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Evaluation of the Networks for School Improvement Initiative

Networks, Coaching, and the Implementation of Continuous Improvement in Schools

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Abstract

The use of networked continuous improvement (CI) in education has grown substantially over the past 15 years, but there is limited rigorous evidence on its effectiveness. The Gates Foundation sought to scale up networked CI through its Networks for School Improvement (NSI) initiative. From 2018 to 2025, the Gates Foundation awarded more than $300 million in 5-year grants to intermediary organizations that formed 34 NSIs across the country.

The NSI initiative focused on increasing the proportion of Black students, Latino students, and students experiencing poverty who are on track for high school graduation and college enrollment. Each NSI consists of an intermediary organization leading a network of about 20 schools and supporting teams of school staff in engaging in continuous improvement.

Intermediaries provided school CI teams with supports, including coaching. In addition, they provided teams opportunities to collaborate across the network. The connections and engagement among schools (i.e., network cohesion) were expected to support school teams in carrying out the CI work, including setting aims and conducting disciplined inquiry cycles to test change ideas.

This report focuses on the association between coaching (a network support) and network cohesion with school-level implementation of CI. The analyses are exploratory, taking advantage of the opportunity to link data on coaching and cohesion from RAND with data on CI implementation in schools from AIR.

Coaching was widely used to support school CI team understanding and use of CI (see Bush-Mecenas et al., 2026). Yet, we see a negative but modest association between the frequency of coaching and schools' CI implementation. Although the results were initially unexpected, interviews with network hub staff demonstrated that more coaching was often provided to school CI teams with greater needs.

Network cohesion—as measured by the density of network connections among participating schools and organizations—was related to schools' implementation of CI practices. In particular, it was associated with fewer but more complete inquiry cycles and more adoption of change ideas, but fewer elements of network aim statements implemented. Network hubs were intentional in establishing cross-school connections within their networks, which created opportunities for data sharing and progress monitoring, peer accountability, and comparing successful change ideas. The results suggest that building dense network connections among schools may be an important avenue to facilitate school improvement.

Acknowledgments

This study was sponsored by the Gates Foundation, which created the Networks for School Improvement initiative to support school networks working to improve outcomes for all students, especially those furthest from opportunity, including students who are Black, Latino, or experiencing poverty. For more information, visit https://usprogram.gatesfoundation.org/.

Introduction

The use of networked continuous improvement (CI) in education has grown substantially over the past 15 years. After the Carnegie Foundation's efforts to define the approach and establish several use cases in education, the Gates Foundation sought to scale up networked CI through its Networks for School Improvement (NSI) initiative. From 2018 to 2025, the Gates Foundation awarded more than $300 million in 5-year grants to intermediary organizations that formed 34 NSIs across the country. The Gates Foundation sponsored an evaluation of the NSI initiative to provide much-needed evidence on the implementation and impact of networked CI. This rapid scale-up of networked CI provides a unique opportunity to understand how intermediaries develop and implement school networks, how networks of schools implement CI to achieve a common goal related to improving student outcomes, and the impact of these efforts.

The NSI initiative provides the opportunity to study an exceptionally large and diverse group of school improvement networks. Although there are studies of specific networks (Dee, 2024; Feygin et al., 2020), the summative evaluation of the NSI initiative is among the first studies to examine a large group of varied school improvement networks (also see the 2024 interim summative evaluation reports and the 2025 issue of the *Peabody Education Journal* for complementary research on NSI).

The NSI Initiative

The NSI initiative focused on increasing the proportion of Black students, Latino students, and students experiencing poverty who are on track for high school graduation and college enrollment. Each NSI consists of an intermediary organization leading a network of about 20 schools (ranging from fewer than 10 to more than 50 schools) and supporting teams of school staff in engaging in continuous improvement. The initiative launched three cohorts of grants in 2018, 2019, and 2020. Each NSI focused on improving student outcomes in one or more of the following areas:

- the proportion of students who were on track for high school graduation and college enrollment in 8th grade (referred to throughout as 8th-grade on-track NSI), 9th grade (9th-grade on-track NSI), or 11th- and 12th-grade (college-ready on-track NSI)
- the proportion of 12th-grade students who completed the steps needed to enroll in college (well-matched postsecondary enrollment NSI)

The NSIs focused their CI activities on one of three "entry points" identified by the foundation: instructional (working to improve the quality of instruction within classrooms), early warning and response (working to create more supportive, connected school environments), and well-matched postsecondary enrollment (working to support postsecondary application, enrollment, and persistence). Entry points characterize how each NSI approached improving the particular student outcome the NSI was focused on. For example, an NSI that aims to improve college-ready on-track outcomes might use an instructional entry point (by testing various shifts in pedagogic practice) or early warning and response entry point (by testing various approaches to building adult–student relationships) to achieve that outcome.

The NSI Evaluation

The foundation sponsored an evaluation to build evidence on the NSI approach. The evaluation addresses three main research questions, each led by a different evaluation partner:

1. How do intermediaries design and implement their NSI? (RAND)
2. To what extent do participating schools implement CI activities? (American Institutes for Research® [AIR®])
3. What is the impact of the NSI on student outcomes? What aspects of the NSI approach are related to impacts on students? (Mathematica)

For reports on these three research questions, see Bush-Mecenas et al. (2026); Garet et al. (2026); and Johnson et al. (2026). For a brief synthesizing the three reports, see Herman et al. (2026). This report complements and extends this work by drawing together data gathered to address research questions 1 and 2.

The NSI Initiative's Conceptual Framework

The NSI initiative was outlined with a broad structure while providing intermediaries with flexibility to adapt their approach. The evaluation partners developed a conceptual framework to describe the key features of the NSI approach and guide the evaluation (Exhibit 1).

Intermediaries established a CI team in each participating school—a team of educators and administrators—and brought them together in networks. As illustrated in Exhibit 1, the intermediaries provided school CI teams with supports, including coaching, other professional learning, resources, and tools. In addition, they provided teams opportunities to collaborate across the network. The connections and engagement among schools (i.e., network cohesion) were expected to support school teams in carrying out the CI work.

