

The Role and Impact of Supplemental Instruction in Accelerated Developmental Math Courses

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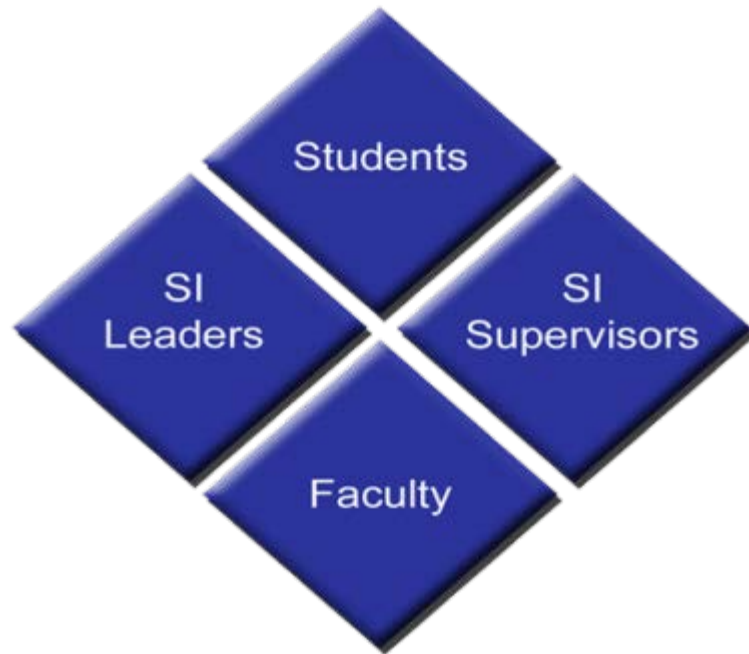


University of Houston-Downtown

- › Founded in 1974
- › 14,231 enrolled students
- › Commuter campus
- › Hispanic-serving institution
- › Average student age: 28
- › Average class size: 26
- › Five colleges



Supplemental Instruction (SI)



› History

- Collaborative peer academic assistance
- University of Missouri-Kansas City

› UHD

- Learner's Community
- *Spring 2001*: 20 SI Leaders, 9 courses, 27 sections
- *Spring 2018*: 39 SI Leaders, 22 courses, 54 sections

Our Goals

Target historically difficult courses

- Improve understanding of course material
 - Improve grades
 - Increase retention
 - Improve graduation rates
- Build study groups
- Foster critical thinking
- Strengthen positive study habits



Figure 3. Spring 2018 SI Leader cohort.

How does SI Work (at UHD)?

- › Traditional format
 - In-class: model student
 - Out-of-class: collaborative study sessions
 - › Twice a week
 - › Free, voluntary
 - 1-2 weekly planning hours
 - Communication with instructor



Figure 4. History 1305 Session (Charades), Fall 2016.

How does SI Work (at UHD)?



Figure 5. Physics 1301 Session (Jeopardy), Spring 2018.

- › Other Responsibilities
 - 2-day training
 - Monthly professional development meetings
 - Observations
 - Mentors
 - Performance evaluation

Staffed Courses

- › Human Biology
- › General Biology I
- › General Biology II
- › Astronomy
- › General Physics I
- › General Physics II
- › Introduction to Chemistry
- › General Chemistry I
- › General Chemistry II
- › Organic Chemistry I
- › Federal Government
- › U.S. History I
- › U.S. History II
- › **Beginning Algebra**
- › **Intermediate Algebra**
- › College Algebra
- › Trigonometry
- › Finite Math
- › Business Calculus
- › Math for Liberal Arts
- › Pre-Calculus
- › Calculus I
- › Calculus II
- › Introduction to Proofs

Developmental Math at UHD

How does it work?

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Context

HB 2223

- › Developmental education must follow co-requisite model
- › Concurrent enrollment

THECB GRANT

- › \$\$\$
- › Improve pass rates of dev. ed. courses
- › Students > college-ready > fast

The Problem:
ATTENDANCE

Participation and Engagement

UNDERPREPARED STUDENTS

- › Self-regulated learning behaviors*
- › Perception of self-efficacy*
- › Time/stress management

