TEACHERS COLLEGE
COLUMBIA UNIVERSITY

Strategic Inquiry and New York City's Renewal High Schools

Final Evaluation Report

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Executive Summary

The following study of Strategic Inquiry (SI) in New York City's Renewal High Schools offers a new answer to the perennial question that often dominates and divides reformers: How do students learn? Our analysis also challenges conventional wisdom about New York City's Renewal program by suggesting there are successful components worth pursuing and adopting elsewhere.

Our findings show promising results from Strategic Inquiry, a framework for school turnaround that aims to improve student performance through creating a culture of shared accountability, distributed leadership, and evidence-based instructional practices. The Strategic Inquiry process, discussed in greater detail below, empowers teacher teams to identify underperforming students, diagnose their needs, and implement customized interventions to improve performance for those students.

Examining the period from November 2014 to December 2016, this study covers the implementation of Strategic Inquiry's train-the-trainer approach in the Renewal High Schools, an initiative that included providing struggling schools with three years of additional funding and support from the New York City Department of Education in an effort to improve student outcomes. Our mixed-methods program evaluation includes qualitative data from interviews with individuals involved with Strategic Inquiry in the Renewal High Schools. Our quantitative data come from staff surveys fielded in four case study schools and administrative data from the New York City Department of Education (NYCDOE) and New York State.

During implementation, Strategic Inquiry consultants trained central district office coaches and school-based teacher leaders to develop inquiry teams, to design specialized inquiry curricula, and to promote SI culture in schools to advance the goals of improved student writing, thinking, and progress to graduation and college readiness. We found that Strategic Inquiry reached more teachers and students than a costlier model with larger numbers of outside SI consultants.

This study also found significant improvements in student achievement. After controlling for student and school characteristics, students in schools that adopted Strategic Inquiry were almost two-and-half times more likely to be on-track to graduate and less than half-as-likely to be off-track to graduate, when compared to students in non-SI schools. Notably, the train-the-trainer model of SI implemented at a lower cost exhibited similar outcomes to more costly iterations of the program, suggesting that the

more efficient version of the model adopted in Renewal schools was effective in shifting school culture and improving student performance at scale in struggling schools.

This study of SI observed strong results in sample schools, despite the fact that the schools were only in Year 3 of implementation in a time frame designed for five years. On multiple measures, Strategic Inquiry performed well. Teacher participation on inquiry teams was high, principal support for SI was strong, inquiry team members considered their SI facilitators to be knowledgeable about SI key principles, and interview respondents were very positive about the support they received from SI consultants.

There is also evidence of a shift toward a culture of inquiry across the case study schools. Staff reported an increase in shared accountability, distributed leadership, and evidence-based practices, as well as an increase in collaboration. Schools adopting Strategic Inquiry also reflected positive increases in NYCDOE measures of school culture. Inquiry participation was associated with a greater interest in pursuing school leadership roles in the future. In addition, inquiry team teachers attributed SI participation to improvements in their practice. Buy-in to the model was strong, and teachers and student support staff found SI to be an effective school improvement strategy. Levels of teacher self-efficacy were high. Teachers reported strengthened collegial relationships since inquiry began. SI was also associated with improvements in student engagement, particularly for special education and English language learner (ELL) students, which is a notable result given the difficulty in reaching these subgroups.

Teachers reported engaging in more evidence-based practice as a result of participation on inquiry teams. These practices included using formative assessment data to identify student skill gaps, designing targeted interventions to address the gaps, adapting curriculum in order to teach needed skills, teaching writing strategies, focusing on struggling students most, and assessing the efficacy of interventions.

In summary, Strategic Inquiry was associated with improved student and school culture performance results in a low cost, minimally resource-intensive manner. SI achieved these positive outcomes while targeting ELLs and special education students. This study suggests that the Strategic Inquiry model can be replicated, customized and adopted in school districts throughout the country as one important component of an education improvement reform.

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Introduction

Strategic Inquiry (SI) is a framework for teacher inquiry which aims to create a culture of shared accountability, distributed leadership, and evidence-based practice in schools, as well as improvements in student performance (Panero & Talbert, 2013). Prior to 2014, SI was implemented in New York City primarily in schools using a certificate program called the Scaffolded Apprenticeship Model (SAM). A study of SI implemented through the SAM model found a significant positive impact on student success rates, teaching practices, and school culture (Talbert et al., 2012). In the SAM model, one external facilitator was assigned to each school and met with teacher inquiry teams one day per week.

Starting in November 2014, SI was implemented using a train-the-trainer approach in New York City's Renewal High Schools, a group of struggling schools receiving three years of additional funding and support from the New York City Department of Education (NYCDOE) in an effort to turn around their performance. In the train-the-trainer model, SI consultants trained district Office of Renewal Schools (ORS) coaches and school-based teacher leaders to facilitate inquiry teams, to design inquiry curriculum, and to initiate the spread of SI in schools (rather than working with inquiry teams themselves). This model allowed Strategic Inquiry Consulting, LLC., to reach more teachers and schools at a lower cost with fewer trained consultants. One purpose of this evaluation is to determine whether SI implemented through a train-the-trainer model can have a positive impact (similar to that of the SAM model) when implemented at scale.

Our study evaluates the efficacy of SI as a model for inquiry-based reform by examining its results in New York City's Renewal High Schools from November 2014 to December 2016. The study also explores district- and school-level supports for teacher inquiry, cultural shifts within schools, and relationships between SI implementation and student outcomes. The evaluation addresses the following questions:

1. How did Strategic Inquiry (SI) work?
2. Was there a shift toward a culture of inquiry in SI schools?
3. Was SI an effective school reform strategy for improving student learning at scale?

Our findings have implications for educators and policy makers interested in the potential value of SI as a strategy for systemic reform at the school and district levels. Most studies of inquiry focus on teacher-level professional development instead of

looking at inquiry as a tool for systemic reform (Anderson & Herr, 1999; Cochran-Smith & Lytle, 1990). This evaluation highlights the benefits and challenges associated with implementing the Strategic Inquiry model at scale.

The Strategic Inquiry Model

The theory of change behind SI holds that strategic inquiry can improve student success and school culture (Talbert et al., 2012). Strategic Inquiry asks educators to study their schools "through the lens of struggling students" in order to understand how school systems shape practices that limit student success (Panero & Talbert, 2013, p. 13). This makes it possible to "identify and implement strategic changes to improve results" for struggling students (Panero & Talbert, 2013, p. 13).

Design Features: The 4Ts

A developer and the lead researcher of the Strategic Inquiry model, Nell Scharff Panero, along with Joan E. Talbert, refer to its design features as the 4Ts: teams, targets, tasks, and training (2013).

- **Teams.** A team structure harnesses the collective wisdom of school practitioners. Inquiry teams are "better and smarter at addressing challenges than any one individual can be" (Panero & Talbert, 2013, p. 14). Also, since team members collectively target a particular group of students, SI's team structure helps engender shared accountability for improving student outcomes, which can later spread this culture throughout the school.

  Ideally, team members should represent "a broad array of units," such as grade levels, subject areas, and small learning communities (SLCs). This helps develop leadership for inquiry-based change across the entire organization. In addition, staff can leverage their experience with students across various settings to build greater understanding of their needs. In particular, student support staff such as guidance counselors, psychologists, and social workers can provide insight into students' lives outside the classroom. Cross-school teams in which teachers, administrators, and student support staff collaborate in the inquiry process may be better able to target issues than teachers working in isolation.

- **Targets.** The core principle of SI is "getting small to get big results." Teams "get small" by identifying and targeting exactly where "learning was breaking down

for struggling students." Teams hold student learning targets "tight," maintaining high, but reasonable expectations while allowing interventions to be "loose," or flexible and responsive to student needs. Once student learning is improving, teams apply the process to their school's systems: getting small is a strategy for "diagnosing flaws in the larger system so that it can be improved" (Panero & Talbert, 2013, p. 14).

- **Tasks.** The design of Strategic Inquiry incorporates three distinct phases of inquiry tasks. In Phase I, inquiry teams focus on moving students. First, teams use data to specify a target group of 12-15 struggling students. Then, analyzing a variety of performance data for those students, the team identifies a small skill gap and chooses learning targets based on a measurable hypothesis. Finally, teams develop interventions and assessments matched to each aspect of the hypothesis.

  In Phase II, inquiry teams shift their attention to moving systems. Teams work together in iterative cycles of action and reflection to identify small, actionable changes that would allow for big success with the skills identified in Phase I for target students. In that way, teams can make instructional decisions and hold one another accountable for making changes. In addition to guiding the work, facilitators teach team members the basic principles of systems thinking.

  In Phase III, Strategic Inquiry team members begin to work on moving their colleagues. They apply the inquiry process to the learning of adults at their schools. Since teacher inquiry is participant-driven and deeply connected to classroom life (Zeichner, 2003), teachers may be more likely to embrace it as a strategy for improving their practice. This is a key advantage of inquiry frameworks, as teacher buy-in is considered essential for reforms to land (Anderson & Herr, 1999; Cuban, 1984; Hiebert, Gallimore, & Stigler, 2002; Rust, 2009). More experienced, highly skilled facilitators help newer facilitators navigate the hurdles of leading adults.

Table 1. Phases of Strategic Inquiry Tasks

Phase	Emphasis	Description
I	Moving *students*	Teams use data to specify a target group of 12-15 struggling students. Then, analyzing a variety of performance data for those students, the team identifies a small skill gap and chooses learning targets based on a measurable hypothesis. Finally, teams develop interventions and assessments matched to each aspect of the hypothesis.
II	Moving *systems*	Teams work together in iterative cycles of action and reflection to identify *small*, actionable changes in school systems that would allow for *big* success with the skills identified in Phase I for target students. In that way, teams can make instructional decisions and hold one another accountable for making changes. In addition to guiding the work, facilitators teach team members the basic principles of systems thinking.
III	Moving *colleagues*	Teams apply the inquiry process to the learning of adults at their schools. Team members also turn the lens of inquiry onto their own facilitation skills. More experienced, highly skilled facilitators help newer facilitators navigate the hurdles of leading adults.

Note. Adapted from Watson, 2018

- **Training.** Teams need a trained facilitator to guide their inquiry work and help them develop leadership skills. Facilitators must be "deeply grounded in the core principles of Strategic Inquiry" and able to apply these principles flexibly given school and team contexts (Panero & Talbert, 2013, p. 24). After participating in the first phase of inquiry, team members are ready to become facilitators as well (though they continue to receive training). After participating in the three phases of inquiry, school-based facilitators are fully trained and ready to lead the continued spread of SI across a school. They understand the underlying principles deeply and flexibly enough to continue to do so in varying contexts.

What Distinguishes SI from Other Models of Teacher Inquiry?

The four features that set SI apart from other models of teacher inquiry include: 1) a time horizon of 3-5 years for seeing results, 2) its use of highly-trained facilitators, 3) a focus on a target group of struggling students, 4) shifting school culture toward one of inquiry, and, in the Renewal context, 5) integrating writing instruction.

1. **Long time horizon.** SI's theory of change involves three years of program activities and a five-year time horizon for intended outcomes. In the first year, schools implementing SI should see culture and practice shifts for trained facilitators and target students. In the second year, these shifts should extend to a larger group of teachers and students, such as an entire grade level or content area through changes in instruction. In year three, school culture should reach a tipping point, with inquiry practices spreading to other grade levels and content areas. In the next two years, schools should apply inquiry to a variety of problems and contexts, beginning to exhibit the "inquiry reflex" as a habit of work and mind.

2. **Trained facilitators.** In contrast to other frameworks for teacher inquiry, SI uses trained facilitators to coach teachers through the inquiry process. For implementation in the Renewal High Schools, SI consultants trained facilitators in twice monthly train-the-trainer sessions, aiming to push expertise and leadership skills as rapidly as possible into the schools. In the train-the-trainer model, SI consultants train district (Office of Renewal Schools (ORS)) coaches and teacher leaders to facilitate inquiry teams, design inquiry curriculum, and initiate the spread of SI in schools. This model implemented at scale allows Strategic Inquiry Consulting, LLC to reach more teachers and schools with fewer trained consultants at less expense.

3. **Starting with students.** Another distinct characteristic of SI is the structure of its cycles of inquiry. SI asks teachers to begin the inquiry process by identifying struggling students and a high-leverage skill gap to target such as including a concluding sentence in each paragraph in an essay. Then, SI guides teachers as they evaluate the impact of their interventions, which are aimed at closing that skill gap; teachers learn to develop assessments that generate the kind of fine-grained data that can guide teachers in closing skill gaps and ultimately, improving student learning.

4. **Targeting school culture.** Strategic Inquiry is designed to overcome the challenge of teachers working in isolation, accountable only to themselves. The facilitation and tasks within inquiry teams are intentionally designed to push educators to examine and challenge the status quo. SI also works to develop a cadre of school leaders that can support the program and ensure its sustainability over time.

5. **Integration of Writing is Thinking (WIT).** In the case study schools, teams integrated SI with Writing is Thinking (WIT). WIT is a distinct approach to content area writing instruction that teaches "foundational elements" of writing, such as sentence level skills. WITsi (WIT through SI) teams use tools to identify specific skill gaps in writing (Panero & Talbert, 2013). Then, teams design highly-scaffolded, methodical interventions using Writing is Thinking strategies.

Strategic Inquiry and the New York City Renewal Schools

New York City Mayor Bill de Blasio announced the Renewal Schools program in November 2014. Schools chosen for the program had been identified as struggling by the state and were performing in the bottom quartile of NYC public schools. Renewal schools would receive a share of $150 million dollars designated for extra instructional time, professional development time, and enrichment programs (Darville, 2014).

The NYC Department of Education (DOE) Office of Renewal Schools (ORS) signed a contract with Strategic Inquiry Consulting, LLC, for assistance in implementing SI as a key reform strategy in its Renewal High Schools for 2014, 2015, and 2016. Implementation began in November 2014 with 14 schools and then spread to 19 more schools in 2015 but ended earlier than planned, in December 2016. Table 2 below summarizes the roles of key stakeholders in the implementation of the model.

