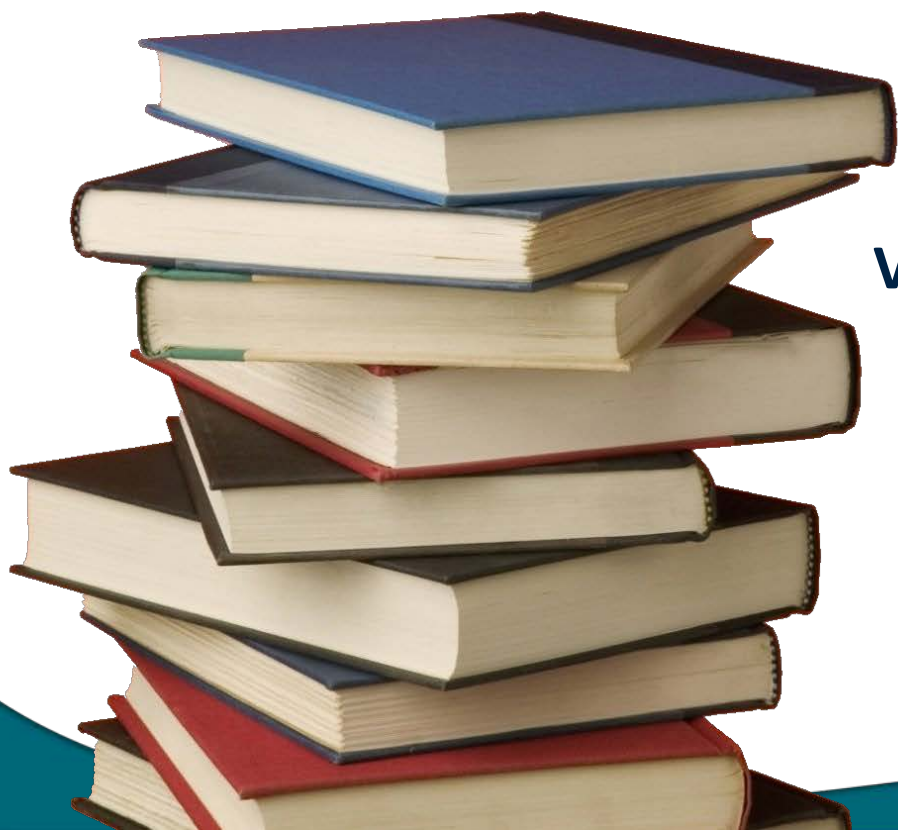


Highs and Lows of Co-Requisite Implementation



Linda Braddy, Ph.D.
Vice President for Academic Affairs
Tarrant County College



TCC | Tarrant County College

SUCCESS WITHIN REACH.

Co-Requisite Models

Co-Requisite Models

Three variations

- **Paired** courses
 - Two 3-hour courses
 - Students enroll in a total of 6 hours
- Non-course-based options (**NCBO**) with a college level course
 - 1 hour NCBO or 2 hour NCBO
 - Students enroll in a total of either 4 hours or 5 hours

Gateway Courses with Co-Reqs

MATH 1314 College Algebra

MATH 1332 Contemporary Mathematics

MATH 1342 Elementary Statistical Methods

MATH 1324 Mathematics for Business & Social Sciences

ENGL 1301 Composition 1

HIST 1301 U.S. History 1

HIST 1302 U.S. History 2

SOCI 1301 Intro to Sociology

PSYC 1302 General Psychology

Additional Success Initiatives

- National research shows mathematics course requirements are the biggest barrier to degree completion.
 - In particular, students get stuck in the developmental abyss and never get out (exponential decay with only 50% success at each level)
- In addition, students have tended to delay enrollment in mathematics courses.

Additional Success Initiatives

- At TCC, TSI liable students are required to stay enrolled in at least one developmental course until they are TSI met.
- If they drop their only developmental course, they are dropped from all courses.
 - Unanticipated consequences
 - We ran out of seats in developmental mathematics classes
 - VPAAAs saw an endless stream of students requesting exceptions (decreased as time when on)

Additional Success Initiatives

- TCC implemented **mathematics pathways** in Fall 2017
 - Algebraic
 - MATH 1314 College Algebra
 - Requires TSI score of 350 or above
 - Non-algebraic
 - MATH 1332 Contemporary Mathematics
 - MATH 1342 Elementary Statistical Methods
 - Requires TSI score of 340-349

Enrollments

Student Enrollments

Fall 2018 as of Aug 15 (5 days prior to start date)

State mandated goal was 25% for 2018-19

	Enrolled in Dev Ed	Enrolled in Co-Req	Enrolled in Co-Req
Mathematics	4,664	1,553	33%
Reading/ Writing	2,853	801	28%

Student Enrollments

Fall 2019 as of June 6 (NE only)

State mandated goal is 50% for 2019-20

	Enrolled in Co-Req
Mathematics	53%
Reading/ Writing	100%

Successes

Stronger Collaborations

- Stronger cross-functional collaborations between academic affairs and student affairs
- Communication among faculty and advisors:
 - One-page advising guides created by faculty for advisors
 - Continuous communication between Directors of Advising & Counseling and department chairs regarding enrollment management
- We placed registration restrictions on stand-alone developmental classes to ensure students were advised properly about co-requisite courses (no self-registration allowed)

Success Rates in College-Level Courses **by Remediation Type**

Success Rates in College-Level Courses by Remediation Type

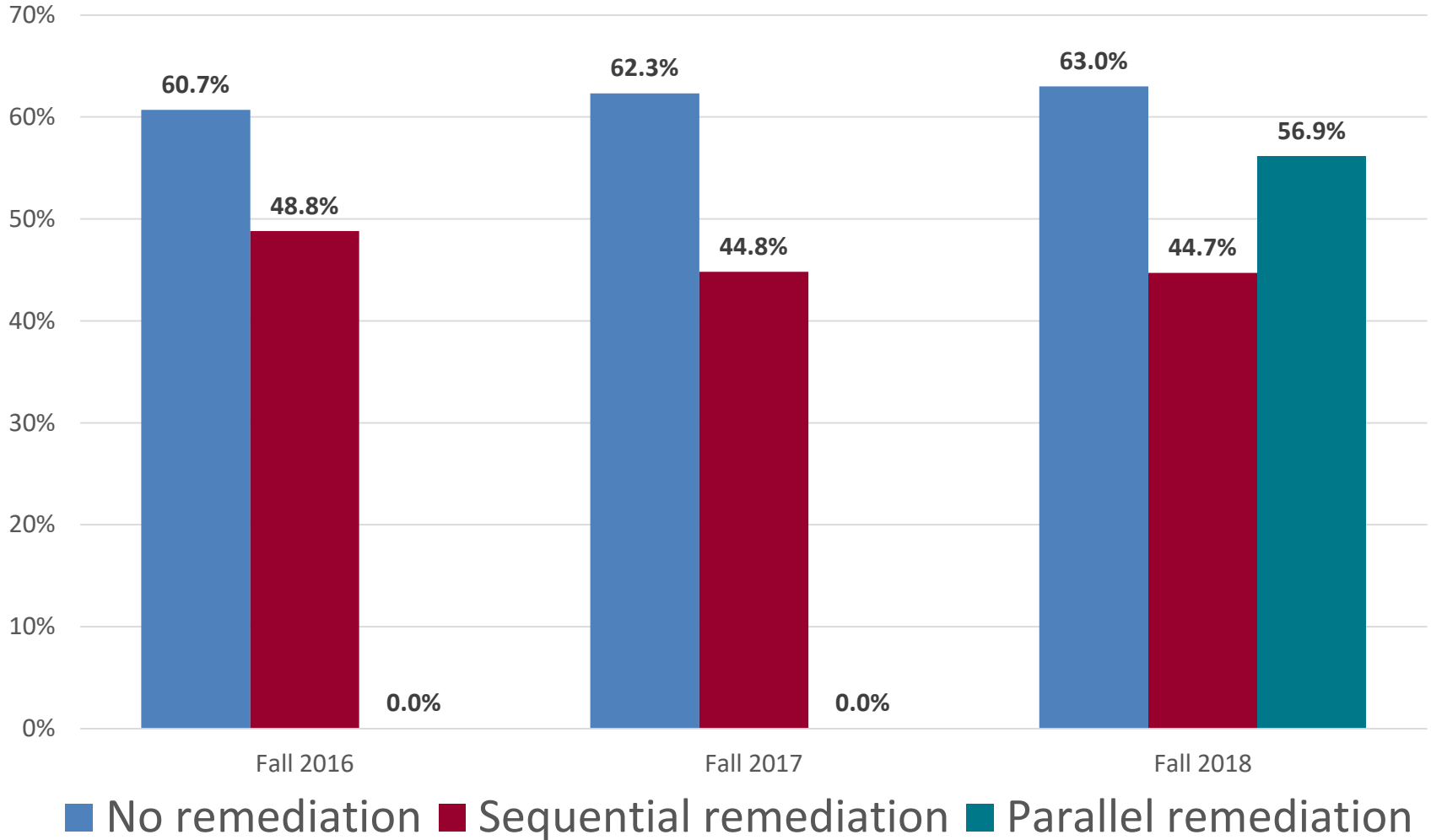
Definitions

No remediation: Student did not take a developmental course in any term prior to the college-level math course or in the same term as the college-level math course in Fall 2018

