

The University System of Maryland First in the World Maryland Mathematics Reform Initiative (FITW MMRI) Project Overview



Background

The University System of Maryland, in collaboration with the Maryland Community Colleges and the other private and public institutions of higher education in Maryland, are working to address the mathematics “pipeline” issues that have created a significant bottleneck for postsecondary students. The Maryland Mathematics Reform Initiative (MMRI) is a collaborative effort currently underway between the public four-year USM institutions and the two-year community colleges in Maryland to develop and implement multiple high-quality mathematics pathways for students that are relevant for their chosen career path while also ensuring that the new courses have sufficient mathematical integrity and rigor to be deemed “college-level.”

As part of that larger statewide MMRI steering committee work, the USM applied for and was awarded a grant from the U.S. Department of Education’s First in the World (FITW) program to develop, implement, and evaluate a statistics pathway in order to accelerate developmental students’ progress into credit-bearing postsecondary courses and help more of those students reach certificate or degree completion effectively and efficiently. Project goals include reducing costs for students who will not have to languish in developmental courses, and saving the state and higher education institutions at least a portion of the estimated \$72 million spent annually in Maryland on developmental education.

In order to meet those goals, the FITW MMRI program supports the development of a new developmental statistics pathway leading to a general education statistics course. The twelve partnering institutions—five USM institutions and seven community colleges serving approximately 158,000 new students each year—are the “early adopters” of the new mathematics pathway and have been leading the development of the new pathway for Maryland’s 29 public higher education institutions.

Partner Institutions
Anne Arundel Community College
Cecil College
College of Southern Maryland
Coppin State University
Garrett College
Harford Community College
Howard Community College
Montgomery College
Towson University
University of Baltimore
University of Maryland, Baltimore County
University of Maryland, University College

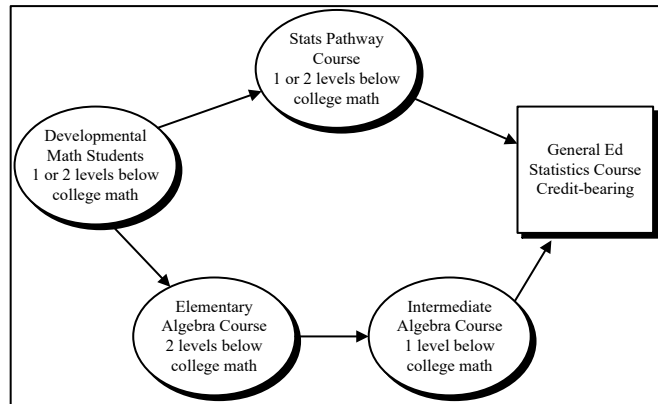
Theory of Action

FITW MMRI hypothesizes that one significant underlying problem with developmental mathematics course sequences is the “disconnect” between the mathematics content students are learning and the mathematics they need to be successful. The key intervention in the project proposed here focuses on a rigorous pathway in statistical reasoning. In the FITW MMRI theory of action, this pathway would be more appropriate, more relevant, and more useful for students who are either undecided about their major or whose college major relies on a fundamental-studies statistics course either in place of, or in addition to a traditional college algebra course. By creating a single, intellectually-rigorous developmental statistics course that meets the needs of students who are up to two levels below college-level math and for whom algebra is not a requirement, the new Statistics Pathway is a strategy with the potential to reduce barriers (costs and time associated with taking multiple developmental-level math courses) to college credit accumulation and successful completion of a postsecondary degree.



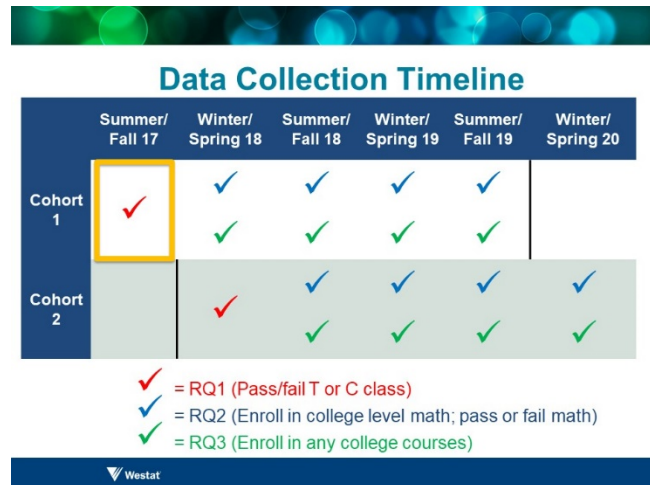
Research Plan & Findings

The main study includes two student cohorts, those from (1) summer/fall 2017 and (2) winter/spring 2018, and compares their performance in the treatment (stats pathway) or comparison (algebra-intensive pathway) “gateway” course (last developmental course before credit-bearing math). Our main research questions concern the following outcomes: (1) student success in the stats pathway versus “traditional” developmental math courses; (2) enrollment and success in a credit-bearing statistics course; and (3) college retention in the five semesters following the stats pathway or traditional developmental course.



Preliminary analyses found that **in fall 2017, students were more likely to pass the gateway treatment class than the comparison class**, after adjusting for demographics ($n = 1,234$). This finding did *not* vary by gender, race (White vs. non-White), or Hispanic ethnicity. We also conducted exploratory analyses to determine the effects of age, full-time status, and math level placement on success. Exploratory analyses found the older students passed both the treatment and comparison classes at a higher rate than younger students. Full-time students were more likely to pass the treatment course than full-time students in the comparison course. Finally, within the treatment course, students who had higher math scores at the beginning were not more likely to pass than student with lower scores—an encouraging, though inconclusive, finding.

The figure to the right shows the data collection timeline for the analyses planned to answer our main research questions.



Project Timeline

- 2015-2016: Project planning; pathways course design and development; advisor training; student recruitment
- 2016-2017: Launch MMRI Statistics Pathways courses at partner institutions; collect data on Cohort 1
- 2017-2018: Collect data on Cohort 2; analyze data collected to date; report on findings
- 2018-2019: Collect data on continued performance; analyze data collected to date; report on findings
- 2019-2020: No-cost extension year; dissemination of findings; recommend scaling to other USM institutions

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The table below shows the planned outcome measures, cohorts, and timeline for data collection.

Outcome measure	Fall 2017 cohort	Spring 2018 cohort
1) Success (pass/fail) in Stats Pathway or the traditional developmental math course	Fall 2017 semester	Spring 2018 semester
2) Enrollment and success (pass/fail) in a college-level statistics course, in the semester following	Winter 2017/8 and spring 2018 semesters	Summer 2018 and fall 2018
3) College retention in the five semesters following the Stats Pathway or developmental math course.	Winter 2017/8-Fall 2019	Summer 2018-Spring 2020