UHD UNDERPREPARED STUDENTS

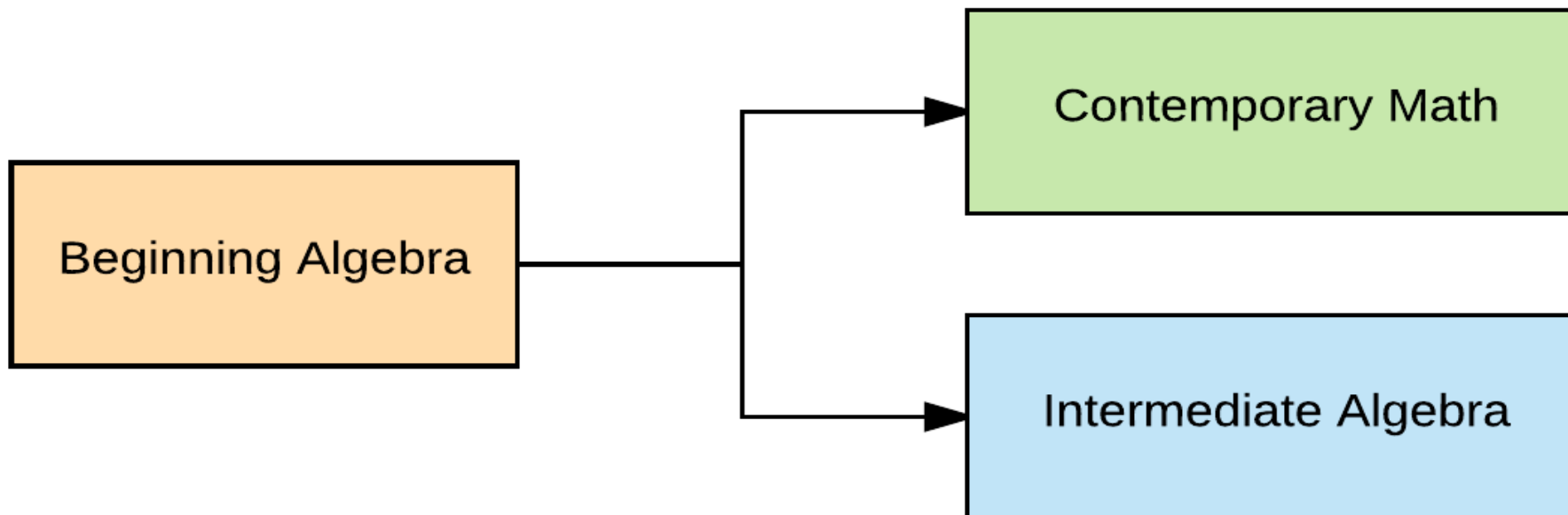
- › Large gap between HS and college
- › Family/work obligations
- › Commute to/from campus (in Houston traffic)
- › High desire to seek help

*Ley, K., & D.B. Young. (1998). Self-regulation behaviors in underprepared (developmental) and regular admission college students. *Contemporary Educational Psychology*, 23, 42-64.

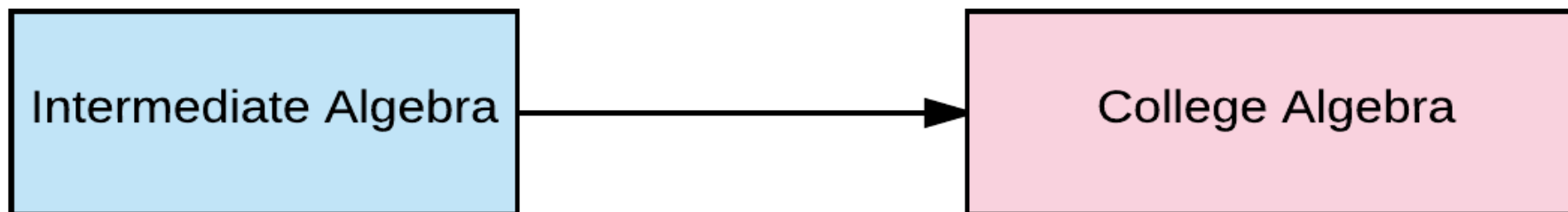
1st 8 Weeks

2nd 8 Weeks

A)



B)



Accelerated Developmental Math

Class Structure:

- › Monday–Thursday
- › Lectures: 1.25 hours
- › In class: problem-based learning
 - problem sets
 - Individually/pairs/groups

SI Session Structure:

- › Optional
- › Immediately before class, immediately after class, or later in the afternoon
 - Scheduled based on the majority availability of the students, determined via paper or oral survey on the first day of class

Role of the SI Leader

(and the instructor)

