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# Quantitative Leap! Webinar 4: Seizing Twelfth Grade to Improve Math Readiness: Senior-Year Transition Courses

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With Support from the College Futures & James Irvine Foundations



# Challenge of Math Readiness: State-Level Perspective

## NOT PROFICIENT

**California Community  
Colleges**

~ 85 percent of incoming students    ~ 234,000 students

**California State University**

~ 33 percent of admitted high  
school graduates    ~ 20,000 students

**University of California**

unknown  
(~ 18 percent UC-Riverside)    unknown  
(749 students UCR)



# Three hurdles for improving math readiness

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- Defining readiness
- Improving effectiveness of placement processes
- Improving preparation in high school





# So far in the Quantitative Leap! Webinar Series...

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- **1 – Re-Defining Math Readiness.** How higher ed institutions and systems are re-thinking math required for admission and graduation
- **2 – Increasing Placement Accuracy.** Limitations of traditional placement exams and initiatives to improve placement accuracy
- **3 – Improving Preparation Opportunities.** Unpacking the links between high school course-taking and math readiness

***TODAY:** Can transition math courses in the senior year ensure that more students can be college ready in mathematics?*



# Quantitative Leap! Brief recommended:

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- College-ready opportunities for all high school students
- Multiple ways to acquire proficiency
- Senior-year transition courses





# Senior-Year Transition Courses

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- Pioneered by Cal State in English
  - tied to 11<sup>th</sup> grade standards test
  - ERWC – Expository Reading and Writing Course
- Multiple states have developed courses in math and English
- Avenue for becoming college-ready (exempt from dev ed)
  - the course itself
  - placement test or other standardized test
- New investment in California
  - \$6.4 million Math Readiness Challenge



# Today's Discussion: What Do We Know?

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- Experience with English transition courses – ERWC
- Early evidence around math transition courses nationally and in California
- Implications for college readiness and completion
- Implications for equity



# Today's Presenters

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Pamela Burdman  
Fellow, The Opportunity Institute



Angela Boatman  
Assistant Professor of Public Policy and  
Higher Education, Vanderbilt University



Neal Finkelstein  
Senior Research Scientist, WestEd



Pitt Turner  
Professor of Mathematics, Sierra College



Elisabeth Barnett  
Senior Research Associate,  
Community College Research  
Center, Teachers College, Columbia  
University

*Send us your questions during the presentation!*

# **Lessons from the Expository Reading and Writing Course (ERWC): Implications for 12<sup>th</sup> Grade Math Transition Courses**

Neal D. Finkelstein, Senior Research Scientist, WestEd



# What is ERWC?

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- ERWC is a high school 12<sup>th</sup> grade English course that meets A-G requirements
- The course is carefully aligned to California's English Language Arts standards
- The course was initially developed by the CSU 20 years ago. Refinements have been frequent and significant
- Significant partnership with K-12 colleagues to deliver support to teachers and certify the training
- Student completers enter the CSU and CCC without the need for remediation, by policy



# ELA and Math in Context

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- California's 2016-17 budget asks how a program of math transition courses can mirror the success of ERWC in California
- Increasing interest statewide in how to reduce remediation rates in math at community colleges and CSU campuses



# ELA and Math Sequences

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- Cumulative demonstration of proficiency throughout high school is critical
- A-G details matter in practice. What a difference a three year (math) and four year (English) requirement makes to student patterns. Courses must “validate”
- Algebra **proficiency** is often sufficient to avoid community college remediation; high school seniors often become rusty



# ERWC Evaluation Overview

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- Four-year Investing in Innovation (i3) Development grant
  - Fresno County Office of Education, California State University and WestEd
- High school impact analysis and follow-on of student success in college (2 years in total)
- English Placement Test (EPT) used as outcome measure for the study
- Qualitative Implementation Data Analysis



# Data

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- 9 California school districts, 24 high schools
  - 56 ERWC teachers, 58 non-ERWC teachers
- 5,170 students in the study dataset
  - 3,309 students took ERWC (64%)
  - 1,861 students took a non-ERWC class (36%)
    - The non-ERWC classes were primarily English 4 and AP Literature



# Matching

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- Matched ERWC to non-ERWC students based on the following characteristics
  - Ethnicity and Gender
  - Grade 11 ELA California Standards Test (CST) Score
  - Grade 11 English course (AP or non-AP)
  - Average Grade 11 English grades



# Impact Results

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- ERWC students scored higher on the EPT compared to similar students who enrolled in other English courses
- Results statistically significant at the 1% level
- In other words, ERWC has a positive impact on student achievement, and this impact was unlikely to have happened by chance
- Effect size of .13 standard deviations



# Fidelity of Implementation

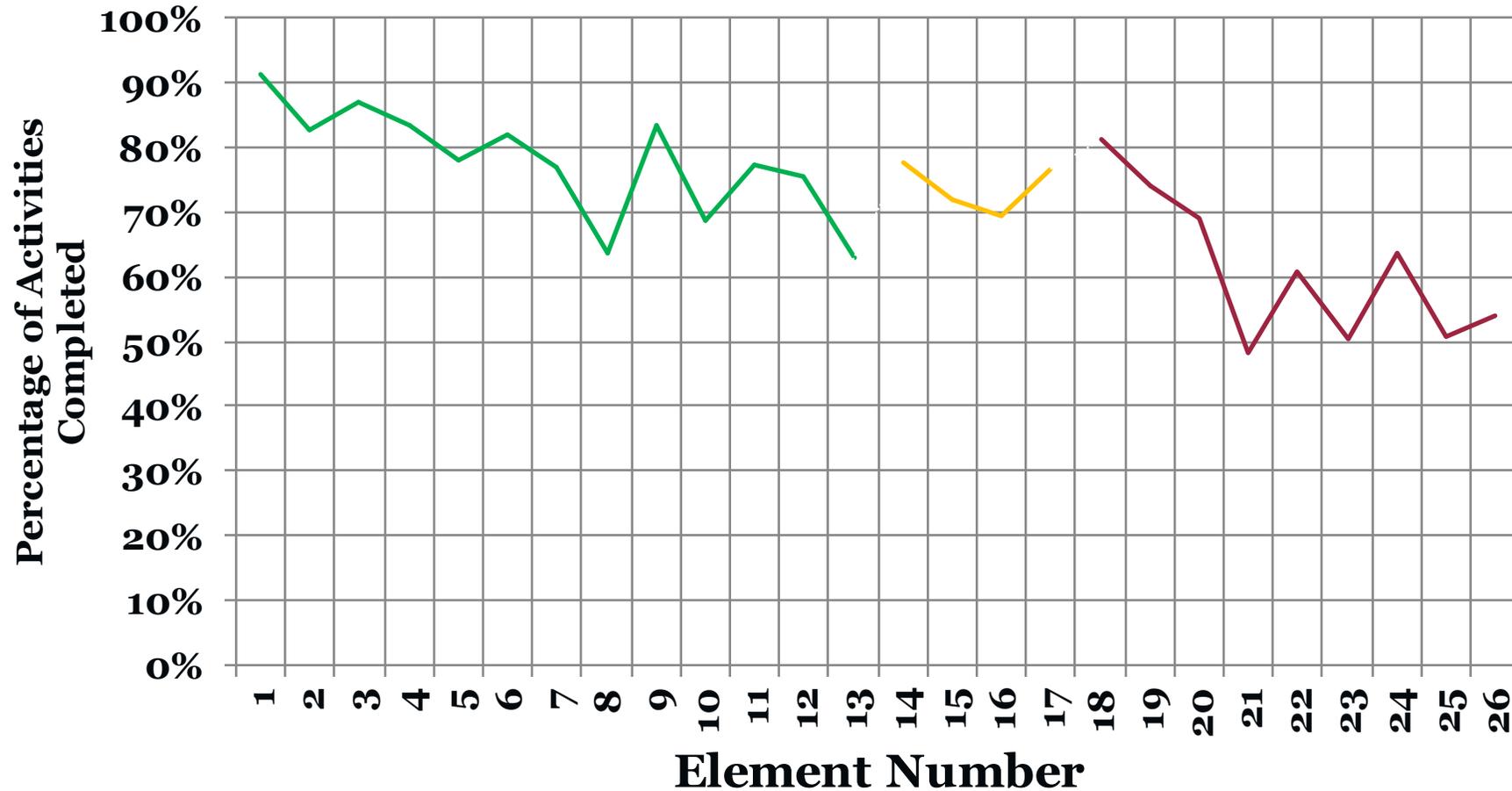
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- To be considered as having taught a module “with fidelity”
  - Teachers needed to complete at least one activity in each of the six strands, or level-2 sections: Prereading, Reading, Postreading, Discovering What You Think, Entering the Conversation, and Revising and Editing
- Teachers needed to teach between eight to ten modules with fidelity
- 17.9% of the study teachers taught at least eight modules with fidelity