Table 2. Roles in Strategic Inquiry

Role	Description
SI Consultant	SI staff responsible for planning and leading train-the-trainer sessions and supporting school principals and school-based leaders of inquiry teams during school visits
SI Facilitator	School-based teachers or assistant principals leading inquiry teams and receiving SI training
ORS Coach	ORS staff responsible for coaching teachers in the Renewal High Schools; some attended train-the-trainer sessions and supported SI facilitators in WIT strategies

The original design involved training an ORS coach and a teacher leader working in partnership as "facilitator pairs." However, because ORS allocated coaches to a variety of support roles, ORS coaches were not consistently present at inquiry team meetings or focused on supporting SI and WIT as their priorities. Therefore, the focus shifted in year 2 of implementation to that of training the school-based facilitators, though some ORS coaches did still attend SI training sessions.

Figure 1 below illustrates the SI theory of action, summarizing the services Strategic Inquiry, LLC planned to deliver during the three years of implementation and the intended outcomes for each year. For example, in addition to leading train-the-trainer sessions designed to prepare facilitators to lead SI teams, SI consultants provided WIT

professional development and curriculum support to all 9th grade teachers, as well as 10th grade English language arts (ELA) and social studies teachers in both cohorts. SI consultants completed just over two years of implementation.

Figure 1. Strategic Inquiry Theory of Action

Support from Strategic Inquiry, LLC.
- Full day Friday train-the-trainer sessions with ORS coaches and school based facilitators
- Monthly school site visits
- WIT PD & curricular support
- WIT lead teacher training
- Meetings with principals

Year 1

Year 2

Year 3

School Outcomes

Year 1:
- At least one 9th grade inquiry team focused on writing
- 9th grade teachers trained to implement WIT across content

Year 2:
- Critical mass of 9th grade teachers on inquiry teams focused on writing
- At least one 10th grade inquiry team focused on writing;
- At least one 11th or 12th grade inquiry team focused on Regents
- 9th and 10th grade teachers trained to implement WIT across content
- One to three trained WIT leads
- 9th grade teachers using WITsi in at least one subject

Year 3:
- Critical mass of 9th and 10th grade teachers on inquiry teams focused on writing
- At least two 11th and/or 12th grade inquiry teams focused on Regents
- Spread of use of WITsi (either to 9th and 10th grade in one subject and/or to other subject(s) in 9th grade)

Student Outcomes

Year 1:
- Improved writing for 9th grade target students

Year 2:
- Improved writing for 10th grade target students
- Improved writing and scholarship for 9th grade as a whole
- Improved Regents passage on focal Regents exam for target students

Year 3:
- Improved writing and scholarship for 9th & 10th grade as a whole
- Improved passage of at least one Regents exam school wide

Evaluation Design and Methods

This mixed-methods program evaluation includes formative and summative components (Morse, 2003; Weiss, 1998), assessing the implementation of SI in four of New York City's Renewal High Schools as well as estimating its impact in all SI schools.[1] By including qualitative and quantitative data, we have a more robust picture of the intervention than would be possible with either type of data alone (Creswell & Plano Clark, 2007; Greene, Caracelli, & Graham, 1989; Fetters, Curry, & Creswell, 2013; Leavy, 2017). A comparative case study (Merriam, 1998) of four high schools gave us insight into the process of SI implementation with the train-the-trainer approach and how SI program activities shifted school culture. Quantitative analysis estimated the impact of SI by comparing students' on track to graduation status in SI and non-SI schools, as well as by comparing school culture measures.

[1] Due to the fact that SI was implemented in all Renewal High Schools, we cannot completely isolate the effect of SI from that of the Renewal program.

Data

Our qualitative data came from 19 semi-structured interviews with 24 individuals involved with Strategic Inquiry in the Renewal High Schools. Informants included four principals, five assistant principals, and 11 school-based SI facilitators. In addition, we interviewed two Strategic Inquiry consultants who designed and led facilitator training, as well as two people affiliated with the District Office of Renewal Schools. Our quantitative data came from a staff survey fielded in the case study schools, SI training attendance records, as well as administrative data from the district and state. Student-level data obtained from the NYCDOE included demographic information, credit accumulation data, Regents test scores, eighth grade scores on New York State (NYS) proficiency tests, and enrollment data. Publicly available school-level data obtained from NYS included measures of attendance, teacher experience, student body composition, and school size, as well as school culture measures such as trust, teacher collaboration, effective school leadership, rigorous instruction, and supportive environment.[2]

In the analysis of administrative data, we tested the hypothesis that students in schools with the train-the-trainer model of SI were more likely to be on track and less likely to be off track to graduate. We also tested the hypothesis that schools with the train-the-trainer model of SI experienced positive shifts in school culture. As in a previous evaluation of SI (Talbert et al., 2012), we created a composite measure of students' course completion and Regents scores similar to New Visions' benchmarks used to classify students. We draw upon Talbert et al. (2012), Fairchild et al. (2014), and New York State graduation requirements in creating our four categories: 1) on track for college readiness, 2) on track to graduate, 3) almost on track, and 4) off track to graduate. Table 3 summarizes this metric:

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[2] Composite measures from the NYC School Survey in 2014-2016. 2013 measures come from a previous version of the survey which had slightly different school culture measures.

Table 3. The four categories for the outcome composite measure

	Credits	**Courses**		**Regents**	
On track for college readiness	33	6 ELA, 6 math, 6 social studies, 4 foreign language, 3.48 physical education	5 required: ELA, global history, US history, math, science + 2 additional exams in math and science	7 exams passed at 65 and above, 80 or above in math, 75 or above in ELA	
On track to graduate	33	6 ELA, 6 math, 6 social studies, 4 foreign language, 3.48 physical education	5 required: ELA, global history, US history, math, science	5 exams passed at 65	
Almost on track to graduate	30	4 ELA, 2 math, 4 social studies, 2 science		2 exams passed at 65	
Off track to graduate			*All other students*		

      We focused on student outcomes for the cohort of students who entered high school in Fall 2014 (at the start of the implementation period) and attended the same high school for six semesters, on grounds that they would have had sufficient time in the school to benefit from the progress of inquiry work over the three-year implementation period. Their on-track statuses at the end of the 2016-2017 academic year would indicate the extent to which the school's inquiry work had a cumulative effect over their time in the school. Students who attended non-participating schools during the same period served as our comparison group.[3]

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[3] We excluded students who did not attend the same school throughout the implementation period.

Instrument Development

SI's theory of change guided us as we identified variables and developed instruments (Weiss, 1998). Interview protocol questions focused on the nature of support for SI from different stakeholders, the role of SI in shaping school culture and teacher attitudes, the perceived impact of SI, and challenges of implementation. Questions were repeated across protocols (see Appendix F) and aligned with survey questions in order to triangulate data and enhance validity (Campbell & Fiske, 1959). Our survey (see Appendix E) targeted all teachers and instructional support staff in the case study schools. Response rates ranged from approximately 44 to 90 percent. Survey items asked about: principal and ORS coach support of SI; the effectiveness of SI facilitators; the structure and functioning of SI teams; teachers' use of evidence-based practices; shifts toward a culture of inquiry; perceptions of changes in student engagement; and perceptions of improvements in student performance. We wrote multiple items targeting the same construct and validated these scales using Cronbach's alpha (Wolf et al., 2016).

Data Analysis

All interviews were recorded and transcribed verbatim. We engaged in an iterative coding process (Saldaña, 2009; Corbin & Strauss, 2008) using Dedoose Qualitative Software. We completed first cycle coding using *a priori* codes derived from the SI theory of change and continued inductively using emerging pattern codes through a second cycle (Saldaña, 2009). We used the staff survey data to validate findings from the interview data about the operation of inquiry teams and principals' support for inquiry. In addition, we use descriptive statistics to examine trends in responses across schools and statistical testing to identify significant differences among schools and between inquiry participants and non-participants across schools. Analyses of administrative data combine the quasi-experimental technique of propensity score matching to construct control groups with complementary regression-based statistical controls (Murnane & Willett, 2010). We match based on school characteristics, including size, demographics, graduation rates, and attendance. A robust set of control variables allowed us to evaluate whether school conditions or student characteristics, rather than SI participation, explained observed differences.

We controlled for student-level covariates, such as previous academic performance (using 8th grade score quartiles on the New York State math and ELA tests), poverty status (eligibility for free and reduced price lunch (FRPL)),

race/ethnicity, and ELL and special education status. Table 4 below summarizes the school-level covariates included in our models:

Table 4. School-level factors included in regression models

Performance	Graduation rate Attendance rate Suspension rate Percent of students in 1st or 2nd quartile on 8th grade math exam
Staff	Teacher turnover rate Percent of teachers with fewer than three years of experience
Demographics	Racial composition Gender composition Free and reduced price lunch eligibility Percent of student body with special needs Percent of students who were English Language Learners
Other	Total enrollment[4] Average class size Career and technical education (CTE) school

Using these variables, we conducted a multilevel logistic regression (nesting students within schools and controlling for additional school characteristics) in order to examine the association between SI participation and students' on and off track to graduation status.[5] We also conducted a school-level linear regression using lagged measures of school culture.

Case Study Schools

This evaluation included a comparative case study of four Renewal High Schools. Three of the case study schools were "high-implementation," meaning that relative to other SI schools, they had a high total number of SI training sessions attended, total months of SI training, and number of staff trained in SI. As exemplars, they provided an opportunity to understand the conditions under which a culture of inquiry begins to spread through schools and to assess the association between inquiry practices and

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[4] Following Talbert et al. (2012), we excluded transfer schools and schools with fewer than 10 students in the cohort of interest. Schools that opened or closed during the implementation period were excluded also.

[5] Following Talbert et al. (2012), we combined on track for graduation and college-ready students into one group.

student achievement. These three schools began SI in 2014 and had two full years to implement the model. The fourth case study school, Gian Carlo Menotti Secondary School, was in the early stages of implementation. This provided an opportunity to understand school-level factors that facilitate or hinder successful implementation of the SI model.

During the implementation period at all four schools, enrollment declined and graduation rates increased. Table 5 provides a comparative snapshot of the schools' demographics and performance in academic year (AY) 2016. We describe each of the four schools subsequently.

Table 5. Key Statistics for Case Study Schools, AY 2016

	Arlington Heights	James Madison	Ravens-wood	Gian Carlo Menotti
Enrollment*	1,800	2,150	2,100	600
% Asian	32%	32%	17%	1%
% Hispanic	48%	36%	61%	80%
% Black	10%	23%	13%	14%
% White	5%	3%	7%	4%
% Free/Reduced priced lunch	79%	80%	73%	100%
% ENL	25%	18%	12%	24%
% Special Education	16%	16%	17%	27%
% Chronically absent	38%	43%	44%	43%
% Graduate in 4 years	64%	66%	63%	66%
% College-ready	22%	22%	25%	4%

Source: NYCDOE 2016-2017 School Quality Snapshots

Note. School names are pseudonyms. Enrollment rounded to nearest 50. Gian Carlo Menotti enrollment includes 6th-8th grades.

Arlington Heights High School. Arlington Heights High School was organized into small learning communities with college- and career-readiness themed pathways, including business, law, engineering, health, forensics, and design. Over the last three years, student attendance had improved. College enrollment and college-readiness rates also increased in the past three years, though these rates remained lower than the city and borough averages.

James Madison High School. Five years ago, James Madison began implementing a school turnaround plan, which included dividing the large school into eight small themed learning communities led by guidance counselors, deans, and

teachers. In the past five years, the school has also introduced the positive behavior intervention and supports or PBIS model. According to recent Quality Reviews, the percentage of students who enroll in college has increased. These rates remain lower than the city and borough averages. Prior to Fall 2014, multiple cohorts of teachers at James Madison participated in the SAM program. This may have provided a strong foundation for their implementation of the train-the-trainer model of SI.

Ravenswood High School. The principal at Ravenswood was appointed as a turnaround leader five years ago. S/he has overseen the introduction of small learning communities, including a freshman academy that focuses on identity exploration and a robust English language learning program. The school also has a CTE certification for their culinary education program. In the past few years, Ravenswood leadership has worked to improve school safety, partnered with college readiness programs, and added more electives and clubs. The percentage of students that graduate college-ready and the percentage of students that enroll in college have gone up and down over the past three years, though they both remain lower than the city and borough averages.

Gian Carlo Menotti Secondary School. As mentioned earlier, Gian Carlo Menotti offers a case study of SI in the early stages of implementation. It underwent a transition in leadership during the summer of 2016, and the new principal began implementing Strategic Inquiry in Fall 2016. (Although the school was part of Renewal, the previous principal had not implemented SI.) Gian Carlo Menotti is also unique because its leader was trained in SI the prior year in his/her role as a Renewal coach. Also, it is the smallest school in our study.

<center>**Results**</center>

In this section, we discuss the results of the evaluation focusing on: (1) How Strategic Inquiry (SI) worked, (2) If there was a shift toward a culture of inquiry in SI schools, and (3) If SI was an effective school reform strategy for improving student learning at scale.

How did Strategic Inquiry (SI) work?

We first examined the extent to which SI was implemented as designed in the case study schools. There are five sub-questions associated with this question:
- How did SI inquiry teams work?
- How did principals support SI in their schools?
- How effective were SI consultants?
- How did the district central office support SI?
- How effective were SI facilitators?

Overall, we found that the case study schools implemented SI as designed. Inquiry team participation was high. Principals prioritized and supported the model in their schools. SI consultants and facilitators were effective in training teachers and encouraging the spread of inquiry throughout the school. The district central office provided support in the first year of implementation but less so in the second and third years.

How did inquiry teams work? The SI model specifies that inquiry teams should meet for at least 90 minutes a week. In order to understand how schools were implementing SI, we asked survey respondents if they participated in inquiry, how many people were on their team, and approximately how many minutes per week they formally met.

