

Principles for the Design and Delivery of Corequisite Mathematics Supports

Introduction

Increasingly, our nation is recognizing and confronting the systemic inequities in our public institutions that have denied social and economic opportunities to generations of individuals from minoritized communities. This critical time calls upon postsecondary institutions, systems, and agencies to reexamine their own policies and practices to ensure more equitable outcomes for Black, LatinX, Native American, and Asian American students, and for those who are first-generation college students or who come from low-income backgrounds. Ending policies that require prerequisite remedial education and creating conditions to scale corequisite academic support* address one significant barrier that disproportionately delays or denies students from minoritized communities access to a postsecondary degree.

A substantial research base shows that enrolling students directly into gateway mathematics and English courses accompanied by aligned corequisite academic support results in dramatic improvements in gateway course success for all students. In some cases, this approach results in more equitable outcomes for students from minoritized communities. In mathematics, successful corequisite models are combined with math pathways that offer gateway math courses that are most appropriate for a student's chosen program of study.

The successful implementation of corequisites for gateway math courses at both the institution and system levels have made the case for their inclusion in every institution's and system's comprehensive student success strategy. The impact of math pathways with corequisites is likely greatest when they are integrated with other reforms, such as multiple measures assessment, guided pathways, equitable teaching practices, intrusive advising, and other student supports. The [Core Principles for Transforming Remediation Within a Comprehensive Student Success Strategy](#) (2020) lays out this multifaceted approach to reform.¹



The Charles A. Dana Center created this resource as a part of a complete toolkit (to be published March 2021) to support the implementation of mathematics corequisite supports. The following organizations contributed to the development.

- Bruce Vandal Consulting
- Carnegie Math Pathways
- Community College Research Center

The Dana Center and contributors would like to thank Strong Start to Finish (SSTF) for providing funding for the development of this resource as a part of SSTF's commitment to scale corequisite reforms that support students in completing their credit mathematics and English courses within their first year of college.

*Corequisite, as in corequisite supports or models, typically refers to the practice of placing students who have been designated as underprepared directly into college-level courses and providing necessary additional supports to help them effectively engage with the college-level coursework.

A crucial step in ensuring that the scaling of corequisite support maximizes student learning and achieves equitable outcomes is to capture and communicate effective practices for designing, delivering, and continuously improving corequisite math to faculty, instructional designers, faculty developers, college administrators, system leaders, and policymakers. With that next step in mind, [Strong Start to Finish](#)² asked the Charles A. Dana Center at the University of Texas at Austin to develop a corequisite mathematics toolkit that provides further support to states, systems, and institutions implementing the Core Principles.

The Dana Center convened a National Advisory Panel of leaders to contribute to the development of the toolkit:

- Tristan Denley, University System of Georgia
- Nicole Edgecomb, Community College Research Center
- Karon Klipple, Carnegie Math Pathways
- Connie Richardson, Dana Center
- Anders Stachelek, Hostos Community College
- Bruce Vandal, Bruce Vandal Consulting

The advisory panel created eight principles for the design and delivery of corequisite support. These principles serve as a guide for faculty, institutions, and policymakers who seek to implement and scale corequisite support in gateway mathematics courses. The alignment between the principles for corequisite math supports and the Core Principles (see Appendix) are noted in each section below. The full toolkit to accompany these principles will be published in March 2021.

Principles for Design and Delivery of Corequisite Supports

PRINCIPLE 1 | COREQUISITE MATHEMATICS OBJECTIVE

The objective of a corequisite math program is to ensure that each student:

- 1.1** Enrolls in the college-level math course aligned to their chosen programs of study.
- 1.2** Is assessed using evidence-based measures to determine their needs for additional academic support.
- 1.3** Receives those supports through just-in-time corequisite support.
- 1.4** Completes the gateway math course with the relevant skills and knowledge essential to success in their programs of study.

The implementation of math pathways with corequisite support is a component of comprehensive institutional policies and practices designed to result in students equitably participating and succeeding in all programs of study. There is special attention to programs that provide opportunities for upward economic mobility and income equality.

PRINCIPLE 2 | COREQUISITE MATHEMATICS COURSE DESIGN PROCESS

Aligns to Core Principle #4.