# Percentage of Activities Completed

Green = Reading Rhetorically, Yellow = Connecting Reading to Writing, Blue = Writing Rhetorically





# Qualitative Data Sources

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- Implementation Feedback Charts
- Coaching Logs
- Professional Learning Community Logs



# Qualitative Data Analysis Findings

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- **Successes**
  - Teachers noted high levels of student engagement and lively class discussions
  - Teachers noted improvements in students' abilities to think critically and analyze texts in greater depth
  - Student writing improved over the year
- **Challenges**
  - Varying student abilities in the classroom
  - Being able to teach 8-10 modules (pacing)



# Implications

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- Early intervention is better; the ERWC team is interested in embedding strategies in earlier grades
- Placement guarantees are a critical policy issue. How does completing the course signal enrollment in a credit-bearing course, without remediation?
- ERWC fulfills the 4<sup>th</sup> year A-G requirement; with the 3 year A-G math requirement, the difference in sequencing can be material

# **The Impact of High School Transition Courses on Short-Term College Outcomes**

**Elisabeth Barnett, Senior Research Associate, Community College Research Center,  
Teachers College, Columbia University**



# CCRC Research- Reshaping the College Transition

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*Early college readiness assessments:* Assessments administered no later than the 11th grade that measure students' readiness to successfully perform entry-level, credit-bearing postsecondary work.

*Transition curricula:* Courses, learning modules, or online tutorials developed jointly by secondary and postsecondary faculty and offered no later than 12th grade to students at risk of being placed into remedial math or English in college.

# Potential Of Early College Readiness Assessments

## Theory:

Knowledge is power. Students and schools can take action to help students become college ready by graduation.

## Evidence:

Participation in California's early assessment (EAP) reduced students' probability of taking remedial courses in college by 6.1 percent in English and by 4.3 percent in math.

Howell, Kurlaender, and Grodsky (2010)

# Potential Of Transition Courses

## Theory:

A full year course in math or English can be offered to students in the 12<sup>th</sup> grade...

- At no extra cost
- Offering high school credit
- Meeting colleges' criteria for college readiness.
- And sometimes including a mechanism for placing out of developmental education.

## Evidence:

Promising descriptive results from high schools and colleges.

Emerging more rigorous research results.

# Reshaping the College Transition Research

- 50 state scan
- Report on approaches and policies - 4 states
- Implementation report - 4 states
- **Impacts reports - West Virginia and New York**
- Future of Transition Courses brief

Also: Report on HS momentum toward college readiness  
(in collaboration with Jobs for the Future)

# West Virginia: Transition Math for Seniors

## Background

- Developed by HS & College Faculty (2009)
- Statewide implementation 2011-12
- Replaced in 2015-16

## Specifics

- Students eligible if they scored below 680 on WESTEST 2
- Review of high school mathematics
- Teach21 available online
- Students take Compass test.

## Goal

- College-level math readiness (to pass the Compass)

# Regression Discontinuity Design Outcomes Estimated:

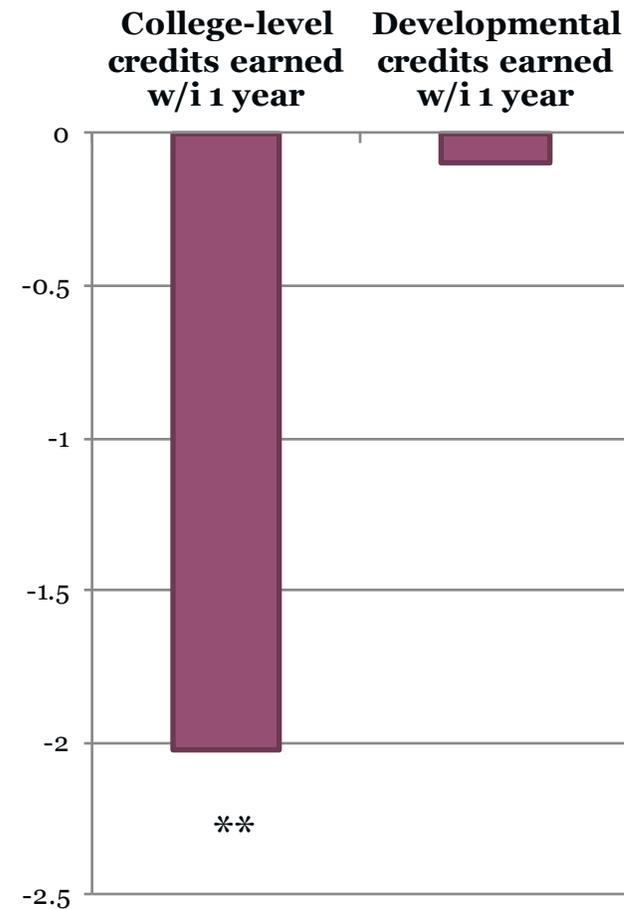
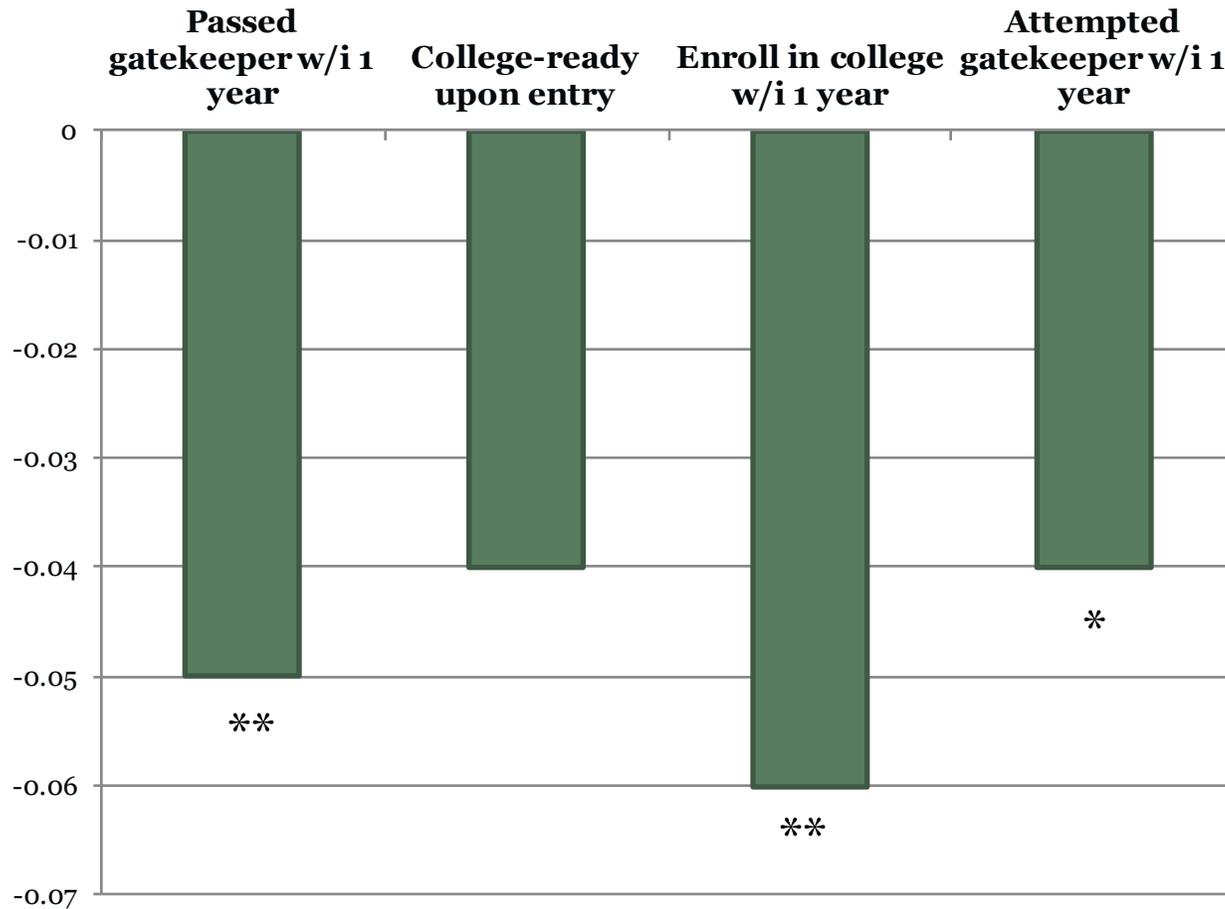
## Primary (all within one year)

