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Jonathan Supovitz
Caroline Ebby
Janine Remillard
Robert Nathenson

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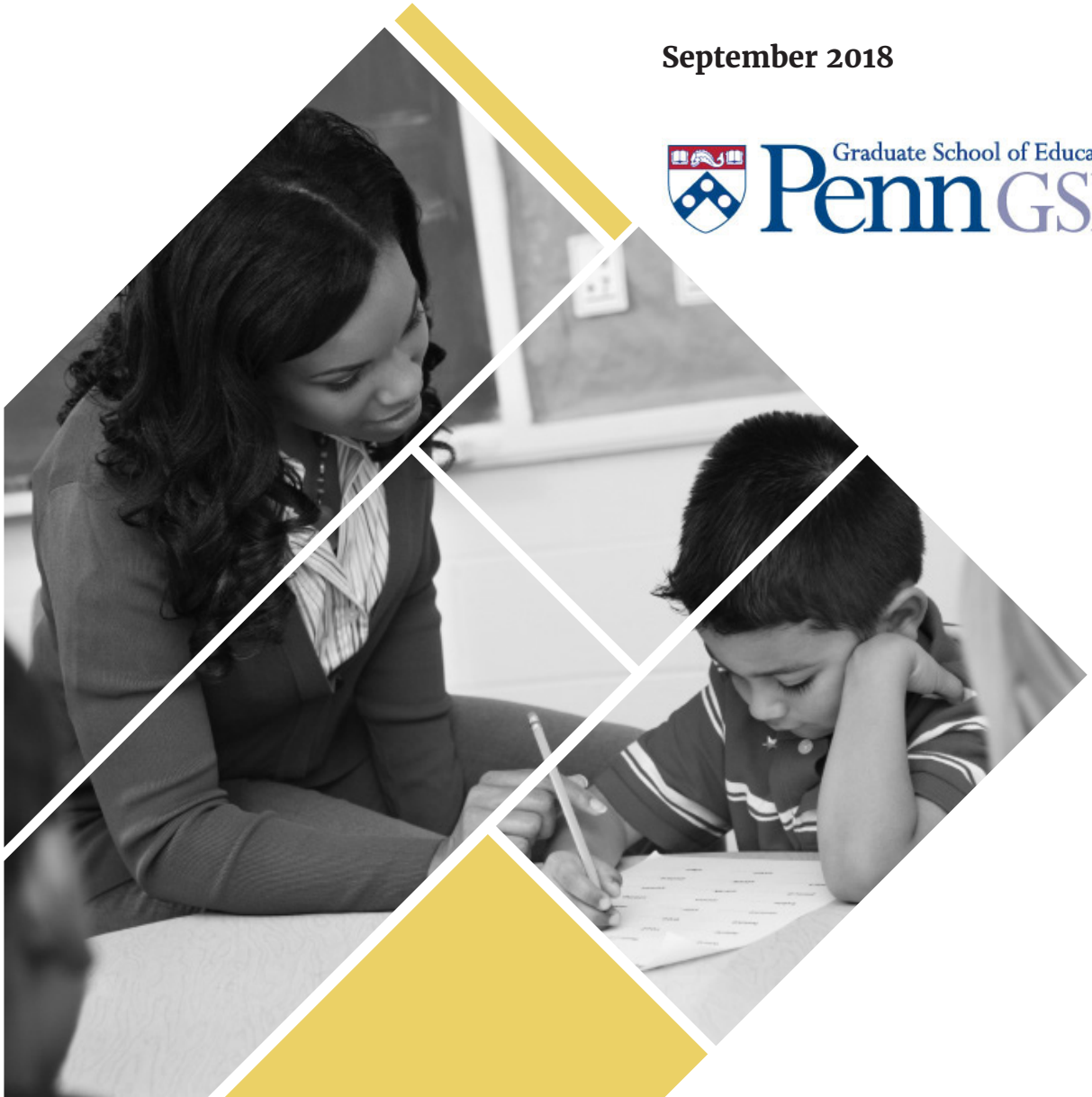
Graduate School of Education
Penn GSE



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Consortium for Policy Research in Education

Jonathan A. Supovitz
Consortium for Policy Research in Education, University of Pennsylvania

Caroline B. Ebby
Consortium for Policy Research in Education, University of Pennsylvania

Janine Remillard
University of Pennsyvania Graduate School of Education

Robert A. Nathenson
Consortium for Policy Research in Education, University of Pennsylvania

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Executive Summary

Educators have long been concerned about student performance in mathematics, particularly for students in challenging urban contexts. For this reason, there is keen interest in developing and testing interventions that improve both instructional capacity and student understanding in mathematics.

