



# LOWER-LEVEL MATH PROJECT

## BRING ON TOMORROW

INDIANA UNIVERSITY SOUTHEAST

# AGENDA

- How the project came about
- Why we needed to do it
- The original proposal
- The twist in the story
- The results
- Publication – Presentation
- References



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## **Summer Academy for Curricular Analysis and Improvement (SACAI) Funded by: Eli Lilly and Company**

Purpose: Develop curricular intervention investigations for each IU campus that faculty teams (2-3 people each) will develop over the summer and that will then be implemented, with staff support during academic year 2021-22.

### **Project Team:**

- Steering Group – Victor Borden, Michael Morrone, Ben Motz, & Becky Torstrick,
- Project staff for AY 2021-21
- Project consultants: Robin Morgan (IUSE Psychology); Monica Johnson (DEMA); Anna Lynch (UIITS, Learning Technologies)
- Research Scientist, Phoebe Wakhungu (IU-CPR)
- Full-time learning analytics specialist: Josh Quick (eLearning Research & Practice Lab)
- Four doctoral graduate assistants in Higher Education and Anthropology

# Other Projects

- IU Bloomington
  - Chemistry: Incorporating elements of mastery-based grading into the Chemistry classes required for pre-health sciences and several science majors.
  - Mathematics – preliminary research related to improving equitable student success in courses required for STEM Majors (M025/M119; M211/M212)
- IUPUI
  - Physics: Restructuring the Physics Introductory Labs
  - Computer Science: How does the alignment between instructional design and student technology use affect student learning and successful course completion.
- IUE
  - Criminal Justice - Incorporating Transparency in Learning and Teaching (TILT) strategies into the Criminal Justice program.
- IUK
  - Computer Science - Identify and resolve the reasons behind attrition and poor performance in Computer Science introductory problem-solving courses.
- IUN
  - Kevin McElmurry, Mark Hoyert, Chris Young, and Chenfeng Zhang: Developing an effective measure of the use of active learning techniques within individual classes that can be used to examine the efficacy of active learning techniques within our educational context and to improve pedagogies.
- IUSB
  - First Year Writing Program - Exploring the impact of the First-Year Writing Program (English Placement exam and the ENG-W 130/131 sequence)

# Reasons to say no!

Commitment - Project participants will meet virtually about every two weeks starting in mid-June, culminating in an in-person event in mid-late August



Mildred was on vacation



Kim had to turn in her Dossier

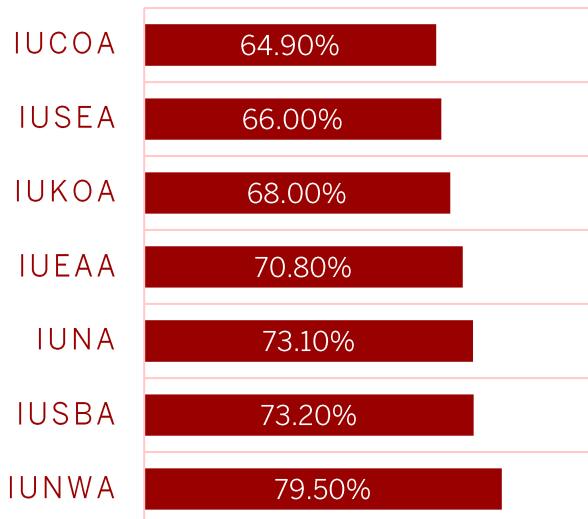


Someone crashed into Phillips's house

# Pass Rate Analysis

Source: [Summer Academy for Curricular Analysis and Improvement \(SACAI\)](#)

## COURSE CAMPUS



## RETENTION RATE\* by course pass status



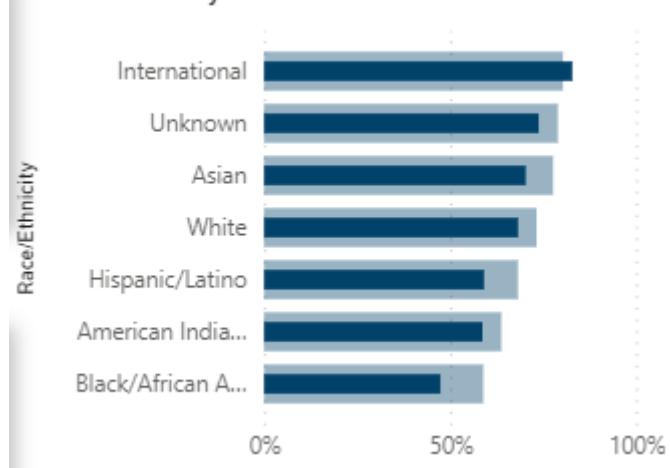
\*Based on students enrolled in a section Fall 2019 or earlier. Students are considered retained if they were either enrolled in or had graduated by Fall 2020.

