

## **Systemically Aligned: Guided Pathways and Mathematics Pathways Working Together for Student Success**

### **Introduction**

The lack of clearly defined postsecondary pathways that are aligned with academic needs and career goals has disenfranchised far too many students, particularly those from low-income backgrounds and for students of color. This misalignment is especially true of mathematics, where students are placed into long developmental, or even credit-bearing, math course sequences with no relation to their academic, career, or life needs. This lack of relevance has proven to be a significant obstacle to student persistence and degree completion.<sup>1</sup> In fact, research has shown that only 16 percent of students enrolled in developmental mathematics complete a college-level math course within three years and just 34 percent of them obtain a credential within six years.<sup>2</sup> Further, students of color and underserved students are disproportionately placed into developmental courses, leading to higher rates of failure and ever-growing attainment gaps.<sup>3</sup>

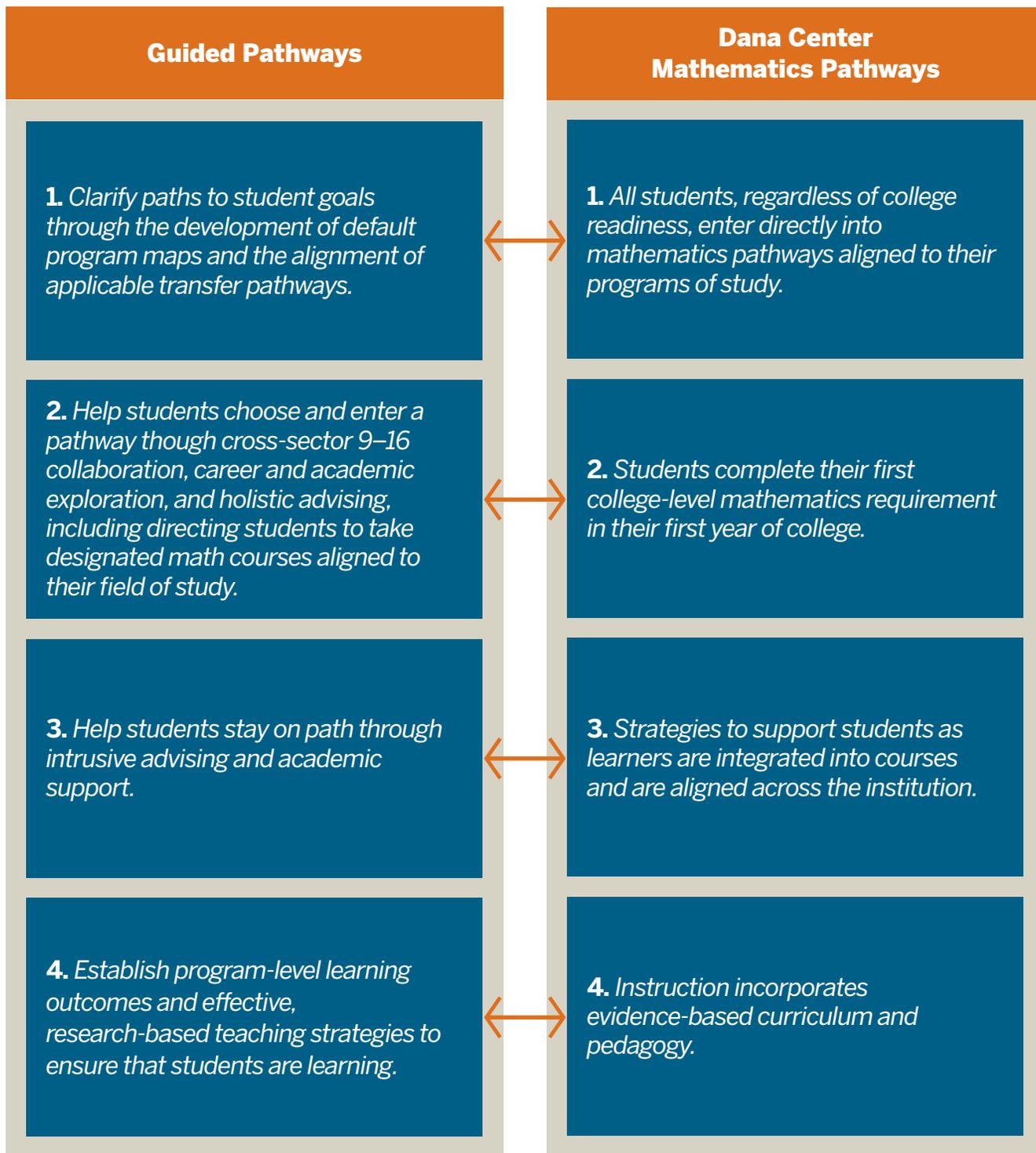
In recent years, two reform movements—guided pathways and mathematics pathways—have attempted to ease the burden placed on students across the higher education pipeline. Both pathways movements seek to simplify and clarify the educational pipeline for college students by aligning program-level requirements and learning outcomes with students' academic and career interests.

