



# *The Math Gym*

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# Inspiring Examples

- Dean LaCourse (Discovery Center)
- Provost Rouse (CASTLE)
- President Hrabowski
- My colleagues Bonny, Liz, and Raji for their tireless work and continuing innovations with our service courses

# Paradigm Shift



[Video Clip](#)

# A Typical Visit to the Math Gym

- A student coach is at the reception desk
- Enthusiastic coaches are walking around
- Students walk up to the reception desk and show IDs
- Based on the Personalized Workout Plan (PWP) look up chart, students obtain the appropriate worksheets from a coach
- Students join one of the round tables designated for that particular worksheet/topic, and start working out
- Students ask for help as needed by flagging for a coach
- Students turn in completed worksheets to the reception desk
- Worksheet is graded, data is entered and transmitted to the appropriate instructors

# QuizZero correlates to FYI (Fall 2011, Spring 2012, Fall 2012)

QuizZero Alert?	FYI ALERT?		Total
	YES	NO	
YES	44%	55%	1327
NO	18%	82%	1139
<b>Total</b>	<b>786</b>	<b>1680</b>	<b>2466</b>

# QuizZero correlates to FYI (Fall 2011, Spring 2012, Fall 2012)

QuizZero Alert?	FYI ALERT?		Total
	YES	NO	
YES	585	742	1327
NO	201	938	1139
<b>Total</b>	<b>786</b>	<b>1680</b>	<b>2466</b>

QuizZero Alert?	FYI ALERT?		Total
	YES	NO	
YES	44%	55%	100%
NO	18%	82%	100%
<b>Total</b>	<b>786</b>	<b>1680</b>	<b>2466</b>

# QuizZero correlates to FYI (Spring 2013)

QuizZero Alert?	FYI ALERT?		Total
	YES	NO	
YES	56%	44%	326
NO	29%	72%	614
<b>Total</b>	<b>360</b>	<b>580</b>	<b>940</b>

# QuizZero correlates with FYI

(Fall 2011, Spring 2012, Fall 2012, Spring 2013)

QuizZero Alert?	FYI ALERT?		Total
	YES	NO	
YES	769	884	1653
NO	377	1376	1753
<b>Total</b>	<b>1146</b>	<b>2260</b>	<b>3406</b>

QuizZero Alert?	FYI ALERT?		Total
	YES	NO	
YES	47%	53%	100%
NO	21%	79%	100%
<b>Total</b>	<b>1146</b>	<b>2260</b>	<b>3406</b>



# Math Gym Usage in Spring 2013

Faculty and courses Involved:

Bonny, Brian D, Brian K, Kale, Liz, and Raji  
Math 155, 150, 151, 152

Total enrollment: 1852  
Invited to Math Gym: 781

**551** students  
visited Math  
Gym for a  
total of **1810**  
visits

# Math Gym Usage in Spring 2013

- Target foundational courses
  - Math 150, Math 155, Math 151, Math 152
  - Total enrollment: 1562
  - Number invited: 781 (50%)  
(Based on the QuizZero performance)
- All faculty involved
  - Bonny, Liz, Raji, Kale, Brian K, Brian D
- 551 students visited TMG at least once
- There were a total 1810 visits. An average of 3.3 (or 2.3) visits per student

