

Accelerating Developmental Mathematics: Early Findings from the AMP-UP Program

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First in the World
Program



Statement of Problem

- Developmental Coursework in Mathematics is a significant hurdle to student persistence and completion at US Community Colleges (Complete College America 2012, Logue et al. 2016)
- Some mathematics coursework may be necessary, but not all students need the same level of mathematics preparation for their careers (Douglas and Attewell 2017)

What is Being Done?

- Policymakers have started making significant changes to developmental coursework requirements
 - California: Cal State colleges have moved to an all co-requisite approach
 - New York: City University of New York campuses are experimenting with Statway, Quantway, and co-requisite courses
 - Florida: No longer requires developmental placement testing or developmental coursework
 - Colorado: Reformed developmental pathways, created some co-requisite courses
- **Co-requisite:** placing students, assessed as needing developmental courses, directly into college-level work with supplemental support activities

Rationale for Intervention

- Bergen Community College, in conjunction with Union County College, received a First In The World Grant to implement and study co-requisite developmental mathematics
- Implementation of this intervention was not feasible at BCC
- Revised intervention focused on accelerating students' progress through developmental math sequences

AMP-UP STUDY: What is it?

- **Purpose of the research study:** To identify more effective strategies to current traditional remedial mathematics course requirements. To increase completion of college-level mathematics requirements, retention, graduation and transfer.
- **Intervention:** Allows a remedial-placing student to finish a college level mathematics requirement within **ONE** semester of enrollment, compared to the current route which takes multiple semesters.
- **Analysis of outcomes:** Intent-to-Treat model. Study participants analyzed as assigned, regardless of behavior after random assignment



AMP-UP Study: Eligibility

Eligibility Requirements for AMP-UP Bergen CC Study

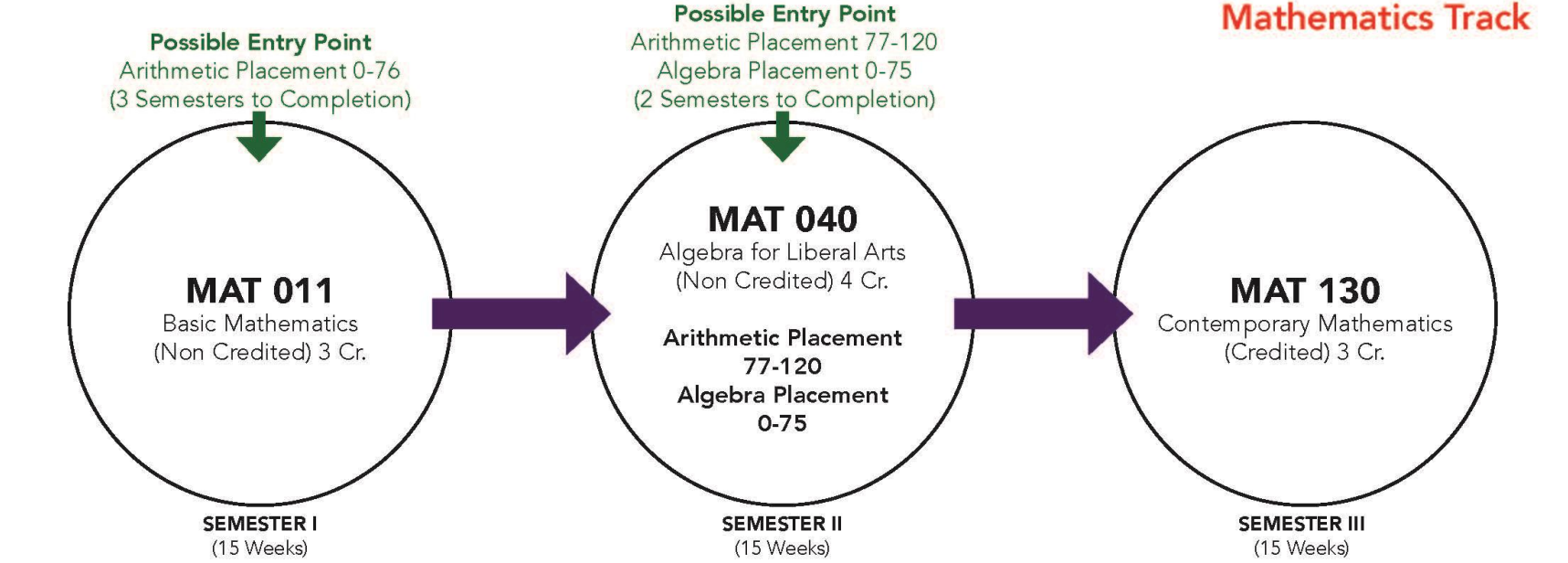
- * **First-time student**
- * **Signed informed consent to participate**
- * **Required to take Accuplacer**
- * **Placed into Development Mathematics**
- * **Earned a minimum Accuplacer Score of 30 in Arithmetic and 40 in Algebra**
- * **Earned a minimum Accuplacer Score of 160 in English**
- * **Selected a major that does NOT require MAT-048**
(Algebra for course of study requiring Intermediate Algebra MAT-160)

