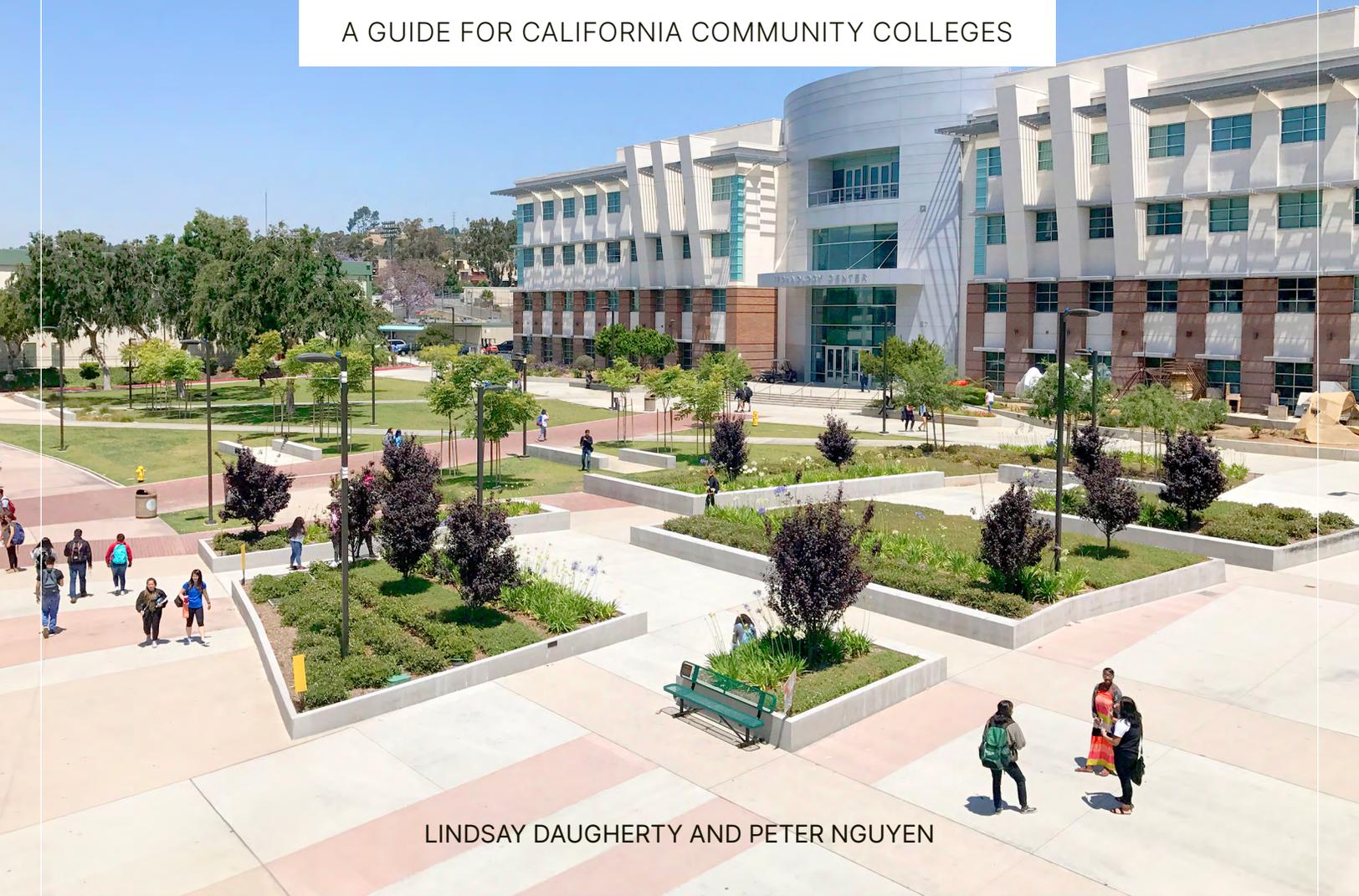# Using Data to Improve and Evaluate Direct Assessment Competency-Based Education Programs

A GUIDE FOR CALIFORNIA COMMUNITY COLLEGES

LINDSAY DAUGHERTY AND PETER NGUYEN

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About This Guide

Our aim with this guide is to provide direction to California community college staff on how data can be used to improve and evaluate direct assessment competency-based education (CBE) programs. The guide provides an overview of how community college staff can track success measures, engage in continuous improvement, and evaluate the impacts and costs of college programs. Examples within the guide are contextualized to direct assessment CBE. The different approaches to data use that we describe in the guide vary in complexity, and some approaches may require assistance from institutional research staff and/or external data experts. The guide concludes with an actionable workbook that is designed to support community colleges in planning for how they will use data to support their direct assessment CBE programs.

Direct assessment CBE programs have the potential to offer more-flexible (and potentially efficient) pathways to college credentials and open up college opportunities to more students.[1] Student progress in these programs is "measured solely by assessing whether the student can demonstrate that he or she has a command of a specific subject, content area, or skill, or can demonstrate a specific quality associated with the subject matter of the program."[2] Direct assessment CBE programs remove the emphasis on "seat time" in college courses as the primary measure of student learning and allow students to learn and demonstrate competencies in varying ways. Direct assessment CBE students typically receive a clear record of the competencies they have mastered, which may allow graduates to better communicate these competencies to employers during the hiring process.[3]

Between 2021 and 2025, the California Community Colleges Chancellor's Office, with support from the Success Center for California Community Colleges, launched the Direct Assessment CBE Collaborative, a learning community that supported eight community colleges in establishing pilot direct assessment CBE programs. The Chancellor's Office created a program syllabus to guide the pilot program colleges in the design and implementation of local direct assessment CBE programs. The Chancellor's Office also brought in Jobs for the Future and the Competency-Based Education Network as partners to support the colleges with program implementation.

We joined the Direct Assessment CBE Collaborative in a developmental evaluation role with the task of providing ongoing feedback to the Chancellor's Office and implementation support to the Collaborative's partners through briefings and internal memos. We will provide a final report to the Chancellor's Office detailing how the eight colleges implemented their programs, barriers and facilitators, and lessons learned to inform future efforts to scale direct assessment CBE programs in California community colleges. The Chancellor's Office also asked us to develop this evaluation guide to support California community colleges that are implementing direct assessment CBE programs.

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Who Is This Guide For?

This guide is for California community colleges that are implementing direct assessment competency-based education (CBE) programs. Community college administrators and staff who are overseeing direct assessment CBE programs should work in close partnership with institutional research staff to determine which measures and data will be collected and how data and evaluation approaches will be used to support, improve, and assess programs.

Why Use This Guide?

This guide provides clear and actionable guidance to community colleges on measures and approaches that can be used to support data-driven direct assessment CBE programs. Leading community colleges regularly use data and evaluation to inform practices and assess program success. Data-driven practices may be particularly important in supporting the successful launch and sustainability of innovative programs, such as direct assessment CBE programs.

What Is in the Guide and How Should It Be Used?

Part A of this guide contains five sections with guidance on data use for colleges that are implementing direct assessment CBE programs:

- **A.1. Prepare for Data Use and Evaluation:** This section provides guidance to direct assessment CBE program leads on three different approaches to data use. It also provides guidance on the capacity colleges need to carry out data-driven efforts.

- **A.2. Choose Progress and Success Measures:** This section describes two sets of measures that community colleges should consider to track their direct assessment CBE programs: (1) the measures of student success that the Chancellor's Office has established for students in traditional community college programs and (2) additional measures that align with the aims and structure of direct assessment CBE programs.

- **A.3. Track Program and Student Progress:** This section provides basic guidance on how colleges should track data at the program level, including selecting benchmarks and disaggregating results. It also provides guidance on using measures of student progress to target supports.

- **A.4. Use Continuous Improvement Processes:** This section provides an overview of how data-driven continuous improvement processes can be employed to identify implementation challenges with direct assessment CBE programs and to test and scale program changes.

- **A.5. Assess Impacts and Costs:** This section provides a brief overview of some approaches to assessing the impacts of direct assessment CBE programs and new program features. It also provides an overview of the ingredients method for calculating costs.

Part B of this guide contains a workbook that community colleges should use to plan for their use of data for direct assessment CBE programs. The workbook content is directly aligned with the guidance provided in Part A.

Contents

Guidance on Data Use for Direct Assessment Competency-Based Education Programs

A.1. Prepare for Data Use and Evaluation

In this section, we describe two ways that community colleges can prepare for data use and evaluation in their direct assessment competency-based education (CBE) programs. First, program leadership must work with college staff and faculty to determine how they will use data to improve, evaluate, and sustain direct assessment CBE programs.[4] Second, college faculty and staff must build the capacity to conduct data analysis, including time and expertise, data systems, and processes for regularly incorporating data into decisionmaking.[5]

Determine How Your College Will Use Data to Support Direct Assessment Competency-Based Education Programs

Community college leadership, staff, and faculty should first determine how they will use data to support their direct assessment CBE programs. We provide a brief description of three strategies for data use below. The first strategy leverages more-basic methods of tracking progress and success data at the program and student levels. The other two strategies are more structured and more rigorous and will likely require additional time and data collection and analytic capacity from college leadership, staff, and faculty and/or consultants. Once college staff identify which of these three strategies they will use to inform their direct assessment CBE programs, they can find additional details on how to carry out the work in the relevant sections of this guide (A.2, A.3, A.4, and/or A.5).

Track Program and Student Progress
(see A.2. and A.3.)

At the program level, community college leadership and staff should use measures to examine trends over time and disaggregate data to identify gaps in success for underserved groups of students.[6] It is also valuable for staff to benchmark program-level success against goals set by staff or comparison programs. At the student level, community colleges should leverage data to ensure that students receive holistic supports. To do this, college staff and faculty can draw on student administrative data, early alert systems, and student perspectives (e.g., surveys, interviews) to identify student support needs.

Use Continuous Improvement Approaches
(see A.4. for guidance)

Continuous improvement is a strategy that leverages data to address implementation challenges related to educational practices and programs.[7] Direct assessment CBE program leadership, staff, and faculty should first identify specific program challenges that they want to address. Staff can then use a structured approach, such as a plan-do-study-act (PDSA) cycle, to test out changes to programs (e.g., modified enrollment processes, new curriculum materials). Continuous improvement approaches focus on shorter-term measures related to implementation challenges and the changes being tested rather than student or program success. The approaches often require additional data collection and call for deep engagement of relevant stakeholders (e.g., staff, faculty, students) to identify implementation challenges and reflect on the changes being tested.

Assess the Impacts and Costs of Programs (see A.5. for guidance)

To estimate the impacts of a direct assessment CBE program, community college staff can use statistical methods (e.g., regression, matching) to make comparisons between students who participated in the program and similar students who did not participate.[8] To estimate the impact of new program components (e.g., additional coaching supports, new assessments), college staff can use these statistical methods and other approaches to establish a *comparison group* of students who do not receive the new program components (e.g., established through a lottery or by choosing a subset of faculty). Impact analysis often requires advanced research support from institutional research offices and/or external consultants. Cost analysis is also important for measuring return on investment. College leadership can focus on the costs to the college or consider measuring other types of costs (e.g., lost wages from changes in work hours to accommodate coursework) to capture the full return on investment from direct assessment CBE programs.

Assess Capacity, Address Gaps, and Ensure Feasibility of Plans for Data Use

In the box on the next page, we highlight some of the key resources and conditions that community colleges need to have in place to support data-informed decisionmaking. Program staff who oversee direct assessment CBE programs should build plans for data use that align with the capacity of their colleges. For example, if a college has limited internal capacity for data collection and analysis, that college's staff may need to leverage available data and focus on monitoring the most-essential student and program progress measures. Continuous improvement approaches require colleges to have strong buy-in from program staff about the value of solving implementation challenges in a structured and data-driven way and strong staff willingness to carve out time for the work. Impact and cost analyses are more-complex data-use strategies that may require colleges to have advanced internal research expertise or the resources to bring in external consultants.

In Part B of this guide, we provide a checklist (Worksheet B.1) for assessing a community college's capacity for data use that direct assessment program staff should complete with other key stakeholders, such as leadership and institutional research staff. After they assess capacity with Worksheet B.1, college leadership and staff should identify and try to fill gaps in capacity where possible.

Key Resources and Conditions Supporting Data-Driven Decisionmaking

Leadership support: Community college leadership must prioritize internal data use and communicate its importance to staff across the institution and to external stakeholders to build buy-in. Leadership is also essential to ensuring funding for data-driven efforts.

Openness to data use among staff: To encourage data use, community colleges should build cultures that emphasize collaboration, trust, and improvement around data. Leadership messaging is important in building this culture. Staff must see connections between data and their work. Staff and leadership must also have a commitment to acting on data.

