

# FOSTERING OPPORTUNITIES FOR TOMORROW'S ENGINEERS (FORTE)



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## Project Goals:

- (A) Improve retention rate and graduation rate of students in Engineering and Computer Science.
  - Increase 1-year retention rates from ~58% to 80%.
  - Increase overall graduation rate of new freshmen from ~31% to 58%.
  - Increase overall graduation rate of new transfer students from ~46% to 70%
- (B) Increase enrollment, retention, and graduation of female, and under-represented minority students.
- (C) Foster Partnerships with local high schools
- (D) Contribute research to the effectiveness of specific strategies for improving retention and graduation rates.

## Project Components:

- (A) Summer Bridge Program
  - Morning Focus on Math Improvement
  - Afternoon Focus on Engineering/CS
- (B) Peer Mentoring / Study Groups
- (C) Living-Learning Community
- (D) Student Recruitment
- (E) Faculty Mentoring
- (F) Evaluation

## Acknowledgements:

Partial support for this work was provided by the National Science Foundation's Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP) under Award No. 0757055. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

The authors would also like to thank Todd Johnson, Tina Current, Sharon Kaempfer, Jenny Klumpp, Leah Rineck, Cindy Walker, and Dee Dee Wallace for their assistance.



## Bridge Program – Participation and Progress:

*Purpose:* Improve the math placement of incoming freshmen students, and generate excitement for engineering and computer science studies.

YEAR	PARTICIPANTS	# IMPROVED MATH PLACEMENT	PERCENTAGE IMPROVED
2009	37	25	68%
2010	47	39	83%
2011	64	56	88%
2012	42	37	88%
2013	36	32	89%

In 2013, 25% of the students improved two math levels, and 29% did so in 2012 (16% average in the previous three years)

Student declines in 2012 and 2013 due primarily to delays in the students taking the math placement exams and reduced applicants to UWM.

## Living-Learning Community – Participation:

*Purpose:* Provide a nurturing on-campus environment for freshmen students in engineering and computer science.

### Sample activities:

- Guest Speakers
- Robotics/Media Production program with Discovery World Museum
- Engineering “Olympics” competition
- Common courses with some students

ACADEMIC YEAR	PARTICIPANTS	2 <sup>nd</sup> -YEAR RETENTION
2009-10	41	78%
2010-11	40	78%
2011-12	65	65%
2012-13	72	74%
2014-14	58	NA

