

Registry of Efficacy and Effectiveness Studies

Study Title:

Dana Center Mathematics Pathways (DCMP): Long-Term Follow-Up Study

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Section I: General Study Information

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Study Start Date:

2014-07-01

Study End Date:

2023-12-31

Intervention Start Date:

2015-08-17

Timing of entry:

Prior to collection of outcome data

Brief Abstract:

The Charles A. Dana Center at the University of Texas at Austin developed the Dana Center Math Pathways (DCMP), which diversifies the math course content that students take so it better aligns with their career interests. The Dana Center also developed curricula for three math pathways, which revise the content and instruction in developmental and college-level math classes while also streamlining the typical two-semester developmental math series into one semester. The DCMP is being evaluated using a mixed-methods research design including a randomized controlled trial (RCT) at four community colleges in Texas. The original study tracked three semesters of post-random assignment follow-up for all cohorts and found that students in the program group were able to complete developmental and college-level math classes at higher rates compared to students in the control group and accumulate more college-level math credits. The long-term follow-up study will analyze impacts on academic outcomes through 5 years of follow-up. The primary analyses will focus on DCMP's impact on successfully completing first college level math course, overall college credit accumulation and degree completion and/or transfer to four-year institutions at 3 and 5 years after random assignment. Exploratory questions will explore impacts on the same outcome measures for subgroups of students based on students' math placement level, whether they planned to enroll in college full- or part-time, the amount of time between high school graduation and when they started college, students' race/ethnicity, and students' gender. The follow-up study will also measure the cost-effectiveness relative to the impact on college completion or transfer.

Keywords:

college success, randomized control trial (RCT), retention, developmental mathematics

Comments:

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Section II starts on the next page.

Section II: Description of Study

Type of Intervention:

Curriculum/Product, Policy, Practice, Professional Development

Topic Area of Intervention:

Mathematics and Science Education, Postsecondary and Adult Education

Number of intervention arms:

1

Target school level:

13-16

Target school type:

Rural, Suburban, Urban

Location of Implementation:

United States: United States : South

Further description of location:

Texas Community Colleges

Brief Description of Intervention Condition:

The DCMP Statistical Reasoning and Quantitative Reasoning pathways are year-long interventions that serve students who are in need of one or two developmental math courses. The Statistical Reasoning pathway is appropriate for students in social sciences careers, such as allied health, government, or psychology; and the Quantitative Reasoning pathway is appropriate for students in humanities or general liberal arts fields. The DCMP attempts to accelerate students' progress through developmental math and allow them the chance to complete their college-level math requirements within one year.

The beginning DCMP developmental math course (Foundations of Mathematical Reasoning) is offered as a one-semester course. The DCMP Foundations course is designed to provide different content and pedagogical approaches than traditional developmental math courses. While most non-DCMP developmental courses are algebra-based lecture courses, DCMP developmental students are intended to receive math content centered around statistics and quantitative reasoning. Additionally, DCMP students are expected to be engaged in active learning activities in their courses where math content is taught based on real-life situations. Students are expected to work regularly with one another both inside and outside of class. Additionally, DCMP students are required to complete their homework and lesson assignments through an online technology platform developed by Pearson, Inc., and based on the MyMathLab format.

Upon the successful completion of the DCMP Foundations math course, DCMP students have completed their developmental math requirements and then can enter one of two college-level math courses, statistics or quantitative reasoning, based on their intended major or career field. In traditional developmental math, students in need of two remedial courses generally need to complete two semester-long developmental math courses before being offered the opportunity to enroll in college-level courses. In DCMP, students in need of two remedial courses only need to successfully complete the single-semester Foundations course.

All DCMP students were offered a spot in the DCMP Foundations course. The participating colleges further offered

some DCMP statistics and quantitative reasoning college-level courses, but only some of the DCMP students moved into these courses. Most of the DCMP students moved into the general college-level statistics or quantitative reasoning course offered at the college.

Brief Description of Comparison Condition:

Students not assigned to DCMP participated in the normal developmental math course offerings at the college.

Comparison condition:

Business-as-usual

Comments:

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Section III: Research Questions

Confirmatory research questions:

Question 1:

What is the effect of the opportunity to participate in DCMP compared to business as usual on math completion (measured by completion of first college-level math course) for students in the study sample?

Question 2:

What is the effect of the opportunity to participate in DCMP compared to business as usual on long-term academic progress (measured by credit accumulation) for students in the study sample?

Question 3:

What is the effect of the opportunity to participate in DCMP compared to business as usual on long-term academic success (measured by degree completion and/or transfer to four-year institutions) for students in the study sample?

Exploratory research questions:

Question 1:

What is the effect of the opportunity to participate in DCMP compared to business as usual on completion of second college-level math course and college-level math credits attempted and earned for students in the study sample?