The SI Leader

› *In class:*

- Walks around class during group work
- Facilitates discussion
- Brings students back on track
- Uses Q&A to get students thinking

› *Out of class:*

- Facilitates four, 1-hour learning sessions
- Fosters critical thinking through group learning
- Integrates course content and study skills/strategies

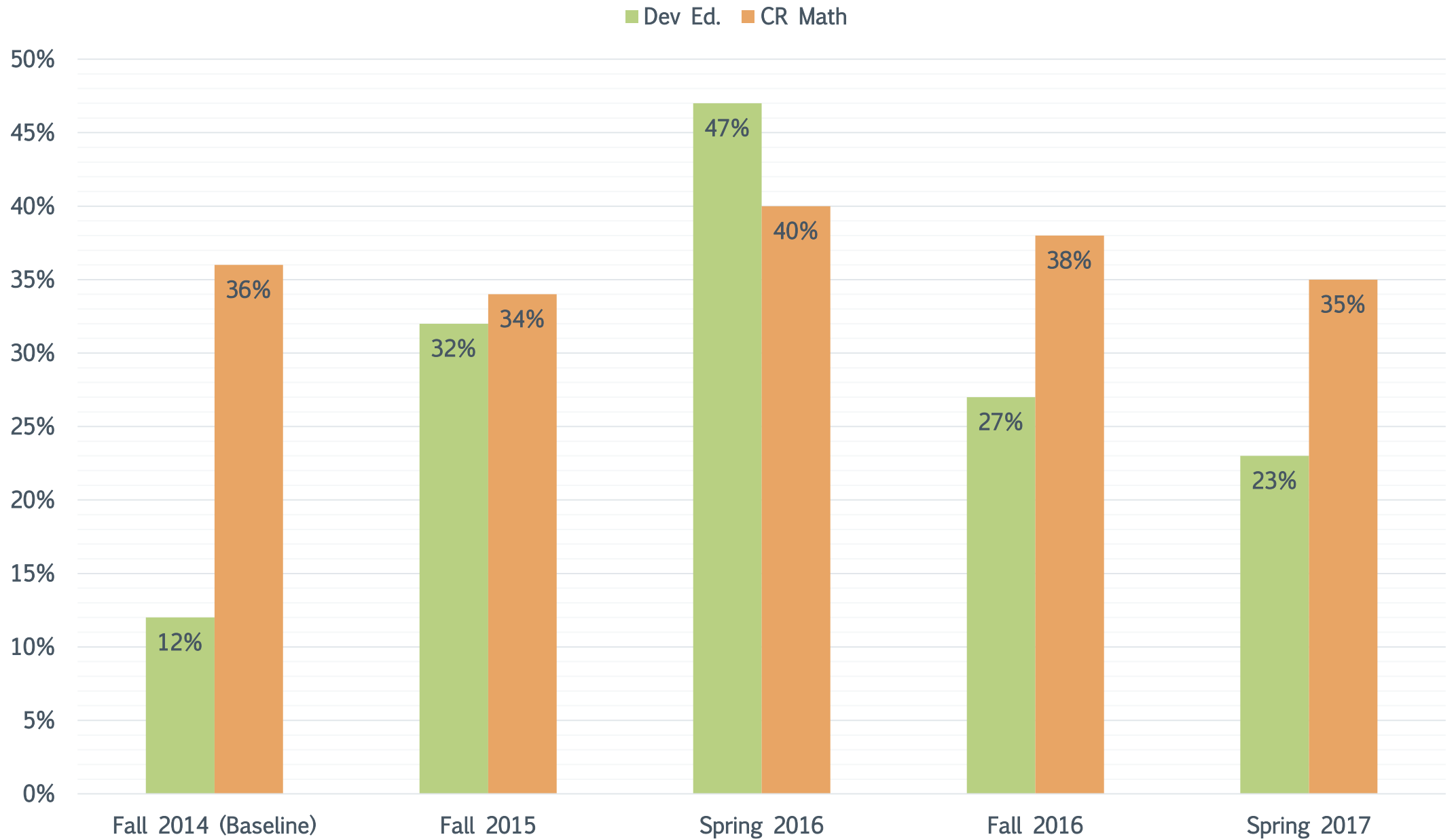
The Instructor

- › The faculty role:
 - Integrate active learning activities during class
 - Allow the SI Leader to assist in facilitation
 - Acknowledge the SI Leader in class
 - Regularly recommend SI study sessions (and other tutoring options!)
 - Communicate expectations and information

