Understanding the Role of Data in Planning
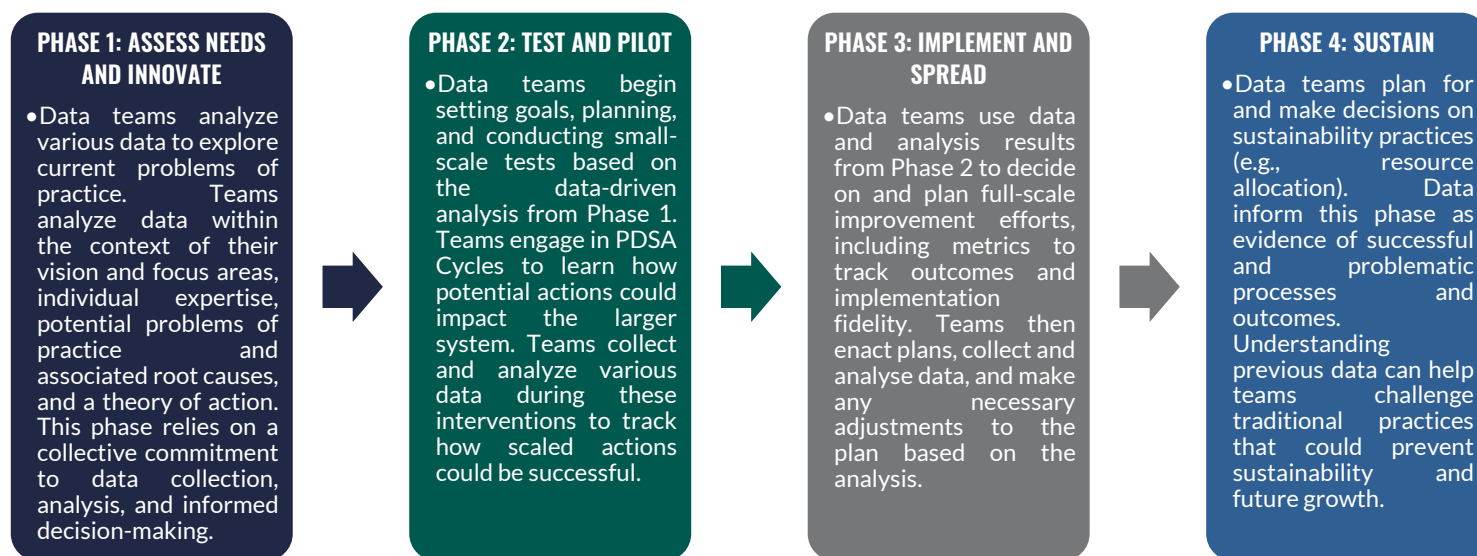
Leveraging Data within Multi-Year Plans

Data inform school leaders and stakeholders throughout long-range planning for school improvement—from an initial comprehensive needs assessment (CNA), through continuous improvement planning and action, and in ongoing sustainability efforts.[2] As described by Bradley J. Geire, the senior director of non-profit educational services initiative, leaders engaging with data for school improvement should:[3]

> Use comprehensive data analysis with a focus on informing and evaluating ourselves against the shared vision of those within the learning organization. This allows you to consider the full scope of what you value and believe needs to be in place relative to curriculum, instruction, assessment, and environment relative to areas of identified need.

Simply obtaining and reviewing data does not lead to a successful improvement planning process. Rather, leaders must use data to inform two key components within school improvement planning: a CNA to identify needs and a problem-solving methodology to apply data to improvement strategies.[4] To frame data use within these components of long-range planning, the following figure presents how data inform four phases of continuous school improvement.

Key Concepts Review

Two key concepts within long-range planning are Continuous School Improvement Plans and Comprehensive Needs Assessments. These terms, defined below, are described in greater detail in two previous VDOE resources, "Comprehensive School Improvement Plans" and "Comprehensive Needs Assessment:"[1]

- **Continuous School Improvement Plan**: a roadmap that supports leaders in bridging current performance and desired performance
- **Comprehensive Needs Assessment**: a systematic process used to identify current needs, associated causes, and outcomes and review operations and practices used to support student achievement.

Links to these two resources appear in the Additional Resources section at the end of this document.

Data in a Continuous School Improvement Planning Process

PHASE 1: ASSESS NEEDS AND INNOVATE

- Data teams analyze various data to explore current problems of practice. Teams analyze data within the context of their vision and focus areas, individual expertise, potential problems of practice and associated root causes, and a theory of action. This phase relies on a collective commitment to data collection, analysis, and informed decision-making.

PHASE 2: TEST AND PILOT

- Data teams begin setting goals, planning, and conducting small-scale tests based on the data-driven analysis from Phase 1. Teams engage in PDSA Cycles to learn how potential actions could impact the larger system. Teams collect and analyze various data during these interventions to track how scaled actions could be successful.

