



Tools for Improving Corequisite Models

A GUIDE FOR COLLEGE PRACTITIONERS

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Preface

Over the past decade, the Texas Legislature passed several bills that required colleges to begin developing and scaling corequisite models of developmental education (among other reforms).¹ For example, House Bill 2223 required that 75 percent of developmental education enrollment be in corequisite remediation by fall 2020 (with the exception of a few exempted student groups), so colleges around the state have prioritized corequisite remediation to ensure that these requirements are met. Corequisite remediation shifts the way that developmental education is provided so that students directly enter a college-level course and receive additional academic support during that same semester to address the challenges they face with basic math, reading, or writing concepts. The state and institutions have rolled out substantial professional development resources to support practitioners in response to developmental education reform. Data-driven improvement efforts were identified as a top priority for professional development, and this toolkit was developed as a resource for these professional development efforts.

This toolkit was undertaken by RAND Education and Labor, a division of the RAND Corporation that conducts research on early childhood through postsecondary education programs, workforce development, and programs and policies affecting workers, entrepreneurship, and financial literacy and decisionmaking. The Texas Higher Education Coordinating Board partnered with RAND and American Institutes for Research to support the state's developmental reform efforts through several studies designed to evaluate those efforts, funded by the U.S. Department of Education's Institute of Education Sciences. The work on these studies informs the content of this toolkit. The first study (supported by grants R305H170085 and R305H150094) included a rigorous randomized control trial of corequisite remediation in five community colleges and a statewide study of how corequisite remediation was implemented across Texas.² This work provided us with an understanding of how corequisite remediation was commonly rolled out in colleges and insight into the decisions around program delivery and the potential issues that colleges may encounter. The second study (supported by grant R305H150069) focused on close technical assistance work with six Texas community colleges to help them engage in improvement processes with developmental education reform initiatives. This work provided us with an understanding of how best to carry out improvement efforts in college settings. In addition to "on-the-ground" experiences with colleges in Texas, these studies provided us with opportunities to review the literature on improvement approaches and accelerated models of developmental education.

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More information about RAND can be found at www.rand.org. Questions about this toolkit should be directed to Idaughter@rand.org, and questions about RAND Education and Labor should be directed to educationandlabor@rand.org.

WHO

Is This Toolkit for?

This toolkit was developed for improvement teams made up of administrators, department and faculty chairs, and other college staff who are helping to oversee important initiatives and programs—such as corequisite remediation—and who are looking to build an ongoing process for addressing challenges they face and improving the way that corequisite models are provided through data use and reflection.

WHAT

Is the Purpose of the Toolkit?

This toolkit aims to act as a guide to improvement strategies for teams of practitioners at colleges, providing them with the knowledge and tools they need to carry out rapid cycles of data-driven improvement.

WHAT

Is in this Toolkit?

In this toolkit, we provide an overview of some key strategies for making quick improvements to educational programs and some tools and tips for carrying out these efforts on the ground. We focus on a common reform being adopted by colleges: corequisite remediation. For more information on what corequisite remediation is and why it is an area in which improvement strategies may be useful, see Box A.

Sections of the toolkit include the following:

- **Approaches to improvement.** A brief overview of two approaches to improvement—quality improvement and rapid-cycle evaluation—that colleges can use to adopt, deliver, and scale corequisite models.
- **The value of improvement approaches to colleges.** A discussion of how improvement strategies call for a different and valuable approach to rolling out programs and initiatives, such as corequisite remediation.
- **Identifying the focus of improvement efforts.** A description of some initial efforts required to prepare for improvement cycles focused on corequisite remediation.
- **Carrying out quality improvement through a Plan-Do-Study-Act (PDSA) cycle.** A guide to a process for testing incremental improvements to the delivery of corequisite remediation. In addition to describing the PDSA process, this section includes tips and tools for (1) identifying questions and making predictions, (2) assigning roles and responsibilities, and (3) developing and sticking to a time line.
- **Carrying out rapid-cycle evaluation.** A guide to a process that can be used to evaluate the effectiveness of particular corequisite model components, practices, or processes before scaling. The section includes tips and tools for (1) determining what to measure, (2) identifying the appropriate data sources, and (3) using comparison groups.
- **Ensuring success in improvement efforts.** Some concluding thoughts on some of the most important keys to success for improvement efforts in colleges.

Approaches to Improvement

In education, practitioners are increasingly looking for strategies to bring data and evidence into decisionmaking and to roll out programs in intentional ways that allow for ongoing improvement. The hope is that these data-driven approaches will lead to educational programs and practices that better support the success of students. This toolkit provides processes and strategies drawn from two fields: quality improvement and rapid-cycle evaluation. We provide a brief introduction to each of these fields and their approaches to improvement below.

Quality Improvement

The field of quality improvement grew out of work from a series of researchers who argued that the scientific process should be conducted with a cyclical rather than straight-line approach.³ These cyclical approaches, such as the PDSA cycle, were adopted widely by practitioners to make incremental improvements to manufacturing processes and health care services, and they have more recently become more popular in education settings.⁴ The idea was that organizations could encourage regular, ongoing improvement by identifying potential areas for advancement, testing changes on a small scale, examining data to determine whether they were successful, and then gradually scaling and adjusting these changes through many rapid cycles of improvement.

Experts built on the idea of testing changes through rapid PDSA cycles by developing an overarching model that guides quality improvement through three questions:

- What are we trying to accomplish?
- How will we know that a change is an improvement?
- What changes can we make that will result in improvement?⁵

After a college addresses these questions and develops a clear understanding of the problem, quality improvement calls for the testing of changes through a series of PDSA cycles that lead to incremental improvements and ongoing data collection and reflection until the problem is sufficiently addressed. Quality improvement also places a strong emphasis on a democratic approach, whereby practitioners are driving the work and are regularly engaging to reflect throughout the process.

Quality improvement also places a strong emphasis on a democratic approach, whereby practitioners are driving the work and are regularly engaging to reflect throughout the process.

Quality improvement is a useful approach for colleges to pursue when they want to develop a better understanding of why they are facing particular issues in delivering corequisite remediation, and when colleges want to test out small, incremental changes to address the issues that they face and scale them over time. This toolkit provides some important strategies and processes for quality improvement (see the sections on Identifying the Focus of Improvement Efforts and on Carrying Out Quality Improvement Through a Plan-Do-Study-Act Cycle).

Rapid-Cycle Evaluation

Although such fields as education and health care have long used program evaluation to assess impact and implementation, high-quality program evaluation has traditionally been long and resource-intensive and therefore limited in its use for quick decisionmaking about how to develop and scale programs and practices. However, practitioners needed more rigorous ways to assess certain program components as they were rolled out. In response, experts in evaluation developed the practice of rapid-cycle evaluation and began to use this approach to evaluate the effectiveness of health care technology, education technology, and program delivery.⁶ Rapid-cycle evaluation makes comparisons between individuals who receive some process, practice, or program feature with individuals in a comparison group in order to evaluate the effectiveness of that process, practice, or program feature.

Practitioners needed more rigorous ways to assess certain program components as they were rolled out.

Rapid-cycle evaluation is the best approach when colleges want to understand whether a particular corequisite remediation process, practice, or feature is effective in order to help with decisionmaking about adopting, scaling, modifying or eliminating the practice, process, or component. This toolkit describes some important strategies and tools for rapid-cycle evaluation (see the sections on Identifying the Focus of Improvement Efforts and on Carrying Out Rapid-Cycle Evaluation).

BOX A

What Is Corequisite Remediation

AND WHY INCORPORATE IMPROVEMENT STRATEGIES?

Many students enter college with an assessment of being “not college ready” in math, reading, or writing. Traditionally, colleges have required these students to enroll in a series of developmental education courses that must be completed prior to entering college-level courses. Data from 2010 suggest that more than two-thirds of community college students enrolled in at least one developmental education course.⁷

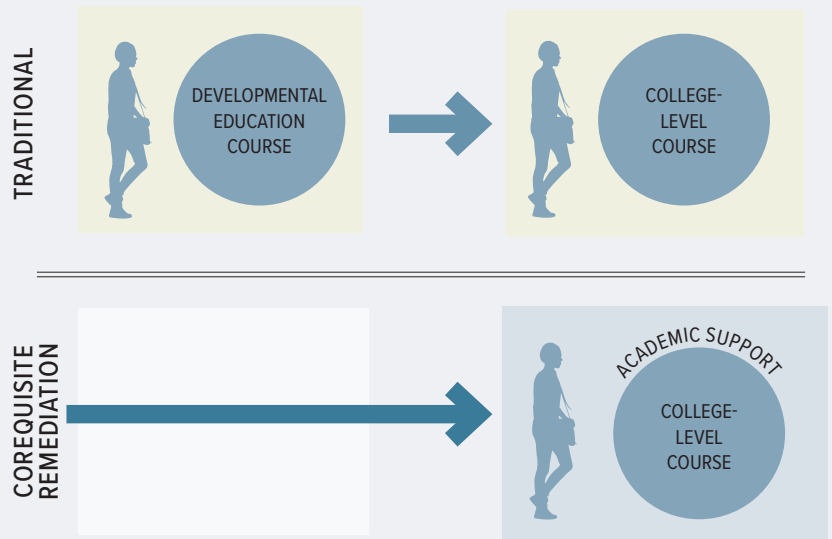
Corequisite remediation shifts the way that developmental education is provided so that students directly enter a college-level course and receive additional academic support during that same semester to address the challenges they face with basic math, reading, or writing concepts (**Figure A.1**). Corequisite models vary in the way that they deliver academic support and may include paired courses, more instructional time to supplement the college course time, workshops, required use of tutoring, or office hours.⁸ Corequisite remediation aims to improve college persistence and completion by increasing student momentum in earning college credits and better aligning the basic skills support that students receive with college-level coursework.

A national survey in 2016 found that 35 percent of two-year colleges were offering corequisite remediation for reading and writing, and 16 percent were offering corequisite remediation for math.⁹ These numbers will increase substantially, as state policymakers and large college systems in such states as Tennessee, Texas, and California have since approved sweeping policy reforms that require colleges to scale corequisite remediation to most students who enter college with a “not college ready” assessment.¹⁰

There are many areas of uncertainty for colleges and states about how to design and scale effective corequisite models, and, as is true of many new reforms, colleges have encountered some challenges as corequisite remediation has been rolled out to students (e.g., staffing considerations, challenges with scheduling and advising).¹¹ There are several rigorous studies that examine the impact of corequisite remediation and provide promising evidence that this approach can improve student success.¹² However, there is limited information on how colleges have dealt with common problems or which aspects of the corequisite models were most important to their success.

States, college systems, and associations increasingly are offering professional development to build knowledge around best practices for corequisite remediation, but professional development sessions often are based on anecdotal evidence and may or may not be relevant to the settings and corequisite models of other colleges. Data-driven improvement efforts can support and complement these professional development efforts by helping colleges develop more-systematic evidence on their promising practices and address real issues they face in their own contexts.

Figure A.1. Corequisite Remediation Versus Traditional Developmental Education



Differences in Approaches

As the descriptions above highlight, rapid-cycle evaluation and quality improvement are similar in that they can be used to address important problems faced by practitioners through the use of short cycles of inquiry that require collaboration, experimentation, data use, and reflection. However, these approaches also differ in some important ways, including the following:

- **Starting point.** In rapid-cycle evaluation, the college starts with a particular practice, process, or program component and wants to evaluate its effectiveness (i.e., its impact on outcomes). In quality improvement, the college starts with a set of improved outcomes it wants to achieve and uses the process to identify and test possible approaches toward those outcomes.
- **Scope of improvement.** Although rapid-cycle evaluation is often used to test the effectiveness of an entire practice or process or a key program component (as well as smaller changes), quality improvement focuses exclusively on smaller changes to a practice, process, or program. Rapid-cycle evaluation is sometimes a one-shot deal and other times involves multiple cycles of evaluation, while quality improvement assumes that many short cycles may be required to test out several incremental changes.
- **Emphasis of measurement efforts.** Because rapid-cycle evaluation is focused on measuring impacts, it requires rolling out programs in ways that allow for strong comparison groups, collecting high-quality data on outcomes, and engaging in rigorous analysis of the data. In quality improvement, there is a greater focus on collecting simple, real-time measures that can be compared across many different improvement cycles and engaging practitioners to reflect and respond to results.
- **Individuals involved in improvement efforts.** It will be important for colleges to include evaluation experts on the improvement team when conducting rapid-cycle evaluation because of its greater emphasis on rigorous impact analysis. With quality improvement, it is critical to ensure practitioner-driven change and reflection, so teams may pull in a broader group of practitioners who are willing to engage in unpacking the challenges the college is facing, supporting real-time data collection, reflecting on results, and scaling improvements.

These two approaches to improvement are complementary, and colleges can draw from both approaches to address problems they face on the ground related to corequisite remediation. For example, a college may conduct a rapid-cycle evaluation of a new software product it is considering using in a corequisite model. After determining the product is effective, the college may then use quality improvement strategies to support faculty as they integrate the software into the classroom and make ongoing alterations. Colleges should think carefully about which approach to improvement will be most useful for addressing their particular

problem and focus on just one approach at a time when carrying out a cycle of improvement efforts.

The Value of Improvement Approaches to Colleges

There are many reasons why improvement approaches that rely on rapid cycles can be valuable in helping colleges develop and scale corequisite models, as well as other college programs and initiatives. We highlight five of the benefits that improvement strategies offer colleges, as follows:

- **Are applied across many contexts, programs, and initiatives.** The improvement strategies we discuss in this toolkit are adaptable and can be used for all types of programs and initiatives (e.g., developmental education reforms, guided pathways initiatives) and all types of colleges (e.g., two-year or four-year, small or big).
- **Help colleges identify and address issues that they face.** Colleges often face uncertainty about what to expect when they roll out new programs and initiatives and encounter challenges that prevent them from delivering and scaling programs successfully. Improvement strategies provide tools for prioritizing challenges and tackling them in an orderly fashion by rolling out programs in deliberate ways to inform improvement.¹³
- **Ensure colleges use data to drive program improvement.** Data use and institutional research in colleges are often driven by reporting requirements for state and federal agencies, accreditation bodies, and funders. Improvement strategies provide the opportunity to collect and analyze data in ways that address internal priorities determined by the college and help colleges develop valuable real-time measures that can be acted on immediately.¹⁴
- **Do not necessarily require complex research methods.** Colleges vary in their research capacity and access to external research support, and they do not always have the resources to conduct extensive data collection and use rigorous research methods to assess programs and initiatives. Although data use is a central feature of improvement efforts and must be prioritized, some approaches to improvement do not require substantial research expertise or resources.
- **Facilitate long-term planning and improvement.** It can be challenging to roll out the perfect program, and colleges may not do so optimally the first time. Improvement strategies can help ensure that colleges approach the rollout and refinement of programs in a more deliberate way through experimentation, data use, and reflection to ensure smart decisionmaking and improvement over the long term.¹⁵

Although improvement approaches can provide many benefits to colleges, they also require resources. A focus on data-driven decisionmaking and improvement requires a

shift in culture that may need sustained leadership and commitment over a long period. In addition, each time a college engages an improvement cycle, this process requires the time of key administrators, faculty, and other staff; resources to support data collection and analysis; and the dedication of leadership to support change. For colleges that face constraints in resources, it may not be appropriate to build cycles of improvement into every program and initiative, and colleges may instead need to focus on high-priority initiatives.

