

Module 2:

Using Data and Research to Improve Career and Technical Education Programs

Facilitator's Guide

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Overview

This module is part of a series of six practitioner training modules developed as part of the Career & Technical Education (CTE) Research Network Lead. The six modules are:

Module 1: Understanding CTE Data and Why It Matters

Module 2: Using Data and Research to Improve CTE Programs

Module 3: CTE Program Evaluation: Why It Matters to Practitioners

Module 4: Using State Data to Partner With Researchers

Module 5: Using Research to Design Your CTE Program for Equity

Module 6: How to Communicate About Your CTE Program Using Research

The work of the CTE Research Network Lead is supported by the Institute of Education Sciences at the U.S. Department of Education with funds provided under the Carl D. Perkins Career and Technical Education Act through Grant R305N180005 to the American Institutes for Research (AIR). The work of the Network member projects is supported by the Institute. The opinions expressed are those of the authors and do not represent the views of the Institute or the U.S. Department of Education.

Module Description

Continuous improvement, a process of implementing and monitoring ongoing feedback, is an important component of creating and maintaining successful CTE programs. For practitioners to engage in continuous improvement—and to use data and research to go beyond accountability—they need to maintain an effective data collection system for decision making and make data-based decisions that lead to equity and improvement for all students. In this module, practitioners will learn how data and research are used to improve CTE programs in the real world.

Module Objectives

By the end of this module, practitioners will:

- Understand how data and research are used to improve CTE programs.
- Learn how to access and use research relevant to CTE programs.
- Learn about the continuous improvement model as it applies to CTE.
- Consider short-term versus long-term program planning.
- Understand real-world examples to undertake this work.

Intended Audience

This training module is intended for local program administrators. The module can be completed individually using the facilitator's guide. Groups or teams will also benefit from this module being led by a facilitator using this guide.

Materials

The following materials are recommended for the training module and associated activities:

- Module 2 PowerPoint
- Chart paper

- Copies of Activity Handouts 1–6:
 - Activity 1: Opening Self-Reflection
 - Activity 2: Applying Research
 - Activity 3: Root Cause Analysis
 - Activity 4: Operational Planning
 - Activity 5: Study the Data
 - Activity 6: Closing Self-Reflection

Time Requirements

The total time required for this module is approximately 90 minutes. You may need to allot additional time for the activities, depending on the audience’s familiarity with the content.

Outline of Module

Materials	Activities	Estimated Time
Slide 1	None (cover slide)	As participants arrive (if in person)
Slides 2–4	I. Welcome, Introductions, Agenda, and Overview	5 minutes
Slides 5–6	II. Objectives/Instructions	3 minutes
Slide 7; Activity 1	III. Activity 1: Opening Self-Reflection	5–15 minutes
Slides 8–11	IV. Defining Key Terminology	4 minutes
Slide 12	V. Using Data and Evidence-Based Research to Improve CTE Programs	1 minute
Slides 13–28 Activity 2 Activity 3	VI. Continuous Improvement Model: Plan <ul style="list-style-type: none"> ▪ Frame and Research the Problem ▪ Activity 2: Applying Research ▪ Activity 3: Root Cause Analysis 	25 minutes
Slides 29–33 Activity 4	VII. Continuous Improvement Model: Do <ul style="list-style-type: none"> ▪ Implement a Solution ▪ Activity 4: Operational Planning 	12 minutes
Slides 34–38 Activity 5	VIII. Continuous Improvement Model: Study <ul style="list-style-type: none"> ▪ Use Data to Assess Results ▪ Activity 5: Study the Data 	12 minutes
Slides 39–46	IX. Continuous Improvement Model: Act <ul style="list-style-type: none"> ▪ Revise and Start the Cycle Again 	7 minutes
Slide 47–50 Activity 6	X. Closing Activity, Resources, and Contact Information <ul style="list-style-type: none"> ▪ Activity 6: Closing Self-Reflection 	6 minutes
Total Time		90 minutes

Facilitator’s Script/Notes for Module

The following section is a slide-by-slide script that provides guidance to facilitators as they present the content and learning activities included in this module. Reviewing the entire guide prior to facilitating the module is highly recommended.

Module 2: Using Data and Research to Improve Career and Technical Education Programs

Script and Notes	PPT Slide
<p>Slide 1: High-quality career and technical education, often referred to as CTE, can prepare students to succeed in postsecondary education and careers. This module is designed to support school district and college CTE program administrators in understanding CTE data and how best to use them.</p>	
<p>Slide 2: The CTE Research Network is supported by the Institute of Education Sciences at the U.S. Department of Education with funds provided under the Carl D. Perkins Career and Technical Education Act through Grant R305N180005 to the American Institutes for Research (AIR). Network activities are directed toward increasing the number of CTE impact studies and strengthening the capacity of the field to conduct and use rigorous CTE research. AIR and its partners—the Association for Career and Technical Education (ACTE), JFF, and Vanderbilt University—serve as the CTE Research Network Lead.</p>	
<p>Slide 3: The CTE Research Network has developed this series of six practitioner training modules to support CTE stakeholders in learning more about how to use data and research to improve CTE programming. Although the modules need not be viewed sequentially, we suggest that you consider doing so if you plan to complete the entire series. This second module in the series “Using data and research to improve CTE programs”, focuses on how data and research can be used to improve CTE programs.</p>	
<p>Slide 4: This module is designed to support practitioners in learning how data and research can be used in a structured planning process to improve CTE programs in the real world.</p> <p>Following a description of key terminology used in this module, information is provided on how data and research can be applied, and where educators can access this information using the Plan, Do, Study, Act continuous improvement model.</p> <p>Activities are provided to give you firsthand understanding of the model, along with downloadable tools that you may adapt for your own use.</p>	