PHASE 3: IMPLEMENT AND SPREAD

- Data teams use data and analysis results from Phase 2 to decide on and plan full-scale improvement efforts, including metrics to track outcomes and implementation fidelity. Teams then enact plans, collect and analyse data, and make any necessary adjustments to the plan based on the analysis.

PHASE 4: SUSTAIN

- Data teams plan for and make decisions on sustainability practices (e.g., resource allocation). Data inform this phase as evidence of successful and problematic processes and outcomes. Understanding previous data can help teams challenge traditional practices that could prevent sustainability and future growth.

Source; Vermont Agency of Education[5]

As shown above, data inform each phase of long-range planning, and teams may analyze data multiple times within a phase. Notably, Phases 2 and 3 involve one or multiple iterations of the Plan-Do-

Study-Act (PSDA) Cycle.[6] The PSDA Cycle—also referred to as the Plan-Do-Check-Act Cycle or the Plan-Do-Study-Adjust Cycle and similar to the Plan-Implement-Evaluate-Improve Cycle—facilitate improvement efforts through the scientific method.[7]

Additionally, using CNA results and potential solutions, data teams and leaders can craft SMART goals that inform action planning, implementation, monitoring, and evaluation. Data provide context for current school performance, measurable evidence to demonstrate gaps between current and desired performance, and metrics for how teams will determine when schools reach their goals.[8] The following figure recalls the SMART goal components and presents common deficiencies that effective data use can help teams avoid.

SMART Goals Criteria and Common Deficiencies

CRITERIA	CRITERIA DESCRIPTIONS	DEFICIENCIES
Strategic and Specific	Focus on a limited number of key goals in areas with a large gap between the current and desired states; goals should describe specific targets for improvement	Lack of specificity often comes from a lack of true understanding of underlying problems and makes it difficult to address other SMART criteria, such as "measurable"
Measurable	Goals should be assessed with multiple measures, including both formative and summative measures to support benchmarks and progress-monitoring	When sets of data are not analyzed, goals often lack specific targets
Attainable	Goals should be ambitious but attainable to motivate stakeholders	Stretch goals are commendable but do not provide opportunities for early success
Results-Based	Goals should focus on desired results, rather than processes	Starting with a strategy instead of a goal often leads to a process-based rather than a results-based goal
Time-Bound	Goals should include specific time frames with benchmarks and a target date for achievement to support commitment and accountability	The absence of a timeline and deadline will lead to a lack of focus and motivation and the inability to hold stakeholders accountable for progress

Source: *The Power of SMART Goals: Using Goals to Improve Student Learning* and Georgia Department of Education[9]

Strategic Plans Versus Continuous School Improvement Plans

Strategic plans and continuous school improvement plans are multi-year, data-informed documents that guide leaders and educators towards goals. However, these plans may differ regarding timelines and specificity, and importantly, system levels. For example, strategic plans typically outline goals and action steps for five years whereas continuous school improvement plans may be broader to support long-range interests.[10] Additionally, a comprehensive school improvement plan is a "living breathing document" focused on schools, whereas strategic plans often apply to districts or divisions.[11]

Although the process for creating these plans may involve similar steps (e.g., analyzing data, creating goals, implementing an evidence-based action plan, monitoring outcomes), key differences include how continuous school improvement planning processes use multiple PDSA Cycles.[12] As described by the Vermont Agency of Education, "The purpose of the continuous improvement process is to use cycles of learning to monitor and document the impact of strategic improvement actions/changes."[13] Differences between these plans and processes also arise when comparing positive outcomes and benefits, which include:[14]

CONTINUOUS SCHOOL IMPROVEMENT PLAN	STRATEGIC PLAN
• Identifies the necessary targeted work that needs to occur in order to improve student outcomes • Serves as a tangible process that integrates data review and data analysis with research-based strategic planning • Guides stakeholders towards addressing all elements of federal, state, and local school improvement planning requirements in a single, integrated format • Provides a guide that is streamlined, targeted for priorities, and situated as a meaningful tool for	• Articulates organizational priorities and stakeholder values • Aligns workforce and resources to the strategic goals and objectives • Establishes a mission, vision, and guiding principles for effective decision making • Increases stakeholder commitment to a common vision • Provides a communication vehicle to inform stakeholders about district initiatives

managing and tracking systems of improvement against measurable goals and intended outcomes • Aligns resources necessary for the successful implementation of school improvement strategies to the strategic goals and activities outlined in the plan	• Engages employees and other stakeholders effectively and authentically

Building Data Teams and Shared Commitment

Data analyses require districts to have a knowledgeable team comprised of diverse voices that will listen to stakeholders and work collaboratively.[15] Two critical members within these teams are an experienced data user and a data manager, in addition to staff from various departments (e.g., elementary education, secondary education, general and special education, curriculum and assessment). The experienced data user is responsible for confirming that the team's work is evidence-based, publicized as appropriate, actionable, and integrated into other improvement efforts. Conversely, the data manager oversees data quality and cleanliness, consistency in data use and terminology, and integration of different data systems.[16] Broadly, data teams are responsible for the five functions contained in the following figure.