School CI teams engaged in structured CI processes—such as root cause analysis and testing change ideas (specific actions that are intended to improve processes or outcomes) through inquiry cycles—to improve educator practices and student supports (for more on network hubs, see LeMahieu et al., 2017; Peurach et al., 2020). The conceptual framework in Exhibit 1 lists the six core features of CI that the foundation expected schools to implement (panel C). Over time, the approach aimed to build capacity, strengthen school culture, improve student outcomes, and spread effective strategies within and beyond participating schools.

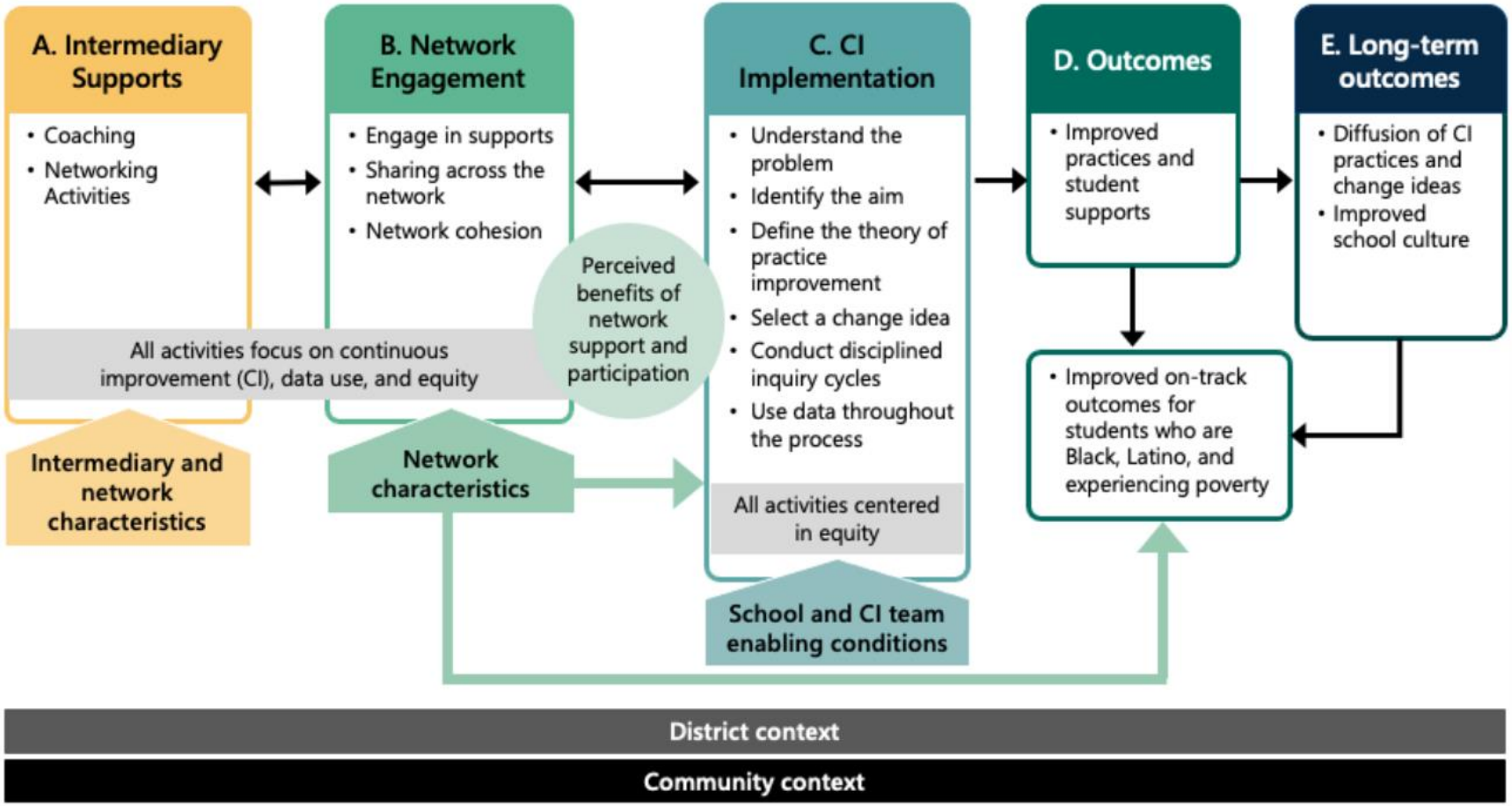
This Report

This report focuses on the association between network supports and network cohesion (Exhibit 1, panels A and B) with school-level CI implementation of CI (Exhibit 1, panel C). More specifically, this report is motivated by two research questions:

- How do measures of network coaching (a key network support) relate to schools' implementation of CI practices?
- How do measures of network cohesion relate to schools' implementation of CI practices?

The analyses discussed in this report are exploratory, taking advantage of the opportunity to link data on network supports and cohesion from RAND with data on CI implementation in schools from AIR. Although we cannot draw causal conclusions about the effects of network activities and implementation of CI, the results provide promising evidence for organizations interested in networked improvement.

Exhibit 1. NSI Conceptual Framework



BOX 1. STUDY DESIGN

What is the focus of this report?

The report examines the relationship between aspects of coaching, network cohesion, and the implementation of CI in the NSI schools.

What data were collected?

Team Connections Survey. RAND invited CI team leads in schools participating in NSI networks to complete the survey, which focused on connections between members of a network.

CI Artifacts. AIR asked representatives from each NSI to share relevant artifacts (e.g., documents) generated by their networks' CI teams, including (but not limited to) root cause analyses, meeting notes and agendas, and descriptions of the change ideas they tested.

Interviews. RAND conducted annual interviews with network hub leaders of 25 NSIs, focusing on the supports that they provided to develop network connections among school CI teams and to build the capacity of educators to engage in equity-focused CI.

Which schools and time points were included in our sample?