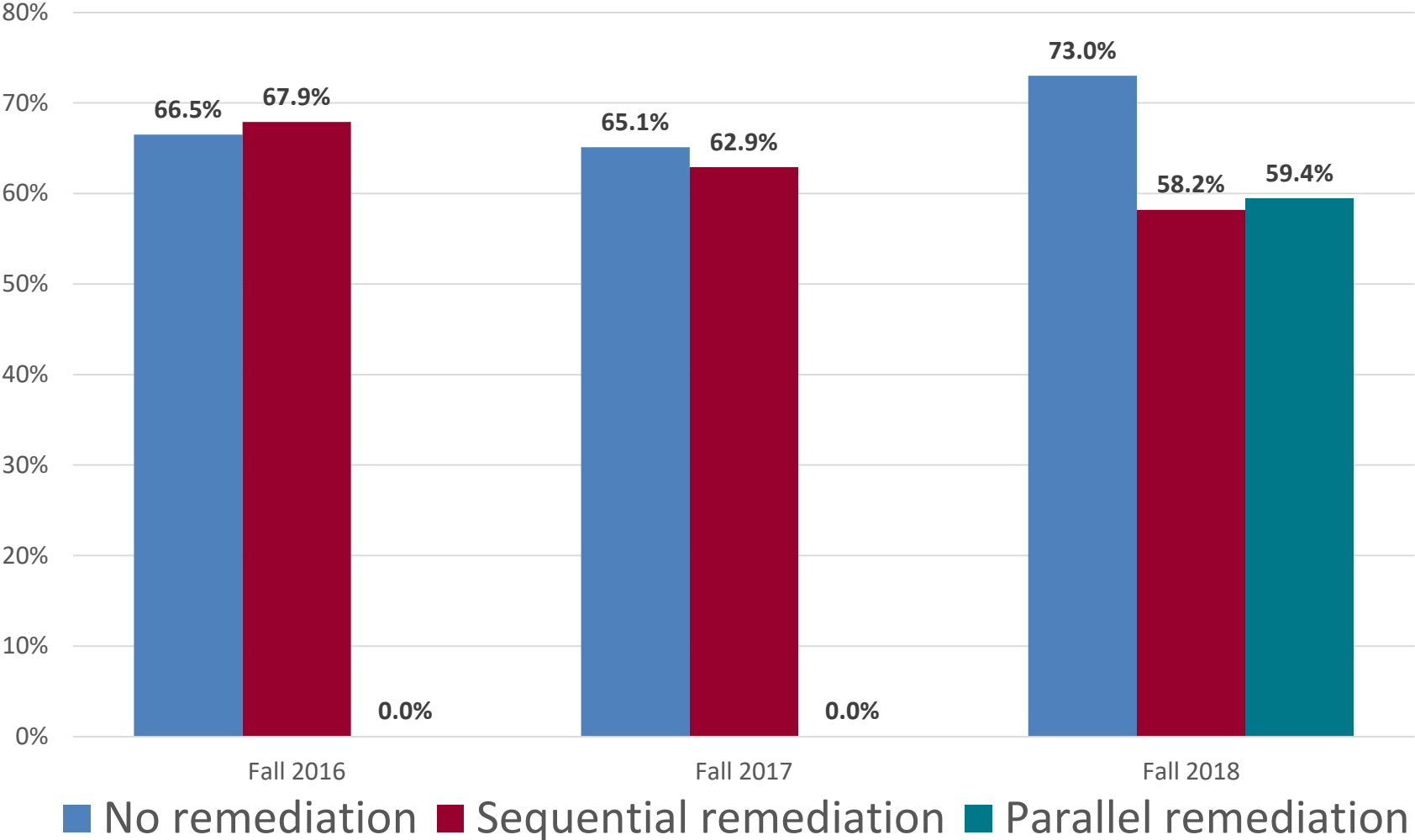
Sequential remediation: Student took a developmental course in some term prior to the college-level math course or in the same term as the college-level math course but not as a co-requisite in Fall 2018

Parallel remediation: Student did not take a developmental course in a term prior to the college-level math course but took a co-requisite developmental course with college-level course in Fall 2018