Impact on Student Success

SI Attendance Comparison, Dev. Ed vs. College-Level Math

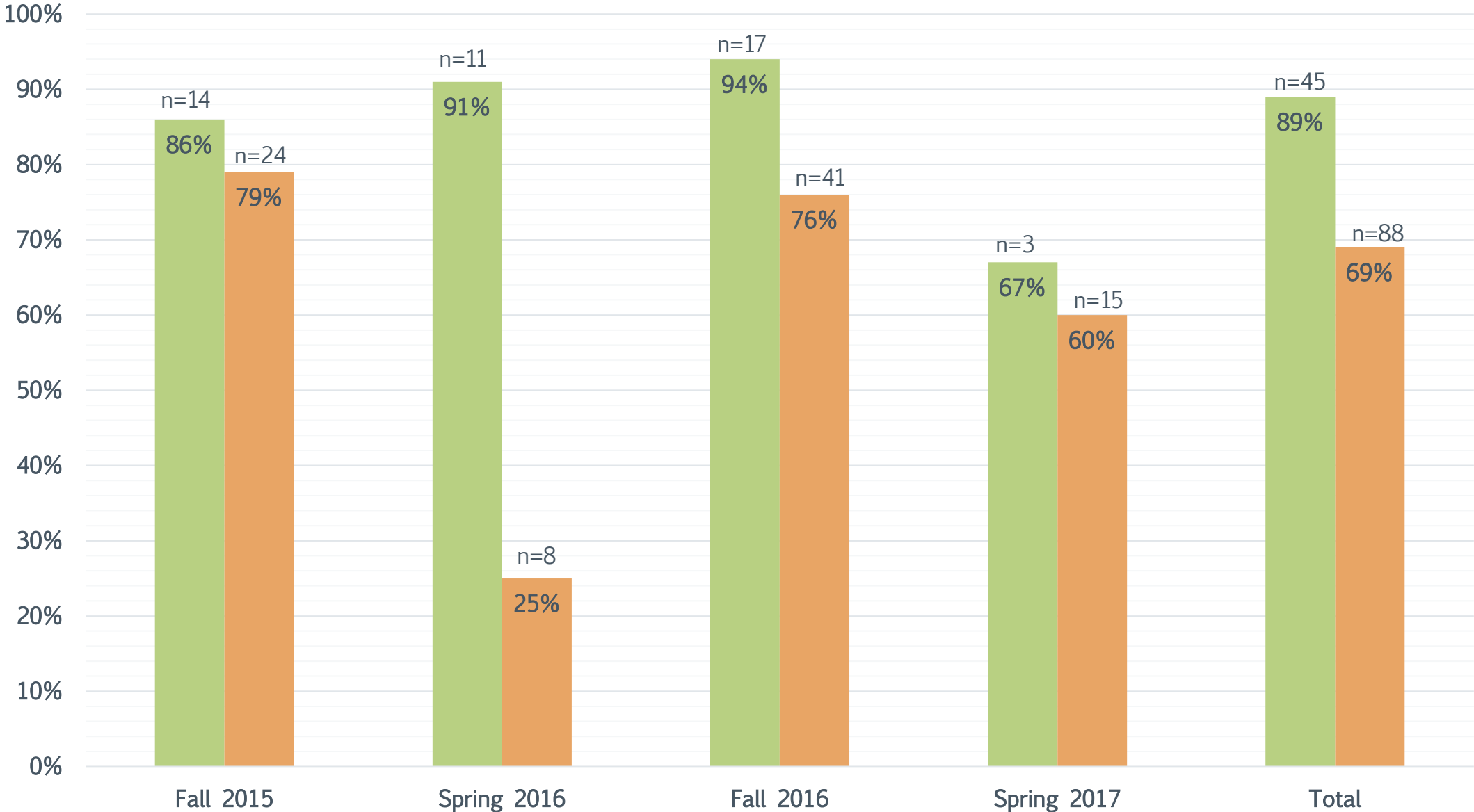
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Pass Rate Comparison, SI Participation (Beginning Algebra)