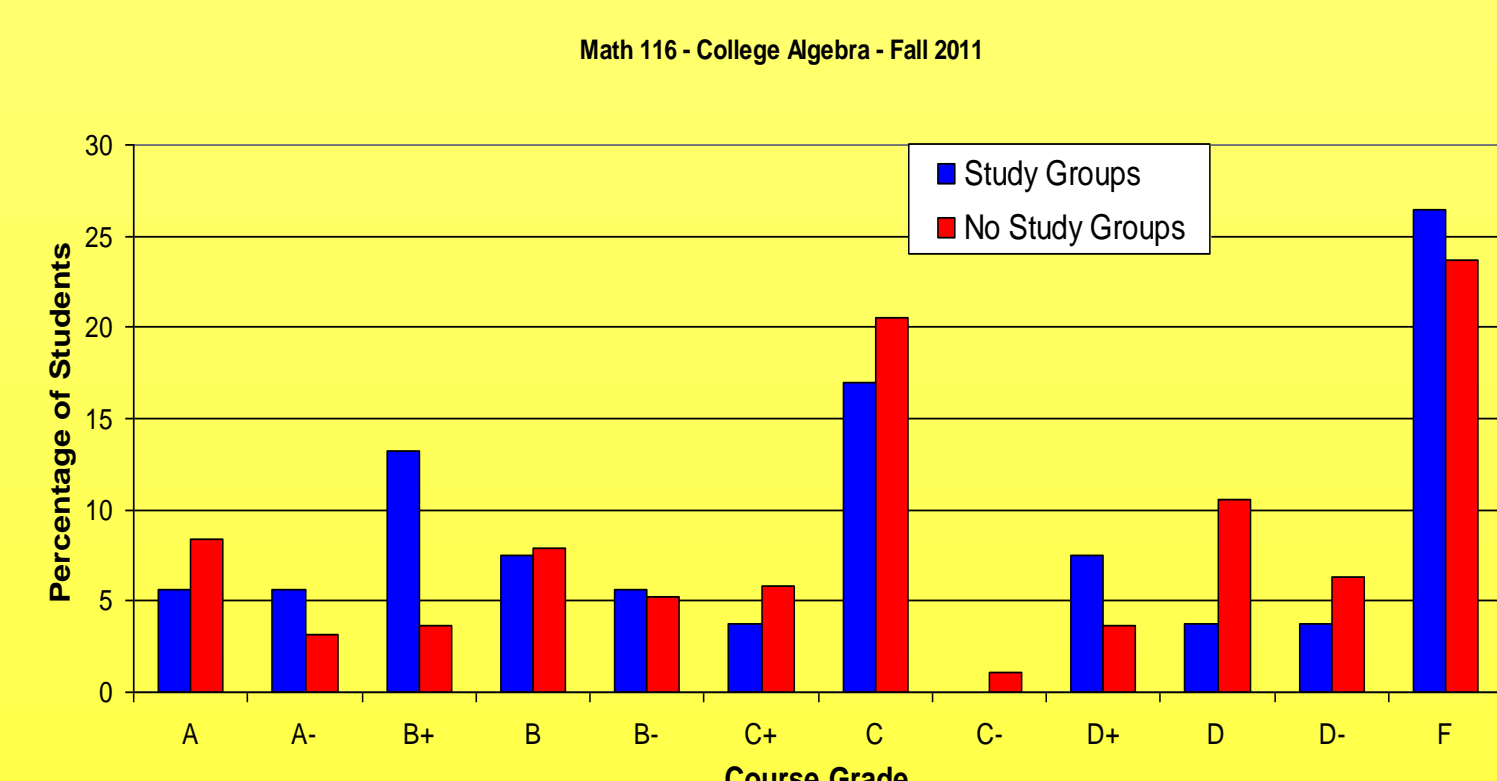
## Study Groups – Participation and Progress:

*Purpose:* Provide additional math instructional support through small, undergraduate-led, study groups.