Identifying the Focus of Improvement Efforts

Prior to engaging in any improvement effort—whether through a quality improvement or rapid-cycle evaluation approach—it is important for a college to clearly determine the focus of those efforts, including the specific problem related to corequisite remediation that the college aims to address and the specific practices, processes, or corequisite model components that will be tested or evaluated through rapid cycles of inquiry. In this section, we describe the process of identifying a problem of practice and objectives for improvement cycles.

Identifying the Problem of Practice

A problem of practice is an issue that a college is struggling with or an area in which it would like to make improvements.

The first step in planning for an improvement cycle is to identify a problem of practice. A *problem of practice* is an issue that a college is struggling with or an area in which it would like to make improvements. We provide some examples of common problems of practice that colleges have faced related to corequisite remediation in **Table 1**.

Colleges may have a variety of issues they need to tackle related to corequisite remediation, so choosing a single problem of practice to focus on for improvement may be challenging. Our experiences and the improvement literature suggest that colleges should consider the following four criteria when prioritizing among the various problems they face:

- **There is a consensus among key stakeholders that the problem of practice is a high priority.** In selecting a problem of practice, colleges should choose problems for which there is general agreement among administrators, faculty, and other relevant staff that the problem is an important one to address. This consensus ensures that individuals will be willing to engage in the various activities required to carry out improvement strategies and willing to make decisions and changes based on the evidence that emerges.

- **The problem of practice is under the purview of the college.**

The problem of practice must be something that individuals on the improvement team have the power to change. Problems of practice like “issues with high schools not sufficiently preparing students” or “challenges students are facing with life events that are causing them to drop out” are not ideal because they are problems that are largely outside of the control of the college.

- **Addressing the problem of practice will drive student success.**

Student success in terms of increased learning, degree completion, and preparation for employment is central to the mission of a college. If addressing the problem of practice will not substantially contribute to the college’s mission, the problem should not be prioritized. For example, uncertainty about whether to assign a letter grade or a pass-or-fail determination for the academic support portion of the corequisite model may be an issue that faculty are struggling with, but if this decision has few implications for the longer-term success of students, it should not be prioritized.

- **The problem of practice cannot be adequately addressed through existing evidence.**

As colleges continue to adopt and scale corequisite remediation, the evidence base on effective models and promising practices is likely to grow. Colleges should first look to what is known internally and what evidence is available about what other colleges have done to support successful corequisite models. There may still be value in gathering local evidence to complement evidence from the literature; however, all else being equal, problems of practice for which there is little or no existing evidence might be prioritized.¹⁶

The problem of practice must be something that individuals on the improvement team have the power to change.

Table 1. Examples of Problems of Practice and Improvement Cycle Objectives for Corequisite Remediation

Problem of Practice	Sample Objectives for Quality Improvement	Sample Objectives for Rapid-Cycle Evaluation
Uncertainty about the best way to determine which students should be placed into a corequisite model	Test a new checklist for advising students into the corequisite model	Evaluate the success of a student group (e.g., lower-scoring students) in the corequisite model
Challenges assigning instructors and scheduling linked sections of the college course and academic support	Test a new faculty and advisor communication protocol	Evaluate the impact of a process to streamline scheduling
Challenges enrolling students into linked sections of the college course and academic support	Test an information technology fix that links courses for the purposes of course registration	Evaluate the impact of an enrollment auditing process
Uncertainty about how to build faculty capacity to teach in corequisite models	Test a new training guide	Evaluate the effectiveness of a new training requirement for instructors
Concerns about collaboration and alignment when corequisite models are taught by instructor pairs	Test a requirement to have aligned syllabi	Evaluate the impact of having a single instructor versus two instructors
Challenges streamlining content to provide sufficient academic support with less instructional time	Test a streamlined lesson plan for a particular concept	Evaluate the impact of a corequisite model with an extra hour of academic support
Uncertainty about whether certain features of a corequisite model (e.g., class size, same instructor) are essential to maintain for student success	Test a small modification to how the corequisite model is delivered	Evaluate the effectiveness of the corequisite model with and without a key feature
Uncertainty about how to ensure that a corequisite model is effective for students with particular characteristics (e.g., lower placement scores, ESL students)	Test an instructional strategy geared toward supporting the student subgroup	Evaluate the effectiveness of the corequisite model for the student subgroup
Uncertainty about the best way to serve students who have been unsuccessful in the corequisite model	Test new guidance provided to instructors on strategies for individualized support	Evaluate the effectiveness of a new individualized corequisite remediation approach

NOTE: A worksheet for prioritizing problems of practice is provided in a supplement at the end of this toolkit; ESL = English as a second language.

Choosing an Objective for the Improvement Cycle

Once a problem of practice has been chosen and the college knows which approach to improvement it will pursue, the next step is to identify a single objective for a specific improvement cycle. This objective should be something that the college hopes will lead to clear progress in addressing the problem of practice and improving corequisite remediation. Both rapid-cycle evaluation and quality improvement call for improvements to be tested or evaluated in a short period (90 days or less for quality improvement and up to nine months for rapid-cycle evaluation), so a college needs to choose a change to corequisite remediation that can be tested, or some aspect of corequisite models that can be evaluated, within this brief time frame.

The objectives for quality improvement efforts and rapid-cycle evaluation efforts are closely related (**Table 1**), as both approaches aim to test or evaluate something and gather evidence to determine whether that improvement to an aspect of corequisite remediation should be scaled, modified, or abandoned. However, as noted earlier, the scope of what is being tested or evaluated may differ across the two improvement approaches, and quality improvement calls for a more thorough process of identifying the changes that will be tested. We describe how objectives are determined for each of the two approaches in the following sections.

This objective should be something that the college hopes will lead to clear progress in addressing the problem of practice and improving corequisite remediation.

Choosing an Objective for Rapid-Cycle Evaluation

In rapid-cycle evaluation, colleges typically come with something predetermined that they would like to evaluate, so the process of choosing an objective is relatively straightforward. However, it is important to ensure a clear vision of how conducting that evaluation will lead to improvement on the problem of practice. For example, if a college must rely both on instructor pairs and on single instructors to lead instruction across the course and academic support because the pool of instructors is limited, it may not be very useful to improvement efforts to conduct an evaluation comparing the effectiveness of two-instructor models and one-instructor models. Instead, it might be useful to evaluate methods of improving instruction regardless of how models are staffed. On the other hand, if a college has more staffing flexibility and does want to choose a single approach to staffing corequisite models, an evaluation comparing the two might be more appropriate.

Choosing Objectives for Quality Improvement

With quality improvement, a college does not start with something it would like to test or evaluate. Instead, it must engage in a more thorough and structured process for

determining what will be tested through PDSA cycles. The college improvement team must first define a model for improvement that will help them figure out what they want to achieve through the improvement process and develop a clear road map toward that desired improvement. Defining a model of improvement requires a college to identify the following items:

1. Aim: What is the college trying to accomplish?
2. Measures: How will the college know that a change is an improvement?
3. Changes: What changes can the college make that will result in improvement?¹⁷

The field of quality improvement calls on practitioners to develop a deeper understanding of what is driving the problem in order to identify changes that might lead to improvements.

Determining a problem of practice is a first step to identifying the aim of improvement. The aim of improvement should also clearly state what progress on the problem is expected and when. For example, if a college chooses “enrolling students in linked learning community sections of a corequisite model” as its problem of practice, it might develop the following aim statement: “We aim for 95 percent of the students enrolled in corequisite remediation to be coenrolled in the correct, linked sections of the college course and academic support by fall 2021.”

To address the second question, colleges will need to think carefully about whether they need to look at processes, outcomes, or both to assess improvement and to think about specific measures that can be used throughout the improvement process to track differences across the changes that are being tested. We provide more detail on selecting measures later in the toolkit.

The third question calls for practitioners to develop a deeper understanding of what is driving the problem in order to identify changes that might lead to improvements. By better understanding these “drivers,” a college will be able to identify improvements that will help solve the problem. Each possible change can then be set as an objective and tested through a PDSA cycle.

There are many strategies and tools that practitioners can use to identify drivers and develop changes that can be tested through PDSA cycles. One common approach is a structured team process called *root cause analysis*, which uses a cause-and-effect diagram—or “fishbone” diagram—to map out the drivers of the problem. An example of a fishbone diagram is presented in **Figure 1**. The process for completing a fishbone diagram includes the following steps:

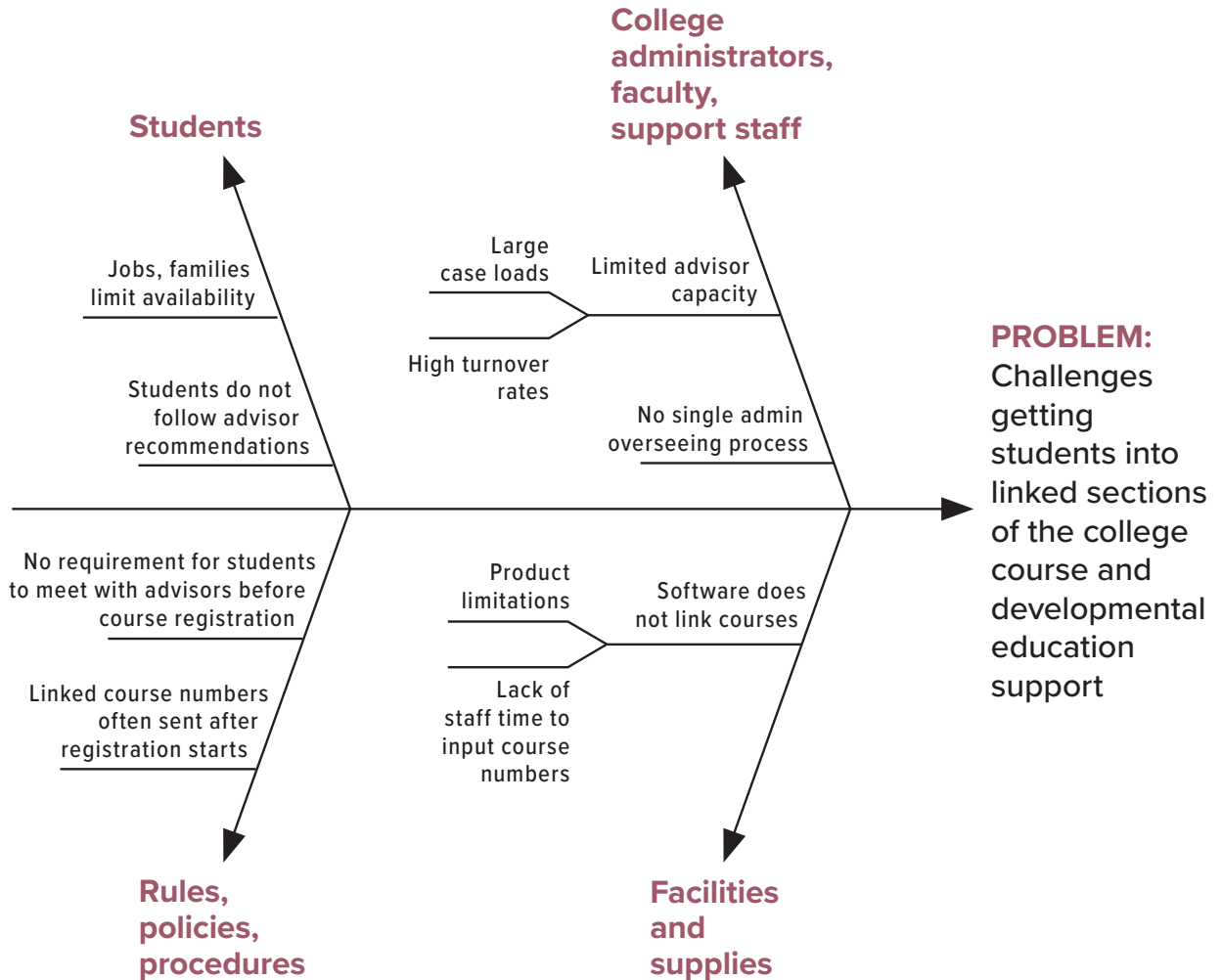
- Write the problem at the mouth of the “fish.”
- Define the different categories of things that might cause that problem (e.g., people, policies).
- Ask “Why does this happen?” to identify different causes of the problem, and

record these causes on the “bones” of the fish

- Identify subcauses underlying the initial set of causes recorded in the diagram, and keep breaking the issue down until participants cannot think of any additional causes.
- Select (or rank) the causes for which participants see the most potential improvement, and list out specific improvements that can be tested through improvement cycles. Each improvement that will be tested is the objective for that improvement cycle.

Root cause analysis typically incorporates the voices of the full range of individuals who have roles or perspectives on the problem of practice, which may include administrators, faculty, other school staff, and external stakeholders. Common strategies for gathering the input of many people are to use sticky notes to identify causes and to ask participants to vote for the top causes for which they believe improvements should be made.

Figure 1. Example of a Fishbone Diagram Describing the Problem of Student Enrollment in Linked Sections of the Corequisite Model



NOTE: A worksheet for completing root cause analysis is provided in a supplement at the end of this toolkit.

Prior to embarking on a rapid cycle of improvement, the college will have identified an objective for the improvement cycle, either (1) an incremental improvement the college wants to test and refine to address the problem (quality improvement) or (2) a particular corequisite model component, process, or practice that needs to be evaluated to address the problem (rapid-cycle evaluation). In the next section, we discuss how to carry out a PDSA cycle to address quality improvement objectives, followed by a description of the rapid-cycle evaluation process.

