Co-Requisite Models in Developmental Mathematics: A Review of Promising Practices

April 12, 2019
Webinar Logistics

Participants will be on mute for the duration of the webinar.

Material from today’s webinar:
In the handouts area you will find a copy of today’s presentation.

How to submit questions:
To submit questions during the webinar, please utilize the Questions function. During the Q&A portion of the webinar, questions will be addressed.

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Agenda

• Introductions and Overview
  Dr. Carrie Henderson, Florida Student Success Center

• Scope of Framework
  Nyema Mitchell, Jobs for the Future

• Promising Models in Co-Requisite and Developmental Mathematics Reform
  Amy Getz – Charles A. Dana Center
  Jeanette Kim – City University of New York (CUNY)
  Ann Edwards – Carnegie Math Pathways

• Panelist Follow-Up
• Audience Q&A
Introductions and Overview

Dr. Carrie Henderson
Executive Vice Chancellor
Florida College System
Scope of Framework

Nyema Mitchell
Associate Director
Jobs for the Future
Promising Practices in Co-Requisite and Developmental Mathematics Reform
Amy Getz
Manager, Systems Implementation for Higher Education
Charles A. Dana Center
Prepare, Enable, Empower

Amy Getz, Charles A. Dana Center, @AmyGetzUTDC
Getz_a@austin.utexas.edu
Dana Center Principles for Math Pathways

Structural and policy changes, quickly and at scale.

Mathematics pathways are structured so that:

1) All students enter directly into mathematics pathways aligned to programs of study.

2) Students complete first college-level math requirement in first year of college, preferably in first semester.

Learn more about the DCMP model at https://dcmathpathways.org/dcmp/dcmp-model
Continuous improvement ensures high-quality instruction.

Students engage in a high-quality learning experience with:

3) Strategies to support students as learners integrated into courses and across institution.

4) Instruction based on evidence-based curriculum and pedagogy.

Learn more about the DCMP model at https://dcmathpathways.org/dcmp/dcmp-model
A Pathways Perspective

Mathematics Pathways
(To and through gateway courses)

Transition (Entry)

What is the desired student experience?
... with the mathematics content?
... with the college, faculty and peers?
... with learning in general?

Know your data:
- Traditional/non-traditional
- Placement levels
- Programs of study/undeclared
- Correlation between placement and programs

What supports the student experience?
Curricular materials and design
Instructional practices
Course structures and delivery methods
Support services or programs

Know your data:
- What programs do students go into?
- Where do they transfer and in what programs?
- How do they do in future math or quantitative courses?

Transition (Exit)

Where do students go when they exit the pathways?

Mathematics Pathways Content
What minimum set of pathways will serve the needs of the students?
What learning outcomes does each gateway math course need to serve the appropriate pathway?
What are the readiness outcomes for each gateway course?
What will help developmental students achieve college readiness?
College Level Math Completion Rates for FTIC Students in Their First Year Steadily Rising

- **AY 2010**: 17% completion rate, 20,866 students
- **AY 2011**: 17% completion rate, 20,225 students
- **AY 2012**: 18% completion rate, 21,081 students
- **AY 2013**: 22% completion rate, 25,169 students
- **AY 2014**: 25% completion rate, 27,955 students

All Texas Community Colleges
Evidence Across Sites and Models

Percentage of underprepared students who earn credit in a gateway math course.

- **1 Semester**
  - Indiana: 64%
  - CUNY RCT: 55%
  - TN: 55%

- **1 Year**
  - Statway: 51%
  - CAP: 49%
  - TX NMP: 43%

- **3 Years**
  - AtD Cohort: 20%

**Sources:**
- Indiana (Complete College America, 2016)
- CUNY (Logue et al., 2016)
- Tennessee (Tennessee Board of Regents, 2016)
- Statway (Sowers & Yamada, 2015)
- CAP (California Acceleration Project, 2015)
- TX NMP (Rutschow & Diamond, 2015)
- AtD (Bailey et al., 2010)
A Case Study from Paris, Texas

Before and After Accelerated Math Pathways

Successful Completion

- 2012-13: Completion of dev math within 2 years
- 2016-17: Completion of dev math within 2 years
- 2017-18: Completion of dev math within 1 year
- Fall 2018: Completion of college math within 1 semester
### Lack of Full-Scale Implementation Raises Equity Concerns

#### Selection into DCMP in Colleges with Multiple Dev Ed Options

<table>
<thead>
<tr>
<th>Student Background</th>
<th>DCMP</th>
<th>Other Dev-Ed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>43.75%</td>
<td>25.71%***</td>
</tr>
<tr>
<td>Asian</td>
<td>1.14%</td>
<td>1.37%</td>
</tr>
<tr>
<td>Black</td>
<td>21.08%</td>
<td>16.16%***</td>
</tr>
<tr>
<td>Hispanic</td>
<td>31.27%</td>
<td>53.76%***</td>
</tr>
<tr>
<td>Other</td>
<td>2.76%</td>
<td>3.00%</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>64.10%</td>
<td>60.79%***</td>
</tr>
<tr>
<td><strong>Filed FAFSA</strong></td>
<td>31.02%</td>
<td>29.75%†</td>
</tr>
<tr>
<td><strong>Family Income (among FAFSA filers)</strong></td>
<td>$47,753</td>
<td>$41,121**</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>4,461</td>
<td>24,394</td>
</tr>
</tbody>
</table>

