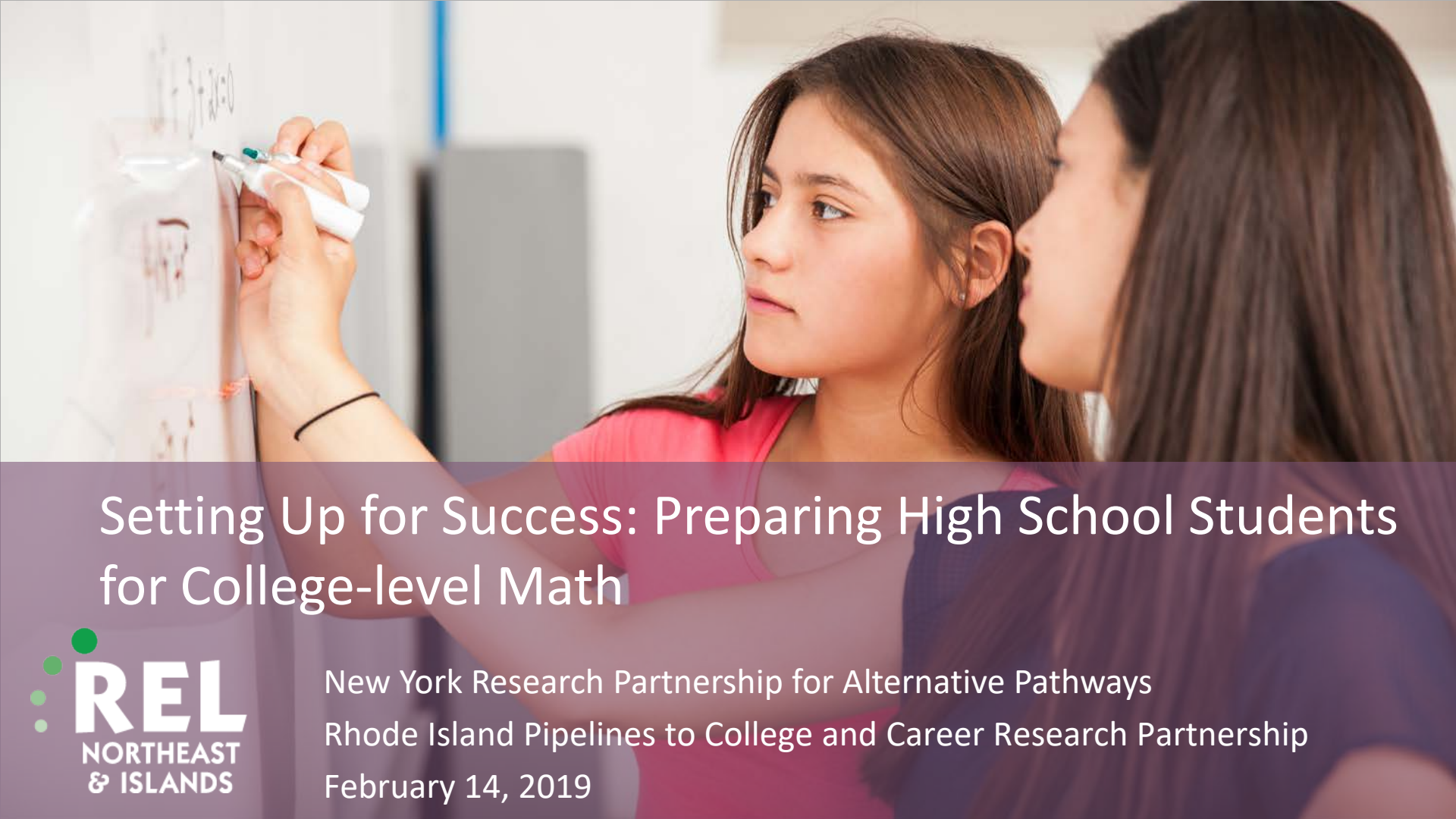


Setting Up for Success: Preparing High School Students for College-level Math

REL NORTHEAST & ISLANDS

New York Research Partnership for Alternative Pathways

Rhode Island Pipelines to College and Career Research Partnership

February 14, 2019

Today’s agenda

- Welcome & introduction
- Research on interventions to avoid remediation: Impact evaluation of a Tennessee program
- An implementation perspective from Mississippi
- Q&A
- Closing & next steps

New York Research Partnership for Alternative Pathways

Develop and use research to inform graduation pathways and college and career readiness policies.