Carrying Out Quality Improvement Through a Plan-Do-Study-Act Cycle

A PDSA cycle can be a valuable tool when colleges are interested in improving corequisite remediation by testing out incremental changes in the way that corequisite remediation is delivered. In this section, we first describe the four stages

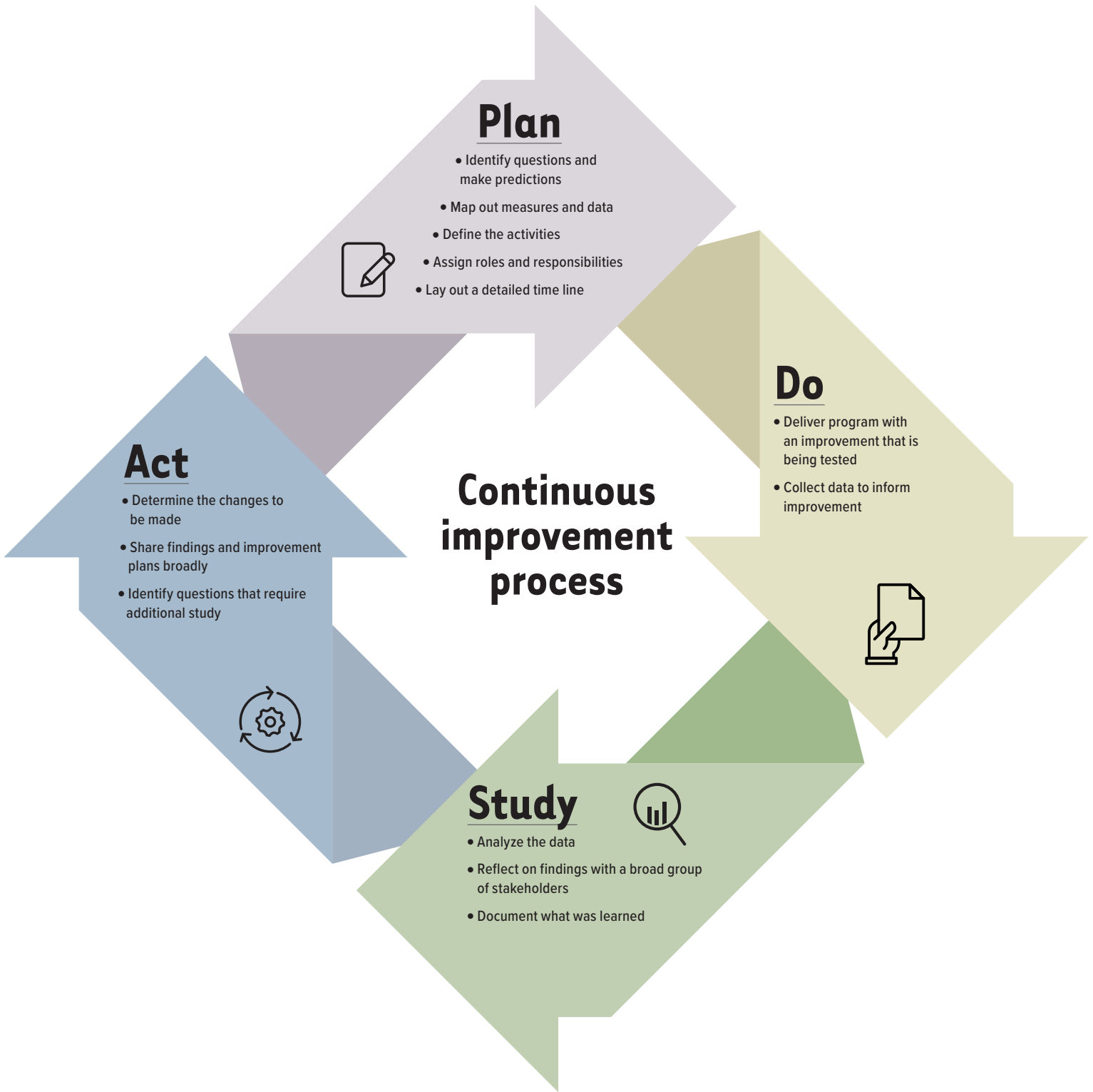
of a PDSA cycle (**Figure 2**) and provide an illustration of what a PDSA cycle might look like if carried out on a common problem of practice related to corequisite remediation (**Box B**). Then we provide some tools and tips on (1) identifying questions and making predictions, (2) assigning roles and responsibilities, and (3) staying on track.

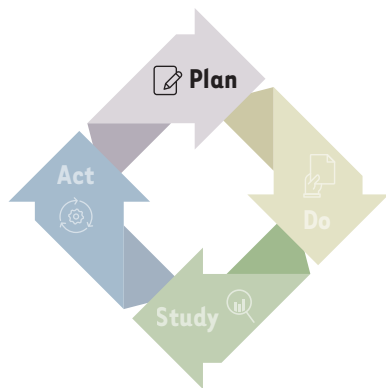
At the outset of any improvement efforts, the college should have identified an improvement team to lead the planning process and oversee the activities in the PDSA cycle. This improvement team should also have led the process of developing a comprehensive understanding of the problem of practice and determining the objective for the PDSA cycle. This team will have the ultimate responsibility for ensuring that evidence from the cycle translates into action. This improvement team is likely to oversee multiple PDSA cycles until a particular problem of practice has been addressed

and the college moves on to a new problem that calls for a different team make-up. We provide additional tips in a later section on what to consider when building a strong improvement team (**Tips and Tools: Getting People Involved**).

A PDSA cycle can be a valuable tool when colleges are interested in improving corequisite remediation by testing out incremental changes in the way that corequisite programs are provided.

Figure 2. Key Activities in a Plan-Do-Study-Act Cycle





Key Activities in the Plan Stage

The Plan stage is about figuring out what the PDSA cycle will focus on and setting up a plan that will help a college successfully carry out the cycle. We describe five types of activities that commonly take place in the Plan stage: (1) identifying questions to be addressed in the cycle and making predictions, (2) mapping out measures and data that will be used to assess improvement, (3) defining the activities that will take place throughout the cycle, (4) assigning roles and responsibilities, and (5) laying out a detailed time line.

It is important to **define questions** that will drive the data collection and analysis based on the specific objective for a PDSA cycle and **make predictions** that will be tested in the cycle. For example, if the objective is to pilot a new checklist for advisors on enrolling students into linked sections of the college course and academic support, one question that a college might aim to answer could be “Were there fewer underfilled and overfilled sections after implementing the new scheduling process?” The improvement team should make a specific prediction, such as “There will be a 10-percent decrease in the number of sections that were underfilled or overfilled.” Later in this toolkit, we provide additional guidance on identifying questions and making predictions ([Tips and Tools: Identifying Questions, Predictions, and Measures](#)).

As part of the process of defining questions and making predictions, colleges will also need to **map out a set of measures and data** that will be used to assess progress toward improvement. These measures should be easy-to-access, real-time measures that can be tracked as improvements are rolled out. Using the same example, to assess whether the new checklist for corequisite remediation advisors was an improvement, the college may want to look at data on how often the checklist was completed, the length of advising sections, whether sections were underfilled or overfilled, and student satisfaction with the advising process. Quality improvement experts often call for a common set of measures that are determined outside of the PDSA cycle to allow for comparison of progress across many different PDSA cycles in an improvement effort, though there may also be additional measures that improvement teams choose to collect that are particularly informative for certain types of improvements.

Next, the college must **define the activities for the other stages of the PDSA cycle**, and the college must be able to reasonably accomplish such activities within a short period (ideally 90 days or less per PDSA cycle). These activities will be guided by the specific objective(s) and questions that the college has chosen for the PDSA cycle. For example, if a college chooses an objective of testing out

a new corequisite remediation checklist, the college will need to lay out a clear plan for what needs to be done to roll out this checklist (“improvement activities”) and also a plan for collecting the data on advising sessions, student enrollment, and student satisfaction (“evaluation activities”).

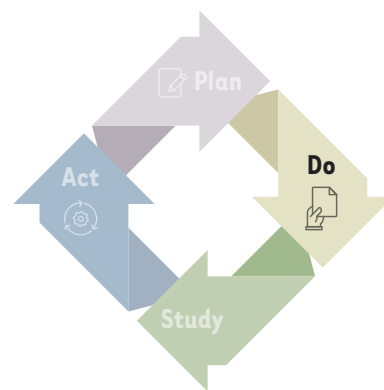
Once a college has identified the key activities that will take place in the cycle, it is critical for the improvement team members to **assign roles and responsibilities** to themselves for overseeing these activities. They must also consider others outside of the group who will need to contribute in various ways to ensure the improvement activities are carried out successfully. For example, if a college is testing out its new corequisite remediation advising checklist, this group may involve administrators, faculty, advisors, the registrar, and students.

In the final step of the Plan stage, the improvement team should **lay out a detailed time line** for the PDSA cycle to ensure that the various activities stay on track and can be completed in a short time. For example, if a college really wants to be scaling improvements to the corequisite remediation advising process in one year, the improvement team will need to lay out a plan for multiple (and possibly simultaneous) PDSA cycles to address the problem in the year leading up to that deadline. The process of identifying the problem and objectives for improvement can also take several months and needs to be built into the time line. We provide some additional tips on the time line in a later section of this toolkit ([Tips and Tools: Developing a Time Line and Staying on Track](#)).

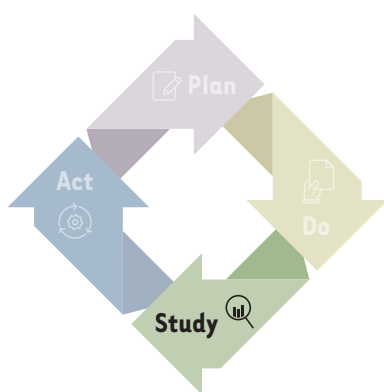
Key Activities in the Do Stage

The Do stage is about delivering the program or initiative and collecting data to understand how things are going. We describe two types of activities that commonly take place in the Do stage: (1) delivering the program or initiative with an improvement that is being tested and (2) collecting data to inform improvement.

First, a college should **deliver the specific improvement that is being tested** to address the problem of practice. In initial PDSA cycles, the college may want to roll out a new corequisite remediation advising checklist to a handful of advisors. The checklist can be tested at a larger scale in later PDSA cycles. College staff involved in delivering the program should have clear guidance and ongoing support to ensure that they understand the expectations for how they should be delivering the program. For example, guidance and support might include (but is not limited to) documents describing improvement activities, a workshop or training that introduces those changes, and ongoing check-in calls to answer questions and offer help as needed.



Finally, the Do stage requires colleges to **collect data to inform improvement** as the program or initiative is rolled out. Although colleges can continue to assess existing student success data, such as course passing rates and persistence, to inform improvement, colleges will need to collect data that track progress within shorter periods (e.g., within semesters) to allow for quicker assessments of progress in rapid PDSA cycles. For example, depending on the corequisite remediation problem of practice, colleges might want to collect data on attendance, homework completion, length of advisor visits with students, weekly audits, or course registration. Systematic collection of these types of data is not common in many colleges, so these efforts are likely to require substantial leadership support and strong buy-in from the college staff involved in collecting the data. We provide some tips on data collection in the rapid-cycle evaluation section of the toolkit that may be relevant to quality improvement efforts ([Tips and Tools: Determining Which Data to Collect](#)).



Key Activities in the Study Stage

The Study stage is the point at which colleges take a look at the findings and reflect on them. We describe three types of activities that commonly take place in the Study stage: (1) analyzing the data, (2) reflecting on findings with a broad group of stakeholders, and (3) documenting what was learned.

Analyzing the data should be somewhat straightforward, as quality improvement calls for descriptive analysis using measures that are easy to collect and can be analyzed within weeks of delivering the change. The assessment plan should be designed around the specific questions identified in the Plan stage, and analysis should be conducted to test the specific predictions made for each of these questions. In many cases, PDSA cycles might focus on analyzing data only from the group testing out the new improvement, so these predictions help establish benchmarks for measuring progress (i.e., a standard for knowing whether the improvement being tested was successful). Another way to set a benchmark for measuring progress is to use a comparison group. Although comparison groups are required for rapid-cycle evaluation, they are not as common for quality improvement efforts. We provide additional detail on comparison groups later in this toolkit in the section on rapid-cycle improvement ([Tips and Tools: Using a Comparison Group](#)).

Once the improvement team has had an opportunity to analyze the findings on the key questions for the PDSA cycle, these findings should be shared with other individuals who might have important perspectives on the findings and the individuals who will drive the improvement efforts based on the findings. For example, the improvement team might want to share its findings from its small test

of the advising checklist with a broader group of advisors and may want to pull in the registrar and a few faculty to also weigh in. **Reflecting on findings with a broad group of stakeholders** will help ensure that the improvement team did not overlook important perspectives on the findings that are evident to a broader set of individuals involved in program delivery. In addition, the opportunity to engage with the findings and provide input may help build buy-in among the individuals who are essential to driving improvement. For example, it can take a lot of time and effort from college staff to scale a new scheduling process, so it is essential to share findings from a pilot of a new scheduling process with advisors, faculty, and the registrar's office to gather their perspectives and demonstrate to them that it is worth their effort to pursue these improvements.

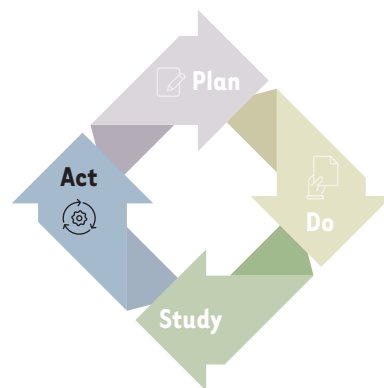
Finally, the college should make sure to **clearly document the findings** from the PDSA cycle so that future cycles can build from what has been learned. For a simple approach to documenting findings, **Table 2** in the next section could be adapted to include a space for findings. The worksheets provided as a supplement to this toolkit also provide a place for documenting efforts. The college could document findings in a more comprehensive way, such as in a memo or presentation, in order to share those findings with others.

Key Activities in the Act Stage

Once the college has identified the problem of practice, gathered some evidence to inform improvement, and reflected on those findings, the final stage of the PDSA cycle is to take action to improve the program or policy. The Act stage commonly includes three types of activities: (1) determining the changes to be made, (2) sharing findings and improvement plans broadly, and (3) identifying questions that require additional study.

Improvement teams must first **determine the changes to be made** in response to the findings. These actions might include abandoning the change, modifying the change, or scaling it as is. For example, if the evidence from piloting the new advising checklist for corequisite remediation students shows promise, the college may decide to move forward with scaling the checklist to a larger set of advisors for continued testing and improvement. Decisions must also be made about how quickly to scale and whether additional modifications may be needed prior to scaling. A clear step-by-step plan for improvement will help ensure that all relevant stakeholders know what needs to be done, who is responsible for doing what, and the time line for making these improvements. For example, scaling the new advising checklist for corequisite remediation may require a handbook that outlines how to use the checklist and training for advisors involved in the process.

In order to mobilize individuals to carry out these improvements and to anticipate challenges that might arise, the college should **share findings and improvement plans**



Colleges typically engage in many PDSA cycles until a problem of practice has been sufficiently addressed.

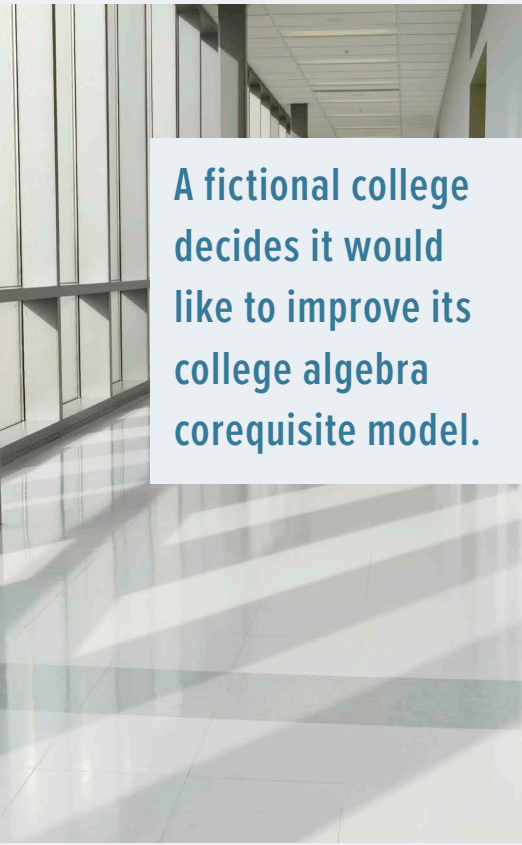
with a broader group of individuals involved in carrying out these changes. Later in this toolkit, we provide some concluding thoughts on conditions that can be important to ensuring broad buy-in across stakeholders and driving action toward improvement (Conclusion: Ensuring Success in Improvement Efforts).

In many cases, a PDSA cycle may raise as many questions as it provides answers, and colleges should **identify questions that require further study**. These questions can then be addressed in future PDSA cycles. Colleges typically engage in many PDSA cycles until a problem of practice has been sufficiently addressed. Once the college decides that it has made sufficient improvement on one problem of practice, the improvement team can move on to another problem of practice related to corequisite remediation.