Across the case study schools, teacher participation in inquiry teams was very high (84% / 207 responses). Significantly more than half of teachers at Ravenswood (96% / 79 responses), Arlington Heights (86% / 32 responses), Gian Carlo Menotti (79% / 30 responses), and James Madison (73% / 66 responses) reported that they participated in inquiry teams.

Interview data supported this finding. According to the principal of James Madison, "Every teacher, every staff member in the building, all the guidance counselors, are involved in inquiry." Even at Gian Carlo Menotti, which was relatively
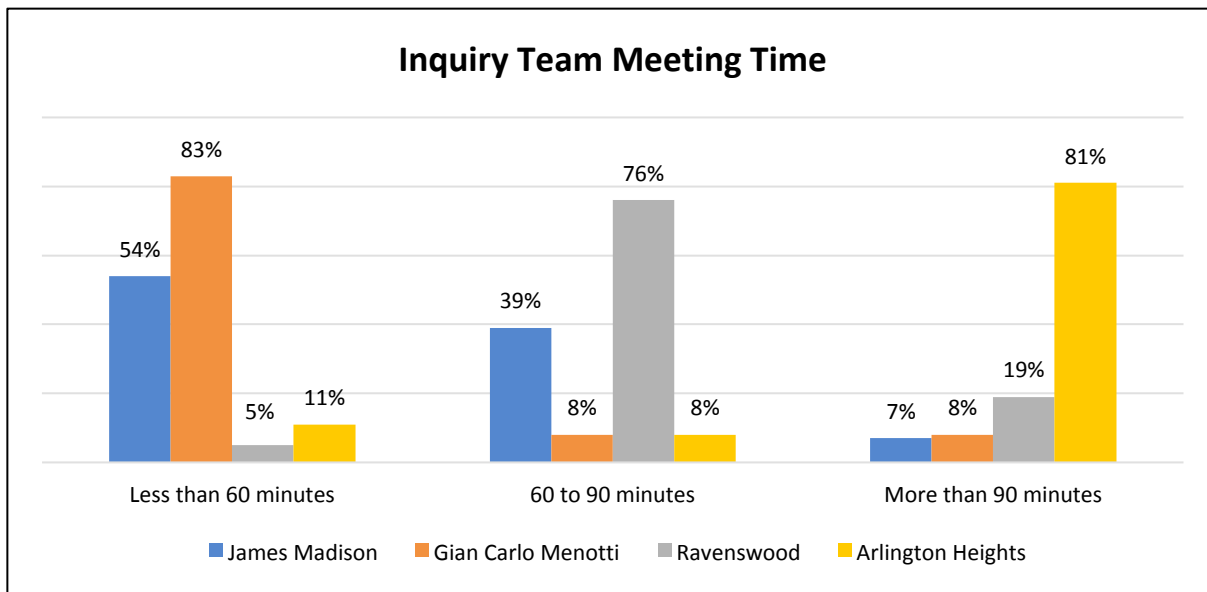
new to SI, the principal stated that about 85% of teachers and support staff participated. S/he cited struggles with the participation of non-ELA teachers though:

> This year [physical education and computer teachers] will [participate in inquiry]. But last year, I didn't really push. It is harder to get [staff] to recognize that they have to be writing in physical education.

At Ravenswood, the school-based option was critical for ensuring that all staff could participate in inquiry teams.

Time devoted to inquiry meetings. We asked respondents to indicate approximately how many minutes per week their inquiry teams met formally. Long blocks of time are necessary to catalyze leadership development and culture shifts within teams (Panero & Talbert, 2013) and can serve as an indicator of principals prioritizing SI. Ideally, teams should meet at least 90 minutes per week. Overall, almost half of respondents spent 60 to 90 minutes per week (44% / 86 responses) in formal meetings with their inquiry teams. As shown in Figure 2, there was considerable variation across schools in the amount of time inquiry teams met.

Figure 2. Inquiry Team Meeting Time

Inquiry Team Meeting Time

Legend: James Madison, Gian Carlo Menotti, Ravenswood, Arlington Heights

Less than 60 minutes: James Madison 54%, Gian Carlo Menotti 83%, Ravenswood 5%, Arlington Heights 11%

60 to 90 minutes: James Madison 39%, Gian Carlo Menotti 8%, Ravenswood 76%, Arlington Heights 8%

More than 90 minutes: James Madison 7%, Gian Carlo Menotti 8%, Ravenswood 19%, Arlington Heights 81%

Note. *Differences across schools were statistically significant:* χ^2*(6, N=157)=146.19, p<0.001.*

James Madison had the greatest variation in meeting times among teams. In the interviews, the principal and facilitators stated that it was difficult to estimate how much time was spent on inquiry because it was infused in everything they did at school. The principal said: "We come together weekly for different types of inquiry but it's always ongoing. It's always [part of] the mix every day because it's [integral to] what you do."

Gian Carlo Menotti's shorter meeting times were not surprising given that when their new principal started in 2016, there were no teacher teams at all. During our interview, Gian Carlo Menotti's principal described how s/he had instituted regular meeting times and was working to make meetings longer and more frequent: "Since the schedule was already set in stone, I couldn't change it to make [inquiry] team time, so I designated Monday afternoon PD as team time, and we started to bring in WITsi, but it was in small pockets."
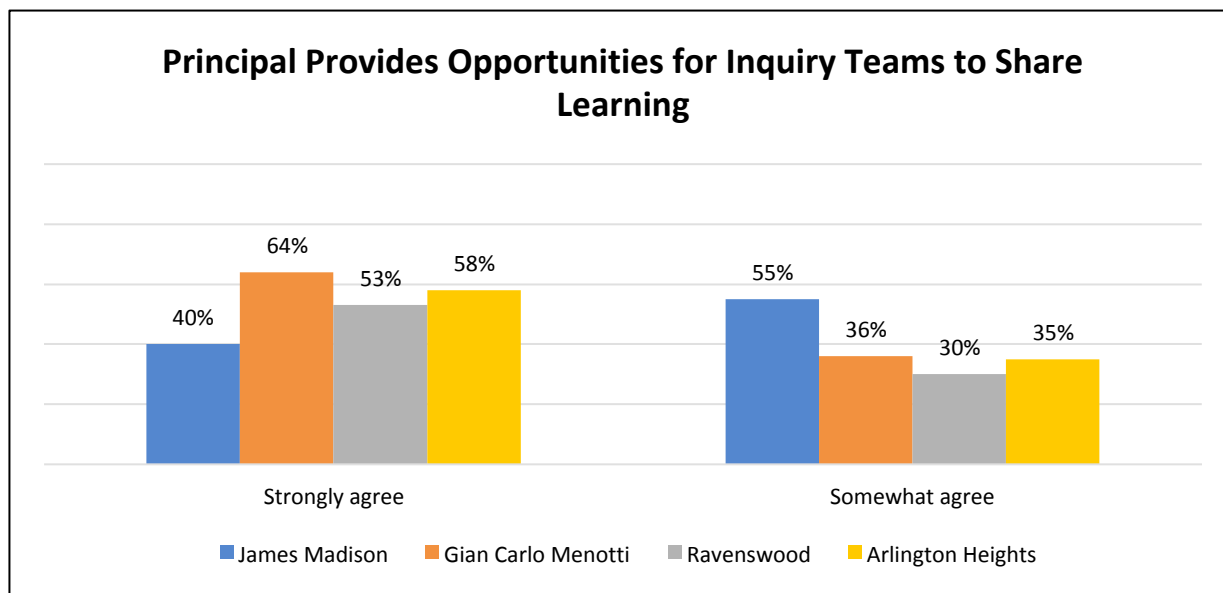
How did principals prioritize and support SI? Principal support is critical to the success of the Strategic Inquiry model. Principals should make SI a school-wide priority and systematize inquiry work by building regular, dedicated, and protected collaboration time for inquiry teams (Panero & Talbert, 2013). In order to assess the level of principal support in the case study schools, we asked all members of inquiry teams (teachers and non-teaching student support staff) to indicate the extent to which they agreed or disagreed that their principal supported inquiry teams on a variety of indicators. Overall, the majority of respondents felt that principals prioritized SI and supported inquiry teams. Across schools, more than three-quarters of respondents strongly or somewhat agreed (87% / 170 responses) that their principals scheduled and prioritized time for inquiry team meetings. At most schools, a similar proportion of respondents strongly or somewhat agreed (87% / 169 responses) that principals planned strategically with inquiry team members to spread SI across the school. Similar proportions of respondents agreed that their principals responded to feedback by making changes in school structures and systems that impede inquiry work.

The interview data also supported the findings that case study school principals prioritized SI and scheduled time for inquiry team meetings and protected that time consistently even when other needs arose.

> Because we've had success with our teacher and inquiry teams, we're going to have this structure for as long as the principal is in charge. It is expected that teachers are going to work in teams in order to improve our school. (SI Facilitator, Arlington Heights)

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Opportunities to share learning. As shown in Figure 3, the overwhelming majority of respondents agreed that principals encouraged inquiry team members to share their learning within the school.

Figure 3. Principal Provides Opportunities for Inquiry Teams to Share Learning

Principal Provides Opportunities for Inquiry Teams to Share Learning

Strongly agree: James Madison 40%, Gian Carlo Menotti 64%, Ravenswood 53%, Arlington Heights 58%

Somewhat agree: James Madison 55%, Gian Carlo Menotti 36%, Ravenswood 30%, Arlington Heights 35%

Legend: James Madison, Gian Carlo Menotti, Ravenswood, Arlington Heights

One of the ways principals did this was by providing opportunities at their school or other SI schools for intervisitations in which inquiry team members visited classes or inquiry team meetings. This proved to be particularly effective as a support for cross-content work.

> We all share this group of students, whether we teach math, science, or social studies, and here's an approach that could work in all the content [areas]. (Principal, Ravenswood)

There also were "Share Fairs" with other SI schools in which inquiry members were able to hear about "similar challenges" to teaching or student learning.

Principal collaboration. Principals can also support inquiry work by making themselves available to collaborate with inquiry team facilitators. Additionally, frequent communication between inquiry leaders and principals can facilitate system changes that address school-level problems teams identify. We asked respondents to what extent they agreed or disagreed that their principal collaborates with inquiry team facilitators.

As shown in Figure 4, the majority of responses were positive. The overwhelming majority agreed that their principal collaborated with inquiry team facilitators at their schools.

Figure 4. Principal Collaborates with Inquiry Team Facilitators
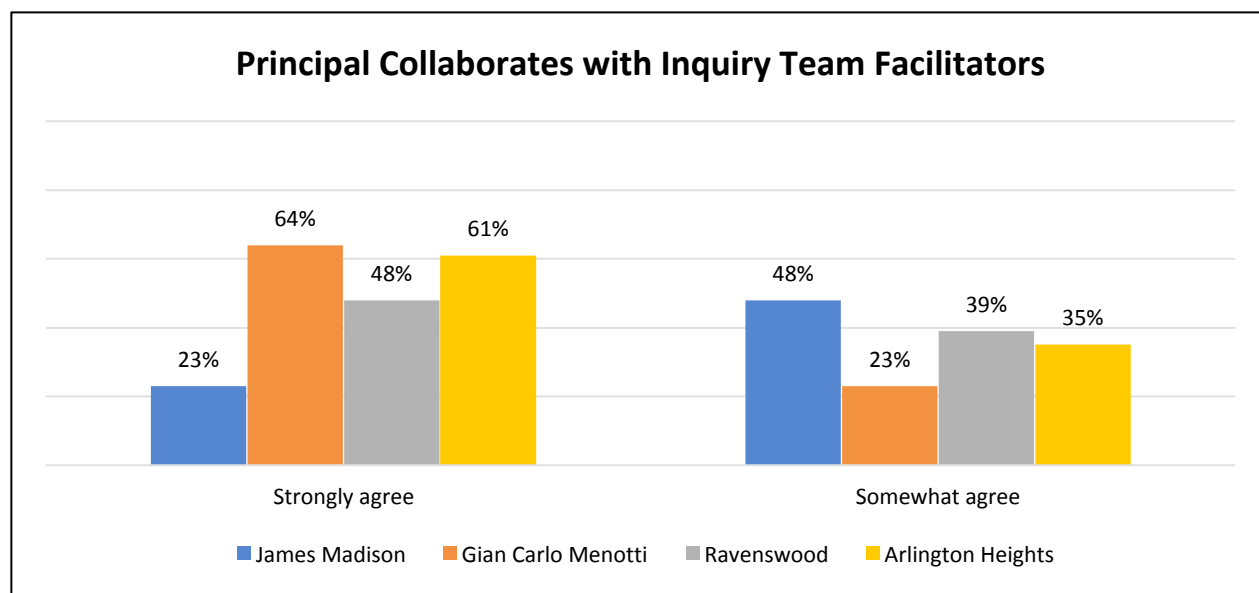
The principal at Arlington Heights met regularly with SI facilitators to discuss issues that arose on their inquiry teams. The facilitators were then expected to share the principal's feedback with their team members and implement changes when necessary: "We looked at ways that we tackled different problems, tried to share solutions and talk about next steps. The teachers [would] then go back to their groups with the information we'd shared and try to implement some of those strategies."

How effective were SI consultants? Respondents were very positive about the support they received from SI consultants. SI consultants were active participants in the learning and made regular visits to each case study school. An SI Facilitator at Ravenswood said, "The SI consultants were extremely supportive, provided us with feedback throughout the entire three years and helped us grow throughout the process."

The SI consultants were especially effective in supporting the cross-content work that is integral to WIT, the writing part of SI. An SI Facilitator at James Madison shared, "The SI consultant did an amazing job making WIT content specific. It wasn't, 'This is an appositive using English,' but 'This is how an appositive looks in a social studies or math class.'"

The support of SI consultants also served as a strong motivator to SI facilitators in the case study schools to persevere with the inquiry work even when it became challenging: "The SI consultants consistently encouraged me and I think that encouragement and support allowed me the confidence to continue to push forward. (SI Facilitator, Arlington Heights)

How did the district central office support SI? Central office (ORS) staff set priorities in schools and helped set up structures that supported SI such as ensuring that inquiry teams were able to meet for at least 90 minutes a week. They also provided trained coaches to case study schools that worked with SI facilitators.