Rhode Island Pipelines to College and Career Research Partnership

- Develop and use research to increase public college access and degree completion rates, especially for high-needs students.
- Support state education leaders in using data to strengthen school-to-career trajectories that increase preparation for and employment in middle- and high-wage growth industries.

Today's goals

- Provide an overview of findings from an impact evaluation of a high school-based intervention intended to reduce remediation rates
- Provide a practitioner's perspective on what it takes to implement such an intervention from a state that has done so
- Provide opportunities for participants to ask questions to experts and practitioners about the challenges they face in addressing math college readiness

Meet today's presenters

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

Dr. Marla Davis
Bureau Director, Mathematics Content Specialist, Secondary Curriculum and Instruction, Mississippi Department of Education

Dr. Katherine Shields
Research Scientist
REL Northeast & Islands

IMPACT EVALUATION OF THE TENNESSEE SAILS PROGRAM

Pre-College Math Remediation: Results from a Statewide Transition Course Evaluation

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

Research partners

- Vanderbilt/Harvard Center for Education Policy Research
  - Thomas Kane, Whitney Kozakowski, Chris Bennett, Rachel Hitch, Dana Weisenfeld
- Tennessee Department of Education
- Tennessee Higher Education Commission
- Tennessee Board of Regents
- Measure TN
- SAILS (Seamless Alignment and Integrated Learning Support) program
- ACT
- The Bill & Melinda Gates Foundation

