the data we used with data on students joining the military. Future efforts should include military placement in Measure 3A.

Finally, limitations of the CTE data system made calculating the measures difficult. Apparent inconsistencies in program codes and names should be addressed. We recommend adding at least two new variables to the system: whether a student reaches concentrator status, and a unique identifier for each individual program at the school level (ideally a numeric code) that remains consistent across years.

4. Contract directly with credential providers.

One of the main categories of unreliable data is receipt of industry-recognized credentials. RIDE should consider direct data-sharing contracts with industry groups that provide credentials to students. Other states have either already established these linkages, or are in the process of doing so, suggesting that this tactic is operationally feasible for RIDE.

Appendix I: Data Details

Data Sources and Notes

To calculate these measures, we used data from three primary sources. RIDE provided student-level data captured by RIDE’s CTE and Teacher Course Student systems. Data on student enrollment in postsecondary education and training came from the National Student Clearinghouse. Data on student earnings and employment came from the Rhode Island Department of Labor and Training (DLT). The organization DataSpark helped to match records across all three of these datasets.

We focus on concentrators as our units of measure. This choice is informed both by conversations with RIDE staff regarding should benefit from CTE programs as well as other states’ practices (see “Implementing an Effective Accountability System”). In Rhode Island there are two methods for defining which students are concentrators. Perkins IV defines a concentrator as a student who has completed two or more courses in a program sequence. RIDE allows programs to create an internal definition of the course in the program sequence when a student becomes a concentrator. For consistency within RIDE and with PrepareRI, we have used the program-defined criteria for concentrator rather than the Perkins IV.

We used data on individual courses taken by students to determine if each student met the concentrator criteria. When aggregating this data, we found that roughly 30 percent of the students who RIDE reported to be at least participants in CTE programs had not taken any classes coded as belonging to those programs. As a result, we dropped them from our data. However, it is likely that this mismatch is due to a coding error, and that many of these students may in fact be concentrators and therefore belong in our calculations.

Our measures our calculated for the cohort of concentrators who exited schooling in 2014-2015, 2015-2016, or 2016-2017 (the “reporting period”). We use this 3-year aggregation because the numbers of students in each program exiting schooling in any one year is small, and a few students could have a dramatic effect on an evaluation measure if calculated for each individual year. Reliable data from RIDE’s CTE system is not available before academic year 2014-2015.

To determine if a student “exited schooling” we constructed a dummy variable that equaled 1 if the exit type for the last year the student appeared in the TCS data indicated that the student was not returning to any school⁷. Similarly, to

⁷ These codes were: Graduated with regular, advanced, International Baccalaureate, or other type of Diploma,” “Completed a GED program,” “Discontinued Schooling,” “Completed grade 12, but did not pass test,” “Transfer to a postsecondary education,” “Moved, not known to be continuing,” “Reached maximum age for services,” “Completed school with other credentials,” “Enrolled by IEP Max-age Requirement.”

determine if a student had graduated, we constructed a dummy variable that was equal to 1 if the exit type for the last year the student appeared in the TCS data indicated they had graduated.⁸

The CTE data does not provide a unique identifier for every single program. While programs are assigned local program codes and program names, two different schools might offer a program with identical codes and names. To create program-level measures, we constructed a unique identifier for each program by combining the school code and the local program code. However, it appears that program codes for the same program may have changed between years. For example, in one school the same program name is assigned the program code “Child Development” for data from the 2014-2015 school year, and “ChildDev” for data from the 2016-2017 school year. As a result, our analysis may have produced multiple unique identifiers for the same program. As RIDE moves into the implementation phase of this project, we recommend that addressing these issues of program coding, as well as the issue of unassigned program codes for CTE courses, receive top priority.

Calculating the Measures

Measure 1A

Numerator: Number of concentrators who exited schooling in the reporting period and took the highest course in the program sequence

Denominator: Number of concentrators who exited schooling in the reporting period

Measure 1B

Numerator: Number of concentrators who exited schooling in the reporting period and graduated from secondary institution

Denominator: Number of concentrators who exited schooling in the reporting period

Optional supplemental measure could report graduation for all program participants

Measure 2

Numerator: Number of concentrators who exited schooling in the reporting period and (during years they were in a CTE program) earned at least one of: industry-recognized credential; transferrable post-secondary credit; advanced standing in a registered apprenticeship

Denominator: Number of concentrators who exited schooling in the reporting period

Optional supplemental measures could report separately on credentials, credits, and registered apprenticeship.