Respondents reported that central office staff were very committed to SI in the first year of implementation and participated regularly in trainings. A central office staff person said: "Year 1 we participated alongside the coaches and the teachers, the [Directors of School Renewal] were all learning together. We went to weekly trainings with the SI consultants."

There were however, competing initiatives at ORS that did not always align well with SI and pulled key people out of the building during inquiry team meeting time.

> The content that Renewal pushes does not always align, especially in ELA, with the outcomes that the SI consultant sets up for Year 1 schools. WITsi is supposed to teach them to write a good sentence and maybe get to a paragraph but in other programs, assessment is an essay. So, there was dissonance there. (Principal, Gian Carlo Menotti)

Due to the concern that competing initiatives at the district level may have limited the ability of ORS coaches to support SI, our survey aimed to understand the extent of ORS coaches' work with inquiry teams in the case study schools and the efficacy of their support as external facilitators. We asked survey respondents a series of questions designed to assess the level of contact SI facilitators had with their coaches and the type of support they received.

Types of Central Office coach support. Of the SI facilitators who knew a Central Office (ORS) coach, we wondered about the patterns in the types of support ORS coaches provided to teachers. Interview respondents expressed concern that competing initiatives in the Renewal High Schools may have led ORS coaches to focus more on content-related support than on support for Strategic Inquiry. We asked survey respondents about following evidence-based teaching practices promoted by SI: using

data to identify target students, designing targeted interventions to address student skill gaps, adapting curriculum in order to teach needed skills, teaching WIT strategies, creating and analyzing low-inference transcripts (LITs) of classroom observations, and creating and using formative assessments (Panero & Talbert, 2013). We also asked about the following curricular content areas: understanding the Common Core Learning Standards (CCLS), setting instructional objectives aligned to CCLS, implementing EngageNY curriculum in their classrooms, and aligning assessments to CCLS. We found that SI facilitators were significantly more likely to have received support for the evidence-based practices related to SI (listed above) than support for curricular content (listed above) from their ORS coaches. We also asked respondents to rate how valuable support from their primary ORS coach was for the practices promoted by the Strategic Inquiry model and for those related more to curricular content.

  Support with evidence-based teaching practices promoted by SI. For each of the evidence-based practices, we asked respondents how valuable they found support from their ORS coach. As shown in Figure 5 below, almost three-quarters of respondents rated ORS coach support with evidence-based practices as very or moderately valuable. Support with the core SI practice of designing targeted interventions was found to be particularly valuable. Respondents rated ORS coach support in creating and using LITs as "Not applicable" more than any other practice.

Figure 5. Value of ORS Coach Support with Evidence-Based Practices
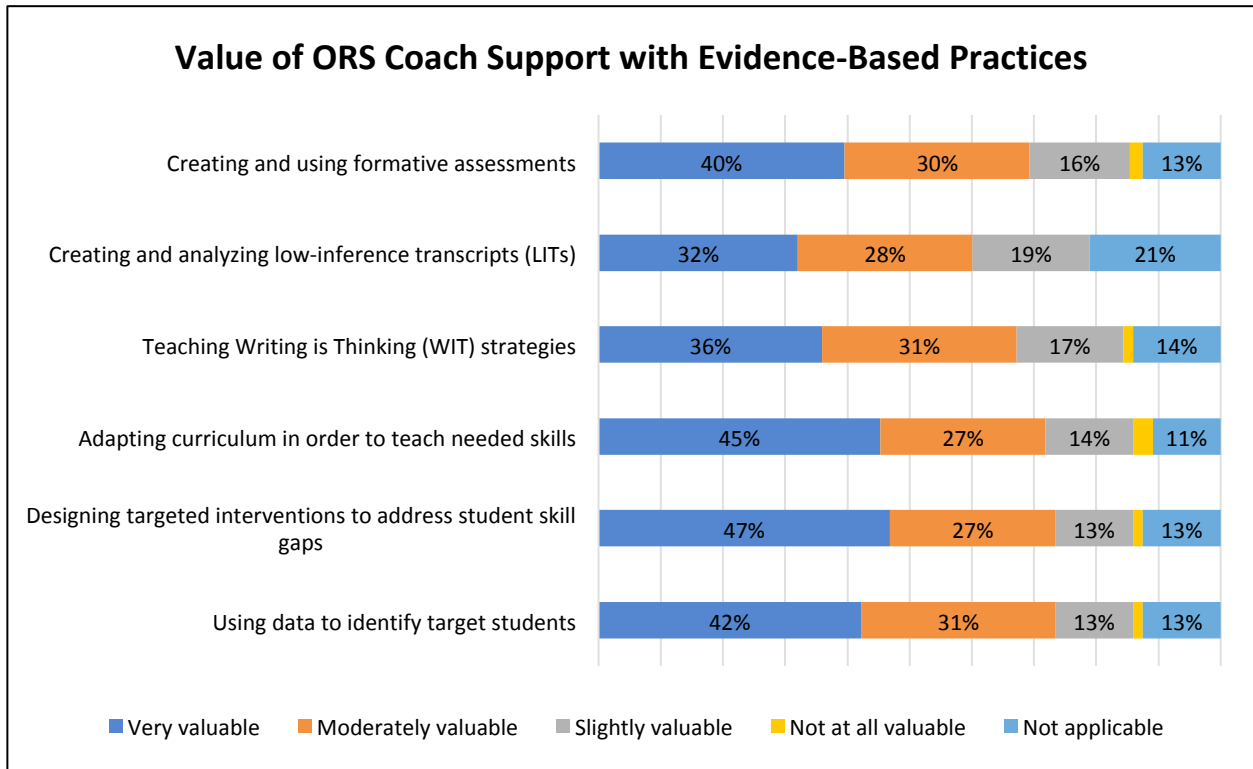
Value of ORS Coach Support with Evidence-Based Practices

Activity	Very valuable	Moderately valuable	Slightly valuable	Not at all valuable	Not applicable
Creating and using formative assessments	40%	30%	16%		13%
Creating and analyzing low-inference transcripts (LITs)	32%	28%	19%		21%
Teaching Writing is Thinking (WIT) strategies	36%	31%	17%		14%
Adapting curriculum in order to teach needed skills	45%	27%	14%		11%
Designing targeted interventions to address student skill gaps	47%	27%	13%		13%
Using data to identify target students	42%	31%	13%		13%

Note. A two-sample t-test for each indicator showed no statistically significant differences among inquiry and non-inquiry respondents.

Support with curricular content. We asked inquiry team members and facilitators how valuable support from their primary ORS coach was with curricular content areas as well. As shown in Figure 6, where they worked with ORS coaches on these activities, the majority of respondents rated support as very or moderately valuable.

Figure 6. Value of ORS Coach Support with Curricular Content
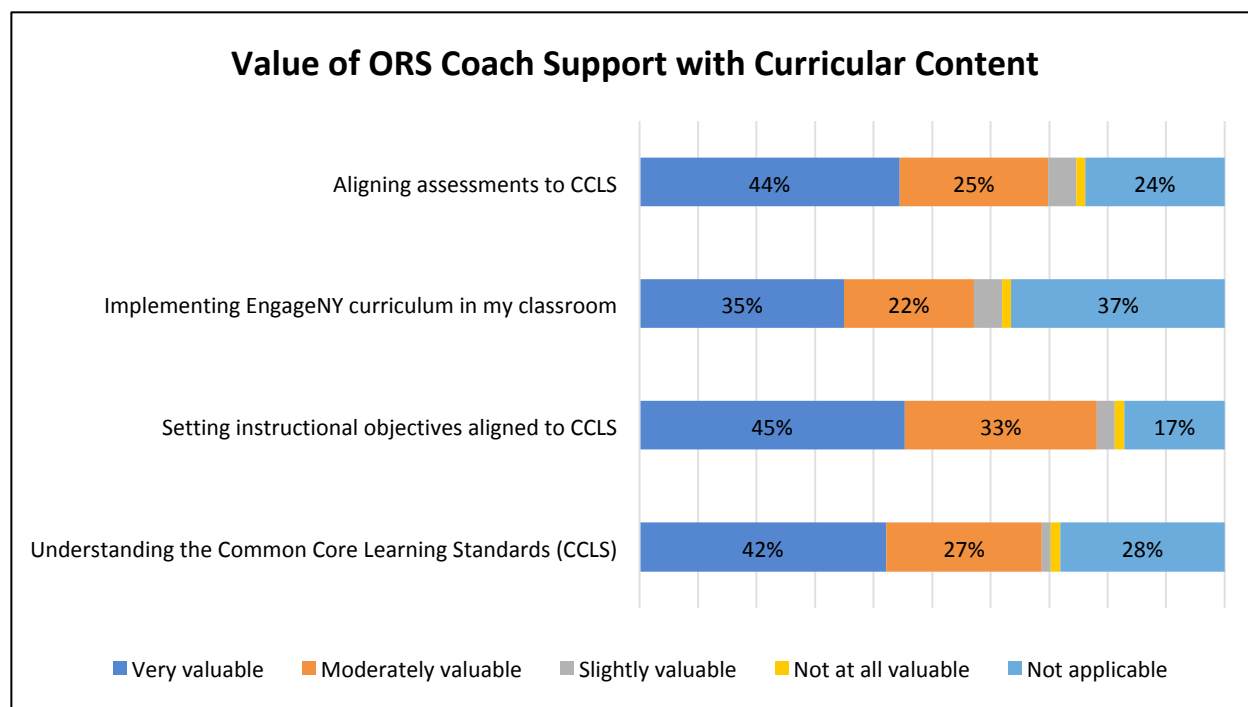
Value of ORS Coach Support with Curricular Content

	Very valuable	Moderately valuable	Slightly valuable	Not at all valuable	Not applicable
Aligning assessments to CCLS	44%	25%			24%
Implementing EngageNY curriculum in my classroom	35%	22%			37%
Setting instructional objectives aligned to CCLS	45%	33%			17%
Understanding the Common Core Learning Standards (CCLS)	42%	27%			28%

Note. A two-sample t-test for each indicator showed no statistically significant differences among inquiry and non-inquiry respondents.

Variation in ORS coach support. ORS coach support appears to have varied by school and SI implementation year. At Arlington Heights and Ravenswood, the coaches had begun to "scale back" in year 3; they provided more of an "informational" role in which they did check-in meetings with school administrations but did not participate in inquiry meetings. Gian Carlo Menotti was relatively new to SI, and three ORS coaches worked with the school but not solely on SI. Conversely, James Madison started SI prior to the other case study schools, they did not feel they needed the support ORS offered and were considered "light touch."

Some suggested that the ORS coaches provided more support for WIT strategies than inquiry at their school. According to an SI Facilitator at Arlington Heights, "Mostly what the Office of Renewal Schools coaches did was support some writing strategies... I felt that their contribution to my growth was more structural in the writing strategies, as opposed to the actual Inquiry process." In addition, many interview respondents found ORS coaches to be at a beginner level with SI and unable to provide real support in its implementation:

> I felt that the ORS coaches were being trained through the process. They
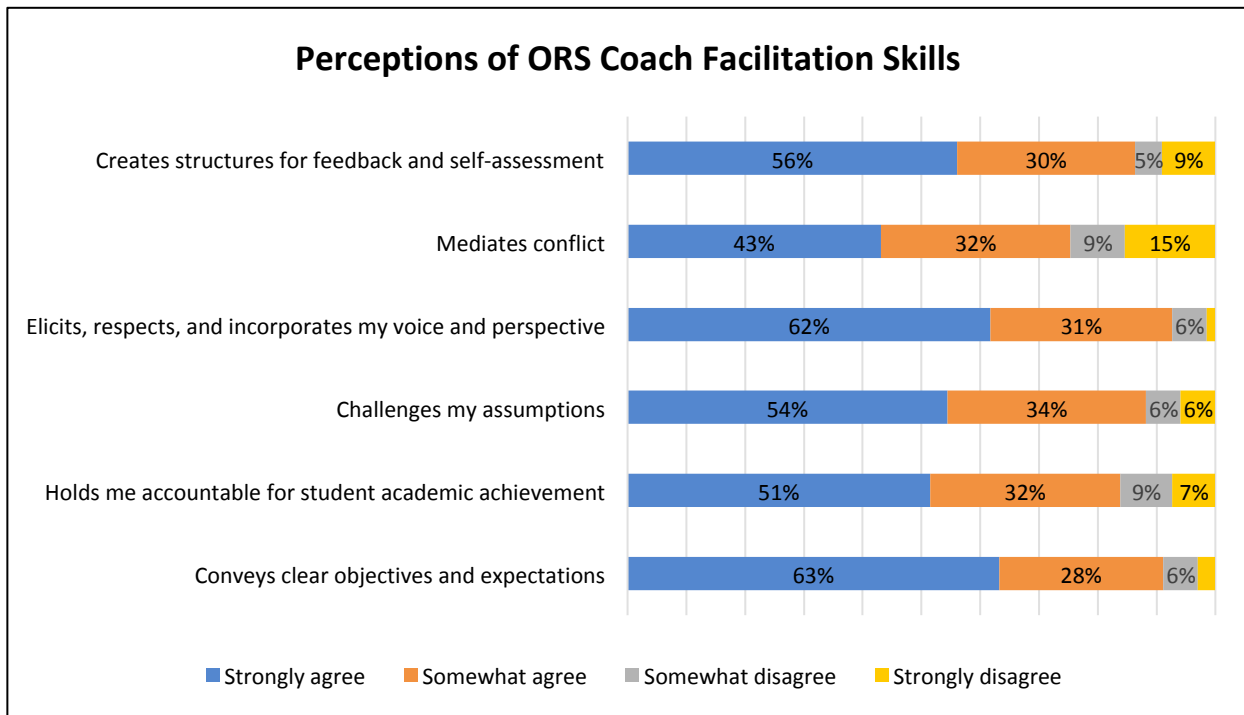> didn't seem very knowledgeable about Strategic Inquiry. I felt like they

were more a part of my team to be trained than support staff I could go to for next steps. (SI Facilitator, Ravenswood)

This may have been due to ORS coaches' reduced participation in training after year 1.