Guided pathways and mathematics pathways entail a systemic redesign of the student experience through changes to program structure, instruction, and support services. They are also systemically aligned and dependent upon each other: Students cannot progress effectively in math pathways without the holistic advising and support of guided pathways; and guided pathways cannot increase completion without having the math pathways principles embedded into its design.

Yet up until now, each reform had acted in isolation. Until these two movements are fully integrated, students will continue to suffer unacceptable levels of credential attainment, dashing dreams of upward social and economic mobility.

#### **About This Brief**

*This brief is intended for policymakers, practitioners, and other education stakeholders who are interested in education reform and want to improve the postsecondary experience for students by predictably aligning students' academic needs with their career goals. Fully integrating the guided pathways and mathematics pathways movements has the potential to remove barriers to student success and create lasting structural change.*



**For background information and list of resources, see pages 4–5.**

### Essential Practices of Guided Pathways and Mathematics Pathways

Both models for guided pathways and mathematics pathways are based on four guiding principles that complement one another.

In addition to complementary practices, guided pathways and mathematics pathways share common characteristics. Both models require faculty input and leadership, engagement of advisors, collaboration across the institution and disciplines, confirmation of student learning outcomes, alignment of program learning outcomes to meet educational and workforce requirements, policies that reduce barriers and clarify processes to enable change, and a focus on what is best for students' economic and social mobility.

While the two reform movements developed concurrently over the past decade, integrating them is essential for improving overall student success. Simply put, guided pathways cannot be fully implemented without the corresponding full implementation of multiple mathematics pathways and vice versa.

## Working Together to Improve Student Outcomes

According to a large body of research and evidence, the most critical course in determining student persistence and completion is mathematics.<sup>4</sup> State, system, and institutional stakeholders need to ask what quantitative skills and mathematical student learning outcomes are relevant and necessary for each core program. Students and advisors need clear guidance on which math pathway is best for a particular program to eliminate identifying college algebra as the first choice for all students. Ensuring that the appropriate entry-level math course or course sequence is embedded within each of the larger guided pathways program maps or metamajors will help students overcome what, for large numbers of students, has been a barrier to student success and completion. Once institutions have aligned the appropriate math course to each program of study, they need to intentionally offer and register students into the mathematics course(s) aligned to their respective programs of study.

Further, mathematics pathways reform can positively impact guided pathways implementation through enhanced faculty engagement across disciplines, improved advising practices that enable students to explore career options and immediately select a program of study, and increased focus on the overall alignment and applicability of credits for transfer students.

Together, guided pathways and mathematics pathways have the potential to remove barriers to student success and reshape higher education in a way that puts the needs and aspirations of students first. The time has come to fully integrate the mathematics pathways movement with the guided pathways movement and ensure improved retention, persistence, learning, and success for all students.

## Endnotes

<sup>1</sup> U.S. Department of Education. (2017). *Developmental education: Challenges and strategies for reform*.

<sup>2</sup> Ran, F. X. (2019). *Better together? The effect of co-requisite remediation in Tennessee*.

<sup>3</sup> EdSource. (2012, February). *Passing when it counts: Math courses present barriers to student success in California community colleges*.

<sup>4</sup> See: Saxe, K., & Braddy, L. (2015). *A common vision for undergraduate mathematical sciences programs in 2025*; U.S. Department of Education. (2017). *Developmental education: Challenges and strategies for reform*.

## Key Resources Aligned to the Guided Pathways and Dana Center Mathematics Pathways Principles

The following resources provide in-depth information and research regarding the four essential practices of the guided pathways and mathematics pathways movements. Resources are organized according to the “Four Pillars” of guided pathways.