Data Team Functions and Responsibilities

FUNCTIONS	RESPONSIBILITIES
Vision and Policy Management	• Creates and articulates the vision for data use • Sets and models expectations • Implements and upholds policies for data use
Data Management	• Identifies data to be collected • Manages data infrastructure and access • Designs meaningful data displays
Inquiry, Analysis, and Action	• Selects or develops models for inquiry and data use • Models the inquiry process publicly
Professional Development	• Provides training and professional development to support departments, principals, school data teams, and teachers in their use of data • Uses data to identify professional development needs
Monitoring and Communication	• Monitors the progress of the district toward achieving its vision for data use • Establishes the lines of communication necessary for the sharing of results and best practices • Communicates with stakeholders to determine their specific needs for data and training

Source: Washington Office of Superintendent of Public Instruction, Washington School Information Processing Cooperative, and Public Consulting Group[17]

Understanding the goals of data analyses and the responsibilities of a data team enables leaders to select which individuals to serve as team members. The following guiding questions may support leaders in choosing stakeholders to participate in the data review process:[18]

- What are the perspectives and expertise needed to fulfill the data team's vision and priority functions?
- What similar or overlapping inquiry and data efforts are underway, and who is involved in them?
- Who has credibility with stakeholders and can champion inquiry and data use with others?
- Whose participation would help the data team address current barriers to effective data use? (Note that this could lead the data team to include individuals who might be hesitant or resistant to processes of inquiry and data use, not just those who are already on board.)

Districts may consider the characteristics and attributes presented in the following figure to ensure that the data team includes a range of identities and skills.[19] These attributes stem from a document for school redesign teams that uses an equity lens and may support data teams for continuous school improvement as well.

Key Attributes for Teams

SKILL SETS/ASSETS	ROLES	IDENTITIES/BACKGROUNDS	ADDITIONAL RESPONSIBILITIES
• Creative thinking • Organized planning • Relational skills • Facilitating • Leadership potential • Community organizing	• Teacher/staff (e.g., special educator, English language learner teacher, guidance counselor) • School administrator • Parent/family member • Student • Organizational partner • District representative	• Race, ethnicity, language, etc. reflective of the community • Gender diversity • Geographic diversity • Age diversity	• Union representative • School board member • Key consultant • Bilingual skills • Representative from a previously established organizational partnership • Municipal or state representative

Source: Center for Collaborative Education[20]

A carefully selected diverse team with strong data literacy (i.e., the knowledge, temperament, and skills needed to apply data to decision making) can then contribute to a data-informed practice. Team members cultivate an environment for data-informed practice by ensuring their work is collaborative, ethical, inclusive, purposeful, and solutions-focused.[21]

Identifying and Collecting Data

Identifying Multiple Types of Data

The data team must review multiple data sources to understand the current trends and outcomes fully. By examining all relevant information, and communicating that the team is doing so, the team may increase the credibility and rationale of their findings.[22] Teams and leaders may categorize data for school improvement into four areas: perceptions, student outcomes, school processes, and demographics. Education expert Victoria Bernhardt emphasizes these overarching areas as they inform data users of schools' impacts on student performance and outcomes rather than solely student outcomes.[23] According to the National Association of Secondary School Principals, using data from these areas enables schools to:[24]

- Know if the school is achieving its vision and goals;
- Understand real successes and true results;
- Evaluate whether everyone is able to do what is working;
- Predict and prevent failures; and
- Predict and ensure successes.

The following figure presents these areas and potential sources.

Major Data Areas and Sources

DATA AREAS	POTENTIAL SOURCES		
Demographics	• School enrollment • Attendance • Graduation rate • Dropout rate • Transience • Homelessness	• Migrant status • Socio-economic level • Age • Grade • Gender • Race	• Ethnicity • Language • Disability • Staff characteristics • Parent profiles
Student Outcomes	• State assessments • Local assessments • Curriculum-based measures • Proficiency measures • Formative measures	• Grades • Portfolios • College and career readiness • School climate	• Student health • Behavior data • Exclusionary discipline practices • English proficiency
School Process	• Instructional practices • Assessment practices • Curriculum development • Curriculum alignment • Planning practices • Resources	• Technology integration • Staff evaluations • Parent involvement • Leadership strategies • Grading • Data use	• Scheduling • Collaboration • Hiring practices • Staff retention • Continuous improvement • Professional learning
Perceptions	• Interviews • Focus groups • Conferences • Questionnaires	• Surveys • Communication records • Meeting notes • Social media posts	• Media coverage • Awards • Commendations

Source: Vermont Agency of Education[25]

With data sources in mind, data teams may then determine what information is accessible. Such access includes what and when data are available, how easily teams can access data, and how stakeholders currently use the data. Determining access is possible through a data inventory, which provides a structure for identifying and collecting viable data.[26] The following figure presents five benefits of taking stock of available data sources.