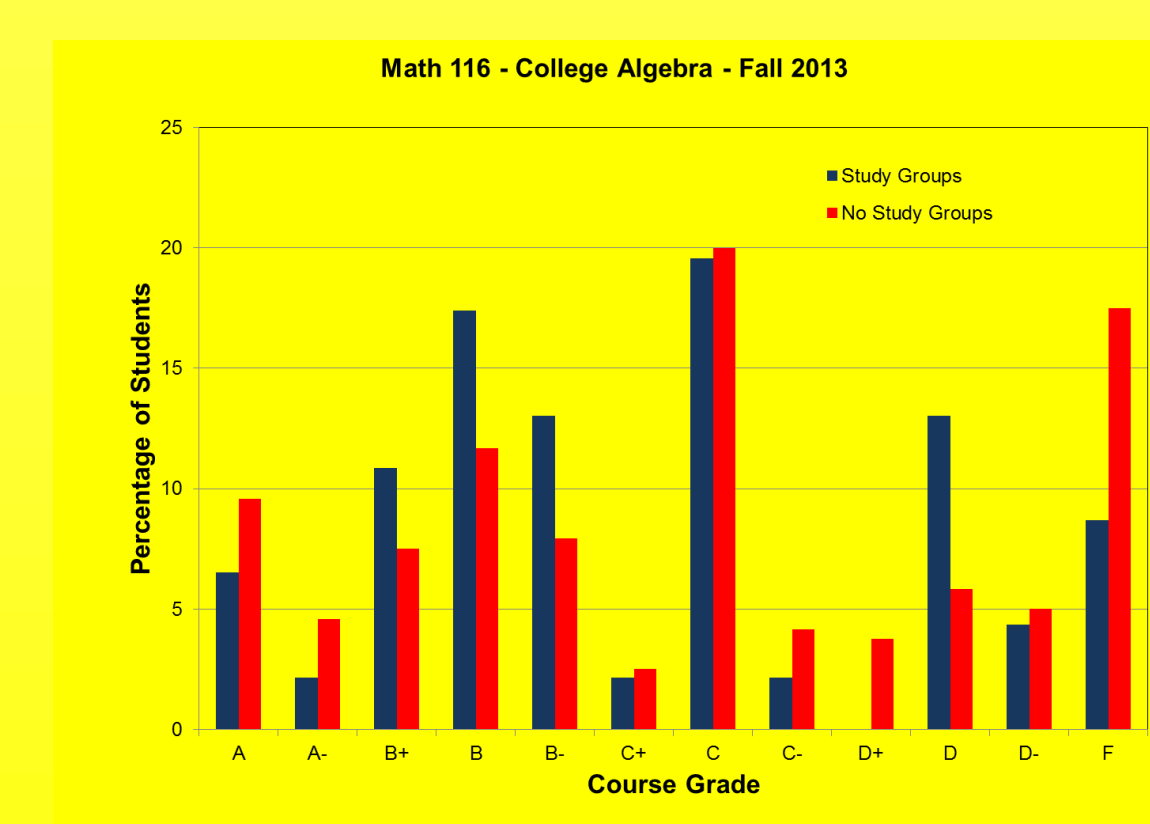
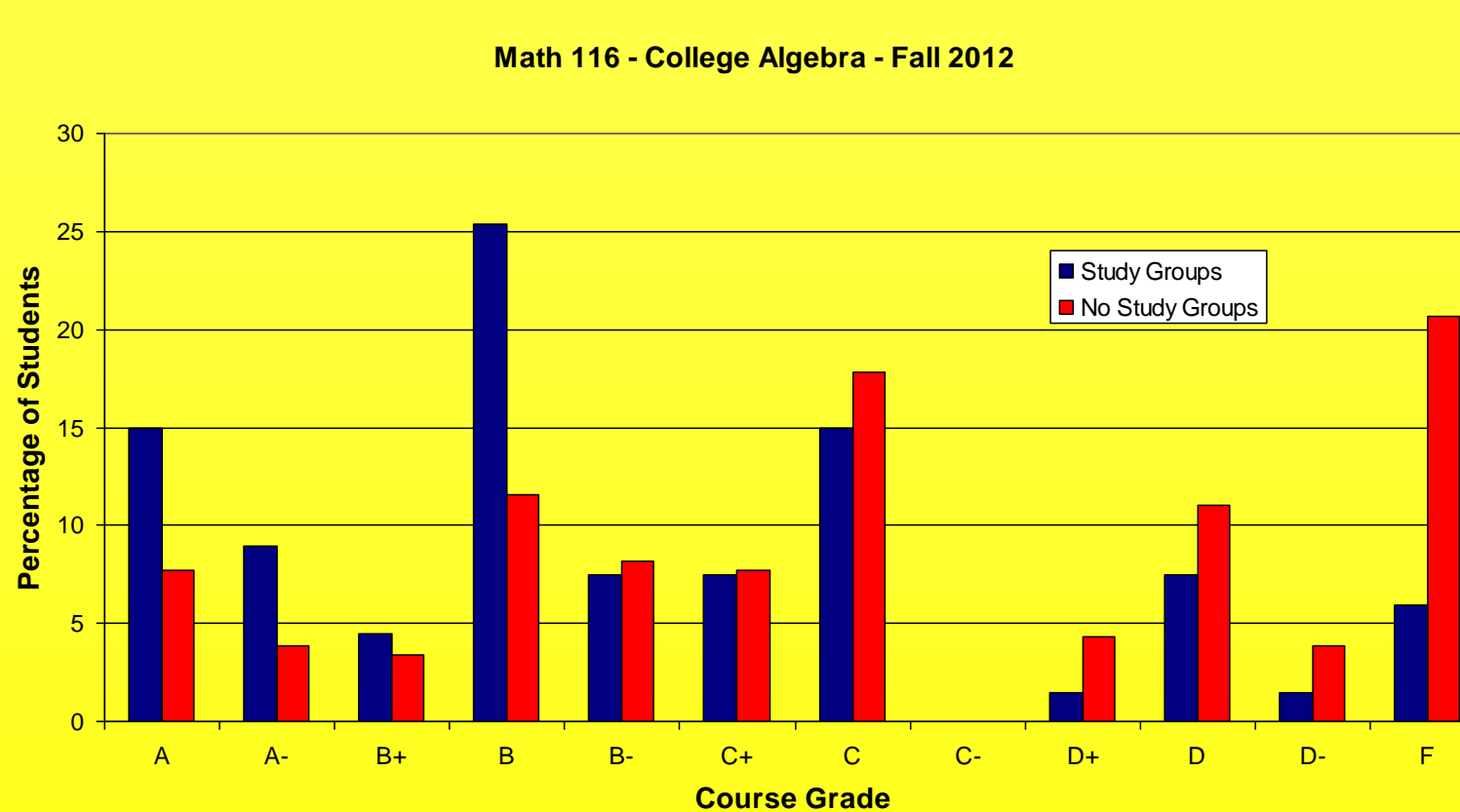
Study group size is 6-12 students, with groups formed around particular math courses. An undergraduate student facilitates the group, introducing problems to be solved and guiding the students in their solution techniques.