Data collection processes and infrastructure: Community college staff can draw on available data (e.g., student information systems, learning management systems) and collect new data (e.g., surveys, document reviews). Any new data collection efforts will require planning, staff time, and materials and technology costs. Community colleges may consider leveraging current data and resources (e.g., adding questions to an annual survey) to minimize burden and costs.

Staff to support data collection and analysis: Using data to inform programs can take time and effort, and leadership and staff must be committed to sustaining the work. Data collection efforts and some of the more-advanced analysis approaches may require individuals with research expertise. Many community colleges can draw on institutional research offices for this expertise and may need to expand capacity in these offices to ensure the systematic use of data to inform decisionmaking. Community colleges can also hire consultants or partner with faculty to supplement internal capacity.

Processes for integrating data into decisionmaking: Community college leadership and staff must be intentional about integrating data into decisionmaking processes. From the outset, community colleges must identify the measures that they want to track, how they will determine success, and what actions they will take to act on data. At the student level, faculty, coaches, and other support staff need clear guidance on how to use data to ensure that students receive holistic support. Continuous improvement and impact analyses require advance planning and clear, structured processes for guiding the work.

A.2. Choose Progress and Success Measures

This section provides community college administrators and institutional researchers with an overview of the measures that could be used to track progress and success in direct assessment CBE programs at the program and student levels. The Competency-Based Education Network's *Quality Framework for Competency-Based Education Programs* specifies that high-quality CBE programs should have "agreed-upon performance goals (including equitable learner outcomes) as well as effective and regular approaches for monitoring, measuring, surveying, analyzing, reporting and acting on performance data (including specific learner outcomes)."[9] We start by describing the current set of success measures that California community colleges track for traditional programs, and then we discuss additional measures that more closely align with the aims of direct assessment CBE programs that community colleges might track.

Continue to Use Traditional Measures of Success for California Community College Programs

The California Community Colleges Chancellor's Office provides a clear list of progress and success measures that are tied to each step of a student's certificate- and degree-seeking journey (Table A.2.1). These measures of progress and success for the traditional student journey largely remain relevant for direct assessment CBE programs and students. For example, both traditional programs and direct assessment CBE programs aim to support students' completion of postsecondary credentials and increase graduates' employment and earnings. California community colleges that are implementing direct assessment CBE programs are developing crosswalk methodologies to map competencies to credit hours. This is required by Title 5 in the California Code of Regulations (Section 55270 on the scope and intent of direct assessment CBE programs) and allows for comparable measures of retention and momentum with traditional programs.[10]

Collecting consistent measures for traditional and direct assessment CBE programs allows for comparisons and benchmarking across different types of programs. Moreover, college staff do not need to invest in training and infrastructure to assist with new forms of data collection. However, traditional measures of learning and progress may not be sufficient for capturing all of the unique components and aims of a direct assessment CBE program.[11] In the next section, we describe some additional measures that colleges can track that are better aligned with the specific aims and structure of direct assessment CBE programs.

TABLE A.2.1

California Community College Progress and Success Measures for Certificate- and Degree-Seeking Students

Stage of Student Journey	Measure
Successful enrollment	• Enrolled in at least one term
Learning	• Completed transfer math or English
Momentum	• Persisted fall to spring (same college or any college) • Successfully completed unit in the fall or during the year
Success or completion	• Earned a noncredit certificate, credit certificate, associate of arts degree or associate of science degree, associate degree for transfer, California Community Colleges bachelor's degree, or apprenticeship journey status • Attained Vision Goal completion definition[a] • Completed average number of units for degree-earners • Transferred to a four-year institution (California State University system, University of California system, in-state private, out-of-state)
Employment	• Became employed in a job closely related to field of study
Earnings	• Had median annual earnings • Had a median change in earnings • Attained the living wage

SOURCE: Adapted from California Community Colleges, "Student Success Metrics by Student Journey," undated-b.

NOTE: We combined some metrics that are specified as separate metrics in the source table. For example, each type of credential attainment is listed as a separate metric.

[a] In 2017, the Foundation for California Community Colleges published a framework that outlined goals for California community colleges to reduce student equity gaps and improve student outcomes. A Vision Goal is related to the outcomes identified in that framework (Foundation for California Community Colleges, *Vision for Success: Strengthening the California Community Colleges to Meet California's Needs*, 2017).

Choose Other Measures That Align with the Aims and Structure of Direct Assessment Competency-Based Education Programs

Community colleges should consider tracking other measures to determine whether direct assessment CBE programs are meeting their intended goals. Table A.2.2 outlines some of the key aims of high-quality direct assessment CBE programs, and we identify specific measures and data sources that colleges can use to track these aims.[12] We provide some additional detail on the proposed aims and measures below. Some of these measures can be accessed through available data sources, but others might require additional data collection to gather student, faculty, and employer perspectives.

In Part B of this guide, Worksheet B.2 has a place for community colleges to identify their own measures of success. College leadership and staff should first identify the aims of their direct assessment CBE program in the worksheet. Program staff should then work with their institutional research office to identify the feasible indicators and data sources that are currently collected or could be collected to track progress toward these program aims.

TABLE A.2.2

Additional Aims and Measures of Success Colleges Should Consider for Direct Assessment Competency-Based Education Programs

Key Program Aims	Possible Success Measures	Data Sources
The program is reaching underserved populations.	• Proportion of enrollees from underserved communities (e.g., adult learners, low-income individuals, communities of color) • How students learn about the program	• Student information system • Application, orientation, or advising data
Students are able to enroll in programs seamlessly.	• Participation in key enrollment and orientation processes • Use of financial aid • *Satisfaction with enrollment and orientation processes*	• Orientation and advising data • Financial aid data • *Student surveys, interviews, and focus groups*
Students are progressing through the program.	• Competencies completed	• Learning management system
Student learning is being supported by curriculum materials and faculty.	• Engagement with instructional materials and faculty • Assessment attempts and scores • *Student and teacher perceptions of learning*	• Learning management system • Assessment records • *Surveys, interviews, and focus groups*
Student success is being supported by student supports.	• Student use of supports • *Student awareness of supports* • *Student satisfaction with supports*	• Advising and support services data • *Surveys, interviews, and focus groups*
Programs offer improved efficiency and flexibility.	• Time to degree completion • *Need to reduce employment hours or earnings while enrolled* • *Perception that program flexibilities prevent dropout* • *Satisfaction with college experience*	• Student information system • *Surveys, interviews, and focus groups*
Programs improve transitions into employment.	• *Employer awareness of graduate competencies* • *Perceptions of dual transcripts*	• *Graduate surveys* • *Employer surveys or interviews*

SOURCES: These examples of other measures were drawn from other lists of CBE evaluation measures (e.g., Parsons and Rivers, 2017), feedback from the California community colleges piloting direct assessment CBE programs, data collection for the Direct Assessment CBE Collaborative, and reviewer recommendations. Other resources provide additional measures for colleges to consider for CBE programs. See Competency-Based Education Network, 2017; Parsons and Rivers, 2017; and California Competes, 2021.

NOTE: Although the table primarily focuses on new and additional measures, some overlap with Table A.2.1 (enrollment and employment). The data for many of the measures in the table are collected from currently available sources, but measures and data sources in italics may require additional data collection beyond what community colleges typically collect from students.

Reaching Underserved Populations

Many colleges implementing direct assessment CBE programs aim to reach underserved populations. In addition, colleges are required to evaluate their outreach strategies for historically underserved groups under Title 5 of the California Code of Regulations on district evaluation plans for direct assessment CBE programs (Section 55270.10).[13] To support this effort, college staff will want to examine enrollment among key populations (e.g., adult learners, underrepresented minority students). Community colleges can typically pull information on the characteristics of enrollees from the administrative data that are collected from application and enrollment forms. Colleges can leverage admissions data on how students learned about programs to determine which outreach and marketing approaches are reaching underserved populations.

Ensuring Seamless Enrollment

The enrollment, orientation, and financial aid processes for direct assessment CBE programs in California community colleges can differ from traditional programs. To ensure that these processes are accessible and facilitate improvements, community colleges can examine data on student and staff experiences. Internal records may already capture students' participation in these processes, but college staff may also need to collect surveys, conduct interviews, and/or host focus groups to get student perspectives. In Appendix A we provide an example of a student survey that includes questions about enrollment experiences that was administered to students at three community colleges that piloted direct assessment CBE programs.

Providing Curriculum Materials and Faculty Support That Help Advance Learning

Experts at the Competency-Based Education Network note that direct assessment CBE programs should offer students access to a variety of instructional materials that support flexible, paced learning and that faculty should provide more-personalized instructional support for students' asynchronous use of learning materials.[14] It may also be valuable to assess data on how students are engaging with instructional materials and how faculty interactions are associated with competency mastery and degree completion. Community colleges can draw on their learning management systems, end-of-course student surveys, and perspectives from faculty to understand how students are engaging with faculty, course materials, and assessments and where additional improvements to materials and instructional support may be needed. Title 5, Section 55270.6, of the California Code of Regulations requires colleges to track faculty interactions.[15]

Providing Holistic Student Supports That Help Advance Progress and Success

Direct assessment CBE programs commonly offer students advising and wraparound supports that are similar to traditional programs, but these supports may be tailored to meet students' needs and align with the flexibility of the program (e.g., supports are provided virtually and during nontraditional hours, programs use more individualized instructional support and coaching). Many community colleges track measures that are related to students' awareness of and engagement with supports, such as advising, coaching, tutoring, and use of basic needs support. Direct assessment CBE programs can leverage these data on student supports and also conduct surveys or interviews with key stakeholders (e.g., students, staff) to ensure that students have access to supports and make improvements as needed.

Ensuring Progression, Efficiency, and Flexibility

As we noted above, traditional measures of progress, such as retention and credit completion, may remain relevant to direct assessment CBE programs. But these programs also rely heavily on competencies and assessments to determine progression, and it is useful to examine such measures of progress that tie to these competencies and assessments. Direct assessment CBE programs aim to improve the efficiency of earning a college credential, and the amount of time it takes students to complete this credential can be a valuable measure of program efficiency. The amount of time it takes to earn a degree can be tracked across both traditional and direct assessment CBE programs. College staff can also explore other measures to assess how students might benefit from the flexibility of a direct assessment CBE program, such as whether students need to reduce work hours to enroll in a program, student perceptions of whether the program flexibility helped prevent dropout, and general student satisfaction with the structure of the program.

Improving Transitions into Employment

The current measures of success from the California Community Colleges Chancellor's Office capture post-completion employment measures that are relevant to traditional programs and direct assessment CBE programs. Beyond employment, direct assessment programs aim to ensure that "learners can articulate what they should know and what they should be able to do upon completion of the program."[16] Direct assessment CBE programs also offer dual transcripts that articulate which competencies have been mastered within a program and aim to support hiring. To assess whether graduates from direct assessment CBE programs are able to better articulate competencies and make improved transitions into employment, staff would likely need to collect additional data from graduates and employers.

Key Things for Community Colleges to Keep in Mind While Choosing Measures of Progress and Success

- Common progress and success measures across traditional programs and direct assessment programs can be valuable for cross-program comparisons.

- Traditional measures of progress (e.g., retention, credit accumulation) may not capture the unique structure and benefits of direct assessment CBE programs, so community colleges should identify their program aims and establish additional measures of progress and success.

- Community colleges should identify available data sources and leverage those wherever possible but also consider where new data collection is important. Collecting new data takes time and effort but can also improve the ability to evaluate all aspects of a program.

A.3. Track Program and Student Progress

Community colleges commonly track data on student progress and success for two purposes: (1) to assess the performance of the college, specific programs, and subsets of students and to identify successes and areas for improvement and (2) to provide holistic academic and nonacademic supports to individual students. The Competency-Based Education Network recommends that CBE programs "proactively monitor data metrics to ensure learners are fully informed, engaged and performing as anticipated throughout the learner lifecycle."[17] In this section, we provide guidance for direct assessment CBE program staff and partners (e.g., leadership, institutional research staff) on how to establish a more robust plan for tracking program and student progress and using data.

Build a Detailed Program-Level Plan for Tracking Progress

Once program leadership and staff have selected measures of success (A.2), they will need to establish more-robust plans for tracking these measures at the program level and acting on these measures. The plans should entail (1) setting benchmarks for success, (2) determining how data will be disaggregated, and (3) determining how frequently program staff will examine measures of success. In Table A.3.1, we provide a sample tracking plan with examples of types of benchmarks that community colleges might use. **Program leadership overseeing direct assessment CBE programs and institutional research staff can use Worksheet B.2 in Part B of this guide to fill in the details for a program-level tracking plan.**

College and program leadership should set clear benchmarks for their direct assessment CBE program success indicators. When programs do not meet these benchmarks, college leadership and staff will need to take action to better understand why the program is facing challenges and ultimately make improvements to the program. There are at least two different approaches that community colleges can use to benchmark progress for their direct CBE programs:

- *Establish benchmarks up front.* There are some measures for which college staff may want to identify a specific number for a benchmark. For example, a college may want to choose a target enrollment number based on internal projections about how many students are needed to ensure that the program is sustainable. Title 5, Section 55270.8, of the California Code of Regulations specifies that individual students must achieve an 80 percent on summative assessments for mastery of a competency, but program staff may want to set a different, program-wide benchmark for how many students master a competency on an initial assessment (e.g., 70 percent).[18] Program staff may want to set some expectations around how frequently instructional materials should be consulted by students and modify these measures over time based on evidence of which student practices are associated with competency mastery.