Question 2:

What is the effect of the opportunity to participate in DCMP compared to business as usual on long-term academic progress (as measured by credits attempted and college enrollment by semester and number of semesters enrolled) for students in the study sample?

Question 3:

What is the effect of the opportunity to participate in DCMP compared to business as usual on long-term academic success (as measured by highest certificate or degree earned, certificate completion, degree completion, and transfer to a four-year college) for students in the study sample?

Question 4:

What are the effects of the opportunity to participate in DCMP compared to business as usual on math completion, academic progress, and academic success for subgroups of students defined by students' math placement level, whether they planned to enroll in college full- or part-time, the amount of time between high school graduation and when they started college, students' race/ethnicity, and students' gender?

Comments:

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Section IV-A: Study Design (Selection)

Study Design:

Randomized Trial (RT)

Comments:

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Section IV-B: Study Design (Input)

Study Design: Input

Unit of random assignment of intervention:

Student

Assignment within sites or blocks:

Yes

Define the sites or blocks:

Campus and cohort

Probability of assignment to treatment the same across sites or blocks:

No

Probability of assignment to treatment:

Three sites were 60/40 treatment to control but one site was 75/25 treatment to control.

Unit outcome data measured:

Student

Intermediate clusters between unit of random assignment and unit of measurement:

No

Comments:

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Design Classification

Based on the responses above, this study has been classified as:

RT: Multisite (Blocked)

Section V: Sample Characteristics

Approximate number of students in the comparison condition within each block (Campus and cohort): 14

Approximate number of students in the intervention condition within each block (Campus and cohort): 21

Number of blocks (Campus and cohort): 40

Yes - To be eligible for DCMP students must be in need of one or two course levels of remedial education in math. In addition, students' career interests or majors needed to include those eligible for the statistics or quantitative reasoning course pathways. The majors were essentially any non-STEM majors and included (but are not limited to) majors such as nursing, journalism, psychology, sociology, anthropology, English, history, and criminal justice. Both new and continuing students were eligible to participate. Yes - Students in STEM majors Yes - Texas Community Colleges Implementing DCMP Yes - Those not fully implementing key components of DCMP

Comments:

Note that there were 4 community colleges in the study, and 10 college campuses across those 4 community colleges are participating. There were also 4 cohorts of students (students in fall 2015, spring 2016, fall 2016, and spring 2017). Each college campus was randomized separately for each cohort creating 40 random assignment blocks.

Section VI: Outcomes (Input)

Confirmatory question 1: Outcome Measure 1

Outcome domain: Student Progress/Completion - Postsecondary Course Progression and Completion

Minimum detectable effect size: 0.15

Outcome measure: Successful Completion of First College-level Math Course

Scale of outcome measure: Binary

Normed or state test: No

Test-retest reliability: N/A

Internal consistency: N/A

Inter-rater reliability: N/A

Same outcome measure in treatment and comparison groups: Yes

Confirmatory question 2: Outcome Measure 1

Outcome domain: Student Progress/Completion - Postsecondary Course Progression and Completion

Minimum detectable effect size: 0.15

Outcome measure: Overall College Credits Earned

Scale of outcome measure: Continuous

Normed or state test: No

Test-retest reliability: N/A

Internal consistency: N/A

Inter-rater reliability: N/A

Same outcome measure in treatment and comparison groups: Yes

Confirmatory question 3: Outcome Measure 1

Outcome domain: Student Progress/Completion - Postsecondary Course Progression and Completion

Minimum detectable effect size: 0.15

Outcome measure: Ever Received a Certificate or Degree or Transferred to a Four-year College

Scale of outcome measure: Binary

Normed or state test: No

Test-retest reliability: N/A

Internal consistency: N/A

Inter-rater reliability: N/A

Same outcome measure in treatment and comparison groups: Yes

Section VII: Analysis Plan

Baseline data collected prior to start of intervention:

Yes

Description of baseline data:

Students' age, gender, race/ethnicity, highest grade completed, diploma/degrees earned, date graduated, level of planned college enrollment (part time/full time), failed a high school or college math course in the past, college math placement, intended major, reported comfort/confidence with math.

Covariates you plan to include in the model:

Received a high school diploma prior to random assignment, Race

Analytic model:

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Plan to handle cases with missing outcome data:

Impute missing outcome data

Process description:

Students will be treated as if they had not completed a first college-level math course, accumulated credits, or earned a degree or transferred.

Comments:

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Section VIII: Additional Information

Links:

No links have been added yet.

Files:

File Name: [DCMP LTF Analysis Plan.docx](#)

Description: Full analysis plan. The analytic model is described on page 12.

Comments:

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