†p>.1, *p>.05, **p>.01, ***p>.001

Schudde, L. & Meiselman, Y. Assessing the Relationship between Dana Center Mathematics Pathways Participation and Early College Outcomes for Dev-Ed Math Students: Fall 2015 and 2016 Cohorts
Free Resources on Curriculum Design

DCMP Resource site: dcmathpathways.org

→ Take Action → Classroom Level → Planning and Implementing

Or go to Resources and search for co-requisite

Resources specific to co-requisite include:

- Recommendations for defining structure and content
- Design webinar
- Sample co-requisite materials
The Charles A. Dana Center is offering a workshop on implementing co-requisite math courses in May.

For further information, please check out the link below: https://www.utdanacenter.org/our-work/higher-education/higher-education-services/implementing-improving-and-scaling-co-requisite-mathematics-courses
Jeanette Kim
Interim University Assistant Dean
Pre-matriculation Programs and Program Assessment
City University of New York (CUNY)
CUNY Start
Maximizing the Pre-Matriculation Space to Address Remedial Needs

Co-requisite Models in Developmental Mathematics - Webinar
The Florida College System – April 12, 2019

Jeanette Kim, City University of New York
E: Jeanette.Kim@cuny.edu
CUNY Start: Program Elements

- Coordinated through CO; implemented at 10 campuses
- FT program (25hrs/wk); PT program (12 hrs/wk)
- Low student fee ($75 for FT; $35 for PT)
- Students defer matriculation for one semester
- Centrally developed curriculum
- Centrally supported professional development
- Teachers trained using apprenticeship model
- Intensive advisement
CUNY Start Math

- Designed to engage students with deep math needs
- Blend of pre-algebra and algebra topics
- Inquiry based approach
- Promotes conceptual understanding and reasoning
- Emphasis on student talk and collaborative learning
- Aligned to CUNY’s standards for exit from remediation (CEAFE)
- Offered as semester-long, summer, or 8-week intensive program
CUNY Start Participation Gains

Number of Developmental Education Needs Before/After CUNY Start Completion (Fall 2009 through Spring 2018; FT and PT Cohorts)

Full-Time (N=9,474)

- Pre-CUNY Start: Three (69%), Two (31%), One (6%), Zero (<1%)
- Post-CUNY Start: Three (69%), Two (30%), One (13%), Zero (5%)

Part-Time (N=7,142)

- Pre-CUNY Start: Three (31%), Two (34%), One (35%), Zero (29%)
- Post-CUNY Start: Three (31%), Two (34%), One (35%), Zero (22%)

Note: Outcomes data shown for program completers only. Initial remedial needs are based on the CUNY Assessment Test scores. Proficiency gains are based on course performance and exit test scores.
(Source: CUNY Start program database)
MDRC (RCT evaluation) Key Findings

- CS students made more progress through their remedial requirements than control group students – especially in math.
- CS students attempted more credits in 2nd semester than control group (7.0 college-level credits vs. 5.2 college-level credits).
- During 2nd semester, CS students enrolled at CUNY College at higher rates than control group students.
- Particularly strong math outcomes – 57% of CS students became college ready in math vs. 25% of control group.

Becoming College Ready: Early Findings from a CUNY Start Evaluation (MDRC, July 2018)
CUNY Start Quasi-experimental Analysis – Post Matriculation

Gateway Coursertaking Outcomes after One and Two Years

<table>
<thead>
<tr>
<th></th>
<th>One-Year</th>
<th>Two-Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passed English</td>
<td>38.9%</td>
<td>36.1%</td>
</tr>
<tr>
<td>Passed Math</td>
<td>21.0%</td>
<td>30.4%</td>
</tr>
<tr>
<td>Passed English + Math</td>
<td>14.3%</td>
<td>25.5%</td>
</tr>
</tbody>
</table>

Note: Results shown from propensity-score analysis of CUNY Start students and CUNY first-time freshmen. Total sample size was 11,198 (5,599 CUNY Start and 5,599 non-CUNY Start students).
(Source: Authors’ calculations using data form the CUNY Institutional Research Database (IRDB))

Starting to Succeed: The Impact of CUNY Start on Academic Momentum: Gateway Course Completion (Jenkins Webber, July 2018)
Broader Access & College Completion

• Working with non-traditional students
  • HSE non-math completers
  • ECI students, other pre-college populations
  • Returning adult learners

• Supporting multiple repeaters
• Pipeline to ASAP
For more information about CUNY Start:

www.cuny.edu/cunystart

Jeanette Kim
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Ann Edwards
Senior Research Associate, WestED
Director of Learning and Teaching
Carnegie Math Pathways
Designing Corequisite Courses: Lessons Learned from Statway and Quantway

Ann Edwards, Director of Learning and Teaching, Carnegie Math Pathways

Florida Student Success Center
April 12, 2019
What do we mean by Corequisite?