- *Compare the direct assessment CBE program with comparable traditional programs.* Where colleges have access to comparable measures across programs (e.g., retention rates, time to credential), they can make direct comparisons of direct assessment CBE programs with similar programs. This approach will be more challenging if a college does not offer similar programs.

TABLE A.3.1

Sample Plan for Tracking Progress with a Direct Assessment Competency-Based Education Program

Aim	Measure	Benchmark[a]
Program maintains sustainable level of enrollment	Number of students enrolled in a term	100
Program is accessible to older working individuals	Percentage of enrollees who are adult learners (aged 25 and older)	Equal to or higher than other college programs
Program materials support learning	Students' use of learning materials	At least 40 percent of students who mastered a competency accessed a particular resource
Faculty support learning	Perceived faculty support	At least 70 percent of students report feeling supported by faculty
Student supports ensure access and success	Students' awareness of supports	More than 90 percent of students report awareness of resource
Students progress	Competency mastery	70 percent of students master a competency on the first assessment
Students earn credentials efficiently	Amount of time to credential completion	Equal to or lower than other college programs
Students transition into jobs	Employment rate	Equal to or higher than other college programs
Key underserved populations to examine: Assuming there are sufficient numbers of enrollees, disaggregate the results for adult learners, working students, first-generation students, and students in underrepresented minority racial/ethnic groups.		
Frequency of tracking: Program staff will consult data at least quarterly		

[a] The benchmarks are just examples and should not be interpreted as the optimal benchmark recommendations for colleges.

To assess how direct assessment CBE programs may be addressing equity gaps, community colleges should disaggregate data to identify how underserved student groups are entering, progressing through, and succeeding in direct assessment CBE programs. Community colleges may prioritize different groups and may want to disaggregate by age, gender, race/ethnicity, Pell Grant recipient status, or first-generation enrollee status. In some cases, colleges may determine a need to collect data on other measures for incoming students who are not included in available administrative data (e.g., employment status, basic needs insecurity). If indicators suggest that underserved student populations are progressing and succeeding at lower rates and are not being well served by the program, college leadership and staff will need to take action to identify the sources of those disparities and target supports to those students.

Identify Ways That Data Can Help Ensure Holistic Support to Students

Leading community colleges use data in systematic ways to identify students who need additional support and ensure that holistic academic and nonacademic supports are provided. Data-informed holistic support may be particularly valuable in direct assessment CBE programs because students have more flexibility and play a more central role in driving the learning process. Figure A.3.1 provides a model of how a community college might leverage three different types of student data from enrollment to completion (orange boxes) to provide holistic student support in a direct assessment CBE program (pink boxes).

First, community colleges can leverage enrollment data to identify students who might benefit from additional support. One approach colleges can take is to identify individuals from historically underserved subgroups (e.g., first-generation enrollees, former foster students) and direct those students into specialized wraparound support programs. Colleges may also use data on students to focus outreach on particular supports, such as directing outreach on public benefits to the individuals who are most likely to qualify (e.g., student parents, low-income students) or requiring incoming students with lower high school math achievement to receive corequisite academic support. Some colleges conduct more-rigorous approaches to identify students who might benefit from additional academic and/or nonacademic support, such as multiple measures placement and predictive analytics that combine academic measures with other student characteristics.[19]

FIGURE A.3.1
A Model of Data-Informed Holistic Support Services in a Community College
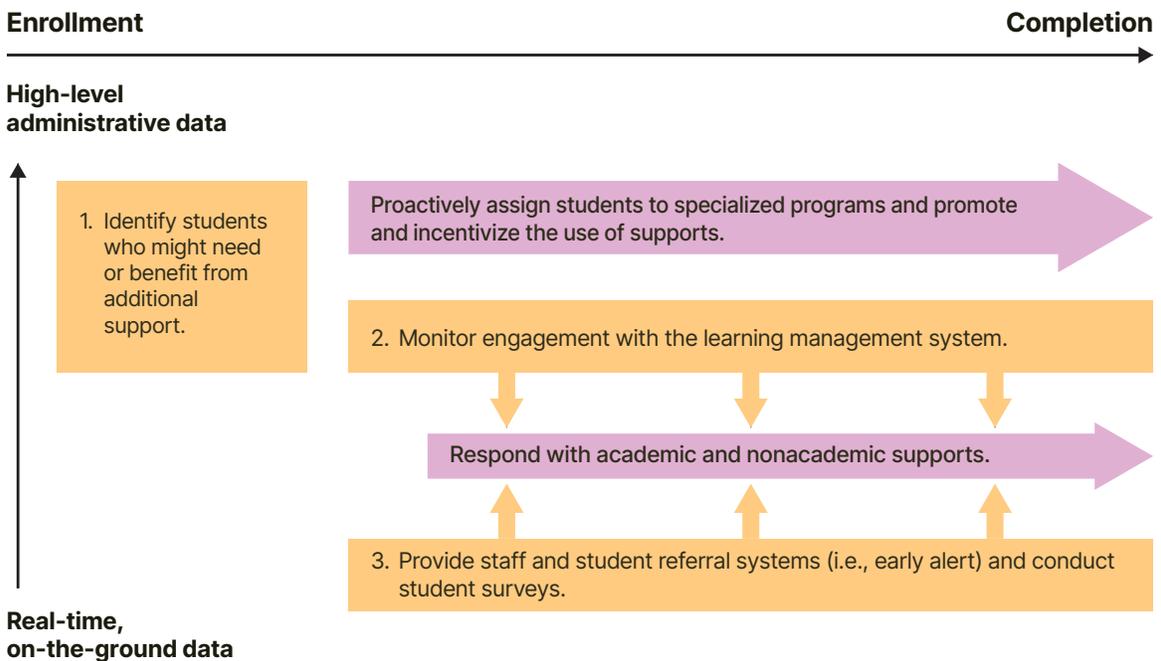
NOTE: The orange boxes illustrate three ways that community colleges assess data, and the pink boxes describe the delivery supports to students.

Second, faculty and coaches can monitor student interactions with instructional platforms and materials to assess engagement as students move through direct assessment CBE programs. Community college staff can also review assessment scores to identify which students might be struggling to master a competency and which instructional resources they have accessed. By examining relationships between short-term student engagement measures and longer-term student success, community colleges can identify the best indicators of success or dropout and focus on tying support to those early indicators. Once community colleges identify early indicators of disengagement, it may be useful to offer additional instructional and coaching support to students. Some colleges are using data-driven virtual nudging techniques to supplement human support and encourage the completion of key program activities.

Third, colleges can offer real-time reporting systems that allow faculty, advisers, and other staff to submit an early alert that a student is facing a challenge. These data systems facilitate referrals from frontline staff to connect students with additional supports in real time and track information on colleges' responses to alerts.[20] In some colleges, students are able to submit their own alerts. Community college support programs (e.g., emergency aid, tutoring) often collect their own data on intake and use and may follow up with students based on this information. Some community colleges also collect student surveys as a way for advisers and support staff to triage supports based on real-time data that indicate which students might be facing particular challenges.

Table A.3.2 provides an example of what a data-informed support plan might look like for a direct assessment CBE program. In this example, a fictional college uses enrollment data to direct first-generation students to specialized support programs and assigns coaches with smaller caseloads and more coaching experience to students who are identified as being at higher risk of dropout. The college monitors engagement with the learning management system and has an intervention for students who are not engaging. Students who fail assessments must participate in additional tutoring sessions and attend extra mandatory progress check-ins with faculty to remain enrolled. Competencies with high failure rates on the summative assessment are reviewed and the content is overhauled, or they receive embedded student supports. Finally, the example college has specific response plans for attendance alerts in the early weeks after a student first enrolls, streamlines ways for students to self-flag a challenge and receive basic needs support, and gathers information on student support preferences through a survey to triage coaching to students who are most likely to engage.

Community college staff can document how they will use data to provide holistic student supports in Part B, Worksheet B.3. Program leadership should work with faculty and support staff to first identify which student-level measures they will consult to identify incoming and ongoing needs for academic and nonacademic support. For each indicator, program staff should map out a clear plan for what actions will be taken to support the student and who within the college is responsible for delivering that support.

TABLE A.3.2

An Example of Data Use to Inform Holistic Support Actions

Type of Data	Measure Indicating Potential to Benefit from a Support	Support Action
Enrollment data on baseline student characteristics	A student is in a group served by a specialized wraparound support program.	Groups with specialized programs receive an invitation during enrollment and in the first semester.
	A student falls into a group that has historically faced gaps in progress and success.	Students who are identified as at risk of dropout are assigned specialized coaches with reduced caseloads that allow for more time to proactively support students.
	A combination of prior academic achievement measures suggests that an individual has a lower chance of completion.	The same action is taken as above.
Learning management system data	A student is engaging with the learning management system fewer than three hours per week.	A faculty member (and coach) reaches out to the student to check in and promote the materials.
	A student fails an assessment.	A student is required to participate in faculty office hours and engage in ongoing tutoring prior to reassessment.
	More than 20 percent of students have failed a particular assessment within a one-year period.	Courses with high failure rates receive a full review to consider refreshing the materials or assessments or embedding additional student supports.
Real-time early alert and student survey data	A student receives an early alert from several faculty members for a high number of absences in the first two weeks.	An adviser (and, if assigned, a coach) reaches out weekly to assess a student's needs, deliver relevant support, and discuss enrollment options.
	A student flags a need for basic needs support.	A basic needs case manager receives an email and follows up within 72 hours.
	A student reports on a survey a desire for more-personalized support.	A student is assigned a coach or receives targeted adviser support.

Key Things for Colleges to Keep in Mind When Tracking Program and Student Success

- Community college leadership and staff will need to establish clear program-level success measures and benchmarks to assess progress with direct assessment CBE programs.

- Community colleges should disaggregate data to examine progress for underserved communities and determine whether a direct assessment CBE program is supporting equitable outcomes.

- To ensure holistic support for students, college staff can draw on administrative data, learning management system data, and other data (e.g., campus climate surveys) to identify student needs and deliver tailored supports.

- Community college staff will need to establish a clear action plan to ensure that student data are systematically used to deliver proactive support to students.

A.4. Use Continuous Improvement Processes

Developing new and innovative programs can be hard work, and colleges will face implementation challenges as they roll out new direct assessment CBE programs. Continuous improvement processes can be valuable in these complex implementation contexts in which community colleges need to test and refine processes and program features. Experts at the Competency-Based Education Network and resources on continuous improvement emphasize the importance of having a systematic process for improvement that engages college staff, faculty, learners, and other key stakeholders.[21] In this section, we provide a brief overview of how colleges might carry out continuous improvement processes.

Identify Problem of Practice and Test Improvements

The first step to continuous improvement is to identify a particular problem of practice—an implementation challenge that community college staff are facing with their direct assessment CBE program and want to address.[22] We provide some examples of possible problems of practice that direct assessment CBE programs may face in Table A.4.1. **Program leadership and staff should use Worksheet B.4 in Part B of this guide to identify problems of practice that their colleges are currently facing.**

Once college staff identify the full list of challenges that they are addressing with their direct assessment CBE program, they can collectively prioritize their problems of practice to determine which challenges they will tackle with their limited time and start to build out a data-driven plan for testing improvements. We recommend focusing on one to two program challenges at a time.

After identifying a problem of practice to tackle, community college staff should work with a variety of stakeholders, such as faculty, support staff, and students, to break down implementation challenges and identify changes to a program or practice that should be tested.

One common tool for this task is a *fishbone diagram,* which allows practitioners to break down complex implementation challenges and develop solutions that address the root causes of implementation challenges.[23] We provide an example of how college staff might break down a direct assessment CBE problem of practice using a fishbone diagram in Figure A.4.1. **Worksheet B.5 in Part B of this guide provides an empty fishbone diagram that program leadership can complete for their direct assessment CBE programs.**

TABLE A.4.1

Examples of Problems of Practice for Community Colleges Launching Direct Assessment Competency-Based Education Programs

Area of Direct Assessment CBE Implementation	Examples of Problems of Practice That Programs May Face
Marketing, enrollment, orientation, and financial aid	• The college is not enrolling a high number of learners from priority groups. • Financial aid staff find the new technology system challenging to incorporate into their processes. • Students are dropping out of the enrollment process at higher-than-usual rates.
Curriculum, assessments, and instructional support	• Students are not passing the assessment for a particular competency at unusually high rates. • Instructors are struggling to engage students to participate in office hours. • Students report challenges understanding the instructional materials.
Student supports	• Students report challenges finding tutors during nonbusiness hours. • Coaches are struggling to get students to respond to outreach.