Recruiting coaches for the math gym --- Feb 14, 2013



QuizZero rush in the first week



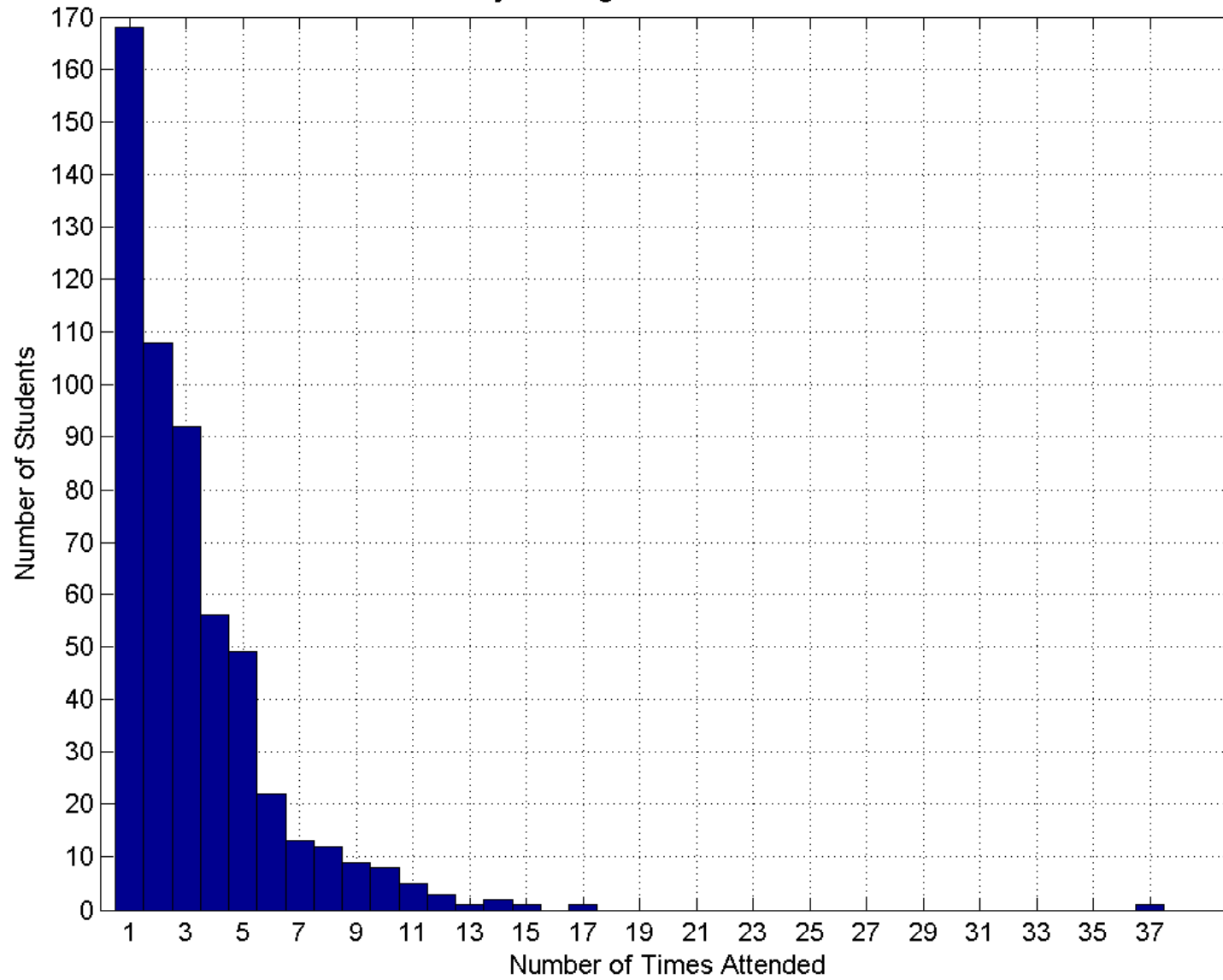


Math Gym Enthusiasts  
spilling into the hallway

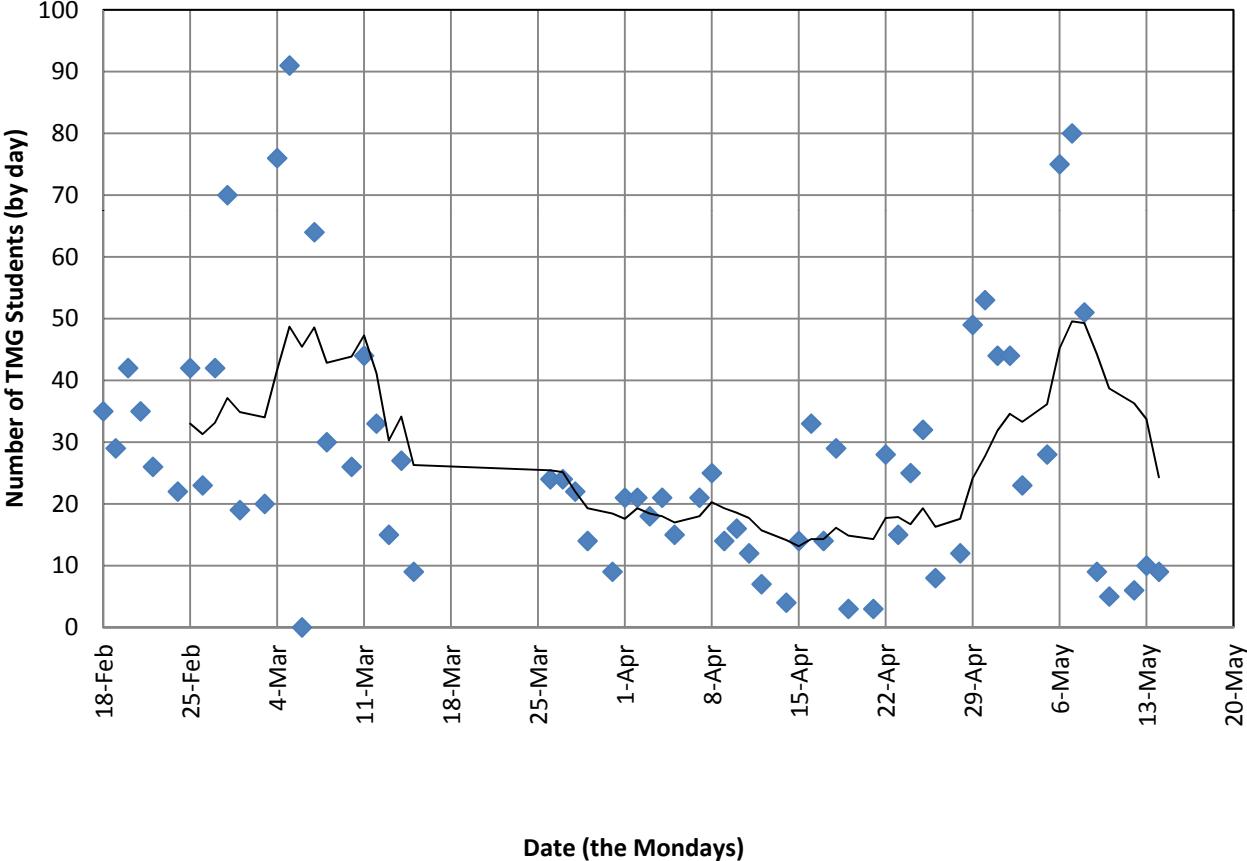
Getting a few hours of work out  
just before the finals week



MathGym Histogram of Attendance Counts



# Math Gym Attendance by Day and the 7-Day Moving Average



# Applied Calculus Course (Math 155)

- Instructors: Liz Stanwyck, Raji Baradwaj
- Liz is the creator of the “customizing extra problems based on QuizZero performance” idea which became the “personalized workout plan” in the Math Gym
- Raji is the QuizZero Coordinator, 2012 Weber award winner
- Total of 247 students

# Historical Grades Data for Applied Calculus (Math 155)

Grades	Spring 2012	Fall 2012	Spring 2013
<b>ABC</b>	70%	61%	66%
<b>DFW</b>	30%	38%	34%
	(FW = 25%)	(FW= 24%)	(FW =18%)
<b>Class Size</b>	171	269	247



# ABC rates by Math Gym Usage Math 155 in Spring 2013

Grades	Spring 2013		
	Math Gym	No Math Gym	Total
<b>ABC</b>	72%	56%	66%
<b>DFW</b>	28%	44%	34%
	(FW =10%)	(FW =31%)	(FW =18%)
<b>Class Size</b>	152	94	247

# MG Participation by QZA (Math 155 in Spring 2013)

QuizZero Alert?	Participate in MG?		Total
	YES	NO	
YES	82	30	112
NO	70	64	134
<b>Total</b>	<b>152</b>	<b>94</b>	<b>246</b>

# QuizZero correlates to FYI (Spring 2013)

QuizZero Alert?	FYI ALERT?		Total
	YES	NO	
YES	184	142	326
NO	176	438	614
<b>Total</b>	<b>360</b>	<b>580</b>	<b>940</b>