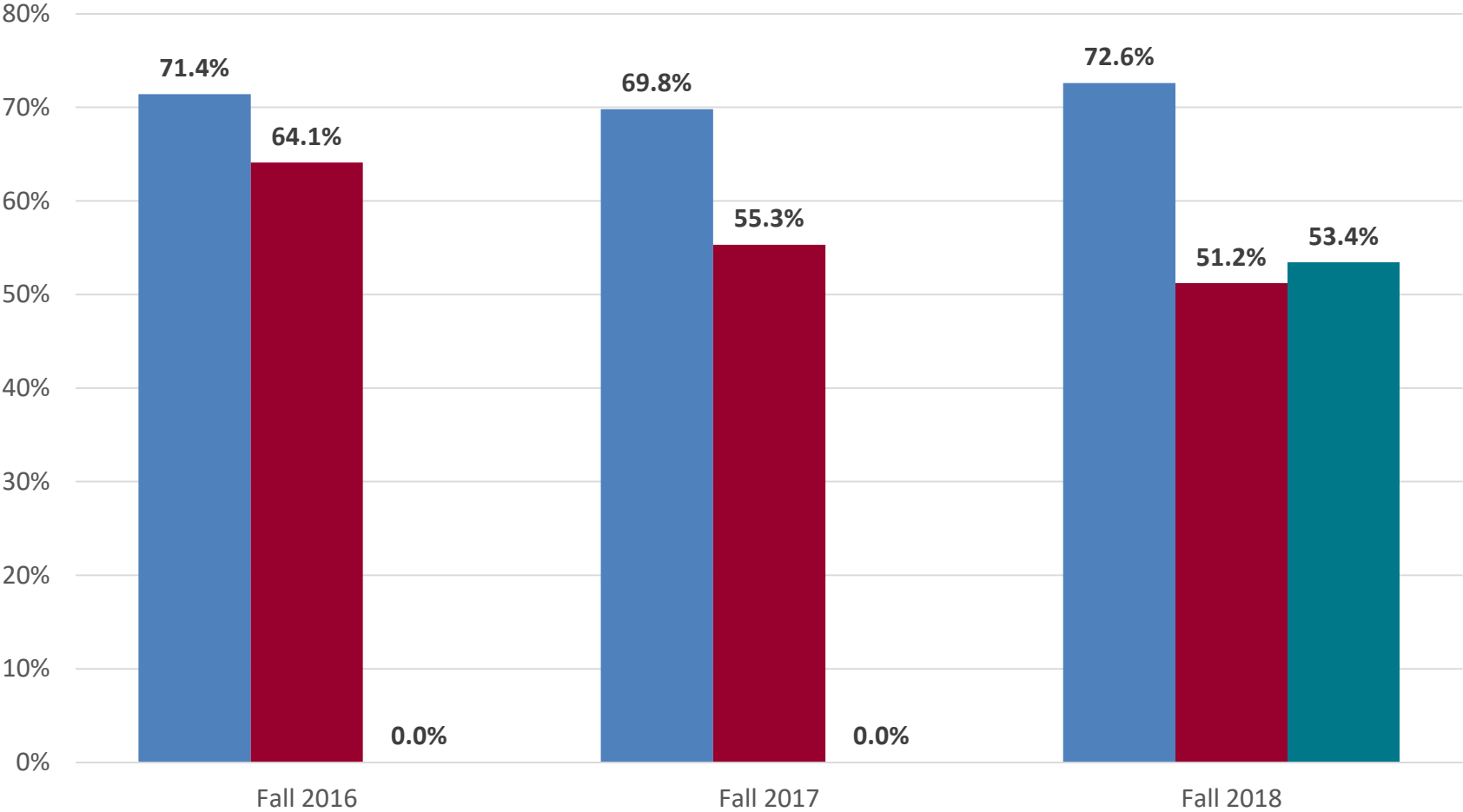
MATH 1314 College Algebra



MATH 1332 Contemporary Mathematics

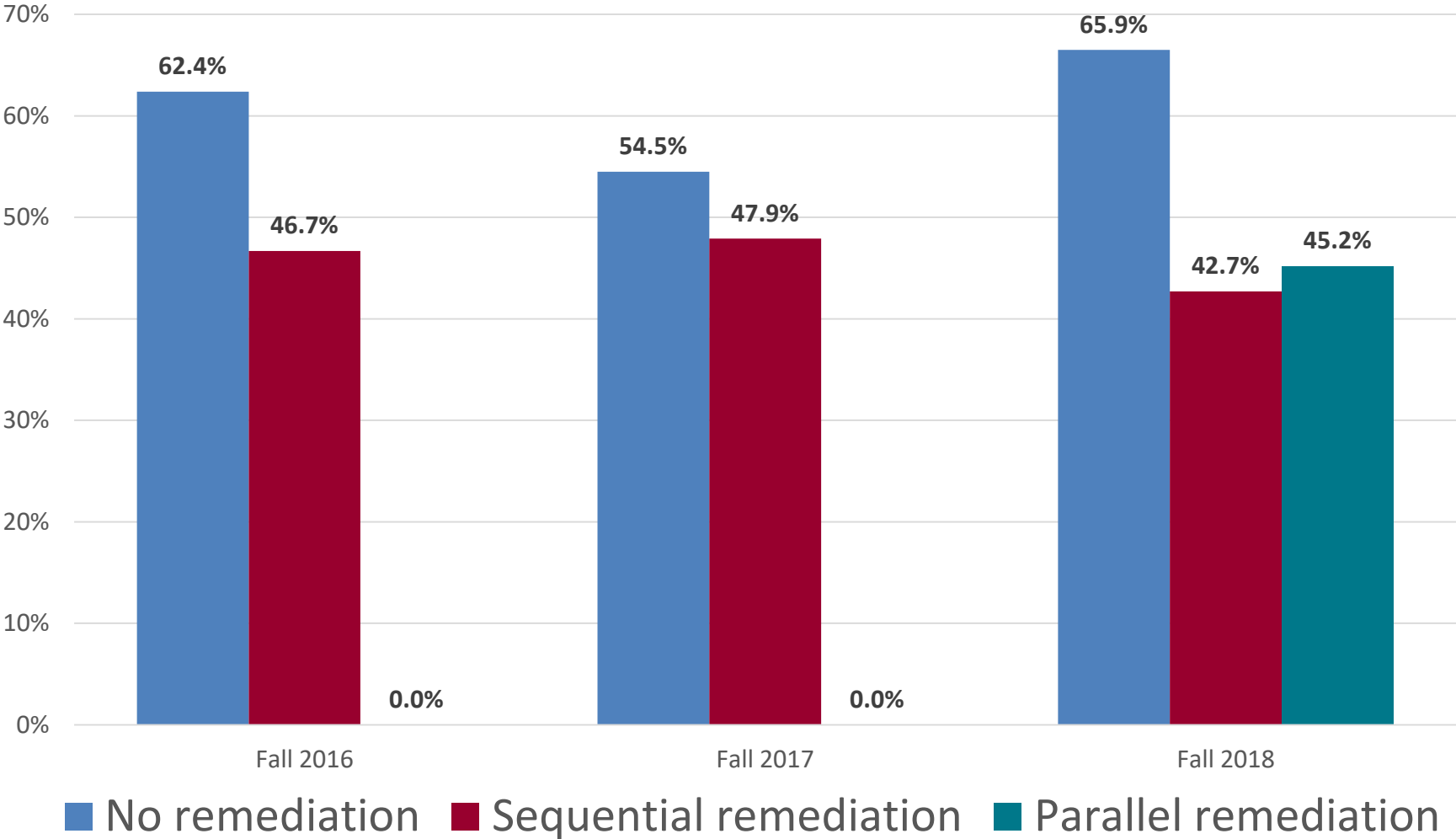


MATH 1342 Elementary Statistical Methods

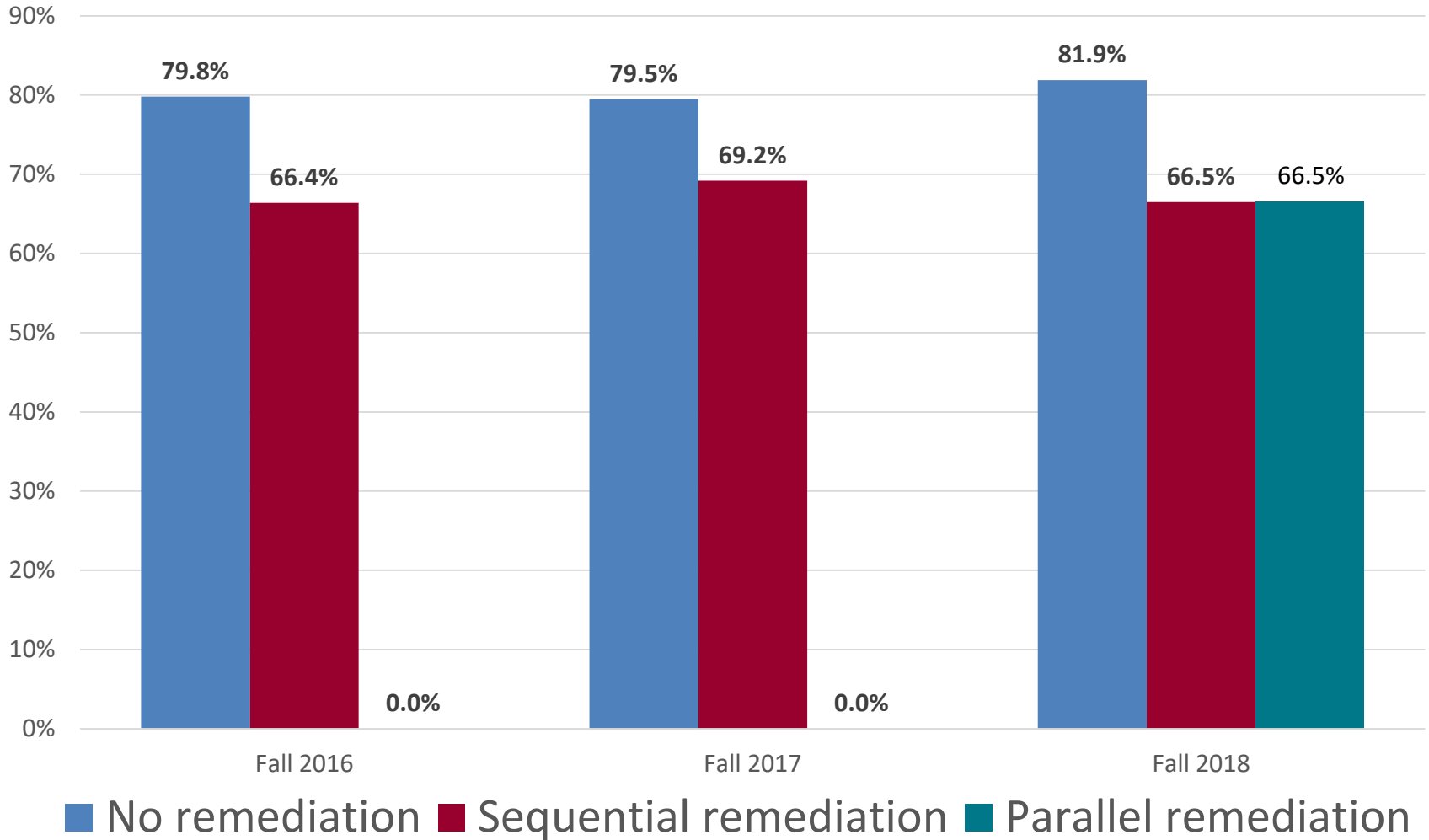


■ No remediation
 ■ Sequential remediation
 ■ Parallel remediation