Carry Out a Plan-Do-Study-Act Cycle

Community college staff and leadership often face time constraints when implementing direct assessment CBE programs, and, as a result, data-driven improvement efforts can fall off the radar. A structured process, such as a PDSA cycle, can help community colleges carve out more time for improvement efforts and build data more explicitly into the process.[24] PDSA cycles for direct assessment CBE programs would likely be overseen by program administrators in partnership with other key stakeholders, such as faculty, support staff, and institutional research staff.
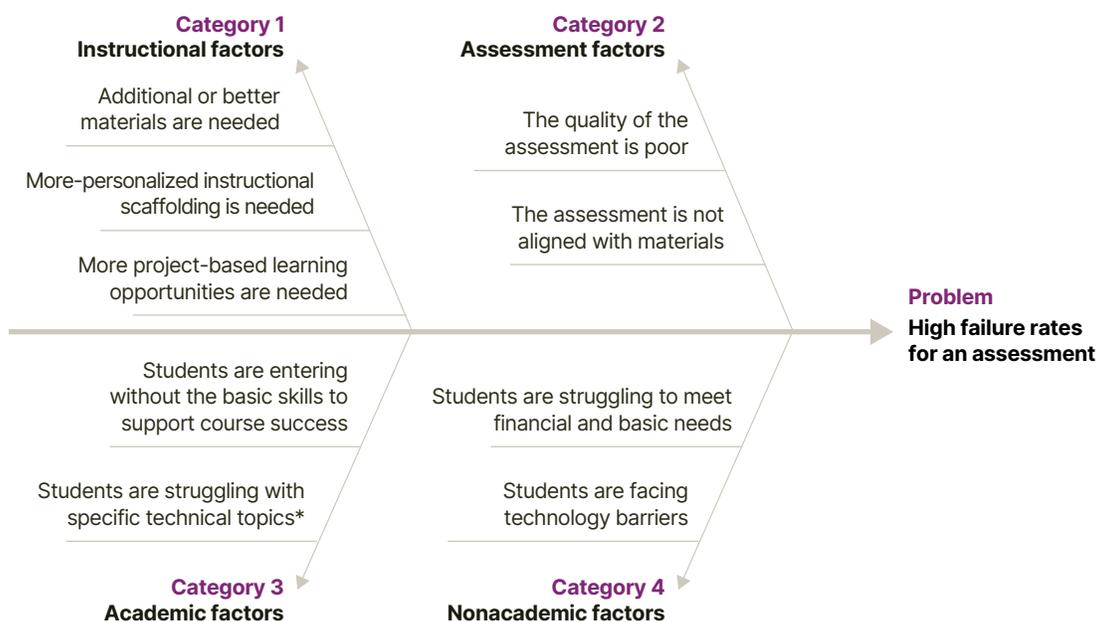
We briefly describe what a PDSA cycle consists of and provide an example that is specific to a direct assessment CBE program below and in Figure A.4.2. **Worksheet B.6 in Part B of this guide provides a space for community colleges to document their continuous improvement efforts.**

Using a Fishbone Diagram to Break Down a Direct Assessment Competency-Based Education Challenge
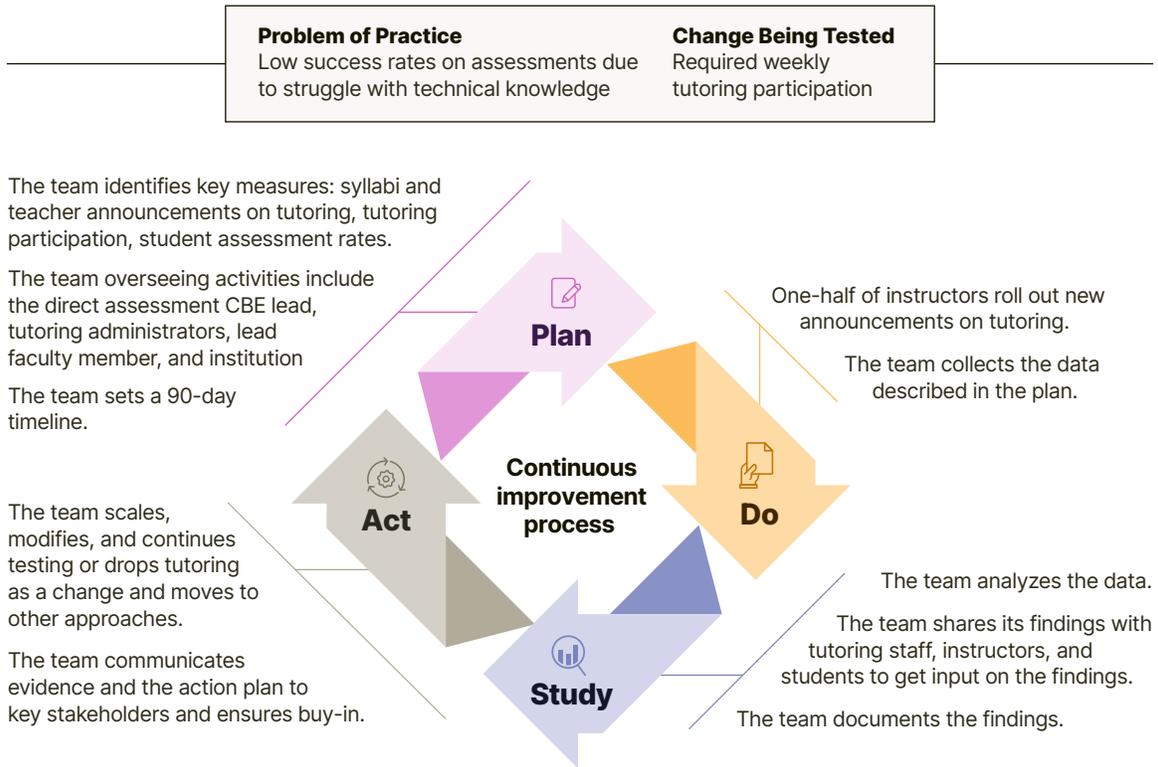
There are five steps to completing a fishbone diagram. Community colleges can enlarge fishbone diagrams and use sticky notes to get perspectives from many stakeholders on root causes and improvements.

1. **Choose a problem with direct assessment CBE program implementation.** The problem is written at the mouth of the fish. In the example in Figure A.4.1, the problem is high failure rates on an assessment for a particular competency.
2. **Identify potential categories of things that might be contributing to the problem.** These categories are written at the end of each fish bone. In the figure example, we highlight instructional factors, assessment factors, academic readiness factors, and nonacademic factors as four categories of things that might be contributing to high failure rates.
3. **Identify the root causes—underlying things—that could be driving the problem.** The root causes are written on the smaller fish bones under the categories identified in step 2. In the figure, the college identifies a variety of root causes for the low assessment success rates. In terms of instruction, examples of root causes could include gaps in materials or a need for more instructor-led scaffolding. It could also be that the assessment is poorly designed or misaligned with the course materials and competency. Students may be entering the program without foundational skills and may need more-personalized academic support from a tutor or instructor to master particular competencies. Or students may be facing nonacademic challenges, such as competing life priorities or technology access issues, that are contributing to success rates.
4. **Rank or prioritize the root causes and identify changes or improvements.** Program staff and other stakeholders then review all the root causes and identify which may be the most critical to address and improve. The best options for improvements address the root causes that are the biggest contributors to the problem and introduce changes that are feasible for community college staff and faculty to make.
5. **Choose a change or improvement to focus on.** Rolling out a single change or improvement on a small scale can be helpful for testing that change or improvement and potentially refining it through a continuous improvement process using a PDSA cycle (described in the next section).

FIGURE A.4.1

An Example of a Root Cause Analysis for a Direct Assessment Competency-Based Education Program Challenge

Category 1
Instructional factors

Additional or better materials are needed

More-personalized instructional scaffolding is needed

More project-based learning opportunities are needed

Category 2
Assessment factors

The quality of the assessment is poor

The assessment is not aligned with materials

Problem
High failure rates for an assessment

Students are entering without the basic skills to support course success

Students are struggling with specific technical topics*

Category 3
Academic factors

Students are struggling to meet financial and basic needs

Students are facing technology barriers

Category 4
Nonacademic factors

FIGURE A.4.2

An Example of a Plan-Do-Study-Act Cycle for a Direct Assessment Competency-Based Education Program

Problem of Practice	Change Being Tested
Low success rates on assessments due to struggle with technical knowledge	Required weekly tutoring participation

The team identifies key measures: syllabi and teacher announcements on tutoring, tutoring participation, student assessment rates.

The team overseeing activities include the direct assessment CBE lead, tutoring administrators, lead faculty member, and institution

The team sets a 90-day timeline.

The team scales, modifies, and continues testing or drops tutoring as a change and moves to other approaches.

The team communicates evidence and the action plan to key stakeholders and ensures buy-in.

Plan

Act

Continuous improvement process

Do

Study

One-half of instructors roll out new announcements on tutoring.

The team collects the data described in the plan.

The team analyzes the data.

The team shares its findings with tutoring staff, instructors, and students to get input on the findings.

The team documents the findings.

SOURCE: This figure is adapted from Daugherty et al., 2019, p. 13.
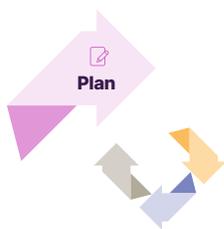
Plan

In the plan stage, community colleges will clearly document the implementation problem and the solution being tested and identify measures of success to track and assess progress. In the fishbone exercise, the team identified student struggles with certain technical concepts as a cause of low assessment pass rates. The solution is to require weekly tutoring participation (Figure A.4.2). Program staff must then map out the plan for testing this modification. In other words, program staff will outline which students will be assigned required tutoring, how the tutoring will be delivered, and how staff will track the data on tutoring participation and other short-term measures that might indicate the success of the tutoring participation requirement.
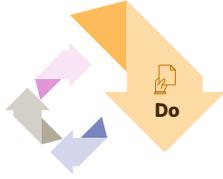
Do

Community college staff must then implement the planned changes and track the data to measure success. Community college staff should document exactly how a change is delivered and collect the data. Using data that are already available can cut down on the burden of new data collection. But continuous improvement is usually carried out in short cycles (i.e., one semester or less), so colleges may need to rely on shorter-term indicators from learning management systems and other internal tracking systems rather than traditional academic progress and success data. Other data sources (e.g., brief surveys or focus groups) can be valuable for bringing in the perspectives of key stakeholders. Program staff may need to work with others who oversee the data sources to pull the necessary information. In the fictional example in Figure A.4.2, college staff conducted a brief survey of all direct assessment CBE data and drew on available data for tutoring participation, class engagement, and course success.

Study

Once community colleges have implemented the change and collected the data, the next step is to analyze the data and interpret the findings with a broad group of stakeholders. The analysis should follow the plan that was set up at the outset of the PDSA cycle. The findings from the direct assessment CBE-required tutoring example in Figure A.4.2 may cover whether and how students were offered tutoring, whether and how students engaged with tutoring, student and tutoring staff perceptions of the tutoring experiences, and the scores and pass rates on second assessment attempts. Broad input from the individuals receiving and delivering the intervention can be helpful for surfacing perspectives and solutions that program leadership may not have thought of. For the example in Figure A.4.2, the college may want to pull in the tutors, some of the students participating in tutoring, and faculty for their perspectives on how well the required tutoring approach worked. All of these findings and stakeholder perspectives should be documented to inform future and ongoing learning and improvement.
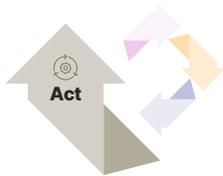
Act

After testing implementation improvements on a smaller scale, the PDSA cycle requires that community colleges quickly act on the findings. If the results from the example in Figure A.4.2 suggest that tutoring was successful, the college may want to scale the change and move on to a new implementation challenge. If the results are less promising, the college may want to modify and test the change further or abandon the change. In the figure example, if staff find lower-than-expected engagement in tutoring and slight increases in student performance, the college may want to modify the way it provides tutoring or consider other changes, such as supplementing instructional materials or modifying assessments.

Often, a single PDSA cycle is insufficient to resolve a problem of practice, and staff must continue to refine how their direct assessment CBE program is delivered through several PDSA cycles. Keeping PDSA cycles short (i.e., 90 days or fewer) can help ensure that progress can be made on a particular implementation issue within a year.

Key Things for Community Colleges to Keep in Mind When Carrying Out Continuous Improvement

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- Continuous improvement processes take time and effort from the staff overseeing a program, so community colleges will need to prioritize problems of practice and only use this process to address one or two implementation challenges at a time.