    ORS coach facilitation skills. SI train-the-trainer sessions aimed to cultivate team facilitation skills among ORS coaches as well as school-based facilitators. We assessed respondents' perceptions of ORS coaches' facilitation skills by asking to what extent they agreed or disagreed with statements about ORS coach support.

    Overall, respondents overwhelmingly agreed that ORS coaches supported them using the facilitation skills emphasized in SI training. As shown in Figure 7, relative to the other items, the largest proportion of respondents strongly or somewhat agreed (93% / 63 responses) that ORS coaches elicited, respected, and incorporated their voice and perspective. A similarly high proportion strongly or somewhat agreed that their coaches conveyed clear objectives and expectations (91% / 62 responses), challenged their assumptions (88% / 60 responses), created structures for feedback and self-assessment (86% / 57 responses), held them accountable for student academic achievement (83% / 57 responses).

Figure 7. Perceptions of ORS Coach Facilitation Skills

Perceptions of ORS Coach Facilitation Skills

Item	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
Creates structures for feedback and self-assessment	56%	30%	5%	9%
Mediates conflict	43%	32%	9%	15%
Elicits, respects, and incorporates my voice and perspective	62%	31%	6%	
Challenges my assumptions	54%	34%	6%	6%
Holds me accountable for student academic achievement	51%	32%	9%	7%
Conveys clear objectives and expectations	63%	28%	6%	

The interview data were mostly positive. For example, the principal at Gian Carlo Menotti rated all three District ORS coaches very highly in content knowledge, but stated that one lacked facilitation skills: "As far as [content] goes, she was really good, but there was just... something about the way she speaks to people... by the end of the year, none of my teachers would talk to her." It is unclear, though, if these coaches worked on SI or other content. At Arlington Heights, staff appreciated the targeted support that they received from their ORS coaches, particularly in the first year of implementation.

> I think that the relationship that was built with the coach and our teacher leads has helped to foster growth and build capacity within the building. They didn't come and try to give a cookie-cutter approach, but they worked with us to see what was the best way to implement the strategy and collaborated with us to do so. (SI Facilitator, Arlington Heights)

How effective were SI facilitators? Effective facilitators are essential to the success of SI implementation. In order to effectively lead teams, facilitators need extensive training that includes the opportunity to apply the inquiry process within a learning community of other facilitators (Panero & Talbert, 2013). We asked inquiry team members about their perceptions of their facilitators. These included questions about the value and type of support they received in different key areas.

Perceptions of SI team facilitator support. In order to understand more about perceptions of SI facilitator support, we asked inquiry team members how much they agreed or disagreed with multiple indicators of facilitator support. Overall, respondents strongly agreed on indicators of SI facilitators' skill in leading inquiry teams. A majority (66% / 120 responses) strongly agreed that their facilitator elicited, respected, and incorporated multiple voices and perspectives and that their facilitator created structures for feedback and self-assessment (64% / 115 responses) and continually reinforced the core ideas of SI (64% / 115 responses).

Facilitator Knowledge. An effective facilitator is highly knowledgeable in the core principles of SI and adept in their ability to apply the principles in a way that is context-specific but does not compromise the principles. A majority of inquiry team members agreed that their facilitators were very knowledgeable about SI principles. As shown in Figure 8, more than half at all schools reported that their facilitator was very knowledgeable in SI principles.

Figure 8. Facilitator Knowledge of SI Principles
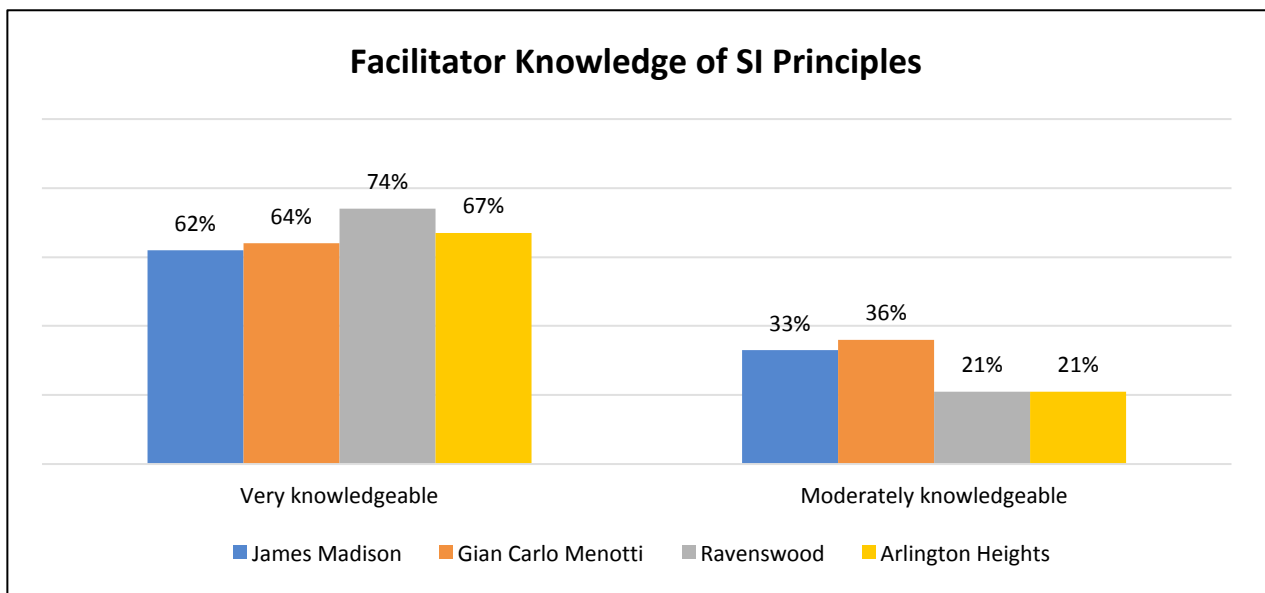
Knowledgeable facilitators can ensure that their team's activities align with the core principles of the SI model. More than half of respondents at all four case study schools strongly agreed that their facilitator supported them by continually reinforcing the core ideas of SI.

SI facilitators spoke fluently in interviews about the SI model and its principles. Many were chosen for the role because they had prior experience with SI through the Scaffolded Apprenticeship Model (SAM) or with other models of teacher inquiry. Many also held leadership positions such as Assistant Principal (AP) or Peer Collaborative Teacher (PCT) and had significant years of experience. They also were able to apply what they had learned in SI training to other problems of practice in their schools. A number of SI facilitators stated that they felt so confident with the tools and practices associated with the model that they were able to use them in a variety of different contexts and break problems down into "smaller components."

Was there a shift toward a culture of inquiry in SI schools?

The second question asked to what extent there was a shift toward a culture of inquiry in SI schools. Teachers engaged in collaborative inquiry ask an authentic

question that stems from their practice, leverage their existing data collection skills to gather information pertaining to their question, and then analyze that data in order to make instructional decisions (Cochran-Smith & Lytle, 1990; Rust, 2009). The facilitation and tasks within inquiry teams are intentionally designed to push practitioners to examine and challenge the status quo (Panero & Talbert, 2013).
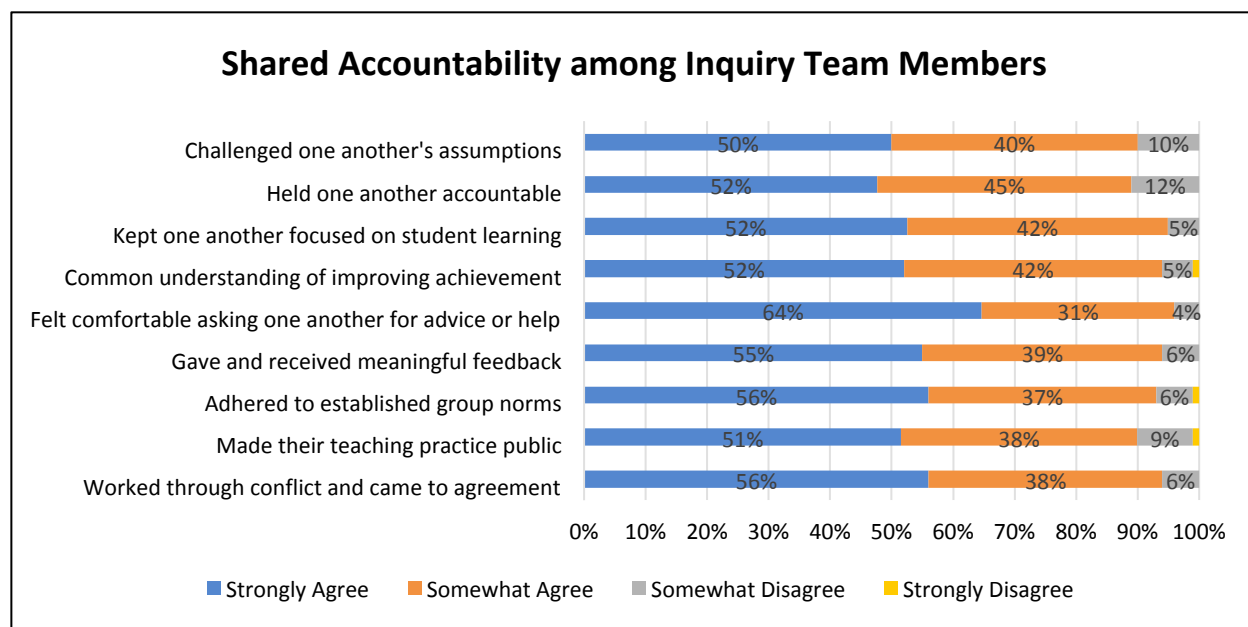
Analysis of the survey data suggested that there has been a shift toward a culture of inquiry in all of the case study schools. The interview data from the three high-touch schools corroborated this finding. The shift to a culture of inquiry differed in magnitude across schools. There are four sub-questions associated with this question:

- Was there an increase in shared accountability among inquiry team members?
- Did teachers engage in more evidence-based practices as a result of SI participation?
- Was there an increase in distributed leadership in SI schools?
- Was there an increase in collaboration in SI schools?

Was there an increase in shared accountability among inquiry team members? Through shared accountability for their target students, student achievement is not just the responsibility of individual teachers who interact with that student in class but of everyone at the school. Members of teams who have developed shared accountability make their learning public, challenge one another, and provide one another with help and constructive feedback (Panero & Talbert, 2013). Our staff survey asked inquiry participants how much they agreed or disagreed that relationships among members of their inquiry teams reflected shared accountability, using multiple indicators.

As shown in Figure 9, across the case study schools, survey respondents overwhelmingly agreed that the members of their inquiry team had a common understanding of how best to improve student academic achievement, worked through conflict and came to agreement, made their teaching practice public, adhered to established group norms, gave and received meaningful feedback, and felt comfortable asking one another for advice or help. There was slightly less agreement that members of their inquiry teams kept one another focused on student learning, held one another accountable for improving student outcomes, and challenged one another's assumptions.

Figure 9. Shared Accountability among Inquiry Team Members

Shared Accountability among Inquiry Team Members

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
Challenged one another's assumptions	50%	40%	10%	
Held one another accountable	52%	45%	12%	
Kept one another focused on student learning	52%	42%	5%	
Common understanding of improving achievement	52%	42%	5%	
Felt comfortable asking one another for advice or help	64%	31%	4%	
Gave and received meaningful feedback	55%	39%	6%	
Adhered to established group norms	56%	37%	6%	
Made their teaching practice public	51%	38%	9%	
Worked through conflict and came to agreement	56%	38%	6%	

Similar to the survey data, the interview data showed evidence of increased shared accountability across all four of the case study schools. In particular, respondents stressed that teachers were becoming more comfortable with making their learning public. At Gian Carlo Menotti, for example, "getting people to share" their teaching practice was "really hard" prior to the implementation of inquiry, but the principal said it has become easier. At Arlington Heights, an administrator reported that teachers have become accustomed to using intervisitation as "a nonjudgmental way to keep teachers focused on certain practices in the classroom."

An SI consultant who worked with all the case study schools observed that attendees of the train-the-trainer sessions developed an ethos of shared responsibility for student achievement, noticing that they began to say, "Your kid is my kid." This ethos extended to inquiry participants in the case study schools as well. At James Madison, for example, teachers realized they needed to collaborate and ask one another for help in order to improve student achievement. Administrators at Ravenswood attributed the shift in part to structuring inquiry teams so that multiple teachers worked with the target students in their classrooms.

Another notable change in shared accountability was higher expectations, even for students with special needs. At Ravenswood, for instance, an administrator noted that an asset-based approach to students had emerged from SI participation: "The shift

from a focus on what students can't do to what students can do has been a major shift."

Did teachers engage in more evidence-based practices as a result of SI participation? A culture shift includes an increase in teachers' use of evidence-based practices (Panero & Talbert, 2013). In order to track this shift, we asked teachers on inquiry teams how much they agreed that SI participation helped them improve their teaching practice. As shown in Figure 10, an overwhelming majority of teachers agreed that participation in inquiry teams helped improve a variety of aspects of their practice.