⁸ These codes were: “Completed a GED program,” “Completed school with other credentials,” “Graduated with regular, advanced, International Baccalaureate, or other type of diploma”

Measure 3A

Numerator: Number of concentrators who exited schooling in the reporting period and either: enrolled in postsecondary education and training during at least one semester period between their exit from secondary and the second quarter of 2017⁹; or earned an income during at least one quarter during that same time period

Denominator: Number of concentrators who exited schooling in the reporting period

Using NSC data allows us to follow students who enroll in postsecondary education and training outside of Rhode Island. However, DLT is not able to capture earnings information for individuals working outside the state. It may be the case, therefore, that some employed students are counted as unemployed in this calculation because that is how they appear in the DLT data.

Measure 3B

Numerator: Number of concentrators who exited schooling in the reporting period who did not enroll in postsecondary at any point through the second quarter of 2017, and whose average quarterly wage across quarters they were employed between leaving school and the second quarter of 2017 was greater than or equal to the living wage in Rhode Island.¹⁰

Denominator: Number of concentrators who exited schooling in the reporting period and did not enroll in postsecondary at any point through the second quarter of 2017.

As with Measure 3A, we are unable to distinguish between students who are working outside of Rhode Island and students who are not employed. This measure may therefore be miscounting students who are working out of state as students who are not earning a living wage.

Measure 4

Numerator: Total cost of CTE program for year X

Denominator: Number of concentrators in the program in year X

We did not have access to information about costs by program, and therefore have not been able to estimate this measure. Conversations with RIDE staff, however, indicate that it would be possible to generate this information based on the costs that schools report through the Uniform Chart of Accounts. To determine the numerator for Measure 4 we recommend that RIDE use the total cost reported for a given year, less wages and benefits for staff (since students would require those costs if they took other courses instead of CTE courses). This total cost will likely include larger capital investments. These types of

⁹ This quarter was chosen based on the most recent available data

¹⁰ Using the MIT living wage calculator, we found that the annual living wage for a single adult in Rhode Island is \$12.10 per hour, or \$6,289 per quarter. The living wage calculator can be accessed at: <http://livingwage.mit.edu/>

investments should be included if they are regularly re-occurring, such as an annual purchase of a car for an auto-repair program. For investments with expected multi-year use, the cost should be spread across the expected useful life of the investment. These nuances are not captured in the Uniform Chart of Accounts. To find this amount, RIDE should develop a system to report the total annual costs back to each program, and inquire about whether any expenditures have multi-year useful life, and if so how many years.

Measure 5A¹¹

Numerator: Number of concentrators who exited schooling in the reporting period and are female

Denominator: Number of concentrators who exited schooling in the reporting period

Measure 5B

Numerator: Number of concentrators who exited schooling in the reporting period and are coded as White

Denominator: Number of concentrators who exited schooling in the reporting period

Measure 5C

Numerator: Number of concentrators who exited schooling in the reporting period and were coded as having an IEP

Denominator: Number of concentrators who exited schooling in the reporting period

Measure 5D

Numerator: Number of concentrators who exited schooling in the reporting period and were coded as either ELL status or in either Monitoring year

Denominator: Number of concentrators who exited schooling in the reporting period

Measure 5E

Numerator: Number of concentrators who left school in the reporting period and qualify for either free or reduced lunch

Denominator: Number of concentrators who left school in the reporting period

¹¹ Measures 5A – 5E should be presented alongside parallel ratios for the school and district


Appendix II: Ohio Report Card

Ohio School Report Cards

[View Printable PDF](#)

2016 - 2017 Career-Technical Planning District Report Card for
Medina County JVSD CTPD

Overview | Achievement | Prepared for Success | Graduation Rate | Post Program Outcomes | Federal | Details | Financial | Info



Achievement


The Achievement component represents the number of students who pass the state's tests and the technical assessments that measure the skills and knowledge learned in a student's career-technical program.

Technical Skill Attainment
80.9%..... **B**

Indicators Met
0.0%..... **F**

COMPONENT GRADE

C




Prepared for Success

Whether training in a technical field or preparing for work or college, the Prepared for Success component looks at how well prepared Ohio's students are for all future opportunities.

COMPONENT GRADE

C



Graduation Rates

The Graduation Rate component looks at the percent of students who are successfully finishing high school with a diploma in four or five years.

