



ADVANCE > CTE

State Leaders Connecting Learning to Work

USING DATA TO IDENTIFY AND ADDRESS CTE OPPORTUNITY GAPS

Participant Workbook

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INTRODUCTION

The promise of Career Technical Education (CTE) is to provide opportunities for each learner to follow their passion and achieve career goals and future economic success. While high-quality CTE programs of study across the country are delivering positive outcomes for learners, the reality is that not all learners have access to these programs. The Strengthening Career and Technical Education for the 21st Century Act (Perkins V) elevated the importance of access and equity and has challenged states and local recipients to prioritize this work to address identified gaps.

Aligning to [Advance CTE's Statement on Equity](#) (see page 1) and [Without Limits: A Shared Vision for the Future of Career Technical Education](#), this workshop is designed to facilitate a process with teams from local school districts and/or postsecondary institutions to examine their CTE enrollment data to identify and address opportunity gaps. Through a facilitated, inquiry-based approach, participants will identify and prioritize root causes, explore evidence-based intervention strategies, and propose specific action steps to address these gaps. This workshop is geared to launch data-driven deep discussions within local communities, including those currently under-served by CTE, to provide insight and propel meaningful action to enhance access to CTE opportunities for each learner.

This participant workbook includes guidance, worksheets and exercises to accompany the workshop and is meant to be completed concurrently.





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OBJECTIVES

AT THE CONCLUSION OF THIS WORKSHOP, PARTICIPANTS WILL BE ABLE TO:



Discuss why equity is important in CTE and understand common equity and access challenges in CTE.



Use a percentage-point gap analysis with CTE enrollment data to identify opportunity gaps.



Leverage different tools and techniques to investigate opportunity gaps and identify root causes.



Draw on practical evidence-based strategies to address root causes and barriers to access.



Identify action steps and prioritize areas in which additional stakeholder input is needed.

ADVANCE CTE'S STATEMENT ON EQUITY IN CTE

Historically, CTE — once called vocational education — was an alternative educational option for learners who were considered not college bound. As a result, a disproportionate number of learners from low-income families, learners of color, learners with disabilities, female learners and other historically marginalized populations were “tracked” into terminal vocational programs that denied their full potential and left them with limited opportunity.

Today, the quality of CTE has vastly improved, making it a preferred path for many secondary and postsecondary learners. Yet even today, many learners do not have access to high-quality programs of study in their communities. The same systemic barriers that contributed to tracking in the 20th century — implicit and overt biases, resource inequity, school segregation — result in inequities today.

State leaders have a critical responsibility to ensure that each learner has opportunities for career success and is supported in identifying and realizing their goals. State leaders must identify and dismantle historical barriers and construct systems that support each learner in accessing, feeling welcome in, fully participating in and successfully completing a high-quality CTE program of study. Meeting this goal means leveraging data to identify and address equity gaps, building trust with historically marginalized communities, establishing feedback loops to ensure that each voice is heard, allocating resources appropriately to expand access to high-quality CTE, and putting measures in place to support each learner to achieve success.

Once the right systems are in place, CTE can be a powerful tool for closing achievement and opportunity gaps. High-quality CTE programs of study can prepare each learner to earn a credential of value that enables them to achieve economic and social mobility, obtain employment in a career of choice with family-sustaining wages, and access opportunities for advancement and lifelong learning. Only through such an intentional focus on equity will states be able to truly put learner success first.¹



ORIENTATION TO EQUITY IN CTE



Let's start with some key terms and definitions. Use the table below to write the definitions for the following terms in your own words. What does **diversity** mean to you? What about **inclusion**? **Equity**? As you complete this exercise keep in mind the many different identities learners possess: race/ethnicity, gender identity, socioeconomic status, disability, etc.

Diversity	Inclusion	Equity

NOTES:

KEY TERMS AND DEFINITIONS

The following terms and definitions will be used throughout the workshop. Refer to this glossary to understand what they mean and how they are used in the context of the workshop.

- **Access** — The ways in which educational institutions and policies ensure that learners have equal opportunities to participate in and take full advantage of their education. Access depends on factors such as geography, resources, academic preparation and awareness.
- **Diversity** — Representation; composition. A wide range of qualities and attributes within a person, group or community. When we celebrate diversity, communities and workplaces become richer, drawing upon the variety of experiences, perspectives and skills that people can contribute.² Diversity can address a variety of factors. In CTE, the special populations and subgroups that are described in this section are the typical ways that we consider diversity.
- **Equality** — An approach to distributing resources and opportunities proportionally without consideration of differences in needs.
- **Equity** — Fairness in outcomes; creating just outcomes; giving everyone what they need to be successful. Acknowledging everyone's unique situation and addressing historical and current-day systemic barriers. (Contrast with equality, in which each individual is treated the same.)³
- **Implicit Bias** — Attitudes or stereotypes that affect our understanding, actions and decisions in an unconscious manner. These biases, which encompass both favorable and unfavorable assessments, are activated involuntarily and without an individual's awareness or intentional control.⁴
- **Inclusion** — Acknowledging and valuing people's differences so as to enrich or shift social planning, decisionmaking and quality of life for everyone. In an inclusive society, we all have a sense of belonging, acceptance and recognition as valued and contributing members of society.⁵
- **Non-Traditional Fields** — As defined by Perkins V, occupations or fields of work for which individuals from one gender comprise less than 25 percent of individuals employed in such occupation or field of work.⁶
- **Opportunity Gap** — An observable disparity in access and/or outcomes for a specific subgroup or special population. These gaps are due to systemic inequities, implicit biases, stereotypes, and outright discrimination based on group identities.
- **Percentage-Point Gap Analysis** — An analysis that reveals whether or not the individuals in a specific program are proportionally representative of the demographics of their broader community.
- **Root Cause Analysis** — A method of problem solving designed to uncover the deepest root(s) and most basic reasons for identified concerns.⁷
- **Special Populations** — Nine special populations recognized in Perkins V: (A) individuals with disabilities; (B) individuals from economically disadvantaged families, including low-income youth and adults; (C) individuals preparing for fields that are non-traditional for their gender; (D) single parents, including single pregnant women; (E) out-of-workforce individuals; (F) English learners; (G) individuals experiencing homelessness; (H) youth who are in, or have aged out of, the foster care system; and (I) youth with a parent who is a member of the armed forces and is on active duty.⁸ *Please note that, for clarity, this workbook uses the terminology used in the Perkins V legislation to identify special populations. The use of deficit-based language such as "economically disadvantaged" is discouraged outside of this context.*
- **Subgroups** — A population of individuals with a common identity, often used when disaggregating and analyzing data. CTE data is often disaggregated by the following racial, ethnic and gender subgroups: Black learners, Native American learners, Asian learners, Pacific Islander learners, Latinx learners, White learners, male learners and female learners.





EQUITY-MINDED PRINCIPLES

Having the right mindset is important when we approach equity work in education. Otherwise, we risk carrying our own biases into the work and ultimately may end up doing more harm than good. Examining opportunity gaps requires making a critical examination of the systems, policies and practices that limit learner success, including the roles we as individuals play in furthering them. The three components to being an equity-minded leader are:⁹

- 1. Being race-conscious — noticing and questioning patterns of educational outcomes that reveal opportunity gaps and viewing inequities in the context of a history of exclusion and discrimination;**
- 2. Being aware that beliefs, expectations and practices can be racialized unintentionally through implicit biases; and**
- 3. Being willing to actively work to dismantle systems that perpetuate inequity.**

Once we adopt these principles, we can more effectively identify the root causes of CTE opportunity gaps and create an evidence-based action plan. The following exercise is designed to encourage participants to think about problems of practice — and locate barriers in policies, practices and systems — rather than focus on learner deficits.

