



Using Supplemental Instruction to Increase Engagement in Co-Requisite Courses

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Tutoring Myths and Paradoxes

- Students who don't need tutoring are the students who go to tutoring.
- Students report they need tutoring but don't go to tutoring.
- The number of tutoring visits varies inversely with the grade.
- Students who go to tutoring ace their HW but fail their tests.
- Students will go to tutoring for math or science courses but not for other gateway courses.

Which of these paradoxes do you think is true? What issues do you see in your tutoring programs at your institution?

Think-Pair-Share

Tutoring Myths and Paradoxes

- Students who don't need tutoring are the students who go to tutoring.
 - FALSE according to national research.
- Students report they need tutoring but don't go to tutoring.
 - Somewhat TRUE at UHD.
- The number of tutoring visits varies inversely with the grade.
 - TRUE at UHD for some classes.
- Students who go to tutoring ace their HW but fail their tests.
- Students will go to tutoring for math or science courses but not for other gateway courses.
 - Often TRUE at UHD.

What is Supplemental Instruction (SI)

- Peer tutoring model
- Developed in 1973 at University of Missouri-Kansas City
- Provides in-class and out-of-class support for high-risk courses
- Facilitated by SI Leaders
 - Attend assigned class
 - Conduct weekly SI group study sessions
- Shown to improve student performance and retention
- Objectives:
 - Improve understanding of course material
 - Strengthen positive study habits
 - Improve individual performance
 - Improve retention and graduation rates
 - Build study groups
 - Foster critical thinking



SI Leaders

- Hiring
 - Online application
 - Faculty recommendation (required)
 - SI Leader recommendation (desirable)
 - Interview
 - 30 minute Mock SI Session that evaluates:
 - Professionalism
 - Written communication skills
 - Oral communication skills
 - Personality
 - Performance under stress
 - Group interview with SI Leaders
 - One-on-one interview with coordinator
- Characteristics
 - Current UHD students
 - Taken and mastered the target course (B or higher)
 - Maintain minimum 3.0 cumulative GPA
 - Demonstrate effective communication skills, professionalism, and integrity

SI Leader Training

- 2-day mandatory training focused on:
 - Role and responsibilities
 - Collaborative study techniques
 - Customer service
 - Public speaking and presentation skills
 - Team-building activities
 - Problem-solving activities



SI leader Evelyn Valdez holds a general biology I mock session during training (Spring 2016).

Responsibilities of the SI Leader

- Attend every class meeting for the assigned section
 - Be a “model student”
- Support and communicate with assigned instructor
 - Direction of SI session
 - Feedback regarding where students are struggling
- Attend and participate in monthly SI Leader staff meetings
- Communicate with supervisor weekly
- Prepare detailed session plans
 - Session activity
 - Exam review
 - Supplemental worksheets for home study
- Facilitate 2-4 60-minute study sessions per week
 - Be a “near peer”
- Provide additional SI sessions as necessary (e.g. prior to quizzes and exams)

SI Study Sessions



SI leader Carlos Guajardo conducts a team-based exam review for history using Kahoot! (Spring 2017).

- Based around activities that encourage group learning
 - Sessions are tailored to a specific course section
 - Students review content or study for exams in small groups
 - SI Leaders do not re-lecture or give out answers
- SI Leaders:
 - Integrate content with learning strategies
 - Empower students to take control of their own learning
 - Encourage the formation of study groups outside of class and SI sessions

Which of these practices have positive impact on first-year persistence?*

- A. Learning communities
- B. First-year seminars
- C. Service learning
- D. Students studying together in groups
- E. Students discussing the content of their courses outside of class

*Angelo, L. (2014) Programs and Practices That Retain Students From the First to Second Year: Results From a National Study, *New Directions for Institutional Research*, no. 160, Wiley Periodicals, Inc.

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Possible Impact of SI; a Study of College Algebra

- Study of the effect of SI on grades and graduation of full-time college-ready FTIC students over 6 years (664 students in SI sections, 1120 students in non-SI sections)
 - The ABC rate was **77%** for the SI sections and **67%** for non-SI sections.
 - The mean class GPA was **2.42** for the SI sections and **2.08** for the non-SI sections.
 - The 6-year graduation rate was **32% higher** for students in the SI section vs. students in the non-SI sections.