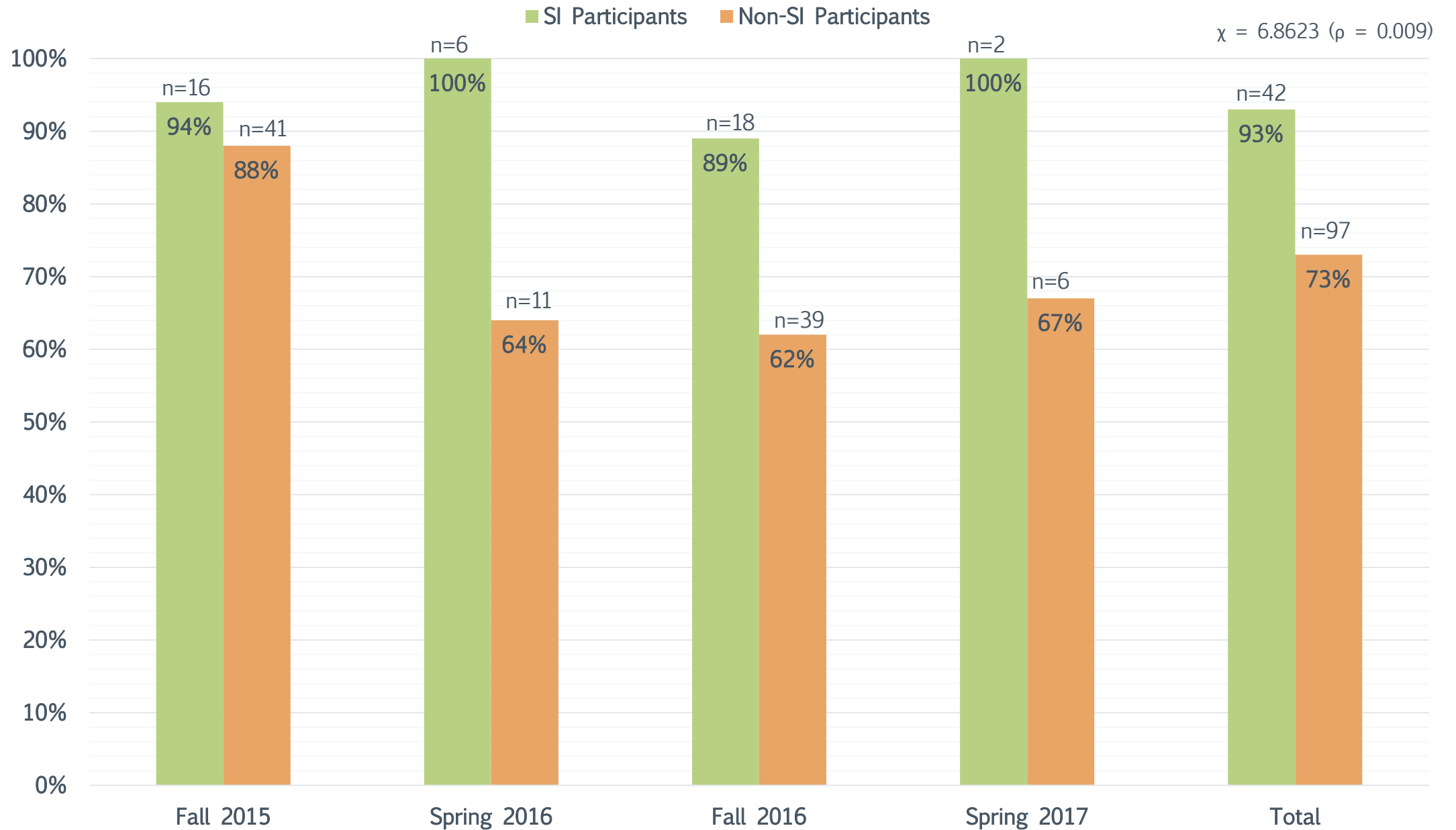
■ SI Participants ■ Non-SI Participants

$\chi = 6.2415$ ($p = 0.012$)