One common mistake people make when they complete an opportunity gap analysis is attributing outcomes and behaviors to individual decisions or preferences. It is easy to point to learners and say that “they just don’t want to join this program” or “maybe it wasn’t the best fit,” thereby attributing differences in outcomes to individual characteristics. This approach — locating the problem with the learner — is called deficit-based thinking because it blames the learner rather than identifying their strengths.

When we take a strengths-based approach to opportunity gap analysis, we start by recognizing and celebrating learners’ individual strengths and then locating the problems in the systems and structures that keep them from realizing their full potential. Instead of saying, “They just don’t want to join this program,” maybe we should start by asking, “Who is missing out because they haven’t been invited or don’t feel welcome in this program?”

Deficit-Based Thinking:

Locating the source of a problem in individual decisions or preferences — in other words, blaming the learner

Strengths-Based Thinking:

Recognizing and celebrating learners’ strengths and locating root causes in systems and structures



For this workshop, shifting our mindsets from deficit-based to strengths-based thinking is important. When we get to the root cause analysis section, it might be easy to default to blaming the learner, locating the deeper causes in learners' motivations, behaviors or attitudes. Using a strengths-based approach, however, helps us center the learner's strengths and focus our attention on the truest and deepest causes of the opportunity gap.

In this activity, we want to shift our thinking and our language from deficit-based thinking to strengths-based thinking. Below is a list of stereotypes or perceptions about CTE learners, families and programs that may be present in a school or college. How can you reframe these statements using a strengths-based lens? Write your responses in the "Strengths-based thinking" column.

Deficit-based thinking	Strengths-based thinking
<i>Example: The reason there are only boys in my welding program is because girls just aren't interested in welding.</i>	<i>Example: There are girls in our school who would excel in welding, but they don't feel welcome in these programs and haven't been invited in.</i>
We've tried to get parents more information about our CTE programs, but they never show up to our open houses.	
This program is too rigorous for some students. They just don't have the motivation or the academic knowledge to make it in my classes.	
CTE just isn't valued in their culture. That's why we never get "those" students in our programs.	
The program is too rough for students who don't like to get their hands dirty.	
We always get a lot of interest in my program at the beginning of the year, but as soon as students find out how much they have to pay for equipment and exam fees, they all back out.	



CONDUCTING A PERCENTAGE POINT GAP ANALYSIS



WHAT IS A PERCENTAGE-POINT GAP ANALYSIS?

One indication of an equitable CTE program is parity between the learners in the program and the broader population. If there were no barriers to access, we would expect the learners enrolled in CTE programs to reflect the demographics of the learners in the school, district, college or broader community.

Conducting a percentage-point gap analysis reveals whether or not CTE learners are proportionally representative of their community. This analysis can also reveal the programs with the largest disparities and help prioritize interventions. The table below illustrates how to conduct this analysis.

While this example looks only at CTE enrollment as a whole, this analysis can and should be conducted at the program level as well. Often, opportunity gaps across programs can be masked by looking at aggregated data. Program-level data can help you understand whether there are disparities in access to programs aligned to high-wage, in-demand occupations or if learners are accessing programs that are non-traditional for their gender identity.

STEP

EXAMPLE

1. Calculate the overall percentage of learners in each subgroup or special population in the school, district, college or community.

There are 500 learners in grades 9-12 enrolled in Heartland Public School District. Out of those learners, 50 have an Individualized Education Program (IEP) and are categorized as students with disabilities. **Therefore:**

$$\frac{50}{500} = .1 \text{ or } 10\%$$

Interpretation: In total, 10% of grade 9-12 learners in Heartland Public School District are students with disabilities.

2. Calculate the percentage of CTE learners in each subgroup/special population.

Heartland Public School District has three CTE programs of study: Welding, Allied Health and Culinary Arts. Out of the 60 total CTE learners in Welding, three are students with disabilities. **Therefore:**

$$\frac{3}{60} = .05 \text{ or } 5\%$$

Interpretation: Out of 60 CTE learners in the Welding program in Heartland Public School District, 5% are students with disabilities.



STEP

3. Calculate the difference between the percentages to find the percentage-point gap.

EXAMPLE

Out of all of the learners in Heartland Public School District high schools, 10% are students with disabilities. Only 5% of learners enrolled in Welding are students with disabilities.

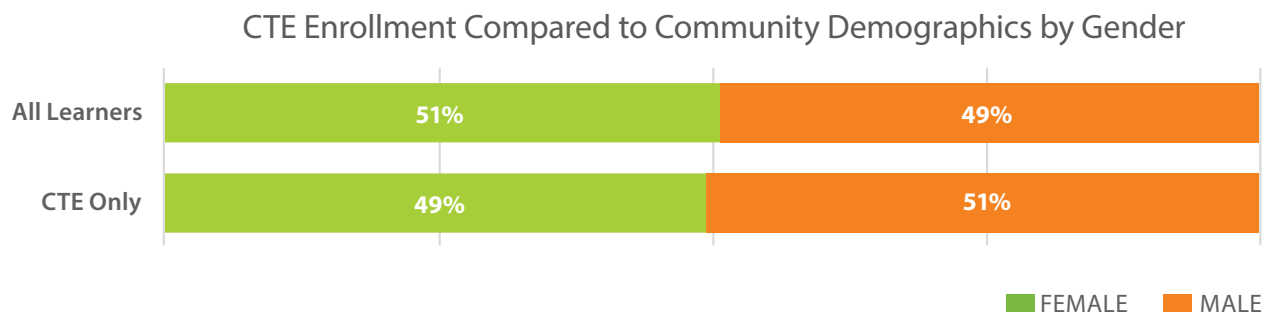
$$10\% - 5\% = 5 \text{ percentage points}$$

There is a 5 percentage-point gap between the population of students with disabilities enrolled in Welding and the overall population.

Interpretation: In Heartland Public School District, students with disabilities are *under-represented* in Welding by 5 percentage points.

EXAMPLE: HEARTLAND PUBLIC SCHOOL DISTRICT

The following graphs represent fictitious data for Heartland Public School District.

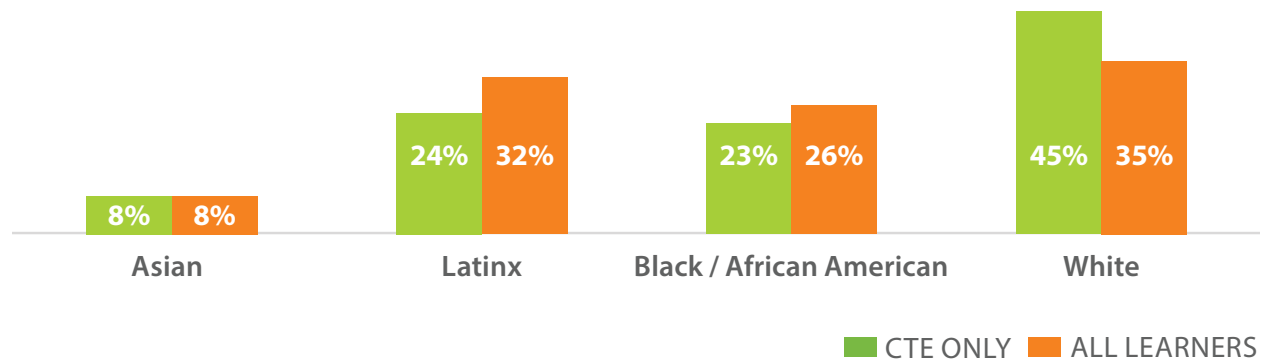


INTERPRETATION: Female learners are under-represented by 2 percentage points in CTE compared to all grade 9-12 learners in Heartland Public School District.



