

Strengthening PreK Mathematics Teaching and Learning:
@Scale Project Final Report

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<http://bpsearlychildhood.weebly.com/boston-k1ds.html>

II. Goals & Objectives

This project (**Boston K1DS**) is designed to strengthen educator effectiveness in PreK mathematics programs by scaling up the successful *Building Blocks* PreK mathematics program to include additional numbers of PreK classrooms in Community-Based Organizations (CBOs) in the city.

The scaling up the Building Blocks program includes professional development for PreK teachers designed to deepen their understanding of mathematics content, how the mathematics learning of young children develops across a learning trajectory, and how this learning is supported by the *Building Blocks* mathematics program. The scaling up also includes coaching support from strong PreK teacher leaders. This hybrid model consisting of both professional development support and coaching support has demonstrated strong gains in student engagement and mathematics learning in BPS and CBO PreK classrooms and has contributed to closing the achievement gap.

Massachusetts STEM Goals addressed by Boston K1DS:

1. Increase student interest in STEM areas.

2. Increase student achievement among all PreK - 12 students
3. Increase the percentage of skilled educators who teach PreK-16 STEM.

In the Boston K1DS @Scale project Year 2, we proposed expanding the professional development (PD) support and the coaching support beyond the original Boston K1DS cohort to include additional teachers in Action for Boston Community Development Head Start PreK classrooms and programs (ABCD) serving approximately 120 PreK students. Further, we continued the support of the teachers from the 10 centers in cohort 1 (Year 1) with a focus on their leadership development. Through the expansion of the PD and coaching support, we anticipated improving the early mathematics instructional quality in the Boston K1DS centers and thus increasing student engagement, outcomes, and achievement in early mathematics.

In addition, we proposed that CBO PreK teachers from Year 1 continue to receive support with a focus on their leadership development as a way to build capacity. The development of these professional learning communities can help to ensure that the mathematics teaching practice of CBO PreK teachers will continue to be supported after the project ends. We also increased the involvement of CBO directors and administrators as an additional capacity-building effort.

Through our @Scale project and with other changes to the Boston K1DS program (see Implementation section below) we have been able to expand the program to serve over 34 teachers and 15 administrators, who collectively teach approximately 315 students.

III. Implementation

We have had great success in implementing our @Scale project. Teachers and administrators from all centers (N=40) attended the PD sessions and in surveys immediately after the session indicated that they agreed on the usefulness and applicability of the sessions to their own knowledge and instructional practice (average of 4.5 out of 5 point Likert scale, with 5=strongly agree).

However, some teachers reported being frustrated by the content and pace of the sessions, sometimes wanting to learn strategies for implementing the content before a strong foundation in that content had been laid. Research has shown that strong implementation follows the development of a strong knowledge base, and thus we designed the sessions to strengthen that content base, given that our observations of classrooms indicated that teachers needed to first increase content knowledge and comfort with early childhood mathematics before working on implementation. Further sessions will incorporate a hybrid between foundational knowledge and implementation strategies.

In our evaluation data, we found that the number of in-depth math activities and the average time spent on each increased from the program onset to the first time point (year 1 of @Scale funding), but decreased at the current second time point. However, overall math instructional quality significantly increased compared to baseline. Average adherence to the curriculum was 51% in year 2 (65% is considered adequate for quality instruction). As instructional quality is

associated with curriculum fidelity, a low curriculum adherence will impede instructional quality. We hypothesize that this is due to a few reasons, including 1) higher than expected turnover of the first cohort's teaching and administrative staff, 2) the addition of the ABCD classrooms unfamiliar with the Building Blocks curriculum, and 3) the inclusion of more 3 year old children in the Boston K1DS classrooms in year 2 as compared to year 1. While mixed-age preschool classrooms are supported by research, the BPS K1 curricula are developmentally appropriate for 4-year-old children, and more than a few younger children in the classroom has been shown to negatively impact student outcomes of these 4-year-old children.

At the beginning of the 2015-16 school year, most of the Boston K1DS and the ABCD classrooms from cohort 2 classrooms were incorporated into Boston's implementation of the four-year Massachusetts Preschool Expansion Grant (PEG). Additional classrooms were also incorporated as part of the grant, resulting in a total of 17 classrooms across 13 centers serving over 300 PreK students. PEG requirements differ from Boston K1DS in some aspects. These include standardizing salary structures and educational requirements¹ in an effort to decrease the turnover prevalent in community-based classrooms. We have continued the PD support and coaching in these PEG classrooms, and we expect that these supports will reverse the decreasing trend and will improve their math instructional quality in the next evaluation as classroom and program staff stabilize, and where teaching focuses largely on the 4-year-old children.