AMP-UP Study: Treatment Groups

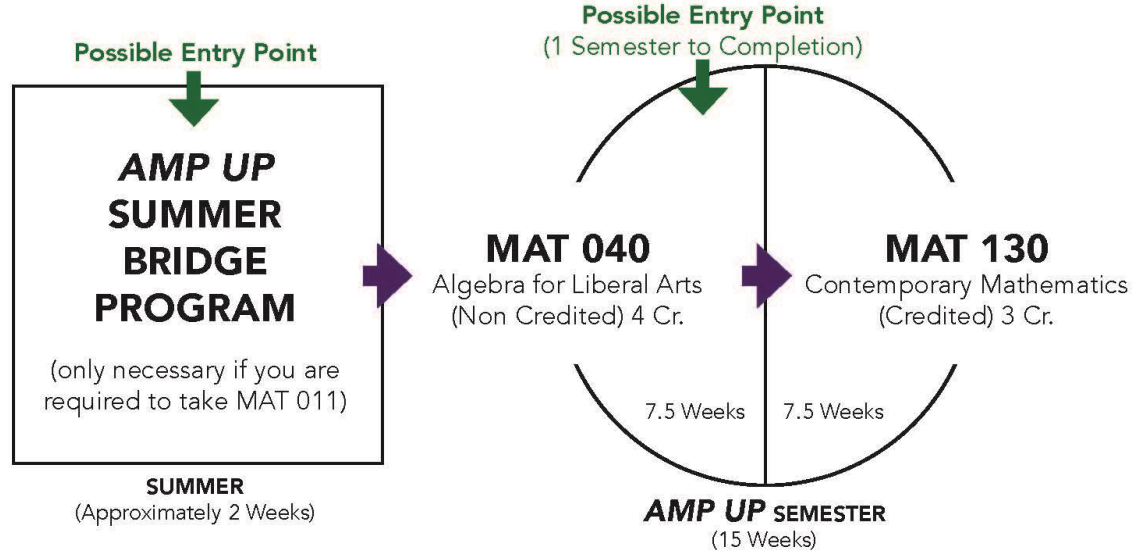
- Students are **randomly selected** to participate into one of the following three groups
- The AMP UP Summer Bridge Program is required for any student placed into Basic Mathematics (MAT 011 or MAT 012)

Pathways	Summer	Fall Semester (One Semester)
Treatment 1	Possible AMP UP Bridge Program	7.5-week MAT 040 (Lecture)  7.5-week MAT 130 (Lecture)
		*Required Enhanced Tutoring
Treatment 2	Possible AMP UP Bridge Program	7.5-week MAT 040 (Self-Paced)  7.5-week MAT 130 (Self-Paced)
		*Required Enhanced Tutoring
Control Group	None	MAT 011/012 or Mat 040 (Possibly up to three semesters to complete a college level math)

**Current BCC Developmental
Mathematics Track**



AMP UP Program



AMP-UP STUDY: Class Schedules

7.5 Week MAT 040 Proposed Schedule									
Times	M		T		W		TH		F
8:20-10:15am	T 1	SP 1	T 1	SP 1	T 1	SP 1	T 1	SP 1	
12:40-2:35pm	T 2	SP 2	T 2	SP 2	T 2	SP 2	T 2	SP 2	
* T: Traditional/ SP:Self-Paced									



7.5 Week MAT 130 Proposed Schedule									
Times	M		T		W		TH		F
8:20-10:15am	T 1	SP 1	T 1	SP 1	T 1	SP 1	1 hr Study Group	1 hr Study Group	
12:40-2:35pm	T 2	SP 2	T 2	SP 2	T 2	SP 2	1 hr Study Group	1 hr Study Group	
* T: Traditional/ SP:Self-Paced									

- Each schedule option has 75 randomized envelopes: 25 traditional, 25 self-paced, and 25 control

