New York City Department of Education

School of One

DID SCHOOL OF ONE IMPROVE MATH ACHIEVEMENT AND STUDENT AND TEACHER ATTITUDES ABOUT LEARNING MATH?

Project Overview

THE PROBLEM: What Challenge Did the Program Try to Address?

Ensuring that students graduate from high school ready for college, meeting the individual needs of students with disabilities and English language learners, and doing this in a way that is scalable across urban and rural communities is a difficult job, and may include a rethinking of the way in which instruction is delivered to students and data are used in classrooms. Traditionally, instruction has been provided with one modality – through one teacher delivering instruction to a single group of students at one time. The School of One provides students with instruction through multiple modalities, all organized through an adaptive, highly intelligent learning platform so students can learn in ways that are personalized to their academic needs, interests, and ways of learning.

THE PROJECT: What Strategies Did the Program Employ?

New York City Department of Education was awarded an i3 development grant[1] from 2010-2015 to implement School of One (So1), a mathematics instruction program for 6th-8th graders. The program differs in many respects from the traditional classroom experience. A technology platform provides instructional plans and materials dynamically, and students receive a mix of live, online, and collaborative instruction that is tailored to their academic needs, interests, and learning preferences. So1's theory of action is based on the premise that students learn at different speeds and in different ways, and that fully differentiated instruction is not possible under the traditional "one teacher" model. So1 seeks to meet each student wherever he or she is on the continuum of math knowledge and skills. To evaluate So1, schools in matched pairs were randomly assigned to the program or non-program group.

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[1]New York City Department of Education was awarded an i3 development grant supported by the U.S. Department of Education's Investing in Innovation program through Grant Number U396C100941. Development grants provide funding to support the development or testing of novel or substantially more effective practices that address widely shared education challenges. All i3 grantees are required to conduct rigorous evaluations of their projects. The quality of evidence required to demonstrate a project's effectiveness depends on a project's level of scale or grant type.

THE SO1 MODEL

- **Diagnostic Assessment.** So1 begins the school year with a diagnostic assessment of each student's math skills, which is used to create an individualized learning plan ("playlist") that specifies the skills on which the student should work. Each class period, students receive instruction in a variety of methods of instruction ("modalities"), and, at the end of each class period, students take a short assessment of the skill that was the focus of their lesson. The results of these assessments are used to inform the students' learning plans for future class periods. Both teachers and So1 staff monitor students' progress and can adapt the learning plans to meet their evolving needs on a daily basis.

- **Classroom Design.** A group of roughly 90 students, who would typically be split into multiple traditional classrooms, instead learn in one large room with multiple teachers. Students' walk into the classroom and look to a large screen to find out where they will work and what skills they will work on during the session. For teachers, So1's dynamic algorithm means that the sequence of lessons they will teach, and which particular students will receive the lessons, cannot be known at the start of the school year; new information on students' learning plans are provided to teachers after school each day.

Summary of Results

IMPACT STUDY: DID SCHOOL OF ONE IMPROVE MATH ACHIEVEMENT AND STUDENT AND TEACHER ATTITUDES ABOUT LEARNING MATH?