- The last 5 years.
- First year courses including: A118, M110, M118, M119, M125, M129, K300
- IU campuses excluding Bloomington
- N = 37,920
- IUS N = 5,459
- Fall 2021 SACAI Super-Supplemental Instruction Intervention

# Ethnic Pass Rate Analysis

Source: [Summer Academy for Curricular Analysis and Improvement \(SACAI\)](#)

## Race/Ethnicity



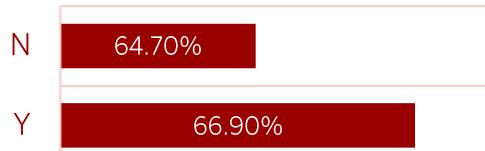
IU Southeast – Navy Blue All Campuses excluding Bloomington – Lite Blue



## LOW INCOME (PELL)



## GENDER BINARY



- The last 5 years.
- First year courses including: A118, M110, M118, M119, M125, M129, K300
- IU campuses excluding Bloomington
- N = 37,920
- IUS N = 5,459
- Supplemental Instructors recruitment for fall 2021
- Doctoral student mentor

# Assessing and improving required supplemental instruction in Math A118 (Finite Mathematics for Social and Biological Sciences) and M129 (Business Algebra and Applications)

- Our goal is to improve equitable student success in our first-year level mathematics courses.

## Pre-post Qualtrics Surveys

1. All student data collected will be locked and de-identified.
2. All students will be given a study information sheet before being included in the study.
3. All student instructors will complete a training course before interacting with these classes. The course will be led by IU Southeast Student Success/Tutoring Center.



August 16 Presentation in Indianapolis

## Our approved funding for support:

- \$9,000.00 to pay nine supplemental instructors (\$1,000 each)
- \$1,000 to pay two student research assistants to analyze data (\$500 each)
- Total \$10,000.00

# Implement required Supplemental Instruction element to nine sections of Gen Ed math courses:

- Historically, SI was optional. And it was not always at a time that was convenient for the student.
- SI was typically only attended by the "best" students.
- Students who needed help joined SI but sometimes it was already too late.
- REQUIRED SI is provided to ALL students to improve their understanding of course material and improve their grades.
- SI is not a substitute for attending class or doing assigned homework.
- SI leaders will be recommended by a faculty member and must have completed the course (or course equivalent) in which they will SI.

## **Potential Improvements:**

1. Supplemental Instructor sessions teach in a multi-sensory way that is beneficial to students with learning disabilities.
2. Provide immediate support/intervention from SI
3. Develop a feeling of community and connection with other students.
4. Compare and contrast other students' struggles with motivation to your own.
5. Identify how others motivate themselves.
6. Improve quantitative confidence.

## What is the Change in SI?



- Required for ALL students.
- The SI session is built into the student's class schedule. The time is now convenient, and room is already assigned.
- Class time extended by 45 minutes - class is now 2 full hours. Took some scheduling finesse to make this happen.
- SI can take place at the beginning or the end of the class – as needed for the content or reviews.
- Students MUST attend - a collected assignment to ensure that they stay.



Original results were  
discouraging!

Fall 2022 Pass Rates only  
67.79% n = 338

Further analysis of the data  
showed that some sections of  
the classes improved  
dramatically, and some  
became far worse.

