

# Accelerated WARM UPS

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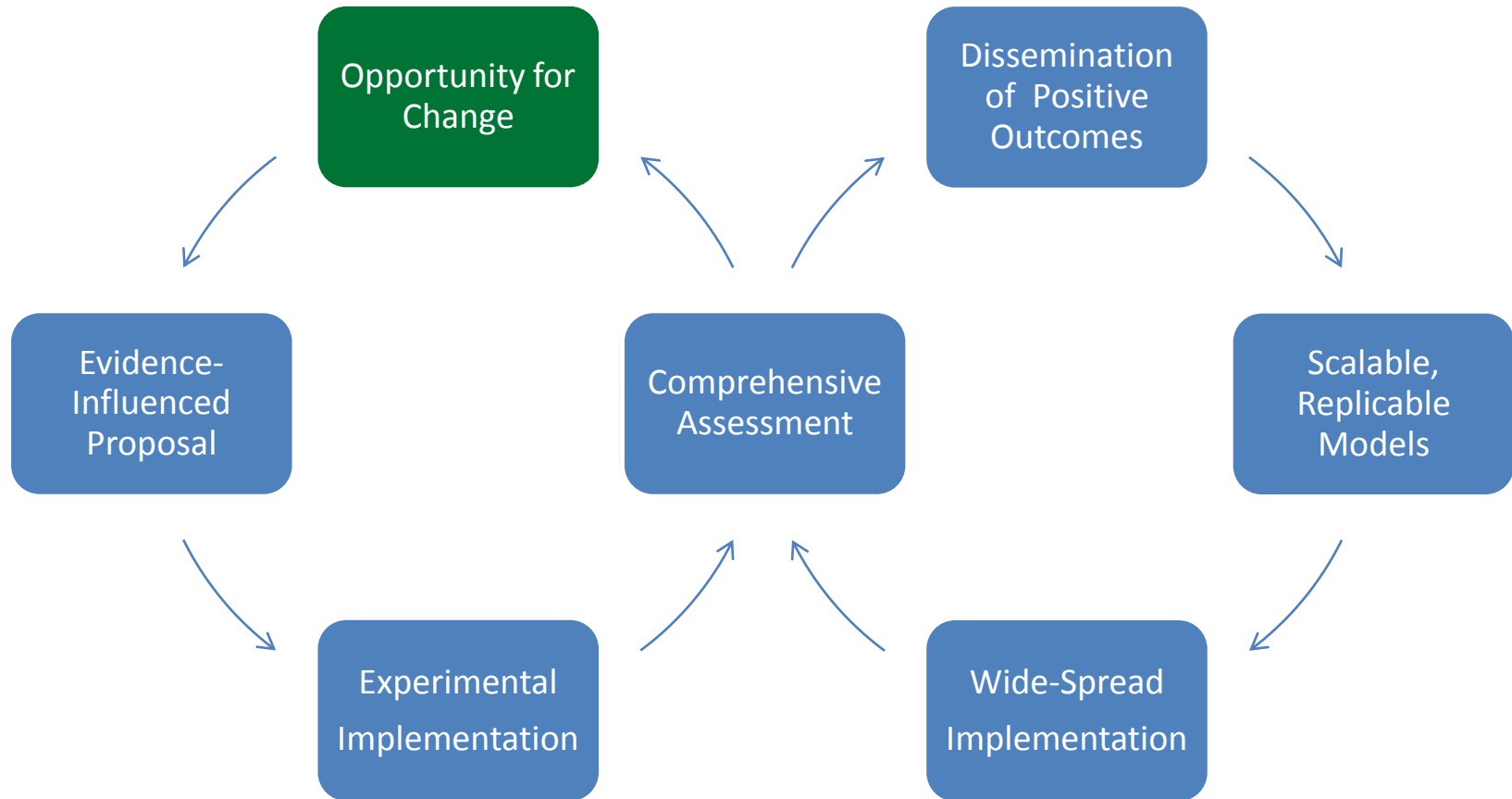
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**Improving Math Learning Luncheon. The City University of New York.  
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- Students who successfully complete a developmental mathematics course have higher odds of retention<sup>1</sup> than those who enroll but do not successfully complete it.<sup>2</sup>
- Nationally,  $\approx 60\text{-}70\%$  who took a remedial course (any subject) never earn a degree.<sup>3</sup>

1. Retention defined as first fall to first spring semester retention.
2. Fike, David S., and Renea Fike. 2008. "Predictors of First-Year Student Retention in the Community College" *Community College Review* 36, 2: 68-88.
3. Attewell, Paul, David Lavin, Thurston Domina, and Tania Levey. 2006. "New Evidence on College Remediation." *Journal of Higher Education* 77, 5: 886-924.