Student Attitudes About Learning Math
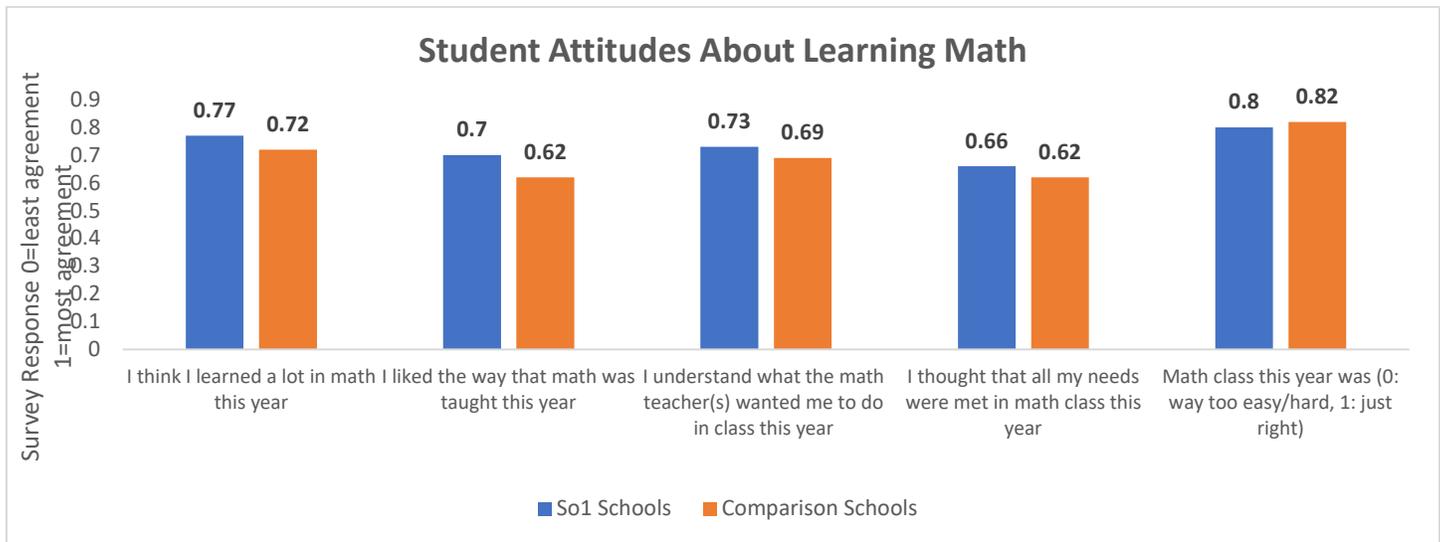
There were no significant differences found on student achievement or teacher outcomes. Overall, program impacts on student and teacher outcomes are imprecise because of the very small effective sample size.[2]

- **MATH PERFORMANCE.** There is no statistically significant impact of the program. However, because of issues with the sample size (described in the footnote below), researchers cannot rule out modest positive or negative effects of the program.

- **MATH PERFORMANCE (NORTHWEST EVALUATION ASSOCIATION ASSESSMENT).** The effects of So1 on Northwest Education Alliance scores were not statistically significant.

- **STUDENT ATTITUDES TOWARD MATH.** Evidence about attitude changes is mixed. Students in later grades assigned to So1 expressed significantly worse views of their math curriculum in the first year of the expansion (although not in the second year).

- **TEACHERS' VIEW OF THE MATH CURRICULUM.** So1 teachers expressed more positive feelings about their math curriculum than control teachers, in both spring 2013 and 2014.

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[2] Due to unanticipated issues during implementation (e.g., school noncompliance, parts of the sample being dropped because of school renovations, and some late baseline survey administration), the size of the sample with full data was much smaller than anticipated. Because of this, very large positive or negative program effects were rejected. But moderate effects or the null hypothesis (of program effects being zero) could not be rejected.

Information about the assessments used by So1 can be found below in the "Program Implementation and Evaluation Resources" section. Please see Appendices A and B for information about the evaluation's design and the quality of the evidence, respectively.

OTHER CONSIDERATIONS

The evaluators noted some other considerations from the School of One report, included here.

- **STUDY ABLE ONLY TO DETECT LARGE EFFECTS.** Power tests conducted for the proposal indicated that this design would only have sufficient power to detect large (roughly 0.25 standard deviation) program effects. This is due to the fact that, despite a large number of students within each school, assignment was made at the school level and there are substantial correlated effects within a school.

- **MODIFICATIONS TO THE ORIGINAL DESIGN.** First, due to the delay in implementation and a long delay in finalizing the evaluation contract, baseline survey data were collected at the start of the school year 2012-13, rather than in the prior school year. Second, while building and renovating classrooms for So1 during the summer of 2012, it became clear that financially and structurally it would be too difficult to implement So1 in the entire school for two of the treatment schools. Last, despite repeated attempts at communication with the principal, the study was unable to obtain survey or low-stakes test data for one of the control schools.

- **PERSONALIZATION/TARGETING.** Students consistently had the most positive reaction to the statement "The School of One program told me how well I was doing in math," supporting the view that personalization/targeting was a distinguishing feature of the program.

- **WORKING DIRECTLY WITH TEACHERS.** Students consistently felt that they learned more in School of One when working "directly with a teacher," followed by "working on a computer," and least when "working with other students."

- **SUCCESS VARIES BY GRADE.** Anecdotal evidence from interviews with So1 teachers and principals suggested that 6th graders took to the So1 model more readily than the 8th graders, most of whom had already been using a more traditional model of math instruction at these middle schools for two years.