# Spring 2022 Results

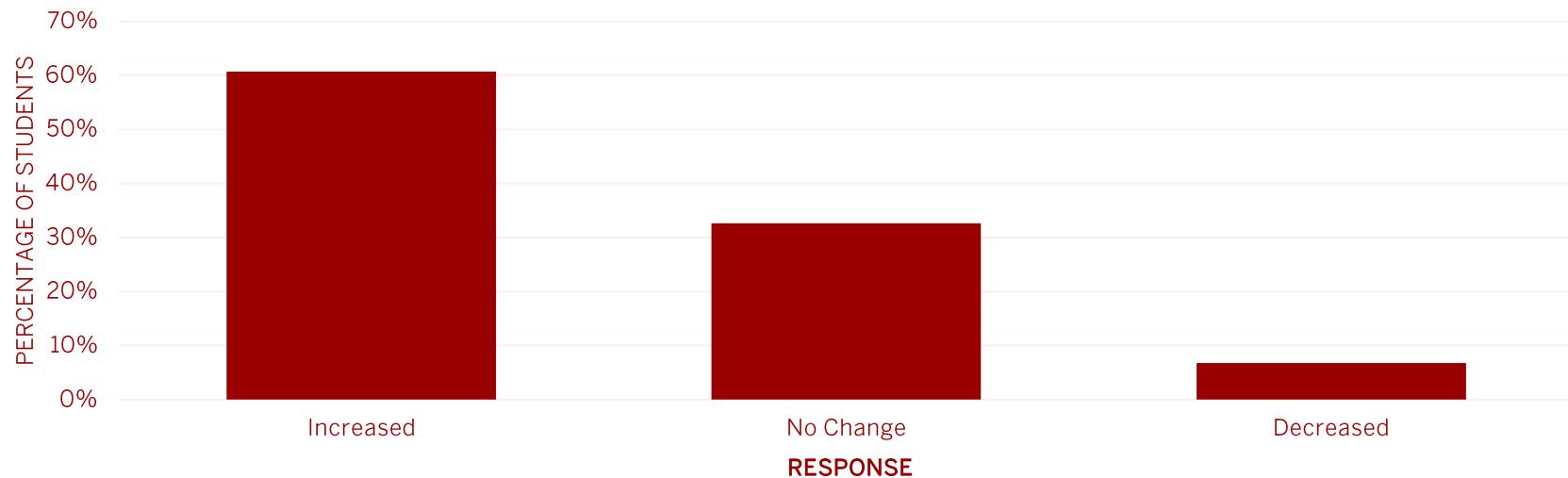
Group	Extra time leader	Homework Amount	Pass Rate	N=
1	Student SI	Regular amount	58.19%	136
2	Student SI	Reduced substantially	78.3%	83
3	Faculty & SI	Regular amount	60%	45
4	Faculty & SI	Reduced substantially	78.4%	74

Reducing homework while doing more in class with assistance seems to be the key to our student success!

# 2022 Survey Results

Question: How has your math confidence changed this semester?

N = 89



# 2022 Survey Results

Question	Yes	No	N=
I felt encouraged I could get this.	90%	10%	88
I felt supported.	92%	8%	85
I felt prepared for tests.	87%	13%	85
I felt free to ask questions.	94%	6%	85
I felt like I was part of a team.	79%	21%	85
I felt singled out in a bad way.	2%	98%	86
I felt like I was the only one who was struggling.	7%	93%	85

# Replicating the Data Fall 2022

Group	Extra time leader	Homework Amount	Pass Rate	N=
1	Student SI	Regular amount	65.22%	23
2	Student SI	Reduced substantially	86.96%	23
3	Faculty & SI	Regular amount	71.11%	45
4	Faculty & SI	Reduced substantially	82.47%	154