- Math readiness at college entry
- Passing gatekeeper course

## Secondary (all within one year)

- College enrollment
- College credits earned
- Developmental education credits earned
- Attempted a gatekeeper math course

# Impact of Transition Math for Seniors



# New York City: At Home in College (AHC) program

## Background

- Program administered by CUNY
- High schools volunteer to participate
- Staggered implementation beginning in 2008-09

## Specifics

- Targets students with Regents scores 65-75 (English) or 65-80 (math)
- Students participate in subject-specific transition course
- College knowledge component
- Students take Compass test.

## Goal

- Academic preparation to achieve college readiness in math and English
- Help students apply and matriculate

# Difference In Differences Design Outcomes Estimated:

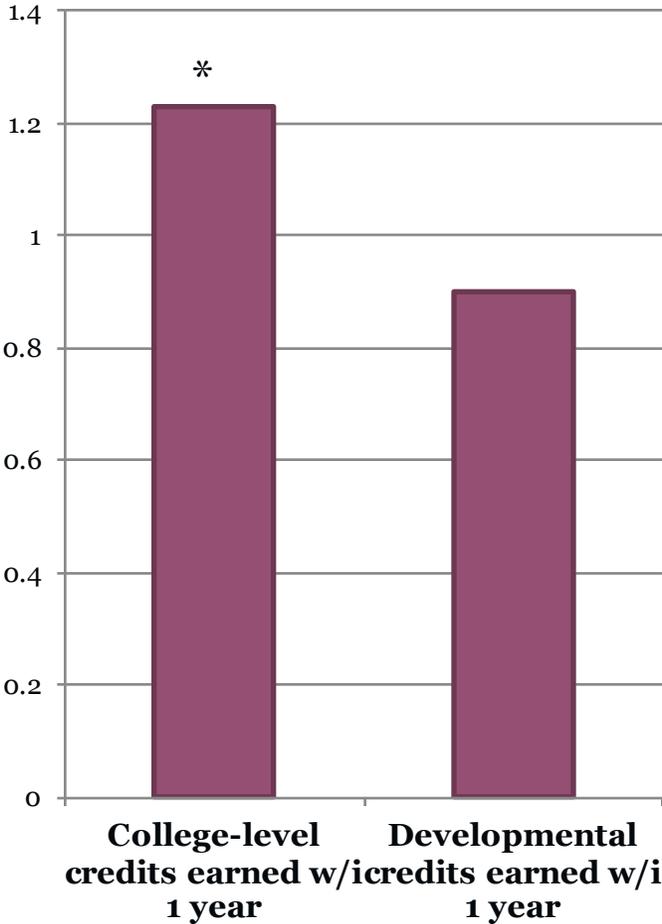
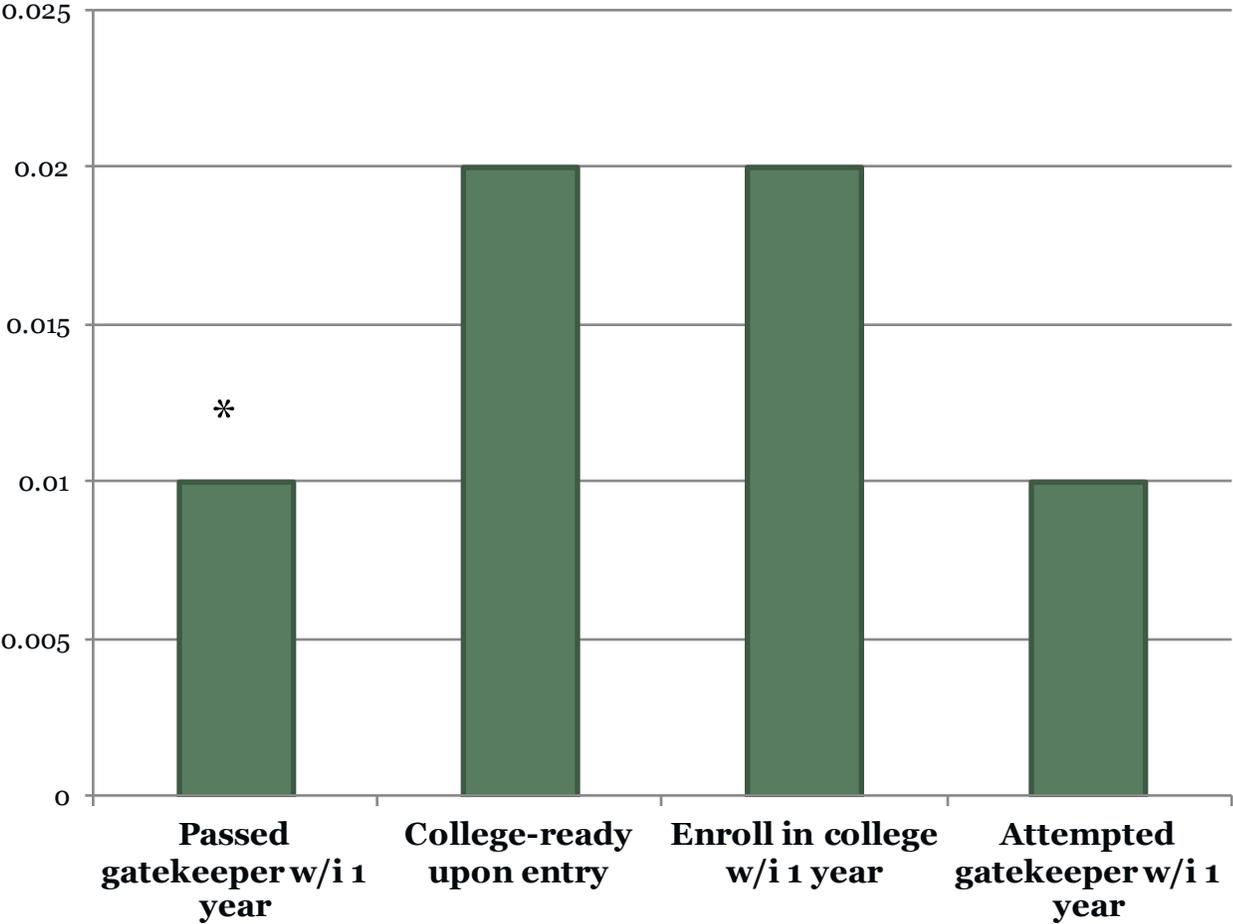
## Primary (all within one year)