## WARM UPS

**W**orkshop

**A**pproach to

**R**emedial (Relearning, Refreshing, Renewing, Reviewing)

**M**athematics

**U**sing

**P**roblem

**S**olving

- All students take placement exam (COMPASS)
- **Target Group:** Students with similar incoming arithmetic scores (25-29)
- **Control Group:** Students in traditional class
- **Experimental Group:** Students in WARM UPS
- Students decided which course to take in consultation with their advisor.



## Two Semesters' Results Fall 2009—Spring 2010

Statistics for students with incoming arithmetic score of 25-29 (Target Group)

	Passed	Total Students	Percent
WARM UPS	310	433	71.6%
Traditional	138	284	48.6%

The probability of such a difference occurring by random chance is  $4.4 \times 10^{-10}$  according to Fisher's exact test for a two-by-two contingency table.

- Prerequisite for experimental class was 25
- Compare “just under” and “just over”
- **Control Group:** Traditional Class w/23-24
- **Experimental Group:** WARM UPS w/25-26



## Two Semesters' Results Fall 2009—Spring 2010

	Passed	Total Students	Percent
WARM UPS	137	202	67.8%
Traditional	208	451	46.1%

The probability of such a difference occurring by random chance is  $1.1 \times 10^{-6}$  according to Fisher's exact test for a two-by-two contingency table.

- **Control Group:** Students in Traditional Class with initial score of 23-24
- **Experimental Group:** Students in WARM UPS with initial score of 25-26



## Change Everything!

- Accelerated four-week course; five hours per week
- Maximize time students spend working on problems
- Fully integrated curriculum
- One lab hour per week
- Ample in-class 1-1 instructor-student interaction
- Students who fail take workshop next four-week session
- Three sessions per semester

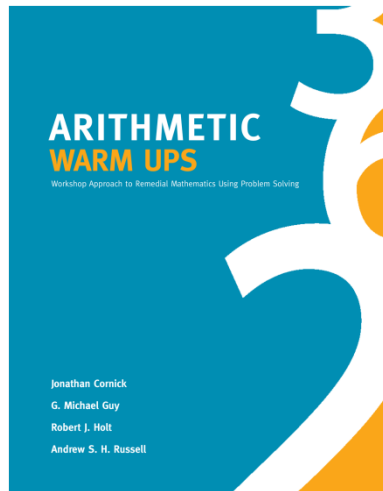
## ≈460 Students Responded (3 semesters)

- 88% indicated class time was sufficient
- 94% indicated labs were helpful
  - 54% of those students wanted more
- Many indicated in comments that they wanted more courses like this one

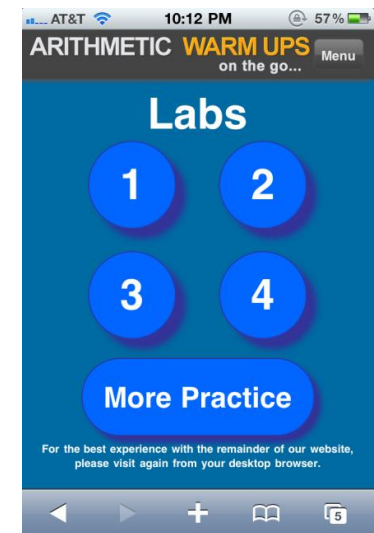
# Scalable and Replicable **ACCELERATED WARM UPS**

<http://ArithmeticWARMUPS.com>

## Workbook



## Online Website with Labs



- Inexpensive ( $\approx$ \$35 in our bookstore)
- Published by Pearson Learning Solutions

- Free and open to all
- Optimized for desktops and mobile devices

- Expanding to all students regardless of score
- Algebra WARM UPS following Arithmetic in same semester (Modular) <sup>1</sup>
- Some students take next remedial course same semester
- Continue to follow the Cycle of Progress

1. Development and Assessment to be funded by a CUNY *Improve Undergraduate Learning Outcomes in Writing and/or Mathematics* grant