Recruitment Procedures

- Students arrive at the Testing Center
 - Accuplacer indicates students with eligible test scores
 - Testing staff directs students to the AMP UP recruitment team
- Eligible students meet with an AMP UP Student Assistant
 - Information collected
 - A friendly and positive introduction to the AMP UP program – including the AMP UP informational video
 - Student urged to see an AMP UP Advisor
- Eligible and interested students meet with an AMP UP Advisor
 - AMP UP Program is fully explained
 - Student Consents and is randomized
 - Help student create a schedule
 - Inform students of summer bridge and payment requirements

Recruitment and Random Assignment

Random Assignment	Fall '16 AMP-UP Recruitment	Fall '17 AMP-UP Recruitment
Traditional Lecture Course	42	37
Self-Paced Course	38	38
Control	41	36
Total	121	111

- Recruitment Challenges
 - Eligibility Requirements
 - Rigorous time commitment

Findings I – 2016 Cohort Sample and Early Outcomes

	Intervention Group (N=80)	Comparison Group (N=41)
<i>Sample Characteristics</i>		
% Female	48.8	43.9
% White/Asian	42.5	39.0
% Black/Hispanic	50.0	53.7
Mean (sd) Age	18.9 (0.2)	19.5 (0.5)
Mean (sd) Math Placement Score	54 (1.1)	53.8 (1.6)
% Parents Less than a BA	72.6	56.2
% Parents BA or More	16.3	24.4
<i>Outcomes</i>		
% Enrolled in Fall 2016	86.3	85.4
% Completed any DE Math in F16	72.5	56.1
% Completed any CL Math in F16	62.5	4.9

AMP UP Study: Accelerated MAT 040 Results

- The initial results seem to indicate a positive outcome for students in accelerated MAT 040

Accelerated MAT 040 Results

Random Assignment	Total Students	Successfully Completed MAT 040	Percent Successfully Completed
Accelerated Treatment: Traditional Lecture Course	31	27	87%
Accelerated Treatment: Self-Paced Course	32	31	97%
Total Students	63	58	92%

AMP UP Study: Accelerated MAT 130 Results

- Similarly. the initial results seem to indicate a positive outcome for students in accelerated MAT 130

Accelerated MAT 130 Results

Random Assignment	Total Students	Successfully Completed MAT 040	Percent Successfully Completed
Accelerated Treatment: Traditional Lecture Course	25	23	92%
Accelerated Treatment: Self-Paced Course	28	27	96%
Total Students	53	50	94%

Next Steps I - Summer Bridge Sub-Study

- Summer Bridge: self-paced online adaptive course using ALEKS software; course offered to students who placed into basic mathematics
- Encouraging findings from summer bridge in year one led us to request a reallocation of funds to study this intervention among the entire entering student population
- Any first-time student scoring above a 30 on the Accuplacer arithmetic exam and placed into Basic Mathematics (MAT-011 or MAT-012) is eligible; Student choice of major does not affect eligibility

Summer Bridge Outcomes I

	Fall '16 AMP-UP Bridge	Fall '17 AMP-UP Bridge
Assigned	51	62
Finished	39	55
Passed	39	54
Attended BCC in Fall	43	57
<i>Among Finished</i>	37	54
Average Time in ALEKS	10.2 hrs	11.4 hrs
Average Final Grade	84%	81%
% Passed	76%	87%
% Passed among BCC starters	86%	95%

Sub-Study Recruitment

Random Assignment	Number of Students
Control Group	68
Summer Bridge Program	69
Total Students	137

- Recruitment was from July 12th to August 15th
- Student recruitment, consent, and randomization was conducted by AMP UP student assistants

Summer Bridge Outcomes II

	Fall '16 AMP-UP Bridge	Fall '17 AMP-UP Bridge	Fall '17 Sub-Study Bridge
Assigned	51	62	69
Finished	39	55	42
Passed	39	54	41
Attended BCC in Fall	43	57	47
<i>Among Finished</i>	37	54	36
Average Time in ALEKS	10.2 hrs	11.4 hrs	12.1 hrs
Average Final Grade	84%	81%	79%
% Passed	76%	87%	59%
% Passed among BCC starters	86%	95%	77%

Discussion – One Size Fits All?

- Co-requisite might be the ideal, but not every college is ready to make changes of this magnitude
- Many colleges still emphasize the developmental math route through algebra for STEM fields and other popular major areas
 - Good to accelerate students through if they are ready
 - Accelerated courses create scheduling challenges
- Bridge program is an opportunity to fulfill students' basic math requirements in a fraction of the time
- How can recruitment be improved?