Graduation Rate
97.1% of students graduated in 4 years..... **A**
96.9% of students graduated in 5 years..... **A**

JVSD Graduation Rates
97.0% of students graduated in 4 years
96.8% of students graduated in 5 years

COMPONENT GRADE

A



Post-Program Outcomes

Post-Program Placement measures the proportion of students who are employed, in an apprenticeship, join the military, or are enrolled in postsecondary education or advanced training in the six months after leaving school. Industry credentials measures the proportion of students earning industry credentials or certificates before they leave high school, or in the first six months after leaving school.

COMPONENT GRADE

A

Post-Program Placement
95.4%..... **A**

Industry-Recognized Credentials.....30.9%
Status Known Rate.....100.0%
JVSD Post-Program Placement.....95.5%
JVSD Industry Credentials.....32.5%

Achievement



The Achievement component represents the number of students who pass the state's tests and the technical assessments that measure the skills and knowledge learned in a student's career-technical program.

COMPONENT GRADE

C

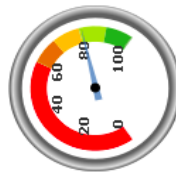
GRADE

B

Technical Skill Attainment

Technical Skill Attainment measures the proportion of students passing technical assessments. These assessments are designed to measure the skills and knowledge learned in a student's career-technical program.

Technical Skill Attainment



- A = 90.0 - 100.0%
- B = 80.0 - 89.9%
- C = 70.0 - 79.9%
- D = 60.0 - 69.9%
- F = 0.0 - 59.9%

Overall Assessment Passage Rate..... **80.9%**

Overall Assessment Participation Rate..... **94.1%**

GRADE

F

Indicators Met %



0.0%
0 out of 10

- A = 90.0 - 100.0%
- B = 80.0 - 89.9%
- C = 70.0 - 79.9%
- D = 50.0 - 69.9%
- F = 0.0 - 49.9%

Indicators Met

Indicators Met measures the percent of students who have passed state tests. Test results are reported for each student in a grade and subject. The passage rate for each indicator is 80%.

8th Grade	English Language Arts	41.7%	X
	Mathematics	NC	
	Science	66.7%	X
	Algebra I	12.9%	X
	Biology	51.9%	X
	English I	50.3%	X
	English II	35.3%	X
	Geometry	23.4%	X
	Government	48.9%	X
	History	62.4%	X
	Physical Science	13.0%	X
HS			

Post Program Placement

COMPONENT GRADE

A

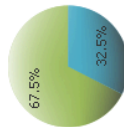
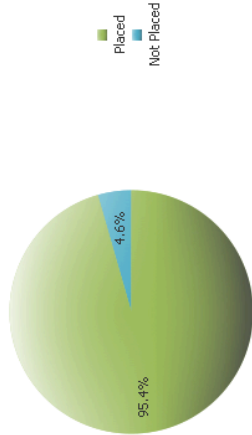


95.4%

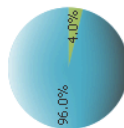
- A = 93.0 - 100.0%
- B = 89.0 - 92.9%
- C = 84.0 - 88.9%
- D = 79.0 - 83.9%
- F = < 79.0%

Post-Program Placement

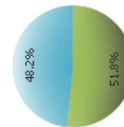
Post-Program Placement measures the proportion of students who are employed, in an apprenticeship, join the military, or are enrolled in postsecondary education or advanced training in the six months after leaving school. Industry credentials measures the proportion of students earning industry credentials or certificates before they leave high school, or in the first six months after leaving school.



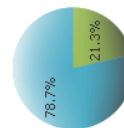
Not Employed Employed



Military Not in military



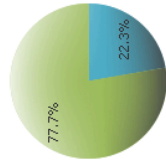
Post Secondary Not In Post Secondary



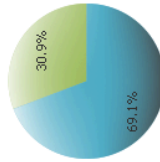
Apprenticeship Not in Apprenticeship

Industry Credentials

Industry Credentials measures the proportion of students earning industry credentials or certificates before they leave high school, or in the first six months after leaving school.



Percentage of students earning ANY credentials **77.7%**



Percentage of students earning at least 12 points in a single credential or in a bundle of credentials in a single career pathway **30.9%**

Appendix III: Outcomes of Secondary Importance

College persistence rate

We considered this indicator but ultimately rejected as it met neither the operational nor political feasibility criteria. First, there are serious challenges to tracking CTE completers into their college years. Even if we were to capture their postsecondary persistence, it would be challenging to incorporate an indicator measured several years after a student's graduation into annual program evaluation. Second, as indicators are measured farther and farther out from students completing the program, political opposition to the indicator increases. Many forces act on students as they proceed through postsecondary, and holding CTE programs accountable for their success in the face of confounding influences may be unfair.