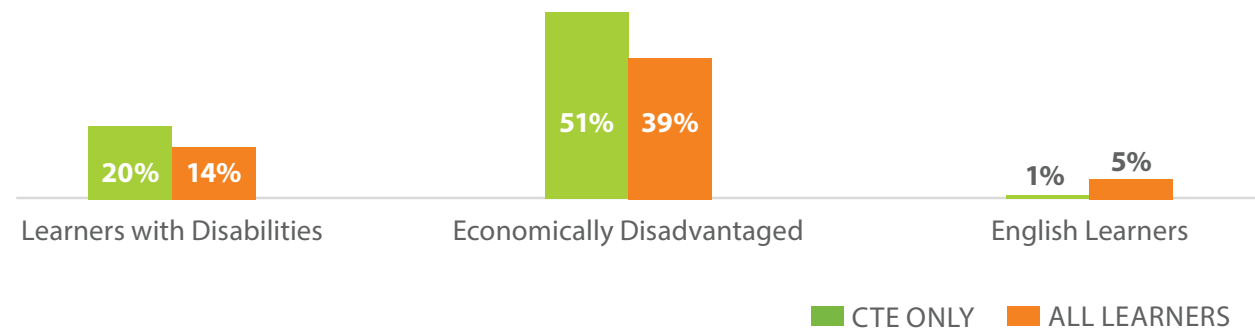
EXAMPLE: HEARTLAND PUBLIC SCHOOL DISTRICT

CTE Enrollment Compared to Community Demographics by Race / Ethnicity



INTERPRETATION: Latinx learners are under-represented in CTE by 8 percentage points compared to all grade 9-12 learners in Heartland Public School District. Black learners are also under-represented by 3 percentage points, and White learners are over-represented by 10 percentage points.

CTE Enrollment Compared to Community Demographics by Special Population



INTERPRETATION: Students with disabilities are over-represented in CTE by 6 percentage points compared to all grade 9-12 learners in Heartland Public School District. Economically disadvantaged learners are also over-represented by 12 percentage points, and English learners are under-represented by 4 percentage points.



READING THE OPPORTUNITY GAP ANALYSIS DASHBOARD

Two components of the Opportunity Gap Analysis Dashboard will aid you in identifying CTE programs or programs of study with notable opportunity gaps:

1. DASHBOARD:

The “Dashboard” tab demonstrates at a glance how the CTE population compares to the overall population in the school, district, college or community. A number of charts and graphs illustrate the degree to which learners are over- or under-represented in CTE or in specific programs by subgroup and special population. This tab is meant to provide high-level trends and allow you to identify areas for further examination.

2. PROGRAM ENROLLMENT HEATMAP:

There are program enrollment tabs for secondary CTE and for postsecondary CTE. These tabs allow you to drill down to the program level to determine whether disparities differ by program area. The heatmap automatically highlights programs with over- or under-represented populations.

Understanding the Heatmap

- Cells are highlighted **BLUE** if the learner subgroup is **over-represented** by 10 percentage points or more.
- Cells are highlighted **ORANGE** if the learner subgroup is **under-represented** by 10 percentage points or more.



HEARTLAND PUBLIC SCHOOL DISTRICT PROGRAM ENROLLMENT HEATMAP

F = Female
M = Male
SWD = Students with Disabilities
ED = Economically Disadvantaged
EL = English Learners

Program Name	Career Cluster	Enrollment	F	M	Asian	Latinx	Black	White	SWD	ED	EL
Accounting Technology/Technician & Bookkeeping	Finance	58	-4%	4%	-8%	-2%	-19%	29%	-9%	17%	-5%
Administrative Assistant and Secretarial Science, General	Business Management & Administration	34	49%	-49%	-8%	4%	9%	-6%	57%	55%	-5%
Applied Horticulture/Horticulture Operations, General	Agriculture, Food & Natural Resources	36	16%	-16%	-8%	7%	8%	-7%	61%	28%	-2%
Architectural Technology/Technician	Architecture & Construction	39	-20%	20%	8%	-27%	-13%	47%	-9%	2%	-5%
Automobile/Automotive Mechanics Technology/Technician	Transportation, Distribution & Logistics	60	-38%	38%	-1%	-18%	21%	-2%	-2%	-2%	-5%
Business Administration/Management	Business Management & Administration	65	9%	-9%	-1%	-15%	8%	8%	-11%	3%	-5%
Carpentry/Carpenter	Architecture & Construction	58	-35%	35%	-6%	-20%	7%	3%	12%	-1%	-5%
Child Care Provider/Assistant	Human Services	62	49%	-49%	-6%	1%	-5%	10%	41%	39%	-4%
Child Development	Education & Training	49	45%	-45%	-5%	9%	7%	-11%	35%	27%	-5%
Computer Programming/Programmer, General	Information Technology	78	-36%	36%	10%	-19%	-18%	27%	-14%	-9%	-5%
Cosmetology/Cosmetologist, General	Human Services	70	46%	-46%	-8%	-3%	-4%	15%	16%	13%	-4%
Criminal Justice/Police Science	Law, Public Safety, Corrections & Security	62	-38%	38%	-8%	-16%	8%	15%	-11%	13%	-4%
Culinary Arts/Chef Training	Hospitality & Tourism	59	-5%	5%	-6%	9%	-5%	-1%	-7%	14%	-5%
Digital Communications & Media/Multimedia	Arts, A/V Technology & Communications	72	-4%	4%	-2%	-11%	-16%	32%	-6%	6%	-5%
Engineering, General	Science, Technology, Engineering & Mathematics	69	-23%	23%	20%	-10%	-17%	22%	-13%	-4%	-5%
Food Preparation/Professional Cooking/Kitchen Assistant	Hospitality & Tourism	43	9%	-9%	-8%	3%	2%	0%	70%	38%	-3%
Health Services/Allied Health/Health Sciences, General	Health Science	75	25%	-25%	3%	-18%	-10%	25%	-11%	0%	-5%
Landscaping & Groundskeeping	Agriculture, Food & Natural Resources	26	-43%	43%	-8%	14%	-3%	-12%	51%	38%	3%
Logistics, Materials and Supply Chain Management	Transportation, Distribution & Logistics	60	-14%	14%	1%	2%	-1%	-2%	-2%	18%	-5%
Manufacturing Engineering Technology/Technician	Manufacturing	82	-27%	27%	24%	-19%	-19%	14%	-12%	-9%	-5%
Mechatronics, Robotics and Automation Engineering	Science, Technology, Engineering & Mathematics	40	-21%	21%	10%	-19%	-1%	10%	-9%	31%	-5%
Nursing Assistant/Aide and Patient Care Assistant/Aide	Health Science	62	43%	-43%	-6%	17%	5%	-16%	36%	37%	-4%
Radio & TV Broadcasting Technology/Technician	Arts, A/V Technology & Communications	57	5%	-5%	-4%	-16%	9%	11%	2%	-4%	-5%
Restaurant/Food Services Management	Hospitality & Tourism	55	0%	0%	-4%	10%	-8%	-8%	-9%	21%	-5%
Small Engine Mechanics & Repair Technology/Technician	Transportation, Distribution & Logistics	12	-43%	43%	1%	-7%	-1%	7%	69%	53%	-5%
Web Page, Digital/Multimedia and Information Resources Design	Information Technology	85	1%	-1%	4%	-13%	-9%	18%	-10%	4%	-5%
Welding Technology/Welder	Manufacturing	36	-48%	48%	-8%	-9%	13%	4%	-3%	22%	-5%
	Overall Under-/Over-Representation		-2%	2%	0%	-7%	-3%	10%	6%	13%	-5%