Box B

A Fictional Example of a Plan-Do-Study-Act Cycle for Corequisite Remediation

The setting for improvement: A fictional college decides it would like to improve its college algebra corequisite model, which pairs a three-hour college algebra course with three hours of weekly academic group support. Last year, the pass rate for the college course was just 52 percent, and the college would like to make improvements. In this corequisite model, one instructor teaches the college algebra course and another instructor teaches the academic support sessions.^a Instructors are required to use the same textbook and learning objectives, but otherwise each instructor has some autonomy to determine the coursework that will be covered, the instructional strategies, and the calendar for the two portions of the corequisite model.



A fictional college decides it would like to improve its college algebra corequisite model.

Identifying the problem of practice: In faculty meetings, the instructors teaching the course have expressed unhappiness with the level of collaboration and coordination in some instructor pairs. Some instructor pairs work very closely, aligning their calendars and coursework to ensure tight overlap in content, while other pairs have invested relatively little time aligning the two components. Advisors also report hearing complaints from students in some sections of the corequisite that the course and academic support do not seem to be connected. In addition, some students have stopped showing up to the academic support sessions and have told instructors that they have decided it is not important to attend as long as they pass the college course. After pulling together instructors, advisors, and administrators to discuss the situation, there is a consensus that limited instructional alignment among some instructor pairs teaching in the corequisite model is an important issue, and faculty believe that they can make some substantial improvements in this area. The improvement team chooses “challenges with instructional alignment across some instructor pairs” as its problem of practice.

Determining objectives for improvement: Because the college does not have a predetermined solution to the problem that it can evaluate, it chooses to focus on quality improvement, conduct PDSA cycles to test changes, and gradually scale effective approaches over time. The team completes a fishbone diagram to understand the sources of the problem and finds that, despite the guidance from the college to closely align instruction across the two components of the corequisite model, some instructor pairs have not been engaging in shared planning time and have inconsistent syllabi and calendars. After discussing with instructors and getting their input on possible changes that could be made to address these issues, the improvement team decides that the objective of the initial PDSA cycle will be to test a possible improvement: requiring instructors to spend at least four hours of time together in the first few weeks prior to the semester in order to align syllabi and calendars.

^a It is important to note that although this example focuses on issues with a corequisite model that happens to be taught by two instructors, there is no evidence suggesting that two-instructor models are any more or less likely to face implementation issues. Furthermore, there is no evidence suggesting differences in student outcomes between one- and two-instructor models. A similar process would be valuable for addressing the improvement needs of one-instructor models.

Defining the questions, making predictions, and selecting measures: The college also identifies some questions it would like to answer through the improvement process and makes specific predictions of what will happen. The college outlines four questions it would like to answer:

- Did instructor pairs meet for four or more hours?
- Did students attend the academic support sessions more often?
- Did students perceive that the academic support sessions supported their success in the college-level course?
- Were students more likely to pass the college course?

If the additional faculty collaboration time has been a success, the improvement team predicts that instructors will have met for at least four hours over the semester, that attendance issues will decline by 10 percent relative to prior semesters, that 75 percent of students will report that the academic support sessions were useful in supporting success in their college course, and that pass rates for the college course will have increased by 5 percent. However, because course passing will take too long to measure for the rapid 90-day cycles required, the college decides to focus on the first three questions.

Defining activities, assigning roles and responsibilities: The college then maps out what will happen in the PDSA cycle and who will be responsible for overseeing various improvement and evidence-building activities. For example, the college must determine how many instructors will test out the four hours of shared planning time and how to provide

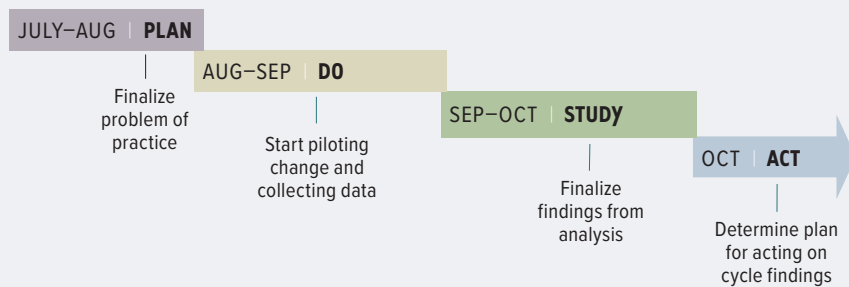
	FACULTY	DEANS, VP	DATA EXPERT
Assign instructor pairs	X	X	X
Collect classroom data	X		X
Analyze student data			X
Reflect on findings	X	X	X
Scale policy if effective	X	X	

the guidance needed to support rollout. The college must plan for any data-collection activities, efforts to process and reflect on findings, and efforts to act on the evidence. Once the college maps out what will happen throughout the PDSA cycle, roles and responsibilities can be assigned. The improvement team includes faculty representatives and department chairs, who can help develop the plan for the coordination time and oversee real-time data collection; administrators, who have the authority to require and scale

improvements and can access resources to support the improvements; and staff, who can advise the team on strategies for collecting and analyzing data. The team members assign roles and responsibilities to themselves for overseeing each activity and identify others outside of the core improvement team whom they must rely on to carry out various activities to support improvement.

Setting a time line: The team also determines a time line for the PDSA cycle. Planning starts one month prior to the semester, and instructors will begin to roll out the change two weeks before the semester starts. Findings will be

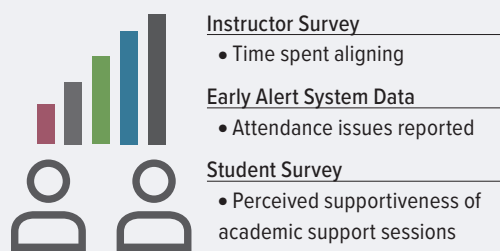
Sample Time Line of Implementation



available one month into the semester, and a deadline is set for determining an action plan less than 90 days after the cycle began.

Delivering the program in a way that informs improvement: To test the new instructor collaboration time, the college first decides to try out the approach with a small group of four instructor pairs, while other instructor pairs continue with “business as usual.” After promising evidence from the fall, the college decides to scale the approach to 15 instructor pairs across two campuses in the next round of improvement. *Note: If the college was interested in evaluating the effectiveness of the strategy and focused on rapid-cycle evaluation rather than quality improvement, it might have wanted to roll out the change to a larger number of instructors, use a lottery approach to assign instructors to one group or the other, and focus the analysis on comparisons of these two groups rather than using predictions.*

Collecting data: To address the questions posed during the Plan stage and assess whether the improvement has been successful, the college collects data over the course of the semester. The college focused on three real-time measures: instructor time spent meeting, student attendance, and student perceptions of whether the academic support sessions helped to support success in the college course. The improvement team collects weekly instructor surveys to determine how often instructors are meeting under the new requirements and administers a



short student survey three weeks into the semester. Instructors commit to using the college’s early alert system diligently to track attendance.

Assessing and sharing findings: The improvement team then examines the findings from the data. Results indicate that among the four instructor pairs testing the improvement, three did follow through and meet for the four hours. Students exceeded the predicted benchmark for perceptions that the academic support

sessions increased success in the college course, with 80 percent of all students reporting that this was the case. There was a 10-percent decrease in reported attendance issues relative to the prior fall semester. The improvement team shares these findings with a broader group of instructors and administrators in order to get input, ensure that all sources of evidence and perspectives are being considered, and increase the likelihood of buy-in.

Taking action to make improvements: After sharing the evidence with others in the college, stakeholders within the college are in agreement that the alignment strategy should be scaled to 15 instructor pairs in another PDSA cycle, with the idea that this strategy may eventually become a requirement for all corequisite remediation instructors. The college identifies a faculty task force to oversee the changes and finds the resources to train instructors and cover the additional planning time to make sure the changes are sustainable. However, discussions with the initial group of instructors who tested out the shared collaboration time suggests that it was really hard to find four hours to meet and that three hours may have been sufficient. To address this barrier, the college decides to pursue a second PDSA cycle in the spring with a reduction of the requirement to three hours and some additional guidance on finding time to meet. Once the college feels comfortable that the improvements have met its expectations for success, the college can shift focus to other problems of practice.

Tips and Tools: Identifying Questions, Predictions, and Measures

This section provides some tips for identifying questions, measures, and predictions for the purposes of improvement. Rather than casting a wide net to collect a great deal of data on a problem of practice and then cutting the data many different ways to see what comes out, it is always good practice to lay out specific

It is always good practice to lay out specific questions that the improvement team wants to address through data collection and analysis in a cycle.

questions that the improvement team wants to address through data collection and analysis in a cycle (e.g., **Table 2**, which draws from the example in Box B). Identifying improvement questions ahead of time will also help keep colleges on track with short cycles and will minimize the burden of data collection in terms of time and resources. These questions should be focused on gathering the critical information that must be known to determine whether the change in question is leading to improvement. Improvement questions can focus on many different aspects of the change that is being tested, including how specific practices or processes are being rolled out, the experiences and perspectives of students and college staff involved in the rollout of the change to corequisite remediation, and outcomes for students or staff.

Table 2. Identifying Questions, Measures, and Predictions

QUESTION	PREDICTION	DATA SOURCE	MEASURE
How many hours will instructor pairs subject to the new alignment strategy meet for in order to align syllabi?	Instructors will meet for at least 4 hours.	Weekly instructor survey	Hours of time collaborating by phone, email
Did students attend the developmental education course more often?	Reported attendance issues will decline by 10 percent from the prior semester.	Early alert system data	Number of alerts submitted for attendance issues
Will students be more likely to perceive that the academic support is valuable?	At least 75 percent of students perceive that the academic support supported success in the college course.	Student survey administered in fourth week of classes	Likert question: “The academic support was important to supporting my success in the college course.”

NOTE: A worksheet for documenting questions, measures, and predictions is provided in a supplement at the end of this toolkit.

After defining the questions that will guide data collection and analysis, the college must then determine which data and measures will be used to answer the questions. Given the emphasis on short cycles and the involvement of a broad range of stakeholders, it is wise for colleges to focus on easy-to-collect data and measures that are meaningful to many individuals in the college. Quality improvement efforts often aim to establish a common set of measures that will be used across multiple PDSA cycles to allow for ongoing tracking of progress toward improvement and to allow for comparisons across different types of improvements.¹⁸ We provide additional guidance on data sources to consider (see [Tips and Tools: Determining Which Data to Collect](#)).

Improvement teams should also make specific predictions for what they think will happen. These predictions will help set clear benchmarks for the college to judge whether the change being tested is leading to improvements as hoped.

Tips and Tools: Getting People Involved

Our earlier discussion of mapping out roles and responsibilities during the Plan stage of a PDSA cycle emphasized two sets of individuals involved in improvement: (1) an improvement team with the ultimate accountability for overseeing the process and ensuring that evidence-building efforts translate into action and (2) a broader set of individuals who might need to be involved in various PDSA activities. Support from leadership and a strong emphasis on improvement as a priority for the college are also essential to getting individuals across the college to engage in improvement efforts. In this section, we provide some tips on developing an optimal improvement team, followed by a description of how colleges might assign roles and responsibilities across all individuals involved in a PDSA cycle.

In terms of selecting an improvement team, there is no magic formula for the number and types of individuals who should be included, and the size and makeup of an improvement team may vary according to the context of the college and the problem of practice being addressed. However, the literature and our experiences with Texas colleges suggest that an improvement team should be chosen with the following in mind:

- Team members feel comfortable engaging in open and honest dialogue with all other members of the group and are valued equally as participants in the process.
- Team members are willing to challenge their beliefs and open themselves up to new perspectives on issues.

The size and makeup of an improvement team may vary according to the context of the college and the problem of practice being addressed.

- Team members have the knowledge and experience to support a deep understanding of the problem of practice.
- Team members have the time and space to meet frequently to oversee the improvement process and can devote sufficient time to carrying out their roles and responsibilities.
- Team members value data and evidence as an essential tool for developing and improving programs and initiatives, and at least some of the team members have some basic understanding of research methods.
- Team members have sufficient authority and resources to drive change in support of the problem of practice.
- Team members are committed to student success as the primary focus of improvement efforts.¹⁹

We recommend starting with an improvement team of at least three and no more than 12 core team members. To ensure that the improvement team has sufficient authority to drive change in a college, it will likely need to include administrators.

Faculty play a critical role in delivering corequisite remediation and have important perspectives on most problems of practice related to corequisite remediation; therefore, most improvement teams are likely to require faculty representation. If administrator and faculty team members do not have expertise in data collection and research, colleges can benefit from bringing on one or more team members who can provide guidance in this area, such as staff from an institutional research office, data specialists supporting college leadership, faculty or administrators with a background in program evaluation, and external consultants. And in cases where corequisite remediation problems are found outside of the classroom—such as scheduling, advising, or tutoring—team members should also be drawn from the relevant departments.

After the improvement team has been chosen, the team may wish to spend at least one meeting setting up expectations and group norms for the improvement efforts. Such a meeting might include discussion of what it means to engage in open, honest dialogue with one another, standards or norms for what counts as “evidence” about whether an improvement strategy is working, any reporting goals, and the value of varied expertise among those on the team. The team may wish to revisit these expectations periodically throughout the PDSA cycle.

The next step is to assign roles and responsibilities for the various activities that are planned for a PDSA cycle (e.g., **Table 3**). Colleges can benefit from assigning a single person from the improvement team to assume responsibility for oversee-

The improvement team should provide room for dialogue about whether these roles and responsibilities can be effectively carried out with the time and resources available.

ing each activity and reporting back to the team on progress, though that accountable team member may receive support from others on the team. After assigning team leads who hold ultimate accountability for seeing the activities through, improvement teams should identify all of the individuals who must be involved with each activity (including those outside of the core improvement team), and clearly lay out the specific responsibilities for each individual or group of individuals. These expectations for roles and responsibilities should be clearly communicated to these individuals, and the improvement team should provide room for dialogue about whether these roles and responsibilities can be effectively carried out with the time and resources available. Once there is common agreement among all of those involved in improvement regarding roles and responsibilities, periodic reminders about responsibilities from those overseeing each activity and opportunities for feedback on concerns can help provide support.

Table 3. A Tool for Assigning Roles and Responsibilities

Activity	Team Lead	Administrators	Faculty	Data Specialist	Students, Other Staff
Develop plan for aligning instruction	Dean Smith	Who: Dean, VP of Instruction What: Select strategy	Who: Faculty lead and team What: Design strategy options	Who: N/A What:	Who: N/A What:
Collect data		Who: Responsibilities:	Who: Responsibilities:	Who: Responsibilities:	Who: Responsibilities:
Analyze data		Who: Responsibilities:	Who: Responsibilities:	Who: Responsibilities:	Who: Responsibilities:
Scale improvement strategy		Who: Responsibilities:	Who: Responsibilities:	Who: Responsibilities:	Who: Responsibilities:

NOTE: A worksheet for assigning roles and responsibilities is provided in a supplement at the end of this toolkit.

