

## Mathematics Pathways: Scaling and Sustaining Notes and References supplement

The brief *Mathematics Pathways: Scaling and Sustaining* presents information that is based on a large number of references. The printed version of the brief provides a short list of the most relevant citations. This document provides a more extensive list along with a few explanatory notes.

This list is organized by topic according to the sections of the brief.

### Introduction

Mathematics Professional Associations on Mathematics Pathways

- American Mathematical Association of America. (2018). *IMPACT*. Retrieved from <https://amatyc.site-ym.com/mpage/IMPACT>.
- Committee on the Undergraduate Program in Mathematics. (2004). *Undergraduate programs and courses in the mathematical sciences: CUPM Curriculum Guide 2004*. Retrieved from the Mathematical Association of America website: <http://www.maa.org/sites/default/files/pdf/CUPM/cupm2004.pdf>.
- Conference Board of the Mathematical Sciences. (2016). *Collective effort to improve the first two years of college math statement by presidents of CBMS member professional societies*. Retrieved from <http://www.cbmsweb.org/2016/10/collective-effort-to-improve-the-first-two-years-of-college-math-statement-by-presidents-of-cbms-member-professional-societies/>.
- National Research Council. (2013). *The mathematical sciences in 2025*. Washington, DC: The National Academies Press.
- Saxe, K., & Braddy, L. (2015). *A common vision for undergraduate mathematical science programs in 2025*. Washington, DC: Mathematical Association of America.

Notes on the following statement, page 1: “Hundreds of colleges and universities have begun work on their campuses and tens of thousands of students are more engaged in learning meaningful mathematics and experiencing increased success.” This claim is based on the combined effects of the work across multiple projects and organizations.

- 88 institutions in Arkansas, Michigan, Missouri, Oklahoma, and Washington committed to implementing mathematics pathways through the Dana Center Mathematics Pathways (DCMP). Charles A. Dana Center at The University of Texas at Austin. (2018). *Implementation Connect - January 2018*. Austin, TX: Author. Retrieved from <https://dcmathpathways.org/sites/default/files/resources/2018-02/MPC-implementation-connect-january2018-v2.pdf>.

- 50 community college districts formed a collaboration with the Dana Center to implement mathematics pathways. In addition, 38 Texas universities have engaged in this effort. See lists of institutions by region at <http://dcmathpathways.org/where-we-work/texas>.
- 12 community colleges and universities participated in the University of Maryland's First in the World grant to implement a statistics pathway.
- 19 community colleges and universities in Tennessee implemented mathematics pathways as a part of a statewide initiative. This work went full scale in Fall 2015. See <https://www.tbr.edu/sites/tbr.edu/files/media/2016/12/TBR%20CoRequisite%20Study%20-%20Full%20Implementation%202015-2016.pdf>.
- 48 community colleges and universities in Montana and Ohio developed implementation plans for mathematics pathways through the joint Dana Center/Complete College America project "Building Math Pathways to Programs of Study. See <http://dcmathpathways.org/where-we-work/building-math-pathways-programs-study>, <https://www.ohiohighered.org/math>.
- 26 institutions in the University of Georgia system are implementing mathematics pathways as part of a statewide student success agenda. See <https://www.completegeorgia.org/math-pathways>.
- Over 90 institutions have implemented Statway and/or Quantway as part of the Carnegie Math Pathways network. See <https://www.carnegiemathpathways.org/#>.
- 45 California community colleges were offering accelerated statistics pathways in 2016. Rodriguez, O., Johnson, H., Cuellar Mejia, M., & Brooks, B. (2017). *Reforming math pathways at California's community colleges*. San Francisco, CA: Public Policy Institute of California.

## Factor 1: Consistent and Predictable Transfer and Applicability

### Obstacles to Transfer

- Bailey, T., Jenkins, D., Fink, J., Cullinane, J., & Schudde, L. (2017). *Policy levers to strengthen community college transfer in Texas*. New York, NY: Community College Research Center, Columbia University & Austin, TX: The University of Texas at Austin.
- Berkner, L., & Choy, S. (2008). *Descriptive summary of 2003-04 beginning postsecondary students: Three years later (NCES 2008-174)*. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Retrieved from <https://nces.ed.gov/pubs2008/2008174.pdf>.
- Crisp, G., & Nuñez, A.-M. (2014). Understanding the racial transfer gap: Modeling underrepresented minority and non-minority students' pathways from 2-year to 4-year institutions. *Review of Higher Education*, 37(3), 291-320.