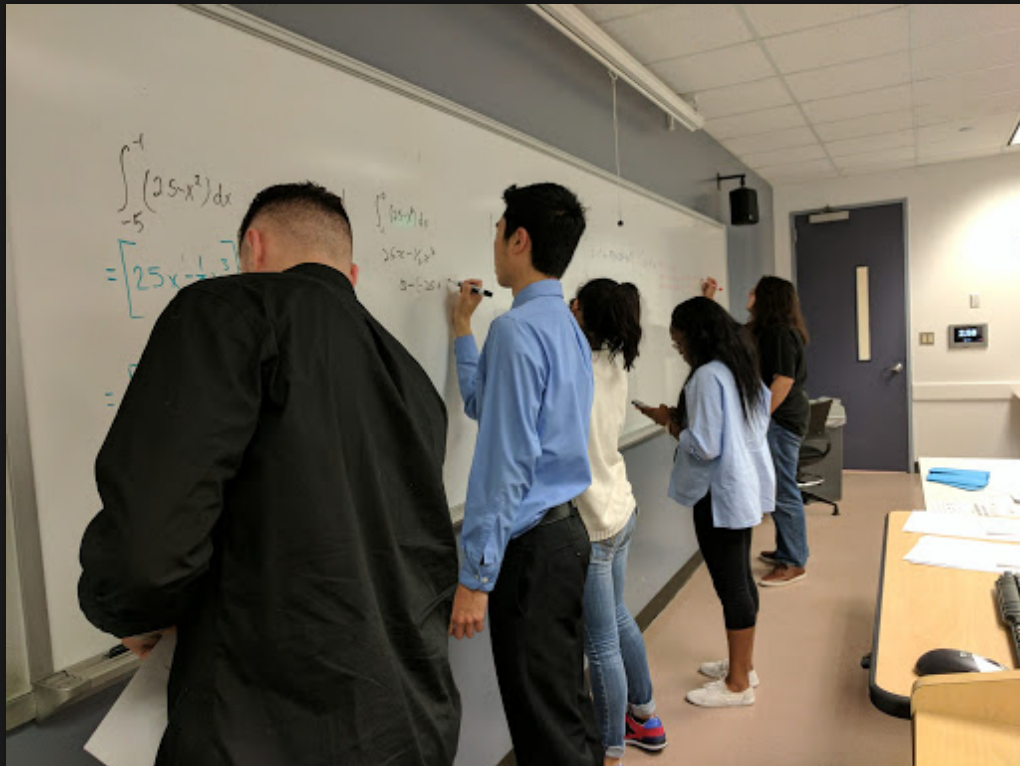
SI in the Classroom

If the mountain won't come to Muhammad, then...

SI Leaders in the Classroom

- Role predominantly dependent on instructor
 - Can be a bridge between the instructor and students
 - Can serve as model student in group activities
 - Can help with handouts and student questions
 - Can identify specific concepts that might need further explanation
- SI Leaders in classroom:
 - Are knowledgeable of class activities, learning outcomes, and course materials
 - Aid in the understanding of course content during application activities by facilitating discussion and participation
 - Take what they learn in class (especially difficult concepts, gaps in student foundations, etc.) to enhance SI sessions


Calculus I: Enhancing Instruction



Students work problems during Calculus I recitation (Spring 2017).

- Extended Classes/Recitation
 - Class extended by 30 minutes
 - Mandatory extra time used for problem-solving, individually or in small groups
 - Often a focus on students presenting their solutions to the class
 - SI Leader facilitates recitation with assistance from instructor (or other assigned faculty)
 - Used in sections of College Algebra, Calculus I, Physics I
 - No charge to students