Script and Notes	PPT Slide
<p>Slide 5: After viewing this module, you will have a better understanding of how data and research can be used to improve CTE programs, and how to access this information. You also will learn about how a continuous improvement process can be launched---with consideration given to short- and long-term planning---and will be provided with real-world examples and tested tools to undertake this work.</p>	 <p>Objectives</p> <ul style="list-style-type: none"> Understand how data and research are used to improve CTE programs. Learn how to access and use research relevant to CTE programs. Learn about the continuous improvement model as it applies to CTE. Consider short-term versus long-term program planning. Understand real-world examples.
<p>Slide 6: This interactive module includes processes and tools to help you improve CTE programming at your site. To help contextualize your experience, activities are provided to help you gain an understanding of how you may use the tools provided to implement change.</p> <p>Before you continue, we recommend downloading and printing the activity worksheets and actively using them to apply your learnings.</p>	 <p>Module Instructions</p> <p>This module includes processes, activities, and tools you can use to drive change at your site.</p> <p>Before you begin, we recommend downloading and printing the activity worksheets to help contextualize the module content.</p>
<p>Slide 7: (5 mins.) To help frame your module engagement, please think about a pressing CTE problem at your site that you would like to fix. Stop the module and follow the directions on the Self-Reflection Activity worksheet.</p> <p>From the worksheet:</p> <p>Purpose: This 5-minute exercise lays the groundwork for the activities included in this training module. It is intended to help focus your thinking about using data and research to improve programs and can help to identify a range of challenges perceived by different members of your team.</p> <p>Directions: Think about a pressing CTE problem you face at your site.</p> <p>Facilitator note: If doing this activity with a group, consider making this a 15-minute think-pair-share, with individuals working taking 5 minutes to brainstorm, 5 minutes to share with another person, and 5 minutes for a report-out. This can help to surface a range of challenges perceived by different members and assist in structuring subsequent activities.</p>	 <p>Activity 1: Opening Self-Reflection</p> <p>Think about a pressing CTE problem you face at your site.</p> <ul style="list-style-type: none"> Answer the questions included in the Self-Reflection Activity worksheet provided. Restart the module when you have completed the worksheet.
<p>Slide 8: It is important that you are aware of some key terminology prior to undertaking your continuous improvement process. The next three slides review key terms used throughout this module. You may wish to download the module glossary that includes these terms, as well as other terms relating to the use of data and research, to help inform your work.</p>	 <p>Defining Key Terminology</p>

Script and Notes

Slides 9–11: [Read slide titles and review the definitions by reading the slide notes below]

Slide 9: *Educators should rely on data and evidence-based research to guide their continuous improvement efforts. This module describes a structured, iterative continuous improvement process that educators can follow to apply the data and research they collect.*

Continuous improvement, a process of implementing and monitoring ongoing feedback, is an important component of creating and maintaining successful CTE programs. For practitioners to engage in continuous improvement – and to use data and research to go beyond accountability – they need to maintain an effective data collection system for decision making and make data-based decisions that lead to equity and improvement for all students.

Although there are many improvement frameworks that exist, this module introduces the Plan-Do-Study-Act process. Although conceptually simple, this four-step process requires careful and thoughtful planning. Its components include:

Plan: *Determine what it is you are seeking to accomplish and how you will assess your result.*

Do: *Design and implement your proposed improvement plan.*

Study: *Collect and analyze data and review the research to help contextualize your results.*

Act: *Use the result of your analysis to fine-tune your engagement.*

The following sections describe this approach in greater detail.

Slide 10: Continuous improvement can be an effective tool for improving educational program performance. Research shows that continuous improvement models have been used in various sectors to achieve significant advances. Although there is no one approach to conducting a continuous improvement process, many models exist; what matters is that educators employ a systemic approach to structure their improvement efforts. Know that continuous improvement will not produce immediate changes or address all organizational processes simultaneously; rather, the cycle of using research and learning cycles to make change is both iterative and gradual.

See the referenced reports relating to the continuous improvement process to gain a more detailed understanding:

1. <https://files.eric.ed.gov/fulltext/ED557599.pdf>
2. https://www.carnegiefoundation.org/wp-content/uploads/2014/09/carnegie-foundation_continuous-improvement_2013.05.pdf

PPT Slide

Continuous Improvement

A structured process for using data and research to improve educational programming



CTE Sector & Technical Education
Programs & Services

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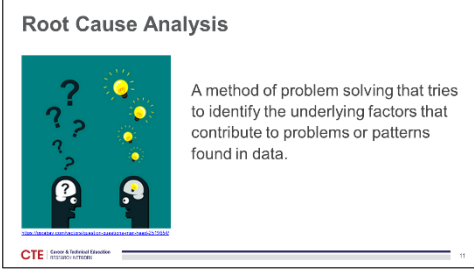
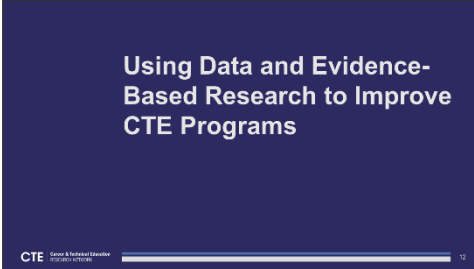
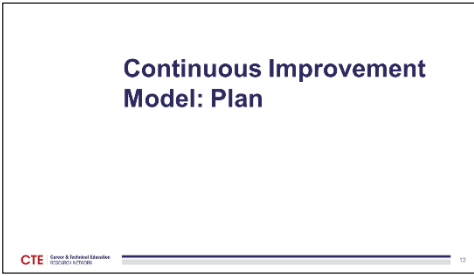

What the Research Says

- Continuous improvement has been used in many sectors to achieve significant advances.
- Many models exist; what matters is that educators employ a systemic approach to structure their efforts.
- Improvement models employ a cycle of research and planning that is both iterative and gradual.