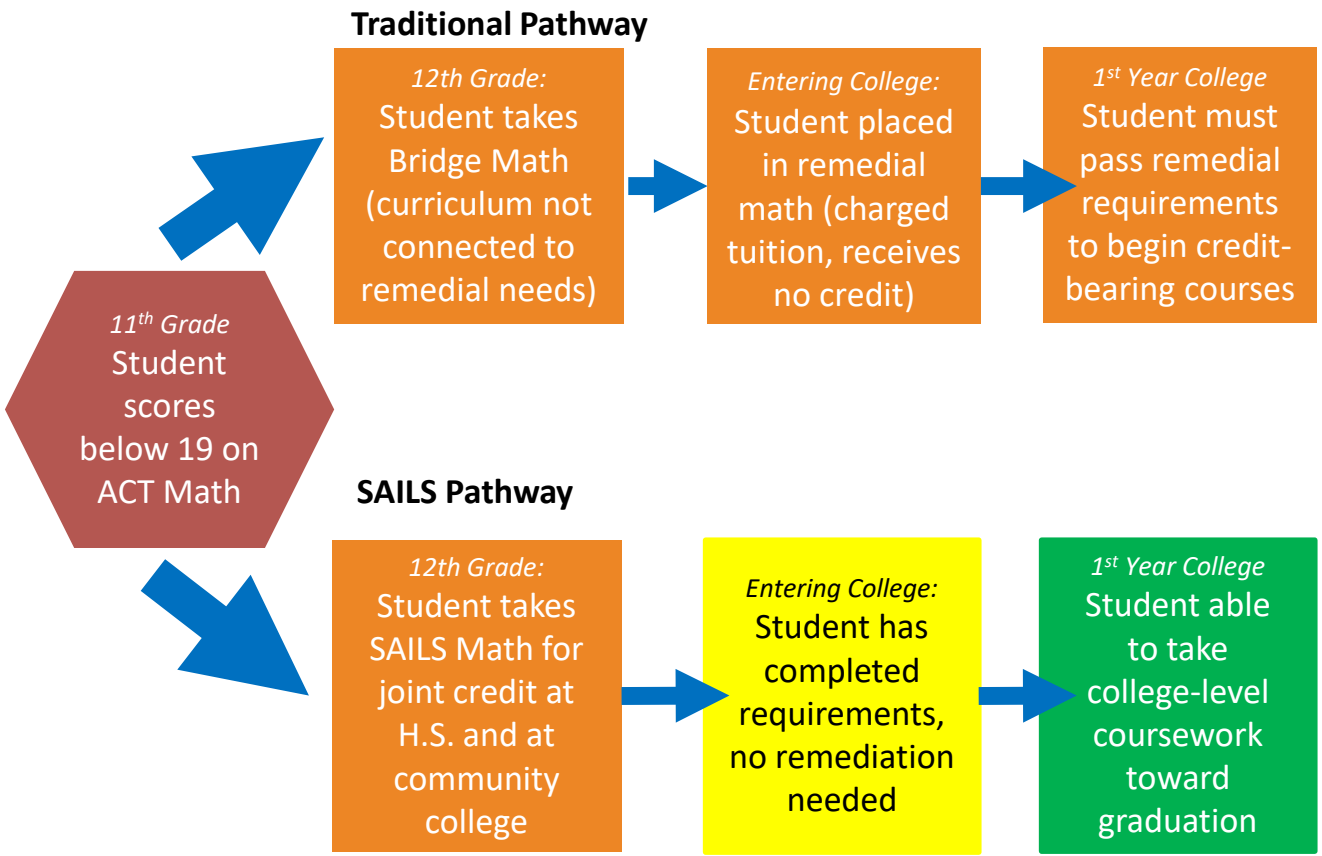
Background on remediation

- 68% of two-year students and 40% of four-year students take at least one remedial course (Chen, 2016)
- Literature: Null or negative effects of math remediation on student persistence and degree completion (Boatman & Long, 2018; Calcagno & Long, 2008; Martorell & McFarlin, 2011; Scott-Clayton & Rodriguez, 2015)
  - No evaluations of whether remedial courses help improve students' math knowledge
- Colleges experimenting with different approaches to improve outcomes
  - For example: co-requisite, online or blended learning and modules, summer bridge programs

