

A SUITE OF DATA MEASUREMENT TOOLS FOR DISTRICTS AND SCHOOLS IMPLEMENTING MATH CURRICULA

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INTRODUCTION

The Effective Implementation Cohort (EIC) initiative, funded by the Bill and Melinda Gates Foundation, focuses on facilitating effective implementation of a high-quality middle school math curriculum across 20 Local Education Agencies (LEAs). The National Implementation Research Network (NIRN) works as a learning partner to specifically support the partnerships between professional learning (PL) providers and school districts in their implementation and measurement efforts.

These efforts include gaining a better understanding of the implementation strategies used by providers, districts, and schools to build implementation capacity and increase curriculum uptake (see "[Implementation Strategies for Systems Change](#)"). One of the critical strategy clusters that has been consistently emphasized throughout the initiative is "evaluative/iterative strategies", or more plainly, data strategies. This output describes the suite of data measurement strategies and tools, as well as data best practices and lessons learned, resulting from this project.



Application of
Established Practice



Enabling Contexts



Variability in
Implementation



Measurement



NIRN

NATIONAL IMPLEMENTATION
RESEARCH NETWORK

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What are data strategies and why are they important?

Data strategies can be defined as any strategy that involves systematic data planning, measurement development, and data collection, analysis, interpretation, or use. In implementation science, these strategies typically focus on assessing the effectiveness of the implementation, and/or innovation (i.e., program, curriculum, service) from both a formative and summative perspective. They can serve multiple purposes, including but not limited to: ascertaining outcomes (whether curricula- or implementation-related), understanding context and delivery, evaluating progress, informing adaptations and change, strengthening relationships, and co-creating solutions.

Data strategies are critical to successful implementation for a number of reasons, all of which are related to making data-driven choices and decisions:

- To generate information for planning and infrastructure preparation: How do I select the best fit curriculum? What capacity building is needed to ensure successful uptake? Are the right supports in place? Is the district's vision aligned with adoption of this curriculum?
- To inform continuous quality improvement and needed changes to either the curriculum, context, or delivery of the innovation: Are adaptations needed to the curriculum or its delivery based on local context, cultural factors, or other considerations? What modifications are needed in real-time to address emerging facilitators and barriers?
- To provide evidence to support implementation and curriculum effectiveness: Was uptake and implementation of the curriculum successful? Did the curriculum achieve its intended outcomes on students?
- To facilitate engagement, buy-in, and co-creation of relevant solutions rooted in shared understanding and evidence: Who should be at the table? What shared stories, barriers, and solutions emerge from the data?

What are the data systems and structures within the context of the EIC project?

NIRN worked collaboratively with the funder, PL providers, and LEAs to design a data system that would:

- Support pre-implementation planning.
- Monitor and improve the implementation of high-quality instructional materials.
- Evaluate the effectiveness of the curriculum.
- Engage and collaborate with the district community.
- Answer key research questions, such as identifying enabling conditions for effective implementation.

With these goals in mind, the EIC adopted a collaborative process to collectively build a comprehensive data system. Through this process, all 20 LEAs and their PL providers agreed on the core or foundational outcomes, as well as measures and methods to be included in the data system. To ensure

contextualization of data systems, each LEA and their PL provider tailored their data system by incorporating additional measures of outcomes or implementing alternative data collection methods.

The outlined process involved identifying important outcomes for various partners, such as districts, schools, and providers. For instance, student engagement, beliefs, and experience in mathematics was selected as a critical indicator. Feasible methods for data collection were then determined, including surveys and focus groups, and a set schedule for data collection was established. Responsibilities for data collection, storage, analysis, and sharing were also assigned among partners. For instance, several LEAs decided to collect agreed upon student engagement and beliefs survey data electronically and have either NIRN and PL providers analyze and summarize the data. Partners also agreed on data review processes, data usage for improvement, and data dissemination strategies. For example, providers and LEAs, in partnership with NIRN, conducted three formal data reviews of all available summarized data and used guiding questions within a Plan-Do-Study-Act (PDSA) Cycle to make meaning from the data and to take actions. The next step involved developing formal data-sharing agreements and obtaining approvals from all needed partners' institutional review boards. Finally, the data system was implemented, with ongoing adjustments to enhance measurement methods and participation.