CTE Sector & Technical Education
Programs & Services

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Script and Notes	PPT Slide
<p>Slide 11: Root cause analysis is a method of problem solving that seeks to identify the underlying factors that contribute to problems or patterns found in data. Once identified, these factors can help guide your review of the literature to help you find evidence-based approaches you might adapt to help address your identified challenges.</p> <p>Later in this module we will share an example of how root cause analysis can be used as part of a structured continuous improvement process.</p>	 <p>Root Cause Analysis</p> <p>A method of problem solving that tries to identify the underlying factors that contribute to problems or patterns found in data.</p>
<p>Slides 12–13:</p> <p>Slide 12: We will now explore how you can use data and evidence-based research to improve your CTE programming as part of a structured four-step continuous improvement process.</p> <p>Slide 13: The first step of the Plan-Do-Study-Act continuous improvement model is Plan. Planning requires you to determine what it is you are seeking to accomplish and the types of data and research you should access to guide your efforts.</p> <p>This section highlights what data are necessary to be collected based on what the problem is you are trying to solve.</p> <p>The following slides provide an overview of the data needed and who needs to be involved in the planning.</p>	 <p>Using Data and Evidence-Based Research to Improve CTE Programs</p>  <p>Continuous Improvement Model: Plan</p>
<p>Slide 14: <i>The first step is to build a team that is representative of your education community. Ideally, you will want to engage those who will be responsible for carrying out or be directly affected by your work. This may include teachers or college faculty (CTE and academic), site leaders, students, parents, employers, teacher unions, and community-based organizations. This group will be critical to gaining buy-in for the work you do.</i></p> <p><i>Ultimately, those responsible for carrying out your plan must believe in it and be able to carry it out if it is to succeed. Imagine, for example, a top-down mandate to create personalized learning plans for CTE students imposed without teacher input. Absent information on teacher workloads, planning time, and student needs, educators may be unwilling or physically unable to implement such a reform, regardless of its value.</i></p> <p><i>To help structure your efforts, consult your site’s comprehensive local needs assessment that was developed as part of your federal grant application under the Carl D. Perkins Career and Technical Education Act, as amended by the Strengthening Career and Technical Education for the 21st Century Act, also known as Perkins V. The advisory group convened for this application may serve as a good source for finding volunteers.[</i></p>	 <p>Plan: Build a Coalition</p> <ul style="list-style-type: none"> • Team members <ul style="list-style-type: none"> • Instructors (CTE and academic) • Site leaders • Students • Parents • Employers • Community-based organizations

Script and Notes

Slide 15: The continuous improvement process is most effective when resources are targeted toward a high-priority problem. In practice, you will want to work with your team to determine where action is needed. This will entail collecting data from a range of stakeholders using a variety of tools, including surveys and focus group interviews, to gather diverse viewpoints.

You also may wish to review your site's CTE performance data to assess student and program performance.

Once you have collected data, you will want to analyze them to identify areas of concern. Because you may surface multiple issues, you will want to prioritize them to determine which require immediate attention. You also will want to consider which you are most likely to realize meaningful change from, as some may be outside your area to control.

Slide 16: The Carl D. Perkins Career and Technical Education Act, as amended by the *Strengthening Career and Technical Education for the 21st Century Act*, also known as *Perkins V*, requires that all secondary and postsecondary grant recipients conduct a comprehensive local needs assessment to be eligible for federal funding. This assessment is intended to help site educators think strategically about their site needs. As part of this review, site teams are expected to review student performance outcomes and to assess various programmatic aspects, including whether offerings are (1) of sufficient size, scope, and quality to meet the needs of all students served by the provider; (2) aligned to state, regional, or local in-demand industry sectors or occupations identified by the state or a local workforce board; and (3) designed to meet local education or economic needs not identified by these boards.

You and your team should access this assessment to assist in your thinking. Visit the federal Perkins Collaborative Resource Network to learn more about this needs assessment. A link is provided to a video describing its purpose (https://cte.ed.gov/view_module/72).

Slide 17: *Although data (and data sources) are important, we need evidence to help us interpret and understand our data. In this section we will learn about where to find the literature we need, from federal resources (and federally funded resources) to association resources to peer-reviewed journal articles.*

A wealth of information exists to help you improve your CTE programming. One excellent federal resource is the Perkins Collaborative Resource Network, which is hosted by the U.S. Department of Education's (ED's) Office of Career, Technical, and Adult Education. The site includes a Learning Center with videos and training modules; a Reports section with results of ED-sponsored studies and national assessments of CTE; a Certification Crosswalk that you can use to identify CTE certifications; and a Perkins Data Explorer that you can use to assess your state's performance over time on the federal accountability indicators.

PPT Slide

Plan: Define the Problem

- What challenges do you face?
 - Collect data
 - Survey stakeholders
 - Conduct focus groups interviews
 - Review performance data
- Analyze results
 - What is their relative priority?
 - Which issues are actionable?

CTE | Level 8 Technical Education | Secondary strategies | 15

Data Sources

PERKINS COMPREHENSIVE LOCAL NEEDS ASSESSMENT

Biannual review of site programming mandated in Perkins V:

- Assess student performance.
- Review program offerings to:
 - Rate program size, scope, and quality.
 - Determine alignment to in-demand industry or job needs.
 - Assess design to meet local education or economic needs.

Comprehensive local needs assessment video (#7): <https://cte.ed.gov/legislation/perkins-v>

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Previous Research: Federal Resources

PCRN PERKINS COLLABORATIVE RESOURCE NETWORK

- Learning Center with videos and training modules
- Reports and programs
- Certifications
- Customized data reports

https://cte.ed.gov/perkins-collaborative-resource-network

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Script and Notes

Slide 18: The CTE Research Network was created to help strengthen the research base for CTE. The Network does so by sponsoring rigorous research studies and offering trainings to strengthen the capacity of the field to conduct and apply high-quality CTE research. The Network includes a searchable catalog of research studies that educators may use to find promising evidence-based approaches for improving CTE offerings.