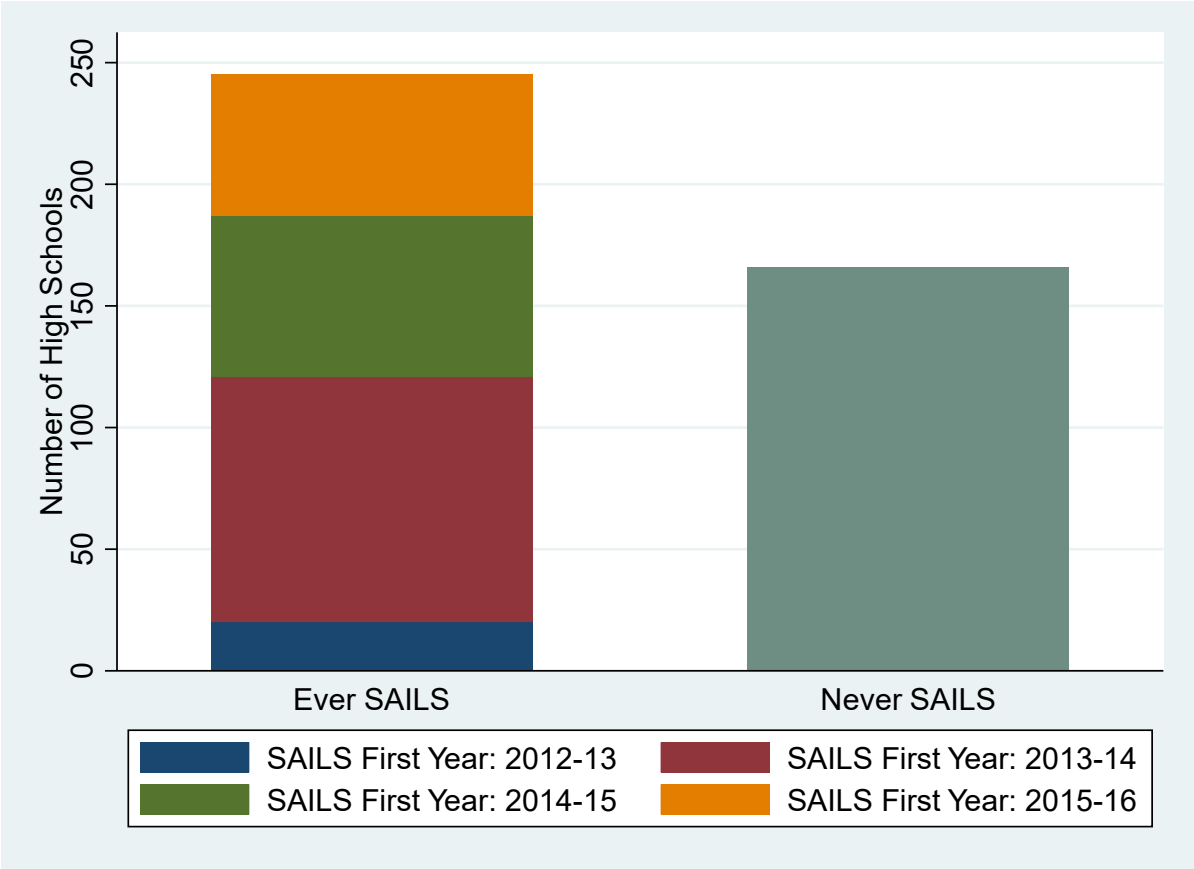
Tennessee SAILS program

- Modular, self-paced online learning
  - Problem sets, supplemented by instructional videos and other multimedia tools to be used at school and home
  - Teachers available on-site to provide individual assistance and monitor student progress
  - Computer-based instruction consisting of 5 modules
- Team of field coordinators train high school instructors, ensure consistent implementation, and monitor student progress.