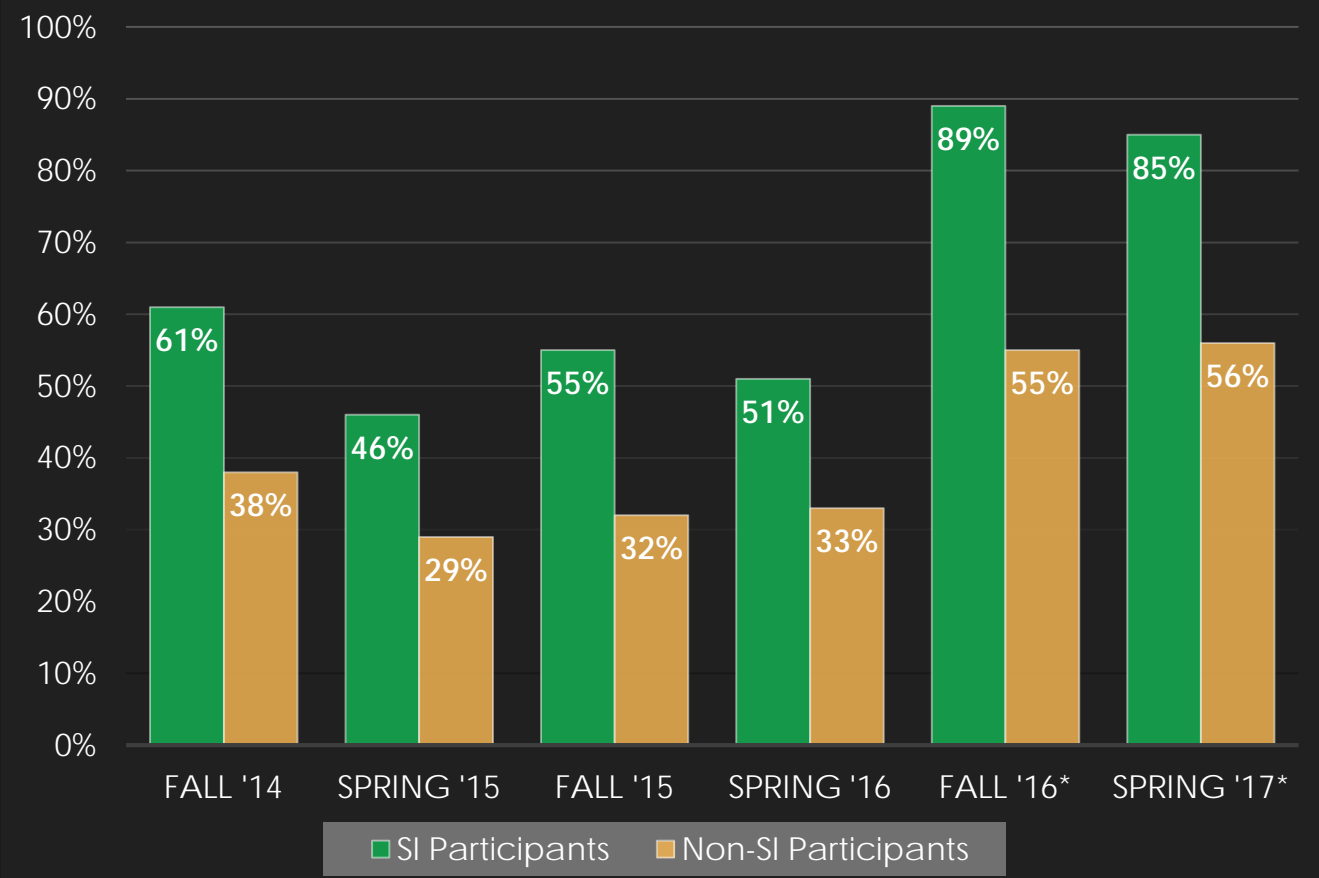
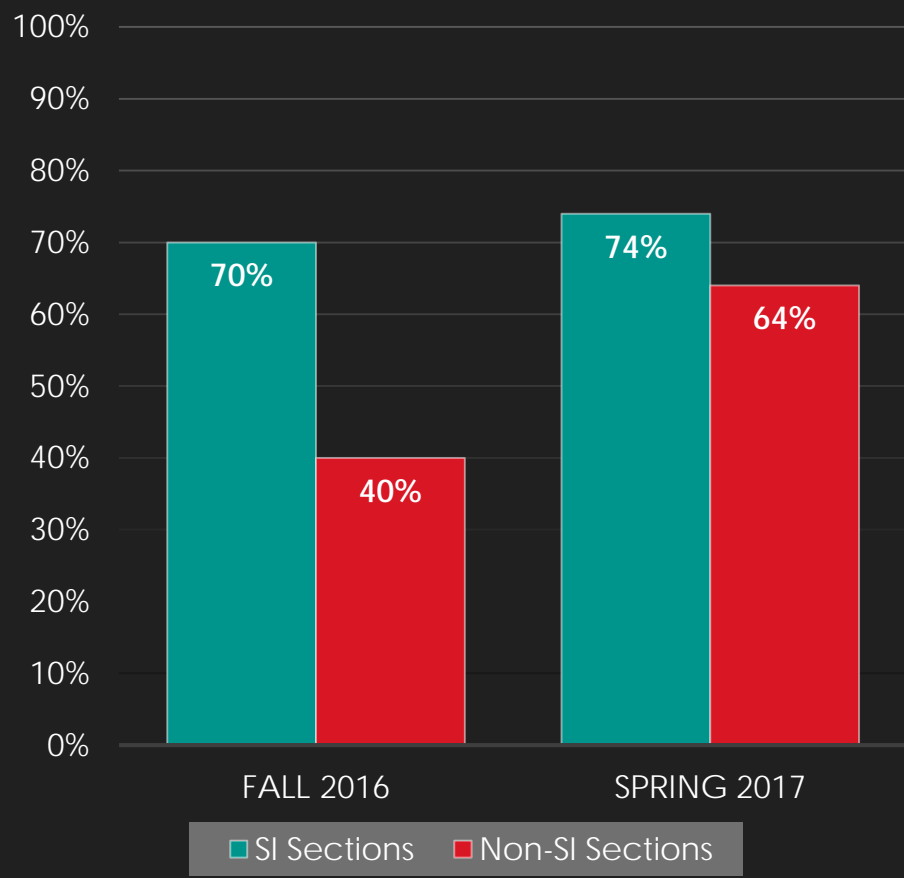
Calculus Flux

- The recitation periods following lecture are mandatory.
 - Calculus Flux is a motivational extra-credit system designed to:
 - Incentivize the inputs of success
 - Invert the logic of extrinsic incentives
 - Allow students to “buy out” of the recitation period
- 
- Here are two other references on the use of mandatory SI sessions:
 - Hanna, B. & Yard, J. (2015) Mandatory Supplemental Instruction in Developmental Mathematics and Calculus: A Program to Promote Student Success. *Proceedings of the 11th Annual National Symposium on Student Retention*, The University of Oklahoma, 285-292.
 - Bonsangue, M. et al. (2013). Impact of Supplemental Instruction on Transfer Success in First Semester Calculus. *The Learning Assistance Review*, 18(1), 61-73.