In this report, we describe the results of a rigorous two-year study of the impacts of a mathematics initiative called the Ongoing Assessment Project (OGAP) on teacher and student learning in grades 3-5 in two Philadelphia area school districts. OGAP is a mathematics program which combines teacher formative assessment practices with knowledge of student developmental progressions to build deeper student understanding of mathematics content. OGAP includes teacher professional development, classroom resources, school-based routines for regular practice, and ongoing school-based supports. The study was conducted in 61 schools during the 2014-15 and 2015-16 school years, with OGAP randomly assigned to 31 schools and the remaining 30 serving as comparison sites. The results of this study showed that OGAP produced statistically significant and meaningful impacts on both teacher knowledge and student learning.

For the study we collected data on teacher knowledge and student learning at three points in time in all 61 participating schools. The first data collection point, or baseline, occurred in the summer of 2014, before teachers and their students began involvement in OGAP. We also collected data in the spring of 2015, after one year of OGAP, and again in the Spring of 2016, after two years of OGAP.

Our measure of teacher knowledge is called the TASK, or Teacher Assessment of Student Knowledge. The TASK is an assessment of teachers' ability to examine student work on an open-ended mathematics problem, to analyze the student thinking underlying the work in relation to a research-based developmental learning trajectory, and to suggest an informed instructional response. The measure is distinct from, but closely aligned with, the OGAP project.

Our measures of student impact are two-fold. First, we developed a measure of student performance called the Learning Trajectory Assessment (LTA). The LTA assesses student performance in multiplicative reasoning both in terms of the accuracy (correctness) of their response and the sophistication of their solution process. This assessment is based on the idea that increasing student solution sophistication will help prepare students for more advanced mathematical concepts. The second measure of student impact was performance on the annual state test, the Pennsylvania System of School Assessment (PSSA) in mathematics.

The results were based on a rigorous randomized control trial (RCT) in which schools were recruited to participate in the study and randomly assigned to receive OGAP or serve as a comparison group. OGAP schools received two years of OGAP professional development, tools, and resources, while the comparison schools received $1,000 per year for their school activities fund.

Overall, we found consistent impacts of the Ongoing Assessment Project on teachers and students across the two years of the study and the different measures. The impacts on teachers showed increased knowledge on the TASK for teachers who participated in OGAP relative to teachers in the comparison group. On the LTA aligned assessment, we found significant impacts of OGAP on student performance in both accuracy and sophistication in both years of the study. We also found impacts on PSSA performance in years one and cumulatively, but not in year two. The results indicate that OGAP can help improve teacher knowledge and student learning in urban school districts.

Overview

This report examines the impacts of the Ongoing Assessment Project (OGAP) on teacher mathematics knowledge and student learning in mathematics in the School District of Philadelphia and the Upper Darby school district. From 2014-2016, OGAP provided training, tools, and resources to participating teachers and schools in grades 3-5. Both the program and associated research was supported by a grant from the National Science Foundation. Year one (2014-2015) began with a focus on multiplicative reasoning, which included summer professional development, follow-up training, and ongoing tools and resources for both teachers and teacher leaders. In year two, the emphasis shifted to fractions, with similar additional training during the school year. In the second year of the intervention, the program added three OGAP coaches, who regularly supported implementation in approximately 10 schools. During both years, teachers also received biweekly email reminders about content, formative assessment processes, online resources, and teaching suggestions.

About The Ongoing Assessment Project (OGAP)

The Ongoing Assessment Project (OGAP) has been developed and refined over the past 20 years by mathematics educators from Vermont. OGAP is designed to provide targeted instructional responses to improve student learning by combining formative assessment practices – an approach that frequently assesses student understanding relative to learning goals – with contemporary research on how students deepen their undrestanding of important mathematics concepts. The OGAP process facilitates teachers' use of an ongoing cycle of assessing student understanding, analyzing student thinking, and making informed instructional responses. The assess-analyze-respond cycle is intended to reflect the ongoing nature of the teaching and learning process.