• Where one course must be taken in conjunction with, and at the same time as, another course.

• Example:

  College-level statistics
  • 3 transfer credits
  • 3 contact hours

  +

  Corequisite support course
  • 3 non-transfer credit
  • 3 contact hours
Ambitious, relevant, problem-centered curriculum that promotes productive struggle

Comprehensive and sustained professional learning opportunities

Network engagement and improvement

Accelerated Pathway

Quantway

Statway

Qw

Sw

Language and Literacy Supports

Student-focused, collaborative pedagogy

Productive Persistence interventions/practices

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Triple the Success in Half the Time

Traditional Programs Versus Statway: Student Success (All Fall Cohorts)

- **Traditional programs**
  - 1 Year: 6%
  - 2 Years: 15%

- **Statway**
  - 1 Year: 56%
Advancing Equity – Improving Outcomes For Diverse Subgroups

Corequisite Implementation
<table>
<thead>
<tr>
<th>Carnegie Math Pathways Corequisite Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active, collaborative learning</td>
</tr>
<tr>
<td>Productive struggle</td>
</tr>
<tr>
<td>Rich authentic contexts</td>
</tr>
<tr>
<td>Social-emotional learning supports</td>
</tr>
<tr>
<td>Language and literacy supports</td>
</tr>
<tr>
<td>Alignment between college &amp; coreq components</td>
</tr>
<tr>
<td>Flexibility of implementation</td>
</tr>
<tr>
<td>Guides for recommended use of materials</td>
</tr>
</tbody>
</table>
Year 1: Administration

Spring 2018 and Fall 2018

Quantway Corequisite
- 3 institutions
- 8 sections
- 7 faculty
- 185 students

Statway Corequisite
- 3 institutions
- 13 sections
- 8 faculty
- 225 students
## Year 1: Administration

<table>
<thead>
<tr>
<th>Institution</th>
<th>College Contact Hours</th>
<th>Corequisite Contact Hours</th>
<th>Transfer Credits</th>
<th>Non-Transfer Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>F</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>
# Year 1: Results

**Student Success Rate = 65.1%**

<table>
<thead>
<tr>
<th>Institution</th>
<th>Pathway</th>
<th># of Students (# of Sections)</th>
<th>Total Contact Hours</th>
<th>Corequisite Success Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution A</td>
<td>Quantway</td>
<td>149 (6)</td>
<td>6</td>
<td>83% (SD 13%)</td>
</tr>
<tr>
<td>Institution B</td>
<td>Quantway</td>
<td>18 (1)</td>
<td>6</td>
<td>89%</td>
</tr>
<tr>
<td>Institution C</td>
<td>Quantway</td>
<td>18 (1)</td>
<td>4</td>
<td>39%</td>
</tr>
<tr>
<td>Institution D</td>
<td>Statway</td>
<td>184 (11)</td>
<td>6</td>
<td>52% (SD 19%)</td>
</tr>
<tr>
<td>Institution E</td>
<td>Statway</td>
<td>29 (1)</td>
<td>5</td>
<td>66%</td>
</tr>
<tr>
<td>Institution F</td>
<td>Statway</td>
<td>12 (1)</td>
<td>5</td>
<td>50%</td>
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</tbody>
</table>
Elements of Successful Implementation

- Faster completion, reducing transitions between courses
- CMP’s Instructional Approach & Alignment of Components
- Higher contact hours

<table>
<thead>
<tr>
<th>Institution’s Total Contact Hours</th>
<th>Corequisite Success Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>38.9%</td>
</tr>
<tr>
<td>5</td>
<td>61.0%</td>
</tr>
<tr>
<td>6</td>
<td>67.0%</td>
</tr>
</tbody>
</table>
Elements of Successful Implementation

- Cohort Model
- Preparation Time
- Instructor Support and Collaboration
- Student Expectations and Encouragement
Challenges

**Limited Time**
- Material and content selection
- Pedagogy
- Assessments

**Student Preparedness**
- Range of reading levels
- Range of fundamental mathematics skills
More Lessons Learned

Streamlining materials

Support for faculty
- Training
- User Guides
- Facilitating Faculty Collaboration

Collaboration with administrators
Panelist Follow-Up
Questions:

• What is a common misperception of “co-requisite”?

• What are two important lessons other colleges should know that are considering implementing bridge programs?

• What are 1-2 immediate challenges to scaling math reforms in community colleges?
SAVE THE DATE
Mathematics Re-Design Institute

June 27, 2019
University of Florida,
Hilton Conference Center
Gainesville, Florida

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THANK YOU!

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