FALL SEMESTER	2009	2010	2011	2012	2013
PARTICIPANTS	133	147	192	205	179
INCOMING FRESHMEN	218	202	233	204	167
PERCENT PARTICIPATED	61.0%	72.8%	82.4%	~100%	>100%

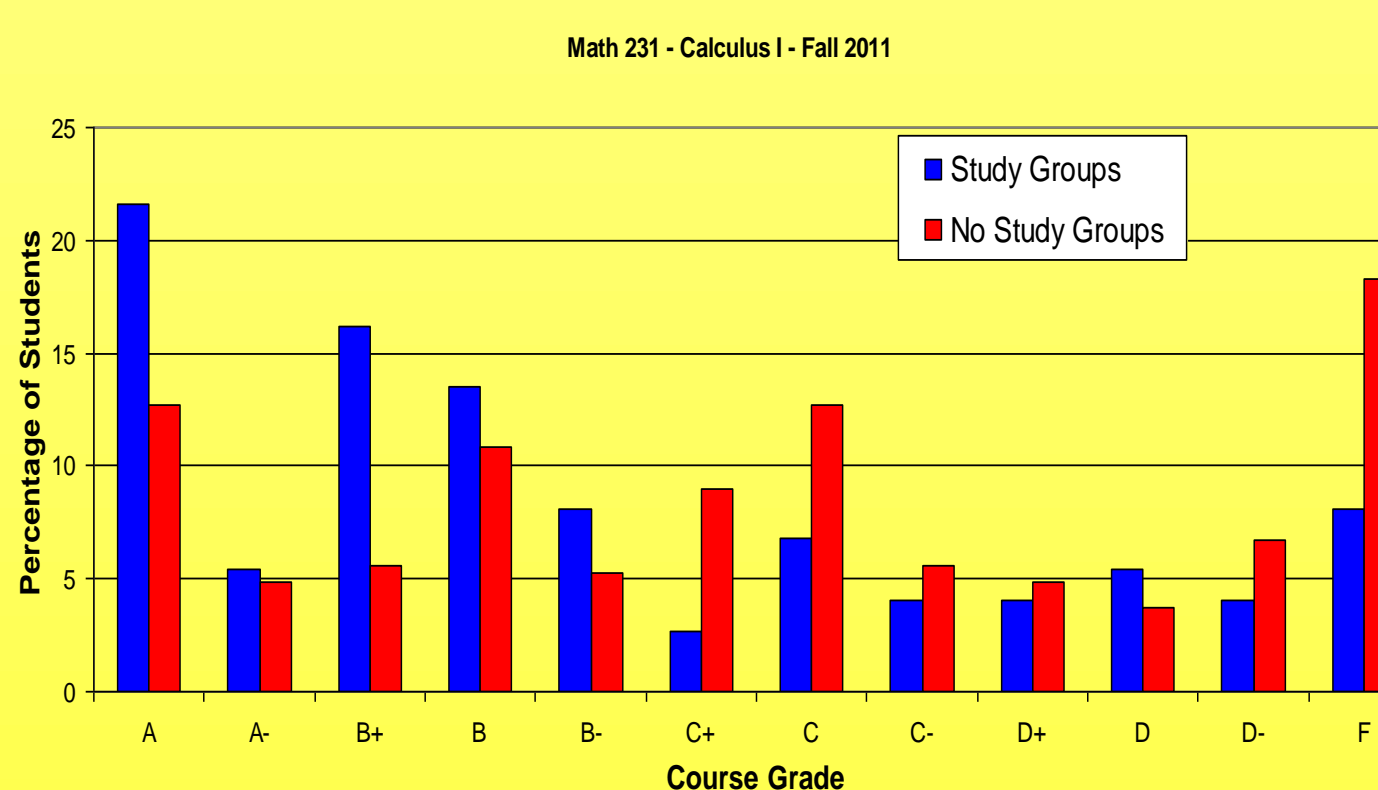
## Impact of Study Groups – Math 116 (College Algebra):