Recitation Activity

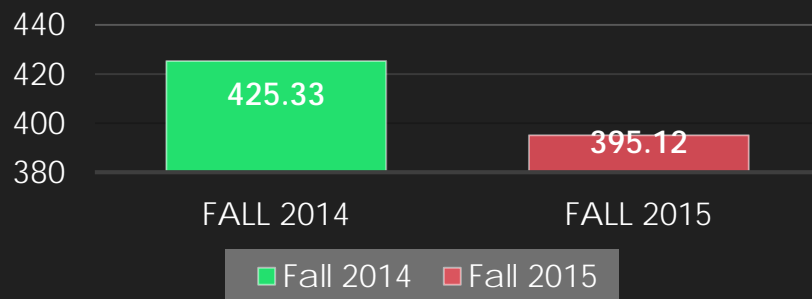
Calculus I

Calculus I Results

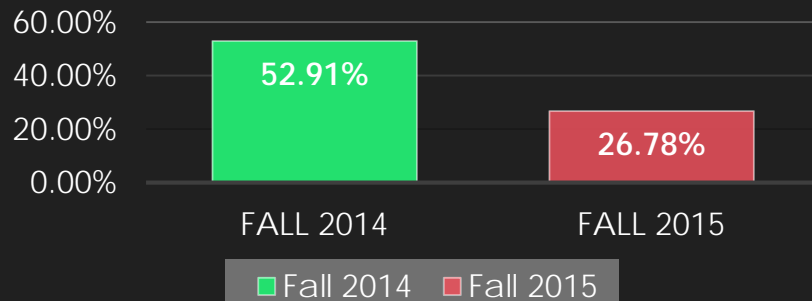


College Algebra: Enhanced Instruction

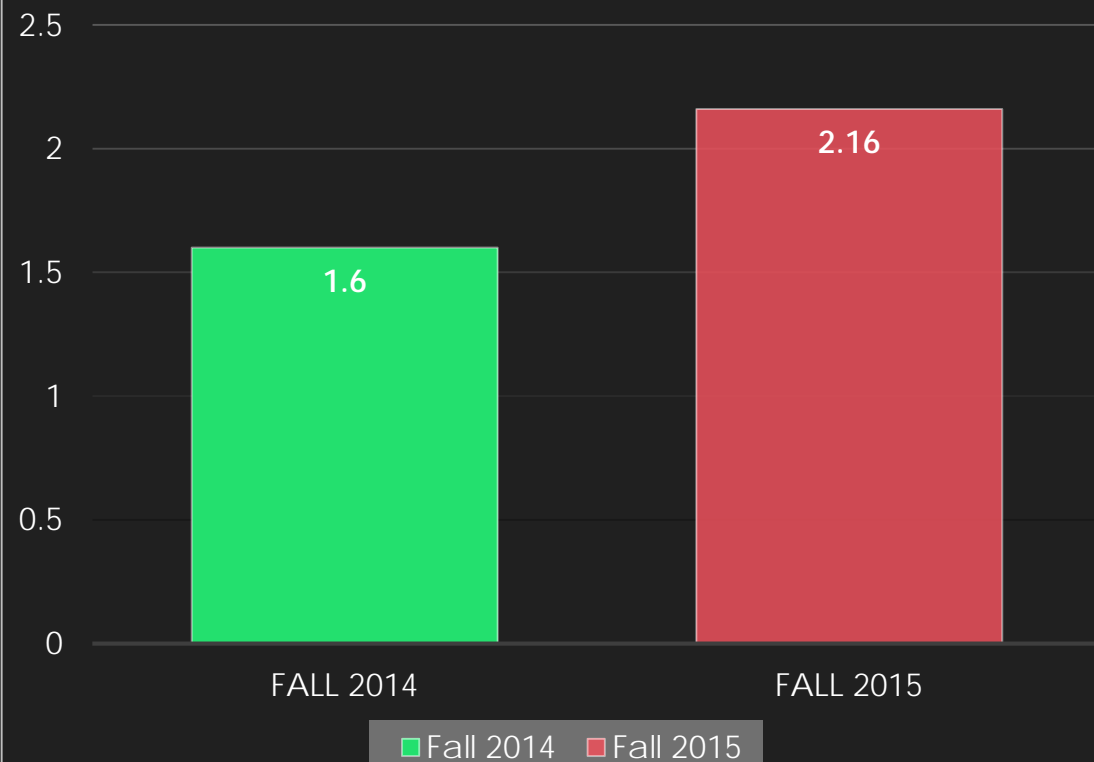
Mean SAT Score



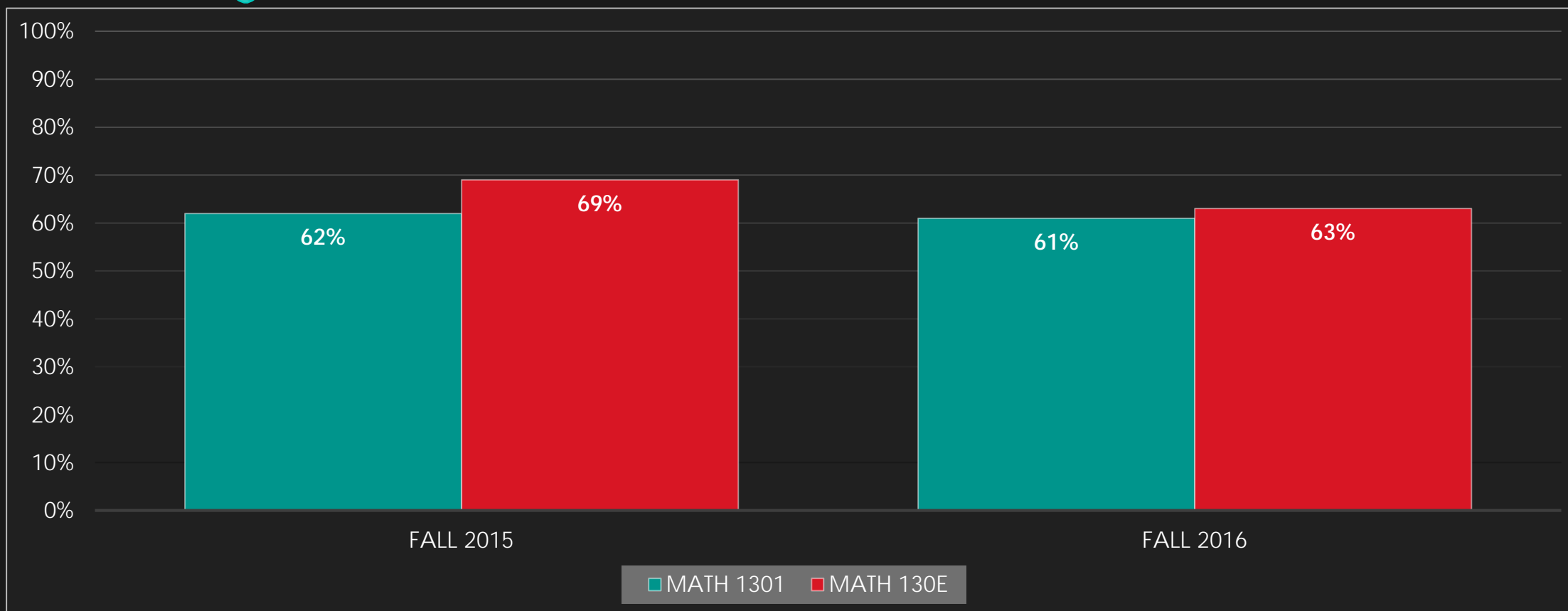
Mean Percentile Rank



Mean Class GPA



Pass Rate Comparison in College Algebra



Biology & Chemistry: Integrated Instruction

- Team-Based Learning (TBL)