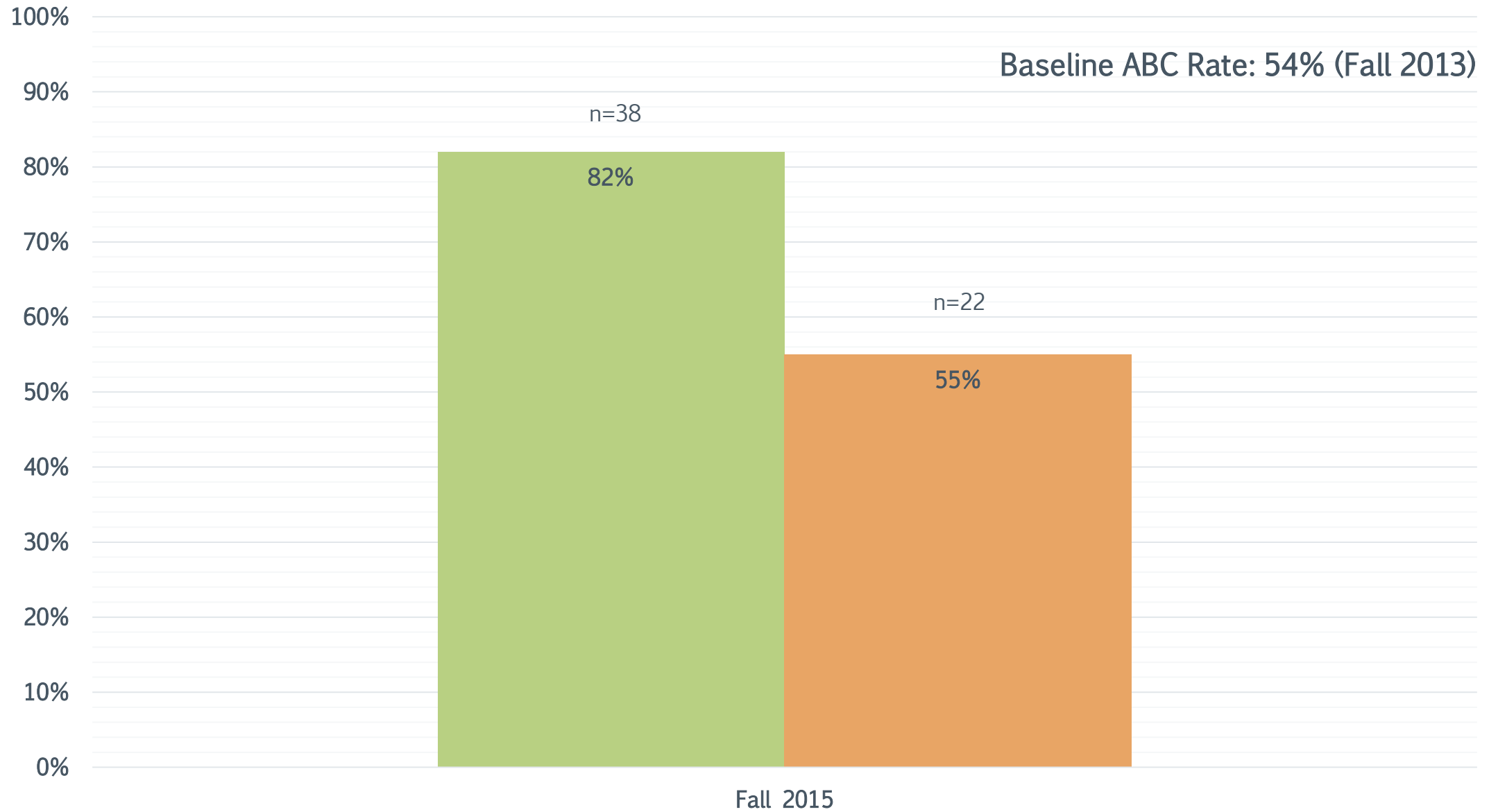
Pass Rate Comparison, SI Participation (Intermediate Algebra)

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Pass Rate Comparison, Sections (Beginning Algebra)