Benefits of Conducting a Data Inventory

Gain a clearer picture of the data currently available to guide inquiry at all levels and how the team uses them	Identify data that are collected, but that are not necessarily well-used	Identify redundancies in data collection that could be eliminated	Identify additional data elements needed to address the school improvement and inquiry process	Communicate expectations for what to do with particular data

Source: Massachusetts Department of Elementary and Secondary Education[27]

Accessing Key Data

Data collection requires careful planning and consideration to occur completely, accurately, and without bias. Bias in data collection often takes two forms: selection bias and confirmation bias. [28] Definitions of these terms according to Oxford Reference appear in the following figure.

Main Types of Bias in Data Collection

SELECTION BIAS	Systematic error due to differences between those selected for study and those not selected.
CONFIRMATION BIAS	The tendency to test one's beliefs or conjectures by seeking evidence that might confirm or verify them and to ignore evidence that might disconfirm or refute them.

Source: Oxford Reference[29]

Collected data should include quantitative *and* qualitative data to ensure student and stakeholder perspectives, experiences, and contexts inform research and action. Qualitative research approaches may include surveys, focus groups, interviews, parent-teacher conferences, and other methods to collect information directly from relevant stakeholders.[30] The following figure presents a variety of data collection methods and associated considerations through an equity lens, which emphasizes four "equity indicators:" achievement status, educational opportunities, social-emotional supports, and climate and culture.[31] Other potential data collection methods include district-level data systems and surveys, **described here**.[32] Note: the following table does not highlight district-level data systems and surveys due to potential access barriers for school-level leaders and their data teams.

Data Collection Methods for Equity

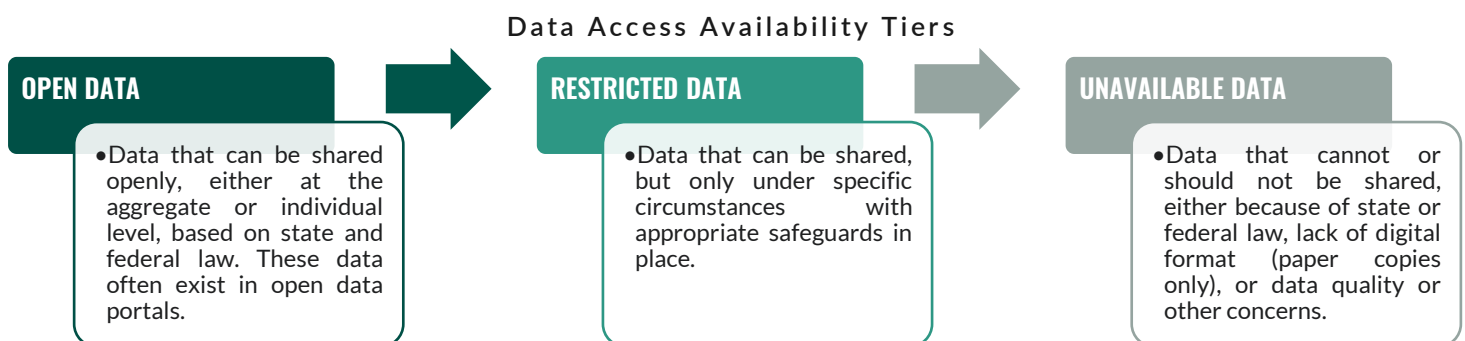| DATA SOURCES	DESCRIPTIONS
Student Focus Groups	• Leaders may conduct focus groups at schools with groups of students to gather data on each of the four equity indicators. Focus groups are a preferred method for gathering data about student beliefs and perceptions because they provide safe spaces among peers where students feel comfortable speaking freely, and they allow for deeper discussions on a topic and consensus on issues and root causes. • To ensure a representative sample, selection criteria are subjected to randomization methods within subgroups.
Surveys	• Leaders may judiciously administer teacher, administrator, and student surveys to assess the four equity indicators. • To reduce the load on participants, leaders may administer surveys in conjunction with or added onto other formative assessments, such as student classroom exit surveys, teacher professional learning community (PLC) exit surveys, and administrator meeting surveys.
Key Informant Interviews	• Key informant interviews allow for the in-depth gathering of knowledge from those who know the most within the school community. Leaders identify key informants through reliable sources (e.g., principals, teacher leaders, parents) and are asked as part of the interview protocol to identify other key informants. • These interviews provide a way to corroborate evidence gathered through other methods and to go into depth on the root causes of identified inequities.
Classroom Observations	• Classroom observations allow the systematic search for root causes of inequities identified through other methods. For example, if an analysis of achievement data by classroom indicates that a subset of teachers has students with greater achievement gaps than other teachers, systematic observations of classrooms where challenges exist compared with observations of classrooms where challenges are smaller may reveal instructional practices that help to reduce the achievement gap.