Institutions that successfully implement a corequisite math course:

- 2.1** Identify and dismantle policy and practice barriers that deny students access to college-level math courses and result in inequitable student outcomes. Dismantling such policies and practices will ensure that each student has equal access to, and successfully engages in, high-quality college-level math courses in their first term.

- 2.2** Establish processes for implementing, assessing, improving, and scaling corequisite courses that involve key institutional stakeholders, including administrators, faculty, instructional designers, advisors, student support services, financial aid professionals, and registrars.
- 2.3** Understand the postsecondary experiences of students, use this understanding in design decisions, and pay particular attention to the impact of design decisions on minoritized communities.
- 2.4** Implement corequisite models that will most effectively achieve equitable access and success for each student, and that will be sustainable within their institutional context.

PRINCIPLE 3 | COREQUISITE MATHEMATICS COURSE DESIGN ELEMENTS

Aligns to Core Principle #4.

Essential elements of effective corequisite math courses include:

- 3.1** Enrollment of students in the college-level math course aligned to their chosen program paths.
- 3.2** Sections of the college-level course with corequisite supports that are identical in content and outcomes to those available to students in non-corequisite sections.
- 3.3** Content in the corequisite support course that is explicitly aligned and organized to support student learning and success in the college-level course and prepares the student to transfer the learning into future courses in their programs of study.
- 3.4** Support content that is provided in a single term side-by-side or embedded within the college-level course, not as a precursor to the college-level content.
- 3.5** Strategies to boost academic confidence, sense of social belonging, and understanding of the relevance of the math concepts, and to achieve academic, career, and personal goals.
- 3.6** Policy stating that successfully completing the college-level course, regardless of the grade in the corequisite support course, is the only requirement for students to earn college-level credit and move on to subsequent courses in the math pathway and/or program of study aligned to the gateway course.
- 3.7** Consistent instructional practice across the college-level math course and corequisite support course that supports each learner's need, in order to achieve equitable outcomes for students, regardless of race, income, age, gender, or other minoritized status.

Design elements of other corequisite math courses depend upon the needs of the student population and institutional context. Institutional teams examine available research on effective practices along with local data to make decisions on:

- 3.8** Assigning a single instructor or different instructors for the college-level course and corequisite course.
- 3.9** Determining the number of credit hours for the corequisite sections.
- 3.10** Co-enrolling corequisite students in college-level sections with students who do not require corequisite support, or offering college-level sections for corequisite students only.
- 3.11** Scheduling corequisite sections relative to the college-level course (e.g., same day as college-level, just before college-level, immediately following college-level).

PRINCIPLE 4 | COURSE ENROLLMENT PRACTICES

Aligns to Core Principles #1 and #2.

Institutions that successfully deliver the instruction students need to achieve their academic goals:

- 4.1** Identify and enroll all students in the gateway math course consistent with their academic goals and chosen programs of study, regardless of any assessment of their preparation levels for that course.
- 4.2** Assess students to ensure instruction and academic support will maximize their success in the college-level math course, not determine access to the college-level course.
- 4.3** Assess the need for support through the use of multiple evidence-based measures to include, but not be limited to, high school GPA and high school performance in mathematics.
- 4.4** Make corequisite support mandatory for students when the evidence-based measures referenced above show corequisite support will increase the likelihood that they will pass the college-level course.

PRINCIPLE 5 | INTEGRATION WITH A COMPREHENSIVE STUDENT SUCCESS FRAMEWORK

Aligns to Core Principles #3 and #5.

Institutions that implement comprehensive student success frameworks:

- 5.1** Align math pathways to other institutional pathways initiatives.
- 5.2** Include corequisite math support as an essential strategy for increasing the likelihood that students achieve critical first-year momentum metrics to include completion of gateway math and English, earning 30 credits and enrolling into and earning at least nine credits in a program of study in their first academic year.
- 5.3** Design math courses and corequisite supports to meet the specific needs of their student populations, including understanding and addressing how policies and practices impact subpopulations differently.

PRINCIPLE 6 | CONTINUOUS IMPROVEMENT

Aligns to Core Principles #6 and #7.