 - Individual readiness assurance test (iRAT): individual, closed book
 - Team readiness assurance test (tRAT): team-based, open discussion
 - Students review lecture material at home via online videos or textbook
 - Majority of the class time is focused on working through problems or application activities

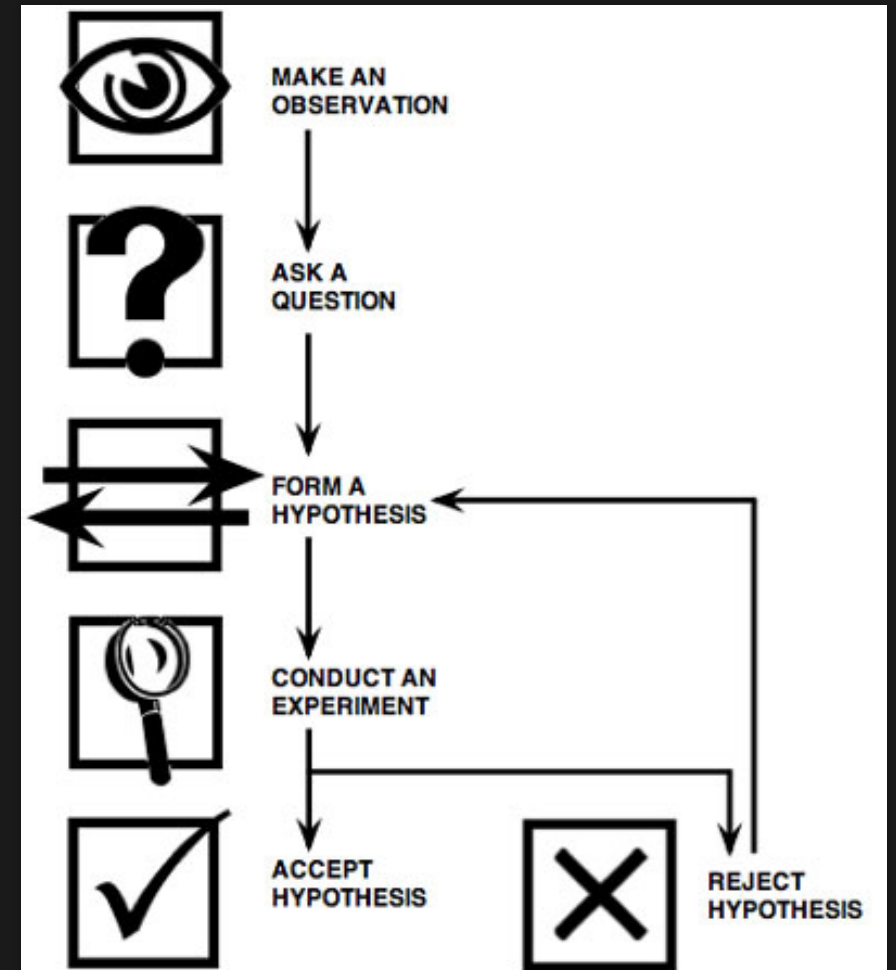


SI leader Bryttanni Duncan conducts a final exam review for biology in the TBL classroom (Fall 2016).