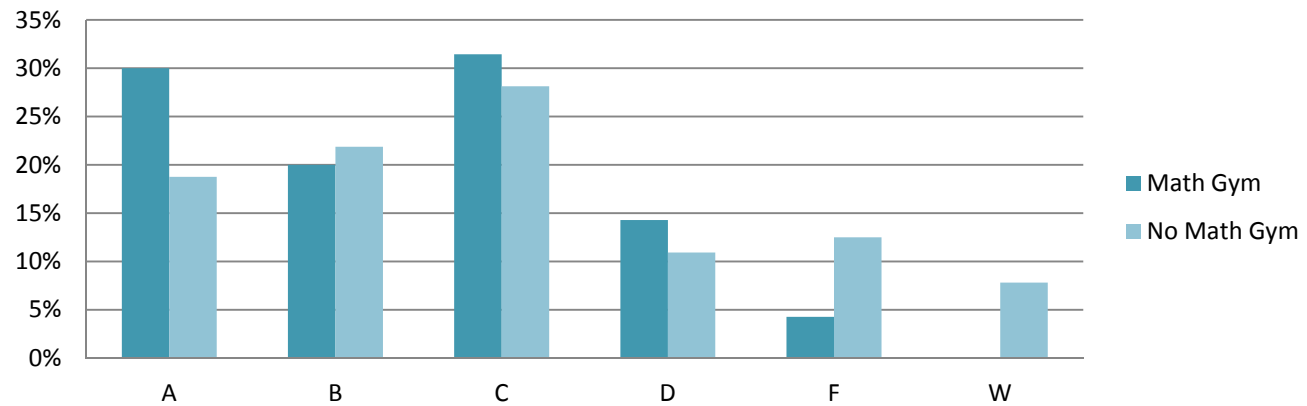
QuizZero Alert?	FYI ALERT?		Total
	YES	NO	
YES	56%	44%	100%
NO	29%	71%	100%
<b>Total</b>	<b>360</b>	<b>580</b>	<b>940</b>

# QuizZero as a tool to identify students who need help (Fall 2011-Spring 2013)

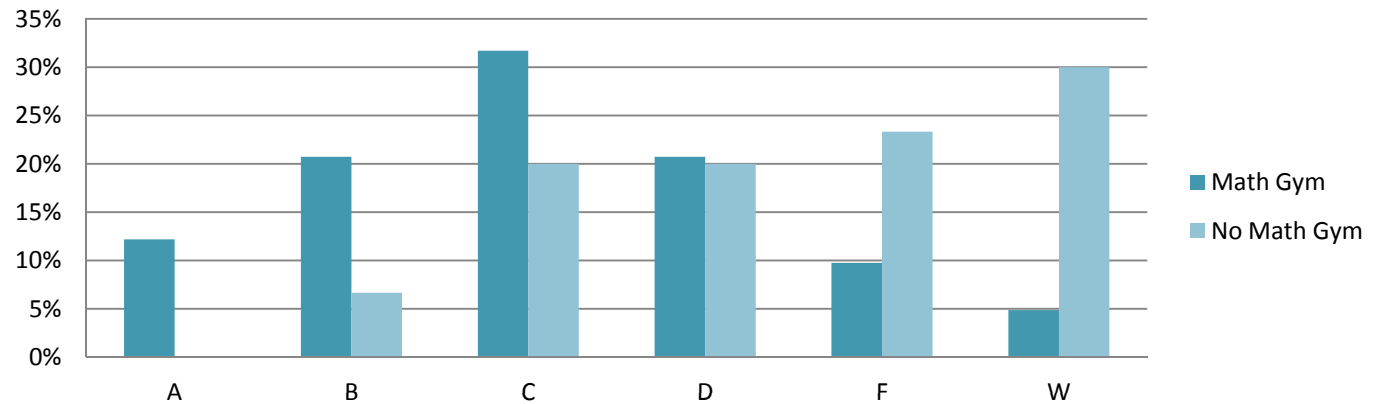
QuizZero Alert?	FYI ALERT?		Total
	YES	NO	
YES	769	884	1653
NO	377	1376	1753
<b>Total</b>	<b>1146</b>	<b>2260</b>	<b>3406</b>