OGAP training, tools, and resources include:

- *Professional development*, most often through a summer institute and ongoing school-based followup visits throughout the school year. Training is focused on developing knowledge of specific mathematics topics and the related research base on student thinking, as well as training in the use of OGAP materials and strategies.
- *OGAP Frameworks* which synthesize the problem contexts, problem structures, and learning trajectories for specific mathematics topics, including a visual representation of the learning trajectory that can be used to analyze evidence in student work and make informed instructional decisions.
- *Electronic item banks* and pre-assessments comprised of formative assessment tasks that are carefully designed to elicit students' developing understandings, common errors, and preconceptions or misconceptions.
- *Suggested routines and associated protocols* for teachers to regularly examine student work together in grade-level meetings, or professional learning communities (PLCs), and discuss instructional strategies.
- *Additional training* is provided for a math teacher leader, who is expected to support the use of OGAP at the school.

Experimental Study of OGAP

In the spring of 2014, the research team recruited schools in the School District of Philadelphia (SDP) and the neighboring district of Upper Darby (UD) to participate in a randomized experiment of OGAP. Schools were recruited with the promise that they would either receive OGAP training, tools, and resources for two years (2014-2016) or their school would receive $1,000 for their school activity fund each year. In all, 61 schools agreed to participate, including 38 schools from the SDP, 13 Philadelphia charter schools, and 10 UD schools. Schools were stratified in each of these categories (SDP, charter, and UD schools) and randomly assigned to either the OGAP treatment or control group.

Research Design and Analysis Approach

The research was designed as a randomized control trial, which provides the most accurate estimates of the causal effects of OGAP on teacher knowledge and student learning outcomes. Over the course of the two years of OGAP implementation, we assessed teachers and students three times. The first, or baseline, assessment, occurred in the summer/fall of 2014 and measured teacher and student knowledge and skills before OGAP began. The second assessment occurred at the end of year one (spring 2015) and the third assessment occurred in the spring of 2016. These

allowed us to conduct three analyses of the impacts of OGAP on teachers and students. These include a year one impact (2014 baseline to spring 2015), a year two impact (spring 2015 to spring 2016) and, for students, the two-year impacts of OGAP on those students who remained in their schools over the two years of the study.

Our analytic approach focused on estimating the effects of OGAP on teachers and students in the schools receiving OGAP training, tools, and resources in contrast to the teachers and students in the schools in the comparison group. Our models estimate the effects of OGAP on teachers and students, controlling for prior performance and demographic and school characteristics. The models appropriately nest teachers and students within schools to more accurately account for the hierarchical nature of educational contexts.

Sample

The study included about 14,000 students in almost 700 classrooms in 61 schools (Table 1). The 61 schools included 38 from the School District of Philadelphia (SDP), 10 from Upper Darby (a school district west of the city of Philadelphia), and 13 charter schools located in Philadelphia. Overall, the demographics of the teachers, students, and schools in the OGAP and comparison sites were quite similar, although there were a few important differences, which are described below and detailed in Appendix A.

Table 1
Sample Sizes of Teachers, Students, and Schools

Participants	OGAP	Comparison	Total
Grades 3-5 Teachers	347	331	678
Grades 3-5 Students	6,737	7,251	13,988
Schools	31	30	61

The two groups of grades 3-5 teachers had similar experience (about 13 years), and similar proportions of ELL (about 11%) and teachers who taught special education students (about 20%). The OGAP teachers had slightly higher average teacher knowledge scores at baseline (2.16 compared to 2.09).

Of the grades 3-5 students, there were more Black and Asian students in the OGAP schools, but fewer Hispanic students. The percentage of students on free/reduced lunch was similar for both groups (about 69%). The two groups had similar percentages of English language learners and special education students. The two groups were also similar on their baseline test performance, although the OGAP students had slightly higher solution sophistication scores (1.21 compared to 1.17)

Finally, the OGAP and comparison schools were similar in size (around 600 students) and had similarly high proportions of students on free/reduced lunch (more than 80%).