INTERPRETATION: In the most popular CTE program (Web Page, Digital/ Multimedia and Information Resources Design), Latinx learners are under-represented by 13 percentage points, White learners are over-represented by 18 percentage points, and students with disabilities are under-represented by 10 percentage points.

Using the Heartland Public School District Heatmap, identify at least one special population or subgroup with an opportunity gap in one or more programs.

Are there any other observations you note based on this data?



REVIEWING YOUR LOCAL DATA



INTERPRETING YOUR DATA

Now that we have practiced the opportunity gap analysis process using the Heartland Public School District dashboard, it is time to take a look at your own data. Refer to your **Opportunity Gap Analysis Dashboard** to complete this activity. To help you interpret your data, first gain an understanding of which learners are included in the dashboard.

Complete the table below describing the learner populations represented in your data.

WHICH LEARNER POPULATIONS ARE INCLUDED IN YOUR ANALYSIS?		
EDUCATION LEVEL	CTE POPULATION	COMPARISON POPULATION
Example:	<i>All CTE concentrators enrolled in CTE programs in Heartland Public School District</i>	<i>All grade 9-12 learners in Heartland Public School District</i>
SECONDARY		
POSTSECONDARY		

REVIEWING SECONDARY DATA – ENROLLMENT IN CTE

Looking at your Opportunity Gap Analysis Dashboard, discuss the following questions:

1. Overall, to what extent does the diversity of the CTE learner population reflect the diversity of your comparison population?
2. List the specific subgroups and special populations that are *under-represented* in CTE overall.
3. List the specific subgroups and special populations that are *over-represented* in CTE overall.

REVIEWING SECONDARY DATA – PROGRAM-LEVEL DATA

- 1. List the CTE programs or programs of study in which enrollment by learner subgroup and special population is proportional to the comparison population's demographics (as close to 0 percentage points as possible).**
- 2. List all the CTE programs or programs of study that have one or more subgroups and/or special populations that are under-represented (list program and subgroup and/or special population).**
- 3. List all the CTE programs or programs of study that have one or more subgroups and/or special populations that are over-represented (list program and subgroup and/or special population).**



REVIEWING SECONDARY DATA – PROGRAM-LEVEL DATA

4. What surprised you about the data?

5. In what areas do you think you are doing well in serving all learners?



REVIEWING POSTSECONDARY DATA – ENROLLMENT IN CTE

Looking at your Opportunity Gap Analysis Dashboard, discuss the following questions:

1. Overall, to what extent does the diversity of the CTE learner population reflect the diversity of your comparison population?
2. List the specific subgroups and special populations that are *under-represented* in CTE overall.
3. List the specific subgroups and special populations that are *over-represented* in CTE overall.



REVIEWING POSTSECONDARY DATA – PROGRAM-LEVEL DATA

- 1. List the CTE programs or programs of study in which enrollment by learner subgroup and special population is proportional to the comparison population's demographics (as close to 0 percentage points as possible).**
- 2. List all the CTE programs or programs of study that have one or more subgroups and/or special populations that are under-represented (list program and subgroup and/or special population).**
- 3. List all the CTE programs or programs of study that have one or more subgroups and/or special populations that are over-represented (list program and subgroup and/or special population).**

REVIEWING POSTSECONDARY DATA – PROGRAM-LEVEL DATA

4. What surprised you about the data?

5. In what areas do you think you are doing well in serving all learners?



IDENTIFYING OPPORTUNITY GAPS



AN OPPORTUNITY GAP occurs when specific subgroups or special populations of learners have disproportionate access (or lack of access) to high-quality learning opportunities or when the environmental conditions are insufficient for specific subgroups of learners or special populations to be successful. These gaps result from systemic, structural and social barriers such as admissions policies, implicit bias, stereotyping or insufficient funding. The first sign of an opportunity gap in CTE is when learners are disproportionately enrolled in CTE by their subgroup or special population status.

Using the data in your dashboard, identify **five opportunity gaps** for further examination. Consider the following questions:

- **Who is most affected?**
- **What is the direction and degree of the opportunity gap?**
- **Where does the opportunity gap occur?**
- **When does the opportunity gap occur?**

*** Do not focus on causes of the opportunity gap — simply use the data to make statements.*

To prioritize your opportunity gaps, consider focusing your data analysis on:

- **Programs with the most sizable gaps;**
- **The most popular programs;**
- **Programs that do not have a compromising n-size;**
- **Programs with gaps affecting multiple learner groups; and**
- **Gaps that are unexpected and/or not currently being addressed.**

OPPORTUNITY GAP EXAMPLE

Who: Latinx learners

What: Under-represented by 27 percentage points

Where: In the Architectural Technology program

When: In the 2018-19 school year

OPPORTUNITY GAP #1:



OPPORTUNITY GAP #2:

OPPORTUNITY GAP #3:

OPPORTUNITY GAP #4:

OPPORTUNITY GAP #5:



BRAINSTORMING ROOT CAUSES



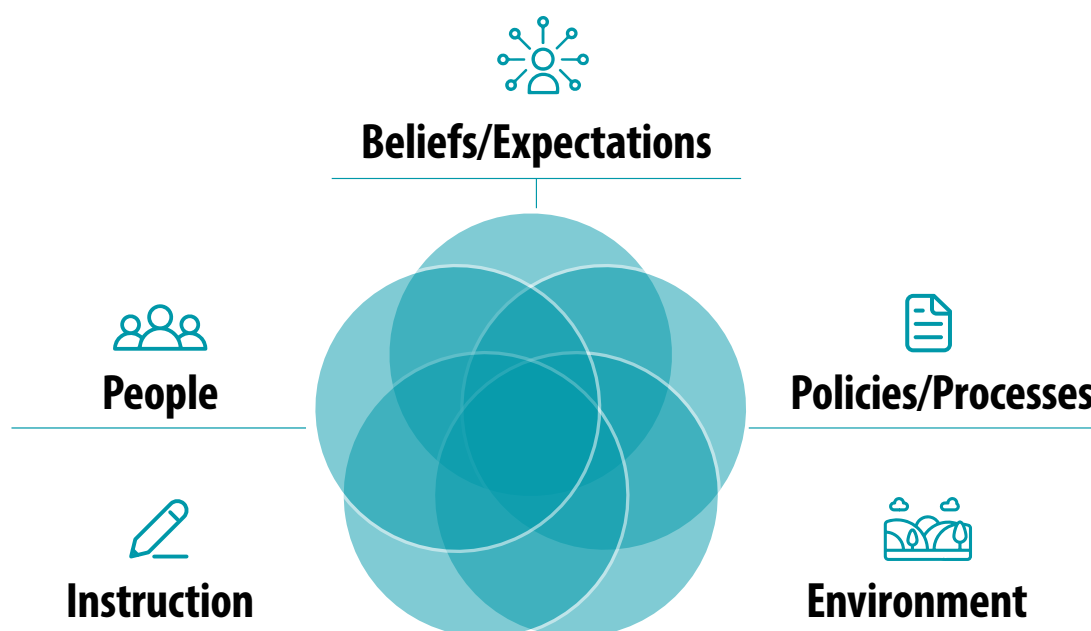
CONDUCTING A ROOT CAUSE ANALYSIS

A **root cause analysis** is a method of problem solving designed to uncover the deepest root(s) and most foundational reasons for the identified concerns. It is an effective tool to investigate and uncover the cause(s) of a problem rather than treat symptoms of the problem. Following the identification of root causes, strategies can be deployed to change policies or shift investments and resources to move to solutions that can have transformative impacts. A root cause analysis induces discussion and reflection with conversations grounded in data. The process includes open and honest deliberations in a brave, collaborative environment to foster examination of data and brainstorm potential causes of the identified opportunity gap.

A systems approach is critical to identify root causes. Systems are composed of an organized array of interdependent and interacting components. While you may start with identifying specific individual parts, as this analysis unfolds you will note how these different parts are interacting. One way to organize this systems approach for the root cause analysis for the opportunity gaps identified is listed on page 22. Some root causes may cross categories and may not seem to fit discretely into a specific category. These categories are merely an organizational tool to help you consider all possible causes through various lenses.

There is a human tendency to blame individuals (or their families) for the problems they experience, but root causes are typically systemic. Yes, there may be individual differences between two students in their interest, motivation, commitment and family support. However, the group differences that are revealed by the gap analysis point to systemic, not individual, factors that create barriers and different opportunities.

Another human tendency is to blame the individual's culture — to see the gap as reflective of a deficit in the person's culture or cultural beliefs. However, a root cause analysis calls for “decentering” — seeing things from the perspective of the groups that are under-represented, understanding their experiences from their vantage point, and not pathologizing or blaming them or their culture. If we do not take this stance, we sometimes end up blaming groups for the biases and stereotypes that have been inflicted on them, i.e., we “blame the victim.”



BELIEFS/EXPECTATIONS: The broader expectations and values in relation to CTE itself and/or to specific learner groups. This category is where we may see examples of implicit bias, CTE stigma and stereotypes about particular groups.

POLICIES/PROCESSES: State, district and/or institutional policies and procedures that create barriers to access or success in CTE programs. This category may include admission requirements, scheduling barriers or funding limitations.

ENVIRONMENT: The geographic and/or socioeconomic factors that affect access and/or prevent learners from realizing their education and career goals. This category may include lack of access to equipment, financial barriers and/or transportation.

INSTRUCTION: The barriers to teaching and learning in the CTE classroom such as lack of accommodations for students with disabilities, teaching strategies that are not inclusive, bias in the curriculum, or insufficient academic preparation prior to entering the CTE program.

PEOPLE: Barriers related to staffing — such as insufficient numbers of school counselors or career advisers, shortages of qualified teachers and faculty, and/or lack of leadership capacity — or lack of representational diversity in the CTE teacher workforce and among industry partners.

HEARTLAND PUBLIC SCHOOL DISTRICT ROOT CAUSE ANALYSIS EXAMPLE

Opportunity Gap:

Latinx learners are under-represented by 27 percentage points in the Architectural Technology program in the 2018-19 school year.

Possible causes:

- Latinx families are not aware of this CTE program. *(beliefs/expectations)*
- This CTE program is not located in the communities where most Latinx families reside. *(environment)*
- Recruitment material for this program is provided only in English. *(policy/process)*
- The high school where this program is located has only one part-time Latinx teacher. *(people)*

INDIVIDUAL BRAINSTORMING

Using the opportunity gap statement assigned to your small-group discussion, list all possible causes you can think of for this opportunity gap.

POTENTIAL CAUSES:

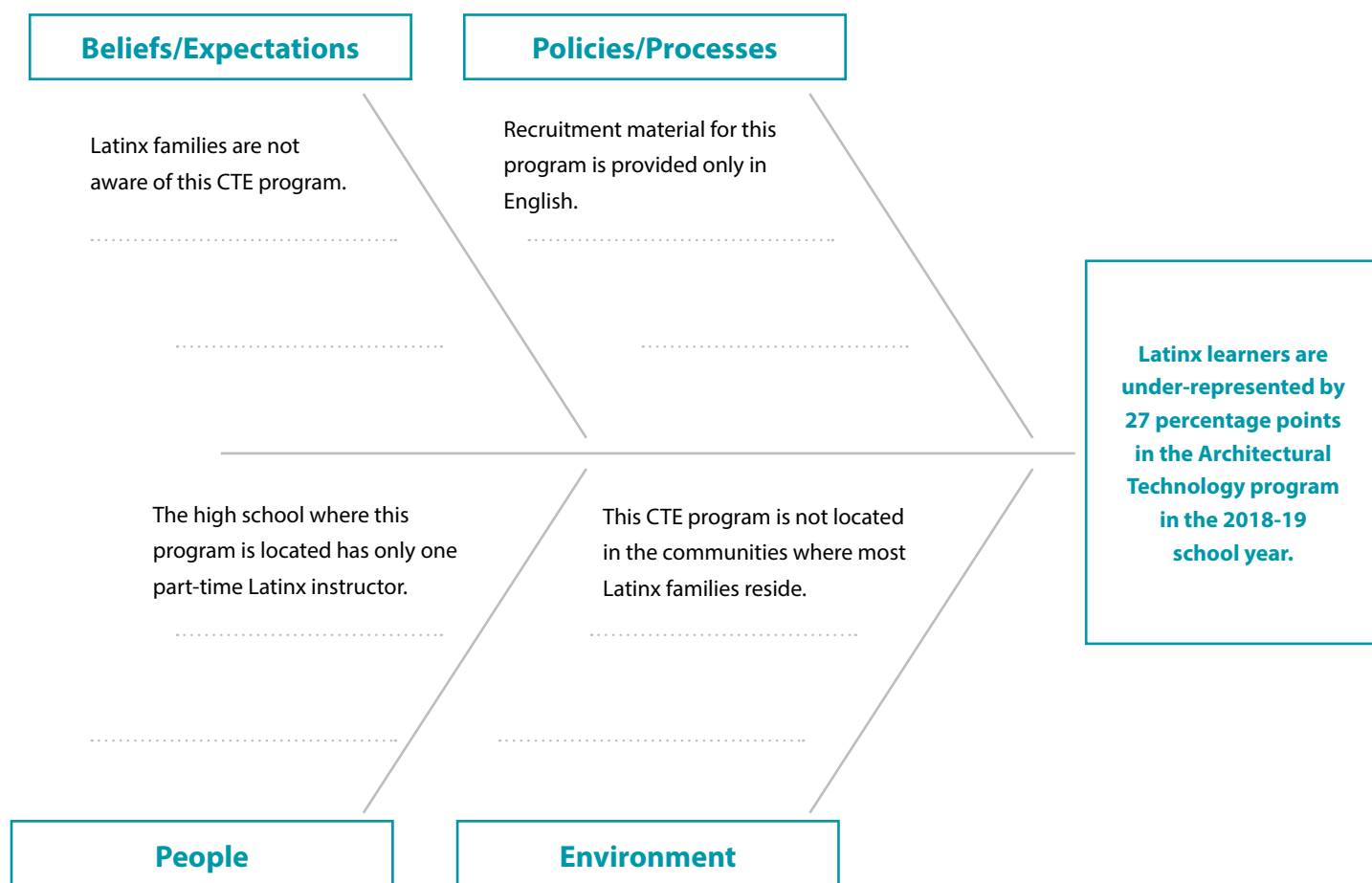


USING A FISHBONE DIAGRAM

A **fishbone diagram** is a visual way to brainstorm and identify possible causes of a problem by sorting ideas into useful categories. The problem, in our case identified as the “opportunity gap,” is displayed at the head of the fish. Possible causes are listed on the smaller bones under various categories. Team members work collaboratively to brainstorm, question and consider alternative causes from various perspectives during this exercise. The fishbone diagram can be helpful in identifying causes that might not have been considered by pushing participants to ask questions and dig beyond the surface to better understand systems and underlying processes that may be contributing to and/or causing the identified opportunity gap. More than one root cause can be identified through this approach.

Below is an example of some of the ideas that began to surface using the Heartland Public School District data dashboard to address the specific opportunity gap. After initial brainstorming, the group worked together to organize their ideas into categories to better understand potential causes for this gap. Clarifying questions posed by the individuals in the group as ideas were posted contributed to the deeper level of understanding of potential causes.

HEARTLAND PUBLIC SCHOOL DISTRICT FISHBONE DIAGRAM



IDENTIFYING ROOT CAUSES

A number of factors can result in disparities in enrollment. Thinking of root causes in terms of systems-level barriers is helpful. These barriers can include those related to **beliefs and expectations, policies and processes, environment, instruction** or **people**. Use the diagram below to list out the major root causes you identified through your root cause analysis in your group discussion for the specific opportunity gap.

THEME 1

THEME 2

THEME 3

OPPORTUNITY GAP STATEMENT

CAUSE 1

CAUSE 1

CAUSE 1

CAUSE 2

CAUSE 2

CAUSE 2

CAUSE 3

CAUSE 3

CAUSE 3

CAUSE 1

CAUSE 1

CAUSE 1

CAUSE 2

CAUSE 2

CAUSE 2

CAUSE 3

CAUSE 3

CAUSE 3

THEME 4

THEME 5

THEME 6



VALIDATING ASSUMPTIONS AND CONSIDERING OTHER INPUT

When completing a root cause analysis, you may also realize that you need more input from others to assist in determining and validating your assumptions. Whom do you need to consult to get perspective and further explore and/or confirm the accuracy of these assumptions?

STAKEHOLDER GROUP/ SPECIFIC PERSON	WHAT DO YOU WANT TO EXPLORE?	HOW WILL YOU DO THIS?
Parents of learners with disabilities	To what degree are CTE options for learners with disabilities limited by the lack of transportation to Heartland Area Technical Center?	Organize a series of focus groups with parents of learners with disabilities, one for each high school in the Heartland Public Schools district.



VALIDATING ASSUMPTIONS AND CONSIDERING OTHER INPUT

You may also have data from your Comprehensive Local Needs Assessment and other sources that can inform and/or validate assumptions. List other data sources to be reviewed along with any specific detail on what you will examine below.

OTHER DATA SOURCES	SPECIFIC INFORMATION TO EXAMINE/EXPLORE



VALIDATING ASSUMPTIONS AND CONSIDERING OTHER INPUT

You may have also uncovered policies that need to be examined to fully address the identified root cause(s) for this opportunity gap. List these policies and how you will address them below.

POLICIES TO EXAMINE	HOW WILL THIS BE DONE?



PRACTICAL STRATEGIES TO IMPROVE ACCESS AND EQUITY



UNDERSTANDING DIFFERENT LEVELS OF EVIDENCE

The next step in developing an equity action plan is to identify impactful strategies that will help you close opportunity gaps. The best place to start is with existing evidence. Learning how other states, districts, colleges and schools addressed similar opportunity gaps helps ensure that your plan of action will lead to the desired outcomes.

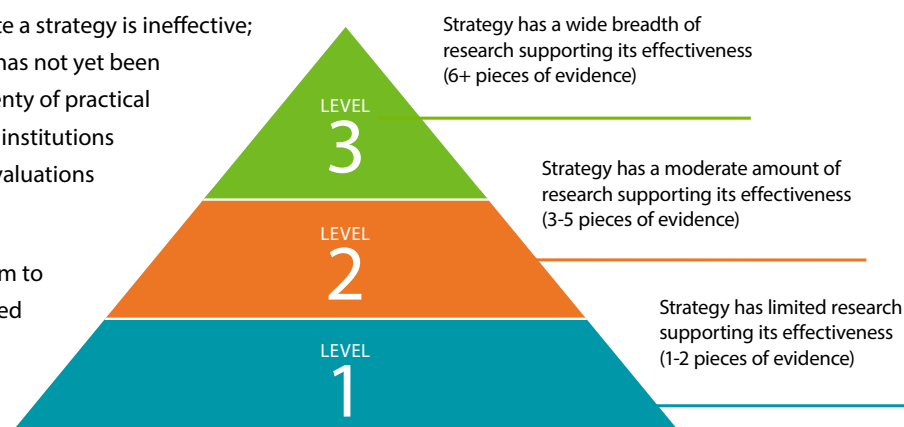
When evaluating whether a strategy can effectively close opportunity gaps, practitioners often seek research or evidence-based practices. These are practices that have been proven to work — through rigorous experimental or quasi-experimental studies or even just early anecdotal evidence.

Not all strategies have the same base of evidence to support their effectiveness. As practitioners seeking to implement evidence-based strategies, differentiating levels of evidence before committing to a particular strategy is important. Some things to look for when you examine evidence are:

- The Rigor of the Analysis:**
 Does the study use descriptive or inferential statistics to draw conclusions? What methodology is used?
 Experimental studies that use randomized control trials are the strongest, but other approaches can provide useful information as well.
- The Effect Size:**
 How big was the detected impact? If an intervention results only in a slight shift in outcomes for learners, is it worth the effort? This answer will help you determine how to prioritize your strategies.
- The Breadth of Supporting Evidence:**
 Is the evidence to support this strategy isolated, or has this approach been validated across multiple studies?
- Face Validity:**
 Does this strategy make practical sense?
 Can you draw a logical connection from the strategy to the outcome?

Lack of evidence does not necessarily indicate a strategy is ineffective; it could simply mean that the research base has not yet been developed to determine its effectiveness. Plenty of practical strategies are widely used in classrooms and institutions across the country even though no formal evaluations have been conducted to date.

For this workshop, we use a three-level system to identify evidence-based practices that is based on the breadth of research supporting that particular intervention or strategy.



PRACTICAL STRATEGIES FOR CLOSING OPPORTUNITY GAPS IN CTE

The following table describes root causes and related strategies to improve equitable access to CTE. While most of these strategies have backing evidence supported by a broad literature review, a few have been demonstrated anecdotally but not rigorously. Additionally, since the research base in CTE is still relatively light, some of these strategies have not been tested specifically among CTE learners.