- Although it may be useful to consult institutional research staff, continuous improvement processes should aim to be practitioner-friendly. These efforts can be led by program staff and should engage other key stakeholders (e.g., faculty, students).

- Continuous improvement cycles should be quick (i.e., 90 days or fewer) and draw on short-term measures to make quick decisions and ongoing refinements to programs.

- Community college staff should draw on available data whenever possible but may need to collect additional data to capture shorter-term indicators on the success of a particular improvement.

A.5. Assess the Impacts and Costs of Programs

In this section, we provide some examples of options to conduct impact and cost analyses on direct assessment CBE programs. Developing and scaling direct assessment CBE programs can require substantial up-front investments. Yet, community colleges across the United States have long been under-resourced. Broad public questioning of college value and ongoing budget constraints place increased pressure on college leadership to justify the value of programs and make tough decisions about where to invest limited funds. Community colleges may want to conduct impact and cost analyses to assess the return on investment of their direct assessment CBE programs and inform decisions about whether to scale these programs. These analyses require more up-front planning, additional data, and strong analytic capacity, so they may not be feasible for every community college.

Assess the Impact of a Program or Program Feature

Assessing impact requires finding a comparison group that is not participating in a direct assessment CBE program or receiving a particular support (e.g., additional tutoring support, new instructional materials or assessments). First, we describe how community colleges might consider creating a comparison group to assess the impacts of direct assessment CBE programs. Then, we describe several

approaches that may be possible for assessing the impacts of program features. These approaches require substantial up-front planning, analytic capacity, and strong buy-in from staff and may not be feasible for many community colleges.

Assessing Direct Assessment Competency-Based Education Program Impacts

It can be a challenge to find comparable students and programs to assess the impacts of direct assessment CBE on student outcomes. Traditional programs at the same college or similar colleges serve as the best comparison groups, and program leadership will want to work with institutional research staff or external consultants to identify which programs and colleges to include in the sample. If a community college is large and offers comparable traditional programs in same discipline, it may be possible to focus on data within the same college. But it may be necessary to access data on other community colleges and include a larger set of comparison students and programs across these colleges.

To account for differences in student characteristics across programs, colleges, and time, analysts will need to use such statistical approaches as *propensity score matching* and *regression analysis*. These approaches leverage student-level data on the characteristics of direct assessment CBE students and their programs and colleges to make comparisons with similar students in similar programs. We do not provide a full overview of how to carry out these statistical analyses here; analysts who are examining program impacts should have prior training on statistical analysis and should consult other technical resources to support this work.[25] The approaches aim to minimize baseline differences between direct assessment CBE students and students in comparison programs.

The advantage of propensity score matching is that it establishes a clear set of comparison students and allows analysts to examine student characteristics to make sure that the two groups are similar at baseline. But propensity score matching approaches may throw out outlier students when fewer comparison students are available. Regression analysis uses information from more students to make comparisons, but the comparison group is less transparent. Analysts use these two approaches interchangeably, and they should lead to similar conclusions in most cases.

Assessing the Impacts of New Direct Assessment Competency-Based Education Program Features

Many community colleges will be introducing new program features (e.g., assessments, student supports) as they scale their direct assessment CBE programs. It can be valuable to test the impact of these features to make sure that they support improved student outcomes before scaling to all students. We describe several approaches to rolling out new direct assessment CBE program features that allow community college staff to establish a comparison group and assess impacts on student outcomes. These approaches require support from institutional research staff or consultants and advance planning.

Allocating the program feature through a lottery: The best way to ensure that the students who receive a program feature and the comparison group are similar is to allocate access to the feature at random. This approach will primarily be possible for program features that are delivered at the individual level (e.g., assessments, student supports) and for which access can be allocated in a randomized way. However, randomizing program features will require careful planning and a willingness to deliver the program to some students and not others.

Allocating access to the program feature according to a cut score: When community colleges use test scores or grade point averages to grant access to academic or nonacademic support, staff can examine student outcomes just below the cut score and just above the cut score to measure impact. For example, if direct assessment CBE program staff want to modify a support for students who fail a particular assessment, they could start by rolling out the support to students with the lowest assessment scores and use the students with slightly higher (but still failing) scores as the comparison group. There may be systematic differences between higher-scoring and lower-scoring students, but these differences should shrink as the college focuses on students who score close to where the cut score for the new program feature is set. In addition, analysts can use the statistical techniques we described above to account for remaining student differences.

Staggering the program feature rollout over time: A third approach to creating a comparison group is to stagger the rollout of the program feature to subsets of enrollees. In other words, the program feature can be implemented with certain groups of students, instructors, or coaches in the pilot group, and others do not receive the feature immediately (but may receive it later). It is helpful to try to eliminate systematic differences between early adopter students and late adopter students. One way to do this is through the pilot group selection. For example, letting faculty or coaches volunteer to pilot a new feature is common but may result in more-experienced or more-motivated individuals delivering the intervention. Choosing faculty or coaches to pilot a new program feature at random or in some other way that minimizes differences can help ensure that the difference being measured between the two groups is driven by the new program feature. The second way to eliminate systematic differences between the pilot and comparison groups is to use the statistical approaches we described above.

Implementing program features in these ways may come into conflict with other college priorities (e.g., ensuring equitable access to a support, piloting new program changes with individuals who have the most capacity and enthusiasm). Leadership overseeing direct assessment CBE programs will need to consider the value of having more-rigorous impact data against these other considerations.

Measure the Costs of Programs and Combine with Impacts

Community college leadership will be interested in the costs and the return on investment for direct CBE programs. The up-front costs of direct assessment CBE programs can be substantial, and community colleges will need to justify these investments by determining the longer-term benefits of these programs. Direct assessment CBE program staff and other analysts may need to devote time to tracking and calculating costs and then combining those costs with impact data.

In this section, we first provide an overview of the *ingredients method*, a common approach to calculating education program costs, and we provide an example of what this might look like in a direct assessment CBE program. Community college staff must then combine these cost calculations with data on the impacts or benefits of the program. We describe several approaches to combining cost calculations with impacts or benefits calculations.

The Ingredients Method Approach to Cost Analysis

The Institute of Education Sciences provides clear guidance on its recommended approach to cost analysis in *Cost Analysis: A Starter Kit*, and we recommend that the individuals conducting cost analysis reference that more-detailed guide.[26] On pages 24–25, we provide a brief overview of the three phases of cost analysis that are documented in the Institute of Education Sciences' guide. Under the ingredients

approach, educational providers are directed to think of cost analysis as similar to pricing out a meal. Community college staff must gather information on the ingredients of the direct assessment CBE program (phase 1) and then price out those ingredients (phase 2). The cost analysis can focus exclusively on the direct assessment CBE program, or colleges can look at the comparative costs of traditional and CBE programs. In phase 3, colleges add up costs and combine them with impacts or benefits.

The ingredients method of cost analysis is general and can be applied across direct assessment CBE programs and traditional programs. Community college staff who are engaging in cost analysis can also benefit from examining resources that focus more explicitly on the costs and sustainability of direct assessment CBE programs to ensure that the unique ingredients for these programs are incorporated into their cost analyses.[27]

College staff can use <u>Worksheet B.7</u> in Part B to calculate the costs of a direct assessment CBE program and make comparisons with the cost of a traditional program. In Table A.5.1, we provide an example of a cost analysis for a direct assessment CBE program covering the following costs:

- **Personnel costs:** We assume that administrator time to set up the infrastructure that enables direct assessment programs in the first three to five years may be considerably greater relative to a traditional program given the added layers of approval, operations planning, and curriculum planning. Administrative costs would then become similar to a traditional program in later years. Direct assessment CBE programs will require community colleges to train instructors and coaches beyond standard levels of ongoing professional development, so there is an incremental training cost. We assume in the example in Table A.5.1 that instructor time remains the same in direct assessment CBE programs and traditional programs (even though their time is focused differently). We also assume that the college has a campus-wide coaching program and that the direct assessment CBE program relies on the current pool of coaches and requires the same amount of coaching time for students.[28] Finally, we assume that direct assessment CBE programs will use support services at equal levels.

- **Facilities costs:** Direct assessment CBE programs are offered fully or partially online, so relative to traditional programs, these programs may cut down on the costs of classrooms and office spaces. But direct assessment CBE programs may need to invest more in learning management system infrastructure to build out new capabilities.

- **Materials and equipment costs:** Direct assessment CBE programs might not require the textbooks and materials that traditional face-to-face programs require. But modifying learning management systems and maintaining technology (e.g., providing computers or internet hot spots for students) can result in costs that are higher in direct assessment CBE programs.

- **Indirect costs:** Similar to traditional programs, direct assessment CBE programs often rely on centralized institutional resources to support operations. These costs may include resources from information technology services (e.g., information technology support), institutional research (e.g., data analysis and reporting, compliance), and library and academic supports. A college's chief financial officer can often provide an estimate of these indirect costs and information on whether these costs will vary for direct assessment CBE programs compared with traditional programs.

Using the Ingredients Method to Calculate Costs

Below, we outline the three phases of cost analysis from *Cost Analysis: A Starter Kit*.[a]
Community colleges often want to calculate the incremental costs of a direct assessment CBE
program, which means that these phases should be carried out for both direct assessment
CBE and traditional programs.

Phase 1: Identify the program ingredients. Community colleges must consider all of
the resources that are needed to deliver and use the program and establish prices for
those ingredients.

- *Common costs of education programs fall into four buckets.* These buckets are (1) personnel
  time to manage and deliver the program; (2) the facilities used to deliver the program;
  (3) equipment and materials, such as computers; and (4) indirect costs, such as technology
  support. Colleges should not limit their costs to these four buckets if other costs are
  identified. Faculty and staff time can account for a substantial portion of costs, so getting
  the costs right may be the most critical to ensuring a good estimate.

- *Colleges should consider whether to include student time costs.* If community colleges
  are only interested in the direct costs of the institution, then they may not want to include
  student time in their calculations. But the opportunity costs of college enrollment in terms
  of reduced employment and lost wages are often substantial. Some of the benefits of direct
  assessment CBE programs are the accessibility and flexibility that allow students to maintain
  employment while furthering their education.

- *Colleges will need to draw on different resources to determine ingredients and quantities.*
  Many costs, such as licensing fees, indirect costs, and facilities costs, may be found in
  program documentation or identified through interviews with program leadership. Collecting
  data on staff and student time can be more challenging and require surveys to capture
  actual time used on course activities outside learning management systems. Colleges may
  need to make assumptions about certain quantities rather than calculations if new data
  collection is infeasible.

Phase 2: Price the ingredients. Community colleges then need to come up with price
estimates for each of the ingredients that are used for the program.

- *Colleges will need to consider whether to use local or national prices.* For example, staff
  time costs could be calculated at local wage rates or at national rates to reflect costs if the
  program is scaled in other locations. California community colleges that are assessing the
  costs of direct assessment CBE programs would likely want to use local prices.

- *Colleges will need to draw on different resources to calculate prices.* To calculate local prices, colleges may need to draw on documents, administrative data, and interviews with program leadership and staff. If the exact prices are not available (e.g., prices for a classroom space), colleges can use other estimates (e.g., the local rate for commercial space) to substitute for actual costs.

- *Colleges will need to adjust prices to account for various factors.* Some ingredients (e.g., computers, facilities) may be used part-time for a program over the year. And some ingredients (e.g., facilities, instructional materials) can be used for multiple years without incurring additional costs. Colleges may want to calculate ingredient quantities and prices by the hour. For example, if a $2,000 computer is used by two students per year for an average of five years, and we assume that each student uses the computer for 100 hours, we calculate the price per hour of use as $2,000 / (2 * 5 * 100) = $2 per hour. Community colleges may also want to adjust pricing to account for changes in prices over time. An assumption of 3.5 percent growth in prices each year is commonly used for cost analysis.

Phase 3: Calculate the costs and combine with benefits information. Once the ingredients have prices, community colleges can calculate total program costs and integrate those costs with data on program value.

- *Colleges should sum the rates to determine total and incremental costs.* Community colleges may be interested in the overall costs of a direct assessment CBE program and the incremental costs of a direct assessment CBE program relative to a traditional program and may calculate both. College leadership may primarily be interested in the costs that the college will incur. But colleges also have the option of reporting the costs of all the individuals who are participating in program delivery (e.g., student time, employer time). Cost analysis often reports the overall cost and the cost per unit (e.g., cost per student, cost per credential earned).

- *Colleges can incorporate uncertainty in costs.* If some of the ingredients and prices are unpredictable, it may be useful to calculate and report a range of costs.

- *Colleges should determine which approach to combining costs and benefits to use.* There are varying approaches to combining costs and benefits—cost feasibility, cost-effectiveness, and cost and benefit—and colleges will need to determine which approach best meets their needs. We provide more information on these three approaches in Table A.5.1.