Slide 19: *[Read quote on slide and then the script]*

Two professional associations offer educators access to a range of research and resources that can help inform CTE program offerings. Advance CTE, the national association for state CTE directors and their staff, maintains the Learning that Works Resource Center that includes research and publications documenting promising practices in the field. Similarly, the Association for Career and Technical Education (ACTE), the national association for CTE administrators and instructors, maintains a resource center that catalogs publications and lesson plan resources that may be useful to CTE educators. It is likely that you accessed this learning module through the CTE Research Network or ACTE.

Slide 20: There are a host of journals and other online resources that educators may access to learn more about CTE and to find scholarly, peer-reviewed publications that may address your problem. Three relatively well-known resources include the *Career and Technical Education Research Journal*, published by the Association for Career and Technical Education Research; the *Journal of Career and Technical Education*; and the Education Resources Information Center, also known as ERIC, which serves as an online digital library of education research and information. ERIC is sponsored by the Institute of Education Sciences of the U.S. Department of Education.

Slide 21: The following 10-minute activity will help you practice how to find CTE research studies you might apply to address a pressing problem in your program. Turn to Activity 2: Applying Research Worksheet. Once you have done so, follow the instructions contained in the document.

Once you have finished the activity, return to this slide deck to begin the four steps in the Plan-Do-Study-Act continuous improvement process.

Facilitator note: If doing this activity with a group, consider making this a 15-minute think-pair-share, with individuals taking 10 minutes to conduct a review of the literature and 5 minutes to share with another person. This can help to illustrate the type of research that might be surfaced when conducting an online literature review.

PPT Slide

Previous Research: CTE Network Resources

- Dedicated to strengthening the quality of CTE research
- Highlights high-quality evidence-based research
- Includes a searchable catalog of resources designed for use by practitioners

Previous Research: Association Resources

- National association for state CTE directors and staff
- Features Learning that Works Resource Center
- National association for CTE administrators and instructors
- Offers publications and lesson plan resources

Previous Research: Journal Resources

- National journals:
- Offer access to peer-reviewed research.
- Document program offerings and outcomes.
- Are used to identify possible root causes and programmatic interventions to address.

Activity 2: Applying Research

- To find CTE research to address a pressing CTE challenge:
- Frame the challenge.
- Conduct a targeted search.
- Review study abstracts for fit.
- Consider how to apply the approach in your program.

Script and Notes

Slide 22: The federal *Perkins V* indicators offer an excellent starting point for assessing student and program performance. These data may be accessed from your comprehensive local needs assessment or, if unavailable, may be obtained from the agency in your state that administers *Perkins V*. The *Perkins V* indicators outcomes tell us many things. They provide insight into the outcomes of students who concentrate in a CTE program or program of study. Specifically, at the secondary level, information is available on students' (1) academic attainment on state exams; (2) graduation rates; (3) placement in postsecondary education or employment and the military; (4) concentration in programs preparing students for nontraditional occupations; and (5) program quality measures, including postsecondary credit award, receipt of a recognized postsecondary credential, and participation in work-based learning.

At the postsecondary level, three indicators are used to assess concentrators' performance in terms of (1) placement in postsecondary education or employment and the military, (2) receipt of a recognized postsecondary credential, and (3) involvement in programs preparing students for nontraditional occupations.

You also may wish to examine any state-specific or local CTE performance indicators that apply to your programming.

In Module 3, you will learn more details about *Perkins V* indicators as part of measuring CTE program performance.

Slide 23: *Although performance data can be useful in assessing how your district or college is performing overall, data often need to be disaggregated to be made actionable. Perkins V requires states to track the performance of subgroups of students, which may be helpful in determining where supports may be needed. These include breakouts by gender, race/ethnicity, migrant status, and special population status. This latter category includes individuals with disabilities, including economically disadvantaged families, English learners, and students experiencing homelessness, among others.*

You also may wish to examine the outcomes of students who are participating in different educational clusters or pathways or who attended different types of schools. For example, it may be that students enrolling in a STEM CTE pathway may have differing outcomes from those in a hospitality and tourism field.

Understanding gaps in student performance can provide a more nuanced picture of how your programs are operating.

PPT Slide

Plan: Analyze Performance Gaps

- Federal *Perkins V* indicators

Secondary	Postsecondary
Academic attainment	Postsecondary placement
Graduation rates	Postsecondary credential
Postsecondary placement	Nontraditional occupations
Nontraditional occupations	
Program quality	

- State indicators
- Local performance

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Plan: Analyze Performance Gaps

- Student subgroups
 - Gender
 - Race/ethnicity
 - Special population status
- Program cluster or pathway
 - Cluster and pathway
- Site characteristics
 - Urbanicity
 - School type (e.g., regular high school, academy)

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Script and Notes

Slides 24–25:

Slide 24: The results of your gap analysis will raise questions. To help inform your thinking, conduct a review of the empirical research literature to see what others have reported. Ideally, you will find evidence-based studies or publications that can help you to make sense of the findings your gap analysis has surfaced.

Slide 25: In the next several slides, we will look at a common CTE problem: enrollment in work-based learning experiences. The Plan phase of a continuous improvement cycle uses root cause analysis (as defined earlier) to help inform your intervention. The goal of this process is to provide an example of how to successfully use the data.

Once you have identified an area and/or student population for attention, you will want to formulate your own reasons why they may be underperforming. Understanding the factors affecting student performance can help inform your intervention strategy. Conducting a root causes analysis is a foundational step in surfacing this information.

Root cause analysis begins with specifying a particular problem that you wish to address, such as performance gaps associated with work-based learning. For example, students may not be enrolling in work-based learning.