Tips and Tools: Developing a Time Line and Staying on Track

This section provides some tips for developing a time line for improvement. PDSA cycles are typically short to encourage rapid feedback and growth (ideally 90 days or less), while the full process of investigating the problem of practice and engaging several PDSA cycles might take a year or more. The reason for keeping PDSA cycles short is to encourage organizations to drive changes at a quicker-than-usual pace and build on improvement through multiple, iterative cycles. However, with the many different responsibilities that administrators, faculty, and other college staff have outside of improvement efforts, it can be difficult to

The reason for keeping PDSA cycles short is to encourage organizations to drive changes at a quicker-than-usual pace and build on improvement through multiple, iterative cycles.

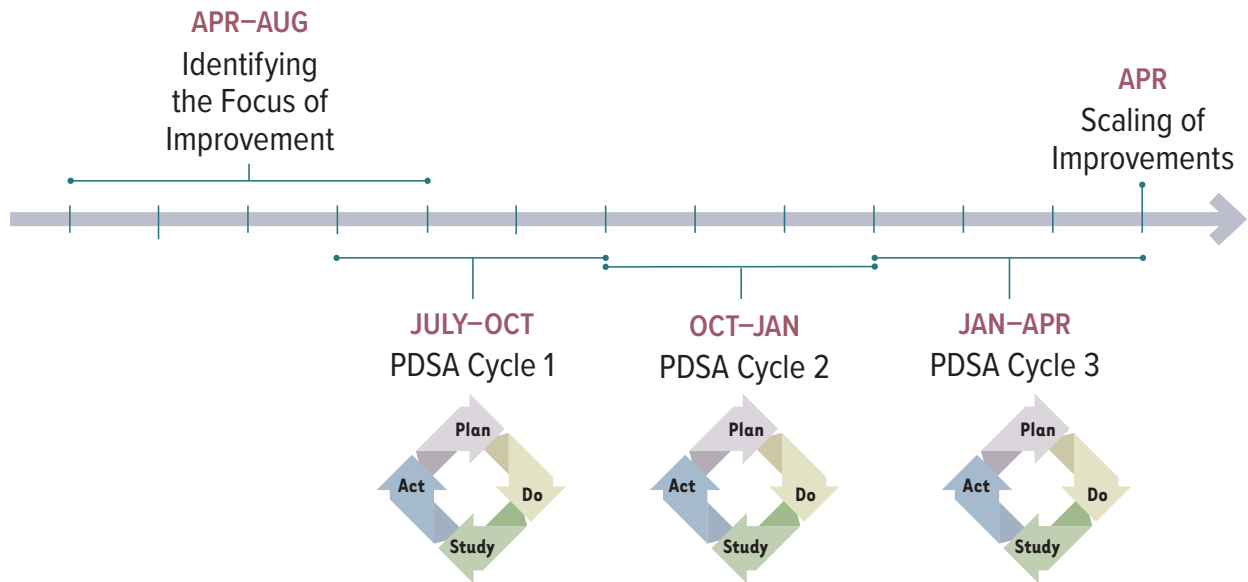
get anything done in these short windows of time, especially with efforts that involve the perspectives of many stakeholders and the collection and analysis of new data. Colleges must have a clear and intentional plan to ensure that the activities set out for a PDSA cycle stay on track. As noted previously, choosing “bite-sized” objectives that can reasonably be examined and addressed in a short time is important.

Once a college has set the objective for a cycle and the improvement team has detailed all of the activities that need to take place in each of the four stages of the PDSA cycle, developing a time line is relatively straightforward. Colleges should set some key deadlines and check-in points for each of the activities in the cycle, and they should develop processes

for informing everyone involved in improvement efforts about these deadlines and hold team leads accountable for sticking to them. There are several options for how a college can start to map out the time line for improvement efforts, as follows:

- **Start from the end.** A college may have deadlines for when it would like to see improvements and when decisions need to be made to scale those improvements. In this case, the college can start by identifying when it would like to commence PDSA cycles and work backward to map out the time line.
- **Start from the beginning.** A college may have constraints on when it can start improvement efforts. In this case, the college can start with the date on which it will begin to investigate the problem of practice and then map out the time line moving forward.
- **Start with the time when it is feasible to implement changes and/or collect data.** The rollout and testing of an improvement (the Do stage) may be the least flexible in terms of timing, as it may only make sense to pilot changes and/or collect data at certain points within the academic year. In this case,

Figure 3. Illustrative Time Line for Improvement Efforts in a College



NOTE: A worksheet for mapping out the time line for improvement efforts is provided in a supplement at the end of this toolkit.

a college can determine when it will be able to carry out these activities in the Do stage and map forward and backward from there.

Figure 3 contains an illustrative 12-month time line for improvement on a problem of practice that builds in multiple PDSA cycles of 90 days or less. Understanding the problem and identifying improvements to be tested through PDSA cycles may take as little as a month or as much as six months depending on how experienced the team is with improvement and how much exploration is required to understand the problem of practice. It may be common for colleges to pilot changes and collect data based on the academic calendar, testing the improvements out during the fall or spring semesters (or both). Data collection should occur within the same semester to ensure rapid cycles. To allow for at least two iterative PDSA cycles within a year, colleges will need to be prepared to quickly assess the data and take action to define an objective for the next cycle (over the summer in **Figure 3**, for example).

Carrying Out Rapid-Cycle Evaluation

When a college's objective for improvement is focused on assessing effectiveness, whether it be the effectiveness of some aspect of a corequisite model, some instructional practice, or some new process for advising and scheduling, rapid-cycle evaluation can be a valuable tool. In this section, we start by describing the process for carrying out rapid-cycle evaluation. We then provide tips and tools for determining what to measure, determining which data to collect, and using comparison groups.

The Rapid-Cycle Evaluation Process

As a quick and focused version of traditional program evaluation, the process for carrying out rapid-cycle evaluation is relatively straightforward and likely to be familiar to colleges. We provide a brief description of the steps for carrying out a basic rapid-cycle evaluation below.

Define the questions for the study. Just as was recommended for PDSA cycles, it is important to define a clear set of questions for the improvement cycle to

ensure that the evaluation will generate the evidence needed for decisionmaking and that the questions can be answered within a short time frame. In rapid-cycle improvement, it can be useful to use a logic model to map out how the thing being evaluated is expected to lead to impacts, and this logic model can be used to generate the questions. We provide a more detailed description of logic models and an example of a logic model related to corequisite remediation in the next section ([Tips and Tools: Determining What to Measure in a Rapid-Cycle Evaluation](#)). A college will need to decide whether it wants to focus the study on outcomes or whether there are aspects of program delivery that might be important to measure to understand why outcomes did or did not change. For example, if a college were evaluating a new instructional approach for corequisite remediation students and found that it was ineffective or even harmful, it might be important for colleges to understand more about what was occurring in the classroom and how students perceived the instructional approach in order to understand why it failed and avoid similar issues in the future.

A college will need to decide whether it wants to focus the study on outcomes or whether there are aspects of program delivery that might be important to measure to understand why outcomes did or did not change.

Identify data and measures that will be collected to address the evaluation questions. After identifying evaluation questions, the next step is to determine which data and measures will be used to address each of those questions. It is common for rapid-cycle evaluations to rely on existing data sources and short-term outcome measures because of the need for data collection and analysis to be quick. However, there may be some potential to collect additional quantitative and/or qualitative data that will help colleges better assess the effectiveness and understand the results of particular corequisite remediation features being tested. We describe different types of data that might be collected to inform rapid-cycle evaluation efforts ([see Tips and Tools: Determining Which Data to Collect](#)).

Figure out how the comparison group will be chosen. Because the purpose of rapid-cycle evaluation is to measure impact, or effectiveness, it requires some sort of comparison group. For example, to test the effectiveness of a new corequisite remediation instructional approach, a college would want to roll out the instructional approach to students in one set of classrooms and stick to “business as usual” in other classrooms with similar students. Rapid-cycle evaluations commonly use randomization to assign students or classrooms to the treatment and comparison groups or use statistical matching approaches to eliminate differences between the two groups of students. However, colleges may not have the capacity to carry out these approaches without support from external research partners, so they may choose comparison groups in less rigorous ways. We describe some options for comparison groups ([see Tips and Tools: Using a Comparison Group](#)).

It is critical to ensure that those rolling out the program have sufficient guidance and resources.

Deliver the program component being evaluated and collect data. The next step is to roll out the aspect of corequisite remediation that is being evaluated to the treatment group and collect data according to the predetermined plan. As described in the PDSA section, it is critical to ensure that those rolling out the program have sufficient guidance and resources and are rolling out that aspect of corequisite remediation in its ideal form to ensure that the evaluation is examining effectiveness when “done right.” In the case of randomized approaches, it is also important to prevent those in the comparison group from receiving the corequisite remediation feature being tested. To ensure rapid cycles of improvement, it is important that these activities be able to take place within a single semester.

Conduct analysis. In rapid-cycle evaluation, the focus of analysis is on comparing outcomes for the group receiving the corequisite model component, process, or practice being tested with a comparison group. The first step of analysis is understanding whether there are differences between the two groups. If a college uses a lottery to assign classrooms or students to the two groups, students and instructors should look

similar across easy-to-access characteristics (e.g., race and ethnicity, incoming test scores, teaching experience). That may not be the case if students or classrooms are chosen in a different way (e.g., instructor or student volunteers). For colleges with sufficient capacity or a willingness to bring on external research partners, statistical matching techniques can help address some of the differences across the comparison group and the group testing out the corequisite model component. We provide some additional detail on this topic (see [Tips and Tools: Using a Comparison Group](#)).

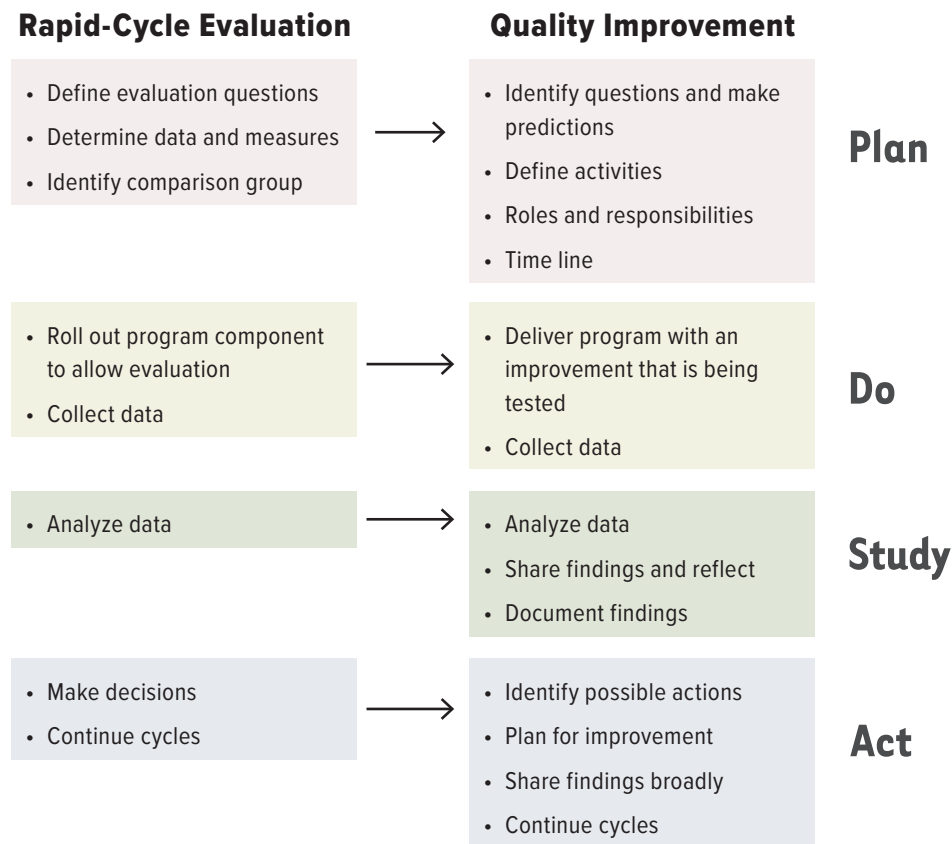
Rapid-cycle evaluation is distinct in its focus on comparison groups and more-rigorous data analysis.

Make decisions based on the findings. Once a college has evidence on the effectiveness of the corequisite model component, process, or practice, the next step is to make a decision about how to move forward. Colleges may choose to scale if the evaluation showed evidence of effectiveness, or they may choose to modify or eliminate the corequisite model component being tested if the results were less favorable. Whatever the decision, colleges should consider best practices for building buy-in and ensuring action on the findings, including some of the valuable lessons offered from the field of quality improvement on building consensus around the objective of the evaluation and reflecting on findings with a broad group of relevant college staff.

Continue cycles of improvement. A college must then consider what might be addressed in future cycles of improvement. Some rapid-cycle evaluation efforts engage in multiple cycles of evaluation for the same intervention as it is gradually scaled to larger and larger groups of students. Alternatively, the college might want to shift to quality improvement as it scales the new practice to allow for continued refinement of how it is delivered. Once the improvement team decides that the problem has been sufficiently addressed through the success of improvement efforts and evidence of effectiveness, the college can shift focus of improvement to another problem of practice related to corequisite remediation.

The rapid-cycle evaluation process may sound familiar because there are many similarities in how rapid-cycle evaluation and PDSA cycles carry out testing and evaluation (**Figure 4**). However, the field of quality improvement provides substantially more guidance on processes for planning improvements, building teams, and reflecting on findings. Rapid-cycle evaluation is distinct in its focus on comparison groups and more-rigorous data analysis.