LEVELS OF EVIDENCE ARE DESIGNATED AS FOLLOWS:

*** Level 3 (supported by 6 or more pieces of evidence)

** Level 2 (supported by 3-5 pieces of evidence)

* Level 1 (supported by 1-2 pieces of evidence)



BELIEFS/EXPECTATIONS

The broader expectations and values in relation to CTE itself and/or to specific learner groups.

This category is where we may see examples of implicit bias, CTE stigma and stereotypes about particular groups.

LACK OF AWARENESS ABOUT CTE	<ul style="list-style-type: none"> • Implement technology-based platforms for career exploration and planning*** • Provide middle school CTE/career exploration curriculum and experiences** • Provide early high school CTE/career exploration curriculum and experiences** • Develop recruitment materials and host recruitment events* • Require individual academic and career plans* • Engage key influencers (school counselors, teachers, CTE learners or alumni) to share information about CTE* • Provide informational materials in multiple languages
IMPLICIT BIAS/ STEREOTYPES ABOUT PARTICULAR LEARNER GROUPS	<ul style="list-style-type: none"> • Implement inter-generational mentoring programs*** • Provide professional development on implicit bias, stereotype threat, disability awareness and more*** • Implement peer mentoring programs or peer support groups** • Develop targeted recruitment materials and strategies* • Partner with media organizations to promote positive representations of diverse learners in different occupations* • Assign learners to counselors from the same racial group* • Develop inclusive recruitment materials and strategies that depict diverse learner populations
CTE STIGMA	<ul style="list-style-type: none"> • Engage families in career development** • Use learner and parent ambassadors to address outdated perceptions about CTE* • Use career exploration and planning platforms and recruitment materials to highlight the benefits of CTE





POLICIES/PROCESSES

State, district and/or institutional policies and procedures that create barriers to access or success in CTE programs. This category may include admission requirements, scheduling barriers, disciplinary barriers, etc.

ADMISSION REQUIREMENTS	<ul style="list-style-type: none">• Eliminate admission requirements• Reserve seats/spaces for targeted learner groups
SCHEDULING BARRIERS	<ul style="list-style-type: none">• Implement career academies or similar cohort-based, inter-disciplinary models for high school learners***• Schedule CTE courses to maximize access, considering graduation requirements and other requirements for students with disabilities and English learners*• Provide courses and services in the evenings and on the weekends
DISCIPLINARY BARRIERS	<ul style="list-style-type: none">• Implement school-wide positive behavior interventions and supports at the middle school or high school level***• Ensure that educators, counselors, administrators and other faculty and staff are trained on using trauma-informed practices to promote a culture of safety and support**
LACK OF POLICIES THAT SUPPORT DIVERSITY	<ul style="list-style-type: none">• Develop and enforce non-discrimination policies*• Develop and enforce anti-bullying/anti-harassment policies• Use data to monitor enrollment patterns and identify opportunity gaps• Conduct learner surveys or focus groups to evaluate whether programs are inclusive and welcoming for under-represented populations
LACK OF SYSTEMATIC COUNSELING AND ADVISEMENT	<ul style="list-style-type: none">• Implement online platforms for career exploration and planning***• Implement dropout prevention/early warning systems**• Provide proactive counseling/advising/career coaching*• Require individual academic and career plans*• Provide professional development for counselors/advisers on how CTE programs and programs of study can prepare learners of all backgrounds for high-skill, high-wage and in-demand employment opportunities aligned to regional labor market needs
SILOED DEPARTMENTS AND SERVICES	<ul style="list-style-type: none">• Implement career academies or similar cohort-based, inter-disciplinary models***• Implement postsecondary guided/accelerated pathways through program maps, intensive advising and early warning systems***• Implement sector-specific training programs scaffolded by career advisement, job placement and financial/tangible supports, among other support services***• Structure postsecondary education to enable early entry into CTE programs/pathways*





ENVIRONMENT

The geographic and/or socioeconomic factors that affect access and/or prevent learners from realizing their education and career goals. This category may include lack of access to equipment, financial barriers and/or transportation.

LACK OF ACCESS TO RELEVANT FACILITIES AND EQUIPMENT	<ul style="list-style-type: none"> • Provide equipment that is inclusive for students with disabilities and various genders (differently sized protective equipment, etc.)* • Share facilities and equipment with other learning providers or industry partners • Enact a one-to-one technology policy to scale up virtual or remote learning opportunities • Provide facilities that are inclusive for students with disabilities and various genders
LACK OF ACCESS TO QUALIFIED CTE INSTRUCTORS AND INDUSTRY PARTNERS	<ul style="list-style-type: none"> • Develop “grow your own” programs in the Education & Training Career Cluster** • Develop induction/mentoring programs for new instructors that build industry and/or pedagogical knowledge and skills* • Provide virtual access to industry representatives, including through simulated work-based learning* • Establish formal dual or concurrent enrollment partnerships between secondary and postsecondary institutions to give high school learners access to postsecondary instruction* • Provide externships for teachers and faculty that build industry knowledge and skills* • Enable co-teaching/team teaching that pairs instructors with differing levels of experience/qualifications or pairs instructors with industry experts* • Provide virtual access to qualified instructors
FINANCIAL BARRIERS	<ul style="list-style-type: none"> • Provide free/low-cost opportunities to earn articulated credit*** • Award credit for prior learning/military experience/work experience*** • Cover fees for industry-recognized credential assessments* • Cover fees for Career Technical Student Organization (CTSO) activities* • Provide financial aid for learners from low-income families that covers tuition, equipment, fees, etc.
TANGIBLE BARRIERS	<ul style="list-style-type: none"> • Provide integrated learner services including health care, mental health services, meals/food pantry, child care, academic services, etc.** • Provide case management/a single point of entry to non-academic support services* • Provide transportation to the CTE program and/or work-based learning site*





INSTRUCTION

The barriers to teaching and learning in the CTE classroom such as lack of accommodations for students with disabilities, teaching strategies that are not inclusive, bias in the curriculum, or insufficient academic preparation prior to entering the CTE program.

LACK OF RELEVANT, ENGAGING HANDS-ON AND WORK-BASED LEARNING EXPERIENCES	<ul style="list-style-type: none">• Provide CTSOs that build technical, employability and leadership skills through competitive events, service learning and other activities***• Provide work-based learning scaffolded by employability skills training and mentoring/coaching, among other support services***• Provide virtual/simulated learning when real-world learning is not safe, legal or accessible***• Teach soft/employability skills*• Provide early career exploration opportunities to give learners the chance to “try on” careers and develop their own occupational identity*• Provide professional development for educators and industry partners to maximize these experiences• Expand access to paid work-based learning opportunities so learners who need to support their families can participate
BIAS IN INSTRUCTION/ CURRICULUM	<ul style="list-style-type: none">• Teach self-efficacy/self-determination and a growth mindset***• Provide professional development on topics related to bias in instruction/ curriculum***• Implement Universal Design for Learning, an instructional approach that draws on a variety of teaching methods to ensure equal opportunities to learn**• Use culturally responsive curriculum*• Employ microaffirmations through active listening, recognizing and validating experiences and affirming emotional reactions *• Be sensitive to logos and imagery that perpetuate stereotypes
BARRIERS TO LEARNER PROGRESS	<ul style="list-style-type: none">• Implement bridge/remediation programs, often through contextualized academic- CTE curriculum and instruction***• Provide accommodations for students with disabilities and English learners**• Implement peer tutoring**• Include CTE representatives on Individualized Education Program/504 teams*• Create space for peer affinity groups so that learners of similar identities can receive support and fellowship*