MATH 1324 Mathematics for Business & Social Sciences

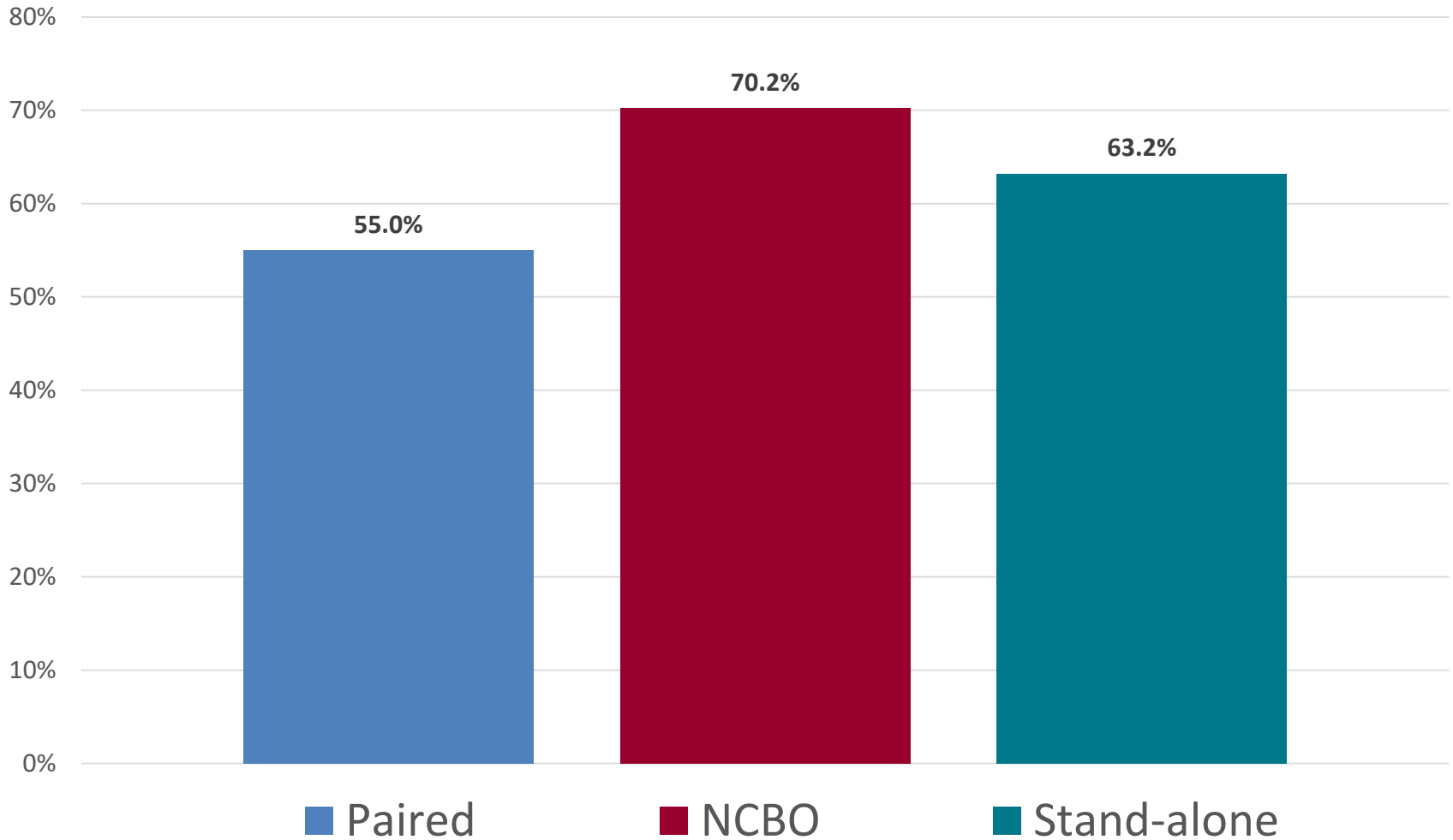


ENGL 1301 Composition 1

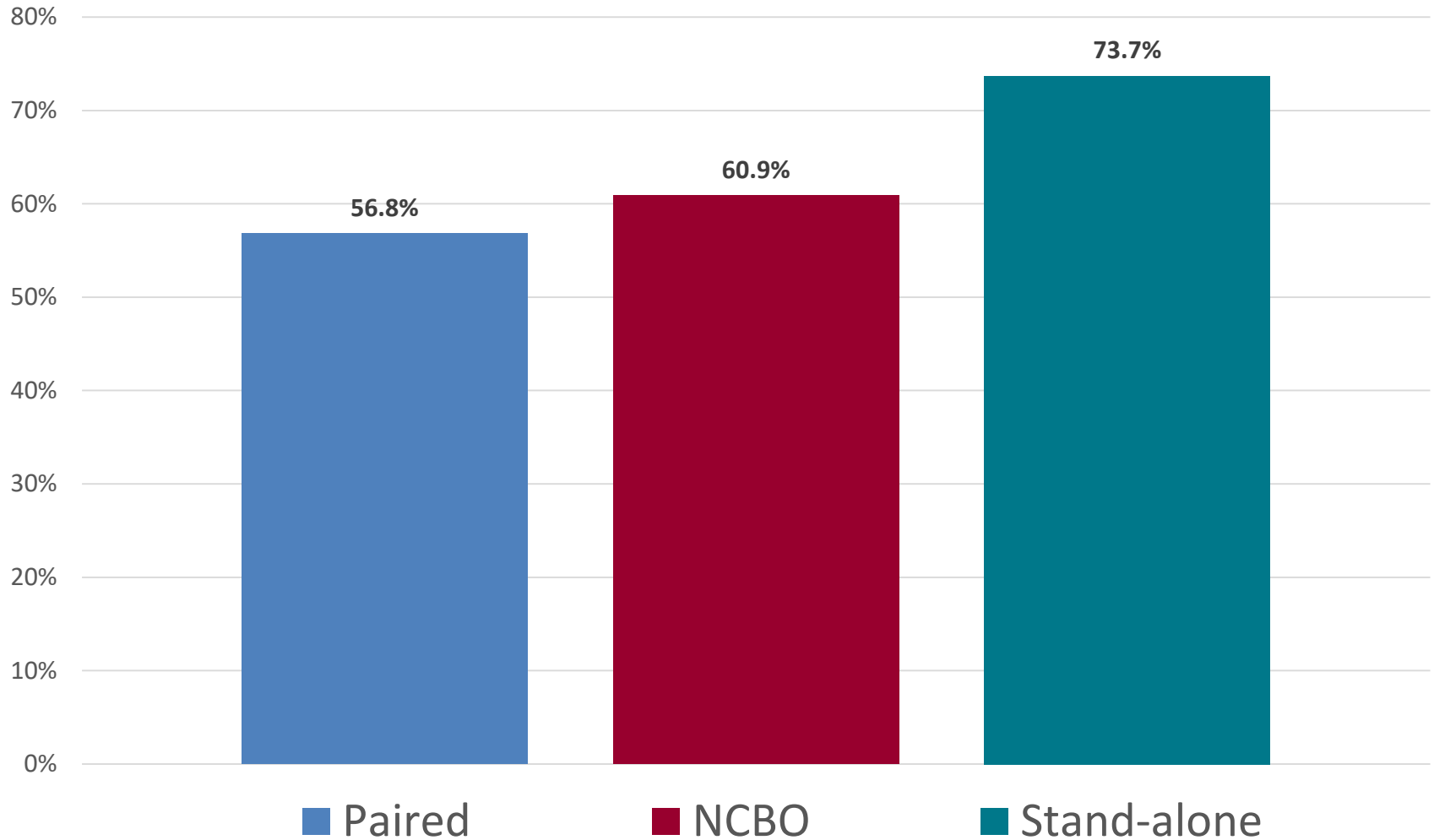


Success Rates in College-Level Courses **by Co-Req Model**

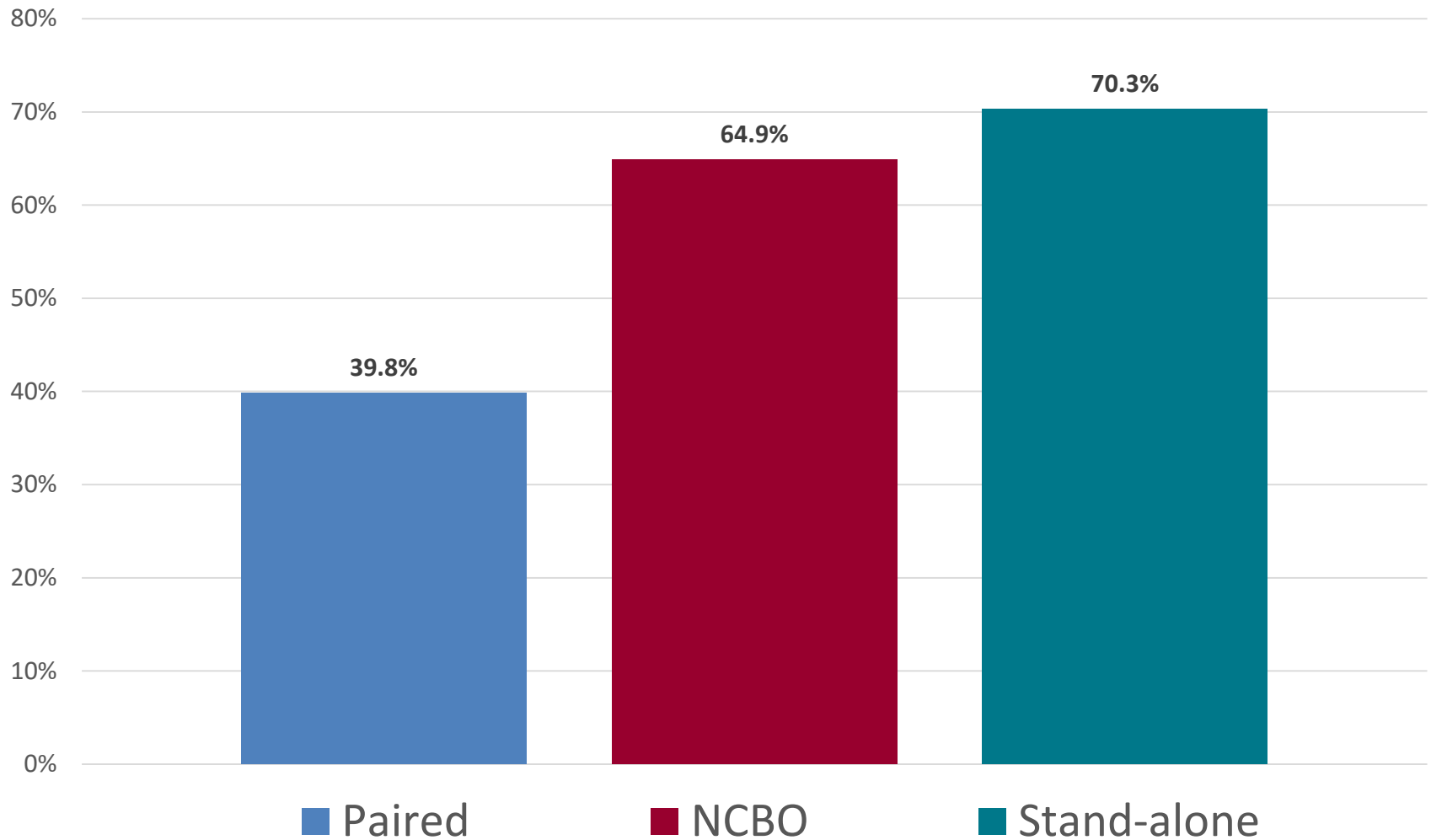
MATH 1314 College Algebra



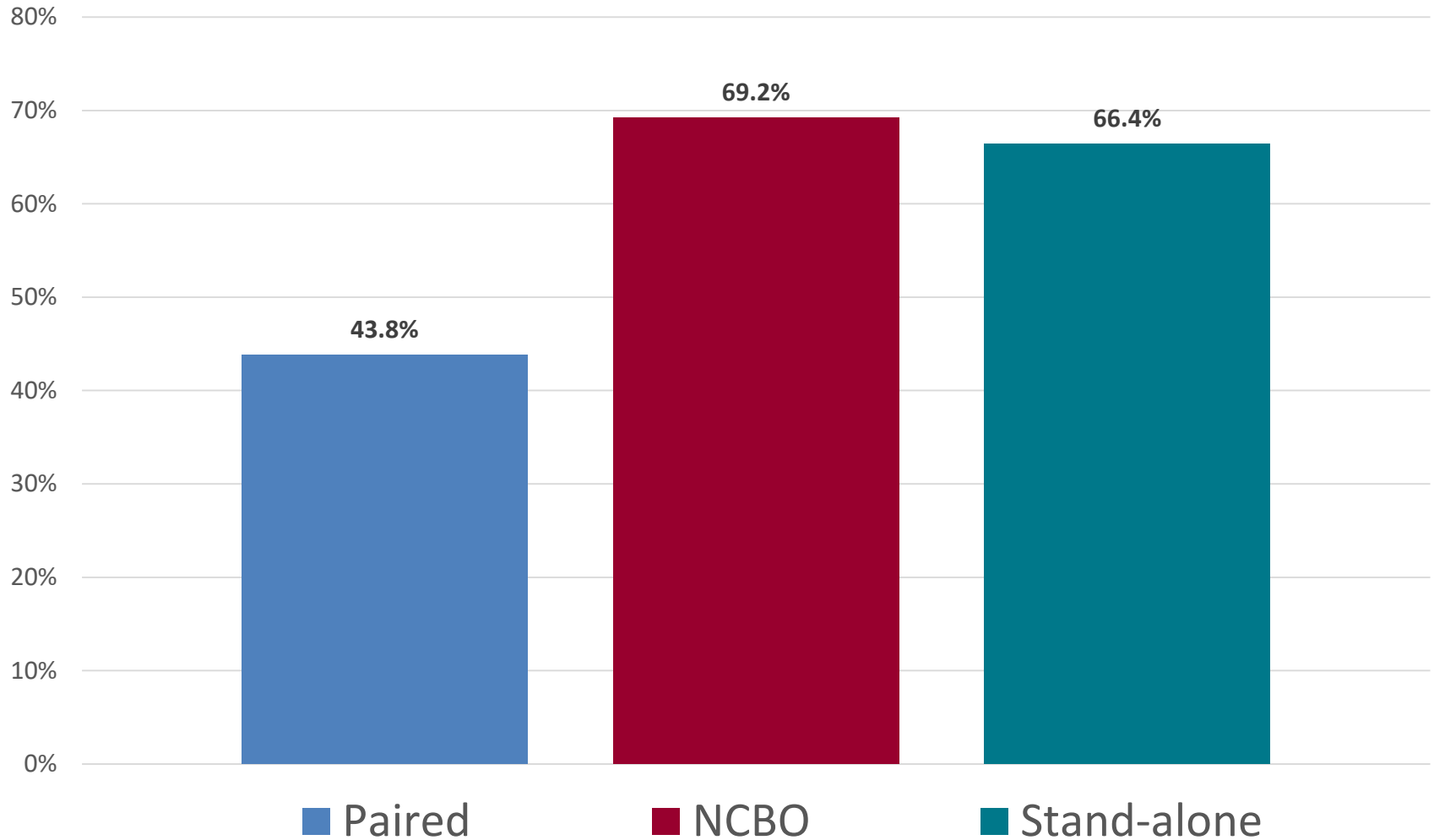