Figure 4. Overlap in the Steps to Carrying Out Rapid-Cycle Evaluation and PDSA Cycles



Tips and Tools: Determining What to Measure in a Rapid-Cycle Evaluation

Given the short time lines involved with rapid-cycle evaluation, it may be important to focus only on the evaluation questions and measures that are most important to understanding effectiveness. To determine what to measure, evaluators often use a logic model. A logic model maps out how a particular practice or aspect of a corequisite model is believed to be related to student success outcomes. Logic models typically have at least three sections, including the following:

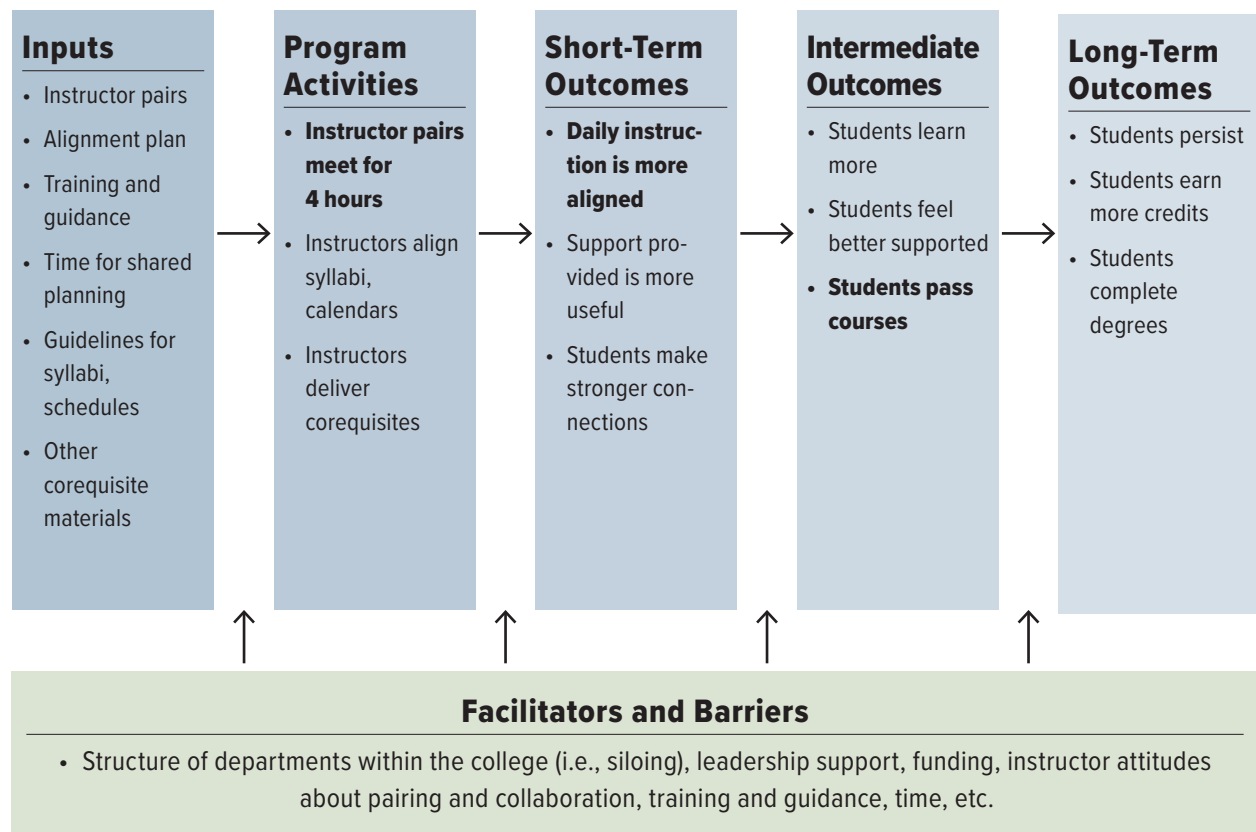
- **Inputs** are the resources and supports required for delivering the aspect of corequisite remediation that is being evaluated. These could include staff, instructional materials, financial resources, and facilities.
- **Program activities** are the core components of the corequisite model, i.e., the things that are being done to deliver the particular practice or aspect of the corequisite model being evaluated. Depending on which part of corequisite remediation is being evaluated through rapid-cycle evaluation, these activities might include

structural components of the corequisite model, instructional activities, or other required support activities (e.g., scheduling, advising, tutoring). Some logic models also specify outputs, which are the immediate results of having delivered the corequisite remediation practice or model component as planned. Example outputs include the number of students enrolled properly, the hours of instruction received, instructional strategies used, and portfolios of classroom work.

- **Outcomes** represent the types of expected changes and results when the corequisite is delivered successfully. It can be useful to break these out into short-term outcomes, which might be observed within the semester, and longer-term outcomes, which ultimately are the measures of student success that the feature, practice, or process is meant to affect. Because of the need for quickly turning around results, rapid-cycle evaluation will focus on measuring short-term outcomes.

If the fictional college in Box B wanted to carry out a rapid-cycle evaluation to assess the effectiveness of its new two-instructor alignment approach, it might develop a logic model like the one presented in **Figure 5**. Although many other

Figure 5. A Logic Model for a College Aligning Instruction Across Two-Instructor Pairs



NOTE: A worksheet for developing a logic model is provided in a supplement at the end of this toolkit.

activities are required to deliver the corequisite model, the college is only evaluating the modification requiring two-instructor meetings and syllabi alignment, so Figure 5 only covers the specific aspects of corequisite remediation that are being evaluated. The items in bold illustrate what the college might want to measure in its rapid-cycle evaluation given limited time and resources.

Tips and Tools: Determining Which Data to Collect

There are several decisions that colleges must make when planning for data collection. This section outlines these data collection decisions and provides examples of the different types of data that colleges might consider collecting to inform improvement efforts. This guidance on data collection may also be useful for informing data collection approaches under quality improvement and PDSA cycles.

As described above, the types of data collected and decisions about how to analyze those data will vary according to the specific questions that a college is trying to answer. A college's resources and capacity to collect data and the short time frame for improvement cycles may also place limitations on what can be collected; rapid-cycle evaluations often rely on existing data. In addition to these considerations, colleges will need to determine the following when designing plans for data collection and analysis:

- **Types of data to use:** There are several types of data that can be used to inform improvement. **Table 4** provides a list of data sources and some information to help colleges choose the appropriate data sources for improvement efforts. Rapid-cycle evaluation requires some measure of effectiveness; therefore, the college may need to rely on administrative data, existing surveys, or in-class assessments to examine outcomes. In some cases, colleges may also want to have a deeper understanding of why particular outcomes were observed, so they may want to collect data on perspectives from key stakeholders or on barriers and facilitators to achieving outcomes. In these cases, the college may benefit from collecting qualitative data, such as through interviews or focus groups.
- **Data from a sample versus the full population:** Data are often collected from just a sample of individuals (rather than the full population) in order to cut down on the costs of data collection and the burden on participants and to improve the quality of the data that is collected. However, collecting data from a sample also has limitations. If a college is using quantitative data and testing for statistical significance, the sample must be large enough to do so. In addition, how that sample is chosen may limit the degree to which the findings can represent the overall population. If it is important that the data from the sample represent the population, it would be optimal to choose the sample of individuals randomly, if possible.

The types of data collected and decisions about how to analyze those data will vary according to the specific questions that a college is trying answer.

- **Create new measures or use ones developed by others:** Wherever possible, it can be useful to use survey questions and scales that have been developed by other colleges or researchers. Using existing measures can save a college time in mapping out a data collection plan, can make the evidence more relevant to other colleges, and can help ensure that the measure has been proven to be of high quality with other data. However, there may not be other studies that have looked at the concepts a college is interested in; in these cases, the college will need to develop new measures.
- **Whether existing data sources can be used:** Because data are costly and take time to collect, it can be beneficial to rely on existing data sources whenever possible, and rapid-cycle evaluations often rely entirely on existing data. If students or instructors are already surveyed or brought together for other reasons, it may be easier to add a few questions to these existing surveys or to pull together instructors for focus groups during department meetings, rather than creating separate data collection efforts. If improvement cycles are taking place across the college, those teams should work closely to coordinate their efforts to ensure that data collection is not overburdening specific groups of students or college staff.

Table 4. Example Data Sources and Their Merits and Limitations

Data Source	Merits	Limitations
Administrative data	<ul style="list-style-type: none"> • Providing systematic data across broad groups of students, college staff • Measuring academic success outcomes for students • Accounting for differences in student, classroom, and instructor characteristics in analysis • Limiting burden on students or school staff participants 	<ul style="list-style-type: none"> • Limited to the measures already being collected for other purposes; can be hard to add new information • May take time to process and be ready for use
Surveys	<ul style="list-style-type: none"> • Providing systematic data across broad groups of students, college staff • Providing data on how a program is being rolled out, perspectives of individuals, successes and challenges, and explanations for trends in quantitative data • Assessing outcomes not captured in administrative data 	<ul style="list-style-type: none"> • Can take a moderate amount of time and resources if creating new surveys • May require institutional review board (IRB) approval • Can suffer from low response rates that limit representativeness • May require incentives to secure participants • Accuracy of self-reported data can be affected by response bias and respondent engagement

Data Source	Merits	Limitations
Focus groups	<ul style="list-style-type: none"> • Providing in-depth data from a moderate number of individuals • Providing data on how a program is being rolled out, perspectives of individuals, successes and challenges, and explanations for trends in quantitative data • Providing a setting where respondents can interact and build off of each other's ideas 	<ul style="list-style-type: none"> • Can take a moderate amount of time and resources • May require IRB approval • Cover a moderate number of individuals and may not be representative • May require incentives to secure participants • Accuracy of self-reported data can be affected by response bias and respondent engagement and interactions
Interviews	<ul style="list-style-type: none"> • Providing in-depth data on individual perceptions and knowledge • Providing data on how a program is being rolled out, perspectives of individuals, successes and challenges, and explanations for trends in quantitative data • Providing individuals with privacy to discuss sensitive issues and perspectives 	<ul style="list-style-type: none"> • Can take substantial time and resources • May require IRB approval • Cover few individuals and may not be representative • May require incentives to secure participants • Accuracy of self-reported data can be affected by response bias and respondent engagement
Observations	<ul style="list-style-type: none"> • Providing data on how a program is being rolled out • Assessing interactions between various groups 	<ul style="list-style-type: none"> • Can take substantial time and resources • May cover few individuals and may not be representative • Can be challenging to collect reliable and consistent data across multiple observers • May require IRB approval
Program documents	<ul style="list-style-type: none"> • Measuring the requirements for a course or program • Understanding how a program is intended to be implemented • Collecting data with limited burden on students or school staff participants 	<ul style="list-style-type: none"> • Information on measures of interest may be limited and not systematic across sections, programs
Program data (e.g., sign-in sheets, time logs, advisor and instructor notes)	<ul style="list-style-type: none"> • Providing data on how a program is being rolled out • Collecting data with limited burden on students or school staff participants (if data already have been collected for other purposes) 	<ul style="list-style-type: none"> • Can be time-consuming to collect (if not already collected for other reasons) • Accuracy of self-reported data can be affected by response bias and respondent engagement

NOTE: A worksheet for identifying data sources that address questions for a cycle is provided in a supplement at the end of this toolkit.

Another important consideration for colleges is how to ensure that the data collected are of high quality. If the data collected do not accurately reflect what is happening on the ground or the perceptions of those involved, the actions taken based on those data may not actually lead to improvements. There are many strategies for ensuring that the data collected are high quality, but we offer the following four tips:

Another important consideration for colleges is how to ensure that the data collected are of high quality.

- **Pilot data collection tools.** If there is sufficient time in the planning stage, it can be useful to pilot a data collection tool, such as a new survey, an assessment, or questions for a focus group. This pilot will help colleges identify effective and ineffective portions of the data collection tool and streamline and make refinements.
- **Build a safe environment for data collection.** It is important to ensure that respondents feel comfortable reporting data accurately. The college can reassure participants that data collected for improvement efforts will be used only for the purposes of improvement and never to evaluate staff or hold people accountable. Collecting data anonymously is another way to increase the comfort of participants.
- **Communicate the importance of data collection.** Colleges should inform the subjects of data collection about the value of the data they are providing and how those data will be used to help the subjects. This can help build buy-in, and subjects will be more likely to devote time and effort to providing accurate data if they see the data collection as valuable.
- **Include data and research experts on the team.** Figuring out how to collect high-quality data can be difficult, and improvement teams can benefit from members with expertise on data collection and research, including members of the institutional research office, other data experts from within the college, or external consultants.

In addition to considering strategies for ensuring high-quality data, colleges should make sure to comply with human subject protection policies and Family Educational Rights and Privacy Act requirements that protect student data. If a college does not have its own institutional review board, it may need to work with an external review board to ensure approval for the data collection procedures. Colleges should consider ways to ensure regular and expedited review processes for ongoing improvement efforts given the need for short cycles of improvement, and improvement teams should adjust the time line to account for these review processes.

Tips and Tools: Using a Comparison Group

The ultimate goal for rapid-cycle evaluation is to measure effectiveness—i.e., the impact caused by a particular practice or corequisite model component. To

measure the impact of something, it is essential to have a comparison group in order to compare outcomes for students and instructors who receive the practice or program component with similar students and instructors who do not. For example, if a college wanted to assess the importance of class size in corequisite courses, it would need to compare corequisite sections of smaller class sizes with a comparison group of larger class sizes (or vice versa). Without a comparison group, it is hard to know what is driving the patterns observed in the data, as it could be other programs or initiatives in the college or changes in the student population over time.

To illustrate the importance of a comparison group for measuring impacts, we can use the example provided in **Box B**. Because this college was engaging in quality improvement rather than rapid-cycle evaluation, there were no efforts to create a comparison group. Let's assume that pass rates for the algebra instructors testing the improvement increased from 51 percent to 72 percent, and the improvement team concluded that the four hours of time that instructor pairs spent together was an improvement. But suppose the college also rolled out a new early alert system that fall, making it unclear how much of the improvement in outcomes is due to the early alert system rather than the improvement strategy. In addition, there may have been differences between last year's students and this year's students that also contributed to success. If the improvement team members really wanted to measure whether the improvement being tested caused the 11-percentage-point increase in passing rates (rather than the early alert system or differences in the student population), they would have needed to develop a comparison group.

It is essential to have a comparison group in order to compare outcomes for students and instructors who receive the practice or program component with similar students and instructors who do not.

There are several possible approaches to choosing a comparison group. We describe the three main options below and outline some of the limitations of using less rigorous ways to choose comparison groups in **Table 5**.

Randomization (i.e., a lottery). The ideal strategy for choosing a comparison group for rapid-cycle evaluation, where possible, is to choose students and staff through a lottery (also referred to as randomization). This is the best way to guarantee that the comparison group is going to be similar to the group testing out the new program or improvement strategy, including characteristics that are observable in data (e.g., age), and characteristics that are not (e.g., motivation). Lotteries can also be valuable because they offer a fair way to figure out who gets the opportunity to try something first. However, it can often be difficult or infeasible to assign students or instructors to a comparison group through a lottery. In addition, lotteries can be counterproductive to improvement efforts if faculty or other college staff are unhappy about the process. In such cases,

colleges will have to consider other options for creating a comparison group.

Statistical approaches. Using statistical methods, such as matching or regression analysis, can help account for the observable differences in students (e.g., Pell-eligible, test scores) and instructors (e.g., adjunct or full time, teaching experience). These approaches can help eliminate some of the concerns about differences between the students and/or instructors in the pilot group and the comparison group driving the results. However, there may still be unobservable differences that cannot be accounted for if the college does not have data on them (e.g., student motivation, instructor quality). The use of matching or regression methods may require colleges to bring on external partners with expertise in data analysis.

Other options for comparison groups. Although rapid-cycle evaluation typically calls for more-rigorous methods, such as using a lottery or statistical methods, there are other types of comparison groups that colleges often rely on when piloting new programs and assessing data (Table 5). However, there are important limitations that colleges need to be aware of with each of these comparison group options. Because of these limitations, colleges should be careful not to assume that the findings of the rapid-cycle evaluation provide definitive evidence of effectiveness unless randomization or statistical approaches are used.

Table 5. Options for Comparison Groups and Limitations when Rigorous Methods Are Not Possible

Comparison Group Option	Limitations
Students, instructors within the same campus or college who did not volunteer to deliver the program or pilot	<ul style="list-style-type: none"> Those who were selected or volunteered might be different from those piloting in important ways, and those differences may drive differences in outcomes.
Students, instructors from other campuses not delivering the program or piloting the improvement	<ul style="list-style-type: none"> Differences in other programs and initiatives across campuses and/or differences in the student and instructor population could be driving results.
Students, instructors from other colleges not delivering the program or piloting the improvement	<ul style="list-style-type: none"> May be challenging to access data from other colleges Differences in other programs and initiatives across colleges and/or differences in the student and instructor population could be driving results.
Prior cohorts of students before the program was delivered or improvement was piloted	<ul style="list-style-type: none"> Changes to other programs and initiatives over time and/or differences in the student population could be driving results.
Pretest and posttest for students, instructors receiving the practice or program component	<ul style="list-style-type: none"> Change in scores may have happened even without the new practice or program component Assessments may not be great predictors of long-term student success.