The study sample includes schools associated with 25 NSI networks. RAND collected data from schools working with the 25 networks in Grant Years 2, 3, and 5, while AIR collected data from schools working with the 25 networks in either Grant Year 1 or 2, 3, and 5. We merged the RAND and AIR data sets, including all schools and years for which we both had data. The final dataset with at least one variable from RAND and one variable from AIR includes 524 schools in 25 NSI networks, with an average of 2.05 time points per school, or 1,109 school-by-year observations.

How were data analyzed and presented?

To examine network and coaching factors related to CI implementation, we estimated multilevel linear regression models, with years nested in schools nested within networks. The sample, variable definitions, and model specifications are described in the appendix. We analyzed qualitative data using iterative coding and thematic analysis.

Limitations

Though the measures for the analyses presented in this report were intentionally selected, we do not explore the relationship across all possible measures generated for the evaluation of the NSI initiative; and some aspects of the initiative could not be systematically measured for exploration. Thus, our work is not comprehensive in identifying all connections across meaningful practices at

the network and school levels. Additional limitations on data collection and analyses are presented in Garet et al. (2026) and Wrabel et al. (2026).

Coaching and Network Cohesion

Each intermediary that received an NSI grant established a network hub—a leadership structure comprised of intermediary staff including a leader, coaches, and specialists in data and research, CI, and professional learning. Network hubs used two primary approaches to support schools in their networks: coaching and creating opportunities for schools to learn from each other (Bush-Mecenas et al., 2026). Coaches often support CI work in schools by modeling aspects of CI, providing feedback and technical assistance, and supporting data analysis. Network connections are intended to support CI work by facilitating sharing across schools as well as by motivating schools to engage in the work. Thus, we examine the extent to which these supports and activities are related to school-level implementation of CI. We had two measures of coaching and four measures of network cohesion available for our analyses:

Coaching

- **Breadth of coaching supports** measures the total number of coaching supports for which a school "agreed" or "strongly agreed" that their network coach assisted with (e.g., helps identify solutions to challenges; analyzes data to inform CI) in a given year. Values can range from 0 to 7.
- **Frequency of coaching** measures how many times a school typically met with their network coach in a month. The measure can take the following values: 0 = no meetings, 0.5 = less than once per month, 1 = once per month, 2.5 = two to three times per month, and 4.5 = four or more times per month.

Network cohesion

- **Network density** measures the reported connections among schools and between schools and the network hub, as a proportion of the total possible connections in the network. Values can range from 0 to 1.
- **Network hub centrality** measures the relative importance of the network hub within a network (i.e., how strongly the network hub is connected to schools that are themselves highly connected to other schools in the network). Values can range from 0 to 1.
- **Tie strength: Network hub frequency** measures the average annual frequency of engagement of school-to-network hub connections. The measure is only available if the school reported a connection to the network hub. The measure can take the following

values: 1.5 = 1–2 times per year, 3.25 = quarterly, 5 = bimonthly, 10 = monthly, and 15 = more than once a month.

- **Tie strength: School frequency** measures the average annual frequency of engagement in school-to-school connections (using the same scale as previous measure). The measure represents the average of all school-to-school connections rather than the total across all school-to-school connections.

More details about these measures and the survey through which they were collected are provided in the appendix.

For our two coaching measures, the average school reports a breadth of coaching supports that covered 6.14 topics of the 7 measured and an average coaching frequency of approximately 1.68 times per month.

Network density and network hub centrality are network-level measures. The average network reports a density of 0.12; said another way, the average network reported connections among 12% of all possible network connections. The average network hub centrality is 0.46, which is on the higher end of the observed range, suggesting network hubs were relatively well connected to influential schools in their networks. For our school-level measures of network cohesion, the average school indicates that they engaged with the network hub (i.e., tie strength: network hub frequency) monthly (10.24) and with other schools in the network (i.e., tie strength: school frequency) just shy of bimonthly (4.45). Collectively, these statistics suggest that schools do not connect with the majority of other schools or organizations in their network, but where they do have connections, those relationships entail relatively frequent engagement.

Implementation of CI

School CI teams were expected to engage in structured, equity-centered CI processes, incorporating the core parameters of CI—conducting a root cause analysis, setting a clear aim, crafting a theory of practice improvement, testing change ideas by engaging in disciplined inquiry cycles, and using data—to improve student outcomes. We created six measures to measure school-level implementation of CI, which were rooted in these core parameters. These measures consisted of:

- **Number of aim statement elements**: A scale in which we examined whether a school's aim statement contained the following elements: (1) explicit, (2) relevant, (3) specific, (4)

measurable, (5) attainable, (6) attention to equity, and (7) timebound. This measure could range from 0 to 7.

- **Number of cycles initiated**: The number of cycles in a year with documented activity for at least one phase of the inquiry cycle. This measure could range from 1 to 10.
- **The percentage of cycles that were completed**: The percentage of cycles that were initiated with evidence of all four phases of a Plan-Do-Study-Act (PDSA) cycle. This measure could range from 0 to 100.
- **Equity – Access**: The number of core CI components among the five measured in which the school focused on students' access to resources. This measure could range from 0 to 5.
- **Equity – Agency**: The number of core CI components among the five measured in which the school incorporated student voice or provided opportunities for students to use their voices. This measure could range from 0 to 5.
- **Adoption of at least one change idea**: Evidence the school concluded the Act phase of at least one cycle by adopting a change idea (rather than adapting or abandoning). This measure could range from 0 to 1.

On average, schools in the sample implemented more than half of the elements of an aim statement (4.04 out of 7). The schools initiated an average of 3.47 cycles in a year, with a minimum of one cycle and a maximum of 10. They completed just over half of these cycles (53.22%). Schools, on average, demonstrated attention to students' access to resources in 1.03 components of CI out of five measured, and they dealt with student voice, on average, in 0.61 components out of five. Slightly less than one-fifth of schools (18%) ended at least one cycle with the adoption of a change idea.