MATH 1332 Contemporary Mathematics



MATH 1342 Elementary Statistical Methods



MATH 1342 Mathematics for Business & Social Sciences



Throughput

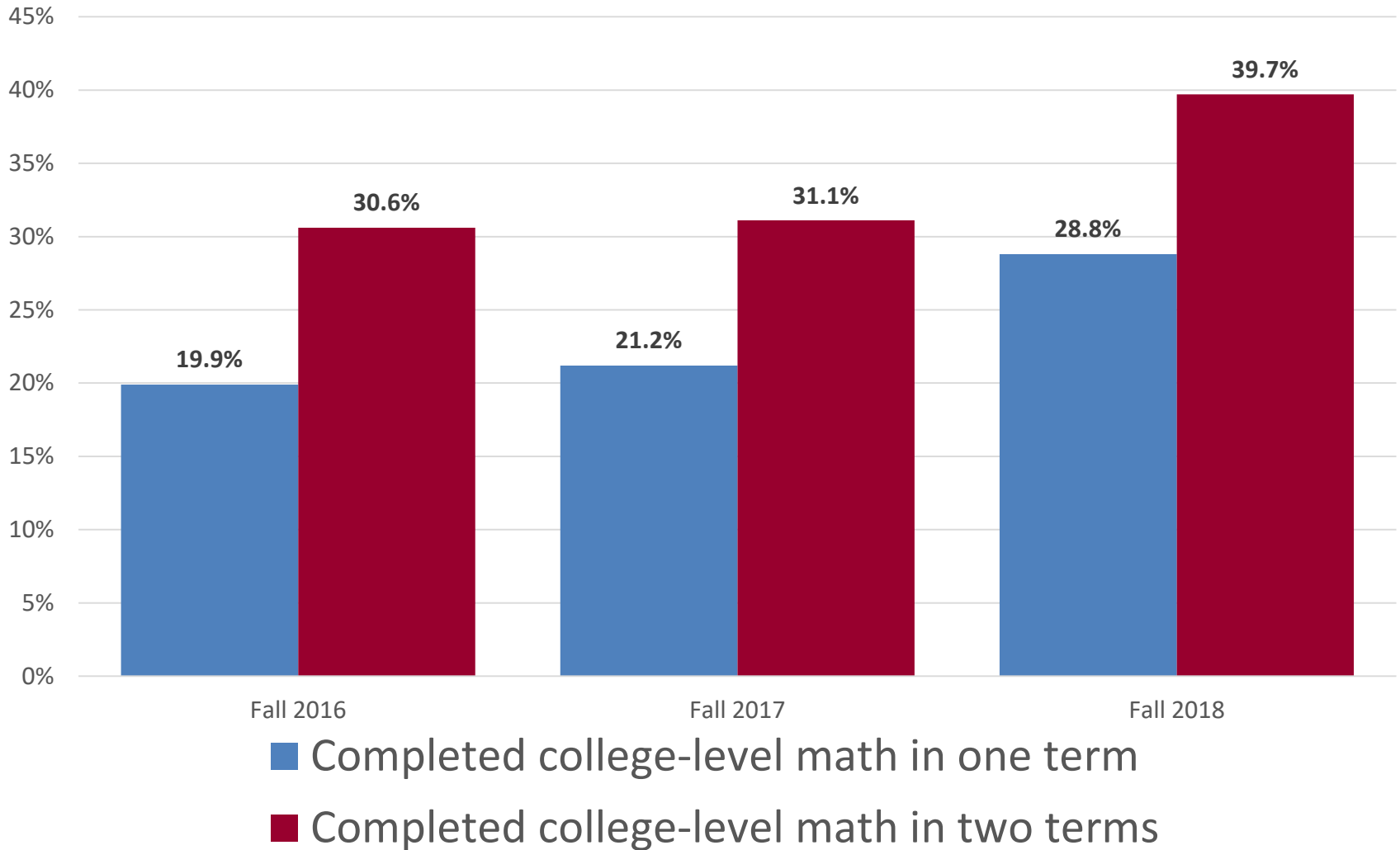
First pass

Not disaggregated by Course or Co-req Model

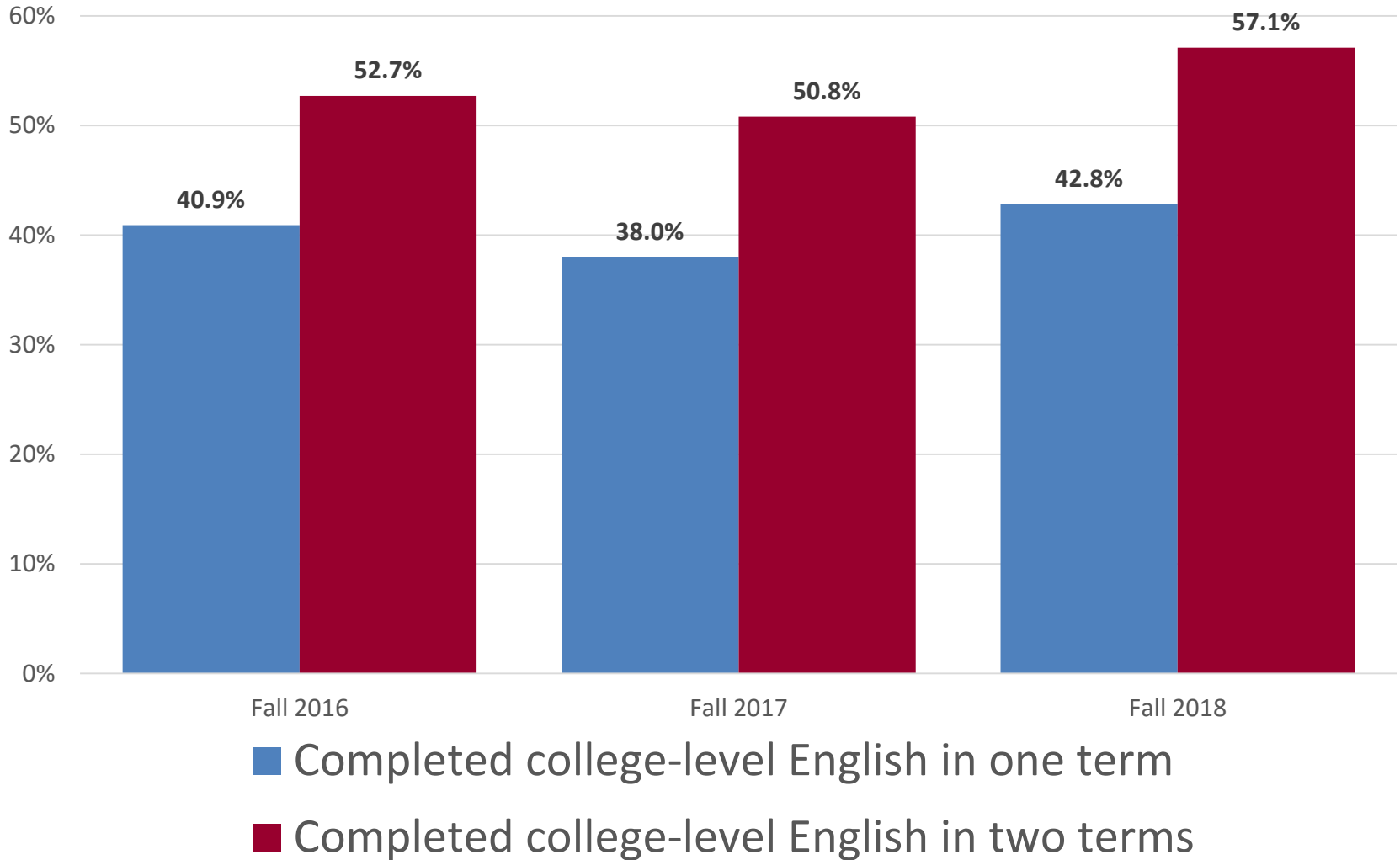
Throughput

- FTIC cohorts
- Completed college-level course in one term (entry term, fall term)
- Completed college-level course in two terms (looking forward one term to spring)
- MATH 1314, MATH 1332, MATH 1342, MATH 1324
- ENGL 1301
- Implemented mathematics pathways in Fall 2017
- New cut scores in reading/writing in Fall 2017