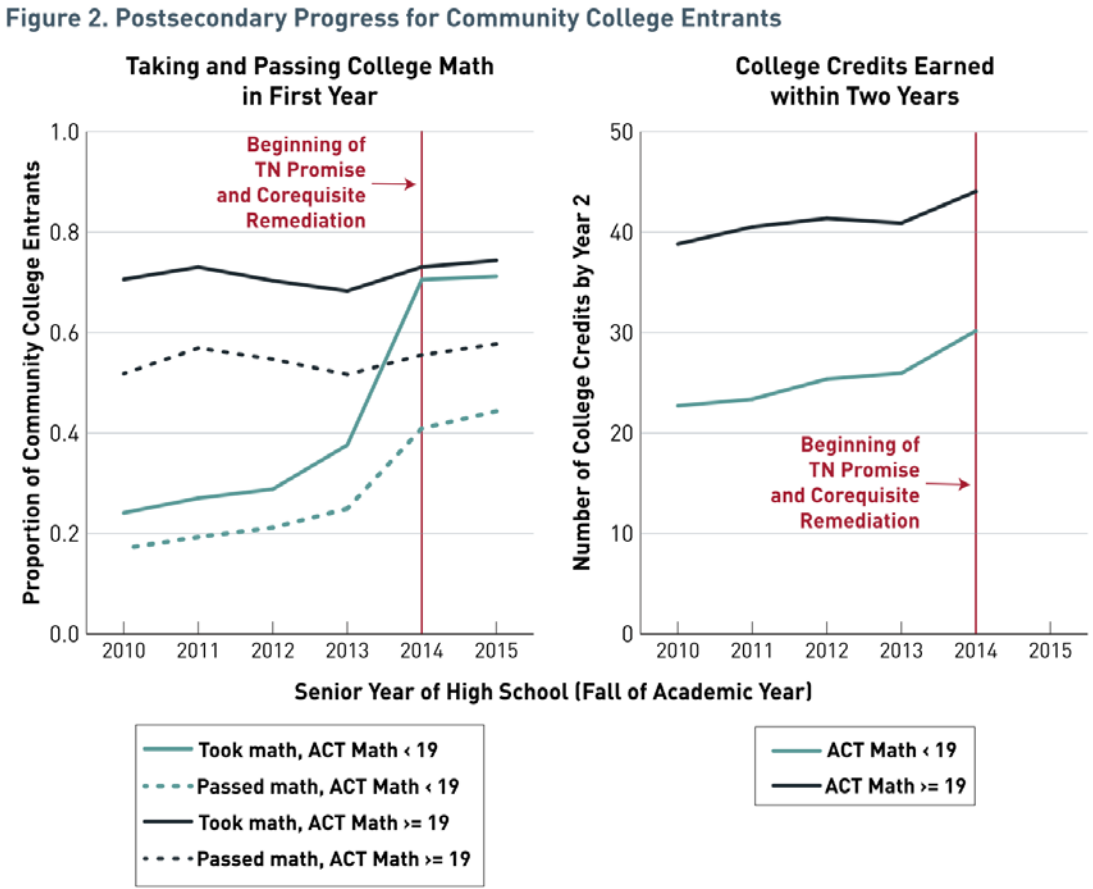
Traditional pathway vs. SAILS



SAILS program Rollout



Distinguishing between policy contexts



Comparisons used in analysis

1. Students with ACT math scores <19 at high schools that did/did not offer SAILS in a particular year
   - Available for 2010–11 to 2015–16 seniors

2. Students slightly above/below 19 on ACT math test
   - Students just above cutoff used as control group for those just below the cutoff
   - Available for 2015–16 seniors only

1. SAILS effects under pre-requisite policy (2013–14 seniors)

- No effects on HS completion or college enrollment
- For SAILS-eligible students who enrolled in TN CC:

Outcome	Significant Effects	Comparison Mean
Took remedial math by year 1	-28 pp	66%
Took college-level math by year 1	+14 pp	45%
Passed college-level math by year 1 (overall)	+6 pp	30%
Passed college-level math by year 1 (if took)	-7 pp	66%
College credits earned by year 2	+2.2 credits	25.0

Not significant: return for year 2, earned credential by year 2

1. SAILS effects under pre-requisite policy (2013–14 seniors)

- Important subgroup differences
  - **ACT score:** strongest improvements for lowest-scoring students (ACT math <= 16)
  - **Gender:** Improvements driven largely by women
    - For example: Effect was +3.5 credits for women, +0.7 credits for men by year 2
  - **Race**: Improvements in credits identified for white students but not black students; otherwise significant effects in same direction for black and white students

2. SAILS effects with co-req/TN Promise

- Slight positive effect on overall college enrollment (+2 pp), but no effect on high school completion
- For SAILS-eligible students who enrolled in TN CC:

Outcome	Significant Effects	Comparison mean
Took remedial math by year 1	-28 pp	66%
Took college-level math by year 1	-4 pp	45%
Passed college-level math by year 1 (overall)	-6 pp	30%
Passed college-level math by year 1 (if took)	-5 pp	66%

Not significant: college credits earned, return for year 2, earned credential by year 2