The Relationship Between Coaching and School-level Implementation of CI

The frequency of coaching was negatively associated with several aspects of CI. As shown in Exhibit 2, a greater frequency of coaching was negatively associated with the number of aim statement elements, the number of cycles initiated, the percentage of cycles completed, and adoption of at least one change idea.

Exhibit 2. Relationships Between Network Coaching and School-Level Implementation of CI

	Number of aim statement elements	Number of cycles initiated	Percentage of cycles completed	Equity: Access	Equity: Agency	Adoption of at least one change idea
Breadth of coaching						
Frequency of coaching	↓	↓	↓			↓

Note. A red arrow indicates a statistically significant negative relationship ($p < 0.05$).

Although these relationships are negative, the strength is modest. To illustrate the magnitude of these relationships, an increase of one coaching session per month is associated with a decline of about 3.5 percentage points in the percentage of cycles completed (see Exhibit A-6 for the metric regression coefficients).

Another way to assess the magnitude of the relationships is to express them as standardized regression coefficients, which can be interpreted as correlations. All four of these relationships have standardized coefficients between −0.10 and −0.15, indicating modest associations (see Exhibit A–7 for the standardized coefficients).

The breadth of coaching supports was not related to any of the six measured aspects of the implementation of CI.

Networks tailor frequency of coaching to school CI team needs. At first glance, these results may seem surprising, but our interviews with network hub staff suggest several explanations for the negative relationship. In particular, the interviews suggest that networks may offer more coaching to schools that are struggling and schools newer to the network. New schools and schools that find CI challenging may implement CI more lightly until they have built adequate capacity to engage in CI.

In interviews, respondents in about half of the networks reported tailoring their coaching to the needs of the school CI teams, often providing more frequent coaching to schools that had greater needs. Indeed, one network hub staff member stated that, “The most common variant is among how frequently the teams meet [with their coach].” Intermediaries described providing more frequent coaching to schools that (a) requested additional help, (b) were identified by the intermediaries as struggling, or (c) were new to the network.

Some intermediaries provided more coaching to those school CI teams that requested more frequent touch points because they had questions or uncertainty or just wanted more support in using CI. As one network hub staff member explained, school CI teams were in direct conversation with their coaches and could readily request additional support, as follows:

> "Yeah, there's a coaching component involved as well, so they do have meetings with the team leads. I feel like our coaches are very flexible. A lot of the team leads you know have their direct number, so someone might reach out, 'Hey, I'm having an issue with this.' They can call [their coach] directly. So, they do meet with their team leads very frequently in addition to joining those school team meetings."

In addition, some networks monitored school CI team progress and purposefully allocated additional coaching sessions to schools that were not progressing. For example, in one network, the hub staff identified two schools that had "slow launches" in using CI and so they provided additional coaching touchpoints to "kind of differentiate our support in that way." Similarly, in another network, one network hub staff member explained that they identified a school that needed additional assistance and deployed an additional coach (in this case, the director) to provide more frequent coaching sessions. In their words,

> "The NSI work sometimes highlights schools that need more help. Whether it is the … coach particularly saying, 'Wow, let's say … [school A] really is not implementing NSI very well. They need a lot more support.' That small example and it's a real example, that has led me as the NSI director … to pay much more attention to that school. And so … I'm deployed more frequently to that school because we know that through the work with NSI it has become apparent that there's other issues at the school that need to be tended to in terms of leadership, in terms of staff buy-in, in terms of equity and community considerations."

These kinds of added supports took place in addition to their ongoing cadence of coaching.

In about one-fifth of networks, network hub staff described providing more frequent coaching to schools that had newly joined the network. For example, one coach described prioritizing visits with newer schools and supplementing monthly coaching with regular attendance at their school CI team meetings. In the words of this network hub coach,

> "I'm trying to go to most of [my schools, in person] this year, and that's partly because I have all new schools.... I think being there to model and facilitate, that's something they just don't know what that's supposed to look like, and so I try to meet as much as I can. I tell them I will be there at one meeting a month, but I'd say I'm usually there for most of their meetings, but not all."

Networks also described newness as one factor, alongside high turnover, that related to the frequency that schools requested or needed support. As one coach explained,

> "Some of our high-performing teams already have that rhythm, but we're realizing that some of our newer teams or teams that maybe have had a lot of turnover, they kind of need more of that structure of like, 'okay, here's an agenda you can use for your team meetings that's going to help you ground it in data, come up with some clear next steps, and have everybody commit to what they're going to do.' So, I'm trying to get more strategic about that."

As this quotation illustrates, about one-fifth of the networks mentioned that their distribution of coaching changed over the course of the grant period. That is, as schools became more skilled at using CI, the network provided less frequent coaching. This was consistent with Team Connections Survey data illustrating a gradual decrease in the frequency of coaching across Grant Years. In an average network, schools in Grant Year 2 had 2.64 coaching sessions per month, in Grant Year 3 had 2.0 sessions per month, and in Grant Year 5 had 1.3 sessions per month.

The Relationship Between Network Cohesion and School-Level Implementation of CI

Network density had a positive relationship with four of six implementation measures. As shown in Exhibit 3, there are several significant relationships between measures of network cohesion and school-level implementation of CI. Denser networks (those in which schools were more interconnected) were associated with fewer elements in an aim statement (standardized coefficient of −0.20) and fewer cycles initiated (standardized coefficient of −0.25), but more cycles completed (standardized coefficient of 0.22). In addition, schools in denser networks had cycles that incorporated both measured dimensions of equity (standardized coefficients of 0.32 and 0.41) and were more likely to adopt at least one change idea (standardized coefficient of 0.22). (See Exhibit A–7 for the standardized coefficients).

To illustrate the magnitude of these relationships, an increase of a tenth of a point in network density (meaning a tenth more of the potential network connections was realized) is associated with an increase of almost 10 percentage points in the percentage of cycles completed.[1]

[1] As reported in Exhibit A–6, the metric coefficient for the relationship between network density and the percentage of cycles completed is 97.3, and thus a 0.1-point increase in density corresponds to a 9.7 percentage point increase in cycles completed.