- College readiness at college entry in math/English
- Passing gatekeeper course in math/English

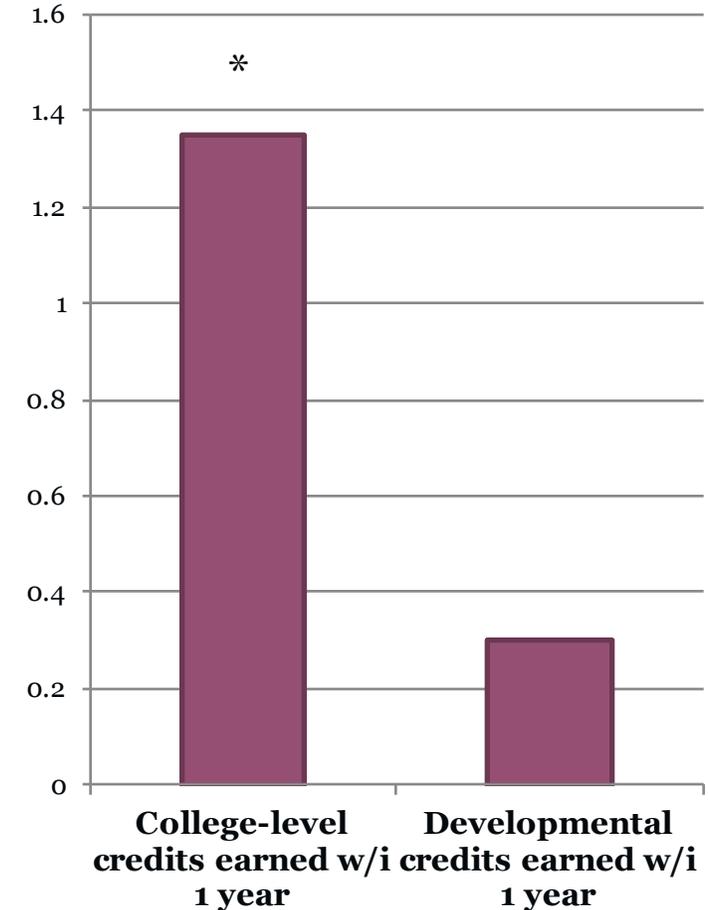
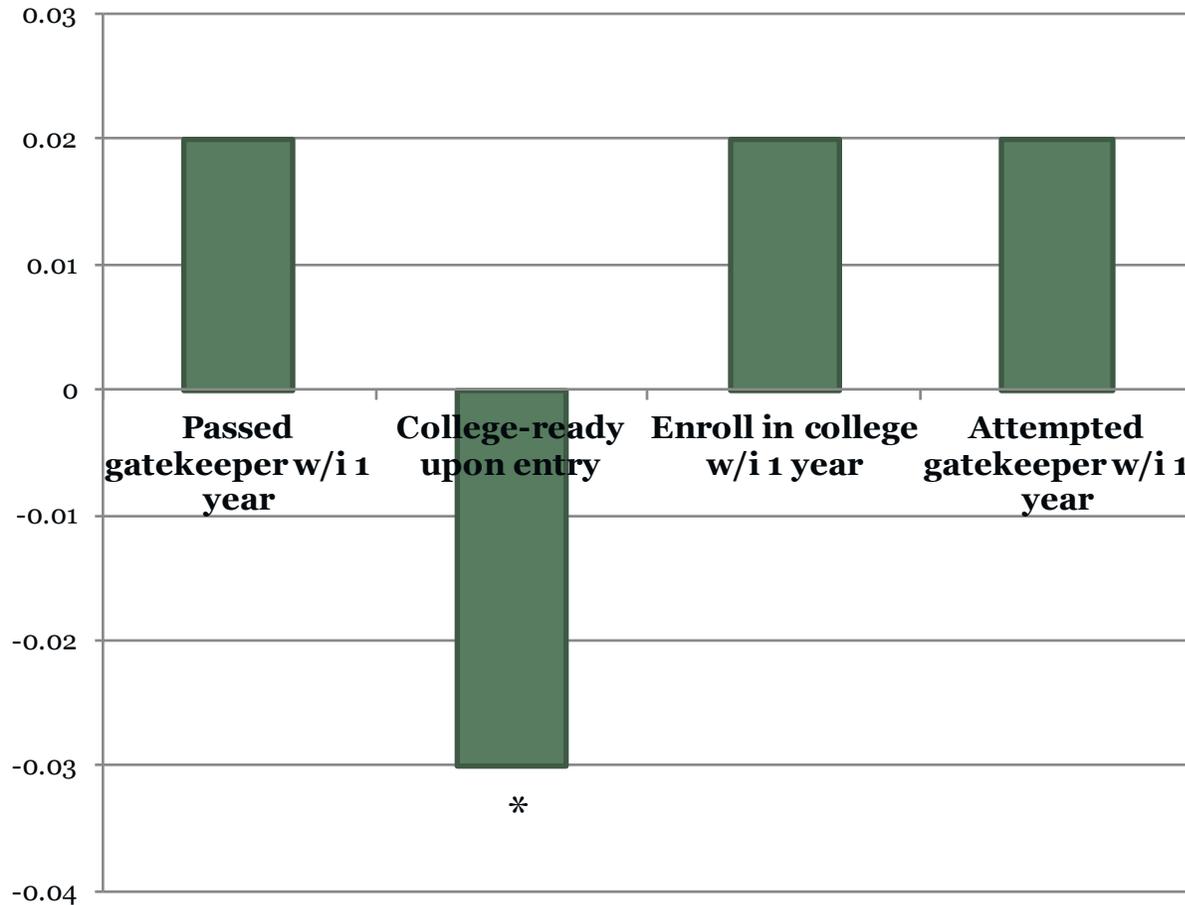
## Secondary (all within one year)

- College enrollment
- College credits earned
- Developmental education credits earned
- Attempted a gatekeeper course in math/English

# Impact of At Home in College - Math



# Impact of At Home in College - English



# Thoughts On Transition Courses

- There are students with many different needs below the college ready cut-off.
- Courses are informed by diverse views of college readiness.
- Courses are “owned” to different degrees by K-12 and higher education.
- Students may or may not place out of developmental education upon finishing the course.



# For more information

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**Please visit us on the web at**

**<http://ccrc.tc.columbia.edu>**

where you can download presentations, reports,  
and briefs, and sign-up for news announcements.

We're also on Facebook and Twitter.