Once you have identified a problem statement, you will want to identify the factors that may be involved. Factors typically encompass broad areas, such as students, schools, or systemic issues. Finally, for each factor there may be a set of underlying issues that help to explain why the problem exists. For any given factor, there may be multiple issues identified, though all may not be of equal importance.

Slide 26: One tool for conducting a root cause analysis is the fishbone technique. Here, the head of the fish is used to state your problem, with the ribs serving as factors and issues the bones that comprise it.

Returning to our example of work-based learning, one challenge that educators frequently encounter is the difficulty of enrolling students in work-based learning. There may be many factors related to why this is challenging. These might include students, teachers, employers, and systemic issues relating to how schools are operated. For any factor theme, there may be several associated issues. For example, for the factor “students,” it may be that students are unaware of the benefits that work-based learning may confer, lack the time to participate given their academic demands or extracurricular activities, or are prevented from participating because their parents are concerned it may adversely affect their schoolwork.

Examining literature related to the problems and related factors can help you learn about potential research and evidence-based causes for the problems as well as potential solutions to the problems.

PPT Slide

Grounding Your Gap Analysis



Research is formalized curiosity. It is poking and prying with a purpose.

– Zora Neale-Hurston

CTE Career & Technical Education
Programs of Study

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Root Cause Analysis

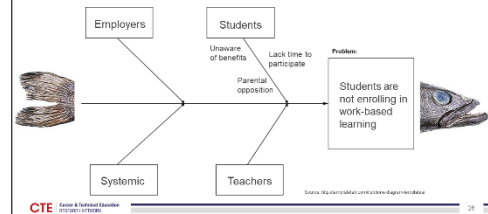


- Problem statement
 - What is the issue you wish to solve?
- Factors
 - Components of the problem
 - Typically encompass broad areas (e.g., students, schools, processes)
- Issues
 - Explanations underlying a factor
 - Multiple issues may be identified

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Programs of Study

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Root Cause Analysis



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Programs of Study

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Script and Notes

Slide 27: Conducting a root cause analysis entails sitting down with your team to brainstorm the factors and associated issues that may help to explain your problem statement. In the process you may identify a multitude of factors and issues. Initially, you should seek to capture all the possible explanations. Once you have completed your brainstorming process, you can winnow down to the primary factors and issues at the root of your identified problem. This is to help ensure that your intervention is both practical and likely to achieve its desired result. You will use this information to help you select an intervention strategy that you will use to address your identified challenge,

Slide 28: The following 15-minute activity can help you to understand how the continuous improvement process works. Using the worksheets, go to Activity 2: Root Cause Fishbone Activity worksheet. Once you have done so, stop/pause the presentation, and follow the instructions contained in the document.

The accountability data used in this activity are based on the nontraditional completion measure contained within *Perkins V*. The results may apply to the secondary or postsecondary education levels. Consult the indicator definitions on the worksheet for background on how the measure is constructed, and use the data provided to begin your brainstorming process.

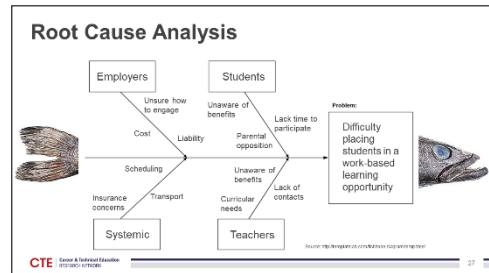
After you have completed the worksheet, you can return to this module and continue your learning.

From the worksheet:

Purpose: For this 15-minute exercise, you will use evidence and research to identify significant factors that influence student performance. Identifying these factors and underlying causes based on data and evidence can help you focus on the areas that will provide the greatest opportunities for change. This activity can be done individually to gain familiarity with the steps but is designed to be worked through with a team.

Directions: Follow the steps using the attached data and “fishbone” template..

PPT Slide



Activity 3: Root Cause Analysis

The worksheet features a central image of a group of colorful figures (purple, blue, green, yellow, orange, red) arranged in a circle around a large black question mark. Below the image is a URL: <http://study.com/academy/content/perkins-v/article.html>. The slide includes a CTE logo and the text 'Lesson 8: Technical Education' and '10/10/2019' at the bottom left, and a page number '28' at the bottom right.

- Review performance data.
 - Answer the question.
- Define your problem statement.
 - What do you plan to address?
- Perform root cause analysis.
 - Identify possible factors.

Script and Notes

Slides 29–30:

Slide 29: Let's move on to the Do component in our continuous improvement model. "Do" starts off with observation, then becomes more complex and rigorous as we move through the cycle.

Slide 30: Once you have identified the problem you wish to solve, you can begin formulating a plan of action. Collecting data and reviewing information is an important part of this component. Begin by conducting a more focused review of the empirical research literature to identify both the problem and the evidence-based intervention strategies that others have developed. Studies of the problem itself might not provide an actual intervention, but they may unpack a problem a bit more.

You also may review national or state data to identify high-performing sites that have populations or programming similar to your own. Also, you may wish to consult with state agency staff or researchers with experience working in the field.

Gathering this information provides access to the data necessary to successfully analyze and address the problem you are seeking to solve.

Slide 31: Identify strategies to address your identified problem, consider the question: What areas will you target?

Stipulate activities to address each strategy, consider the question: What will you do?

Establish benchmarks, consider how you will track progress.

For example, if one of the issues that you identified in your root cause analysis was that employers did not know how to engage, you might have performed a review of the literature to identify promising practices or evidence-based approaches proven to work. In that process you might have uncovered several strategies, such as the need to advertise the benefits of placing students in work-based learning programs and developing curricular supports that employers might adopt.