Exhibit 3. Relationships Between Measures of Network Cohesion and School-Level Implementation of CI.

	Number of aim statement elements	Number of cycles initiated	Percentage of cycles completed	Equity: Access	Equity: Agency	Adoption of at least one change idea
Network density	↓	↓	↑	↑	↑	↑
Network hub centrality			↓	↓		
Tie strength: Network hub frequency						
Tie strength: School frequency						

Note. A red arrow indicates a statistically significant negative relationship ($p < 0.05$). A green arrow indicates a statistically significant positive relationship ($p < 0.05$).

Network hub centrality was negatively associated with two aspects of CI implementation: the percentage of cycles completed (standardized coefficient of −0.13) and Equity – Access (standardized coefficient of −0.17). For example, an increase of a tenth of a point in hub centrality (the hub's influence in the network) is associated with a decline of about 4 percentage points in the percentage of cycles completed.[2]

No relationship was found between the frequency of a school's engagement with the network hub (i.e., tie strength: network hub frequency) and the implementation of CI; similarly, no relationship was found for frequency of engagement of a school with other schools (i.e., tie strength: school frequency) and the implementation of CI. This suggests that the connections across the entirety of the network—as measured by network density—are more important for school implementation of CI than any single school's connections to or engagement with other network schools or the network hub.

Networking activities may help support data sharing and peer accountability as well as promoting successful change ideas. Interview data provide some insights into the relationships between network cohesion and CI implementation. Network hubs made purposeful efforts to promote cross-school connections and knowledge sharing (Bush-Mecenas et al., 2026). We analyzed the types of work schools did with each other, as reported in intermediary interviews, and drew on these analyses to theorize why network density was positively associated with some aspects of CI implementation.

[2] As reported in Exhibit A–6, the metric coefficient for the relationship between centrality and the percentage of cycles completed is −37.4, and thus a 0.1 increase in centrality corresponds to a 3.7 percentage point decrease in cycles completed.

We have robust interview data describing the relationships between network density and three aspects of the implementation CI: initiating cycles, completing cycles, and adopting change ideas. We explore those relationships below. The interview data do not offer insights on the relationships between density and the implementation of aim statements or equity, or the relationship between network centrality and CI implementation. Thus, this section does not focus on these relationships.

Number of Cycles Initiated. Schools in denser networks tended to initiate fewer cycles. We theorize that schools involved in networking activities spent more time thinking through their options and therefore had less time for starting new cycles. In a few networks, network hub staff noted that their networking activities, in particular cross-school visits, may have helped to encourage reflection among school CI team staff and "slowed down" the team to encourage more disciplined improvement work. As one network hub staff member described, their network convenings included many opportunities for reflection within and across school CI teams:

> "The reflection time that we provide for them really gives them that space that they don't really have in other areas, yet, to slow down a minute and actually take a look and see, 'Oh, I thought this was working for my students, but now that we're talking about this, it's different than what I anticipated, or I didn't see this perspective.' And so, I think if we didn't have those reflection pieces, the work also would not be advancing."

Similarly, in another network, the network hub staff identified that cross-site visits between schools allowed schools to see how improvement efforts could be phased across years to support implementation. As this staff member noted, "Because [the school CI team leader] was able to see and learn from other schools about their journey, was able to identify, one, that it is a process and that there are some things that can be accomplished this year and then more things can be accomplished next year. So, kind of thinking more long-term." Though these insights were only shared by a few networks, it is possible that network connections contributed to school CI teams taking a slower, more deliberate approach to change.

Percentage of Cycles Completed. Schools in denser networks tended to complete a greater percentage of CI cycles. This may be because networking activities often focused on sharing data among schools in the network. In interviews, half of the networks described integrating cross-school data sharing in their networking activities (e.g., convenings, monthly data "huddles," role-alike meetings). Engaging school CI teams in sharing data with peer schools may have helped support cycle complete in two ways: (a) by providing the necessary data needed to complete the latter cycle phases and (b) by motivating cycle progress across networks through data comparison.

The Study and Act portions of the PDSA cycle, which are more often neglected (leading to incomplete cycles), rely upon access to and use of data to assess change idea success. Sharing data was intended to help schools understand their progress through the CI process and adjust their change ideas or CI activities as a result. As one network hub staff member shared,

> "So, we think that capacity-building aspect of our convenings is reviewing data, thinking intentionally about that implementation, and then sharing it across the network. And, hopefully, you're leaving with a better understanding about your school's progress, but you also have a few ideas about how to maybe tweak what you've done because you've now met with other people in the network."

Alternatively, sharing data among schools in the network may have helped school CI teams to compare their progress through PDSA cycles with other teams and could motivate ongoing CI efforts out of a sense of shared responsibility. As one network hub staff member described,

> "We promote our way of doing continuous improvement, and then we support schools with implementing a change idea, and then throughout our network learning and events throughout the year we highlight what we see is working, what's showing promise, and kind of move schools along in the process there."

Networking activities that focused on data use and progress monitoring, therefore, might support more complete cycles of inquiry.

Adoption of Change Ideas. Schools in denser networks were more likely to end cycles by adopting change ideas (rather than adapting or abandoning them). This may be a function of networking activities that engaged school CI teams in sharing their successful change ideas and promoting these ideas (often with implementation supports) across the network. Almost half of the networks engaged in networking activities that involved comparing change idea effectiveness and, in some cases, curating more successful change ideas for broader adoption across the schools in the network. For example, staff at one network hub described using networking sessions to purposefully identify change ideas that had demonstrated stronger outcomes and engaging school participants in creating toolkits to help their peers implement these change ideas well. This staff member described how they "pivoted from a change idea that we are testing to something that we have tested and refined in multiple places and how we are helping to scale it." They explained, as follows:

> "[The change idea] started in one school as a need, something they were trying and then it worked. So, then more schools adopted it. More schools have refined it over the years and we feel like saying, 'You know, if there is an evidence base and there is enough of a tool kit that other schools can replicate this that we want to build a strand of learning specific to that strategy to help the schools who maybe have been doing it for a few years have sort of scaffold the planning.'… So, it both helps schools who have been doing it for a little while have that sort of thought partner who is scaffolding their preparation to do the thing or it helps schools who have never done it before but are like, 'That's interesting; that might meet a need that we have at our school. I want to come learn about it and explore whether or not we might want to replicate it in our setting.'"