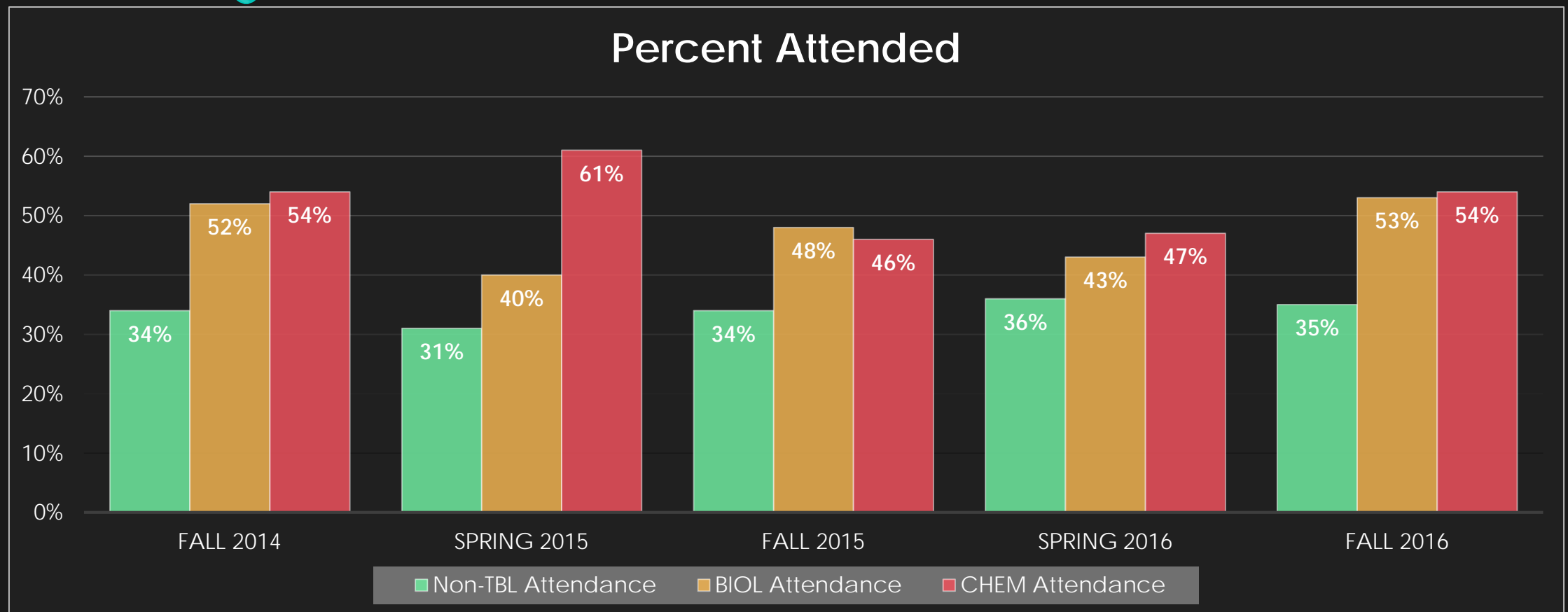
TBL Activity: The Scientific Method

Steps of the Scientific Method:

1. The Problem or Question: *What does the scientist want to learn more about?*
2. The Hypothesis: *An "educated" guess of an answer to the question.*
3. Experimentation: *Detailed and controlled in order to directly test the hypothesis.*
4. Data Analysis and Conclusions: *Was the hypothesis correct or incorrect?*