DATA SOURCES	DESCRIPTIONS
Educational Ethnography	• Educational ethnography is a human-centered examination of education policies and practices. It is an emerging approach that sees policy as a form of sociocultural practice, a system of social relationships, beliefs, narratives, motivations, norms, and understandings. • Traditional research assumes a linear relationship between policy and practice, but a human-centered lens can reveal the role and perceptions of staff, key decision-makers, and other actors in the system. • Building on ethnographic techniques, leaders conduct observations in various settings (e.g., department and PLC meetings, professional development activities, central office meetings) and examine the interaction of diverse individuals and groups in the educational system, thereby providing a holistic understanding of the intersection of equity policies and practices.

Source: Education Development Center [33]

Additionally, data teams must carefully review data privacy and confidentiality regulations. Because certain data may include Personally Identifiable Information (PII), health information, or other information that should not be distributed publicly, teams are responsible for understanding and complying with privacy regulations and should create a plan for maintaining confidentiality. [34] Considerations when determining what data to collect and how to use it appropriately include: [35]

- Whether the data include PII;
- Whether the data include sensitive information that district stakeholders want to keep private;
- Whether regulations of certain data exist (e.g., Family Educational Rights and Privacy Act (FERPA));
- Whether the district or data team has a plan for storing data securely;
- Who has access to data, when, and why; and
- How long the district or data team will retain the data.

When identifying data and how data teams can use them, the Actionable Intelligence for Social Policy (AISP) at the University of Pennsylvania recommends using a tiered system to classify data and establish the extent to which they may use and share information. This system appears in the following figure. [36]

Data Access Availability Tiers

OPEN DATA
- Data that can be shared openly, either at the aggregate or individual level, based on state and federal law. These data often exist in open data portals.

RESTRICTED DATA
- Data that can be shared, but only under specific circumstances with appropriate safeguards in place.

UNAVAILABLE DATA
- Data that cannot or should not be shared, either because of state or federal law, lack of digital format (paper copies only), or data quality or other concerns.

Source: Actionable Intelligence for Social Policy, University of Pennsylvania [37]

- A lack of understanding of the importance of collecting this information;
- A lack of capacity to use standards;
- Discomfort with talking about or acknowledging race/ethnicity; and

Notably, data projects often confront missing data due to data systems not collecting race and ethnicity data according to regulations. As such, data teams must discuss the metrics they use and how missing relevant data may distort analyses and conclusions. [38] Common reasons for systems missing data include: [39]

Furthermore, data teams must deeply understand their metrics and data—including why teams collect data, how teams collect data, and who are and *who are not* included in data—since presentations, visualizations, and communications cannot fix biased or racist data later in the research process.[40]

> Assumptions that asking about race and ethnicity makes communities of color uncomfortable.

Analyzing Data

Exploring questions around the four data categories (i.e., demographics, student outcomes, school processes, perceptions) can help structure questions and conversations and align improvement efforts with current operations.[41] Aligning data questions with existing goals and key performance indicators (KPIs) may support the data team in the following ways:[42]

- Help the data team coordinate efforts with other existing teams;
- Help the data team identify data that might be available to inform the inquiry process; and
- Help the data team avoid redundancy when it gets to the point of developing strategies and action steps.
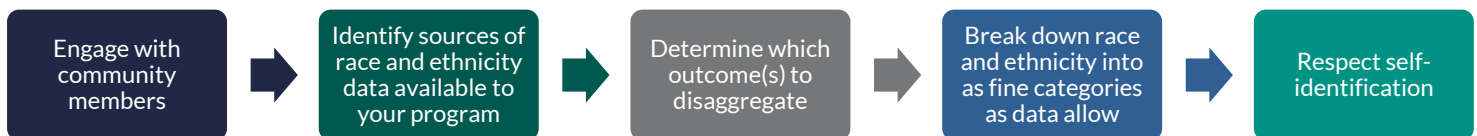
Presenting Data

Once the data team discusses key questions, goals, and indicators, members may shift to presenting data and looking for potential gaps or additional data needs.[43] Data presentations, or displays, allow school leaders to view various data in one place. The information presented "enables educators to focus on particular problems and, equally important, to monitor and address all the issues that affect performance."[44] The presentation itself should meet the criteria below:[45]

- Tell the whole story;
- Have complete, accurate, and timely data;
- Contain all relevant and pertinent data; and
- Be readable and understandable.

Disaggregating data by demographics and subgroups is a common approach to data analyses as it enables teams to target specific factors and observe how these factors manifest throughout a population. Although disaggregation can be difficult (e.g., highly diverse populations may have small subgroups that get reduced to an "other" category), strategies that support accurate results include oversampling, self-identifying options, and cross-tabulating.[46] Nonetheless, data teams must be wary of focusing too much on a subgroup that may already be "over-surveyed."[47] Additionally, data teams may use the steps described in the following figure to analyze data for demographic differences and disaggregate information to understand experiences and outcomes.[48] Although this process comes from outside of the education sector, school leaders may still benefit from these steps.