It is possible that network density helped school CI teams access a range of change ideas, especially since network hubs actively supported sharing change ideas when the schools gathered. In addition, school-to-school sharing may have allowed school CI teams to learn about the efficacy of these change ideas in similar local contexts and to gain insights about how to support implementation of these change ideas.

Discussion and Implications

The NSI initiative provides a unique opportunity to examine the relationship between network supports and connections, on the one hand, and school implementation of CI, on the other. The initiative intentionally allowed networks to flexibly design their approach to the work; this variation in design enabled us to observe connections and implementation patterns across the network and school levels. The unique structure of the NSI evaluation, which organized three coordinated evaluation partners in examining the network supports, school CI implementation, and outcomes of the initiative, made it possible to explore the relationship between network supports and CI implementation.

Coaching was widely used to support school CI team understanding and use of CI (see Bush-Mecenas et al., 2026) and, yet, we see a negative but modest association between the frequency of coaching and schools' CI implementation. Although the results were initially unexpected, interviews with network hub staff demonstrated that more coaching was often provided to school CI teams with greater needs.

This finding raises a key question for future work: does coaching best support capacity building for CI when it is purposefully tailored to the needs, contexts, and learning trajectories of school CI teams? And, if so, how can intermediary organizations or districts leading networked CI efforts (like NSI) best tailor supports to the changing needs of school CI teams as they build capacity to engage in CI?

In addition, the density of network connections among participating schools and organizations was related to schools' implementation of CI practices. In particular, it was associated with fewer but more complete cycles and more adoption of change ideas, but fewer elements of network aim statements implemented. Network hubs were intentional in establishing cross-school connections within their networks, which created opportunities for data sharing and progress monitoring, peer accountability, and comparing successful change ideas. The information schools gathered through their connections may have shaped their implementation of CI.

These results echo findings from Johnson and colleagues' (2026) companion report on the association between NSI and impacts on student outcomes, which found that schools with meaningful impacts on student outcomes tended to have more connections to schools in their networks. Thus, the networking aspects of the NSI initiative appeared to play an important role in supporting CI implementation and impacts on student outcomes. Developing meaningful connections between members within the network may help school CI teams to support one another in implementing CI cycles, in raising and discussing critical issues, and in testing, and eventually adopting, change ideas that are connected to desired outcomes. The results are also consistent with findings from Johnson and colleagues that schools with meaningful impacts had higher overall engagement in both their network and CI.

Another question for future work involves the role of hub centrality. Centrality assesses the extent to which the hub is connected to school teams that are highly connected to one another. We found that networks with higher hub centrality were lower in implementation of CI. More centralized networks complete fewer CI cycles and focus less on one aspect of equity. This relationship is important to explore further, as it could have implications for the structure of future networks.

Although exploratory in nature, our findings provide useful indications about how network supports may be associated with the implementation of CI in schools. As described in the appendix, our analyses are potentially limited by the focus on concurrent rather than lagged relationships between network activities and CI implementation and the exploration of the two primary and most common supports (coaching and networking) rather than a full range of network activities. In addition, the analysis is limited by the number of networks in the sample. Having only 25 networks—each of which is unique—constrains the number of variables that can be considered. Despite these caveats, the results suggest that building dense network connections among schools may be an important avenue to facilitate school improvement. Future work should explore further how these dense relationships can be fostered and how they may lead to improved implementation of CI in schools.

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Appendix A. Data and Methods

The sections below provide additional detail on the data and methods used in the report. The appendix begins with the instruments and measures for coaching and network cohesion. It then turns to the instruments and measures for the implementation of CI. Then, it summarizes the estimation model and provides the coefficient estimates. Finally, it describes interview data used to examine potential hypotheses and explanations for the quantitative findings and considers limitations of the study.

Coaching and Network Cohesion: Team Connections Survey. RAND and Visible Labs Networks designed the Team Connections Survey in 2020 as an interorganizational network survey to understand the specific connections between organizations in a network. In the spring of SY2020–21 through SY2024–25, the lead or a representative of each CI team, identified by network hub staff, was invited to participate in the Team Connections Survey. RAND invited networks to participate in the survey in Grant Years 2, 3, and 5, which were as follows:

- Cohort 1 networks were invited to take the survey in SY2020–21 and SY2022–23.[3]
- Cohort 1B/2 networks were invited to take the survey in SY2020–21, SY2021–22, and SY2023–24.
- Cohort 3 networks were invited to take the survey in SY2021–22, SY 2022–23, and SY2024–25.

RAND customized the survey for each participating network, using network-specific terminology. In many networks, for example, CI teams were school based, so the survey asked about schools' interactions with other schools and the network hub. In a small number of networks, CI teams were organized at the district level, so the survey asked about interactions among districts and with the network hub. The survey asked respondents about their organization's interactions with other organizations in their respective networks, including the content of their interactions and the benefits of those interactions. Survey response rates for each network, by administration, and the SY2024–25 survey are available in Wrabel et al. (2026).

[3] Cohort 1 networks were not surveyed in Grant Year 2 because the evaluation started after the initiative had launched.

Coaching and Network Cohesion: Measures. RAND generated analytic measures from the Team Connections Survey data. As described in Exhibit A–1, the network cohesion measures focus on the connections and relationships among organizations within a network; the coaching measures focus on the breadth of coaching supports or the frequency of coaching an organization received as a network participant.