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# **Pre-College Math Remediation in Tennessee: Examining the SAILS Program**

**Assistant Professor of Public Policy and Higher Education, Vanderbilt University**



# The Need for Remediation in Tennessee



- Tennessee Promise (college scholarships)
- Tennessee ReConnect (working adults)
- SAILS\* (Seamless Alignment and Integrated Learning Support)

**Target Population:** 13 community colleges, 6 public universities, 3 Univ. of TN campuses (~300,000 students)

**Identified Need:** 66% of incoming freshmen at community colleges in TN require remediation in at least one subject

- Only 5 percent of these students graduate within three years
- Only 25% obtain AA credential within five years

**Solution:** Address remedial math needs prior to college



# SAILS – Program Description

Computer-based, self-paced math curriculum  
Offered to 12<sup>th</sup> graders as part of HS grad requirements  
Identical to remedial courses taught at community colleges

## **Five modules, aligned with community college remedial math competencies:**

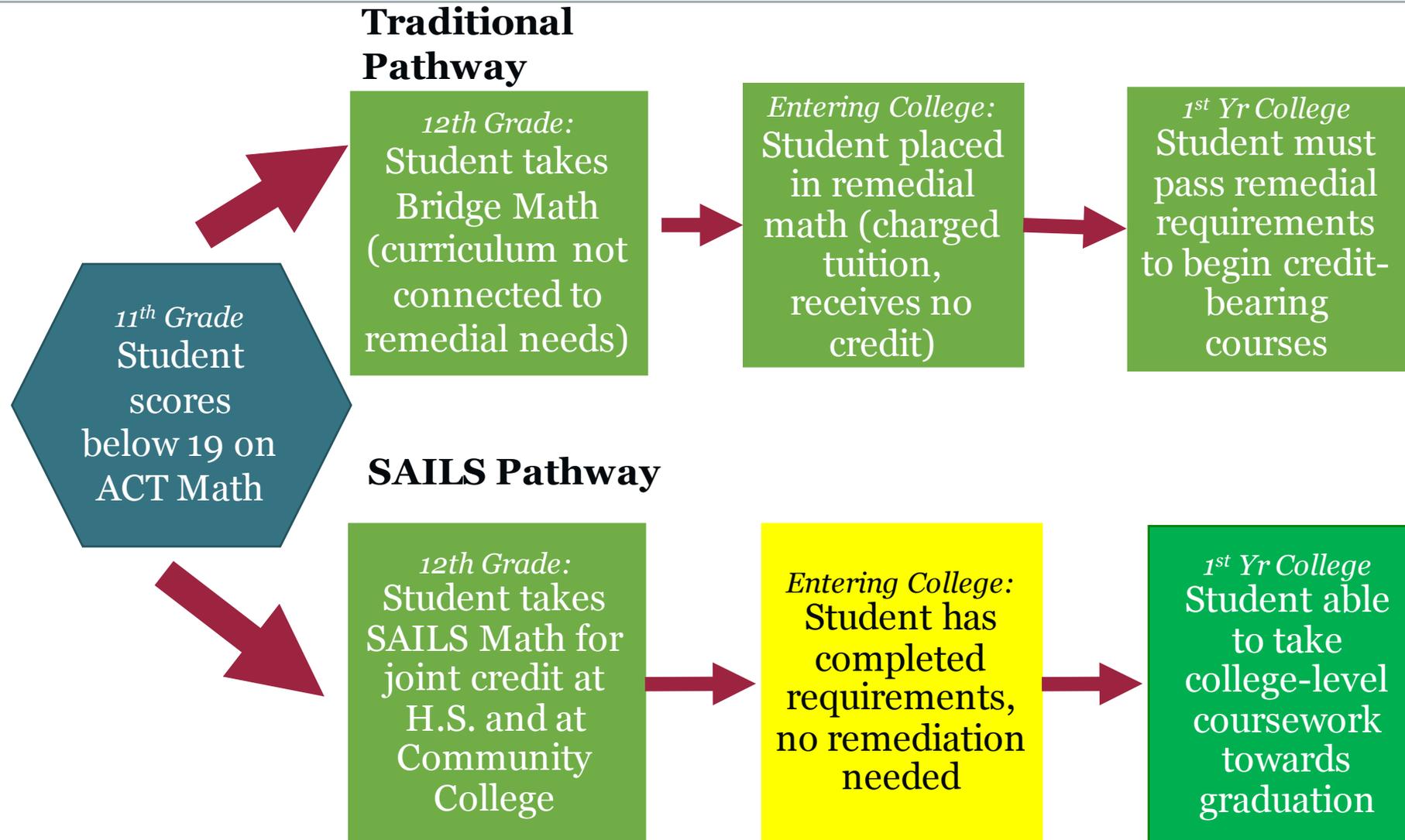
- 1) Real number sense and operations
- 2) Operations with algebraic expressions
- 3) Analyze graphs
- 4) Solve equations
- 5) Modeling and critical thinking

**Students must pass a test at the end of each module before moving on.** No comprehensive test at the end of each of the course.

**When student completes all five modules, they are automatically exempted** from remedial math courses at any public postsecondary institution in TN. Students who complete modules before end of the year can also enroll in dual-credit courses.



# Traditional Pathway vs. SAILS





# Overview of the Research Study

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## **1. Program implementation**

*What factors and conditions are associated with successful implementation of SAILS?*

## **2. Student surveys**

*Are there differences in students' experiences and attitudes about school, mathematics, and postsecondary aspirations when comparing SAILS and non-SAILS students?*

## **3. Teacher Surveys**

*Are there differences in teacher practices, beliefs, or experiences when comparing SAILS and non-SAILS math teachers? What factors are associated with successful implementation of SAILS?*



# Overview of the Research Study

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## 4. Growth in student math achievement

*How do achievement gains for students in SAILS compare to those in other senior math courses? Are long-term impacts of SAILS attributable to improvements in math achievement or to a reduction of postsecondary remediation barriers?*

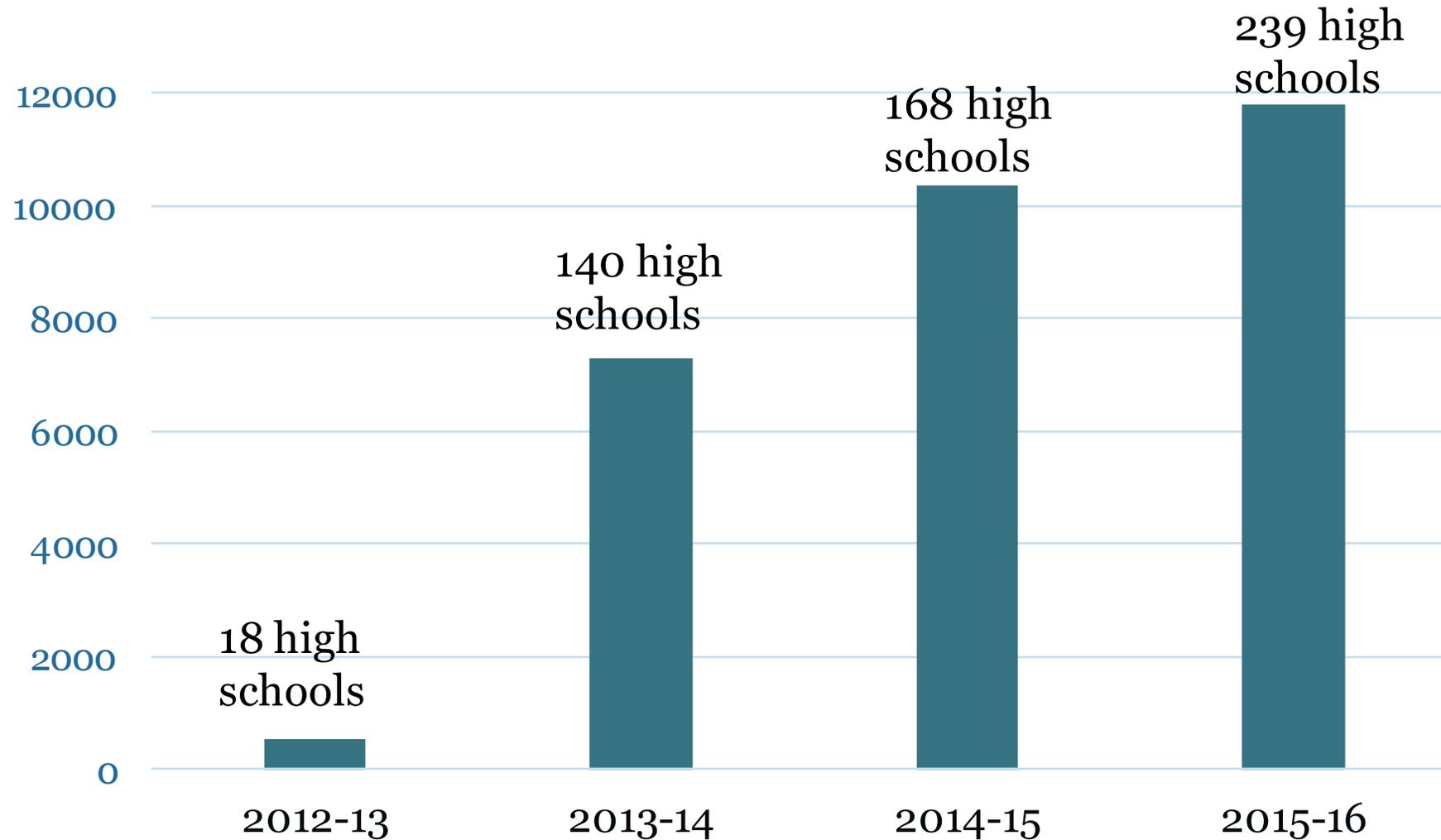
- **Data Collected:** Assessment of math skills administered to 16,000 seniors in 120 high schools, conducted with students in SAILS and non-SAILS classes.
- Matched to junior year ACT score (pre-test) and to state administrative data (student, class, and teacher level)
- **Research Design:** Regression discontinuity analysis using the SAILS program eligibility cut-off (19 on the ACT) for sample assignment