Data Disaggregation Process

| Engage with community members | → | Identify sources of race and ethnicity data available to your program | → | Determine which outcome(s) to disaggregate | → | Break down race and ethnicity into as fine categories as data allow | → | Respect self-identification |

Source: Massachusetts Department of Public Health[49]

Additional best practices include using proportions and rates, analyzing statistically significant and insignificant outcomes, and disaggregating *opportunities*. Proportion and rates, rather than numbers, provide more accurate comparisons as the results account for differences in subgroup population sizes. Data teams should also review results that demonstrate statistical significance *and those that do not* since small subgroup population sizes may prevent differences from appearing statistically significant. Notably, small differences may indicate unanticipated outcomes and be cause for concern.[50] Furthermore, data teams must disaggregate opportunities to identify other potential patterns and systemic issues and avoid deficit-based thinking.[51]

Data teams should also consider various contexts (e.g., cultural, historical, mathematical, social) and perspectives (i.e., researchers' and data populations' perspectives) to understand findings as interpretations, decrease the likelihood of subjective findings causing or sustaining inequities, and avoid deficit-based thinking.[52] Understanding research outcomes as interpretations caveats that data team members have personal experiences and biases, and while metrics and indicators show trends, data teams add meaning. Therefore, viewing outcomes as interpretations allows data teams to demonstrate that "data decisions come from a place of understanding and not one of unintentional ignorance or outright pretending."[53]

Contextual information and lived experiences also provide insights into systemic issues and help prevent deficit-based thinking. Deficit-based thinking presents a barrier to equity as it causes stakeholders to blame individuals rather than root causes.[54] For example, when teachers with deficit-based thinking review test scores and see certain demographics performing at a lower level (e.g., English learners, students with disabilities), they attribute poor performance to student challenges. By blaming students for challenges, teachers or other stakeholders avoid responsibility and do not address structural issues. Alternatively, understanding contexts and asset-based thinking shifts the focus to underlying challenges causing lower test scores and focuses on student strengths. Therefore, understanding context may help explain differences across groups and enable more effective responses.[55]

Discussing Data

Leaders must actively support data conversations to ensure discussions are successful and avoid common challenges preventing accurate and efficient data analysis and interpretation. When facilitating conversations, leaders should follow the "fundamentals of facilitation" shown below.[56]

Fundamentals of Facilitation

FUNDAMENTALS	DESCRIPTION
Establish Norms	Ensure team members feel safe so that constructive and honest conversations can transpire. These norms also affect how team members interact and represent the group's values; therefore, leaders should explain the need for and set norms regarding trust and safety before engaging in discussions.
Follow a Process	Deliberately follow a purposeful process or protocol when facilitating data discussions so that all members contribute to and support efforts towards improved school performance.
Provide Structure	Provide structure to avoid distractions and inefficiencies that derail conversations (e.g., team members focusing on their individual experiences rather than systematic trends and data). A common structure is the PDSA Cycle, which keeps conversations focused on results and next steps.
Support Communication	Stimulate conversations by applying verbal and nonverbal skills. Specifically, leaders must listen without judging team members to prevent team members from feeling threatened and vulnerable. Leaders must also pause to ensure everyone has time to process and reflect on new information and contributions and think creatively about challenges and solutions. Verbal skills include paraphrasing and asking open-ended questions to ensure effective communication and encourage inquiry that leads to new ideas.

Source: Texas Elementary Principals and Supervisors Association[57]

Leaders may use a defined protocol during data dialogues to establish norms, assess data as a group, hear multiple perspectives regarding the data, and come to agreed-upon conclusions regarding data interpretations.[58] Using a protocol and being cognizant of potential pitfalls and challenges is essential to prevent derailed conversations and inaccurate interpretations. Common challenges include:[59]

- Drawing conclusions too quickly and based on subjective reasons;
- Experiencing confusion or fatigue due to feeling overwhelmed by data; and
- Visiting the data as a team of individuals rather than a true team looking for ways to improve implementation.

The following figure provides an example of a protocol for data conversations with key elements and considerations for each step. Leaders and team members engage in each step for about 10 minutes, though the first and final steps sometimes require less time (e.g., leaders may allocate five minutes for the debrief process).[60]

Data Conversation Protocol

STEPS	DETAILS
Step 1: Getting Started	• The facilitator reminds the group of the norms. • The educator providing the data set gives a very brief statement of the data and avoids explaining what they conclude about the data if the data belong to the group rather than the presenter.
Step 2: Describing the Data	• The facilitator asks: "What do you see?" • The team gathers as much information as possible from the data. • Team members describe what they see in data, avoiding judgments about quality or interpretations and identify from where the observation comes (e.g., "On page one in the second column, third row…") • If judgments or interpretations do arise, the facilitator should ask the person to describe the evidence on which they are based. • Facilitators may list the group's observations on chart paper. If team members make interpretations, facilitators may list these in another column for discussion during Step 3.
Step 3: Interpreting the Data	• The facilitator asks: "What do the data suggest?" Followed by— "What are the assumptions we make about students and their learning?" • During this period, the team tries to make sense of what the data say and why. The team should try to find as many different interpretations as possible and evaluate them against the kind and quality of evidence. • From the evidence gathered in the preceding section, try to infer: what is being worked on and why? • Think broadly and creatively. Assume that the data, no matter how confusing, make sense; your job is to see what they may see. • As team members contribute interpretations, ask questions that help members better understand each other's perspectives.