2. SAILS effects with co-req/TN Promise

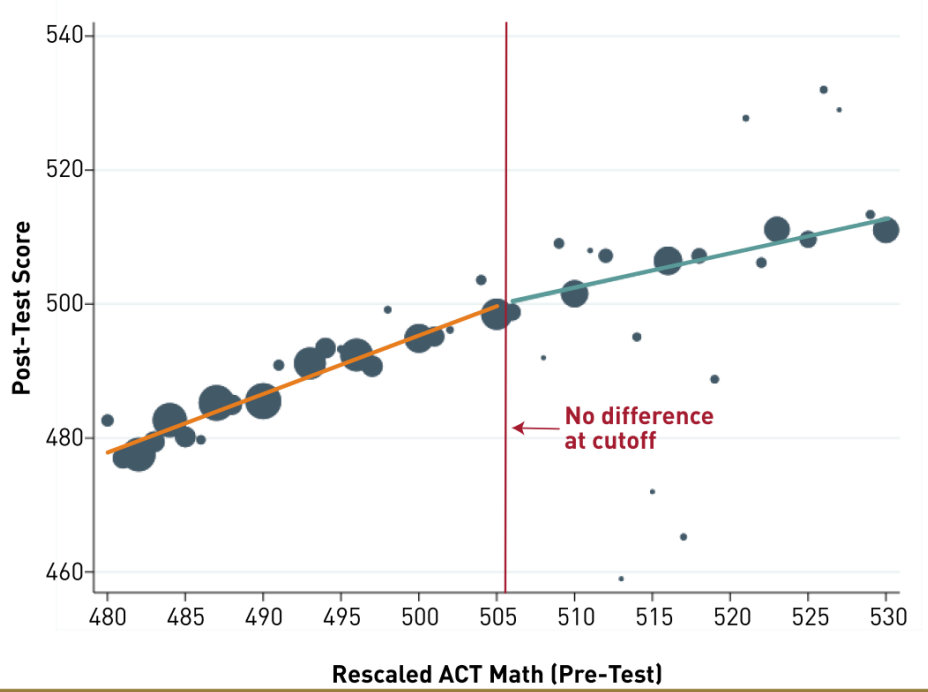
- Subgroup differences
  - **ACT score:** Results largely consistent across ACT scores.
  - **Gender:** Results slightly more negative for women.
  - **Race:** Improvements in credits identified for white students but not black students; otherwise significant effects in same direction for black and white students.

3. ACT post-test and student survey

- Administered in 2015–16 to approximately 16,000 students at 119 schools
- Received responses from 69% of students (~11,000)
  - Testament to diligent work of field coordinators
- Post-test: 50-minute, 35-question abbreviated version of ACT math test
  - Received detailed scores from 333 to 680 (rather than 1–36)
- Student survey: 15-question survey after post-test

3. SAILS effects on student achievement

Figure 5. Score on Posttest by Pretest Score



4. Findings from student survey

- No differences near cutoff for college plans, highest degree expectations, teacher expectations, homework

Outcome	Significant Effects	Comparison Mean
Course content useful in career	+7 pp	42%
Better prepared for college math	+10 pp	58%
More interested in math	+6 pp	20%
Class stays busy	-8 pp	74%

What has improved

- SAILS shifted the locus of remediation back to high school for roughly a quarter of "remedial" students
- In 2013–14:
  - Increased the proportion of SAILS-eligible students taking college math in their 1st year at community college by 14 pp
  - By the end of their 2nd year in college, SAILS-eligible students had completed 2.2 more credits
- In later years, continued reduction in remedial course-taking in college
- Students report positive experiences in the course

Caveats: Recent HS grads, community college students only, limited timeframe, math achievement only estimated around the cutoff

Discussion

- Of the additional students who were able to take college-level math after SAILS, about half passed college math.
- Opened up college math to a new group of students.
  - What are the additional barriers to passing college-level math?
- Curricular alignment: Introduction of alternative math pathways (statistics vs. college algebra).
- ACT math assignment instrument vs. multiple measures (HS GPA).
- Long-term outcomes of co-requisite model.

AN IMPLEMENTATION PERSPECTIVE FROM MISSISSIPPI

MDE Transition Courses

Essentials for College Math and Literacy & SREB Math Ready and Literacy Ready

Marla Davis, Ph.D., NBCT
Bureau Director
Office of Secondary Education

Transitional Math/Literacy Courses

Ready for High School Math/Literacy	SREB* Math/Literacy Ready	Essentials for College Math/Literacy
Grade 8 or 9 students	Grade 12 students	Grade 12 students
3-day teacher training recommended; no extra endorsement	3-day teacher training; Teachers earn required endorsement (929/930)	3-day teacher training; Teachers earn required endorsement (929/930)
Transition students also	ACT Math/English Sub-Score **below** 15	ACT Math/English Sub-Score **of 15** or above

High Schools were required to offer this course beginning in school year 2018-2019.