Clarify pathways	Choose and enter a pathway	Progress and stay on pathway	Ensure students are learning
<p><i>Improving Labor Market Outcomes</i> (Aspen Institute)</p> <p><i>Key Decisions for Colleges Transforming the Student Experience through Guided Pathways</i> (National Center for Inquiry &amp; Improvement)</p> <p><i>Accelerating Opportunity in Rural Regions: Designing Pathway Programs for Adults and Other Non-Traditional Learners</i> (Jobs for the Future)</p> <p><i>The Transfer Playbook: Tool for Assessing Progress toward Adoption of Essential Transfer Practices for Community Colleges</i> (Aspen Institute &amp; CCRC)</p> <p><i>How to Measure Community College Effectiveness in Serving Transfer Students</i> (Community College Research Center [CCRC])</p> <p><i>Tracking Transfer: New Measures of Institutional and State Effectiveness in Helping Community College Students Attain Bachelor’s Degrees</i> (CCRC)</p>	<p><i>Moving Beyond the Placement Test: Multiple Measures Assessment</i> (CCRC)</p> <p><i>Multiple Measures Placement Using Data Analytics: An Implementation and Early Impacts Report</i> (Center for the Analysis of Postsecondary Readiness)</p> <p><i>Development and Implementation of Multiple Measures for College Placement Across States and Systems</i> (Research for Action)</p> <p><i>Expectations Meet Reality: The Underprepared Student and Community Colleges</i> (Center for Community College Student Engagement [CCCSE])</p> <p><i>North Carolina’s Multiple Measures Policy</i> (North Carolina Community Colleges)</p> <p><i>Davidson County Community College (NC): Placement Based on High School GPA</i> (Research for Action)</p> <p><i>Integrated Advising and Student Supports Readiness Assessment</i> (American Association of Community Colleges &amp; Achieving the Dream)</p>	<p><i>Show Me the Way: The Power of Advising in Community Colleges</i> (CCCSE)</p> <p><i>Redesigning Advising and Student Support: Tools for Practitioners</i> (CCRC)</p> <p><i>Technology-Mediated Advising and Student Support: An Institutional Self-Assessment</i> (CCRC)</p> <p><i>Implementing Holistic Student Support: A Practitioner’s Guide to Key Structures and Processes</i> (CCRC)</p> <p><i>Early Momentum Metrics: Leading Indicators for Community College Improvement</i> (CCRC)</p> <p><i>Driving Toward a Degree: The Evolution of Planning and Advising in Higher Education</i> (Tyton Partners)</p> <p><i>The Male Student Success Initiative</i> (MDRC)</p> <p><i>Emerging Issues in Mathematics Pathways: Case Studies, Scans of the Field, and Recommendations</i> (DCMP)</p> <p><i>Mathematics Pathways: Scaling and Sustaining</i> (DCMP)</p>	<p><i>Learning Outcomes Assessment: A Practitioner’s Handbook</i> (Centre for Teaching and Learning at Scholarship at UWindsor)</p> <p><i>Unpacking Relationships: Instruction and Student Outcomes</i> (American Council on Education)</p> <p><i>Project Based Learning in Higher Education</i> (Sam Houston State University)</p> <p><i>A Matter of Degrees: Promising Practices for Community College Student Success (A First Look)</i> (CCCSE)</p> <p><i>A Matter of Degrees: Engaging Practices, Engaging Students (High-Impact Practices for Community College Student Engagement)</i> (CCCSE)</p> <p><i>A Matter of Degrees: Practices to Pathways (High-Impact Practices for Community College Student Success)</i> (CCCSE)</p> <p><i>Rising to the LEAP Challenge: Case Studies of Integrative Pathways to Student Signature Work</i> (Association of American Colleges &amp; Universities)</p>
MORE ▼	MORE ▼	MORE ▼	MORE ▼

Clarify pathways	Choose and enter a pathway	Progress and stay on pathway	Ensure students are learning
<p style="text-align: center;">^ MORE</p> <p><i>Good Jobs That Pay without a BA: A State-by-State Analysis</i> (Georgetown University Center on Education and the Workforce)</p> <p><i>Top Five Growing Industries for Those Without a Bachelor's Degree</i> (Georgetown University Center on Education and the Workforce)</p> <p><i>Hawai'i Career Explorer</i> (University of Hawai'i)</p> <p><i>Career Pathways as a Framework for Program Design and Evaluation</i> (Pathways for Advancing Careers and Education)</p> <p><i>The Case for Mathematics Pathways</i> (Dana Center Mathematics Pathways [DCMP])</p> <p><i>Creating Accelerated Pathways for Student Success in Mathematics</i> (CCRC)</p> <p><i>Dana Center Mathematics Pathways Institutional Implementation Guide</i> (DCMP)</p> <p><i>Guide to Aligning Mathematics Pathways to Programs of Study</i> (DCMP)</p>	<p style="text-align: center;">^ MORE</p> <p><i>Checklist for iPASS Degree Planning Technology</i> (Achieving the Dream &amp; EDUCAUSE)</p> <p><i>A Framework for Advising Reform</i> (CCRC)</p> <p><i>What Happens to Students Who Take Community College "Dual Enrollment" Courses in High School?</i> (CCRC)</p>	<p style="text-align: center;">^ MORE</p> <p><i>Emerging Solutions in Mathematics Education for Nurses</i> (DCMP)</p>	<p style="text-align: center;">^ MORE</p> <p><i>LaGuardia Community College (NY): Weaving Assessment into the Institutional Fabric</i> (National Institute for Learning Outcomes Assessment)</p> <p><i>What Is Rigor in Mathematics, Really?</i> (DCMP)</p> <p><i>The Mathematics Opportunity: Rethinking the Role of Mathematics in Educational Equity</i> (Just Equations)</p> <p><i>Gaining Ground: Findings from the Dana Center Mathematics Pathways Impact Study</i> (CCRC &amp; MDRC)</p>