Mathematics



English 1301



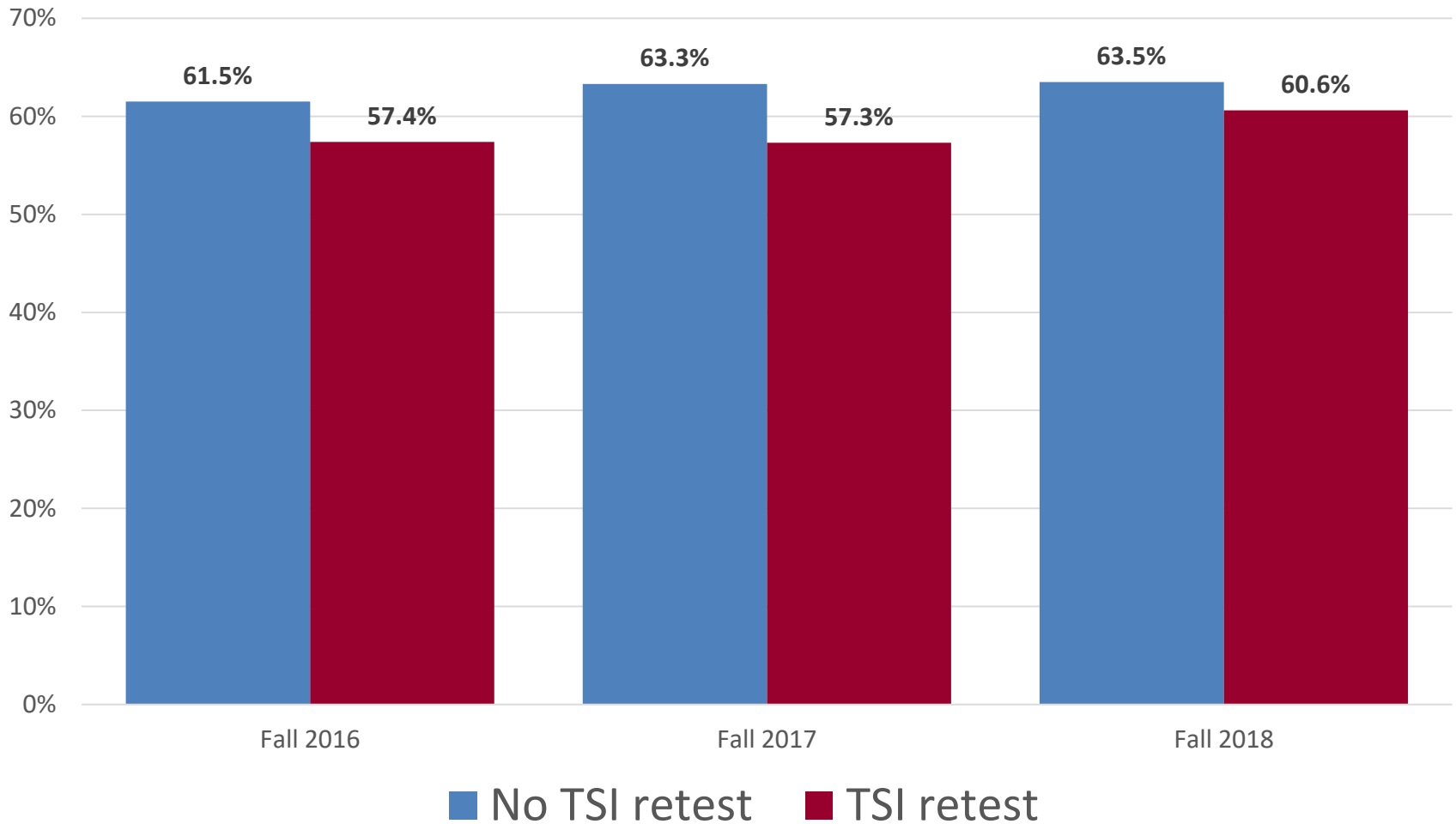
TSI Retests

TSI Retests

- MATH 1314 students in “no remediation” group (not FTIC cohort)
- Requires at least 350 on TSI
- Disaggregated by “TSI retest”
- “TSI retest” = Students scored below 350 on first attempt of TSI test but retested and scored 350 or higher

MATH 1314 College Algebra

No Remediation Group



Why is this data noteworthy?

- Some perceive students “play the system” and a higher TSI retest score does not indicate college-readiness.
- This data indicates students are not “harmed” by placement based on a TSI retest.

Why is this data noteworthy?

- In fact, this data indicates students **benefit** in huge ways.
- For example, in Fall 2018 alone, in this one course alone:
 - **309 additional students** passed with A, B, or C **in one semester!!**
 - Not stuck in the developmental abyss!

Challenges

Advising

Beth mentioned advising is complicated....

Advising Guide - Mathematics

TSI ASSESSMENT	COURSE PLACEMENT	
	ALGEBRAIC	NON-ALGEBRAIC
310 – 335 with ABE Diagnostic Level 1 – 4	Adult Basic Education	Adult Basic Education
310 – 335 with ABE Diagnostic Level 5 – 6 Or 336 – 339	First developmental education course for 3 hrs	<p>Credit-NCBO Pair: Contemporary Math with Support NCBO (1 hour) for a total of 4 hrs or Statistics with Support NCBO (1 or two hour options) for a total of 4-5 hrs</p> <p>Credit-Developmental Course Pair: Each course is 3 hours for a total of 6 hrs</p> <p>Developmental stand alone 3 hrs</p>
340 – 349	<p>Credit-NCBO Pair: Support NCBO is two hours for a total of 5 hrs</p> <p>Credit-Developmental Course Pair: 6 hrs</p> <p>Second developmental course stand alone 3 hrs</p>	College level non-algebra course with NCBO support
350 – 390	COLLEGE READY	COLLEGE READY

Advising Guide - Reading/Writing

TSI ASSESSMENT		COURSE PLACEMENT
READING	WRITING	
310 – 337 and ABE Level 0 – 6	310 – 327 and ABE Level 0 – 6 and Essay 0 – 4	INRW 0090
338 – 347	328 – 335 and ABE Level 4 – 6 and Essay 0 – 4	Developmental Course + Approved Credit Course OR NCBO + Approved Credit Course
348 – 350	336 – 339 and Essay 0 – 4 OR < 340 and Essay 0 – 3	NCBO + Approved Core Course
351	340 and Essay 4 OR < 340 and ABE Level 4 – 6 and Essay 5	COLLEGE READY

Staffing

Beth also mentioned staffing challenges

- As we scale up, we will need more faculty who can teach college-level courses
- We anticipate losing some great adjuncts who teach only developmental-level courses
- We also need additional instructional staff in our tutoring centers

Communication

- Always a challenge
- Specifically, we have missed some opportunities to communicate with students
- Initially, we did a better job communicating the options for paired courses than for NCBOs
- Initially, enrollments in NCBOs lagged
- Student apprehension about “taking two math classes at the same time”

Moving Forward

Moving Forward

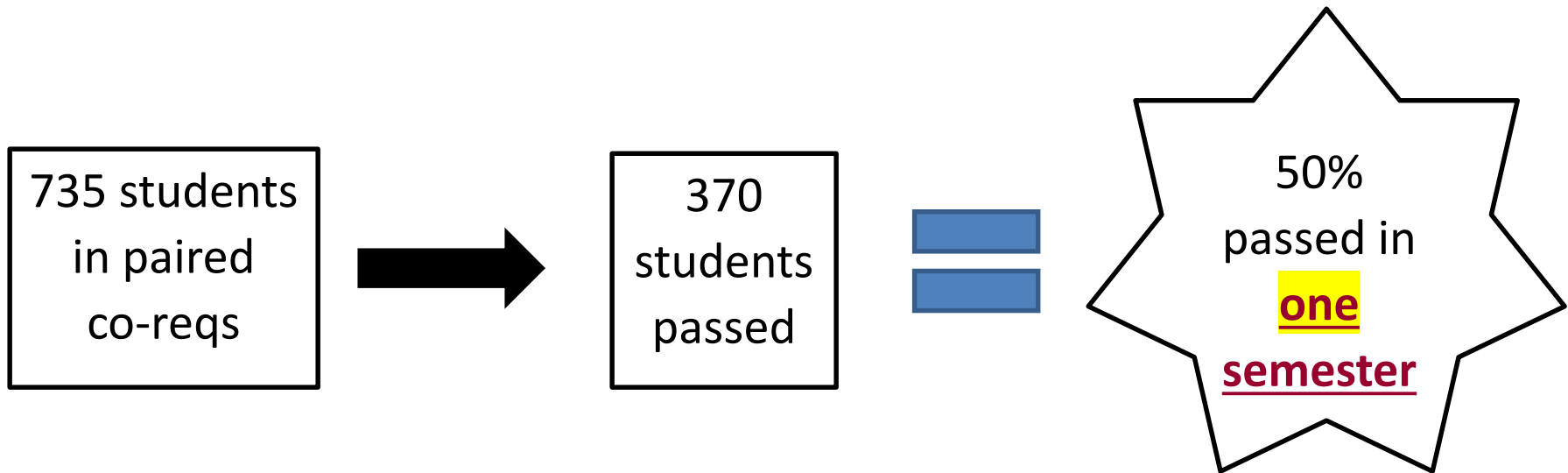
- Hire adjuncts who can teach college-level courses (not just developmental)
- Move immediately to 100% co-requisite model for reading/writing (state mandated goal is 50% → 75%)
- Discontinue co-requisite model for MATH 1324 Mathematics for Business and Social Sciences due to low enrollments in past semesters