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*SREB: Southern Regional Education Board

Implementation and Training

- Master Teacher Training
  - Certification and Credentialing Outside of the State
- Classroom Observations
  - Successful Classrooms, Teachers Based on Data
- Quality Feedback and PD Evaluations

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State Board of Education Policy

Excerpt from Chapter 28, Rule 28.6

II. Beginning with the 2017-2018 school year, any LEA that offers either of the Essentials for College Literacy and Essentials for College Math classes must meet the following requirements:

a. Teacher must have a valid 7-12 mathematics endorsement (154) or English Language Arts/Literacy (119) endorsement before participating in this training.
b. Teacher must attend certification training as offered or approved by the Mississippi Department of Education.
c. Teacher must apply for and request an add the 930 supplemental endorsement for the Essentials for College Literacy or the 929 supplemental endorsement for the Essentials for College Math to be added to his/her teaching license with the Mississippi Department of Education Office of Teacher Licensure.
d. Students eligible for this class must enter with an ACT sub-score of 15-18 in the respective content area (English or mathematics).
e. Students must be classified as a senior for enrollment. An exception to this requirement may include students classified as a junior planning to graduation prior to the spring of their senior year.

III. Beginning with the 2018-2019 school year, all LEAs must offer Essentials for College Math and Essentials for College Literacy

IV. LEA failure to adhere to the set forth requirements in Section 2 will be a violation of the Mississippi Accountability Standard 2 and 26.

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MS IHL Policy 608

Based on Mississippi Institutions of Higher Learning (IHL) Policy 608, students who complete these Essentials courses with an 80 or above will not be required to take the corresponding remedial courses for College Algebra or English Composition at any of the eight public Mississippi Universities.

ACT Results: Impact of Grade 12 SREB Ready & Essentials for College Courses

- Since the 2014-2015 school year, the MDE has collaborated with the Southern Regional Education Board (SREB) to implement the Grade 12 SREB Ready and Essentials for College courses in Literacy/ELA and Mathematics through face-to-face and online training, and technical assistance for educators across the state.
- During the 2017-2018 school year, SREB conducted a study to evaluate the effectiveness and impact of these courses on ACT performance. SREB provided funding for students at schools in the study to re-take the ACT, post-course enrollment.
- The results of the study indicate:

LITERACY READY COURSES

ACT SUBJECT	PRE-COURSE ACT AVERAGE	POST-COURSE ACT AVERAGE	IMPROVEMENT IN POINTS	% OF STUDENTS IMPROVING	TYPICAL STUDENT IMPROVEMENT IN POINTS	STATISTICALLY SIGNIFICANT
English	14.3	16.0	1.7	71	2.5	YES
Reading	14.2	15.3	1.1	62	2.3	YES

MATH READY COURSES

ACT SUBJECT	PRE-COURSE ACT AVERAGE	POST-COURSE ACT AVERAGE	IMPROVEMENT IN POINTS	% OF STUDENTS IMPROVING	TYPICAL STUDENT IMPROVEMENT IN POINTS	STATISTICALLY SIGNIFICANT
Math	15.5	16.2	0.7	56	1.7	YES
Science	15.0	16.8	1.8	71	3.2	YES

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Outcome 2: Increase the Percentage of Students Ready for College as Measured by ACT Benchmarks in Each Content Area from High School

- 11th graders* meeting all four ACT benchmarks remained at 9% from 2015 to 2018
- Grade 11 ACT composite score increased from 17.6 in 2015 to 17.8 in 2018
- Class of 2018 ACT composite held steady at 18.6 from 2017 to 2018, while the national average dropped from 21 to 20.8

ACT®

ACHIEVEMENT among the graduating class is higher than the junior class, which suggests students improve their scores when they retake the ACT as seniors

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*Public school

Questions

How will you use what you've learned today in your work?

Enter your ideas in the chat.

We listen to you!

Your feedback is essential to our work. Please take our survey to help us improve.

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ies.ed.gov/ncee/edlabs/regions/northeast

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