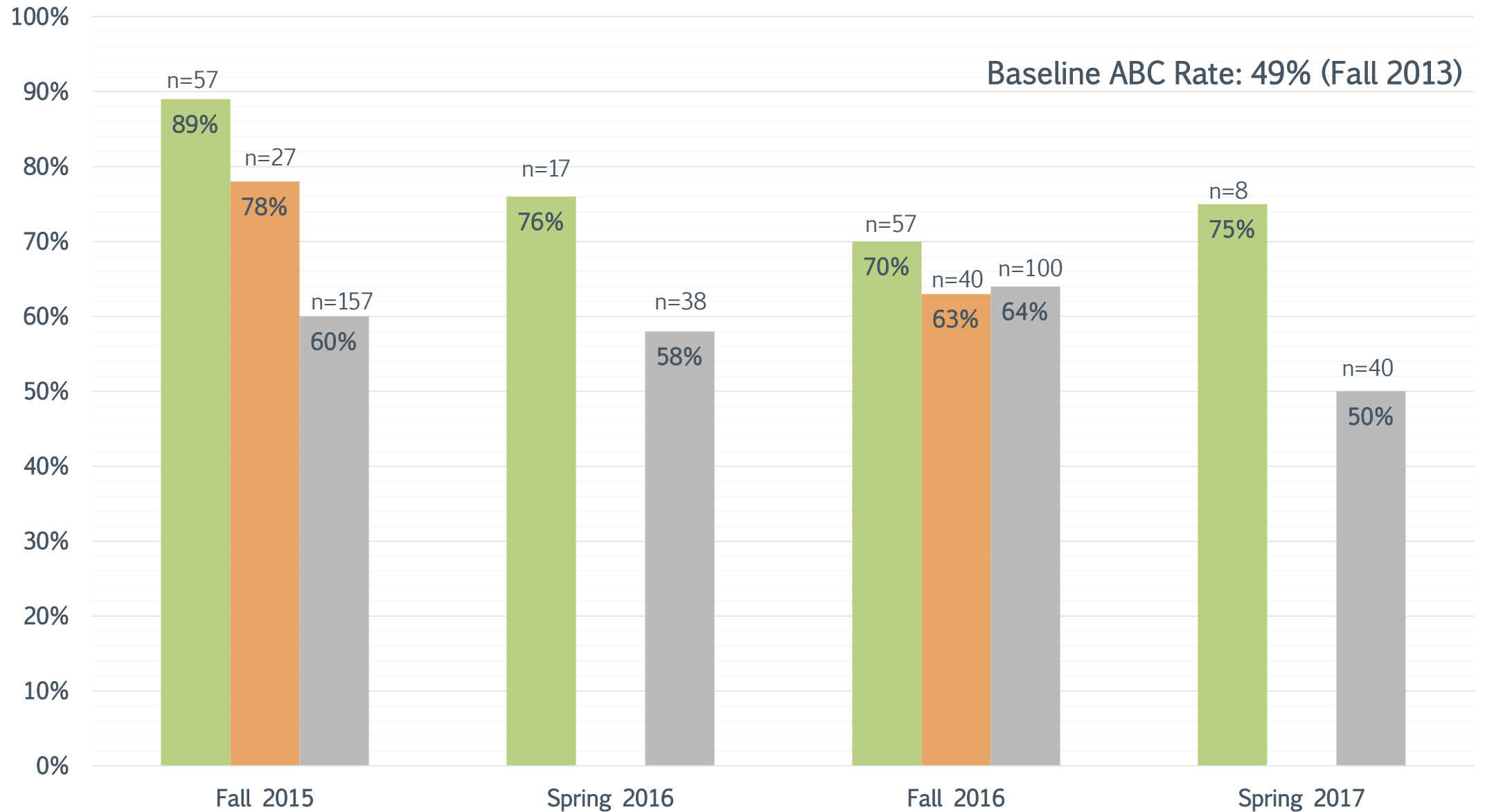
■ Accelerated with SI ■ Accelerated, No SI



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Pass Rate Comparison, Sections (Intermediate Algebra)

■ Accelerated with SI ■ Accelerated, No SI ■ Non-Accelerated, No SI



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Limitations

- › Faculty instruction
- › Self-selection
 - Enrollment into SI courses
 - Tutoring attendance



Figure 7. Intermediate Algebra session, Fall 2016.

Conclusions

The Moral of the Story

- › Embedded SI can counteract attendance issues to traditional tutoring centers
- › May be more cost-effective compared to one-on-one tutoring
- › Student Success with SI
 - Highly dependent on interaction and rapport built inside the classroom
 - Highly dependent on faculty instruction
 - Faculty buy-in is crucial

The Magic Ingredient: Faculty Buy-In

- › Faculty participation essential to success of SI
 - Marketing sessions
 - Validating “expertise” of SI Leader
 - Fostering two-way communication
 - Promoting SI to their colleagues

- › How we got our UHD faculty on board:
 - Found an advocate in each department
 - Data from past semesters
 - Pre-semester networking session
 - “Grant” restrictions

Where We Go From Here

- › Prioritize staffing to accelerated sections
- › Phase out 16-week dev. ed. math sections
- › Faculty teaching circle



Figure 8. Calculus I in-class SI activity, Fall 2017.

Questions? Advice?

What's going on at your institution?

Thank you!

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