Moving Forward

- Analyze and track throughput
 - Disaggregate by course
 - Disaggregate by co-requisite model
- Perform course sequence analysis for MATH 1314
College Algebra → subsequent mathematics courses
 - Disaggregate by co-requisite model
 - Disaggregate by college-readiness status upon entry to TCC

Projected Improvements

Documented Fall 2018



MATH 1314 College Algebra

Projected Fall 2019 & Beyond

If those 734 students had instead taken stand alone Math 0362 in Fall 2018



46.7% pass rate; 343 would have passed; enrolled in Math 1314 in Spring 2019*



56% pass rate; 192 would have passed

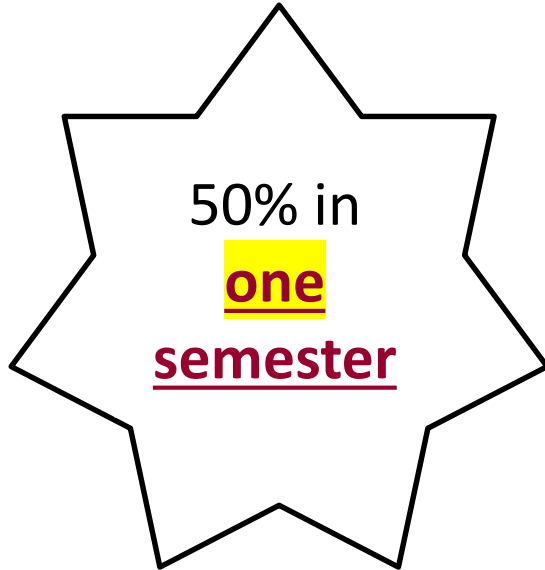


*It's possible some would not have even enrolled in Math 1314 the following semester

26% would pass in **two** semesters

Comparison Summary MATH 1314

Co-Requisite Model
(documented)



Traditional Model
(projected)



Parallel Remediation

Sequential Remediation

Comparison Summary MATH 1314

Co-Requisite Model
(documented)

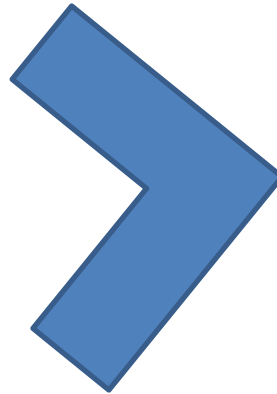


Parallel Remediation
1 semester

Traditional Model
(projected)



Sequential Remediation
2 semesters



Comparison Summary MATH 1314



**We left 178 students
in the
developmental abyss!!**

Comparison Summary MATH 1314



**At what point are we
guilty of educational
malpractice??**

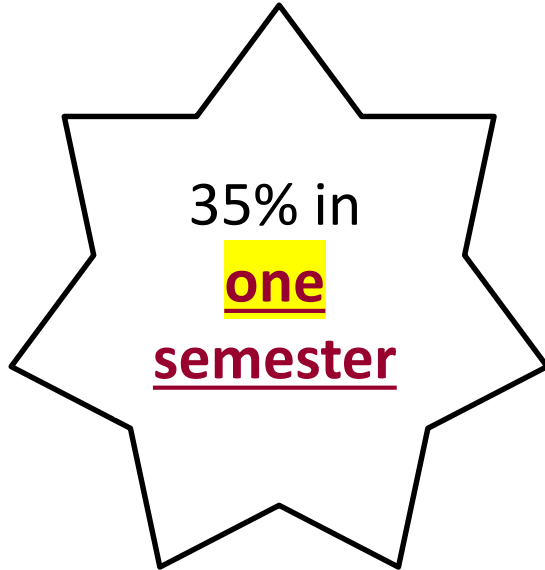
Similar Projections for Non-Algebraic Pathway

MATH 1332 Contemporary Mathematics

MATH 1342 Elementary Statistical Methods

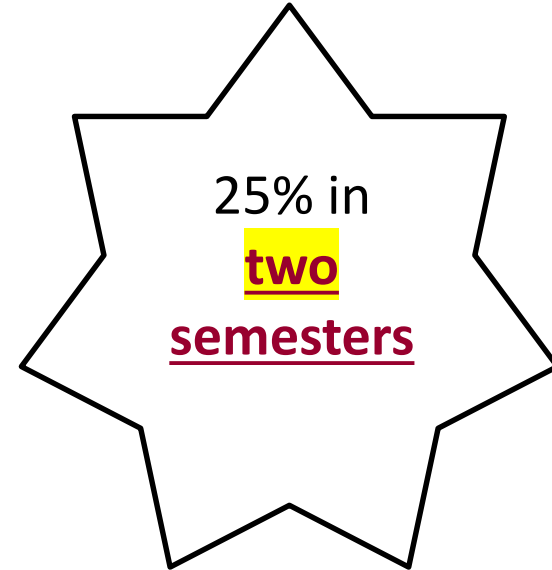
Non-Algebraic Pathway Summary

Co-Requisite Model
(documented)



Parallel Remediation

Traditional Model
(projected)



Sequential Remediation

Non-Algebraic Pathway Summary

Co-Requisite Model
(documented)

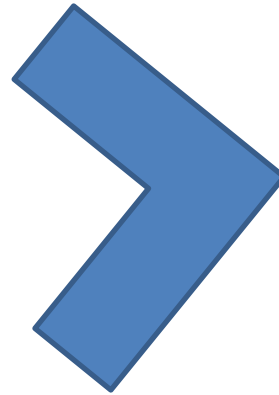


Parallel Remediation

Traditional Model
(projected)



Sequential Remediation



National Trends

Workshop on Developmental Mathematics Education

NATIONAL ACADEMIES OF SCIENCES (NAS)

NAS Workshop

Workshop on developmental mathematics education

- Multiple pathways
- Co-requisite model of remediation
- Placement
- Equity

Link to video recording:

http://sites.nationalacademies.org/dbasse/bose/developmental_math/index.htm

Highlights

- Carnegie, Dana Center at UT Austin: Mathematics **pathways**
- Statewide efforts
 - California: **Multiple measures placement** process
 - Tennessee, Georgia: **Exclusively co-requisite model** in mathematics
 - Texas: Scaling up co-requisite model
- TPSE Math: **Upper division pathways**, alternate points of entry

NAS Vision (Summary)

- We are ensuring **equitable opportunities for ALL students** to learn the mathematics they need to navigate the world and achieve their life goals.
- Mathematics is a human experience: students experience the **power** and **beauty** of mathematics and experience **joy** in doing mathematics.
- Mathematics education enables people to use mathematical tools effectively and ethically in **integrated ways**.

NAS Vision (Summary)

- “Developmental education” will no longer exist. Instead, it’s “**College mathematics for ALL**” and “Mathematics literacy for ALL.”
- Placement is no longer necessary. Rather, **guidance into appropriate pathway and appropriate academic support for individual learners.**

NAS Vision (Summary)

- **Demographics are no longer barriers.**
- More students in high demand fields that **reflect the population.**
- National free college model.
- **Barriers among K-12, 2-year, and 4-year institutions are eliminated; pathways are aligned and span the entire spectrum of education; no more repetition, no more blame game, no more unproductive competition.**

NAS Vision (Summary)

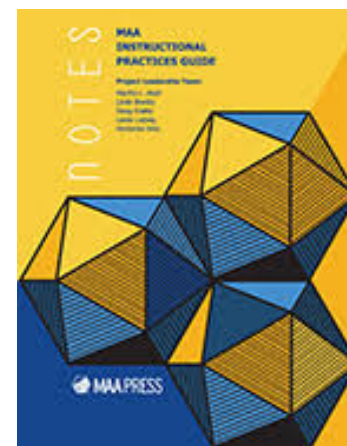
- **All pathways are rigorous.**
College Algebra and Calculus are no longer synonymous with rigor.

What's Missing (nationally)?

- Data to identify the students who are not currently being served by pathways & co-requisite models
 - Lack of success
 - Lack of access to the intervention
- Qualitative Data
 - Students' race-based experiences with mathematics reform
 - Instructional practices

What's Missing (nationally)?

- Tenure and promotion systems that reward this kind of work
- **Faculty development** at scale that addresses issues of **equity** and **evidence-based instructional practice**



(See MAA's Instructional Practices Guide at

https://www.maa.org/sites/default/files/InstructPracGuide_web.pdf)

Questions?

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