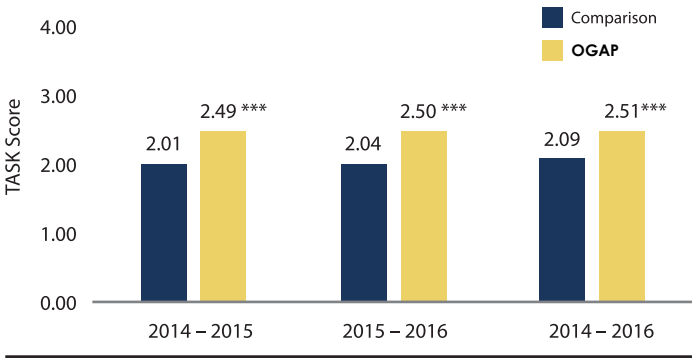
Impact of OGAP on Teachers

Teacher impacts were assessed on an assessment called the Teacher Analysis of Student Knowledge (TASK). The TASK is a grade-specific, online assessment for mathematics teachers which measures important components of the instructional knowledge necessary to teach to the high expectations of the Common Core State Standards in Mathematics. The TASK provides teachers with a grade-appropriate, open-ended mathematics problem and a set of student responses, and asks teachers to (1) analyze the thinking of the students based on their responses; (2) rank each student's solution based on the level of sophistication of the mathematical thinking represented, and explain the rationale for the rankings given to each student, and; (3) suggest instructional next steps, and their rationale, for a subset of the students. The TASK was developed by CPRE in 2012 and has been used in a variety of state and district contexts. As a measure of learning trajectory-oriented formative assessment, it is highly aligned with OGAP.

Figure 1 shows the impact of OGAP professional development, tools, and resources on Teacher Knowledge of Student Thinking in multiplication for a typical SDP teacher. The graph illustrates that SDP teachers who participated in OGAP performed about a half point (or 13%) better on the four point multiplication TASK than did teachers who did not participate in OGAP. The values represented in the graph are those for a regular education (i.e. not special education) teacher of average experience from a school of average size with average student demographics and average percentage of students on free/reduced lunch.

In the first year of OGAP, which focused solely on multiplication, teachers in schools implementing OGAP

Figure 1
OGAP Impacts on Teacher Knowledge of Student Thinking (TASK)



*** p<.001

significantly outperformed teachers in the comparison schools. In year two, OGAP teachers continued to outgain comparison teachers in TASK performance in multiplication, even as the program shifted its emphasis toward fractions. The third set of bars in the graph shows similar effects for teachers who remained in their schools over the two years of the study, and thus had data from 2014 to 2016. The complete models from which the graph was derived is shown in Appendix B.

Impact of OGAP on Students

We assessed the impacts of OGAP students on two different assessments. The first assessment was the Learning Trajectory Assessment (LTA). The LTA assesses student performance in multiplicative reasoning on two dimensions – accuracy and sophistication. Accuracy refers to the correctness of a student response, while sophistication refers to the congnitive complexity of the solution approach that students use. Student solution sophistication is an important dimension to measure because it reflects students' ability to master increasingly challenging mathematical content. For example, consider two students who answer a single digit multiplication problem correctly. One student uses an inefficient additive approach to solving the problem, while the other uses a multiplicative approach. Just by looking at their correct answers, we would not be able to distinguish between the two students. But in terms of sophistication, the second student will be more prepared for more advanced problems, like double digit multiplication, than the first student. This is both an example of the importance of measuring solution sophistication in addition to accuracy, as well as an example of the core approach of OGAP, which is to use this knowledge to help students progress developmentally.

The second assessment we analyzed was student performance on the Pennsylvania System of School Assessment (PSSA). Although only a portion of the PSSA is focused on multiplication and fractions in grades 3-5, and thus not a perfectly aligned measure of OGAP impacts, it is the state test in Pennsylvania, and therefore more meaningful to district leaders than the LTA.