[a] Institute of Education Sciences, 2020.

TABLE A.5.1

An Example of Cost Analysis for a Direct Assessment Competency-Based Education Program

Ingredients (Phase 1)	Price per Unit (Phase 2)	Traditional Program		Direct Assessment CBE Program		Incremental Cost
		Quantity	Cost	Quantity	Cost	
Administrator time	$72 per hour	300 (100 hours * 3 administrators)	$21,600	480 (160 hours * 3 administrators)	$34,560	$12,960
Faculty classroom time	$45 per hour	1,440 (144 hours * 10 faculty)	$64,800	1,440 (144 hours * 10 faculty)	$64,800	$0
Faculty training time	$45 per hour	80 (8 hours * 10 faculty)	$3,600	400 (40 hours * 10 faculty)	$18,000	$14,400
Coaching time	$35 per hour	640 (160 hours * 4 coaches)	$22,400	640 (160 hours * 4 coaches)	$22,400	$0
Coach training time	$35 per hour	32 (8 hours * 4 coaches)	$1,120	160 (40 hours * 4 coaches)	$5,600	$4,480
Classroom space	$10.75 per hour	1,440 (144 hours * 10 rooms)	$15,480	0	$0	−$15,480
Technology	$0.52 per hour for traditional $1.50 per hour for direct assessment CBE	100	$52	6,500	$9,750	$9,698
Costs (Phase 3)			$129,052		$155,110	$26,058

Once college staff have calculated the costs of the direct assessment CBE program, they should combine the costs and compare the cost data with budgets or program benefits. Table A.5.2 presents three ways that community colleges can use costs:

- *Cost feasibility analysis* is an approach that simply compares program costs with the budget that is set aside for the program to ensure that a direct assessment CBE program is sustainable.

- *Cost-effectiveness analysis* compares direct assessment CBE programs with similar traditional programs and assesses the differentials in student outcomes and incremental costs.

- *Cost-benefit analysis* monetizes the benefits of the direct assessment CBE program to the institution (e.g., new enrollees, increased retention) and compares these benefits with total costs.

Most college leadership and staff will want to focus on the costs and benefits to the institution. But cost-effectiveness analysis and cost-benefit analysis could be calculated from a societal perspective, which means including time and materials costs for students, faculty, or other staff who are not covered by the college (e.g., reduction in employment while enrolled) and benefits that extend beyond college revenue (e.g., graduate earnings). However, collecting data on broader societal costs and benefits would require additional data collection and analytic time and is likely beyond the scope of what California community colleges can do for direct assessment CBE programs.

TABLE A.5.2

An Overview of Different Approaches to Combining Costs and Benefits

Category	Cost-Feasibility Analysis	Cost-Effectiveness Analysis	Cost-Benefit Analysis
Formula	Budget amount minus costs of the program	Incremental costs are divided by outcome effect size	Monetized benefits minus (or divided by) incremental costs
Interpretation of results	If greater than $0, resources are sufficient to cover the costs of the program	Lower numbers indicate more–cost-effective programs to achieve the same outcome	If the benefits are greater than $0 (or the ratio is greater than 1), then there is a positive return on investment
Pros	Easy to understand and informs sustainability	Useful to college leaders when comparing programs with the same effectiveness measures	Useful to college leaders when comparing across programs with different effectiveness measures
Cons	Does not provide any information on returns to the investment	Programs must have the same outcome measures	It can be difficult to price benefits

SOURCE: This table was adapted from Institute of Education Sciences, 2020, p. 48.

Key Things for Colleges to Keep in Mind When Assessing Impacts and Costs

- Rigorously assessing the impacts of programs and program components can require substantial up-front planning and research expertise, so some community colleges may not have the capacity to carry out this work independently.

- Community colleges will need to balance impact study design against other priorities (e.g., program implementation constraints, equity).

- Cost analysis requires individuals to make assumptions, and college staff should not get fixated on nailing down precise quantities and prices; instead, they should use approximations as needed to push forward.

- When calculating costs, colleges will want to (1) decide whether to include all costs (including start-up costs) or just ongoing operating costs; (2) compare costs for the direct assessment CBE program with the costs of a traditional program, and (3) figure out their preferred approaches to combining costs and impacts and benefits.

Conclusion

Although high-quality approaches to data use require time and effort from college leadership and staff, the data can be essential to supporting the successful implementation of direct assessment CBE programs and telling a story about how these programs are helping support students. Program staff who are overseeing direct assessment CBE programs should regularly monitor program-level progress, determine whether the program is meeting its intended aims, and identify areas for improvement. Community colleges can pursue continuous improvement approaches to carve out time for making data-driven improvements through a structured process. Direct assessment CBE program staff should also identify student-level indicators to deliver holistic and proactive support. College leadership may also require evidence of a return on investment for direct assessment CBE programs, which will require staff to carry out more-advanced analysis of impacts and costs.

Sections A.1 through A.5 provide guidance to California community colleges with direct assessment CBE programs on how to build capacity for data use, how to identify which measures to track, and how to use data to track progress, improve implementation, and assess the impacts and costs of the programs. Some of these approaches are more basic and require less time and expertise to carry out (sections A.2 and A.3), and some require deeper staff engagement and may require additional data collection (sections A.4 and A.5). The capacity for community colleges to carry out all three approaches may vary, and those colleges that are facing constraints may need to focus on more-basic approaches to data use. Community colleges should use Part B of this guide (the workbook) to map out plans for data use that are feasible.

Workbook to Help Community Colleges Develop Plans for Data Use

This section contains worksheets for community college staff to use to support their efforts to use data more intentionally. Staff who are overseeing direct assessment CBE programs should work with institutional research staff and other key stakeholders (e.g., faculty, support staff) to build out a plan for data use with these worksheets.

Worksheet B.1 is a checklist that community college leadership and staff can use to reflect on their readiness to carry out data-driven efforts to assess and support student progress, improve direct assessment CBE program implementation, and rigorously assess the return on investment for direct assessment CBE programs. These measures align with the key elements of capacity that we described in Table A.2.1. Community college leadership and staff who mark "Not at All True" or "Somewhat True" in Worksheet B.1 should discuss opportunities to strengthen capacity in these areas prior to carrying out the work discussed in this guide.

Worksheet B.2 provides a place for community college staff to lay out which measures they plan to track in the direct assessment CBE program data. First, program staff should work with leadership and other key stakeholders (e.g., faculty, institutional research) to identify program aims. Then, they should select a set of measures that they view as important to track these aims (see Tables A.2.1 and A.2.2 in Part A for examples) and list the data sources that they will draw on for these measures. Finally, program staff should select benchmarks, which could include comparisons with other programs and colleges (e.g., a completion rate that is equal to or greater than the pass rate for comparable programs) or a specific number that stakeholders agree on as a threshold for success (e.g., 70 percent of enrollees master a competency on their first assessment attempt) (see Table A.3.1 for examples). College tracking plans should also include details on how the data will be disaggregated to examine measures of success for underserved student groups and how frequently program staff will review the data.

WORKSHEET B.1

Assessing Community College Capacity for Data-Driven Decisionmaking

Measure of Capacity for Data Use	Not at All True	Somewhat True	Very True
Leadership regularly communicates to staff that the use of data should be part of the process for program decisionmaking.			
Staff across the college believe that data will be used to help programs rather than to harm programs.			
Staff who are overseeing direct assessment CBE programs view the use of data as helping support their efforts to deliver the program.			
The college collects detailed individual-level data on direct assessment CBE student progress and success.			
College staff can access student data periodically to assess direct assessment CBE student and program progress.			
Faculty and support staff have access to data that allows targeting individualized support.			
The college has the capacity to conduct rigorous program evaluation and cost analysis among internal staff or through external contractors.			
Direct assessment CBE program staff have established explicit plans and set aside time and resources for incorporating data into program improvement efforts.			
Direct assessment CBE program staff have built explicit processes that leverage student data to target supports.			
Direct assessment CBE program staff have established a plan for evaluating the impacts of the program.			
Direct assessment CBE program staff have established a plan for evaluating the costs of the program.			

WORKSHEET B.2

Other Measures and Data Sources Your Direct Assessment Competency-Based Education Program Will Track

Aims for Direct Assessment DBE Program	Measure Your Direct Assessment CBE Program Will Track	Data Source	Benchmark (i.e., comparison group, target number)
Aim 1:			
Aim 2:			
Aim 3:			
Aim 4:			
Aim 5:			

Disaggregation plan:

Frequency of tracking:

Community college staff can use Worksheet B.3 to identify key progress indicators that they will track for students who are in direct assessment CBE programs and how these indicators will be tied to concrete actions to deliver proactive support to students. Program staff should identify the student-level indicators of progress and success that they see as important and explicitly map out how the college will act to deliver holistic supports based on the indicator. We provide an example of what this plan might include in Table A.4.1.

WORKSHEET B.3

A Template for a Data-Informed Student Support Plan

Type of Data	Measure Indicating Student Might Benefit from Support	Support Action
Enrollment data on baseline student characteristics		
Learning management system data		
Real-time early alert and student survey data		
Other data sources		

Community college staff should use Worksheet B.4 to identify the problems of practice (i.e., implementation challenges) that they are facing in their direct assessment CBE programs. Program staff who are overseeing direct assessment CBE programs work with other stakeholders to identify problems of practice, prioritize one or two of these challenges, and test out improvements through a data-informed continuous improvement process.

WORKSHEET B.4

Problems of Practice That You Are Facing in Your Direct Assessment Competency-Based Education Program

Area of Direct Assessment CBE Implementation	Problem of Practice (i.e., implementation challenge)
Marketing, enrollment, orientation, and financial aid	
Curriculum, assessments, and instructional support	
Student supports	
Other implementation areas	

Once community colleges decide to tackle a problem of practice, the next step is to dissect the problem to identify the root cause of the issue. The solution or improvement will focus on addressing this root cause. In Worksheet B.5, we provide a blank fishbone diagram that college staff can use to map out their own problems of practice. The process for completing a fishbone diagram entails the following steps:

1. Write the problem at the mouth of the fish.

2. Define the different categories of things that might cause that problem (e.g., people, policies) and record these categories at the end of each fishbone.

3. Ask, "Why does this happen?" to identify the causes of the problem and record these causes on the bones of the fish under their corresponding category.

4. Add additional, smaller bones and list out the sub-causes underlying the initial set of causes recorded in the diagram. Keep breaking the issue down until participants cannot think of any additional causes.

Select (or rank) the causes stakeholders consider the most important and most feasible to address as a college. A worksheet may be valuable for a smaller group of direct assessment CBE program leads. But if a college wants to engage a broader set of stakeholders (e.g., staff, students), it may find it valuable to blow up the fishbone diagram to allow many stakeholders to move around and contribute their thoughts on root causes using sticky notes. A facilitator can then reorganize the sticky notes to pull out common themes and fill out the bones of the diagram to solicit an additional round of stakeholder input. Stakeholder votes could also be useful information to help colleges prioritize where to focus improvement efforts.

Once stakeholders have used the fishbone diagram to identify the root cause they aim to improve, they will need to list the specific changes or improvements that can be tested to address the root cause. The next step will be to choose one of those changes to test through a PDSA cycle.