For More Information

Evaluation Reports

[**Final Evaluation Report (Full Report)**](#) (Columbia Business School, September 2015)[3]

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[3] The information and data for this result summary was collected from the most recent reports as of 01/31/2020: "Evaluation Report on the School of One i3 Expansion," Jonah E. Rockoff, 2015.
https://www.edweek.org/media/evaluation%20of%20the%20school%20of%20one%20i3%20expansion%20--%20final%20copy.pdf

Appendix A: Students Served by the Project[4]

GRADE(S)

PK	K	1	2	3	4	5	6	7	8	9	10	11	12

GENDER	RACE/ETHNICITY	COMMUNITY
Not Reported	Not Reported	Not Reported

HIGH-NEED STUDENTS[i]

Free/Reduced-Price Lunch	English Learner	Students with Disabilities
86%	13%	24%

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[4] These data reflect the entire student population served by the intervention, not just the evaluation sample used in the impact study.

Appendix B: Impact Evaluation Methodology[5]

RESEARCH DESIGN:

Design:	Cluster Randomized Controlled Trial, using a treatment on the treated framework
Approach:	- Eight schools were identified and matched into pairs based on prior math achievement. - After the researchers controlled for demographic differences, matched pairs had no statistically significant differences in prior math achievement. - One school in each pair was randomly designated the treatment school and the other served as the comparison school.
Study Length:	Two years

DATA COLLECTION AND ANALYSIS

Study Setting:	Eight public middle schools in New York City
Final Sample Sizes:	*Intervention Group:* 2,671 students *Comparison Group:* 2,399 students
Intervention Group Characteristics:	- Free/Reduced Priced Lunch: 83.6% - Individualized Education Program: 21.6% - Average percent days absent: 5.6% - English Learners: 6%
Comparison Group Characteristics	- Free/Reduced Priced Lunch: 88.7% - Individualized Education Program: 26.9% - Average percent days absent: 6.1% - English Learners: 22%
Data Sources:	- New York State end-of-year math test scores - Northwest Evaluation Association math test scores - Baseline student and teacher surveys - Follow-up student and teacher surveys - New York City Department of Education enrollment and demographic data

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[5] These data reflect only the evaluation sample in the impact study, not the entire population served.

Key Measures:

- Measures developed from student surveys
  - Intrinsic Motivation
  - External Motivation
  - Amotivation
  - Interest and Competence in Math
  - Self-directed Learning
  - Confidence/Competence in Using Technology.
- Constructs measured by the teacher surveys
  - Self-Efficacy
  - Attitudes Towards Use of Technology in the Classroom
- Student and teacher opinions regarding the math curriculum they used at the end of each school year

Appendix C: Quality of the Evidence

Although an evaluation may not have been reviewed by the time of publication for this summary, it is possible that the study will be reviewed at a later date. Please visit the websites found in the footnotes on this page to check for updates.

WHAT WORKS CLEARINGHOUSE REVIEW[6]

STUDY	RATING
Not reviewed as of 01/31/2020	N/A

EVIDENCE FOR ESSA REVIEW[7]

STUDY	RATING
Not reviewed as of 01/31/2020	N/A

NATIONAL CENTER ON INTENSIVE INTERVENTIONS REVIEW[8]

STUDY	RATING
Not reviewed as of 01/31/2020	N/A

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[6] https://ies.ed.gov/ncee/wwc/FWW
[7] https://www.evidenceforessa.org/
[8] https://intensiveintervention.org/

*The **Investing in Innovation Fund (i3)**, established under section 14007 of the American Recovery and Reinvestment Act of 2009, is a Federal discretionary grant program at the U.S. Department of Education within the Office of Elementary and Secondary Education (OESE). i3 grants help schools and local education agencies work in partnership with the private sector and the philanthropic community to develop and expand innovative practices that improve student achievement or student growth, close achievement gaps, decrease dropout rates, increase high school graduation rates, and/or increase college enrollment and completion rates for high-need students.*

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[i] "High-need student" refers to a student at risk of academic failure or otherwise in need of special assistance and support, such as students who are living in poverty, attend high-minority schools, are far below grade level, who have left school before receiving a regular high school diploma, at risk of not graduating with a diploma on time, who are homeless, in foster care, have been incarcerated, have disabilities, or who are English learners. For more information see: Applications for New Awards; Investing in Innovation Fund-Development Grants, 81 FR 24070 (April 25, 2016).