QuizZero Alert?	FYI ALERT?		Total
	YES	NO	
YES	47%	53%	100%
NO	22%	78%	100%
<b>Total</b>	<b>1146</b>	<b>2260</b>	<b>3406</b>

### Math 155 final grades for Spring 2013 Students who did NOT receive QuizZero Alerts



### Math 155 final grades for Spring 2013 Students who received QuizZero Alerts



@Risk Group

# ABC rates vs. MG participation

## Math 155 Spring 2013

QZ Alert?	MG participation?	ABC rate	Impact of MG participation
No QZ Alert	MG	81%	1.15
	No MG	69%	
QZ Alert	MG	65%	2.41
	No MG	27%	

Interpretation:

Proportion of students passing with a grade of “A , B or C” improved 2.41 times for Math Gym participants in the @Risk group of students.

# DFW rates vs MG effect

		ABC	DFW	Total
No QZ Alert	MG	57	13	70
	No MG	44	20	64
QZ Alert	MG	53	29	82
	No MG	8	22	30
Total		162	84	246

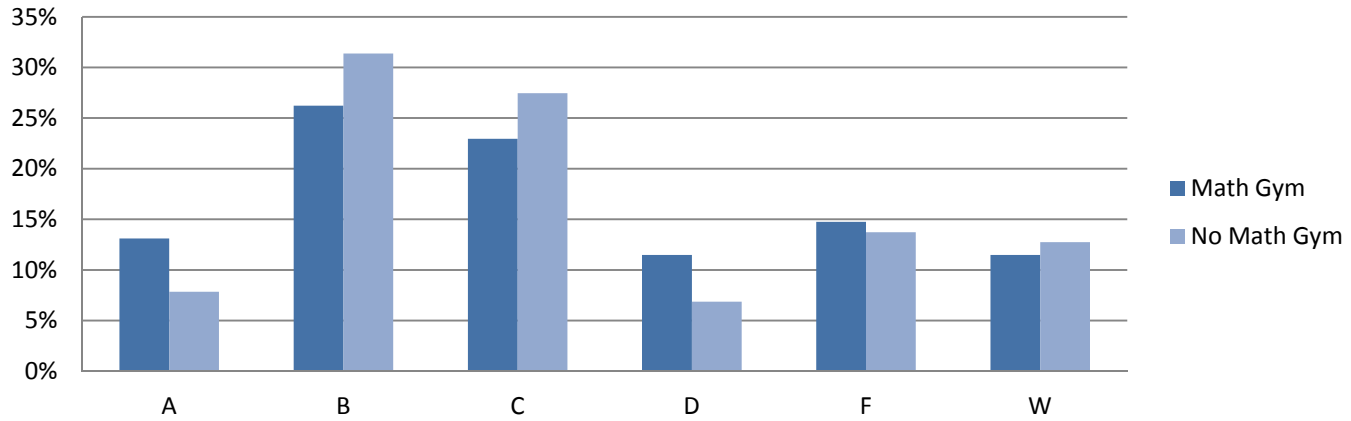
QZ Alert?	MG participation?	P(ABC)	Odds Ratio
No QZ Alert	MG	81%	2.00
	No MG	69%	
QZ Alert	MG	65%	5.03
	No MG	27%	