Figure 10. Effect of Inquiry Participation on Improvement of Evidence-based Practices
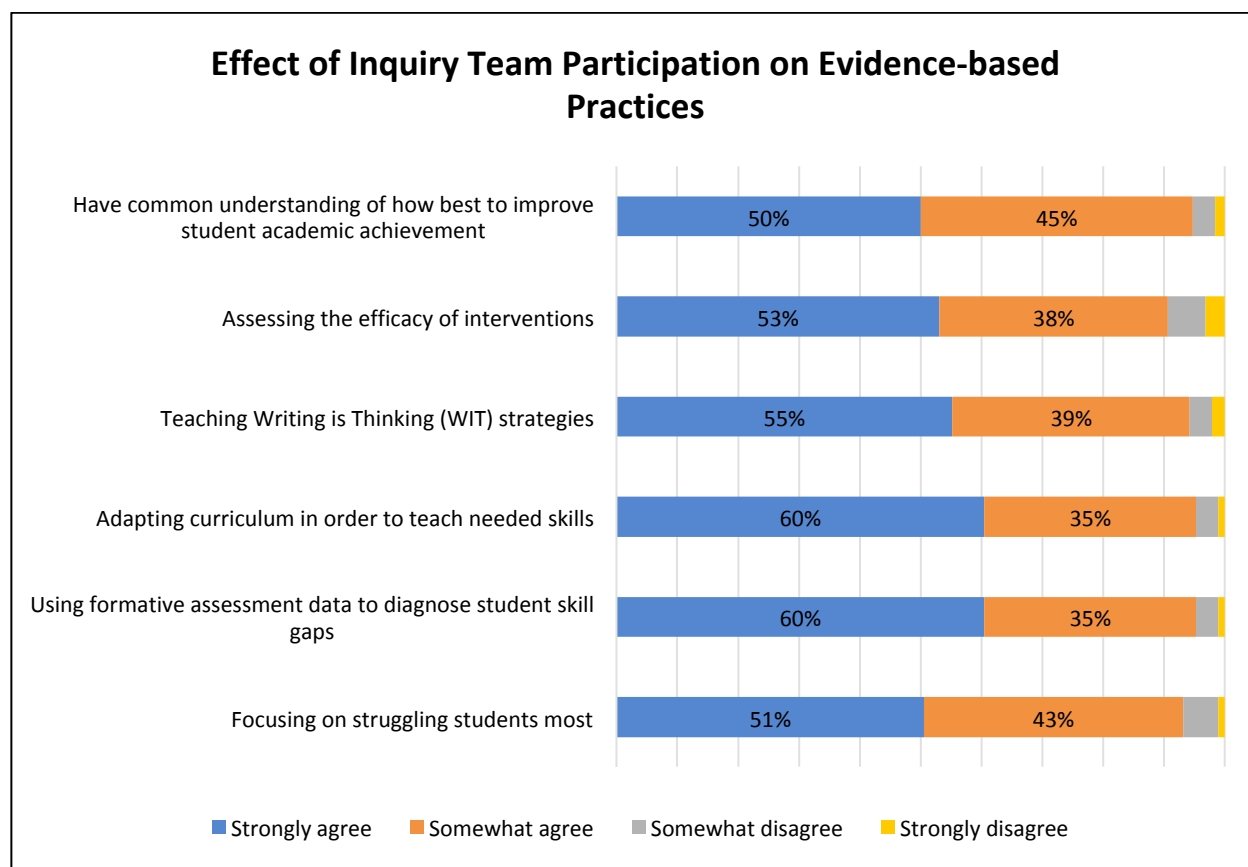
Consistent with the survey data, interview respondents reported a notable increase in teachers' use of evidence-based practices as a result of inquiry participation. An official from the Office of Renewal Schools who had worked with the three high-implementation schools said there had been a "big improvement in teacher teams," especially where they use SI tracking tools and protocols to guide their use of evidence. For example, at James Madison, staff used interim assessments to track student progress, and a facilitator reported learning to design more authentic and powerful

assessments that gave teachers better insight into student thinking. This informant noted variation across schools, though, praising Arlington Heights for designing rigorous and content-driven instructional tasks but noting that Ravenswood struggled in this area. At Jose Morales, after almost one academic year of inquiry participation, teachers were looking closely at evidence, but the principal had not yet seen them begin to design interventions in response their analysis of the evidence.

Many people we spoke with found that grounding conversations in student data enhanced transparency and kept the work focused and concrete. Similarly, a facilitator at Arlington Heights thought that SI helped teachers "focus on what they see instead of what they think, or any preconceived notions."

Was there an increase in distributed leadership in SI schools? Broad, distributed leadership is an important aspect of the school-wide culture of inquiry that SI promotes. Teachers take on leadership roles as they facilitate the inquiry process and share their learning with colleagues. School administrators should foster the development of distributed leadership by delegating authority to teacher teams and giving teachers a role in school-wide decision-making (Panero & Talbert, 2013).

Our staff survey asked all teachers to respond to two indicators of their principals' efforts to cultivate distributed leadership: 1) the extent to which the principal delegates leadership tasks to teachers and 2) the extent to which the principal gives teachers an active role in school-wide decision-making. Across schools, almost all teachers agreed that principals delegated leadership tasks to teachers (89% / 240 responses), but fewer agreed that principals involved teachers in decision-making (72% / 195 responses). There was statistically significant variation across schools for both indicators, suggesting that school administrators differed in the extent to which they released authority to teachers. Inquiry team members also overwhelmingly agreed that their principals gave them a role in leading professional learning (88% / 173 responses), and again, variation across schools was significant.

Like the survey, interview data showed that all principals distributed leadership among teachers. Even at Gian Carlo Menotti, which was early in implementation, the principal had already devolved considerable authority to inquiry teams and engaged in collaborative decision-making:
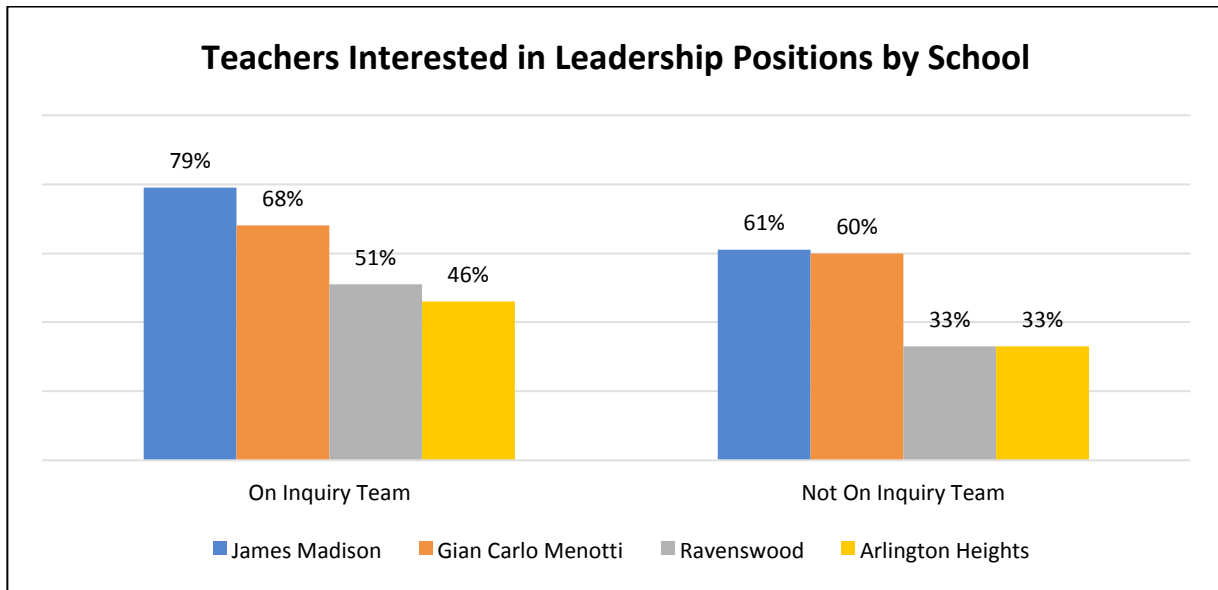
The Inquiry team leaders have complete autonomy... I trust them. We have a shared vision for the school. We came up with an instructional focus based on what we wanted to happen with WIT and where we saw the problems, and each one of them understands that we're working toward that same goal, that same instructional focus, same theory of action, which we wrote together. We're a very flat school. (Principal, Gian Carlo Menotti)

Interviews also revealed that increases in distributed leadership were directly connected to implementation of SI. At Ravenswood, for example, the principal intentionally sent two Peer Collaborative Teachers (PCTs) to train-the-trainer sessions and then set up weekly meetings, providing time and space for trained PCTs to turnkey their learning to the other PCTs in all of the school's SLCs. Therefore, the principal's distribution of new responsibilities to the PCTs was the direct result of SI implementation. James Madison implemented a similar strategy for spreading leadership to teachers using APs.

Cultivating an interest in formal leadership. A previous evaluation of SI found that in at least one school, teacher-leaders became assistant principals and cultivated new teacher-leaders to take their places (Panero & Talbert, 2013). We wondered whether the distribution of leadership among teachers resulting from SI implementation encouraged participants to seek formal leadership roles in schools.

Figure 11 below compares the leadership aspirations of inquiry team members and non-inquiry teachers, disaggregated by school. Inquiry participation was associated with a greater interest in pursuing leadership roles. More than half of inquiry team members at James Madison (79% / 85 responses), Jose Morales (68% / 25 responses) and Ravenswood (51% / 50 responses) and almost half at Arlington Heights (46% / 18 responses) reported that they were interested in pursuing a leadership position at their school in the future. These results suggest that inquiry team work is potentially cultivating a leadership pipeline.

Figure 11. Teachers Interested in Leadership Positions by School

Teachers Interested in Leadership Positions by School

On Inquiry Team: James Madison 79%, Gian Carlo Menotti 68%, Ravenswood 51%, Arlington Heights 46%

Not On Inquiry Team: James Madison 61%, Gian Carlo Menotti 60%, Ravenswood 33%, Arlington Heights 33%

Legend: James Madison, Gian Carlo Menotti, Ravenswood, Arlington Heights

Note. There were statistically significant associations between interest in any future leadership role and inquiry participation, $\chi^2(1, N=309)=4.88$, $p<0.05$, and between leadership interest and school, $\chi^2(3, N=308)=14.61$, $p<0.01$.

Was there an increase in collaboration in SI schools? Active teacher collaboration is another important dimension of a school-wide culture of inquiry (Panero & Talbert, 2013). In order to assess collaboration in our case study schools, we asked all teachers, "Would you say that collaboration among teachers at your school has increased or decreased since inquiry began at your school?" More than half (61% / 160 responses) of respondents reported that collaboration among teachers had increased at their school since inquiry began. As shown in Figure 12, the same was true across the individual schools.

Figure 12. Change in Teacher Collaboration
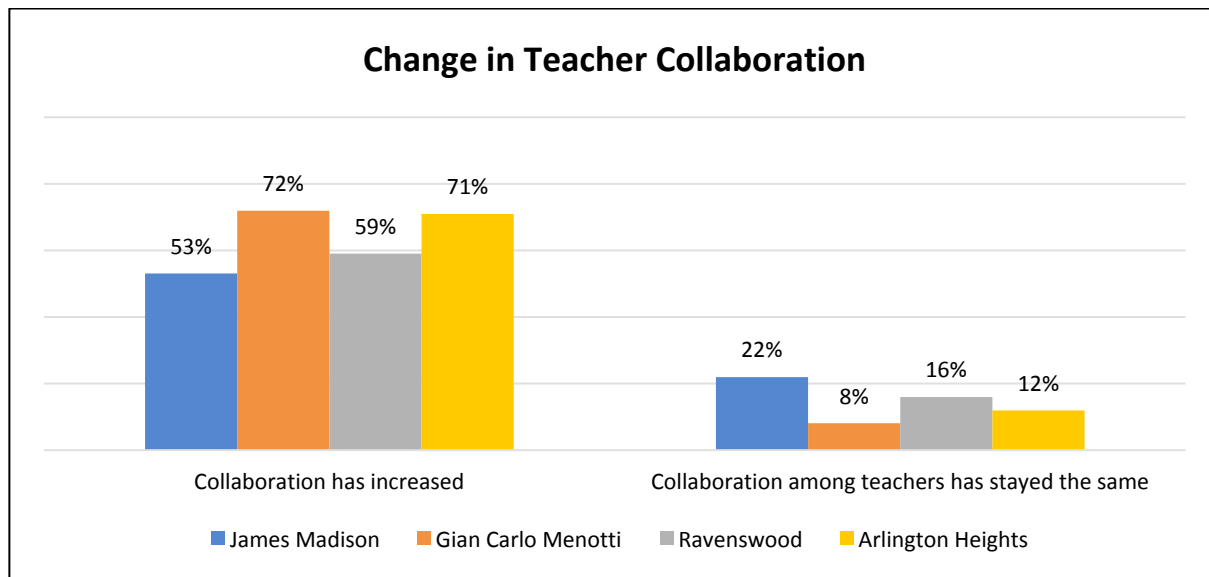
There was a similar pattern within inquiry teams. On the staff survey, nearly all inquiry participants agreed that their team members collaborated through every phase of the inquiry process (93% / 188 responses). In an interview, an administrator at Arlington Heights reported that having mixed teacher teams facilitated communication and cooperation among teachers of different grade levels and content areas.

Interview respondents valued collaboration and saw it as essential to the SI model. For example, an administrator at James Madison said, "It's all about collaboration. If the teachers don't collaborate, then you're really not doing inquiry." Participation in SI was also associated with an improvement in the quality of teachers' collaboration across all of the case study schools:

> [I'm] seeing teacher teams being much more systematic in their approach
> to meeting rather than having loose talk which was previously the case.
> They actually had a tool to work with. They were bringing student work.
> The facilitators were taking their role seriously and facilitating the
> meeting. (ORS Staff)

At Ravenswood, an administrator said that although teachers had always collaborated around the social-emotional needs of students, inquiry participation shifted their conversations to include a proactive approach to academic intervention as well. At Gian Carlo Menotti, the principal found that including guidance counselors on inquiry teams

also positively changed the nature of collaboration since they were able to share important non-academic information about target students with teachers.

Informal discussions of inquiry. Inquiry should become so much a part of the school culture that faculty think of "collaboration and shared responsibility to improve student achievement as 'the way we do things here'" (Panero & Talbert, 2013, p. 40). Therefore, the frequency of informal conversations about inquiry work outside of regular meeting times may be an indicator that SI had infused school culture. Across all four schools, more than half of respondents engaged in informal discussions of inquiry work with members of their inquiry team outside of regular meetings several times a week (54% / 104 responses).