Here, you would use your operational plan to document how you will approach the expanding placement options and an associated set of activities that you will pursue. Keep in mind that you may have multiple strategies for success. For example, you also could seek to implement reforms at the student, teacher, and school levels.

PPT Slide

Continuous Improvement Model: Do

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Do: Identify Promising Practices



- What do we know?
 - Review empirical research literature.
- Who is succeeding?
 - Use data to identify high-performing sites.
- What resources exist?
 - Federal government
 - State agency
 - Professional associations
 - Research community

CTE Career & Technical Education RESEARCH NETWORK

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Do: Create an Operational Plan

Current and Technical Education Improvement Updated Fall

GOAL: Increase student enrollment in work-based learning opportunities.

EVIDENCE BASE: Combined the WBL Toolkit on the National Post-Secondary Research Network (<https://www.postsecondaryresearch.org/>), tools for building employer-education partnerships on the UNCC website (<https://www.uncc.edu/employment/about/mbw/>), and the Work-Based Learning Toolkit developed by the College & Career Academy Support Network (<https://www.collegeandcareeracademy.org/work-based-learning/>)

INDICATORS	STRATEGIES FOR SUCCESS	ACTIVITIES
1. Expand Placement <ul style="list-style-type: none">• Double the number of employers participating in WBL programs by end of first year	1. Expand Placement Options <ul style="list-style-type: none">• Increase the number of employers providing work-based learning experiences	A. Develop promotional materials to advertise the benefits of work-based learning to students and employers B. Create curricular supports to assist employers in structuring a meaningful work-based learning experience C. Research approaches for addressing employers' liability concerns

CTE Career & Technical Education RESEARCH NETWORK

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Script and Notes

Slide 32: An action plan details the steps you will take to address the activities you identified. This will entail identifying the specific tasks you will carry out to address a given activity, who is responsible for this work, and when it will be completed. For example, to address the need for developing promotional issues to expand student and employer engagement, a set of tasks might include developing student and employer focused promotional materials and creating articles to gain publicity. Assigning an individual to be responsible for this work and a date for when it will be completed can help ensure the work gets done.

PPT Slide

Do: Create an Action Plan

Strategy 1: *Expand Placement Options*

Activity 1.A: Develop promotional tools to advertise the benefits of work-based learning to students and employers.

Tasks	Who	When
Develop a student-focused brochure	Sally M.	Oct. 15, 2020
Develop employer handouts	Tim S.	Nov. 13, 2020
Create an article for the community paper	Mark R.	Dec. 4, 2020

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Expanding the Evidence Base

Slide 33: The following 10-minute activity can help you to understand how the operational plan development works. Turn to the Operational Plan Activity worksheet and follow the instructions contained in the document.

You do not need to complete the full document to benefit from this activity. Rather, try to identify a goal, evidence supporting the goal, a strategy, a set of two to three activities, and a benchmark that you would use to assess your progress.

From the worksheet:

Purpose: This exercise is to help you apply research-based evidence in a systemic way to solve the program challenges you identified. Ideally, the operational plan you develop will help you to incorporate rigorous research in targeted activities designed to address the performance gaps and programmatic challenges you identified. This activity can be done individually to get familiar with the steps but is designed to be worked through with a team.

Directions: Follow the steps below and use the attached “operational plan” template.

Facilitator’s note: If this is done with a group, after some work has been done on the worksheet, gather participants to share and reflect by answering the following questions:

1. *What factors did you identify?*
2. *What were your underlying causes?*
3. *What strategy and activities did you choose?*

Call on two to three participants and allow up to 5 minutes for sharing.

Activity 4: Operational Planning Worksheet

- Operationalize the challenge.
- Identify a set of strategies.
- Define activities to address.
- Specify a measurable benchmark.

CTE | Career & Technical Education
Expanding the Evidence Base

Script and Notes

Slide 34: Let's move on to the Study component in our continuous improvement model. "Study" is contextualized by previous work you may have been engaged in. As a part of the Study component, you are collecting and analyzing data to assess and evaluate what the data mean and what they tell us following the Do component.

Using data and research to improve CTE programs is an iterative process. Once you have implemented your activities and assessed your results, you may wish to study or reevaluate your approach. Here is where data and research can inform your efforts. Consider the outcomes you have achieved. If you are dissatisfied with the gains you have made, it may be necessary to pivot to a new approach.

Slide 35: Once you have launched your initiative, you will want to track its progress over time. To do so, you will need to construct indicators that are aligned to your identified outcomes. Where appropriate, you may use the benchmarks identified in your operational plan. You also may seek to develop new indicators that are associated with the overall outcome you are trying to achieve. Be sure that the outcomes you select are measurable, meaning that you will be able to obtain data to construct your numerators and denominators. One useful strategy is to consult with your district or institutional research office to learn about data that already exist.

You will need to collect and analyze data on a regular basis to assess your progress. This will be easier if the data are already collected by your district or institution for other purposes. If you will need to collect new data, be sure to establish consistent collection procedures and a timeline for when collection is to occur so that the data you obtain are valid and reliable. Many districts require that you go through an Institutional Review Board, IRB, review process to collect new data for research purposes.

Slide 36: You must be mindful of when outcomes can be achieved in selecting indicators.

Process indicators are used to track the progress you are making in rolling out your initiative. These may include metrics related to the number of times that groups are meeting or the number of individuals attending activities. The information you collect may offer formative feedback, which can help you to shape your work.

Interim outcomes provide information on your early successes, which may be related to your longer term goal. Due to the time it may take for students to progress through a CTE program, interim outcomes can offer early information to help you assess your efforts. For example, if you are seeking to decrease student dropout rates, you might wish to measure the number of 10th-grade students who are on track to graduate on time.

Mid- and long-term outcomes offer insight into whether you are achieving your overall goal. Recognize that these may take substantial time to manifest, so don't be discouraged if you see little initial success.