# Data used for the bar graphs

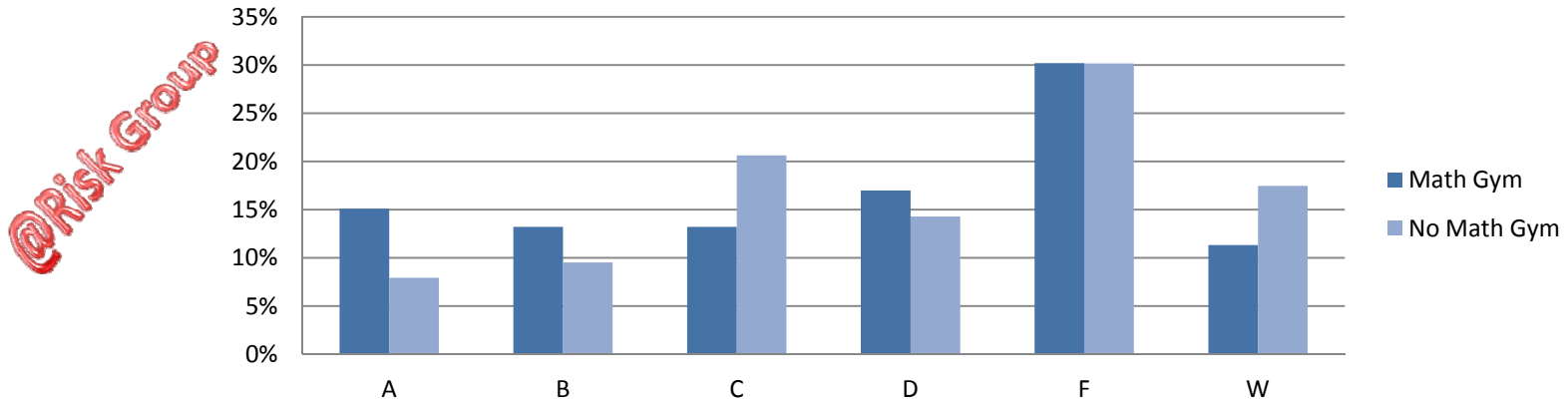
Grades	Q0 & MG		Q0 & ~MG		~Q0 & MG		~Q0 & ~MG	
	n	%	n	%	n	%	n	%
<b>n</b>	70	100%	64	100%	82	100%	30	100%
<b>A</b>	21	30%	12	19%	10	12%	0	0%
<b>B</b>	14	20%	14	22%	17	21%	2	7%
<b>C</b>	22	31%	18	28%	26	32%	6	20%
<b>D</b>	10	14%	7	11%	17	21%	6	20%
<b>F</b>	3	4%	8	13%	8	10%	7	23%
<b>W</b>	0	0%	5	8%	4	5%	9	30%
<b>ABC</b>	57	0.814286	44	0.6875	53	0.646341	8	0.266667
<b>DFW</b>	13	0.185714	20	0.3125	29	0.353659	22	0.733333
<b>FW only</b>	3	0.042857	13	0.203125	12	0.146341	16	0.533333