IV. Scale

With the inclusion of the ABCD classrooms and the advent of Boston's PEG program, we have been able to successfully scale our @Scale project. Future scaling will be dependent upon expansion of the PreK Expansion Grant as well as city and state government investment into high-quality preschool for all 4-year-old children in Boston and Massachusetts.

V. Outputs, Outcomes & Evaluation

For outputs and outcomes of this project and their influencing factors, see the Implementation section above.

We feel that our @Scale project, as part of Boston K1DS and now incorporated into PEG, has positively impacted the mathematics learning of 4-year-old students and the mathematics teaching practice of teachers in participating CBO PreK classrooms. Specifically, we have worked with over 34 teachers and 16 administrators this year, serving 300 4-year-old students in 17 classrooms spread among 13 centers. As PEG and the movement to universal high-quality PreK programs grow, we expect that our program and its effectiveness will continue to expand.

¹ Some classrooms (3) have not continued with PEG due to various factors, including loss of degreed teacher and the stringent requirement on the number of three year olds in each classroom.

In evaluating this project, we used a variety of qualitative and quantitative measures. These measures included post-seminar evaluation forms, teacher interviews and surveys, director interviews and surveys, classroom observations (using both the Classroom Assessment Scoring System (CLASS; Hamre & Pianta, 2001) and the Classroom Observation of Early Mathematics Environment and Teaching (COEMET; Sarama & Clements, 2009)). The CLASS is a highly recognized and valid classroom measurement tool used in the early childhood field to measure instructional quality, among other items, and the COEMET is used to measure the implementation and depth of knowledge for *Building Blocks*. Child outcomes (numeracy, early mathematics, and problem-solving skills) were measured using the Woodcock-Johnson Applied Problems subscale. The complete Boston K1DS evaluation is currently undergoing final revisions and will be sent when finalized.

PEG has succeeded Boston K1DS and includes funding for a large-scale evaluation, meaning that many of the evaluation measures and instruments used in this project will continue to be used over time, thus allowing a longitudinal analysis of the program impact.

VI. Budget and Plans for Program Sustainability

As described in our application, we used our @Scale funding to support an early mathematics coach at 0.4FTE (including benefits) to support the professional development, coaching, and project implementation. Stipends were paid to the facilitators of the professional development as indicated in our original application. The contractual services were used for program documentation and evaluation, in the hopes that this would assist scaling this program to additional PreK classrooms and centers city- and statewide over time.

The Boston K1DS project itself has helped attract additional funding and @Scale project has helped to put emphasis on mathematics instruction and its import to early education. The result is that, together, the Boston K1DS funding and the @Scale funding have raise the profile of the importance work in PreK settings.

Boston K1DS has evolved into the Boston PreK Expansion Grant (PEG) with dedicated federal funding through the MA Department of Early Education and Care, and through PEG we are working to expand the project to strengthen mathematics instruction and outcomes in the PEG classrooms. BPS, along with other collaborators, has recently received a federal grant from the Institute of Educational Services (IES) to examine its PreK-3rd grade system and it is likely that this and further funding will continue to raise the profile of these projects at the state and national levels.

Form 1a: Expenditure Worksheet

Please complete the expenditure worksheet below. In the first column, identify how you divided your grant among the identified expense categories. In the second column, list your expenditures to date. The third column will automatically populate with the difference (remaining balance). Make sure to sign and date this worksheet before submission and include any necessary explanations or comments in the "Comments Box".

Instructions: Double-Click on the table for it to become an interactive spreadsheet. Click outside the table to return to MS Word. ONLY FILL IN CELLS HIGHLIGHTED IN YELLOW: Non-Yellow cells contain formulas and will fill in automatically. Also, all cells are formatted for currency; you do not need to type in \$ signs.

<i>Administrator</i>			\$ -
<i>Support Staff</i>	\$ 39,500	\$ 39,500	\$ -
<i>Other</i>			\$ -
Fringe Benefits	\$ 8,750	\$ 8,750	\$ -
Contractual Services	\$ 770	\$ 770	\$ -
Travel/Transporation			\$ -
Total Supplies & Materials:	\$ -	\$ -	\$ -
<i>Curriculum</i>			\$ -
<i>Equipment</i>			\$ -
<i>Other</i>			\$ -
Training			\$ -
Tuition & Stipends	\$ 7,500	\$ 7,500	\$ -
Evaluation			\$ -
Other (Identify)			\$ -
Other (Identify)			\$ -
Indirect Costs (10% Max)	\$ 2,175	\$ 2,175	\$ -
Total	\$ 58,695	\$ 58,695	\$ -

Project Name/Organization: Boston K1DS: Boston Public Schools

Project Manager: Brian Gold **Date:** 1/25/2016

Comments Box

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