Conclusion: Ensuring Success in Improvement Efforts

Throughout this toolkit, we have repeatedly discussed some of the conditions that help make improvement efforts work well and ensure that various activities lead to real improvements on the ground. To conclude, we emphasize three of the most important conditions that help drive action toward improvement.

A committed team with time to engage.²⁰ Improvement efforts (especially in the case of quality improvement) rely on the ongoing and frequent involvement of practitioners. We noted that it is critical for an improvement team to be able to meet frequently to discuss progress and reflect on the results of the process. Data collection and the design of potential improvements also take substantial time. Although we recommended that this core team be kept relatively small to ensure it is agile and sufficiently resourced, the team should find ways to incorporate the voices of a broader set of individuals in the college throughout the process. Broad groups of stakeholders should be included in the process of exploring the problem, identifying drivers and possible improvements, reflecting on findings, and determining how to move forward. A more democratic approach to decisionmaking can help guide the focus of improvement to the most-important issues, provide critical insights on how to address those issues, and ensure the buy-in needed to drive collective action.

Support and involvement of leadership.²¹ Leadership involvement and support is important because it communicates to all of those involved that improvement is a priority. In addition, leadership can help ensure that the improvement team is equipped with the resources needed to carry out the improvement process, as well as the resources and authority to scale improvements in response to findings from the process. Leadership can also play an important role in setting the open and honest tone for improvement efforts and negotiating the different priorities and perspectives of those involved in the improvement process.

An openness to inquiry and reflection.²² College improvement efforts are built on the belief that educational programs and initiatives need to be improved and that doing so requires taking a critical, evidence-based look at these programs and initiatives. Involved individuals must therefore be willing to challenge their beliefs about what works and what does not, willing to collect additional data on what is happening on the ground, and open to reflecting on data that might not always be positive. Leadership and the improvement team can help create an environment that supports this openness to inquiry in various ways, such as by ensuring that the evidence collected for improve-

ment is not used for staff evaluations or other high-stakes purposes, requiring that individuals be equally valued and respected throughout the process, and letting staff play a key role in setting the agenda for improvement cycles. The short nature of improvement cycles and the testing of new improvements with small groups of students or instructors can limit the risk of trying new things, providing a space that offers the “freedom to fail.”

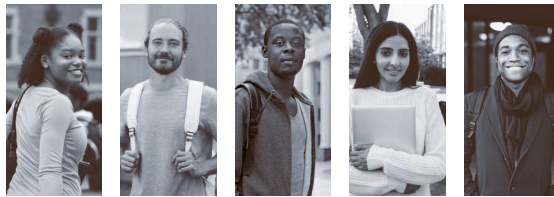
Acknowledgments

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Endnotes

- 1 Texas Senate Bill 162 was passed in 2011 and called for colleges to begin developing accelerated models of developmental education. Texas House Bill 2223 was passed in 2017 and required colleges to develop corequisite models, scaling corequisite remediation to 25, 50, and 75 percent of developmental education enrollments for eligible students (i.e., excluding some special groups, such as English-as-a-second-language students and low basic skill students).
- 2 Lindsay Daugherty, Celia J. Gomez, Diana Gehlhaus Carew, Alexandra Mendoza-Graf, and Trey Miller, *Designing and Implementing Corequisite Models of Developmental Education: Findings From Texas Community Colleges*, Santa Monica, Calif.: RAND Corporation, RR-2337-IES, 2018.
- 3 Ronald D. Moen and Clifford L. Norman, "Circling Back," *Quality Progress*, Vol. 43, No. 11, p. 22–28.
- 4 W. Edwards Deming, *The New Economics for Industry, Government, Education*, Cambridge, Mass.: MIT Press, 1993; Masaaki Imai, *Kaizen (Ky'zen), The Key to Japan's Competitive Success*, New York: Random House, 1986; Donald M. Berwick, "Continuous Improvement as an Ideal in Health Care," *New England Journal of Medicine*, Vol. 320, No. 1, 1989, pp. 53–56; Walter A. Shewhart, *Economic Control of Quality of Manufactured Product*, New York: Van Nostrand, 1931; 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*, Cambridge, Mass.: Harvard Education Press, 2015; Sandra Park, Stephanie Hironaka, Penny Carver, and Lee Nordstrum, *Continuous Improvement in Education*, Stanford, Calif.: Carnegie Foundation for the Advancement of Teaching, 2013.
- 5 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., San Francisco, Calif.: Jossey-Bass, 2009.
- 6 Sebastian Schneeweiss, William H. Shrank, Michael Ruhl, and Malcolm Maclure, "Decision-Making Aligned with Rapid-Cycle Evaluation in Health Care," *International Journal of Technology Assessment in Health Care*, Vol. 31, No. 4, 2015, pp. 214–222.
- 7 Community College Research Center, *What We Know About Developmental Education Outcomes*, New York, January 2014.
- 8 Daugherty et al., 2018.
- 9 Elizabeth Zachry Rutschow and Alexander K. Mayer, "Early Findings from a National Survey of Developmental Education Practices," New York: Center for the Analysis of Postsecondary Readiness, February 2018.
- 10 Tennessee scaled corequisite remediation under the A-100 Guideline, adopted in fall 2015; Texas scaled corequisite remediation under House Bill 2223, passed in June 2017; California scaled corequisite remediation under Assembly Bill 705, passed in October 2017.
- 11 Daugherty et al., 2018.
- 12 Sung-Woo Cho, Elizabeth Kopko, Davis Jenkins, and Shanna Smith Jaggars, *New Evidence of Success for Community College Remedial English Students: Tracking the Outcomes of Students in the Accelerated Learning Program (ALP)*, Working Paper No. 53, New York: Community College Research Center, December 2012; A. W. Logue, Mari Watanabe-Rose, and Daniel Douglas, "Should Students Assessed as Needing Remedial Mathematics Take College-Level Quantitative Courses Instead? A Randomized Controlled Trial," *Educational Evaluation and Policy Analysis*, Vol. 38, No. 3, 2016, pp. 578–598.
- 13 Anthony S. Bryk, "Advancing Quality in Continuous Improvement," speech delivered at the Carnegie Foundation Summit on Improvement in Education, San Francisco, Calif., April 3, 2018. As of April 22, 2019: <https://www.carnegiefoundation.org/resources/publications/advancing-quality-in-continuous-improvement/>
- 14 Bryk et al., 2015; William R. Penuel, Donald J. Peurach, Whitney A. LeBoeuf, Robbin Riedy, Michael Barber, Tiffany Clark, and Kathryn Gabriele, *Defining Collaborative Problem Solving Research: Common Values and Distinctive Approaches*, Boulder, Colo.: University of Colorado Boulder School of Education, Research and Practice Collaboratory, White Paper, 2017.
- 15 Bryk et al., 2015; Park et al., 2013.
- 16 Shirley M. Hord, *Professional Learning Communities: Communities of Continuous Inquiry and Improvement*, Austin, Tex.: Southwest Educational Development Laboratory, 1997; Sharon D. Kruse, "Creating Communities of Reform: Continuous Improvement Planning Teams," *Journal of Educational Administration*, Vol. 39, No. 4, 2001, pp. 359–383; Penuel et al., 2017.
- 17 Langley et al., 2009.
- 18 Langley et al., 2009.
- 19 Hord, 1997; Kruse, 2001; Karen Seashore Louis and Sharon D. Kruse, *Professionalism and Community: Perspectives on Reforming Urban Schools*, Thousand Oaks, Calif.: Corwin Press, 1995.
- 20 Hord, 1997; Anthony S. Bryk, Louis M. Gomez, and Alicia Grunow, "Getting Ideas into Action: Building Networked Improvement Communities in Education," in Maureen T. Hallinan, ed., *Frontiers in Sociology of Education*, New York: Springer, 2011, pp. 127–162; Shirley M. Hord, "Professional Learning Communities: Educators Work Together Toward a Shared Purpose," *Journal of Staff Development*, Vol. 30, No. 1, 2009, pp. 40–43; A. M. Wilkinson and M. Smith, "Team Recruitment, Team Building, and Skill Development," in Howard G. Garner, ed., *Teamwork Models and Experience in Education*, Boston, Mass.: Allyn and Bacon, 1995, pp. 103–124.
- 21 Hord, 1997; Hord, 2009; Robert V. Hogg and Mary C. Hogg, "Continuous Quality Improvement in Higher Education," *International Statistical Review*, Vol. 63, No. 1, 1995, pp. 35–48.
- 22 Hord, 1997; Louis and Kruse, 1995.

Worksheet Supplements



Tools for Improving Corequisite Models

A GUIDE FOR COLLEGE PRACTITIONERS

Quality Improvement and Rapid-Cycle Evaluation: Prioritizing Problems of Practice

In the toolkit, we described how improvement efforts typically focus on a single problem of practice. This worksheet aims to help colleges prioritize among a group of problems that a college might be considering for improvement efforts.

Step 1. List the major challenges or issues that the college wants to resolve. Based on the input of a broad range of stakeholders within the college and using existing evidence, identify issues or areas of uncertainty that the college is facing with corequisite remediation and list these problems in the first column.

Step 2. Rate problems according to the four criteria provided. Choose a rating from 1 (low) to 5 (high) and provide a brief description of the rating. These ratings can be determined as a group through discussion or done individually and aggregated across team members.

Step 3. Choose a problem of practice for improvement efforts to focus on. Based on individual or aggregated group ratings, determine which of the problems of practice should be prioritized for improvement efforts.

Problem of Practice (PoP) and Supporting Evidence	Actionable PoP is entirely driven by things under the college’s control (5) to entirely outside of the college’s control (1)	Aligned with Mission Addressing PoP will cause big changes in student success (5) to no changes in student success (1)	Consensus on Importance All stakeholders agree it is important to address the PoP (5) to few agree it is important (1)	Evidence Limitations Substantial existing evidence on how to address the PoP (5) to no evidence available (1)
<p>Problem: Issues with student success in corequisite models taught by instructor pairs</p> <p>Evidence: Lower student outcomes in two-instructor sections; faculty perceptions of alignment issues</p>	<p>Rating (1-5): 3</p> <p>Reasoning: Much that can be done to improve issues, but some drivers of issues out of the college’s control</p>	<p>Rating (1-5): 5</p> <p>Reasoning: Planning to scale two-instructor model soon, so needs to be resolved soon and will affect many students</p>	<p>Rating (1-5): 4</p> <p>Reasoning: Faculty and administrators view as very important; support staff and instructors in one-instructor models less so</p>	<p>Rating (1-5): 4</p> <p>Reasoning: Many colleges struggling with this, but only anecdotal evidence on how to address it</p>

Quality Improvement: Using a Fishbone Diagram to Understand the Problem and Identify Objectives for Improvement

In the toolkit, we described the need to deeply understand the problem of practice for the purposes of quality improvement efforts through root cause analysis. Root cause analysis can help the college identify where improvement is needed and develop more-successful objectives for improvement that can be tested through a Plan-Do-Study-Act (PDSA) cycle. This worksheet aims to help colleges identify root causes through a cause-and-effect diagram, or a fishbone diagram

Step 1. Write the problem of practice related to corequisite remediation at the mouth of the fish.

Step 2. Figure out what categories of things might contribute to a particular problem. One possible set of categories could include students, college staff, rules, policies and procedures, and facilities and supplies.

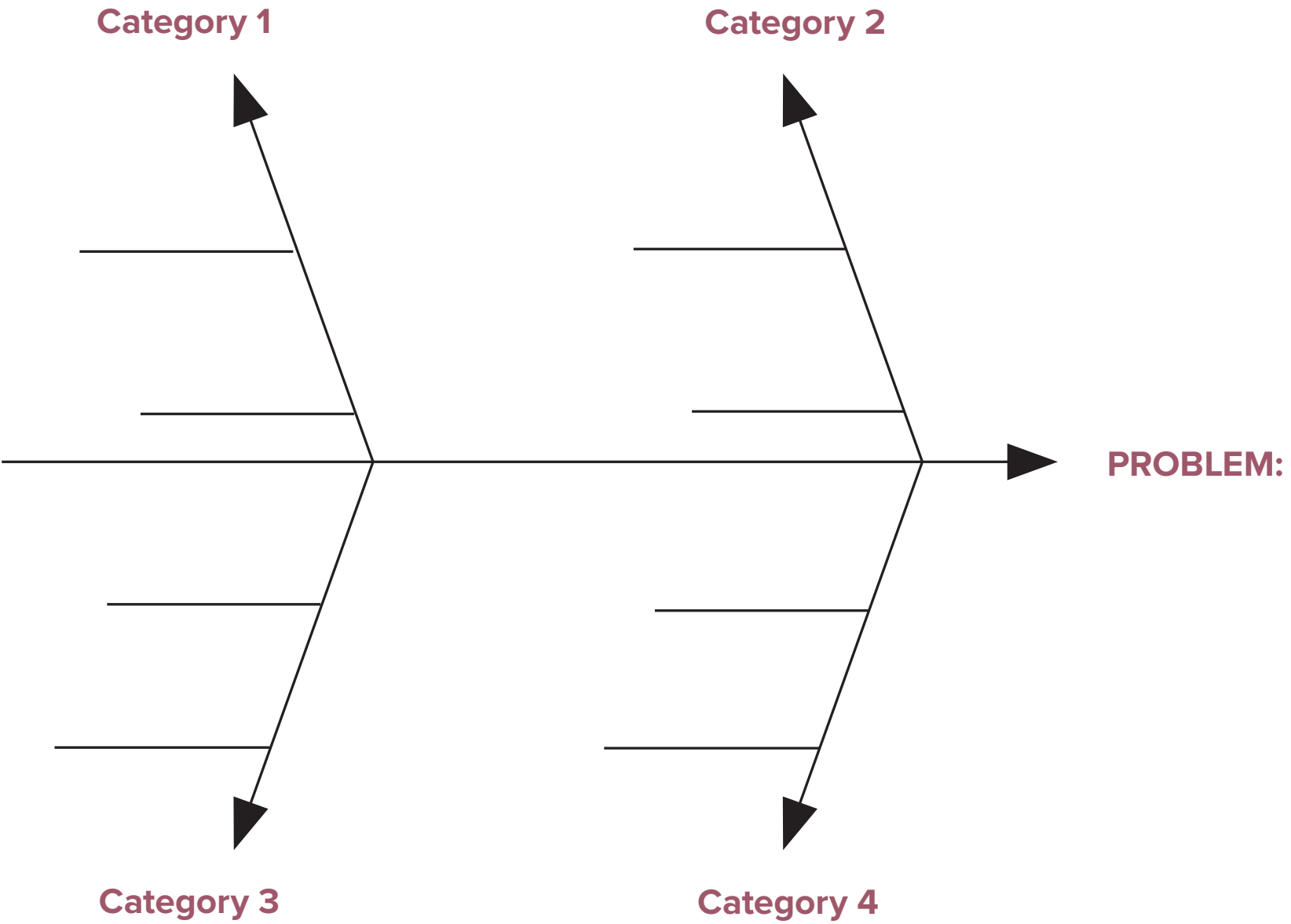
Step 3. Ask “Why does this happen?” to identify different causes of the problem, and record these causes on the “bones” of the fish.

Step 4. Identify subcauses underlying the initial set of causes recorded in the diagram, and keep breaking the issue down until participants cannot think of any additional causes.

Step 5. Select (or rank) the branches where stakeholders see the most potential for improvement (i.e., changes can be made in how things are done, and these changes are likely to help address the particular issue), and list out specific improvements that can be tested through improvement cycles.