Work-Based Learning option offered

While we agree with stakeholders such as RIDE and employers on the importance of providing students an applied learning option, this indicator sits apart from those we selected because it measures an *input* rather than an output. Merely recording whether or not a program offers work-based learning option does little to show whether or not students are benefitting from it or the quality of the option. Furthermore, many of the CTE Board Standards for programs of study include this requirement, and more are planned to as the Board revises and updates the Standards. Including as a requirement for renewal that individual programs meet the Board Standards for the applicable Program of Study will be sufficient to ensure that programs are focusing on applied learning.

High-demand industry

Like the above indicator, reporting on whether a CTE Program is for a high-wage, high-demand skillset falls under the category of input rather than outcome. Including this as a small piece of a dashboard may be logical, but it makes less sense to include it in an outcomes-focused evaluation. As data on future wages become more reliable, that indicator should support incentivizing investment in high-demand, high-wage programs.

Demonstrated engagement with industry

Like the previous two indicators, we believe that sustained and comprehensive engagement with industry about high-demand skills and appropriate curricula are crucial to a high-quality CTE program. However, as it is an input standard, it does not fit into an outcomes-focused evaluation system. We believe that many of the outcomes proposed will capture the benefits to students of rigorous engagement with industry and many of the CTE Board Standards already include this requirement. This should be a widely publicized minimum requirement for a CTE program, as opposed to a way for programs to be held accountable.

Overall grades and attendance

This measure is operationally feasible to measure and came up multiple times in academic studies as a way to control for differences in student achievement when attempting to determine the returns to CTE programs. However, we believe

they are not directly relevant to program evaluation for two major reasons. First, programs cannot control and thus should not be evaluated based on students' grades and attendance in classes beyond the CTE program. While we recognize it shares this similarity with post-secondary achievement, we believe that indicator is central to the core goals of CTE, while this is not. Second, programs can easily "game" students grades by lowering the standards for high grades in CTE courses. Finally, programs should be preparing *all* students for career and college, and should not use low grades and attendance as an excuse for not doing so.

Standardized test scores

Similar to grades and attendance, standardized test scores reflect some measure of student achievement, but are not core to CTE goals. Given that Rhode Island currently does not have any standardized tests measuring the learning specific to CTE courses, attempting to use overall test scores would be merely a crude proxy for preparedness. Furthermore, standardized test scores are used to track many other educational initiatives, and we do not believe reporting them is an effective or transparent way to evaluate programs, nor is it coherent with RIDE messaging that emphasizes there are multiple avenues for student success.

Appendix IV: Evaluation Results for Top 20 Programs by Number of Concentrators

Program	Denominator Concentrators leaving school 2015-2017	Measure 1A	Measure 1B	Measure 2	Measure 3A	Measure 3B	Measure 5A	Measure 5B	Measure 5C	Measure 5D	Measure 5E
		CTE persistence	Secondary Persistence	Credential/Credit/Apprenticeship	Post-secondary achievement	Well-paying job*	Female	White	IEP	ELL	Free & Reduced Lunch
Program A	134	83%	96%	100%	78%	0%	57%	34%	19%	5%	72%
Program B	108	6%	96%	99%	80%	0%	58%	37%	8%	5%	67%
Program C	89	94%	98%	100%	96%	0%	83%	27%	1%	3%	82%
Program D	70	74%	100%	31%	90%	0%	53%	3%	9%	9%	89%
Program E	68	100%	96%	100%	84%	0%	43%	44%	12%	3%	49%
Program F	67	72%	99%	99%	96%	0%	54%	96%	1%	0%	22%
Program G	65	77%	100%	97%	86%	4%	23%	91%	12%	2%	25%
Program H	65	97%	91%	100%	82%	3%	15%	20%	12%	6%	63%
Program I	64	95%	94%	100%	84%	0%	13%	34%	9%	0%	63%
Program J	64	95%	97%	100%	97%	0%	67%	23%	8%	0%	66%
Program K	61	48%	98%	36%	92%	18%	5%	97%	7%	0%	16%
Program L	56	55%	93%	86%	89%	0%	91%	18%	9%	0%	84%
Program M	56	75%	98%	71%	88%	0%	100%	89%	14%	2%	55%
Program N	49	43%	100%	0%	100%	0%	31%	90%	8%	0%	4%
Program O	48	96%	100%	0%	90%	0%	40%	17%	0%	4%	56%
Program P	48	96%	100%	19%	92%	0%	98%	4%	17%	13%	81%
Program Q	47	98%	94%	100%	91%	8%	96%	32%	13%	4%	72%
Program R	47	98%	98%	100%	74%	9%	13%	40%	6%	0%	53%
Program S	46	67%	98%	0%	85%	0%	96%	43%	17%	2%	67%
Program T	46	80%	100%	0%	83%	0%	61%	46%	7%	0%	59%