DATA CONSIDERATIONS AND MEASUREMENT OPTIONS

What needs to be considered when selecting data strategies to implement a math curriculum?

Based on the EIC Data Practices (described in detail in "[Data practices, use, and needs](#)"), consider the following when preparing a measurement plan and selecting a type of data needed:



WHY ARE WE COLLECTING DATA? FOR WHAT PURPOSES? WHAT QUESTIONS ARE WE INTERESTED IN ANSWERING?

Examples of questions are:

- How effective is the new math curriculum?
- How well is it being implemented in classrooms (i.e., fidelity)?
- What implementation supports do I need to have at the district-, school-, and classroom-level?

Examples of data collection purposes in the EIC project were:

- Understanding the curriculum impact on teacher and student outcomes.
- Evaluating implementation progress and adherence to curriculum fidelity, and informing needed modifications and adaptations.
- Guiding conversations, decision-making, and priorities.
- Facilitating engagement of all partners, co-learning, and shifting behaviors.



DO WE NEED TO INCLUDE ALL THREE LEVELS OF DATA, NAMELY STREET, MAP, AND SATELLITE (SAFIR & DUGAN, 2021)?

- Street data are defined as detailed information that helps us understand student, staff, and parent experiences and facilitates monitoring of students' internalization of important skills. Street data are typically based on anecdotes, interviews, and other qualitative information.

- Map data provide a closer look at a school or district-level and tend to be based on trends across settings (e.g., classrooms, schools).
- Satellite data tend to be broad quantitative measures that illuminate patterns and project a single story of what is happening across systems.



WHAT TYPES OF DATA SHOULD WE FOCUS ON? IMPLEMENTATION OR PROGRAM OR BOTH?

- Implementation data relate to the information collected about the process of putting an innovation into practice. Broad categories of implementation data include: contextual data (e.g., organizational capacity for implementation, reach); process data (e.g., fidelity); and outcome data (e.g., acceptability, appropriateness, feasibility).
- Program data refer to any data associated with efficacy, effectiveness, or impact of the curriculum itself. Examples include: teacher outcomes, standardized math assessments, behavioral student measures.



WHO ARE THE CONSUMERS OF THESE DATA? HOW WILL THE DATA BE USED?

Examples of data consumers in EIC were:

- Executive sponsors
- Coaches
- Learning providers
- Districts and schools
- Classroom teachers
- Parents/students



WHAT ARE THE MOST FEASIBLE AND ACTIONABLE DATA SOURCES FOR ANSWERING THESE PARTICULAR QUESTIONS?

- Selection of data sources should be informed by the questions of interest, purposes of the data, consumers for the data, feasibility considerations, and use of the data.
- Use of multiple data sources is recommended to ensure validity of findings, provided intentional (rather than volume-based) selection of tools within a cohesive measurement plan.
- Data sources can be qualitative or quantitative, and include various formats (e.g., assessments and surveys, administrative data, classroom observations and walkthroughs).
- Timeframes for collection of different data sources should be considered and outlined during measurement planning (e.g. using a [data calendar](#)).



WHO SHOULD BE INVOLVED WITH DATA STRATEGIES?

- Who should be at the table when developing the data measurement plan?
- Who should facilitate implementation of the data measurement plan? Who should collect data at each level?
- Who should be involved with data analysis and interpretation?
- Who would be responsible for ensuring dissemination of results and use of data? Who should review findings?

What data sources and tools might be useful to include as part of a measurement plan?