The Learning Trajectory Assessment

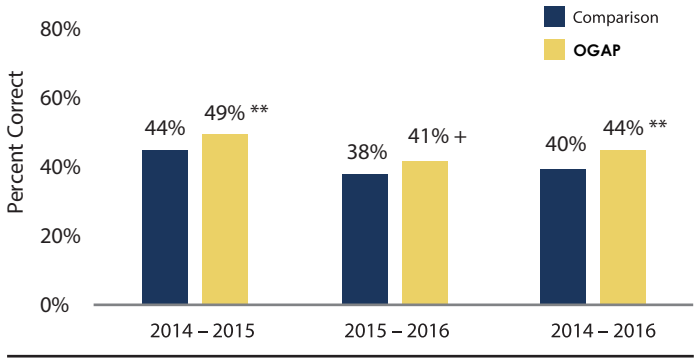
Measures two dimension of student learning:

- **Accuracy** – Did the student answer the question correctly?
- **Sophistication** – How advanced was the approach that the student used to solve the problem?
- While assessments typically focus on accuracy, sophistication is an important indicator of students' conceptual understanding and preparation for more advanced mathematics.

Student Impacts on the Learning Trajectory Assessment

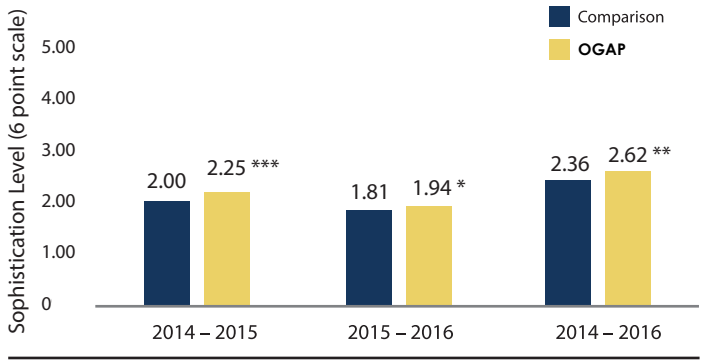
Overall, OGAP produced significant improvements in both student accuracy and sophistication on the Learning Trajectory Assessment. As shown in Figures 2 and 3, students in schools participating in OGAP performed significantly better than did students in the control schools.

Figure 2
OGAP Impacts on on 4th Grade Student Accuracy/ Correctness Learning Trajectory Assessment



+ p <.10 ** p<.01

Figure 3
OGAP Impacts on 4th Grade Student Solution Sophistication (Learning Trajectory Assessment)



* p <.05 ** p<.01*** p<.001

Overall, the students in the OGAP schools had significantly higher percentages of correct/accurate responses on the LTA in both the first and second years of participation in OGAP, as well as for the subgroup of students who were in their schools over the two years of OGAP. To illustrate these differences, Figure 2 shows the average differences in 4th grade performance of typical students from a school with average demographics in the School District of Philadelphia. Students in the OGAP schools had a significantly greater average correctness score on the LTA in both 2014-15 and 2015-16, although the differences were bigger in year one than year two. The average effect for the typical student who was in 3rd grade in an OGAP school in 2014-15 and stayed in their OGAP school in 4th grade in 2015-16 was about a 10 percent increase in performance. It is also important to temper these differences by pointing out that, even though OGAP was improving student performance on the LTA, students were still only getting less than half of the items correct.

Students in the OGAP schools also outperformed students in the comparison schools on the sophistication dimension of the LTA assessment. Generally, students in the schools participating in OGAP had solution approaches that were about 10 percent more sophisticated, on average. An example of these results for average 4th grade SDP students from typical schools is shown in Figure 3. In 2014-15 and 2015-16, the OGAP students had solution approaches that were significantly more sophisticated than did the comparable 4th grade students in the comparison schools. Although OGAP students were using significantly more sophisticated solution strategies, it is important to recognize there is still substantial room for growth, as these responses still represent mostly additive or early multiplicative solution approaches.

More detailed results of students of different backgrounds and in different school conditions are shown in multi-level regression results in Appendix C. A few additional important details emerged from these results that are worth mentioning. First, girls performed significantly lower than boys on both the accuracy and solution sophistication measures. Second, students in charter schools performed worse in year 1 than did students in the SDP schools, but performed no different than students in other SDP schools in the 2nd year or across the two-year stable sample.