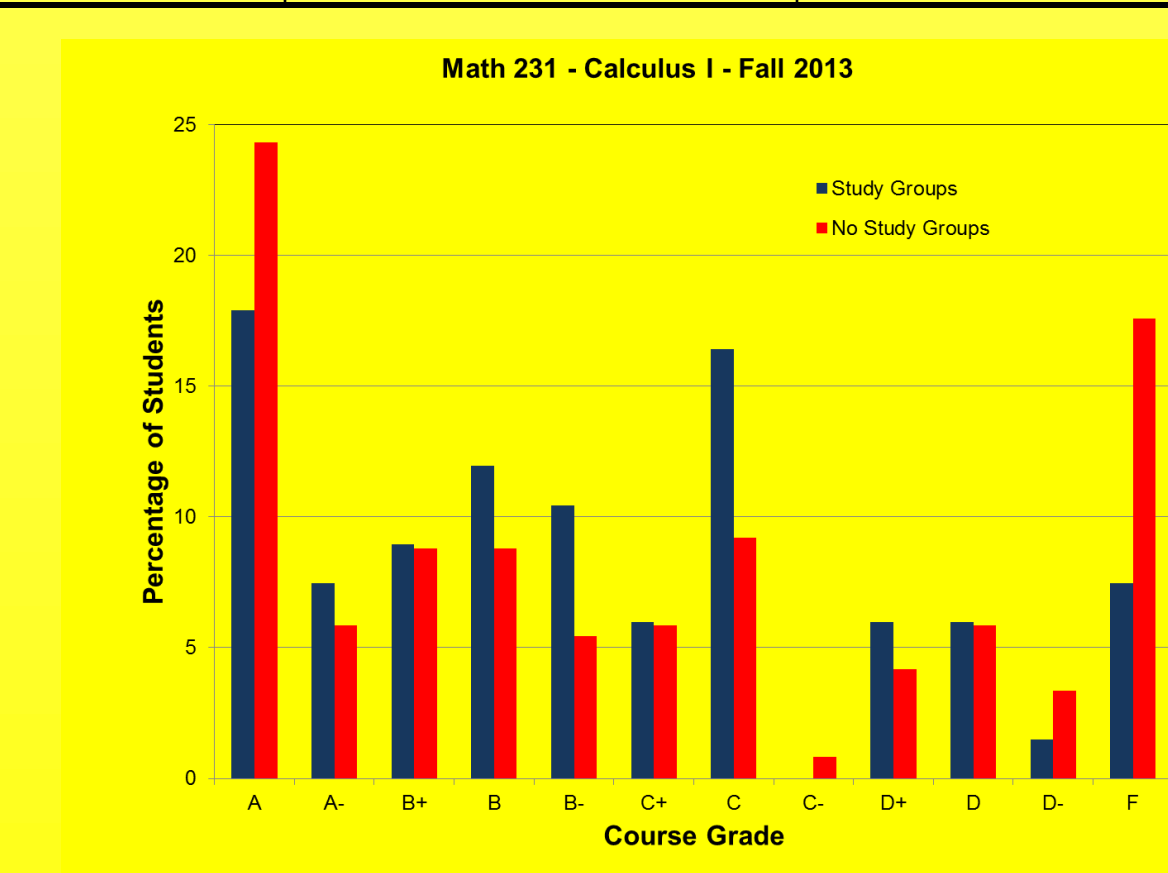
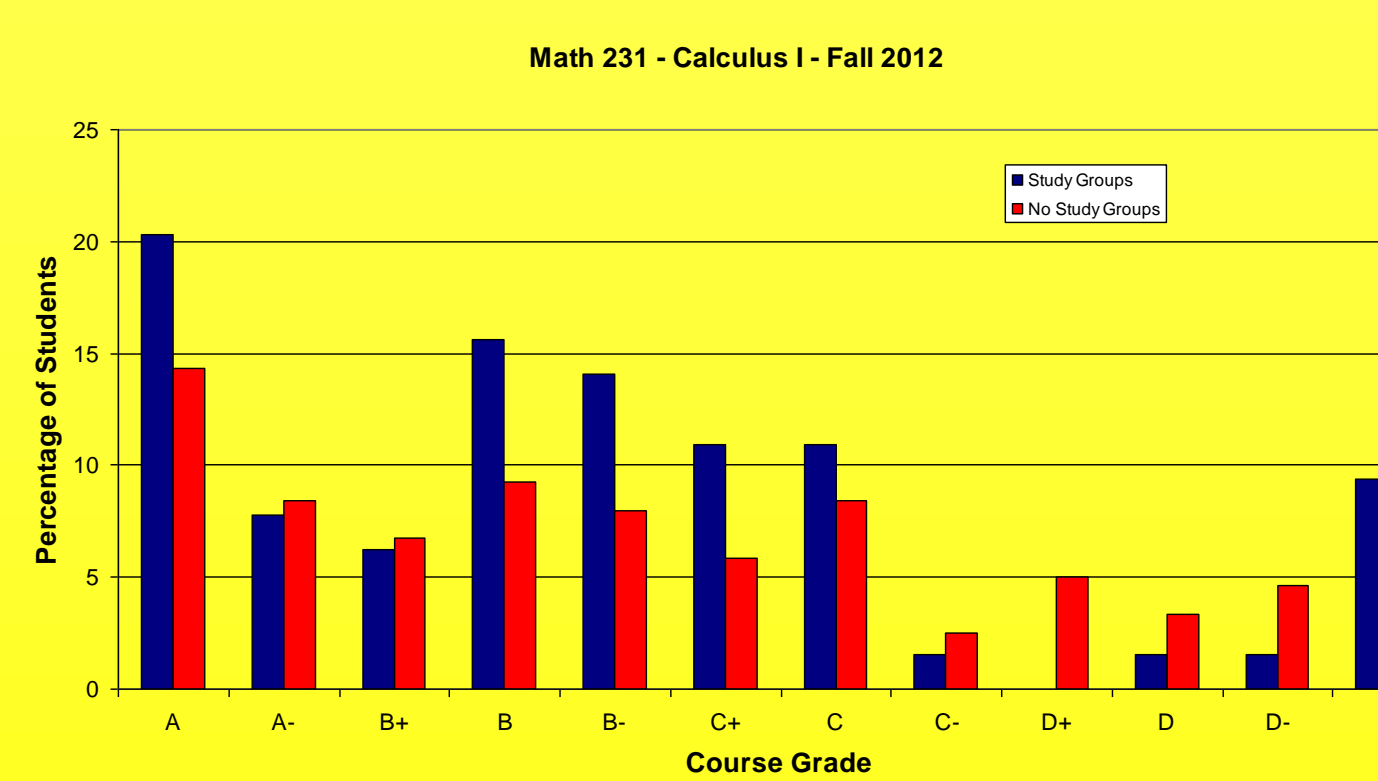
Semester	Participants' Course GPA	Non-Participants' Course GPA
F 10	2.38	2.02
F 11	1.84	1.71
F 12	2.61	1.85
F 13	2.21	2.05



## Impact of Study Groups – Math 231 (Calculus I):



Semester	Participants' Course GPA	Non-Participants' Course GPA
F 10	2.49	2.06
F 11	2.63	2.04
F 12	2.68	2.07
F 13	2.54	2.36



## Observations on Study Groups:

The Study Groups often help produce substantially better performance.

The improvement is greater, more consistent, and more statistically significant at the Calculus level. An explanation for this is student attitudes towards the groups. Students in Intermediate Algebra (Math 105) often see no need for the groups, as they see no need to be in the course having had the material in high school. As many students will also have had College Algebra in high school, a similar, but less-intense, version of this attitude may exist in Math 116, diminishing the effectiveness of the groups.

## Questions:

How can we help students understand the benefits of the study groups more quickly?

How can we further help students from the bridge program in their Fall math courses?