Step 4: Considering Practical Implications	• The facilitator asks: "What are the implications of this work for teaching and assessment?" Facilitators may modify this question, depending on the data.
	• Based on the team's observations and interpretations, discuss any implications this work might have in practice. In particular, consider the following questions:
	  ○ What steps could be taken next?
	  ○ What strategies might be most effective?
	  ○ What else would you like to see happen? What kinds of assignments or assessments could provide this information?
	  ○ What does this conversation make you think about in terms of your own practice? In general?
	  ○ What are the implications for equity?

STEPS	DETAILS

Step 5: Reflecting on the Process	• Individual Reflection:
	   o What did you learn from listening to your colleagues that was interesting or surprising?
	   o What new perspectives did your colleagues provide?
	   o How can you make use of your colleagues' perspectives?
	• Group Reflection:
	   o What questions did looking at the data raise for you?
	   o Did questions of equity arise?
	   o How can you pursue these questions further?
	   o Are there things you would like to try because of looking at these data?

Step 6: Debriefing the Process	• How well did the process work? • What about the process helped you to see and learn interesting or surprising things? • What could be improved?

Source: School Reform Initiative[61]

When describing and interpreting data, leaders may encourage team members to look at where data intersect, allowing for a more nuanced view of schools. The following figure provides examples of questions that teams can pose and explore when analyzing information within one or multiple data areas (i.e., demographics, student outcomes, school processes, perceptions).[62]

Questions to Explore by Intersecting Data Areas

DATA AREA				QUESTIONS
DEMOGRAPHICS	**STUDENT OUTCOMES**	**SCHOOL PROCESSES**	**PERCEPTIONS**	
☒	☐	☐	☐	• How many students are enrolled in the school this year?
☐	☒	☐	☐	• How did students at the school score on a test?
☐	☐	☒	☐	• What programs are operating in the school this year?
☐	☐	☐	☒	• How satisfied are parents, students, and/or staff with the learning environment?
☒	☒	☐	☐	• Do students who attend school every day perform better on the state assessment than students who miss more than five days per month?
☒	☐	☒	☐	• What strategies do Grade 3 teachers use with students whose native languages are different from that of the teacher?
☒	☐	☐	☒	• Is there a gender difference in students' perceptions of the learning environment?
☐	☒	☐	☒	• Do students with positive attitudes about school do better academically, as measured by the state assessment?
☐	☐	☒	☒	• Are there differences in how students enrolled in different programs perceive the learning environment?
☐	☒	☒	☐	• Do students who were enrolled in active hands-on content courses this year perform better on standardized achievement tests than those who took the content courses in a more traditional manner?

DATA AREA				QUESTIONS
DEMOGRAPHICS	STUDENT OUTCOMES	SCHOOL PROCESSES	PERCEPTIONS	
☒	☒	☐	☒	• Do students of different ethnicities perceive the learning environment differently, and are their scores on standardized achievement tests consistent with these perceptions?
☒	☐	☒	☒	• What instructional process(es) did the previously non-English-speaking students enjoy most in their all-English classrooms this year?
☐	☒	☒	☒	• Is there a difference in students' reports of what they like most about the school by whether or not they participate in extracurricular activities? Do these students have higher grade point averages than students who do not participate in extracurricular activities?
☒	☒	☒	☐	• Which program is making the biggest difference with respect to student achievement for at-risk students this year, and is one group of students responding "better" to the processes?
☒	☒	☒	☒	• Are there differences in achievement scores for eighth-grade girls and boys who report that they like school, by the type of program and grade level in which they are enrolled?
☒	☒	☒	☒	• Based on whom we have as students and how they prefer to learn, and what programs they are in, are all students learning at the same rate?

Source: California Association for Supervision and Curriculum Development[63]

Root Cause Analyses

A root cause analysis (RCA) comprises a key component of the CNA—the first step in a school's continuous school improvement plan process—and may continue to facilitate teams throughout long-range planning. According to the American Society for Quality, an RCA is:[64]

> A collective term that describes a wide range of approaches, tools, and techniques used to uncover causes of problems. Some RCA approaches are geared more toward identifying true root causes than others, some are more general problem-solving techniques, and others simply offer support for the core activity of root cause analysis.