WORKSHEET B.5

A Fishbone Diagram for Identifying Root Causes of Direct Assessment Competency-Based Education Program Issues

Category 1

Category 2

Problem

Category 3

Category 4
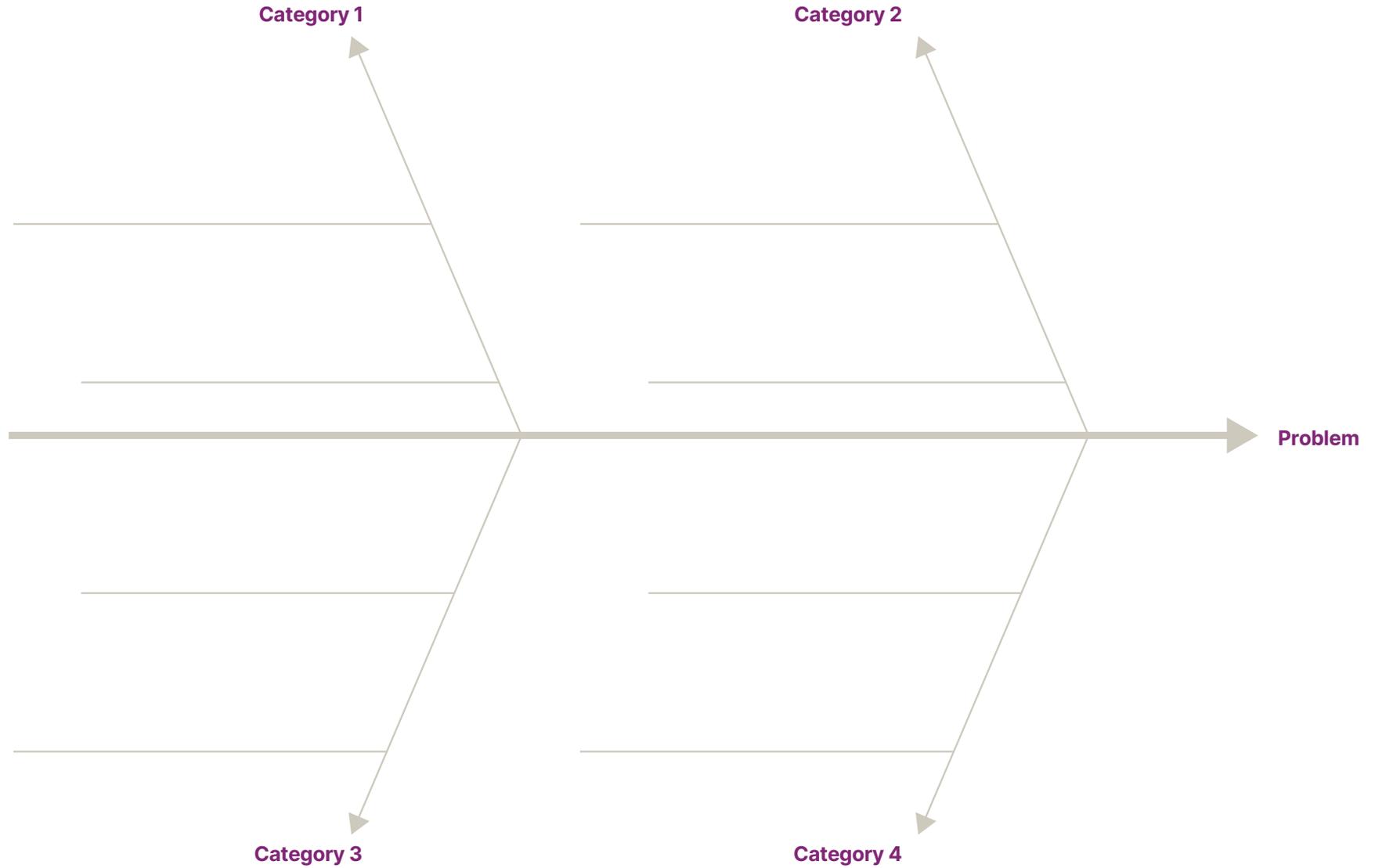
In Worksheet B.6, direct assessment CBE program staff should document their PDSA cycle efforts. Documenting PDSA cycles is important for recording what issues were addressed and how to inform ongoing program improvement. Guidance on planning for and carrying out a PDSA cycle can be found in section A.4, "Carry Out a Plan-Do-Study-Act Cycle," in Part A.

WORKSHEET B.6
Documenting a Plan-Do-Study-Act Cycle

Key Things to Document		What Happened in the PDSA Cycle
Plan	Problem of practice:	
	Improvement tested:	
	Measures of success:	
	Activities and responsibilities:	
Do	How the improvement was tested:	
	Data collected:	
	Barriers and facilitators	
Study	Key findings:	
	Implications for improvement being tested:	
	Stakeholders who provided input on findings:	
	New questions raised:	
Act	Improvement to be scaled, modified, or abandoned:	
	Action plan:	
	Another PDSA cycle or shift to new priorities:	

In Worksheet B.7, we provide a table that community college staff can use to calculate the costs of their program ingredients. The ingredients for the program should include staff costs, facilities costs, equipment and materials costs, indirect costs, and any other costs that do not fall into those categories. Prices are identified based on college information or other public information that can be used to approximate national average prices. Program staff and analysts must then determine the quantity of each ingredient needed for the direct assessment CBE program. Community colleges will often want to compare direct assessment CBE program costs with traditional program costs to understand the additional costs that are associated with offering direct assessment CBE. This allows colleges to combine costs with information on the benefits of a direct assessment CBE program relative to a traditional program. We provide a more-detailed description of how to complete this table and an example in Part A.

WORKSHEET B.7

Calculating the Costs of Ingredients of a Direct Assessment Competency-Based Education Program

Ingredients (Phase 1)	Price per Unit (Phase 2)	Traditional Program		Direct Assessment CBE Program		Incremental Cost
		Quantity	Cost	Quantity	Cost	
	$		$		$	$
	$		$		$	$
	$		$		$	$
	$		$		$	$
	$		$		$	$
	$		$		$	$
	$		$		$	$
	$		$		$	$
	$		$		$	$
	$		$		$	$
	$		$		$	$
Costs						

Sample Student Survey

As part of our developmental evaluation of the California Community Colleges Chancellor's Office's efforts to pilot direct assessment CBE programs in eight community colleges, we fielded a survey to the initial cohorts of students at three of the pilot colleges in fall 2025. In this appendix, we provide a copy of the survey in case the survey items are useful to community colleges for gathering information on their programs from students. This survey is presented without revision.

Direct Assessment Competency-Based Education Program Student Survey

This survey is led by a research team from RAND that was hired by the California Community College System to assess the development of direct assessment competency-based education (CBE) programs. The purpose of this survey is to capture your experience in the college program you are enrolled in (which is a direct assessment CBE program). RAND will use your insights from this survey to provide the System with recommendations for improvement.

If you choose to take this survey, RAND will keep all of your personal information confidential. RAND will not, under any circumstances, release your name or email address to anyone. We take your privacy seriously.

You will never be personally identifiable in any reports. Your answers will be combined with answers from other survey participants and reported as aggregated statistics, totals, and averages.

Your participation in the survey is voluntary.

You may skip any question you do not want to answer.

Your feedback is valuable to improving the program. In exchange for your time, you'll receive a **$25 Amazon gift code upon completion of the survey.**

Please select "Agree" or "Disagree" below.

- ☐ Clicking "Agree" indicates you have read and agree to the information provided above.
- ☐ Clicking "Disagree" indicates you do not agree to the information provided above. You will exit the survey.

What motivated you to enroll in a direct assessment CBE program?
Select all that apply.

- ☐ The program allows me to take responsibility for my own learning.
- ☐ The program allows me to move at a pace that works with my personal life.
- ☐ The program awards credit for my prior experiences.
- ☐ The program connects directly to the career I want.
- ☐ The program costs less than other programs I was considering.
- ☐ The way the program is designed aligns well with how I learn.
- ☐ The program offers direct access to support staff who understand my goals and help address my needs.
- ☐ Another reason (please describe):

  _____

Would you have enrolled in a traditional (non-direct-assessment CBE) program if the direct assessment CBE program you enrolled in was not available?

- ☐ Yes
- ☐ Unsure
- ☐ No

What is your goal for enrolling in a direct assessment CBE program?
Select all that apply.

- ☐ Earn a credential or degree that a future employer values
- ☐ Transfer to a four-year program
- ☐ Gain or update job-related skills
- ☐ Advance in your current career
- ☐ Change careers
- ☐ Other (please describe):

  _____

Do you have consistent and reliable <u>access to the internet</u>?

- ☐ Yes
- ☐ Unsure
- ☐ No

Do you have consistent and reliable <u>access to a device (e.g., laptop, tablet) that meets the minimum requirements for your direct assessment CBE program</u>?

- ☐ Yes
- ☐ Unsure
- ☐ No

Are you currently employed?

Select "yes" for any job where you receive wages or a salary, including an internship or apprenticeship.

- ☐ Yes
- ☐ No

Please describe any ways your employer supports your participation in your direct assessment CBE program.

How did you learn about your direct assessment CBE program?

Select all that apply.

- ☐ College website
- ☐ Program advertisement—Social media
- ☐ Program advertisement—Campus e-mail
- ☐ Program advertisement—Flyer
- ☐ Employer
- ☐ Colleague at work
- ☐ Faculty recommendation
- ☐ Counselor recommendation
- ☐ Student support staff recommendation
- ☐ Other (please describe):

_____

How easy or difficult was the <u>process of applying to your direct assessment CBE program</u>?

☐ Very easy
☐ Easy
☐ Neither easy nor difficult
☐ Difficult
☐ Very difficult

How does the <u>total cost of your direct assessment CBE program compare to traditional college programs</u>?

☐ The total cost of my program will be LOWER than a traditional college program.
☐ The total cost of my program will be ABOUT THE SAME as a traditional college program.
☐ The total cost of my program will be HIGHER than a traditional college program.
☐ I'm not sure.

How easy or difficult was the <u>process of applying for financial aid for your direct assessment CBE program</u>?

☐ Very easy
☐ Easy
☐ Neither easy nor difficult
☐ Difficult
☐ Very difficult

How satisfied or unsatisfied were you with the <u>support you received applying for financial aid for your direct assessment CBE program</u>?

☐ Very satisfied
☐ Satisfied
☐ Neither satisfied nor unsatisfied
☐ Unsatisfied
☐ Very unsatisfied
☐ I did not receive support applying for financial aid for my direct assessment CBE program.

Which statement best describes your experience with orientation for your direct assessment CBE program (not the general college or new student orientation)?

☐ I took part in an online orientation prior to the beginning of the program.
☐ I attended an on-campus orientation prior to the beginning of the program.
☐ I was not aware of a program orientation.
☐ I was unable to participate in orientation due to scheduling or other issues.

How much did <u>orientation for your direct assessment CBE program help you understand the following topics</u>?

	Very Much	Quite a Bit	Some	Very Little
The direct assessment CBE approach to learning				
What's expected of you in the program				
The program's main goals				
Available program supports				
Financial aid rules for this program				
What happens if you decide to leave the program (i.e., redirection policy)				

How much do you agree or disagree with the following statements about <u>competencies in your direct assessment CBE program?</u>

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Competencies in my program are clearly defined.					
I understand how mastering the competencies in this program will help me achieve my goals.					
The sequencing of competencies for my program makes sense for my goals.					
Final tests and projects that measure my mastery of a competency feel authentic, as they allow me to apply what I've learned to real-world situations.					

Which statement best describes how quickly you are moving through your direct assessment CBE program?

- ☐ I'm moving through my program FASTER than I expected.
- ☐ I'm moving through my program at about the pace I expected.
- ☐ I'm moving through my program SLOWER than I expected.

Please tell us why you're moving faster than you expected through your direct assessment CBE program.

Please tell us why you're moving slower than you expected through your direct assessment CBE program.

How much do you agree or disagree with the following statements about <u>Canvas?</u>

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Canvas is easy to use.					
I understand how the program materials are organized in Canvas.					
As soon as I'm enrolled in a competency, the materials I need are easy to find in Canvas.					
If I have any questions or run into any problems on Canvas, I am able to seek support from faculty or staff.					

How frequently do you interact with faculty in your direct assessment CBE program?

☐ At least once per week

☐ At least once per month, but less than once per week

☐ At least once per academic term, but less than once per month

When you interact with faculty in your direct assessment CBE program, what kinds of topics do you discuss?

Select all that apply.

☐ Competencies

☐ Reading material

☐ Assessment instructions and expectations

☐ Feedback and performance from assessments

☐ Career-related topics

☐ Other topics (please describe):

_____

How much do you agree or disagree with the following statements about <u>feedback from faculty in your direct assessment CBE program?</u>

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
The feedback I receive from faculty provides clear examples of where I can improve.					
The feedback I receive from faculty offers clear steps for how I can improve.					
Once I've completed an exam or assignment, faculty send me feedback within a reasonable amount of time.					

How much do you agree or disagree with the following statement: "If I was experiencing difficulty with my studies, someone from my direct assessment CBE program would contact me to help me get the assistance I need."

☐ Agree strongly

☐ Agree

☐ Neither agree nor disagree

☐ Disagree

☐ Strongly disagree

How much do you agree or disagree with the following statements about the <u>coach* in your direct assessment competency-based education program?</u>

* A coach is a staff member dedicated to supporting students in a direct assessment CBE program.

|	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I can reach out to my coach for support if I am having challenges in the program.					
My coach responds to my communication in a reasonable amount of time.					
The support that I receive from my coach helps me make progress in the program.					
My coach will refer me to someone on campus if they do not have an immediate answer or solution to my concerns.					

How much do you agree or disagree with the following statements about the <u>supports (e.g., tutoring, counseling, financial aid) available to help you with your direct assessment CBE program?</u>

|	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I am aware of campus resources to support my success in the program.					
I understand how to access campus resources when I need them.					
Campus resources are available during times that work for me.					