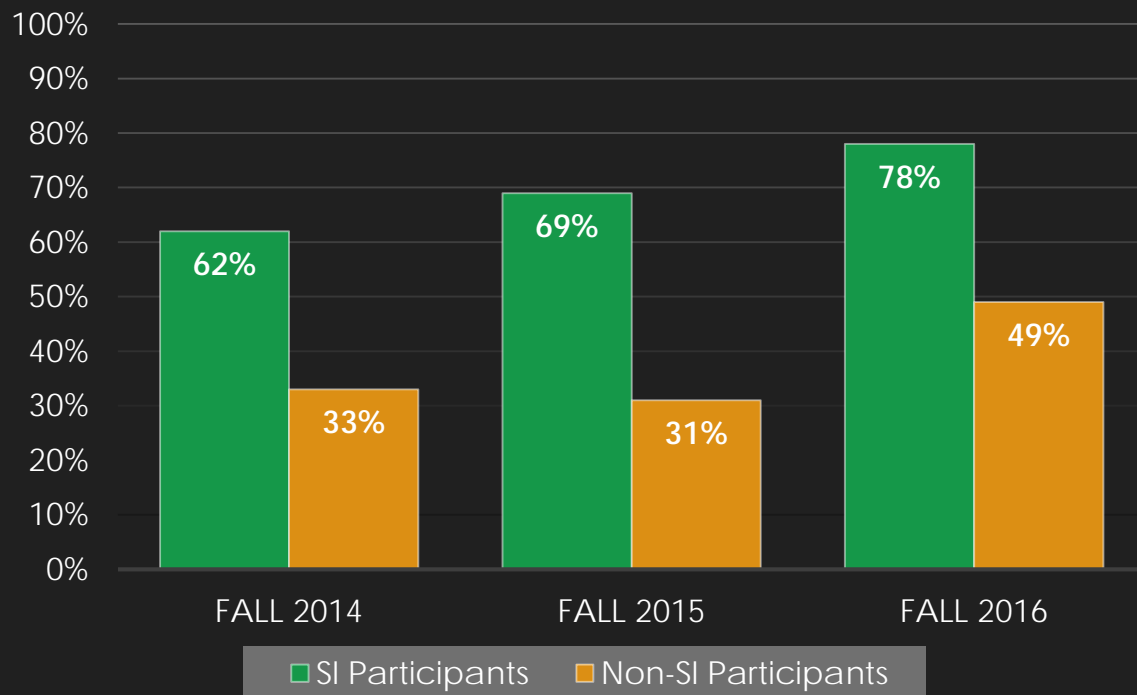


TBL Student Attendance to SI Sessions



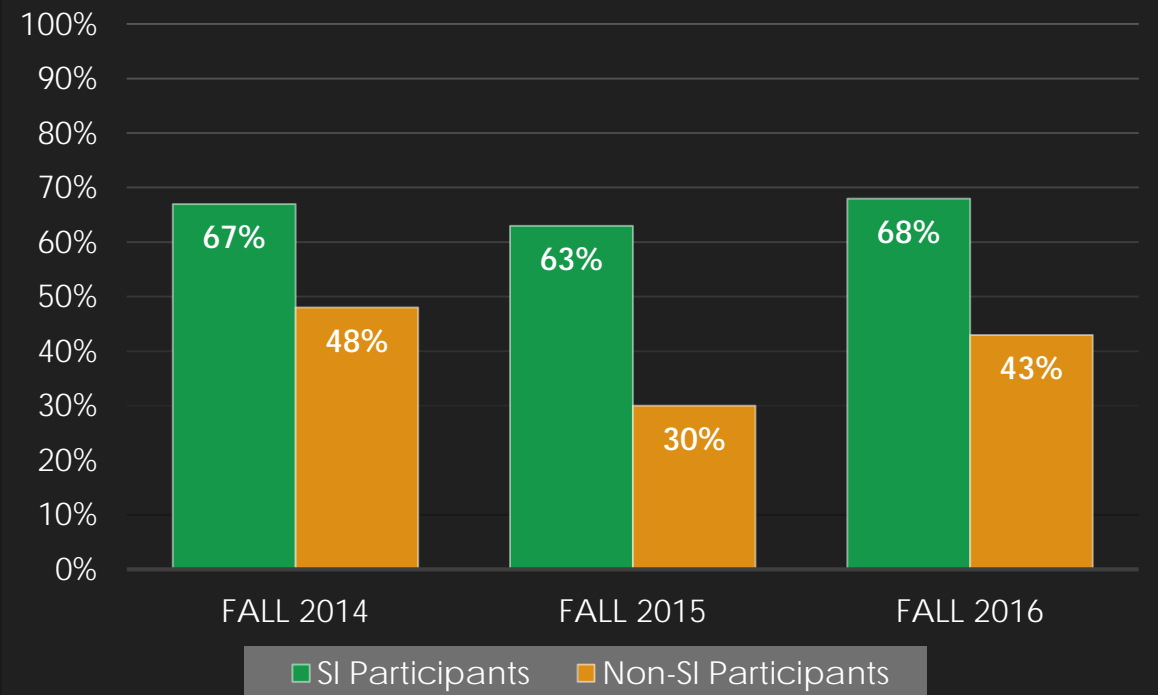
Pass Rate Comparison for TBL Courses

General Biology I



Overall ABC Rate: 38% (Fall 2011) → 65% (Fall 2016)

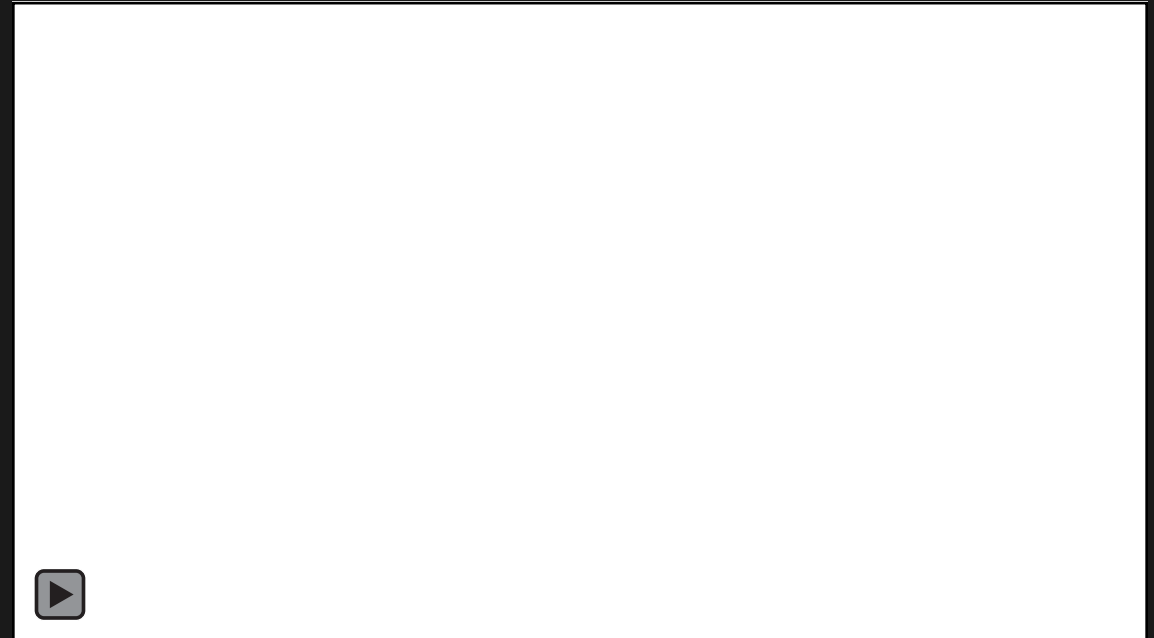
General Chemistry I



Overall ABC Rate: 44% (Fall 2011) → 57% (Fall 2016)

Developmental Algebra: SI Integration into Co-Requisite Courses

- 8-wk Beginning Algebra/ 8-wk Intermediate Algebra or Contemporary Math
- 8-wk Intermediate Algebra/8-wk College Algebra
- Class meets 4 times per week
 - SI interacts with students every day
- Out-of-class: collaborative study sessions
 - Four times a week
 - 2-4 weekly planning hours
 - Weekly exam reviews
 - Friday open lab for homework assistance