## 5. Student post-secondary outcomes

*Does enrolling in SAILS during the senior year of high school result in higher rates of high school graduation and college attendance, as compared to similar students not enrolled in SAILS?*

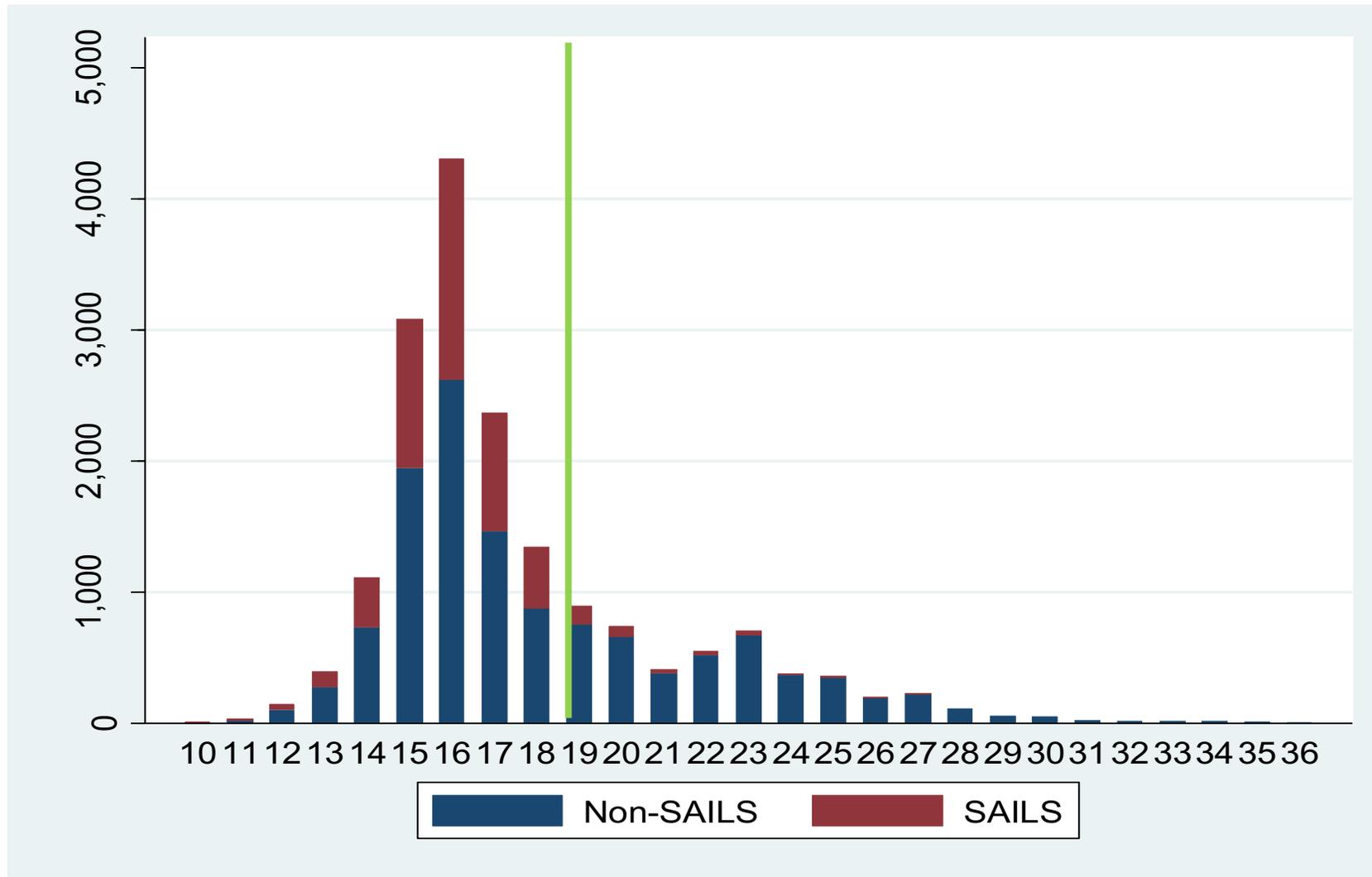


# SAILS Enrollment 2012-13 to 2015-16





# Non-compliance/ Issues of Capacity





# SAILS and non-SAILS cohort (2013-14)

	ACT math scores less than 19	
	SAILS	Non-SAILS
<b>% Female</b>	0.541	0.522
<b>% White</b>	0.773	0.753
<b>% Black</b>	0.219	0.234
<b>% Hispanic</b>	0.041	0.077
<b>Mean ACT Composite Score</b>	16.34	16.11
<b>Mean ACT Math Score</b>	15.85	15.76
<b>Enrolled in college</b>	0.411	0.369
<b>Enrolled in 2-yr college</b>	0.297	0.221
<b>Enrolled in 4-yr college</b>	0.114	0.148
<b>Enrolled in remedial math in college</b>	0.159	0.455
<b>Enrolled in college-level math in 1<sup>st</sup> yr</b>	0.615	0.515
<b>N</b>	5,635	10,913