ABOUT STUDENTS				
Data Source	Indicators	Data Type	Data Levels	Examples of Data Purposes
Exit tickets	Math proficiency	Program	Street	Understand the curriculum impact on students, inform improvements
Student Work Samples	Math proficiency	Program	Street	Understand the curriculum impact on students, inform improvements
Classroom Walkthroughs and Observations	Math self-efficacy, growth mindset, math engagement, math enjoyment	Program	Street	Understand the curriculum impact on students, inform improvements
Student Feedback/discussions	Varied	Program or Implementation	Street	Understand the curriculum impact on students, inform changes and refinements
Formal Academic Achievement Data (e.g. summative, interim, formative)	State end-of-year assessment scores	Program	Map or Satellite	Understand the curriculum impact on students, guide decision-making
Student Engagement, Experience, and Beliefs Survey	Math self-efficacy, growth mindset, math engagement, math enjoyment, perceptions of teachers' use of cultural pedagogy	Program	Map or Satellite	Understand the curriculum impact on students, inform changes and refinements, guide decision-making

ABOUT TEACHERS AND CLASSROOMS

Data Source	Indicators	Data Type	Data Levels	Examples of Data Purposes
Rubrics (used by teachers in classroom walkthrough and observation)	Varied (e.g., teachers' use of curriculum, teachers' instructional practices)	Program and Implementation	Street	Facilitate understanding of day-to-day of implementation, facilitates co-learning and build engagement and from all (e.g., principals, teachers), inform changes and refinements
Teacher Program Self-Efficacy Survey	Self-Efficacy for math instruction self-efficacy for cultural pedagogy	Program	Map or Satellite	Understand the curriculum impact on teachers, inform improvements
Implementation Outcomes Measure	Acceptability, appropriateness, feasibility	Implementation	Map or Satellite	Understand the effectiveness and quality of implementation, inform improvements
Fidelity Assessments (to curriculum)	Fidelity	Implementation	Map or Satellite	Understand the effectiveness and quality of implementation, inform improvements
Fidelity Assessments (to teacher practice)	Fidelity	Implementation	Map or Satellite	Understand the effectiveness and quality of implementation, inform improvements

ABOUT THE SCHOOLS

Data Source	Indicators	Data Type	Data Levels	Examples of Data Purposes
Implementation Leadership Scale	Proactive, perseverant, knowledgeable, supportive	Implementation	Map	Understand the quality of implementation, inform improvements
Implementation Outcomes Measure	Acceptability, appropriateness, feasibility	Implementation	Map or Satellite	Understand the effectiveness and quality of implementation, inform improvements

ABOUT DISTRICTS/LEAS

District Capacity Assessment	Leadership, competency, data systems	Implementation	Map or Satellite	Understand the quality of implementation, inform improvements
Look-fors Observations of District Implementation Teams	Team functioning	Implementation	Map or Satellite	Understand the quality of implementation, inform improvements
Implementation Team Survey	Teaming	Implementation	Map or Satellite	Understand the quality of implementation, inform improvements
Listening Sessions with Executive Sponsors, Coaches, and Providers	Depends	Implementation and Program	Street or Map	Multiple

ABOUT EXTERNAL SUPPORTS (E.G., COACHING, TRAINING) PROVIDED TO THE LEA

Contact Logs	Multiple (e.g., dosage, intensity, reach, focus)	Implementation	Street or Map	Understand the quality of implementation, inform improvements
Reflection Logs (for use by coaches)	Strengths, Weaknesses, Opportunities, Threats (SWOT Analysis) on LEA dyads, lessons learned, next steps	Implementation	Street or Map	Understand the quality of implementation, inform improvements
Quality of PL Services (teacher survey)		Implementation	Map or Satellite	Understand the quality of implementation, inform improvements

DATA INSIGHTS AND LESSONS LEARNED

INSIGHT 1

When developing a measurement plan and selecting measurement tools, consider purposes of the data collection, feasibility of measures, and uses of data.