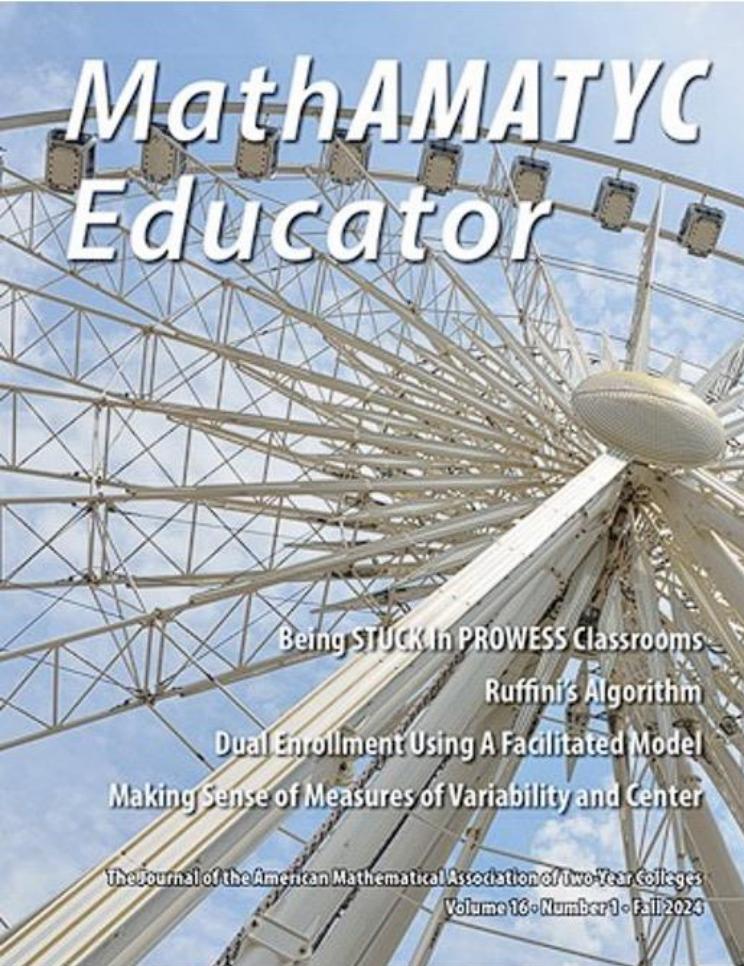
Student success was the maximized when the instructor and SI stayed for the entire 2-hour class! Stipends were made available to those instructors.



## Our Lilly Grant Funding

Ended December 2023

IU Southeast is providing a reduced budget for our project for fall/spring 2023/2024



Fall 2024 Issue Volume  
16, November 1

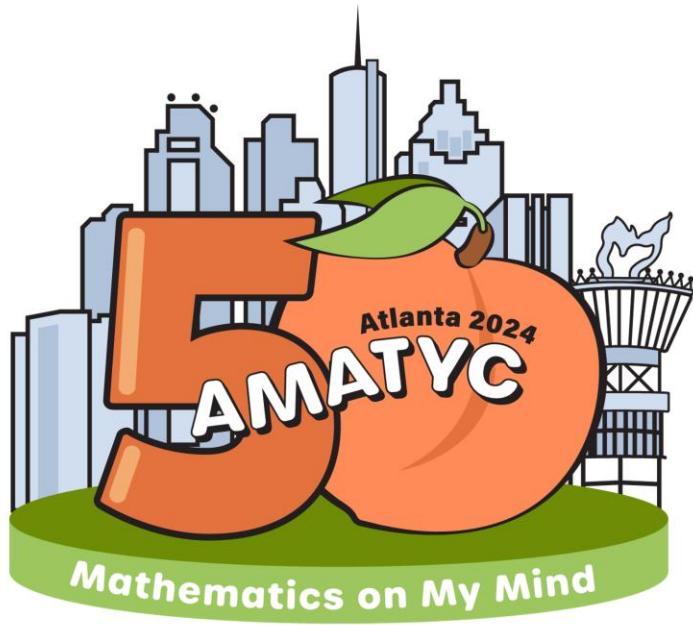
A refereed publication

Feature:

**Less is more: Increasing Class  
Time and Reducing Homework**

Mildred A. Vernia

Indiana University Southeast



# Presentation 50<sup>th</sup> AMATYC Conference

November 14–17, 2024  
Atlanta, Georgia

Informal discussion with Author  
Less is More: Increasing Class Time  
and Reducing Homework

Mildred A. Vernia  
Indiana University Southeast

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- Loewus, Leana (2015). Heavier Homework Load Linked to Lower Math, Science Performance, Study Says. March 2015, Education Week.
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- Lumina Foundation, & Bill and Melinda Gates Foundation. (2020). Higher Ed Budgets for the Post-COVID Era: Now's Our Chance to Do This Right. In Lumina Foundation.
- Suh, E. K., Dahlgren, D. J., Hughes, M. E., Keefe, T. J., & Allman, R. J. (2019). Conditions for success: Fostering first-year students' growth mindset in developmental mathematics. Journal of The First-Year Experience & Students in Transition, 31(2), 63-78.
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# THANK YOU!

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