Consider using sticky notes and other engagement strategies to solicit broad input and systematic ratings if the group conducting root cause analysis is larger. **Note, an example of a completed fishbone diagram is provided in Figure 1 of the toolkit.**

Quality Improvement: Using a Fishbone Diagram to Understand the Problem and Identify Objectives for Improvement



Quality Improvement: Defining Questions, Measures, and Predictions for a Cycle

In the toolkit, we described how colleges engaging in quality improvement will need to identify specific questions and make predictions about what will happen when a specific improvement is tested through the PDSA cycle. In addition, it is important to identify what measures will be used to test those predictions and which data are required to track that measure. Quality improvement typically calls for colleges to focus on a set of measures that will be used across multiple PDSA cycles to ensure that comparisons can be made across different types of improvements being tested. This worksheet will help colleges identify questions, determine the data sources and measures that will be used to address questions, and make specific predictions about what will be found.

Step 1. Develop concrete questions that will be addressed through the evaluation. What are the key things that the college needs to know to determine whether the change being tested was an improvement? These items should be turned into specific, measurable questions.

Step 2. Identify data sources and measures. The college should consider which types of measures it needs to answer the proposed questions. Some of these measures should be drawn from a common set of measures that can be used across PDSA cycles, while others might be specific to a particular improvement being tested. It is also important to think about data and measures that can be collected and assessed by practitioners within a relatively short period.

Step 3. Make a prediction. Next, make a specific prediction about what the improvement team expects the measure to show during that PDSA cycle. If the data is being collected only from those testing the improvement, this prediction should be a benchmark, a specific value that the measure is expected to reach, or the amount of progress made on the measure. If the college has access to similar individuals not testing the improvement and will also have data on the measure for this group, the prediction can focus on a comparison of the two groups.

Question	Data Source	Measure	Prediction
How many hours will instructor pairs subject to the new alignment strategy meet for in order to align syllabi?	Weekly instructor survey	Hours of time collaborating by phone, email	Instructors will meet for at least four hours.
Will students be more likely to perceive that the developmental education part of the corequisite model is valuable?	End-of-course satisfaction survey	Likert question: "The developmental education support was important to supporting my success in the college course."	Students in courses with the instructor pairs testing the alignment strategy will be at least 10 percentage points more likely to agree or strongly agree compared with other students.
Will student success rates in the college course increase?	Administrative data	Percentage of students passing	Course passing rates will increase by 5 percentage points relative to prior semesters.

Quality Improvement: Defining Questions, Measures, and Predictions for a Cycle

Question	Data Source	Measure	Prediction

Rapid-Cycle Evaluation: Using a Logic Model to Guide the Evaluation Questions and Measures

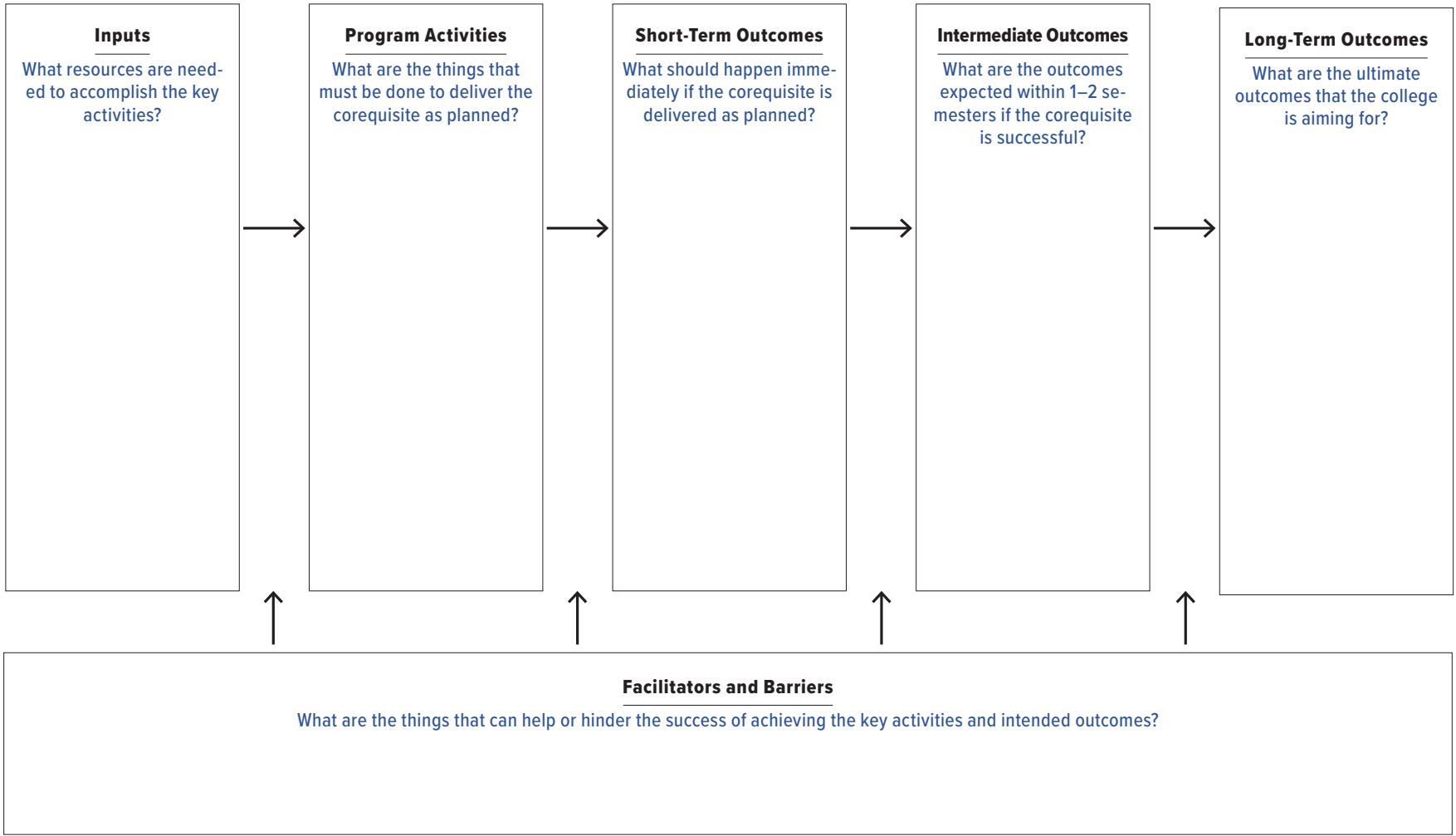
In the toolkit, we recommended that colleges identify specific questions to guide evidence-building activities and suggested that a logic model might be a useful tool for developing these questions. This worksheet will help colleges develop a logic model and identify evidence-building questions for a continuous improvement cycle.

Step 1. Fill in the sections of the logic model. Start with the key activities, including what must be done to deliver the corequisite model component, practice, or process that is evaluated. Next, list the inputs—i.e., what resources are required to achieve these activities. Then fill in long-term outcomes—i.e., the ultimate student success outcomes the college aims for. Map backward to shorter-term outcomes to describe what the college hopes will happen between the time the corequisite activities take place and the long-term outcomes are observed.

Step 2. Identify which aspects of the logic model are highest priority to measure effectiveness and inform improvements. Because the goal of rapid-cycle evaluation is to assess effectiveness, a college will definitely want to measure outcomes. Short-term outcomes may be the only ones observable within the short time frame for the cycle. If the college decides it is important to measure how things worked and to understand more about the role of the college's context, it may want to also examine whether and how the key activities were carried out and facilitators and barriers to success.

Step 3. Develop concrete questions that will be addressed through the evaluation. Once you have identified the things you want to measure to assess effectiveness (and other aspects of program delivery), these items need to be turned into questions. For example, were students who received a corequisite remediation practice more likely to pass the college course? How often did instructors use the practice being evaluated? What are the barriers instructors faced to using the practice?

Note, an example of a completed logic model diagram is provided in Figure 5 of the toolkit.



Research questions:

- 1.
- 2.
- 3.
- 4.
- 5.

Rapid-Cycle Evaluation: Developing a Data Collection and Analysis Plan

In the toolkit, we recommended that colleges choose the best sources of data to address particular evaluation questions and to lay out a plan for how data collection will take place. This worksheet will help colleges develop that plan.

Step 1: Determine which data should be collected. Identify the best sources of data for each evaluation question, whether this is quantitative data from administrative records or surveys; qualitative data from focus groups, interviews, observations, or surveys; or program data from program documentation and data records. Determine how many individuals data will be collected from (i.e., all individuals participating or a sample), and whether existing measures will be used or new ones will be developed. **Note: Table 4 in the toolkit provides some info on pros and cons of different data sources and some tips for ensuring high-quality data.**

Step 2: Determine how to construct the comparison group. Because rapid-cycle evaluation aims to produce evidence of effectiveness, it is important to have a comparison group to be able to measure this effect when looking at outcomes. For other types of measures on how the program was rolled out and whether there were barriers and facilitators, it may be less important to have comparison group data. For each measure, describe whether there will be a comparison group and how the comparison group will be constructed. **Note: As you consider different comparison groups, Table 5 in the toolkit provides some important limitations to keep in mind.**

Strategies for ensuring rapid evaluation cycles:

1. Will you primarily be relying on existing data sources?
2. Will you be measuring things that can be observed within a short period?

Strategies for ensuring high-quality data:

1. Will you pilot new questions or instruments to ensure that they will produce the data you intend for them to produce?
2. Will you collect data anonymously and inform participants about who will have access to responses to increase the likelihood they will provide honest and accurate responses?
3. Will you provide participants with information on how the data will be used to communicate the value of investing time in data collection and providing honest and accurate responses?

Rapid-Cycle Evaluation: Developing a Data Collection and Analysis Plan

Evidence-building question	Data source(s)	Who and how many in the data collection sample	Measures and instruments used	Comparison group
<i>Did alignment strategy (requirement to meet four hours and align syllabi) lead to greater alignment of instruction?</i>	<i>Student survey</i>	<i>All students enrolled in two-instructor sections of the corequisite</i>	<i>Add question(s) to existing student satisfaction survey</i>	<i>Sections that have instructor pairs who were not selected by lottery to pilot the alignment strategy</i>

Quality Improvement and Rapid-Cycle Evaluation: Assigning Roles and Responsibilities

In the toolkit, we recommended that colleges assign clear roles and responsibilities for each activity in the Plan, Do, Study, and Act stages of the continuous improvement cycle. This worksheet will help colleges identify task leads and identify roles and responsibilities for all individuals involved in a continuous improvement activity

Step 1. Identify the detailed set of activities for each stage of the cycle. Start by listing the detailed activities for each stage of the cycle that will help achieve the objectives identified for the cycle and support the evidence-building efforts required. *Note: Figure 1 in the toolkit lays out some general categories of activities for each stage that can help you think through the types of activities that should be listed.*

Step 2. Assign a core improvement team member to lead each activity. This activity lead will be the person to provide guidance to other participants in the activity, make sure the activity stays on track and on time, and report back on progress to the improvement team. If you do not have enough people or the right people on the core team to oversee activities, consider adding others to the team.

Step 3. Identify others who will be involved in the activity and define their roles and responsibilities in participation. Other participants may include individuals helping the activity lead plan for and oversee the activity, participants in data collection, individuals who will be consulted on findings and/or plans for action, and individuals who must be involved in scaling improvements.

Activity	Activity Lead	Administrators	Faculty	Data and Analysis Experts	Others (e.g., advisors, support staff, students)
Stage: PLAN Activity: Refine alignment strategy through discussions with faculty reps	Who: Faculty chair What: Create plan to get feedback, identify faculty to give feedback, refine strategy, report back	Who: N/A What:	Who: Six faculty representatives What: Give feedback, approve refinements to strategy	Who: Information retrieval representative What: Consult on plan to get feedback	Who: N/A What:

Activity	Activity Lead	Administrators	Faculty	Data and Analysis Experts	Others (e.g., advisors, support staff, students)
Stage: Activity:	Who: What:	Who: What:	Who: What:	Who: What:	Who: What:
Stage: Activity:	Who: What:	Who: What:	Who: What:	Who: What:	Who: What:
Stage: Activity:	Who: What:	Who: What:	Who: What:	Who: What:	Who: What:
Stage: Activity:	Who: What:	Who: What:	Who: What:	Who: What:	Who: What:
Stage: Activity:	Who: What:	Who: What:	Who: What:	Who: What:	Who: What:

Quality Improvement and Rapid-Cycle Evaluation: Determining Time Lines for the Improvement Cycle

In the toolkit, we recommended that colleges map out clear time lines for activities to ensure that things stay on track through rapid cycles of improvement.

Step 1. Identify the detailed set of activities for each stage of the cycle. Start by listing the detailed activities for each stage of the cycle that will help to achieve the objectives identified for the cycle and support the evidence-building efforts required. *Note: Figure 1 in the toolkit lays out some general categories of activities for each stage that can help you think through the types of activities that should be listed.*

Step 2. Assign a start and end date for each activity. In the toolkit, we recommended three potential approaches for mapping out time lines: (1) starting with when a college would like to see action and mapping backward, (2) starting with when a college can begin planning and mapping forward, or (3) starting with when a program will be delivered and data collected and mapping forward and backward.

Step 3. Develop one or more key deadlines at which the lead will report on progress. Assigning deadlines, or key check-in points at which the activity lead will assess progress and report back to the group, will help ensure that activities stay on track and will provide an opportunity for adjusting time lines if necessary.

Activity	Start Date	End Date	Deadline 1	Deadline 2	Deadline 3
Stage: PLAN Activity: Refine alignment strategy through discussions with faculty representatives	June 1, 2019	July 15, 2019	Date: June 10, 2019 What: Finalize plan to get feedback	Date: June 30, 2019 What: Finish collecting feedback from faculty representatives	Date: July 15, 2019 What: Finalize plan for refined alignment strategy

Activity	Start Date	End Date	Deadline 1	Deadline 2	Deadline 3
Stage: Activity:			Date: What:	Date: What:	Date: What:
Stage: Activity:			Date: What:	Date: What:	Date: What:
Stage: Activity:			Date: What:	Date: What:	Date: What:
Stage: Activity:			Date: What:	Date: What:	Date: What:
Stage: Activity:			Date: What:	Date: What:	Date: What:

In education, practitioners are increasingly looking for strategies to bring data and evidence into decisionmaking and to roll out programs in intentional ways that allow for ongoing improvement. This toolkit acts as a guide to improvement strategies for teams of practitioners at colleges, providing them with the knowledge and tools they need to carry out rapid cycles of data-driven improvement. It provides an overview of key strategies for making quick improvements to education programs and some tools and tips for carrying out these efforts on the ground. An included supplement provides seven worksheets that colleges can use to plan for a rapid cycle of improvement.

The authors focus on corequisite remediation, a common approach being adopted by colleges. Corequisite remediation shifts the way that developmental education is provided so that students directly enter a college-level course and receive additional academic support during that same semester to address the challenges they face with basic math, reading, or writing concepts.

This toolkit was developed for improvement teams made up of administrators, department and faculty chairs, and other college staff who are helping to oversee important initiatives and programs, such as corequisite remediation, and who are looking to build an ongoing process for addressing challenges they face and improving the way that corequisite models are provided through data use and reflection.

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