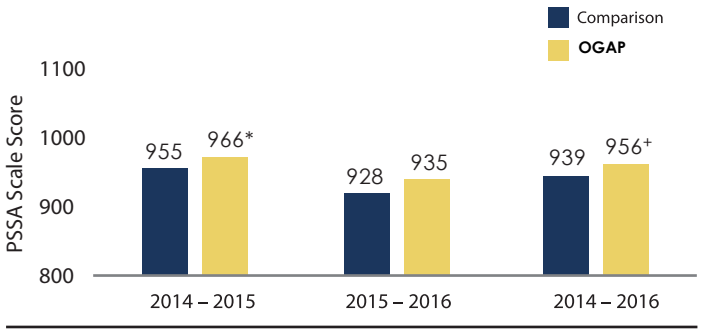
Student Impacts on the PSSA

The final analysis examined the impacts of OGAP on the Pennsylvania System of School Assessment (PSSA). Depending on the grade level, the PSSA contains different amounts of emphasis on multiplication, which was the main focus of OGAP during the 2014-2016 work in Philadelphia area schools (as well as an introduction of fractions in the second year of the intervention). Therefore, the PSSA covers content beyond the focus of OGAP and is therefore a less aligned assessment.

Even given these caveats, there are significant effects of OGAP on student PSSA performance.

Figure 4 shows the estimated impacts of OGAP on typical SDP 4th graders in average school contexts. As shown, 4th graders in OGAP schools scored an average

Figure 4
OGAP Impacts on on 4th Grade PSSA Scores



+ p <.10 * p<.05

of 966 on the PSSA in 2015, compared to 955 for students in the comparison schools, a difference of 11 points. There was a non-significant difference of seven points in 2015-2016 between the typical fourth grader in an OGAP SDP school versus a student in a comparison school. The stable sample of 3rd grade students who were in an OGAP school in 2014-15 and stayed in that school as 4th graders in the 2015-16 school year were predicted to have a 17 point boost in PSSA performance relative to students in the comparison schools. For those interested in the statistical model underpinning these results, the details of these impacts are shown in Appendix D.

Finally, these results can be examined in terms of percentile gains. From an examination of the content areas covered on the PSSA by grade (documentation publicly available on the Pennsylvania Department of Education's webpage) and in consultation with math content experts, we believe that 25-50 percent of the PSSA (depending on grade) does not cover multiplication and division. We therefore estimate that, on the proportion of the PSSA focused on these two mathematical topics, OGAP produced about 6-11 percentile point gains for students, as shown in Table 2.

Table 2
Average percentile gains for student particpating in OGAP for two years

A student in this percentile	Would be predicted to move to this percentile	Percentile Point Gain
10th	19th	9
25th	40th	15
50th	58th	8
75th	80th	5

Conclusion

The Ongoing Assessment Project (OGAP) is a set of professional development strategies, tools, and resources which help teachers use principles of formative assessment and research-based developments in student mathematical learning to develop students mathematical understanding in a range of math domains.

During the two school years from 2014 to 2016, OGAP was implemented in 61 public and charter schools in the School District of Philadelphia, as well as the nearby school district of Upper Darby. In partnership with OGAP program staff and the participating school districts, the Consortium for Policy Research in Education conducted a randomized control trial (RCT) to experimentally examine the impacts of OGAP on teachers' knowledge and students' learning.

The results show statistically significant impacts of OGAP on both teacher knowledge and student performance. Teachers in the OGAP schools demonstrated significantly higher capability to analyze student thinking as represented in student work samples and make informed instructional responses, as measured on a validated authentic assessment called the Teacher Assessment of Student Knowledge (TASK).

The students of OGAP teachers also signfiicantly outperformed students in a set of comparison schools on two measures of their performance. The first measure, called the Learning Trajectory Assessment, assessed students' correctness as well as solution sophistication in multiplicative reasoning, an important aspect of student conceptual understanding. The second measure was the state test used in Pennsylvania, the Pennsylvania System of School Assessment. Across both years of the study and for the sub-sample of students who remained in their schools over the two years of the study, the OGAP students performed higher on both measures than did students in the comparison schools.

In sum, the findings from this rigorous study indicate that OGAP produces statistically significant and educationally meaningful impacts on both teacher knowledge and student learning.