RCAs may support teams in expanding their awareness of a certain need, exploring various contributing factors to weaknesses, focusing on the most pressing needs, identifying potential evidence-based practices for school improvement, and making informed decisions.[65] Notably, RCAs in an education setting may prove difficult since participants often have strong opinions regarding school-based solutions. Therefore, the data team must spend time discussing all potential issues. Additionally, problems may not have one answer or an obvious answer, so data teams must consider multi-layered causes and all related factors.[66] Common methods for conducting RCAs are available through the U.S. Department of Education's **Office of Elementary and Secondary Education**.[67]

Using Data to Scale Improvements

Through data conversations, data teams and leaders must determine whether to implement school improvement interventions throughout the system. This decision rests on having enough data demonstrating how specific interventions positively impact a current need. Leaders should also consider the three factors shown in the following figure as they plan for change.[68]

Considerations for Implementing Continuous Improvement Interventions

CONSIDERATIONS	DESCRIPTIONS
Progress Toward the Aim Statement	Discuss whether a single change practice makes sufficient progress towards a goal or if additional practices are necessary. When additional practices are needed, teams should craft a "change packet" comprised of several practices before scaling interventions.
Understanding of the Change Practice	Teams should take time to understand multiple aspects of each change practice or packet (e.g., when to use it, how to implement it for maximum benefit, why it causes improvements) and whether the team feels prepared to train others in implementing these interventions to support scaling. If teams are not prepared for training and scaling, teams may consider conducting additional PDSA Cycles to gain a more concrete understanding of the intervention.
Schedule	Consider how continuous school improvement planning efforts fit into long-range capacity and whether additional testing is needed given the current date and intended implementation timelines. If the team does not have time to do more testing and solidify practices, discuss documenting current efforts and progress so that stakeholders can apply practices and work towards goals later (e.g., next academic year, next semester).

Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Northeast & Islands [69]

If leaders intend on using interventions tested during the PDSA Cycle at scale, key contributors must transition to planning, acting, and evaluating change by identifying which needs to address and using research-based interventions designed for the intended population.[70] Although actions are specific to data, cultures, and current policies, they must go beyond symbolic change.[71] After choosing a course of action, leaders must select an evaluation system for measuring effectiveness and continue to engage stakeholders in action and evaluation processes. Leaders can continue to support these steps through goals, ongoing use of the PDSA Cycle, and reflection regarding anticipated and future change and change management.[72] Examples of reflection questions include:[73]

- What can be done to increase the chances of success?
- Whose support is needed for this change strategy?
- What results will show that this innovation is working?
- How long will it take for those results to appear?
- How might you amplify—or help people see—these results sooner?
- What barriers do you foresee in sustaining the effort? How might those be overcome?

Supplemental Resources

The following resources provide additional information for school leaders to explore long-range data planning. These resources support school leaders and their work with data teams as they prepare to engage with multiple forms of data to support the continuous improvement process.

RESOURCE	PUBLISHER(S)	QR CODE
Comprehensive Needs Assessment[74]	Hanover Research on behalf of the Virginia Department of Education	
Description: This info-brief summarizes research and best practices for CNAs as well as strategies for conducting CNAs and engaging stakeholders in the process. School leaders may use this resource to develop their ability to manage the assessment process. Additionally, this resource provides links to external reports and tools published by state and national organizations and institutions.		
Comprehensive School Improvement Plans[75]	Hanover Research on behalf of the Virginia Department of Education	
Description: This info-brief describes comprehensive school improvement plans and the main components of the planning process. The resource contains best practices for engaging in the planning process, explanations of processes within the overall planning process (e.g., PDSA Cycles), and examples of how school leaders and stakeholders can leverage tools, diagrams, and activities. This resource concludes with additional resources and guides to support school leaders in crafting and executing comprehensive school improvement plans.		
Continuous Improvement in Education: A Toolkit for Schools and Districts[76]	U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Northeast & Islands	
Description: This toolkit supports school leaders in continuous improvement planning by presenting an overview of continuous improvement efforts and exploring the PDSA Cycle through an education lens. This resource also contains individual meeting guides and handouts that help leaders prepare for and facilitate continuous improvement meetings and activities.		
Data Driven Dialogue[77]	School Reform Initiative	
Description: This resource provides a data dialogue protocol and series of activities for leaders to use during data discussions for continuous improvement planning. The protocol provides a series of steps for leaders or facilitators to follow with recommended time limits to ensure efficiency and completion. Additionally, the activities support four distinct actions within a data review process (i.e., making predictions, creating visuals, sharing observations, developing inferences).		
District Data Team Toolkit[78]	Massachusetts Department of Elementary and Secondary Education	
Description: This toolkit is a district-level resource for engaging in a data inquiry and action process. This process contains six steps: getting ready, inquiry, information, knowledge, action, and results. Although the resource frames information in terms of districts, district-level data, and district-level teams, school leaders may follow the same general process for their school's needs, goals, and stakeholders.		
Education Quality and Continuous Improvement Framework: Research, Resources, and Support for Continuous Improvement Planning[79]	Vermont Agency of Education	
Description: This guide presents research, best practices, guiding questions, and additional resources for continuous improvement. Leaders at the state, district, or school level may use the information and resources to guide their data-driven improvement planning. Further, the resource focuses on the PDSA Cycle as a driving factor for ensuring ongoing testing and evaluation of improvement efforts. Although the resource includes Vermont-specific standards and improvement criteria, all school leaders may leverage the academic research, best practices, and tools to help shape their school improvement process.		

Source: Resource-specific citations noted within the figure, QR Code Generator[80]

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