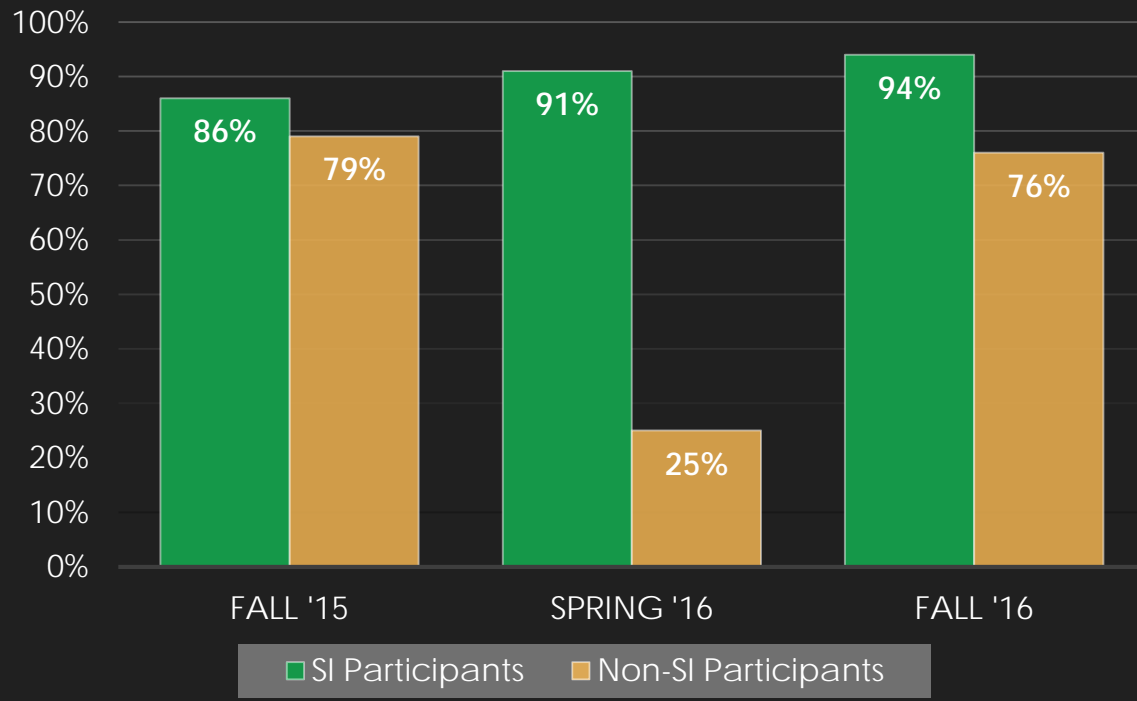
Instructor Description of a Co-Requisite Class

Developmental Co-Requisite Results

- Nearly doubled the percentage of FTIC Beginning Algebra students who complete a core math course in two long semesters (20% → 39%)
- Pilot nearly doubled the percentage of FTIC Intermediate Algebra students who complete a core math course in two long semesters (38% → 71%)

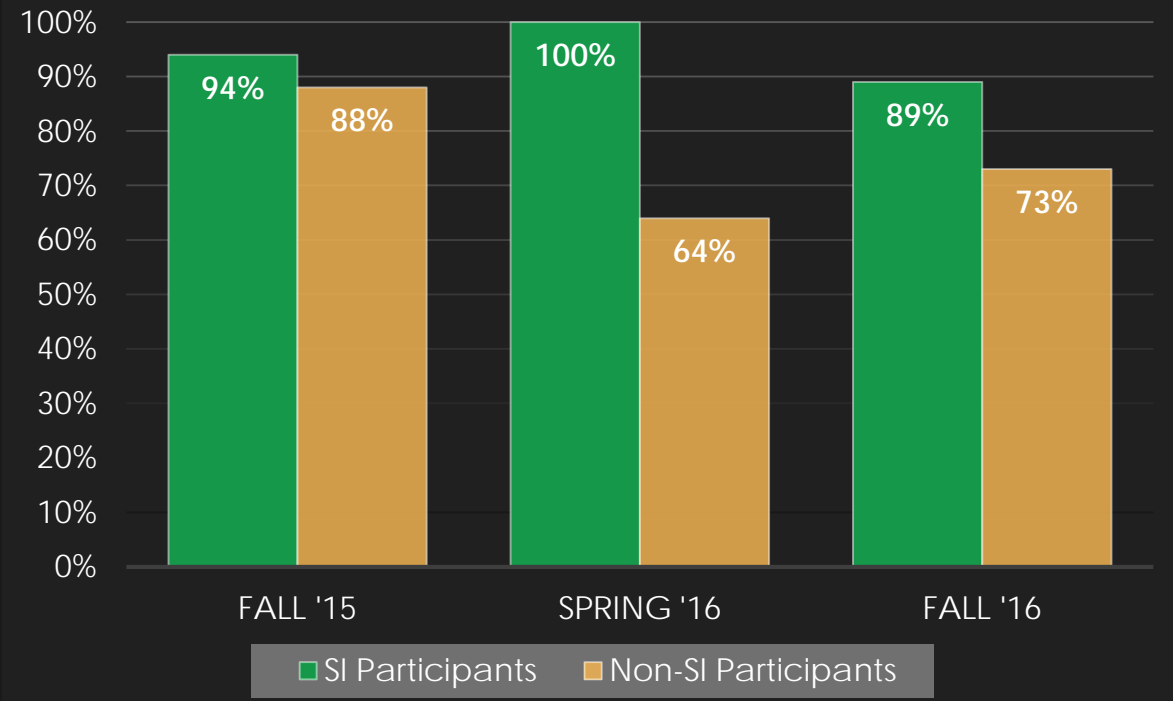
ABC Rate Comparison: Developmental Co-Requisite Courses

MATH 0300



Overall ABC Rate: 54% (Fall 2013) → 70% (Fall 2016)

MATH 1300



Overall ABC Rate: 49% (Fall 2013) → 66% (Fall 2016)

Which of these methods of integrating tutoring into the classroom have you tried?

Did it work? Why or why not?

What courses could benefit from one or more of these integration models?

Turn to a Partner

Planning Activity

How might this look at your institution?

Thank you!

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