The interview data supported this finding. Many inquiry teams utilized email to discuss their work outside of meetings, and team members found opportunities throughout the day to talk about inquiry. Here are a few illustrative examples:

> I get stopped in the hallways to talk about [inquiry], I get stopped in the elevator to talk about it, I have a teacher who comes up to me and will ask me to look at something and ask me if it's any good before they implement it… School culture-wise, it's definitely one of our main things… I feel like inquiry consumes me every second of my work day. (SI Facilitator, Arlington Heights)

> If you happen to be in the same room with other teachers, during lunch or whatever, we talk about the inquiry process or talk about the strategy and how to implement it, the finer points of it. It always comes up in conversation, outside the meetings and outside of the inquiry circles. (SI Facilitator, James Madison)

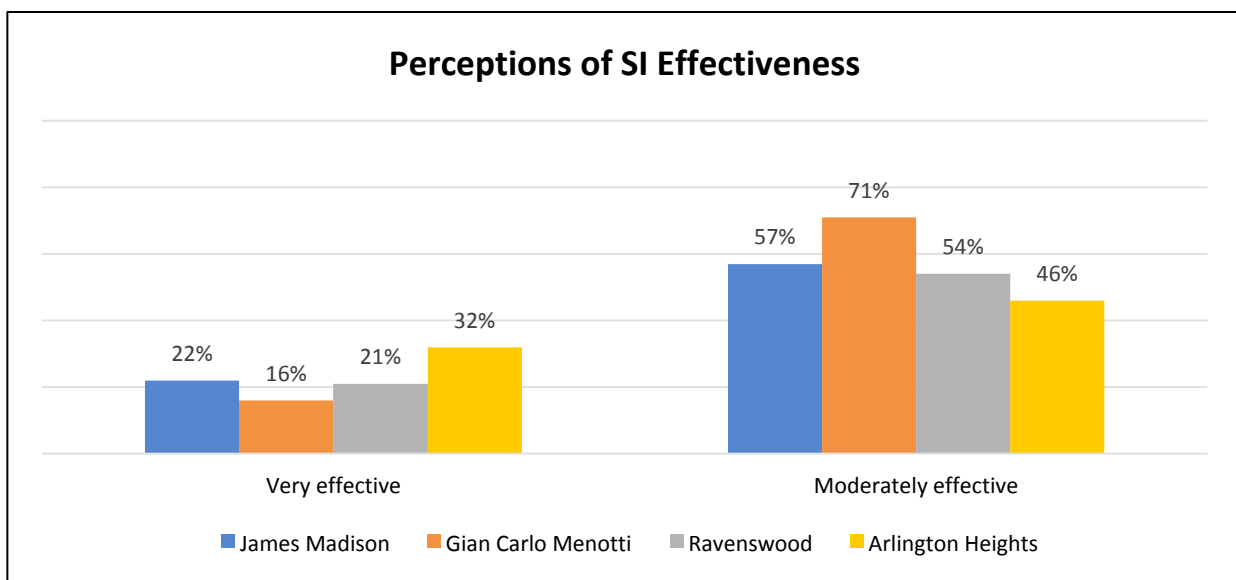## Was SI an effective school reform strategy for improving student learning at scale?

Next, we explored the extent to which SI is an effective school reform strategy. There are three sub-questions associated with this question:

- What difference did SI make for schools?
- What difference did SI make for teachers?
- What difference did SI make for students?

Overall, we found that SI was an effective school reform strategy in the case study schools. SI implementation was associated with significant, positive shifts in school culture. Teachers reported higher levels of self-efficacy and strengthened relationships. They also perceived enhanced engagement among their students, particularly ELLs and those with special needs. Citywide analysis of administrative data showed performance gains (in terms of credit accumulation and Regents passage) for students at SI schools. Attending a school participating in SI was associated with an increased probability of being on track to graduate and decreased probability of being off track for all students, including ELLs and those with special needs.

What difference did SI make for schools? In order to assess perceptions of the effectiveness of SI as a reform strategy, we asked all survey respondents the following question: "Overall, how effective is Strategic Inquiry (SI) as a strategy for school improvement?" About three-quarters of respondents believed that SI is very effective (23% / 43 respondents) or moderately effective (55% / 102 respondents) as a strategy for school improvement. As shown in Figure 13 below, buy-in is strong among all teachers and student support staff across the case study schools.

Figure 13. Perceptions of SI as an Effective School Improvement Strategy

Perceptions of SI Effectiveness

	Very effective	Moderately effective
James Madison	22%	57%
Gian Carlo Menotti	16%	71%
Ravenswood	21%	54%
Arlington Heights	32%	46%

Interview respondents also found SI to be highly effective as a school improvement strategy. For instance, an SI Facilitator at James Madison, the school with the most developed SI model, observed: "People believe in inquiry, people do it, people show progress because inquiry is a priority. Nobody would even question inquiry because it works, and it's worked for our school tremendously." The principal at Gian Carlo Menotti who had prior experience with SI, agreed saying, "Teacher teams to me are the most powerful change agent in a school. Period. End of story. Teacher teams, when given autonomy, time, space, training, are the ones who will change outcomes for students."

In addition to using our staff survey to assess culture shifts in the case study schools, we used a composite of culture measures from the NYC school survey to see if there was an association between the implementation of SI in the Renewal high schools (n=30) and positive culture changes. Using linear regression with robust standard errors, we compared the culture of SI schools (as measured in February 2016 after three semesters of implementation) with a weighted sample of 304 secondary and high schools citywide.[6] Control variables included school culture measures from two previous years, the 2012 high school progress report score, total enrollment, and membership in an affinity network.[7] Table 6 below summarizes regression coefficients:

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[6] We weighted our sample using inverse probability weights derived from a propensity score. The propensity score matched each SI school with three "nearest neighbors" or schools that were similar on characteristics that plausibly predicted selection in the Renewal Schools program (AY 2013 measures of graduation rate, percent of students with special needs, suspension rate, average class size, and per pupil expenditure). This quasi-experimental technique helps mitigate selection bias (Murnane & Willett, 2010).
[7] Schools in affinity networks receive additional instructional and operational support from non-profit affinity organizations.

Table 6. School Culture Shifts during SI Implementation

	School Culture February 2016
Strategic Inquiry School	2.960*
Previous Culture Measures	
School Culture February 2015	0.724***
School Culture February 2014	0.280***
High School Progress Report Score AY 2012	0.067***
Staff Composition[8]	
% Teachers with master's degree or higher	0.058***
% Teachers with fewer than 3 years of experience	0.039
% Teachers with no appropriate certification	-0.005
School Characteristics	
Affinity Network Member	2.278***
CTE school	1.25
R²	0.60

Notes. N=334 schools
* $p < .10$, ** $p < .05$, *** $p < .01$

After accounting for continuity in school culture over time (i.e., previous culture predicts current culture) and pre-existing school characteristics, we find that the implementation of SI is associated[9] with a statistically significant 3 point increase (p<0.05) in our composite measure of school culture. This measure is an average of scores in the areas of teacher collaboration, effective school leadership, trust, supportive environment, and rigorous instruction. This finding is consistent with our findings from the case study schools, in which staff reported stronger relationships among teachers, increased collaboration, increased use of evidence-based practices, and school leaders prioritization of SI.

What difference did SI make for teachers? Participation in Phase I of SI training should lead to teacher mindset shifts such as increased self-efficacy and belief in the power of collaboration, as well as strengthened relationships among teachers

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[8] Measures for AY 2013

[9] These results are suggestive of a causal effect, particularly when combined with the qualitative findings from the case study schools. Although we employed statistical techniques to help isolate the impact of SI, we cannot fully separate the effect of the Renewal Schools program (since these were the only schools to receive SI).

(Panero & Talbert, 2013). Self-efficacy is the belief that teachers can move student achievement and even the lowest achievers are never a lost cause.

An overwhelming majority of teacher survey respondents agreed that all students can learn (87% / 239 responses) and teachers can have a positive impact on the academic achievement of all struggling students (72% / 201 responses). More than half of teachers strongly agreed that their decisions directly affect students' academic achievement (65% / 182 responses). Research on an earlier iteration of SI found that teachers' beliefs in their ability to improve student achievement increased with each year of implementation (Talbert et al., 2012), suggesting that the high levels of self-efficacy in the case study schools may be attributable, at least in part, to SI.

There was some variation in the response to indicators of teacher self-efficacy by inquiry team participation and by school. Most teachers were in agreement that all students can learn and that teachers' decisions directly affected student academic achievement. There was less agreement about the ability to meet special education and ELL students' instructional needs. Interview data also showed improvement in teacher self-efficacy:

> You know, in the past, the average teacher would come in and say, well I taught it to the kids, they didn't learn it, they have to get a tutor and they have to do their homework and there's nothing I can do about it. And the fact is that there is a lot that we can do about it, but we needed people to become familiar with inquiry to see that there is a lot. (Principal, James Madison)

In addition, teachers reported an improvement in relationships among inquiry team members. These strengthened relationships contributed to positive changes in shared accountability and collaboration. As shown in Figure 14, almost half (48% / 132 responses) of respondents reported that relationships among teachers at their school were stronger since inquiry began while more than a quarter (32% / 87 responses) reported that they had stayed the same.

Figure 14. Change in Teacher Relationships

Change in Teacher Relationships
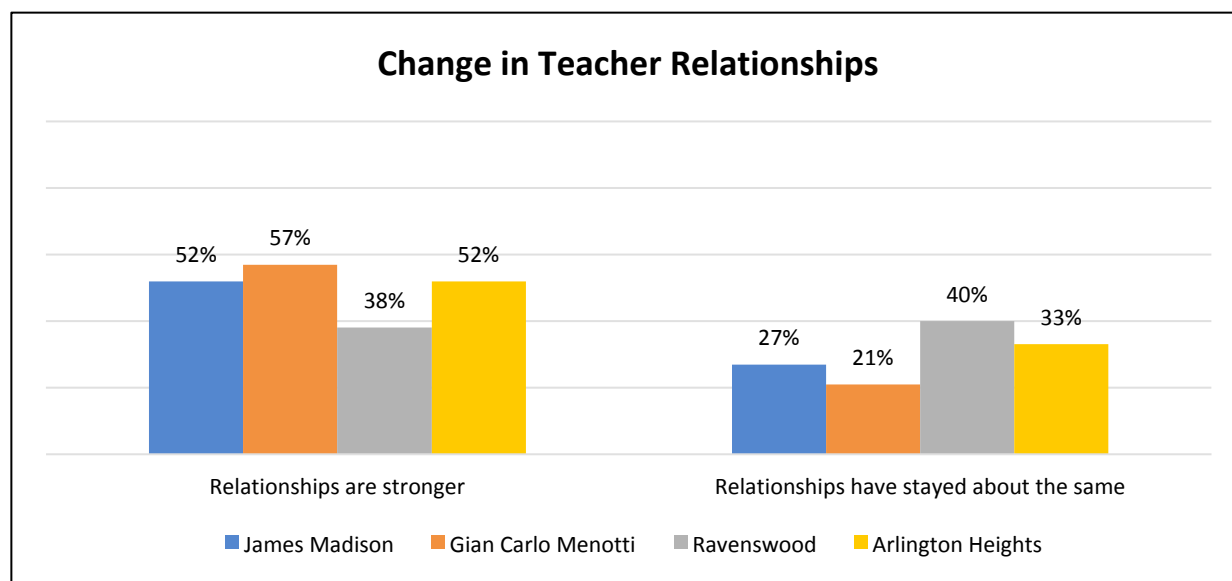
What difference did SI make for student outcomes? In our analysis of the data from the case study schools, we found evidence of improvement in student engagement, and, we found that implementation of SI was associated with an increased probability of being on track to graduate and decreased probability of being off track.

Student Engagement. While it is not an explicit goal of the SI model, several principals and facilitators noted improvement in student engagement in interviews. The staff survey asked teachers on inquiry teams, "How much improvement have you seen in the engagement of the students that your inquiry team is targeting?" Across the case study schools, almost half (46% / 87 responses) of inquiry team teachers reported a moderate amount and more than a quarter (31% / 58 responses) reported a little improvement in the engagement of the students targeted by inquiry teams.

Figure 15 below displays the survey results disaggregated by school. The modal response for all schools was a moderate amount. More than half of survey respondents at James Madison (60% / 34 responses) and almost half at Gian Carlo Menotti (41% / 10 responses) and Ravenswood (43% / 31 responses) reported a moderate amount of improvement in engagement in students targeted by inquiry. More than a quarter of inquiry team teachers at Arlington Heights (27% / 10 responses) and Gian Carlo Menotti (25% / 6 responses) reported a lot of improvement in engagement in students targeted by inquiry teams.