Exhibit A–1. Coaching and Network Cohesion Measures

Measure	Measure details
Network Cohesion	
Network density	The reported connections between schools and the network hub as a proportion of the total possible connections in the network. Values can range from 0–1; higher values suggest a denser or connected network.
Network hub centrality	The relative importance of the network hub within a network. Values can range from 0–1; higher values indicate higher network hub's influence in the network. We measured network hub centrality by calculating eigenvector centrality (see Bonacich, 2007, for more information).
Tie strength: Network hub frequency	The average annual frequency of engagement in school-to-network hub connections. Measure is only available if the school reported a connection to the network hub. Values can range from: 1.5 = 1–2 times 3.25 = Quarterly 5 = Bimonthly 10 = Monthly 15 = More than once a month
Tie strength: School frequency	The average annual frequency of engagement in school-to-school connections. This is the average of all school-to-school connections not the total across all sch-to-sch connections. Measure is only available if the school reported a connection to at least one other school. Values can range from: 1.5 = 1–2 times 3.25 = Quarterly 5 = Bimonthly 10 = Monthly 15 = More than once a month
Coaching	
Breadth of coaching supports	The total number of coaching supports on which a school "agreed" or "strongly agreed" that their network coach assisted within a given year. The seven coaching supports include: Helps our CI team identify solutions to challenges we face; Raises questions about equity implications in our work; Helps our team prioritize demands on our time; Connects our team with other network schools using promising practices or facing similar challenges; Monitors our team's progress toward network milestones; Analyzes data to inform our CI work; Guides our team in analyzing data to inform our CI work. Value can range from 0–7.
Frequency of coaching	Respondents' answer to "How often do you typically meet with a coach from your network?" Values can range from 0–4.5, meaning: 0.0 = I haven't met with a coach 0.5 = Less than once per month 1.0 = Once per month 2.5 = 2–3 times a month 4.5 = Four times a month or more.

Exhibit A–2. Descriptive Statistics on Measures of Coaching and Network Cohesion

Measure	Mean	Standard deviation	Minimum	Maximum
Breadth of coaching supports	6.14	1.72	0.00	7.00
Frequency of coaching	1.68	1.37	0.00	4.50
Network density	0.12	0.10	0.03	0.70
Network hub centrality	0.46	0.15	0.00	0.71
Tie strength: Network hub frequency	10.24	4.96	1.50	15.00
Tie strength: School frequency	4.45	3.51	1.50	15.00

Source. RAND's Team Connection Survey.

Implementation of CI: Artifact Data Collection. We asked representatives from each intermediary to share relevant artifacts (e.g., documents) generated by their networks' CI teams, including (but not limited to) root cause analyses, meeting notes and agendas, and descriptions of change ideas that have been tested. We collected data for all networks in 2020–21. Beginning in 2021–22, we asked intermediary staff to share artifacts in Grant Years 3 and 5. A team of research staff examined each artifact according to a set of codes. The codes describe school actions at either the cycle or school level.

Implementation of CI: Measures. From the coded artifacts, we created a set of measures that allowed us to assess the implementation of CI within each school. For the aim statement measure, we analyzed the codes using the Rasch rating scale model (Andrich, 1978), as implemented in WINSTEPS version 3.91 (Linacre, 2020). Applying the Rasch model allowed us to examine the psychometric properties of scales constructed from binary and ordinal items derived from the artifacts. The Rasch rating scale model is useful because it allows us to test whether a set of items from the artifacts measures a single latent variable. A description of each measure used in this report is in Exhibit A–3. Summary statistics for these measures are in Exhibit A–4.

Exhibit A–3. School-Level Implementation Measures of CI

Measure	Measure details
Number of aim statement elements	The number of aim statement elements. These elements included (1) an explicit aim statement, (2) "relevant" criterion for a SMART goal, (3) "specific" criterion for a SMART goal, (4) "measurable" criterion for a SMART goal, (5) "attainable" criterion for a SMART goal, (6) attention to equity in the aim statement, and (7) "timebound" criterion for a SMART goal. The measure could take a value from 0 to 7.
Number of cycles initiated	To determine the number of cycles initiated at the school level, we computed the number of cycles for each CI team in the school and then calculated the equally weighted average count of cycles for CI teams. Thus, the results should be interpreted as the number of cycles on average per school team. Most schools (94%) only had one CI team. The measure of the number of cycles initiated was restricted to schools that had at least one team that initiated at least one cycle, based on artifact data. We truncated these school cycle averages to 10 for cycles initiated and completed.
Percentage of cycles completed	To determine the percentage of cycles that were complete, we divided the total number of cycles completed by the number of cycles initiated and multiplied the result by 100. For schools with more than one CI team, we computed the equally weighted average percentage of cycles completed among all CI teams in a school. The measure could take a value from 0 to 100.
Equity – Access	To measure CI implementation that reflected the dimensions of the equity framework based on the work of Gutiérrez (2007, 2012), we identified artifact items that were aligned to each of the four dimensions: access, achievement, identity, and agency. We use five items to construct a measure for each of the dimensions, with one item for each of the core parameters (disciplined inquiry cycles, use of data, root cause analysis, aim statement, and theory of practice improvement). The access dimension measures providing access to teachers who are attentive to student needs, supplies for effective learning, a classroom environment that encourages student participation, and support/opportunities. The measure could take a value from 0 to 5.
Equity – Agency	The agency measure was based on the equity framework described above. The agency dimension measures using resources and interventions that provide students from nondominant backgrounds with increased opportunity to use their voices and express agency. The measure could take a value from 0 to 5.
Adoption of at least one change idea	This is a binary indicator that takes a value of 1 if at least one of the school team's cycles ended with the team adopting a change idea (rather than adapting or abandoning it), and 0 otherwise. The measure is available only for schools that conducted at least one cycle.

Exhibit A–4. Descriptive Statistics for Measures of CI Implementation

Measure	Mean	Standard deviation	Minimum	Maximum
Number of aim statement elements	4.04	2.50	0	7
Number of cycles initiated	3.47	2.55	1	10
Percent of cycles completed	53.22	45.57	0	100
Equity – Access	1.03	1.19	0	4
Equity – Agency	0.61	0.82	0	3
Adoption of at least one change idea	0.17	0.38	0	1

Source. Artifacts from 2022–23 (cohort 1 NSI); 2020–21, 2021–22, and 2023–24 (cohort 1b/2 NSI); and 2022–23 and 2024–25 (cohort 3 NSI).