The following slides provide examples of resources you can access as part of the Study phase in this model.

PPT Slide

Continuous Improvement Model: Study

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PROGRAMS OFFICE

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Study: Collect Performance Data



- Identify indicators to assess outcomes.
- Specify a set of measurable outcomes.
- Define numerators and denominators.
- Collect and analyze data.
- Establish collection procedures.
- Set a timeline for collection.

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PROGRAMS OFFICE

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Study: Long- Versus Short-Term Outcomes



- Process indicators
 - Track implementation activities.
 - Provide formative feedback.
- Interim outcomes
 - Assess early successes.
 - May be related to your longer term goal.
- Middle- and long-term outcomes
 - Used to assess your overall goal.
 - Often may take years to achieve.

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PROGRAMS OFFICE

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Script and Notes

Slide 37: Finally, know that data need to be used if they are to drive change. This is important across local, state, secondary, and postsecondary agencies.

To start, build buy-in among CTE stakeholders. It is important to engage individuals at all stages of the Plan-Do-Study-Act improvement process, so that they understand how the initiative will benefit students. Involving stakeholders in reviewing data and research can help to improve the accuracy of information and communicate that results matter.

It also is important to share findings on a regular basis. Because data can be complicated to interpret, consider translating results into usable information. For example, in lieu of sharing tables of statistics, consider creating figures and charts to illustrate results. Creating dashboards also can be effective in publicizing results. These can serve as to motivate staff because they can provide a tangible manifestation of staff's efforts.

An example of the research showing how this can work is provided for guidance: <https://eric.ed.gov/?id=ED441075>.

This article, although published some time ago, is still considered a pivotal piece of research that has driven many programs to change their approach to career academies.

Slide 38: The following 10-minute activity will help you practice how to study and interpret your program's data. Turn to Activity 5: Study the Data worksheet.

Once you have finished the activity, return to this slide deck to learn more about research and data sources.

From the worksheet:

Purpose: This 5-minute exercise will help you to interpret your CTE data.

Directions: Use the fictitious state example in the activity to answer questions about how to interpret program data: What do the data tell us? What do you do with the data?

Facilitator note: If doing this activity with a group, consider making this a 10-minute think-pair-share, with individuals taking 5 minutes to read through the example and interpret the data, and 5 minutes to share with another person. This can help to illustrate the kinds of research questions that practitioners can answer using program data.

Slide 39: Now, we come to the final component in our continuous improvement model. "Act" is focused on reflecting on the steps you've taken in the past and what changes you make going forward as part of your continuous improvement cycle.

PPT Slide

Study: Engage Stakeholders

- Build buy-in among CTE stakeholders.
- Involve stakeholders in studying data.
- Convene educators to fine-tune activities.
- Share findings on a regular basis.
- Translate complex data into usable information.
- Create dashboards to publicize results.
- Click here to see an example of how data have been used to drive change: <https://eric.ed.gov/?id=ED441075>.

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Activity 5: Study the Data

CTE Dual Enrollment Program in State A: Student Makeup by FRL Status

FRL Status	Percentage
Specialty FRL (English)	75%
Specialty FRL (Math)	15%
Specialty FRL (Other)	10%

Percent of CTE Dual Enrollment Programs in Schools in State A, by FRL Level

FRL Level	Percentage
<15% FRL (all)	85%
15-75% FRL (all)	10%
>75% FRL (all)	5%

CTE Career & Technical Education Research Network 38

Continuous Improvement Model: Act

CTE Career & Technical Education Research Network 39

Script and Notes

Slide 40: Recall that the continuous improvement cycle is intended to be an iterative process. Act means taking the time to review your performance results in the context of your work and feed the study information you collect back into the process.

Simply put, did you achieve what you set out to do? Are you satisfied with your results? If not, it may be you are using the wrong approach. This is where we look at what the data tell us from implementing our plan for continuous improvement and determine what we may need to change. Act is where you apply the data and research you collected to determine whether changes are needed and mobilize your team to refine your effort.

Slide 41: Specifically, you may wish to review your operational plan and, where necessary, make changes in how you are approaching your work. This will begin with reviewing the strategies you originally selected to address your identified problem. Are they still appropriate or are changes necessary? Did your review of the research suggest updates to your approach?

You also will wish to consider whether the activities you identified are appropriate for the strategies selected. Are they accomplishing what you hoped? Might they need to be updated or replaced?

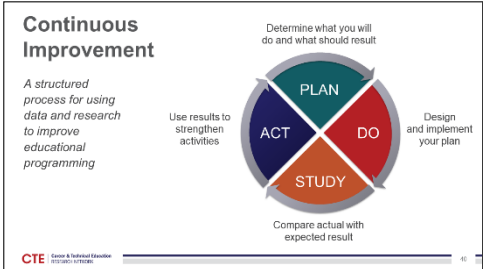
Finally, you may wish to review the benchmarks you are using to assess success. Are they accurately measuring what you set out to assess? Is there a need to reset or revise?

Slide 42: Change takes time. You must moderate your planning in accordance with the time it takes for change to happen.

Keep in mind that students participating in CTE programming must first complete a threshold level of coursework, which may entail completing 2 or more years of schooling, before they achieve measurable results. Accordingly, be wary of instituting changes too quickly if your goals are not immediately achieved.

One means of checking your performance is to set short-term, middle-term, and long-term benchmarks for assessing your results. Ideally these benchmarks align with a research-based logic model. This type of short- and long-term outcomes-based planning will feed into each other so that you can assess your progress along the way. For example, if your long-term goal is to improve student college and career transitions, your short-term goals might be to assess changes in student participation and concentration in CTE programming over the short- and middle-term.

PPT Slide



Act: Review Your Operational Plan

Strategy	Activities	Outcomes
1.
2.
3.
4.
5.