Figure 15. Perceptions of Improvement in Student Engagement by School

Perceptions of Improvement in Student Engagement by School

James Madison · Gian Carlo Menotti · Ravenswood · Arlington Heights
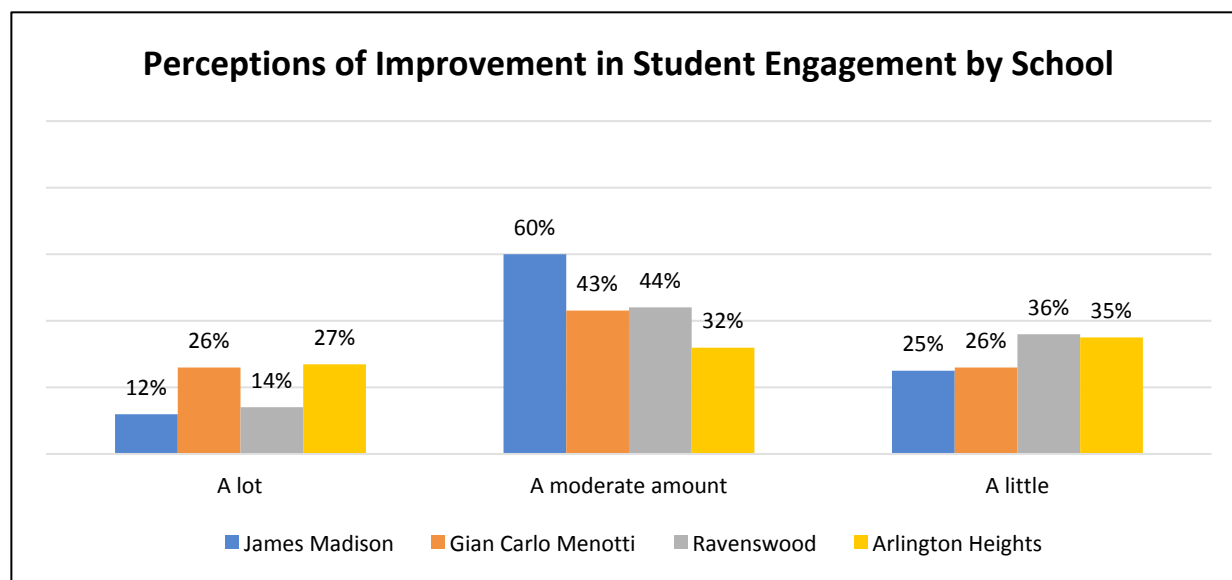
These positive responses about student engagement indicate that this may be an important outcome of the SI model, particularly given that school engagement and academic performance are mutually predictive (Chase, Hilliard, Geldhof, Warren, & Lerner, 2014). In the interview data, the marriage of WIT and SI was found to be particularly effective in improving student engagement. Students who had previously struggled with writing felt empowered as they learned to write and communicate more effectively.

> The focus on some of the granular components of language has given
> students who felt that they were not able to write extended pieces a place
> at the table to be able to participate, so, it really created the opportunity
> for students to grow and build their skills. (Principal, Ravenswood)

In addition to looking at perceptions of improvement in student engagement across schools, we looked for patterns across teacher specialization. As shown in Figure 16, the data suggested that special education teachers were divided in their perceptions of SI's impact on student engagement. More than a quarter (39% / 7 responses) indicated that there was a lot of improvement in student engagement, but almost half (44% / 9 responses) thought there was just a little improvement. ENL teachers were more positive about impact on student engagement, with more than a quarter (31% / 12 responses) reporting a lot of improvement and almost half (48% / 18 responses)

reporting moderate improvement. Special education and ENL teachers were more likely to report a lot of improvement in student engagement than general education teachers.

Figure 16. Perceptions of Improvement in Student Engagement by Population
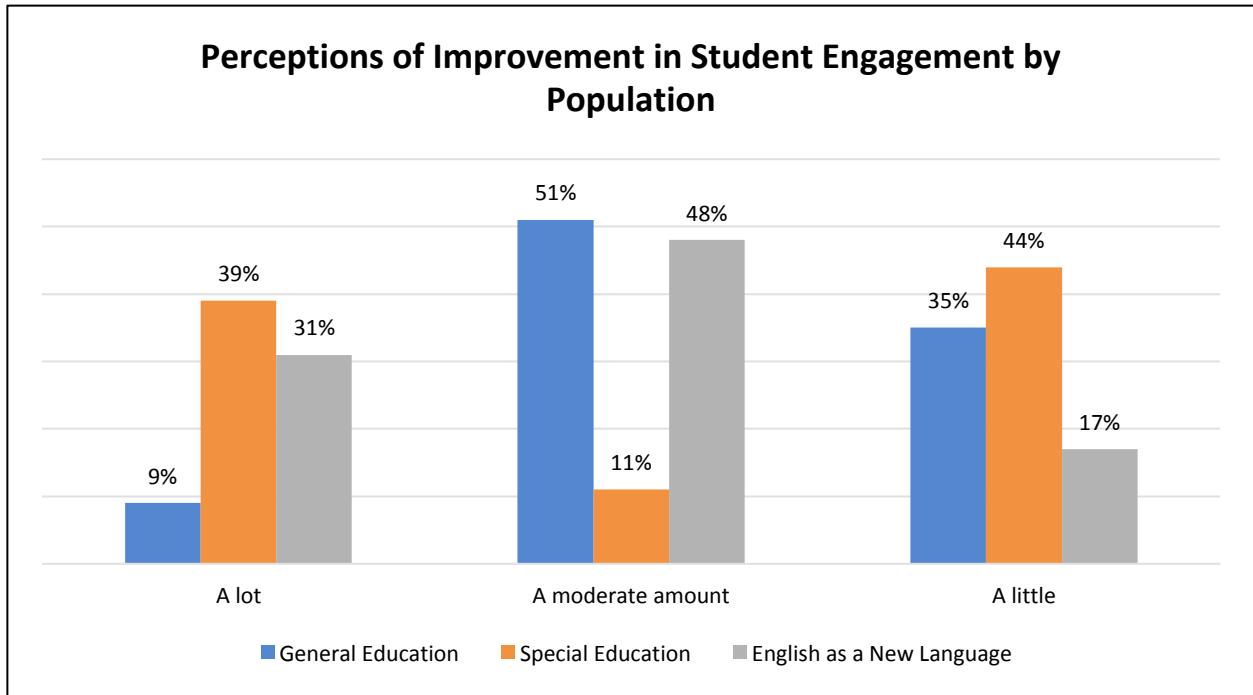
Note. Due to the small numbers of special education and ENL teachers in our sample, we used Fisher's exact test to assess this association between perceptions of improvement in student engagement and teacher specialization and found it was statistically significant ($p<0.001$, FET).

SI and WITsi were also reported in interviews to be effective for special education and ELL students. SI helped teachers identify their skill gaps and target interventions to their unique needs:

> We have students that are persistently outside the sphere of success. We use the curriculum to expose special education students to higher-level knowledge and questions, and we use SI in order to identify exactly where the students are struggling, provide strategies, and assess and reassess the process. (SI Facilitator, James Madison)

> I think that the [WITsi] skills lent themselves really well to helping [the ENL] population . . . we were always about the rigor and everyone thought rigor was giving them high school quality work, but in reality, rigor for some of the students was writing a sentence. (SI Facilitator, Arlington Heights)

Student Achievement. Using multilevel logistic regression models, we examined the association between SI implementation and the likelihood that students would be on track or off track to graduate, controlling for student characteristics. We again used inverse probability weights derived from propensity scores to mitigate selection issues, comparing SI schools to similar schools across the city. Measures of school-level characteristics from AY 2013 (the year prior to SI implementation) helped control for potential variation in SI schools caused by their entry into the Renewal School program. Table 7 below summarizes regression coefficients from our analyses:

Table 7. Results from Multilevel Logistic Regression

	On Track to Graduate	**Off Track to Graduate**
Strategic Inquiry School	0.130***	-0.10***
Student level variables		
8th Grade Test Scores	0.117***	-0.167***.
ELL	-0.183***	0.087***
Eligibility for Free and Reduced Price Lunch	-0.002	-0.006
Special Needs	-0.144***	0.107***
Male	-0.018***	0.046***
Black	-0.051***	0.038***
Asian	0.032**	-0.038***
Hispanic	-0.051***	0.037***
School-level variables (2013 values)		
% Below Basic on 8th Grade NYS Math Exam	0.001	0.002*
Attendance Rate	0.011***	-0.009**
Culture Composite	0.002	0.005*
% Black	-0.002**	-0.000
% Hispanic	-0.002	0.000
% ELL	-0.002*	0.001
% Eligible for Free and Reduced Price Lunch	0.005***	-0.004*
% Teachers with fewer than 3 years of experience	0.001	-0.002*
Teacher Turnover Rate	0.001	-0.000
School-level variance (SE)	1.635 (.263)	2.563 (.594)
Wald χ^2(df)	1462.84 (18)	3310.26

Notes. Hierarchical model. Level 1 N=38,345 students, Level 2 N=355 schools.

* $p < .05$, ** $p < .01$, *** $p < .001$

Attending an SI school was associated with a 13 percentage point increase (p<0.001) in the likelihood that a student would be on track to graduate compared to students in non-SI schools, after adjusting for student and school characteristics. In other words, students at SI schools would be almost two and a half times as likely to be on track (OR = 2.42), all else equal.

SI participation also appeared to improve performance of the most struggling students. Attending an SI school was associated with a 10 percentage point decrease in the probability that a student would be off track to graduate compared to students in non-SI schools, after adjusting for student and school characteristics. In other words, students at SI schools would be less than half as likely to be off track (OR = 0.41), all else equal.

Although we employed statistical techniques to help isolate the impact of SI, we cannot fully separate the effect of the Renewal Schools program (since these were the only schools to receive SI), but these results are suggestive of a causal effect, particularly when combined with the qualitative findings from the case study schools. Comparison of SI schools within Renewal[10] also supports the possibility of a causal effect. Using cluster analysis[11], we identified high and low implementation schools. A two sample t-test showed a statistically significant difference in the percentage of students who were off track for graduation in high implementation schools (M=0.30, SD=0.01) versus low implementation schools (M=0.036, SD=0.02); t(2600)=2.638, p=0.008. This suggests that students in high implementation Renewal High Schools were less likely to be off track to graduate than their counterparts in low implementation Renewal High Schools.

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[10] Within-Renewal linear regression analysis of both on track and off track status yielded favorable and significant results as well, but estimates were not robust to model specification, likely because of small sample size. Therefore, we have chosen not to report those coefficients.
[11] Clusters formed using the following variables: total SI training sessions attended, total months of SI training and number of staff trained in SI.

Conclusions

SI implementation was strong in the four sample schools, which is remarkable since the schools were in Year 3 of implementation and the time frame for full implementation is 5 years. Teacher participation on inquiry teams was high. Principal support for SI was important. Inquiry team members considered their SI facilitators to be knowledgeable about SI key principles, and interview respondents were very positive about the support they received from SI consultants.

There was strong evidence of a shift toward a culture of inquiry across the case study schools. Staff reported an increase in shared accountability, distributed leadership, and evidence-based practices, as well as an increase in collaboration. Schools with SI also showed positive increases in NYCDOE measures of school culture. Inquiry participation was associated with a greater interest in pursuing leadership roles in the future. In addition, inquiry team teachers attributed SI participation to improvements in their practice. Buy-in to the model was strong, and teachers and student support staff found SI to be an effective school improvement strategy. Levels of teacher self-efficacy were high. Teachers reported strengthened relationships since inquiry began. SI was also associated with improvements in student engagement, particularly for special education and ELL students.

There were improvements in student achievement as well. After controlling for student and school characteristics, students in schools with SI were almost two and half times as likely to be on track to graduate and less than half as likely to be off track to graduate compared to students in non-SI schools. Notably, the train-the-trainer model of SI was associated with similar outcomes to prior higher touch and more costly iterations of the program (Talbert et al., 2012) suggesting that it was just as effective in shifting school culture and improving student achievement at scale in struggling schools.

References

Anderson, G.L. & Herr, K. (1999). The new paradigm wars: Is there room for rigorous practitioner knowledge in schools and universities? *Educational Researcher, 28*(5), 12-21.

Chase, P. A., Hilliard, L. J., Geldhof, G. J., Warren, D. J. A., & Lerner, R. M. (2014). Academic achievement in the high school years: The changing role of school engagement. *Journal of Youth and Adolescence, 43*, 884-896.

Cochran-Smith, M. & Lytle, S.L. (1990). Research on teaching and teacher research: The issues that divide. *Educational Researcher, 19*(2), 2-11. DOI: 10.3102/0013189X019002002

Cuban, L. (1984). *How teachers taught: Constancy and change in American classrooms, 1890-1980*. New York, NY: Teachers College Press.

Hiebert, J., Gallimore, R., and Stigler, J.W. (2002). A knowledge base for the teaching profession: What would it look like and how can we get one? *Educational Researcher, 31*(3), 3-15.

Merriam, S. (1998). *Qualitative Research and Case Study Applications in Education*. San Francisco, CA: Jossey-Bass Publishers.

Murnane, R.J. & Willett, J.B. (2011). *Methods matter: Improving causal inference in educational and social science research*. New York, NY: Oxford University Press.

NYCDOE. (n.d.-a). Quality Review Report, 2016-2017, James Madison High School. Retrieved from http://schools.nyc.gov/OA/SchoolReports/2016-17...

NYCDOE. (n.d.-b). Quality Review Report, 2016-2017, Gian Carlo Menotti Secondary School.
Retrieved from http://schools.nyc.gov/OA/SchoolReports/2016-17...

NYCDOE. (n.d.-c). Quality Review Report, 2016-2017, Ravenswood High School. Retrieved from http://schools.nyc.gov/OA/SchoolReports/2016-17....

NYCDOE. (n.d.-d). Quality Review Report, 2016-2017, Arlington Heights High School. Retrieved from http://schools.nyc.gov/OA/SchoolReports/2016-17...

Panero, N.S. & Talbert, J.E. (2013). *Strategic Inquiry: Starting small for big results in education*. Cambridge, MA: Harvard Education Press.

Panero, N.S. (2016). Progressive mastery through deliberate practice: A promising approach for improving writing. *Improving Schools*, 1-17.

Rust, F.O. (2009, August). Teacher research and the problem of practice. *Teachers College Record, 111*(8), 1882-1893.

Talbert, J.E. with Cor, M.K., Chen, P., Kless, L.M., & McLaughlin, M. (2012, January). Inquiry-based school reform: Lessons from SAM in NYC. Palo Alto, CA: Center for Research on the Context of Teaching, Stanford University.

Watson, C. (2018). *Strategic Inquiry model of school improvement: Perspectives on implementation from the lens of school-based facilitators* (Unpublished doctoral dissertation). University of Pennsylvania, Philadelphia, PA.

Zeichner, K. (2003). Teacher research as professional development for P-12 educations in the USA. *Educational Action Research, 11*(2), 301-325.