Sample and Analysis. We merged the coaching and network cohesion data collected by RAND and the CI implementation data collected by AIR, including schools that had data from both sources. Because RAND collected data in Grant Years 2, 3, and 5, while AIR collected data for Grant Year 1 instead of 2 for some cohort 3 NSIs, the final data set is somewhat more focused on Grant Years 3 and 5 than the data set from each source, but is otherwise similar. The final dataset with at least one variable from RAND and one from AIR includes 542 schools in 25 networks, with an average of 2.05 time points per school, or 1,109 school by year observations.

To assess relationships between coaching and network cohesion and school implementation of CI, we estimated a series of hierarchical linear regressions in which each of the two coaching measures and four network cohesion measures predicted each of the six measures of school implementation of CI. All 36 models included the covariates listed in Exhibit A–5. These covariates were intended to improve the precision of estimates and control for potential intermediary organization and network characteristics that might confound the coaching and network cohesion effects being estimated. For example, network size is associated with network density, and it could also be associated with the implementation of CI.

Exhibit A–5. Covariates Included in the Analysis

Measure	Measure details
Intermediary Organization and Network Characteristics	
Entry point	Indicators of the overarching approach used by a network to address its focal outcome area: • Early warning and response system • Instructional • Well-matched postsecondary
Cohort	Indicator for grantee cohort • Cohort 1 • Cohort 1B/2 • Cohort 3
Organizational type	Indicator for whether the intermediary organization is a non-profit organization (as compared to a public education district or regional office)
Network size	Number of schools in the network

Each analysis is based on a three-level model, with schools nested within NSI, and time points nested within schools. The sample size for the models differs because some schools or time points had missing data for some of the measures.

Exhibit A–6 shows the regression coefficients for the relationship between each coaching and network cohesion measure and each measure of the implementation of CI. The metric coefficients cannot be directly compared with one another because the units of the measures differ. Exhibit A–7 provides the results in standardized coefficient form, obtained by multiplying the metric coefficient by the standard deviation of the independent variable (measure of coaching or network cohesion), and dividing by the standard deviation of the dependent variable (measure of implementation of CI).

Exhibit A–6. Metric Regression Coefficients for Relationship Between Coaching, Network Cohesion, and Implementation of CI

Measure	Number of aim statement elements		Number of cycles initiated		Percentage of cycles completed		Equity – Access		Equity – Agency		Adoption of at least one change idea	
	β	*n*	β	*n*	β	*n*	β	*n*	β	*n*	β	*n*
Breadth of coaching supports	−0.0170	411	0.1031	300	0.4180	300	−0.0219	392	−0.0079	392	−0.0064	300
Frequency of coaching supports	−0.2012**	422	−0.2716**	301	−3.5430*	330	−0.0201	403	0.0126	403	−0.0415**	301
Network density	−4.9866***	1109	−6.1244***	677	97.3354***	677	3.7970***	892	3.2943***	892	0.8119***	677
Network hub centrality	−1.0342	1102	−0.9519	674	−37.4257**	674	−1.2815**	885	0.2936	885	0.0128	674
Tie strength: Network hub frequency	0.0149	255	−0.0112	188	0.6668	188	−0.0062	244	−0.0054	244	0.0028	188
Tie strength: School frequency	−0.0321	230	−0.0582	165	−0.5710	165	0.0027	222	0.0012	222	−0.0020	165

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

Exhibit A–7. Standardized Regression Coefficients for Relationship Between Coaching, Network Cohesion, and Implementation of CI

Measure	Number of aim statement elements		Number of cycles initiated		Percentage of cycles completed		Equity – Access		Equity – Agency		Adoption of at least one change idea	
	β	*n*	β	*n*	β	*n*	β	*n*	β	*n*	β	*n*
Breadth of coaching supports	−0.01	411	0.07	300	0.02	300	−0.03	392	−0.02	392	−0.03	300
Frequency of coaching supports	−0.11**	422	−0.14**	301	−0.10*	330	−0.02	403	0.02	403	−0.15**	301
Network density	−0.20***	1109	−0.25***	677	0.22***	677	0.32***	892	0.41***	892	0.22***	677
Network hub centrality	−0.06	1102	−0.06	674	−0.13**	674	−0.17**	885	0.06	885	0.01	674
Tie strength: Network hub frequency	0.03	255	−0.02	188	0.07	188	−0.03	244	−0.03	244	0.04	188
Tie strength: School frequency	−0.05	230	−0.08	165	−0.05	165	0.01	222	0.01	222	−0.02	165

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

Interview Data. RAND also collected extensive qualitative data in the form of interviews with network hub staff, network coaches, and district leaders. The full scope of these data collection approaches and the techniques used to analyze these data are detailed in Wrabel et al. (2026). In this report, where appropriate, we draw on these interview data to provide hypotheses and potential explanations for trends identified by the quantitative analyses.

Limitations. Our analyses are exploratory and do not indicate a causal relationship between network coaching and cohesion and school-level implementation of CI. We analyzed contemporaneous relationships—for example, whether coaching in Grant Year 3 was related to school CI implementation in Grant Year 3. Although this is a plausible assumption, it may well be that implementation in Grant Year 3 is a function of the cumulative work of networks in Grant Years 1, 2, and 3.

We studied 25 networks in the NSI initiative. These networks were given flexibility and implemented the initiative in varying ways. Given this variation, our work has implications for broader school networking efforts, but the results of our analyses may not be directly transferable to networks operating under different conditions or structures. Moreover, there may be key dimensions of the NSI initiative (e.g., the provision of knowledge management systems to support CI work or the provision of change packages) that may have meaningful influence on school-level implementation that we were unable to explore here.

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