- Horn, L., & Skomsvold, P. (2011). *Community college student outcomes: 1994–2009 (NCES 2012-253)*. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Retrieved from <https://nces.ed.gov/pubs2012/2012253.pdf>.
- Martinez-Wenzl, M., & Marquez, R. (2012). *Unrealized promises: Unequal access, affordability, and excellence at community colleges in Southern California*. Los Angeles, CA: The Civil Rights Project.
- Shapiro, D., Dundar, A., Huie, F., Wakhungu, P., Yuan, X., Nathan, A., & Hwang, Y., A. (2017, April). *Completing college: A national view of student attainment rates by race and ethnicity – Fall 2010 cohort* (Signature Report No. 12b). Herndon, VA: National Student Clearinghouse Research Center.
- Taylor, J. L., & Jain, D. (2017). The multiple dimensions of transfer: Examining the transfer function in American higher education. *Community College Review*, 45(4), 273-293.

### Factor 3: Appropriate Placement and Acceleration Options

#### Placement

- Belfield, C., & Crosta, P. M. (2012). *Predicting success in college: The importance of placement tests and high school transcripts*. (Working Paper No. 42). New York, NY: Columbia University, Teachers College, Community College Research Center. Retrieved from <https://ccrc.tc.columbia.edu/publications/predicting-success-placement-tests-transcripts.html>.
- Bracco, K. R., Dadgar, M., Austin, K., Klarin, B., Broek, M., Finkelstein, N., Mundry, S., & Bugler, D. (2014). *Exploring the use of multiple measures for placement into college-level courses: Seeking alternatives or improvements to the use of a single standardized test*. San Francisco, CA: WestEd.
- Logue, A.W., Watanabe-Rose, M., & Douglas, D. (2016). Should students assessed as needing remedial mathematics take college-level quantitative reasoning courses instead? A randomized controlled trial. *Educational Evaluation and Policy Analysis*, 38(3), 578-598.
- Melguizo, T., Kosiewicz, H., Prather, G., & Bos, J. (2014). How are community college students assessed and placed in developmental math? Grounding our understanding in reality. *Journal of Higher Education*, 85(5), 691-722.
- Ngo, F., Chi, W. E., & Park, E. Y. (2018). Mathematics course placement using holistic measures: Possibilities for community college students. *Teachers College Record*, 120(2), 1-42.
- Ngo, F., & Melguizo, T. (2016). How can placement policy improve math remediation outcomes? Evidence from community college experimentation. *Educational Evaluation and Policy Analysis*, 38(1), 171–196.
- Scott-Clayton, J., Crosta, P. M., & Belfield, C. R. (2014). Improving the targeting of treatment evidence from college remediation. *Educational Evaluation and Policy Analysis*, 36(3), 371-393.

- Smith-Jaggars, S., & Stacey, G. W. (2014). *What we know about developmental education outcomes*. New York, NY: Columbia University, Teachers College, Community College Research Center.

### Co-Requisite and Accelerated Structures

- California Acceleration Project. (2017). *Up to the challenge: Community colleges expand access to college-level courses*. Retrieved from <http://accelerationproject.org/Publications/ctl/ArticleView/mid/654/articleId/56/Up-to-the-Challenge-Community-Colleges-Expand-Access-to-College-Level-Courses>.
- Charles A. Dana Center, Complete College America, Education Commission of the States, & Jobs for the Future. (2012). *Core principles for transforming remedial education: A joint statement*. Retrieved from <https://www.jff.org/resources/core-principles-transforming-remedial-education-joint-statement/>.
- Chen, X. (2016). *Remedial coursetaking at U.S. public 2- and 4-year institutions: Scope, experiences, and outcomes (NCES 2016-405)*. Washington, DC.: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Retrieved from <https://nces.ed.gov/pubs2016/2016405.pdf>
- Complete College America. (2016). *Corequisite remediation: Spanning the completion divide*. Retrieved from <http://completecollege.org/spanningthedivide/>.
- Denley, T. (2017). *Co-requisite remediation full implementation 2015-16*. Nashville, TN: Tennessee Board of Regents.
- Ganga, E., Mazzariello, A., & Edgecombe, N. (2018). *Developmental education: An introduction for policymakers*. Denver, CO: Education Commission of the States.
- Henson, L., Huntsman, H., Hern, K., & Snell, M. (2017). *Leading the way: Cuyamaca College transforms math remediation*. Sacramento, CA: The California Acceleration Project.
- Hoang, H., Huang, M., Sulcer, B., & Suleyman, Y. (2017). *Carnegie Math Pathways 2015 - 2016 Impact report: A 5-year review*. Stanford, CA: Carnegie Foundation for the Advancement of Teaching.
- Logue, A.W., Watanabe-Rose, M., & Douglas, D. (2016). Should students assessed as needing remedial mathematics take college-level quantitative reasoning courses instead? A randomized controlled trial. *Educational Evaluation and Policy Analysis*, 38(3), 578-598.