Appendix A
Descriptive Student and School Characteristics, 2014-2015

Student Characteristics	**Comparison** (n=7,251)	**OGAP** (n=6,737)
Fall 2014 Correctness	.49	.48
	(.52)	(.50)
Fall 2014 Sophistication	1.17	1.21 +
	(1.24)	(1.24)
% Female	48.66	48.92
% White	17.40	18.43
% Black	49.20	51.04 *
% Hispanic	19.73 ***	11.81
% Asian	7.05	13.80 ***
% Other	6.12 **	4.91
% Free/Reduced Lunch	69.14	68.05
% Special Education	18.35	17.36
% English language learners	10.95	11.97 +

Teacher Characteristics	**Comparison** (n=331)	**OGAP** (n=347)
2014 TASK Score	2.09	2.16 +
	(.025)	(.025)
Years of Experience	12.75	12.31
	(.47)	(.44)
% English language learner Teachers	11.42	12.07
% Special Education Teachers	17.69	23.87 +

School Characteristics	**Comparison** (n=30)	**OGAP** (n=31)
School Size (hundreds)	5.94	5.67
	(1.88)	(2.25)
% Free/Reduced Lunch	81.42	84.12
	(21.28)	(15.89)
Charter Schools	6	7
Upper Darby Schools	5	5
Philadelphia Schools	19	19

+ p<.10, * p< .05, ** p<.01, *** p<.001
1 Sample size varies by variable due to missing data

Appendix B

Impact of OGAP on Teacher Knowledge of Student Thinking (TASK) in Multiplication

Variable	Year 1 2014-15 (n=435)	Year 2 2015-16 (n=291)	Two Year Stable Sample 2014-16 (n=246)
Constant	1.07***	1.114***	1.284***
	(.195)	(.258)	(.322)
Pre-Test	.472***	.453***	.424***
	(.062)	(.049)	(.065)
OGAP	.338***	.192**	.318***
	(.046)	(.066)	(.083)
Multiplication		.183***	.194***
		(.050)	(.054)
Years of Experience	.0001	-.007+	-.005
	(.004)	(.004)	(.005)
ELL Teacher	-.004	.029	.105
	(.062)	(.111)	(.155)
Special Ed. Teacher	.021	-.192**	-.100
	(.063)	(.064)	(.120)
School-Level Variables			
School Size (hundreds)	-.001	-.010	-.008
	(.008)	(.016)	(.017)
% Free/Reduced Lunch	.086	.263	.046
	(.173)	(.403)	(.425)
Charter School	-.01	.102	-.063
	(.090)	(.156)	(.168)
Upper Darby School	.026	.081	-.074
	(.100)	(.136)	(.172)
Percent Black Students	.034	-.307	-.161
	(.114)	(.294)	(.291)
Percent Hispanic Students	.059	-.292	.002
	(.176)	(.324)	(.349)
Percent Asian Students	.632**	-.166	.462
	(.192)	(.439)	(.499)
Percent Multirace Students	-.896	.111	-1.384
	(.933)	(1.338)	(1.663)