### Math 150 final Grades for Spring 2013 Students who did NOT receive QuizZero Alerts



### Math 150 final Grades for Spring 2013 Students who did receive QuizZero Alerts



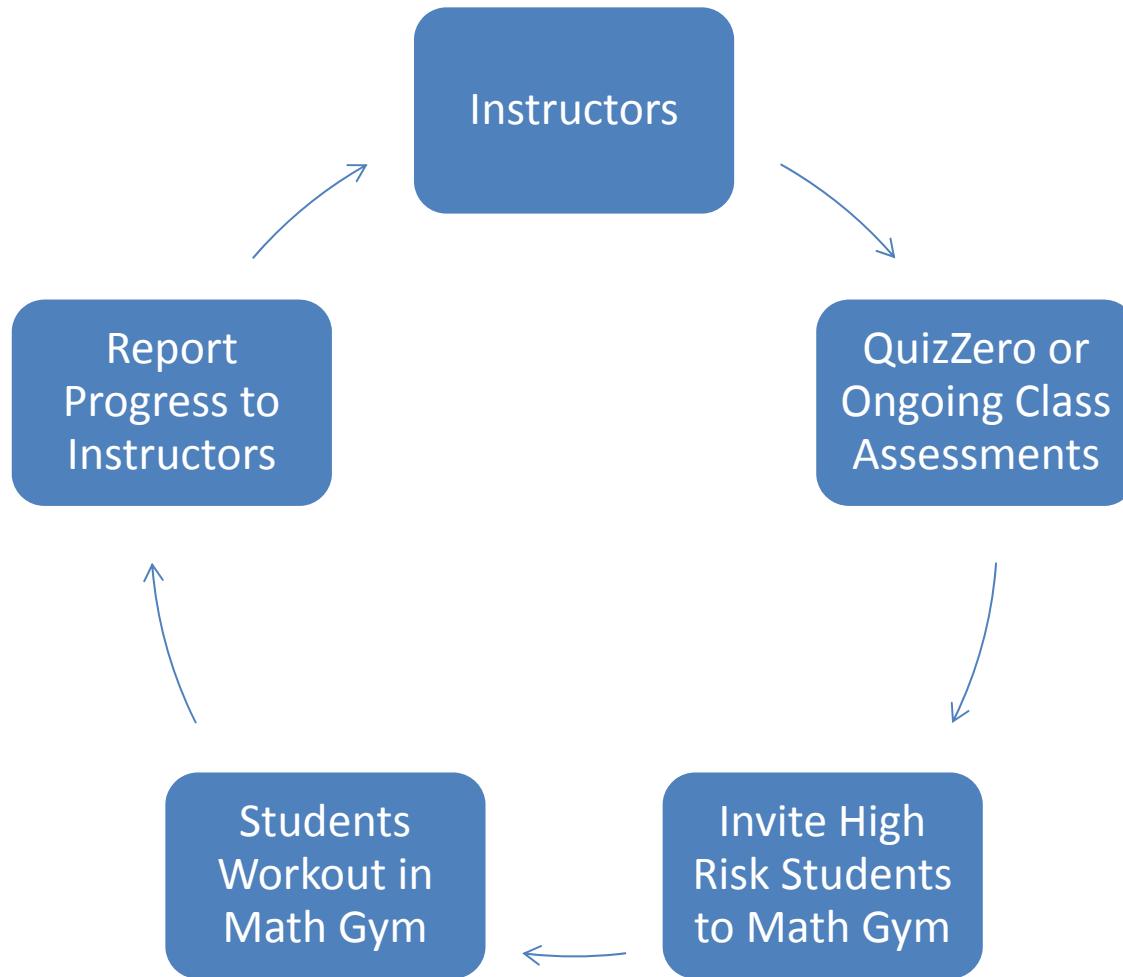
# Math 150: ABC rates vs. MG part

QZ Alert?	MG participation?	ABC rate	Impact of MG participation
No QZ Alert	MG	62%	0.93
	No MG	67%	
QZ Alert	MG	42%	0.68
	No MG	62%	

Interpretation:

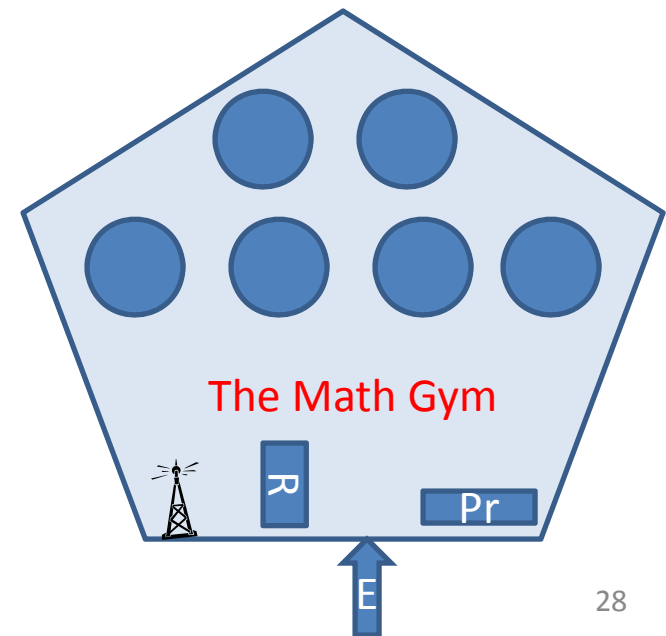
Proportion of passing with a “A , B or C” for Math Gym participants is about 68% of the non MG participants in the @Risk group of students.

# The Math Gym Loop



# Math Gym: Resources

- Head coach, Assistant Coaches, Student Coaches
- Large room with a reception desk, round tables, chairs
- Laptops (2), printer, WiFi
- QuizZero as a starting point
- Personalized Workout Plan



# Math Gym in Fall 2013

- Continue to implement at pilot level and collect data
- Assess the impact of Math Gym on an ongoing basis
- Work on improving traffic flow by coordinating deadlines across classes
- Introduce “Review on Demand” by using a feedback mechanism to analyze the student needs or needs of key classes from other departments (e.g. Engineering Math by Anne Spence)
- Explore expanding TMG’s reach beyond the campus