*The denominator for Measure 3B is different from the listed denominator, as only concentrators who never enrolled in postsecondary are included

Appendix V: Note on Adjusted Measures

One concern regarding program evaluation and accountability is that different programs serve different populations of students. While RIDE is setting initiatives in place to encourage diverse enrollment in CTE programs, and Perkins IV has long required reporting on non-traditional participants in CTE programs (theoretically incentivizing focus on these disparities), discrepancies in pre-existing differences in student ability or likelihood of success may remain between CTE programs.

Ohio, which has developed the most analogous evaluation and accountability system to what we propose here, has chosen not to attempt to control for this variation between programs. From their perspective, such calculations would not provide enough benefit to make the logistical tradeoff worthwhile. Furthermore, we believe that introducing complex statistical methods to implement such controls will severely impact the clarity and transparency of the evaluation system. For these reasons, our proposed measures do not control for pre-existing differences in student population between programs.

However, if RIDE determines that such controls are a priority, we recommend that they present “adjusted measures” alongside each proposed measure. Adjusted measures should be calculated through linear regression. The dependent variable would be a dummy variable for the specific indicator relevant to that measure (i.e., likelihood of completing the full program sequence for Measure 1A, or likelihood of either enrolling in postsecondary or becoming employed for measure 3A). The independent variables would include a series of dummy variables indicating which program a student was a concentrator in, their race, gender, and 8th-grade standardized test scores.

Appendix VI: List of Interviewees

- Shaun M. Dougherty, Assistant Professor of Education and Public Policy, University of Connecticut
- Casey Haugner Wrenn, Assistant Commissioner, Division of College, Career and Technical Education, Tennessee Department of Education
- Danielle Mezera, Principal Consultant and Owner, DCM Consulting (formerly with the Tennessee Department of Education)
- Emily Passias, Director of Office of Career and Technical Education, Ohio Department of Education
- Joe Battaglia and Nancy Diaz, The Metropolitan Regional Career and Technical Center, Providence, Rhode Island
- Cindy Kazanis, Director of Analysis, Measurement & Accountability and Reporting, California Department of Education
- Charlotte Cahill, Associate Director, Pathways to Prosperity, Jobs for the Future
- Luke Rhine, Director, Career & Technical Education and STEM Initiatives, Delaware Department of Education
- Annie Phillips, Associate, Education Strategy Group
- Kate Kreamer, Deputy Executive Director, Advance CTE
- Katherine Caves, Post-Doctoral Researcher, CEMETS, KOF Swiss Economic Institute, ETH Zurich
- Bob Schwartz, Senior Fellow, Harvard Graduate School of Education and Jobs for the Future
- Ten interviews with RIDE internal staff
- Two working groups in Rhode Island with CTE stakeholders

Notes

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- ^{xii} Advance CTE. (n.d.). *Policy Benchmark Tool*. page 26
- ^{xiii} Advance CTE. (n.d.). *Policy Benchmark Tool*. Page 24-25
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- ^{xx} Dougherty, S. M. (2016). The effect of career and technical education on human capital accumulation: Causal evidence from Massachusetts. *Education Finance and Policy*.
- ^{xxi} “CTE Regulations,” accessed October 30, 2017, <http://sos.ri.gov/documents/archives/regdocs/released/pdf/DESE/6665.pdf>.
- ^{xxii} We distinguish between transferrable and non-transferrable (articulated) credits. RIDE’s goal is that students leaving CTE programs will be able to receive credit at *any* institution they wish to attend.
- ^{xxiii} “CTE Regulations.”
- ^{xxiv} “Tennessee Department of Education Division of Career and Technical Education Report Card Definitions,” accessed December 15, 2017, https://www.tn.gov/content/dam/tn/education/ccte/cte/cte_data_report_card_definitions.pdf.
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