- Review the strategies you selected to address your identified problem.
 - Are they still appropriate?
 - Might any need to be updated?
- Review the activities you identified to address each strategy.
 - Did they accomplish what you hoped?
 - Is there a need for updating?
- Review your benchmarks.
 - Are they measuring what you hoped?
 - Do you need to reset or revise?

CTE Career & Technical Education Research Network

Act: Moderate Your Planning

Short-Term Outcomes (e.g., 1 year)	Middle-Term Outcomes (e.g., 2–3 years)	Long-Term Outcomes (e.g., 4+ years)
<ul style="list-style-type: none"> CTE participation rates Ninth grade on track to graduate Academic Career and technical student organization engagement 	<ul style="list-style-type: none"> CTE concentrator rates Work-based learning rates Dual-credit attainment Cumulative grade point average Industry certifications 	<ul style="list-style-type: none"> Graduation Employment placement Postsecondary enrollment Retention in work or postsecondary Career satisfaction

CTE Career & Technical Education Research Network

Script and Notes

Slide 43: Planning continues by recognizing that the purposes of your work may differ. Examples of outcomes for the secondary, postsecondary, and state levels are shown on this slide.

For example, the purpose of CTE at the secondary level may be directed at preparing students with basic career readiness skills so that they are ready to enter the workforce, along with career exposure to help them pick a career.

Conversely, CTE at the postsecondary level may be more occupationally directed. Here, students may participate in job-specific training or pursue industry-recognized certification.

At the state level, outcomes may be broader, such as improving the state's economy, reducing the need for social services (such as the payment of unemployment benefits) or increasing state payroll tax revenues.

Ultimately, the continuous improvement cycle will differ depending upon the targeted sector.

Slide 44: Remember, it is critical to build buy-in among CTE stakeholders. It is important to engage individuals at all stages of the Plan-Do-Study-Act improvement process, so that they understand how the initiative will benefit students. Involving stakeholders in reviewing data and research can help to improve the accuracy of information and communicate that results matter. It is just as important to engage educators during the Act stage of continuous improvement as it is during at the previous three stages.

As we said earlier, you'll see more about this in Module 6 where we discuss communicating with stakeholders.

Slide 45: Here is an example of how a state is using data.

Nebraska's reVISION process, which puts data into the hands of CTE educators to drive program improvement, illustrates how research and data can be used to drive change.

To support Nebraska CTE educators in strengthening programming, the Nebraska Department of Education created the reVISION process. reVISION is a yearlong process that engages educators in analyzing data to transform their career education systems. Work occurs in collaboration with postsecondary education, regional workforce/economic development leaders, and staff from the State Departments of Labor & Economic Development.

The process begins with school district staff convening along with partners to participate in a facilitated process to review and analyze data to identify areas for improvement. This information is shared with community members to gather feedback to inform development of a 3- to 5-year action plan. Nebraska Department of Education staff then provide ongoing, individualized technical assistance to support plan implementation. Over time and with ongoing reviews of results, districts can leverage change to improve their student performance.

PPT Slide

Local Outcomes (Secondary)	Local Outcomes (Postsecondary)	State-Level Outcomes
<ul style="list-style-type: none"> Enhancing career readiness Expanding career exposure Seamless post-program transitions 	<ul style="list-style-type: none"> Job-specific training Industry credentialing Employment 	<ul style="list-style-type: none"> Economic development Reduced social services Increased revenue

CTE Sector & Technical Education
Continuous Improvement

- Build buy-in among CTE stakeholders.
- Involve stakeholders in reviewing data.
- Convene educators to fine-tune activities.
- Share findings on a regular basis.
- Translate complex data into usable information.
- Create dashboards to publicize results.

CTE Sector & Technical Education
Continuous Improvement

- Share CTE performance data.
- Educators review CTE data in collaboration with regional partners.
- Identify areas for improvement.
- Create action plan.
- Establish up to a 5-year plan.
- Individualized technical assistance is provided by state staff.

CTE Sector & Technical Education
Continuous Improvement

Script and Notes

Side 46: Data and research also can be used to offer insights into the effect that CTE has on learners after they exit.

For example, to assess how CTE participation affects community college students' post-program employment outcomes, researchers in California surveyed community college students following program exit (<https://doi.org/10.1080/10668926.2019.1650843>). The study found that students completing programming reported higher annual wages and improved their employment status and work-term status. Importantly, they also found that the highest returns occurred for individuals whose job closely related to their program of study.

This information can help communicate the benefits that CTE confers on program completers generally, and those in jobs aligned to their studies.

Slides 47–50: Closing Activity, Resources, and Contact Information

Slide 47: Congratulations on completing Model 2: Using Data and Research to Improve CTE Programs. We hope that this module has provided you with useful information to help structure your CTE improvement efforts.

Slide 48: To help close out your module engagement, please consider how you might use the information contained in this module to use data and research to improve your CTE programs. Stop the module and follow the directions on the Self-Reflection Activity worksheet.

For facilitated in-person professional learning, this closing reflection question activity should be done as a 10-minute think-pair-share.

Thank participants for attending.

PPT Slide

Act: California Community Colleges

Survey of community college completers

- Administer following exit.
- Assess employment outcomes.

Effects

- Hourly wages
- Work status (i.e., employed part-time or full-time)
- Work term (i.e., temporary, permanent)

Source: Community College Practice Profile: Employment Outcomes: Results from the Career Technical Education Research Survey. <http://doi.org/10.1080/10668926.2019.1650843>

CTE Career & Technical Education Research Network

Closing Activity, Resources, and Contact Information

Activity 6: Closing Self-Reflection



How might you use the information in this module to use data and research to improve CTE programs?

- Answer the questions included in the Self-Reflection Activity worksheet provided.
- Restart the module when you have completed the worksheet.

References and Resources

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- Activity handouts 1–6

Contact Information

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