# Inverse Probability Weighting

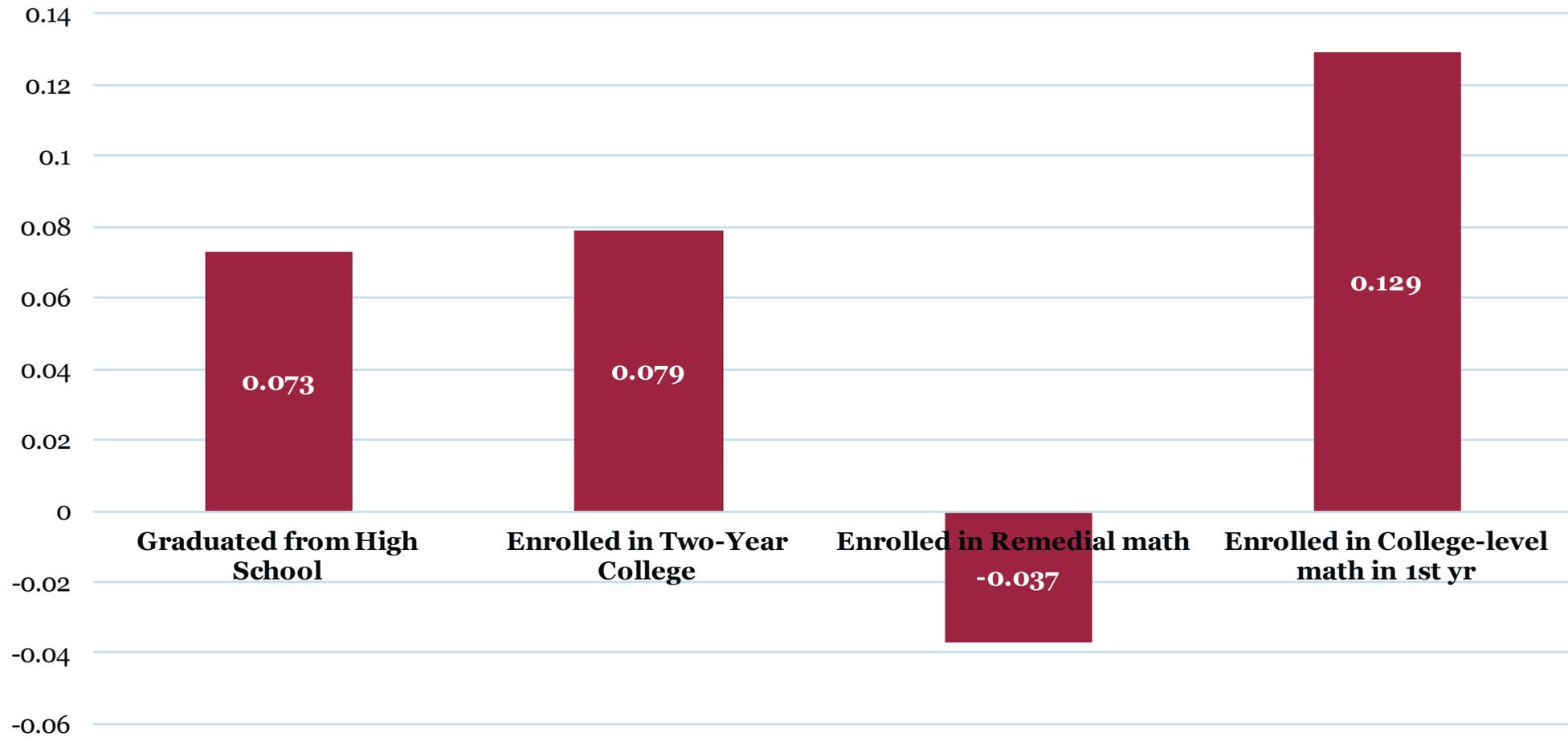
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Matched on prior observable characteristics: Gender, race, 11<sup>th</sup> grade ACT score, high school information

Outcomes: graduated from high school, college enrollment, enrolled in college-level math in the first year



## Impact of SAILS Math





# Conclusions

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**The program has scaled-up in a short amount of time with relatively high fidelity**

**SAILS students report being more empowered by, and comfortable in their learning environment than their peers**

**Positive impact on HS graduation and college enrollment, but course enrollment mixed:**

- Participating in the SAILS program appears to positively impact high school graduation and enrollment in college → these effects are being driven largely by 2-year colleges.
- SAILS students are more likely to enroll in college-level math in their first year than observationally similar students not enrolled in SAILS

**Are long-term impacts of SAILS attributable to improvements in math achievement or to a reduction of postsecondary remediation barriers?**

# **A Collaborative Effort To Reduce College-level Math Remediation**

**Pitt Turner, Sierra College, [pturner@sierracollege.edu](mailto:pturner@sierracollege.edu)**



# ESM

## Early Assessment Program Senior-year Math

Sierra College

California State University, Sacramento

Placer Joint Unified High School District

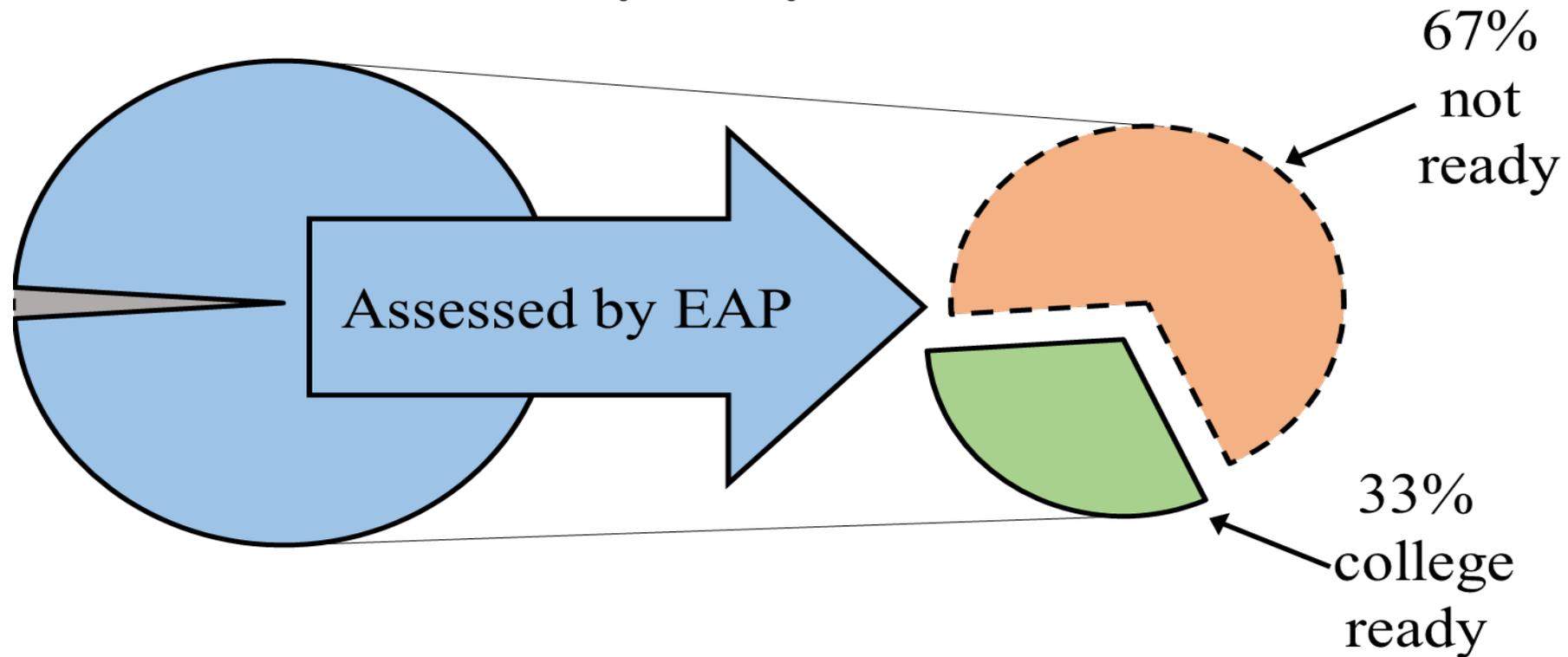
Roseville Joint Unified High School District

West Placer Unified School District

Rocklin Unified School District

# Why Was ESM Created?

- We saw the same story everyone else saw...



- less than 1 percent of eligible California students did not take part



# Who created ESM?

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- A Regional Partnership between:  
Sacramento State, Sierra College, PCOE,  
and local feeder high schools.
- Two-year period of faculty:  
developing , teaching, evaluating, assessing  
and revising the ESM course.
- ...of course we had a lot of

TRIAL AND ~~ERROR~~





# How Was **ESM** Created?

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- The content was guided by:
  - The National Common Core Standards
  - The California Common Core State Standards Sierra
  - And Sac State's Math Curricula
  - Local High School Course Outlines
  - Multiple Resources On Pedagogy
- The pedagogy was designed to:
  - Allow teachers flexibility to focus on the learning, rather than preset schedule and mandates.