+ p<.10, * p<.05, ** p<.01, *** p<.001

Appendix C
Impact of OGAP on LTA, Accuracy and Sophistication

	Accurancy/Correctness			Sophistication		
Variable	**Year 1 2014-15** (n=9,099)	**Year 2 2015-16** (n=7,162)	**Two Year Stable Sample 2014-16** (n=4,508)	**Year 1 2014-15** (n=9,099)	**Year 2 2015-16** (n=7,162)	**Two Year Stable Sample 2014-16** (n=4,508)
Constant	.507***	.368***	.489***	2.44***	2.031***	3.000***
	(.046)	(.035)	(.044)	(.191)	(.206)	(.267)
Pre-Test	.322***	.446***	.281***	.462***	.579***	.472***
	(.01)	(.019)	(.013)	(.017)	(.027)	(.025)
OGAP	.049**	.024+	.043**	.245***	.131*	.259**
	(.016)	(.013)	(.016)	(.068)	(.065)	(.099)
Third Grade	.035**	.02		-.329***	-.248***	
	(.011)	(.015)		(.061)	(.073)	
Fifth Grade (Grades 4-5 for stable sample)	-.058***	.011	.011	-.029	.003	.121+
	(.012)	(.011)	(.013)	(.068)	(.072)	(.063)
Female	-.01*	-.011+	-.025***	-.098***	-.048*	-.109***
	(.005)	(.006)	(.007)	(.020)	(.023)	(.031)
Black	-.084***	-.057***	-.08***	-.350***	-.254***	-.408***
	(.012)	(.016)	(.022)	(.054)	(.070)	(.108)
Hispanic	-.044**	-.024	-.038	-.180**	-.124+	-.151
	(.014)	(.017)	(.028)	(.067)	(.072)	(.134)
Asian	.089***	.093***	.121***	.391***	.439***	.619***
	(.016)	(.023)	(.03)	(.081)	(.084)	(.138)
Other Ethnicity	-.021	-.03+	-.045*	-.129+	-.125*	-.292**
	(.016)	(.015)	(.022)	(.072)	(.069)	(.104)
Free/Reduced Lunch	-.018**	-.018**	-.021*	-.122***	-.048+	-.108*
	(.006)	(.006)	(.01)	(.030)	(.031)	(.046)
Special Ed. Students	-.128***	-.07***	-.1***	-.584***	-.389***	-.588***
	(.009)	(.01)	(.013)	(.036)	(.055)	(.079)
English language learners	-.071***	-.045***	-.045***	-.327***	-.212***	-.311***
	(.009)	(.008)	(.012)	(.045)	(.039)	(.065)
School-Level Variables						
School Size (hundreds)	-.007	-.003	-.005	-.028	-.027+	-.038
	(.004)	(.003)	.003)	(.017)	(.015)	(.025)
% Free/Reduced Lunch	-.165***	-.167***	-.183***	-.676***	-.767***	-1.102***
	(.033)	(.035)	(.034)	(.151)	(.174)	(.203)
Charter School	-.032+	-.003	-.011	-.186*	-.062	-.138
	(.018)	(.02)	(.025)	(.074)	(.104)	(.129)
Upper Darby School	-.035+	.011	.007	-.167*	.072	.031
	(.019)	(.016)	(.016)	(.074)	(.087)	(.090)

+ p<.10, * p<.05, ** p<.01, *** p<.001

Appendix D
Impact of OGAP on PSSA

Variable	Year 1 2014-15 (n=9,099)	Year 2 2015-16 (n=7,162)	Two Year Stable Sample 2014-16 (n=4,508)
Constant	1001.52 ***	962.04 ***	994.51 ***
	(12.91)	(22.89)	(27.79)
Pre-Test	73.99 ***	102.34 ***	74.19 ***
	(2.037)	(5.51)	(3.84)
OGAP	11.10 *	6.65	17.04 +
	(5.44)	(8.31)	(9.39)
Third Grade	-10.00 **	14.44 **	
	(3.18)	(5.58)	--
Fifth Grade (Grades 4-5 for stable sample)	-37.80 ***	11.71 **	13.33 **
	(3.11)	(4.03)	(4.82)
Female	-5.69 ***	-10.16 ***	-7.62 *
	(1.36)	(2.33)	(3.29)
Black	-30.92 ***	-32.68 ***	-46.03 ***
	(5.13)	(6.31)	(11.47)
Hispanic	-16.02 ***	-18.19 ***	-26.84 *
	(4.80)	(5.62)	(11.85)
Asian	36.77 ***	33.64 ***	36.59 **
	(5.93)	(9.03)	(14.09)
Other Ethnicity	-9.41 +	-12.58 *	-13.62
	(5.07)	(5.95)	(10.41)
Free/Reduced Lunch	-14.91 ***	-13.69 ***	-6.91 +
	(2.70)	(2.88)	(3.95)
Special Education Students	-39.66 ***	-38.74 ***	-48.65 ***
	(2.84)	(4.17)	(5.63)
English language learners	-38.13 ***	-37.25 ***	-35.26 ***
	(3.35)	(4.77)	(6.71)
School-Level Variables			
School Size (hundreds)	-0.75	-1.47	-1.57
	(1.06)	(1.49)	(1.84)
% Free/Reduced Lunch	-70.21 ***	-75.89 ***	-82.83 ***
	(12.45)	(22.38)	(20.41)
Charter School	8.10		
	(13.31)	--	--
Upper Darby School	8.97	21.53 **	
	(6.70)	(7.62)	--

+ p<.10, * p<.05, ** p<.01, *** p<.001

Note: The pre-test used in the PSSA analyses was the 2014 student score for accuracy/correctness. We did this because there would otherwise have been no first year and stable sample baseline for 3rd graders, as there is no end of second grade PSSA assessment.

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3440 Market Street, Suite 560
Philadelphia, PA 19104
p: 215–573–0700
@CPREresearch | cpre.org

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