In a few words, please describe any <u>challenges accessing campus-wide supports that you encounter.</u>
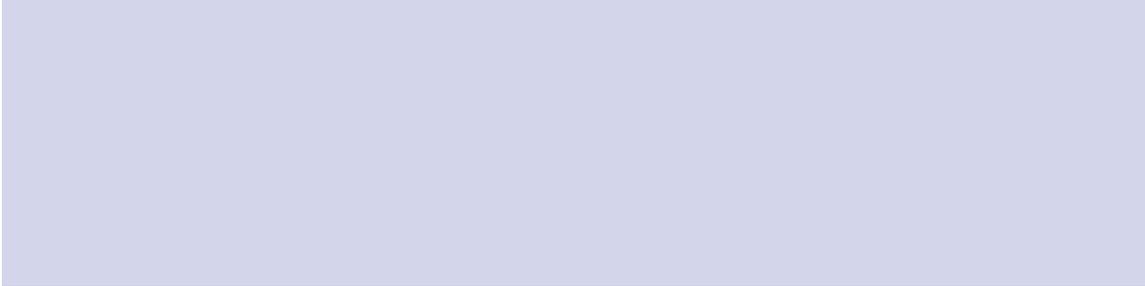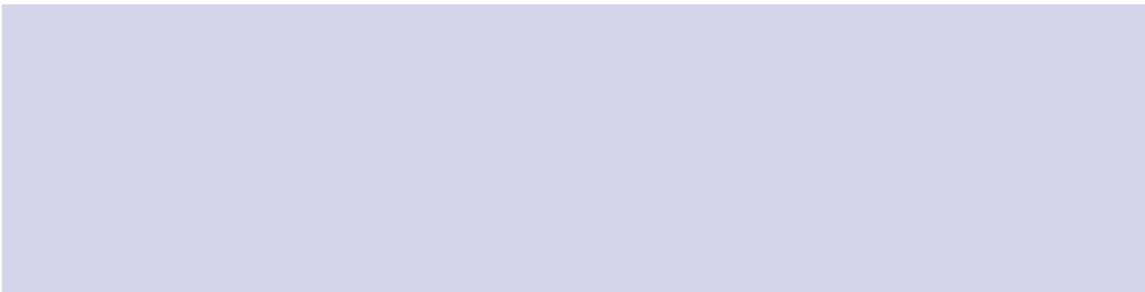
Please describe <u>one thing you enjoy</u> about your direct assessment CBE program and why.
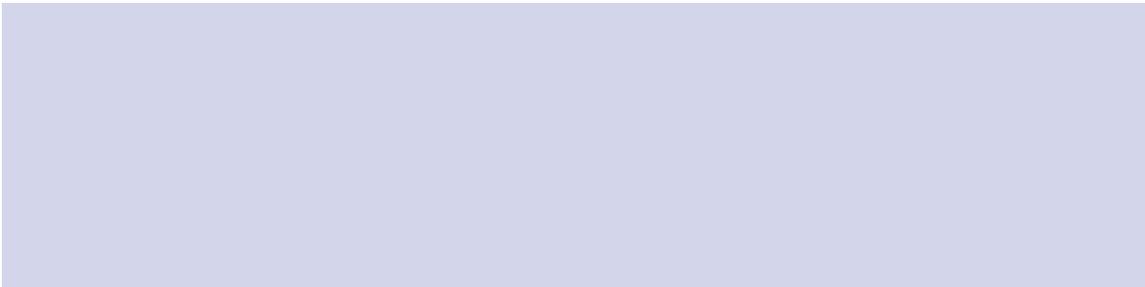
Please describe <u>one challenge</u> you have experienced in your direct assessment CBE program and why.
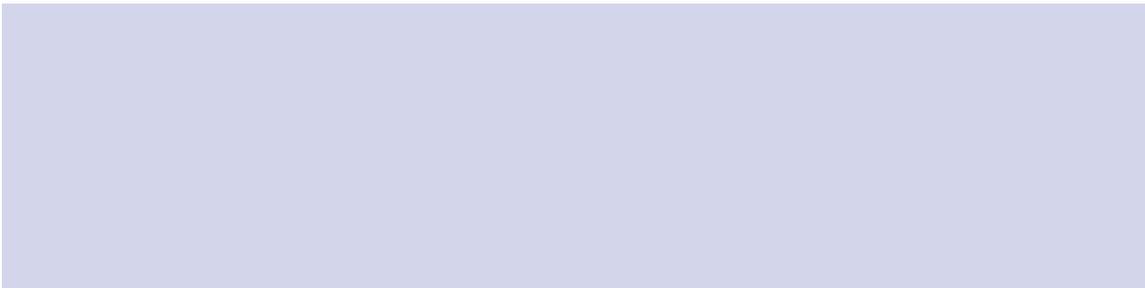
Please describe <u>one thing you would improve</u> about your direct assessment CBE program and why.

Please select each answer that describes your employment situation.
Select all that apply.

- ☐ I work part-time (less than 35 hours per week).
- ☐ I work full-time (35 hours per week or more).
- ☐ I have an internship.
- ☐ I have an apprenticeship.
- ☐ Other (please describe):

_____

What is your age range?

- ☐ Under 18
- ☐ 18–20
- ☐ 21–24
- ☐ 25–29
- ☐ 30–39
- ☐ 40 and above

Which of the following best describes your racial and/or ethnic background?

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☐ Hispanic or Latino/Latinx
- ☐ Middle Eastern or North African
- ☐ Two or more ethnicities
- ☐ Prefer not to disclose
- ☐ Prefer to self-describe:

_____

What is your gender identity?

- ☐ Female
- ☐ Male
- ☐ Non-binary
- ☐ Prefer not to disclose
- ☐ Prefer to self-describe:

_____

So that we may send you a $25 Amazon gift card code, please enter the name you would like to be called and your email address below.

Name:

Email address:

Lastly, we are interviewing students who responded to this survey to better understand their experiences in their direct assessment CBE programs. Interviews last up to 60 minutes, and you will receive a $50 Amazon gift card code upon completion of an interview.

Would you like to participate in an interview?

- ☐ Yes
- ☐ No

Thank you for your interest in participating in an interview!

We will follow up by email to schedule interviews based on availability and the order in which individuals responded. Please watch for an email from our team.

Notes

[1] Rachel B. Baker, *The Student Experience: How Competency-Based Education Providers Serve Students*, American Enterprise Institute, AEI Series on Competency-Based Higher Education, June 2015; Rebecca Klein-Collins, *Competency-Based Degree Programs in the U.S.: Postsecondary Credentials for Measurable Student Learning and Performance*, Council for Adult and Experiential Learning, 2012; Charla Long, Stephanie Bernoteit, and Stephanie Davidson, "Competency-Based Education: A Clear, Equitable Path Forward for Today's Learners," *Change*, Vol. 52, No. 6, November–December 2020; Robert Kelchen, *The Landscape of Competency-Based Education: Enrollments, Demographics, and Affordability*, American Enterprise Institute, AEI Series on Competency-Based Higher Education, January 2015.

[2] U.S. Department of Education, "Direct Assessment (Competency-Based) Programs," webpage, last reviewed January 14, 2025.

[3] Klein-Collins, 2012; Long, Bernoteit, and Davidson, 2020.

[4] Monica Reid Kerrigan, "A Framework for Understanding Community Colleges' Organizational Capacity for Data Use: A Convergent Parallel Mixed Methods Study," *Journal of Mixed Methods Research*, Vol. 8, No. 4, October 2014; Brad C. Phillips and Jordan E. Horowitz, *Creating a Data-Informed Culture in Community Colleges: A New Model for Educators*, Harvard Education Press, 2020; Mark M. D'Amico and Grant B. Morgan, "Turning Data into Information: Helping Community Colleges Use Existing Data to Advance Student Success," *Journal of Applied Educational and Policy Research*, Vol. 1, No. 2, 2015.

[5] Kerrigan, 2014; Phillips and Horowitz, 2020; D'Amico and Morgan, 2015.

[6] Our tracking and support guidance draws on the following resources: Kelle Parsons and Carlos Rivers, "Measuring Student Success in Postsecondary Competency-Based Education Programs: Toward a Student Outcomes Metrics Framework," American Institutes for Research, 2017; California Competes, "Measuring Student Progress in Competency-Based Education Programs," November 2021; Kelli A. Bird, Benjamin L. Castleman, Zachary Mabel, and Yifeng Song, "Bringing Transparency to Predictive Analytics: A Systematic Comparison of Predictive Modeling Methods in Higher Education," *AERA Open*, Vol. 7, January 2021; Monique O. Ositelu, Ewaoluwa Ogundana, and Iris Palmer, *Five Recommendations for Community Colleges to Equitably Implement Early Alert Systems*, New America, October 2022; and Lori J. Dwyer, Mitchell R. Williams, and Shana Pribesh, "Impact of Early Alert on Community College Student Persistence in Virginia," *Community College Journal of Research and Practice*, Vol. 43, No. 3, 2019.

[7] Our continuous improvement guidance draws on the following resources: Anthony S. Bryk, Louis M. Gomez, Alicia Grunow, and Paul G. LeMahieu, *Learning to Improve: How America's Schools Can Get Better at Getting Better*, Harvard Education Press, 2015; Sandra Park, Stephanie Hironaka, Penny Carver, and Lee Nordstrum, *Continuous Improvement in Education*, Carnegie Foundation for the Advancement of Teaching, white paper, May 2013; Robert V. Hogg and Mary C. Hogg, "Continuous Quality Improvement in Higher Education," *International Statistical Review*, Vol. 63, No. 1, April 1995; Gerald J. Langley, Ronald D. Moen, Kevin M. Nolan, Thomas W. Nolan, Clifford L. Norman, and Lloyd P. Provost, *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*, 2nd ed., Jossey-Bass, 2009; Mark Hatcher, Kyra Martin, Jessica Mason, and Kelle Parsons, *Using Continuous Quality Improvement in Competency-Based Education Programs: A Quick Guide for Practitioners and Program Leaders*, American Institutes for Research, 2020; and Lindsay Daugherty, Rita T. Karam, Daniel Basco, and Julia H. Kaufman, *Tools for Improving Corequisite Models: A Guide for College Practitioners*, RAND Corporation, TL-319-IES, 2019.

[8] Our impact and cost analysis guidance draws on the following resources: Institute of Education Sciences, *Cost Analysis: A Starter Kit*, version 1.0, U.S. Department of Education, IES 2020-001, 2020; Daugherty et al., 2019; and Scott Cody and Andrew Asher, "Proposal 14: Smarter, Better, Faster: The Potential for Predictive Analytics and Rapid-Cycle Evaluation to Improve Program Development and Outcomes," The Hamilton Project, Brookings Institution, 2014.

[9] Competency-Based Education Network, *Quality Framework for Competency-Based Education Programs*, September 2017, p. 31.

[10] California Code of Regulations, Title 5, Education; Division 6, California Community Colleges; Chapter 6, Curriculum and Instruction; Subchapter 3, Alternative Instructional Methodologies; Article 6, Direct Assessment Competency-Based Education; Section 55270, Scope and Intent.

[11] M. Mayeshiba and A. Brower, "Student Success and Retention Using New Definitions Created for Nonterm, Direct Assessment CBE," *Journal of Competency-Based Education*, Vol. 2, No. 1, March 2018; Parsons and Rivers, 2017.

[12] Although we focus on a small subset of sample measures, other resources provide a broader list of student progress measures that colleges can consider for direct assessment CBE programs.

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[14] Competency-Based Education Network, 2017.

[15] California Code of Regulations, Title 5, Education; Division 6, California Community Colleges; Chapter 6, Curriculum and Instruction; Subchapter 3, Alternative Instructional Methodologies; Article 6, Direct Assessment Competency-Based Education; Section 55270.6, Instructor Contact.

[16] Competency-Based Education Network, 2017, p. 13.

[17] Competency-Based Education Network, 2017, p. 21.

[18] California Code of Regulations, Title 5, Education; Division 6, California Community Colleges; Chapter 6, Curriculum and Instruction; Subchapter 3, Alternative Instructional Methodologies; Article 6, Direct Assessment Competency-Based Education; Section 55270.8, Academic Record Symbols and Grade Point Average.

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[28] This is an assumption for the purposes of this simplistic example. Coaching roles in direct assessment CBE programs often differ somewhat from the advising and other support students in traditional programs receive, and costs of personnel and time may need to be accounted for differently.

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EDUCATION, EMPLOYMENT, AND INFRASTRUCTURE

C alifornia community colleges are developing direct assessment competency based education (CBE) programs, which aim to offer more-flexible (and potentially more-efficient) pathways to college credentials. These programs remove the emphasis on "seat time" as the primary measure of student learning and allow students to learn and demonstrate competencies in varying ways.

This guide provides California community college staff with an overview of several ways data can be used to improve and evaluate direct assessment CBE programs. The guide provides basic direction on tracking success measures, describes approaches to continuous improvement, and illustrates how college staff might evaluate the impacts and costs of college programs. These different approaches to data use vary in complexity, and some may require time, additional evaluation funding, and analytic support. Examples in the guide are contextualized to direct assessment CBE. The guide concludes with an actionable workbook that is designed to support community colleges in planning for how they will use data to support their direct assessment CBE programs.