Institutions that deliver an equitable, high-quality learning experience that maximizes the success of each student:

- 6.1** Collect, analyze, and act upon disaggregated quantitative and qualitative data that measure the impact of course design, course content, instructional strategies, placement policies, and other relevant institutional or state policies on the success of students by race, ethnicity, income level, gender, age, or other minoritized status.
- 6.2** Collect qualitative data that capture the experiences of students and faculty, and examine the messaging students receive about math pathways, corequisite courses, and other types of supports.
- 6.3** Establish clear measures of success that include the numbers and percentages of students completing a college-level math course, and establish mid- and long-term measures, such as retention, success in subsequent courses, and completion of a certificate or degree.
- 6.4** Use data to inform a continuous improvement process to refine both the college-level course and corequisite supports and related practices, including placement and advising.

- 6.5** Use data to identify, understand, and address the needs of students who are less well-served by the corequisite supports.
- 6.6** Explicitly identify, understand, and address factors that either contribute to or detract from the success of students from minoritized communities in college-level mathematics courses.

PRINCIPLE 7 | POLICY

Aligns to Core Principles #1 and #2.

States, systems, and institutions that successfully scale corequisite support:

- 7.1** Adopt policies that create the enabling conditions for each student to enter directly into and succeed in a gateway mathematics course aligned to their goals.
- 7.2** Involve institutional leaders and faculty in the development and design of, and advocacy for, policies to support the implementation of math corequisites.
- 7.3** Design policies and provide resources to ensure that corequisite math courses are accessible to all students who are assessed as needing additional academic support, and address structural and systemic inequities present in entry-level mathematics programs.

PRINCIPLE 8 | PROFESSIONAL DEVELOPMENT AND SUPPORT OF STAKEHOLDERS

Aligns to Core Principle #3.

Institutions that successfully implement and scale corequisite math, design professional development and other supports that:

- 8.1** Build the capacity of faculty to design, deliver, and continuously improve corequisite math at their institutions with supports that meet their needs at different stages of the implementation process.
- 8.2** Facilitate collaboration among diverse stakeholders, including institutional researchers, administrators, and student support professionals.
- 8.3** Result in the deployment of inclusive pedagogies and practices that maximize the success of students from minoritized communities.
- 8.4** Enable faculty, advisors, and student services staff to maintain and build the academic mindset of students.
- 8.5** Inform faculty, advisors, and student services staff on how students can access additional social supports.
- 8.6** Sustain support and engagement of all institutional stakeholders responsible for the successful implementation of corequisite math. In particular, advisors receive support on equitable practices when advising for math pathways.

Appendix

SEVEN CORE PRINCIPLES

PRINCIPLE 1 Every student’s postsecondary education begins with a well-designed process that empowers them to choose an academic direction and build a plan that starts with passing credit-bearing gateway courses in the first year.

PRINCIPLE 2 Placement of every student is based on multiple measures, using evidence-based criteria, instead of through a single standardized test.

PRINCIPLE 3 Campus communities transform policies and practices to ensure that every student is provided with high-value learning experiences and with the supports needed to remove barriers to success—especially students from historically underrepresented, disenfranchised, and minoritized communities.

PRINCIPLE 4 Program-appropriate college-level math and English courses are offered to every student through evidence-based, integrated support models designed to accelerate gateway course success.

PRINCIPLE 5 Every student is provided access to multiple pathways, such as statistics and data science, that integrate rigorous math appropriate to different disciplines and to the well-paying careers of today and tomorrow.

PRINCIPLE 6 Every student is supported in staying on track to a postsecondary credential through the institution’s effective use of early momentum metrics and mechanisms to generate, share, and act on finely disaggregated student progression data.

PRINCIPLE 7 Efforts to improve the student experience, meet the evolving needs of students, and remove barriers to student success are visibly prioritized by the institution through the use of mechanisms that elevate the voices and lived experiences of students—and the entire campus community.

Source: Kadlec & Dadgar, 2020.

Endnotes

¹ Kadlec, A., & Dadgar, M. (2020, March). *Core principles for transforming remediation within a comprehensive student success strategy: A statement from the field*. Denver, CO: Strong Start to Finish, Education Commission of the States. https://strongstart.org/sites/default/files/documents/Website_SSTF_CorePrinciples_Booklet_V2_FINAL_Web.pdf

² <https://strongstart.org/>