# Where is ESM Taught?

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- Placer County:
  - Fall '13 – 4 sections at 4 high schools (pilot)
  - Fall '16 – 25 sections at 11 high schools
- Sacramento County:
  - Fall '14 – 3 section at 3 high schools (pilot)
  - Fall '16 – 13 sections at 8 high schools
- - The expansion is funded by:
    - Basic Skills Partnership grant and the
    - California Math Readiness grant



# What Does ESM Give?

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- Sierra students:  
Placement into any college-level mathematics course with a prereq of Intermediate Algebra.
- Sac State Students:  
Exemption from Early Start Program and considered to have met the college readiness requirements in math ... pending EAP status.



# When Does ESM Get a “c”?

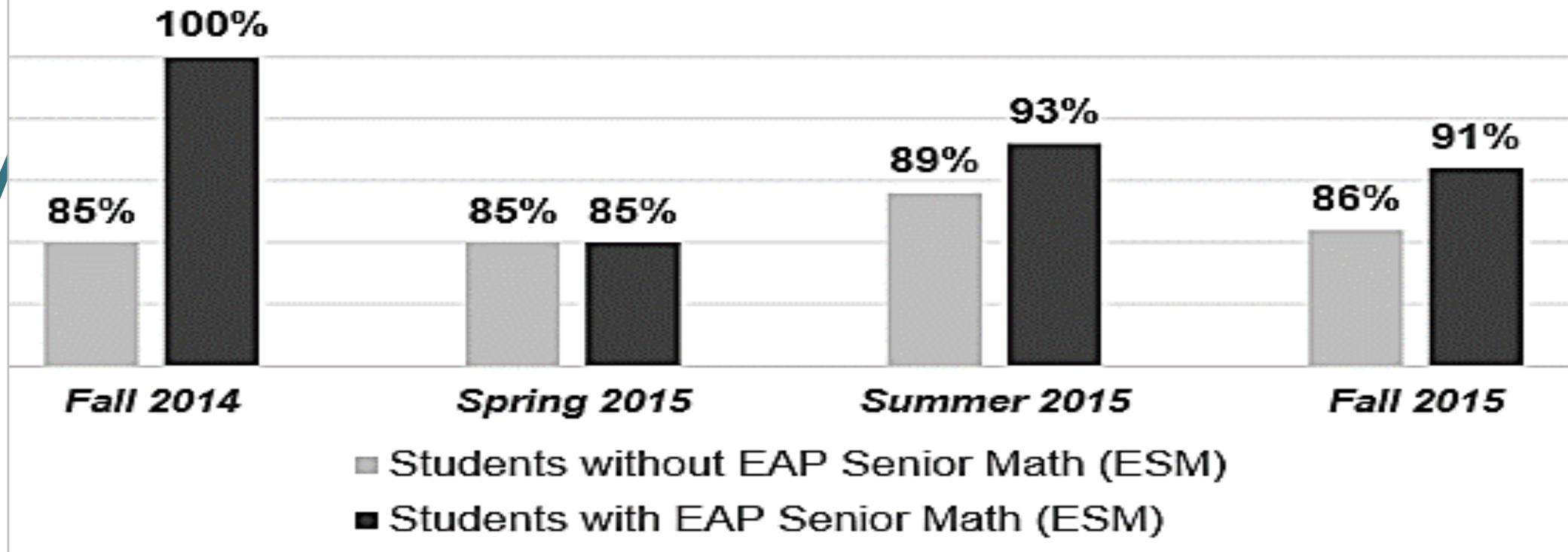
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Course meets an “a-g” requirement:  
currently meets “g” or elective  
applying for “c” math subject status

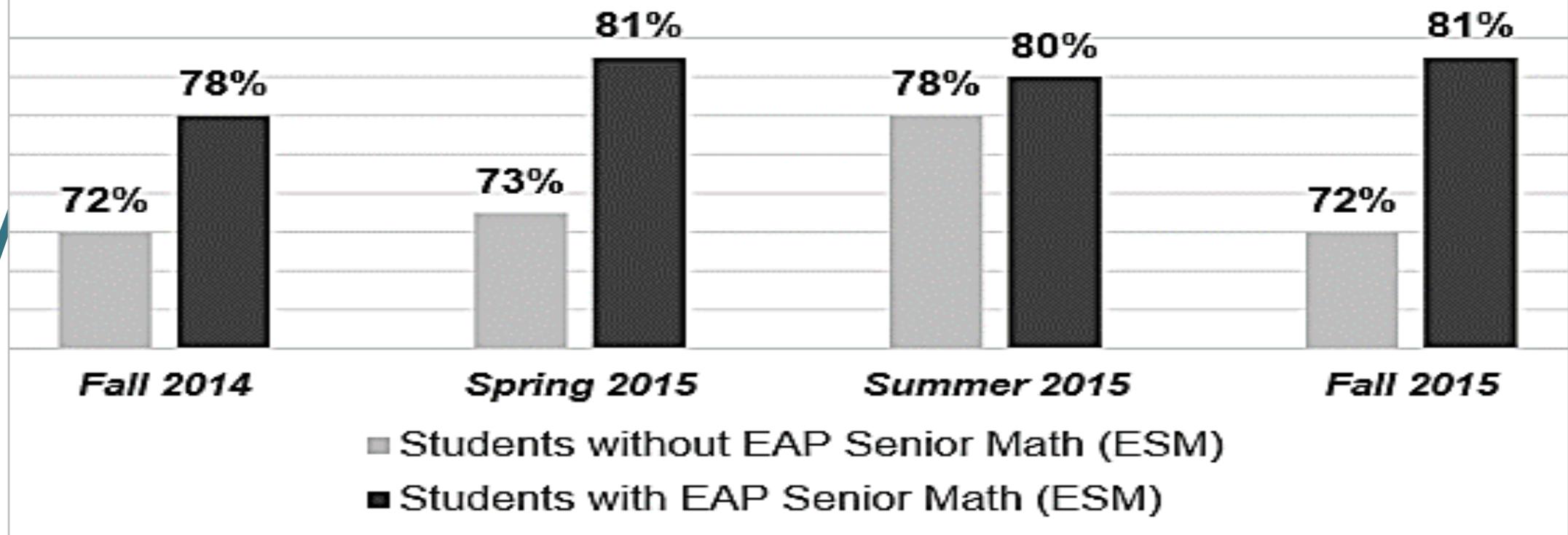
Reformatting the curriculum  
this course is a ‘living document’  
it is adaptable to local needs

- The strength of this program is:  
continuing collaboration and commitment

## Sierra College Student Retention Rates



## Sierra College Student Success Rates





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# Early Assessment Program Senior-year Math (ESM)

Pitt Turner

Sierra College

[pturner@sierracollege.edu](mailto:pturner@sierracollege.edu)



# Resources

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- [Improving the Transition to College: Estimating the Impact of High School Transition Courses on Short-Term College Outcomes](#)
- [What We Know About Transition Courses](#)
- [Implementation of High School-to-College Transition Courses in Four States](#)
- [Seamless Alignment and Integrated Learning Support \(SAILS\)](#)
- [EAP Senior Math Course](#)
- [Evaluation of the Expository Reading and Writing Course](#)

# Thank You For Joining Us!

The webinar will be posted on the websites of  
The Opportunity Institute and LearningWorks.

For more information and to provide feedback about the  
QuantitativeLeap! webinar series please contact Pamela  
Burdman, [pbstrategy@gmail.com](mailto:pbstrategy@gmail.com)