

Executive Summary

MAY 2019

Evaluating the Transition to College Mathematics Course in Texas High Schools: Findings from the First Year of Implementation



Project Aims

Success in post-secondary education has become a gateway for economic and social mobility in the U.S, yet many students leave high school under-prepared for college-level coursework—especially in mathematics. Students who are not ready for college-level coursework are referred to or required to take developmental classes. However, studies have shown that developmental coursework requirements, which serve as pre-requisites to credit-bearing courses, may actually hinder credit and degree completion.

State-level policy makers and institutions of higher education are adopting a variety of policy responses to address under-preparation of students for college-level course-work. One avenue of intervention is to offer college preparatory courses in high school that focus on the transition from high school to college-level coursework. Texas is now pursuing this strategy, following implementation of Texas House Bill 5 (HB5) from the 2013 legislative session. Specifically, following HB5, school districts are now required to offer college preparatory courses for students not meeting college readiness standards by the end of their third year in high school.

The Charles A. Dana Center developed the Transition to College Mathematics Course (TCMC) as a model college preparatory math course, aligned with the goals and requirements of HB5. TCMC differs from conventional remedial math courses in several ways, including that it (1) provides content covering a broad range of mathematical skills; (2) utilizes novel

materials and instructional strategies; (3) incorporates richly contextualized applications; and (4) aims to help students develop self-regulated learning strategies. Furthermore, the course content aligns with the Mathematics Pathways framework adopted by many Texas higher education institutions, and thus provides a coherent sequence of work across the transition from high school to higher education.

TCMC was offered in nine districts across central Texas during the 2016-17 school year and has subsequently been expanded to over thirty districts. As the course is more broadly adopted, it is important to evaluate its effects on students' success in post-secondary education. We therefore sought to evaluate the impacts of participating in TCMC on students' progression into higher education. This report describes our findings from the first year of implementation.

Methodology

We used statewide longitudinal data collected by the Texas Education Agency (TEA) and the Texas Higher Education Coordinating Board (THECB), accessed through the University of Texas Education Research Center. We identified students who took TCMC during the 2016-17 school year in eight districts in central Texas. To evaluate the effects of participating in the course, we identified students who did not take TCMC but were observationally similar to the students who did take the course.

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We matched students who took TCMC and those who did not based on background characteristics that include demographics, prior math course-taking patterns, and prior math achievement. These characteristics might have influenced whether students enrolled in TCMC and also affected their success in post-secondary education. We created two distinct comparison groups. The first group consisted of students from the same schools and the same year as the students who enrolled in TCMC. The second group consisted of students from the same schools but who were in twelfth grade a year prior—during the 2015-16 school year. We then estimated the differences in high school graduation rates, post-secondary enrollment rates, and post-secondary math course enrollment and passage rates between the TCMC group and each of the two comparison groups.

Key Findings

We found that students who took TCMC graduated from high school at slightly higher rates than the observationally similar students who did not take TCMC, with an estimated increase of 2.7 percentage points (95% CI 0.3-5.1) based on the previous-year comparison group. However, we found that students who took TCMC had lower rates of enrollment in post-secondary institutions in the Fall semester after their senior year of high school, driven by lower enrollment in four-year colleges or universities. Specifically, we estimated that students who took TCMC enrolled in four-year institutions at a rate 2.9 percentage points lower (95% CI 0.1-5.6) than the rate for students in the previous-year comparison group. Further, we found that students who took TCMC were less likely to enroll in and pass college-level math courses by the end of their first semester in college, by 3.2 percentage points (95% CI 1.0-5.4) when based on the previous-year comparison group.

The pattern of the effects was similar for both the comparison groups, although the size of the effects was smaller when based on the previous-year comparison group.

Implications

These findings from the first year of implementation are preliminary and limited in several important respects. We therefore think that further research, including longer-term follow-up and examination of a larger cohort of schools, is necessary before considering policy implications.

Findings from the first year of implementation do raise the possibility that placement and participation in TCMC may lead to some unanticipated effects on students' trajectories, discouraging some students from pursuing post-secondary education at four-year institutions. We think the most plausible explanation for these observed differences is bias stemming from our inability to fully adjust for initial differences in college readiness, as well as other potential confounders such as college aspirations, at the start of students' senior year. Notably, the magnitude of the estimated effect on four-year college enrollment based on the previous-year comparison is only half the size of the effect estimated from the contemporaneous comparison. If the contemporaneous comparison is more likely than the previous year comparison to be subject to problems of omitted confounders, the sensitivity of the effect estimate across the two comparison groups suggests that there may be remaining bias at work.

Apart from bias, an alternative explanation for this pattern of findings is that participating in the course heightened the salience of attaining college readiness. If participation in the course raises students' awareness of the developmental education system—and the hurdles it presents to completing college-level courses—this could have the effect of dampening students' aspirations and discouraging some students from pursuing college. A further possibility is that the course heightened students' awareness of partner community colleges as the main pathway available to them for pursuing post-secondary education. These possibilities could be probed further in several ways, including further examining advising processes, examining variation in the effects of

the course across the schools where it is implemented, or examining rates of student application and acceptance into four-year colleges. We intend to pursue several of these directions in ongoing work.

It is important to recognize that our analysis has several key limitations. First, although students were closely matched on previous math course-taking patterns and performance on end-of-course exams in algebra, we were unable to access scores on some of the standardized tests that are used to designate students as college-ready. Therefore, we were unable to fully account for students' college readiness at the start of their senior year, which may have influenced placement into TCMC and also directly affected their pursuit of post-secondary education. Second, our analysis is limited to outcomes from the first semester of college. Impacts of TCMC may evolve as we examine longer-term measures of students' post-secondary trajectories. Third, we were unable to account for the fidelity of implementation of TCMC. The small, negative differences between students who took TCMC versus comparison students may be due to issues with implementation rather than to the curriculum itself. Finally, we can only generalize the results to the 2016-17 cohort of students, the first time the course was offered and when it did not count towards graduation. Further implementations of the course may differ due to gained experience and because the course began to count for graduation credit requirement beginning with the 2017-18 school year.

Our on-going work is examining longer-term outcomes for multiple cohorts of students in order to provide a fuller picture of the effect of TCMC on post-secondary success. This more extensive analysis will address several of the limitations noted above. Evidence from the project may be beneficial to districts considering implementing TCMC versus another college preparatory math course. The overall pattern of findings will provide evidence for policy-makers working to implement the requirements of House Bill 5 and interventions that can improve post-secondary access and attainment for students in Texas.

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