In addition to the considerations listed above, make sure that the data are meaningful and aligned with the questions of interest; feasible to measure within the specified contextual constraints and timeframe; actionable to inform needed changes; and focused based on priorities (there is such a thing as too much data!). The depth and complexity of the data collected should also fit with the district/school data cultures and capabilities. Remember, while some data sources may be useful to some, they may be considered superfluous by others (e.g., formal student assessments) in your data stakeholders team.



"We've had so much data that we're pulling from them and giving to them that it's been hard to truly unpack all of the impact of it. So just survey overload for us has been a barrier... I would've liked to see more data around looking at assessment data in relation to the work that we've done. So really digging into are we truly seeing that, the student outcome data... There was just so much out there that we were forgetting to bring it all together to focus in on are we actually getting our goals to where we want them to be."

- PROVIDER



INSIGHT 2

Describing data dissemination and sharing approaches (e.g., formats, language, graphs) aligned with the data purposes and consumer audiences should be part of the measurement plan and associated tools.

Each group of data consumers will require a different dissemination approach, requiring consideration of the types of dissemination formats (e.g., reports, briefs), data visualization strategies (i.e., representation of data through graphics), and language. Developing data stories and communications translating key findings for each type of audience is an ongoing process that should be transparent and occur throughout the curriculum implementation. Accounting for the amount of effort, staffing, and time it takes to interpret, synthesize, and translate data into a cohesive set of findings is critical to successful dissemination and use of this information.



"It's like what are we communicating? Who are we communicating to? And having a clear expectation of how often we're communicating. So then we were all serving the same purpose, right? It's like we're not over communicating. We're not saying incorrect information to people, but we're kind of supporting one another with communications of different stakeholders."

- EXECUTIVE SPONSOR

"One of the big things was actually making use of the data period. I do think we had a lot of data that we weren't even looking at. And so, one of the structures that I think has been probably moving us along the most, is that now we've aligned our data chat cycles for our school leaders, our principals, along with the conversations that we're having around their [curriculum] goals."

- EXECUTIVE SPONSOR



INSIGHT 3

Intentional and planned use of data cycles to facilitate ongoing improvement should be incorporated as a critical tool into data measurement plans.

Successful implementation of a curriculum should be evidence-based (i.e., informed by ongoing data findings). This information should be collected in a timely manner (i.e., occur at critical points during the curriculum implementation), targeted enough to allow rapid analysis and synthesis, and inform decision making and refinements (to either the curriculum through adaptation, its delivery, or contextual supports). Plan-Do-Study-Act Cycles (PDSAs) should be incorporated into data measurement plans for optimal use of data.



"I mean, it got harder as we went on. And I think my ability to make use of the data is understanding that those elements, whether they're qualitative or quantitative, are important because then we can come back to the staff and say, here's what we're seeing... the drivers to that were, initially, it was having the conversations with the provider, then it would be taking those data sets and having the conversations with the principals, and then it would be taking the conversations with the principals to come up with an implementation plan based upon the data. And then it would be going back into the classroom after you've had the conversations or the modeling to see if it's being done. And if it's not being done, then let's start back and see what the barrier is. It's going through this continuous cycle. We would call now a PDSA cycle."

- EXECUTIVE SPONSOR



INSIGHT 4

Data strategies, while critical, are all but one of the implementation strategies that should be part of your multi-faceted implementation package.

Based on the EIC project learnings (see "[Implementation Strategies for Systems Change](#)"), and the implementation science literature, there is consensus that in order for curriculum uptake to be successful, a system-wide, multi-level, integrated approach to implementation needs to be adopted. Use of data strategies in isolation of other implementation strategies (e.g., implementation supports, cultivating relationships, program integration) will not produce the desired results. Implementation strategies are closely interrelated, influencing each other's effectiveness. For instance, the ability to cultivate relationships, navigate politics, and communicate transparently will impact effective sharing and use of data.



"I don't really think any of these strategies are effective if you're just using that one strategy...it's more about the system of using all of them and a coherent way with each other. So I think that's one thing that we have learned."

- PROVIDER



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