PEOPLE

Barriers related to staffing — such as insufficient numbers of school counselors or career advisers, shortages of qualified teachers and faculty and/or lack of leadership capacity — or lack of representational diversity in the CTE teacher workforce and among industry partners

LACK OF DIVERSITY IN THE CTE EDUCATOR WORKFORCE

- Recruit diverse instructors through minority-serving institutions and affinity groups, among other methods***
- Develop “grow your own” programs in the Education & Training Career Cluster*
- Develop more inclusive pipelines into leadership and administration

LACK OF DIVERSITY AMONG INDUSTRY PARTNERS

- Recruit diverse industry partners through affinity business groups, among other methods

ADDITIONAL RESOURCES TO IDENTIFY PRACTICAL STRATEGIES

- Achieving the Dream — [Knowledge Center](#) ¹⁰
- American Youth Policy Forum — [Topic Areas](#) ¹¹
- Illinois Center for Specialized Professional Support — [Super Strategies](#) ¹²
- JFF — [Ensuring Equity in Advancement](#) ¹³
- National Alliance for Partnerships in Equity — [Root Causes and Strategies](#) ¹⁴
- National Center for Homeless Education — [Homeless Education Issue Briefs](#) ¹⁵
- National Technical Assistance Center on Transitions — [Effective Practices and Predictors](#) ¹⁶
- Nebraska Department of Education — [Strategies for Special Population Success: Practical Tips and Tools for Nebraska Educators](#) ¹⁷
- MDRC — [Center for Effective Career and Technical Education](#) ¹⁸



SELECTING ACTIONABLE STRATEGIES

Now that you have explored some practical strategies for closing opportunity gaps in education — and in CTE specifically — it is time to start thinking about which strategies you would like to implement. Refer back to your data and the root causes you identified in the fishbone exercise earlier to identify strategies that will make the most sense in your community. Consider the following questions:

- **WHAT STANDS OUT TO YOU?**
- **ARE YOU ALREADY USING ANY STRATEGIES FROM THE REPORT OR THE WORKBOOK?
HOW EFFECTIVE ARE THEY?**
- **ARE ANY OTHER IDEAS NOT INCLUDED ON THIS LIST?**

LIST ANY EVIDENCE-BASED STRATEGIES THAT CAN HELP ADDRESS THIS OPPORTUNITY GAP

Looking to other schools, districts and institutions for evidence of effective practices is helpful. What are others doing to address similar opportunity gaps? What lessons have they learned? If possible, try to find evidence of success from external evaluators or researchers.

STRATEGY	EVIDENCE



IDENTIFYING ACTION STEPS

Now that you have completed the root cause analysis and review of actionable evidence, it is time to identify some next steps to turn your ideas into action. Identifying challenges and opportunity gaps is one thing, but identifying solutions and developing a plan and timeline to close them takes leadership, commitment and dedication to equity. Action planning for equity can be difficult for a number of reasons:

- **You may feel that the problems you face are out of your control or that you are unable to influence the outcomes you want to achieve.**
- **The problems you want to address might be bigger than the CTE system itself can address (we know inequities in education begin long before learners enter a CTE program).**
- **New challenges may arise that require you to adapt your strategies.**
- **There may not be consensus from everyone that these are the right solutions or that equity is a priority to begin with.**

Yet every building starts with the first brick. This section is designed to help you map out an action plan to close the opportunity gaps you identified previously and begin to take the steps needed to improve equity, access and inclusion in CTE.

A SEPARATE SECTION — SECTION 8 — is available as a companion document to this workbook. It is designed to help leadership-level actors synthesize input from the opportunity gap analysis workshop and chart an action plan for closing opportunity gaps. The action planning tool builds upon action steps participants identify in this section.



IDENTIFYING ACTION STEPS

Take a minute to reflect on the opportunity gaps, root cause analysis and solutions you identified previously. You have worked to identify the structural challenges that disproportionately limit access to CTE for learners. You have also reviewed the research to find practical strategies to remove those barriers. Now consider: What are the first bricks we need to lay?

In the table below, start to identify some action steps. In the left column, list any actions you can take as an individual. Consider your role and your level of influence in your building, institution or agency. In the right column, list any actions you would like to see your school, district, college or state take to address the opportunity gaps above.



ACTIONS I CAN TAKE



ACTIONS MY SCHOOL/DISTRICT/ COLLEGE/STATE CAN TAKE



NEXT STEPS

It takes a team effort to realize the vision for equity in CTE: that each learner can access, feel welcome in, fully participate in and successfully complete a high-quality CTE program of study. The same systems that have limited access to high-quality CTE programs and created roadblock after roadblock for marginalized learners can be redesigned to ensure equity and access. In this workshop we have identified barriers to access and examined evidence-based research to select practical strategies for closing opportunity gaps.

But the work does not stop here. Equity is a process that takes persistence, dedication and commitment. Each of us has a role to play in this effort. As you look ahead, consider the following commitments:

- **Hold yourself accountable to practices, behaviors and language that further equity instead of reinforcing historical barriers.**
- **Put pressure on leaders in your community and your state to change inequitable policies and practices.**
- **Hold yourself and your leaders accountable for following through on the action steps you identified in this workshop.**
- **If you have not already, engage learners, families and representatives of special populations to understand what they see as the most urgent barriers.**
- **Take advantage of the Comprehensive Local Needs Assessment or other local planning processes to push for equity.**
- **Continually monitor your data and keep an eye out for potential patterns of inequity.**

FOR MORE RESOURCES ON EQUITY IN CTE, VISIT
[CAREERTECH.ORG/RESOURCE/SERIES/MAKING-GOOD-PROMISE](https://careertech.org/resource/series/making-good-promise)



END NOTES

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- ³ Shorter-Gooden Consulting. (n.d.). <https://www.shorter-goodenconsulting.com/>
- ⁴ Kirwan Institute for the Study of Race and Ethnicity. (2012). *Understanding implicit bias*. Ohio State University. <https://kirwaninstitute.osu.edu/article/understanding-implicit-bias>
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- ⁷ Clark County School District. (n.d.). *School improvement planning basics: Root cause analysis*. <http://ccsd.net/resources/aarsi-school-improvement/pdf/planning/school-improvement-planning-basics-root-cause-analysis.pdf>
- ⁸ Strengthening Career and Technical Education for the 21st Century Act of 2018, Public Law 115-224.
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- ¹¹ American Youth Policy Forum. (n.d.). *Topic areas*. <https://www.aypf.org/topic-areas/>
- ¹² Illinois Center for Specialized Professional Support. (n.d.). *Super strategies*. Illinois State University, College of Education. <https://icsps.illinoisstate.edu/cte/special-populations/76-super-strategies>
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- ¹⁴ National Alliance for Partnerships in Equity. (n.d.). *Root causes and strategies*. <https://napequity.org/root/>
- ¹⁵ National Center for Homeless Education. (n.d.). *Resources*. <https://nche.ed.gov/resources/>
- ¹⁶ NTACT the Collaborative. (n.d.). *Effective practices*. <https://transitionta.org/topics/effective-practices/>
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