DATA ANALYSIS AND ASSESSMENT PRACTICES FOR PRINCIPALS

K-12 Info-Briefs

Data Analysis for Continuous Improvement

Before a principal or any educator can engage in effective data analysis or assist others in doing so, they should understand what kinds of data are currently available or could be collected using existing tools and frameworks without a significant investment of time, effort, or resources (see Figure A).[1] At the same time, principals must be able to prioritize which data are most useful to them and their staff in achieving outlined strategic goals set by their organization, whether those goals relate to student outcomes (e.g., achievement, attendance) or operational efficiencies (e.g., personnel management, family and community engagement).[2] The core principle is that school leaders should support data analysis in those areas where such analysis will guide practical improvements or assess the impacts of ongoing cycles of improvement.[3]

Figure A: Sample Educational Data Types and Measures

Academic Achievement	Non-Academic Outcomes	School Performance	Student Demographics
Student growth	Attendance rates	Classroom observations	Age
Course grades	Disciplinary referrals	Staff performance evaluations	Race and ethnicity
Graduation rates	Extracurricular participation	Stakeholder surveys	Gender
District and state assessments	Dropout rates	Existence of program features	Economic status
Advance course participation	Social-emotional learning	Family engagement	Disability status
Reading proficiency	Health and wellness	Community partnerships	Language status

Source: Multiple[4]

Essentially, **principals should work with district and school staff and other stakeholders to ensure that they have access to the correct and most useful information to make decisions and continuously improve programming and operations to drive better outcomes for students, staff, families, and communities** (see Figure B).[5] Principals should also consider mechanisms to promote measurement of meaningful outcomes and collection of relevant data to avoid dilution of their school's finite capacity to manage data.[6] This will ensure that staff do not become overwhelmed by an unnecessarily high volume of data points that distract from those most applicable to school objectives and most relevant for solving existing problems of practice.[7]

Principals should communicate the importance of approaching data analysis "with a purpose, a quandary [stakeholders] want to resolve, a gap [stakeholders] want to fill, or a problem [stakeholders] want to solve." In practice, this means principals should work with district-level staff and other school leaders to:[8]

- **Clarify Goals**: Principals should establish objectives for student outcomes and school performance to help staff identify, collect, and examine data.
- **Build Infrastructure**: Principals should work with staff to outline procedures to collect and examine data to inform decision-making at the classroom and school levels. In addition, they should advocate for functional digital data systems.
- **Expand Staff Capacity to Use Data**: Principals should prioritize data analysis and data-based decision-making in professional learning. They should also hire new staff with established expertise in using data.

Figure B: Requirements for Data Usability

Available

Data must be easily found, aggregated, and shared when needed.

Complete

Data must fully account for the dynamic or outcome it is meant to measure.

Relevant

Data must be applicable to its intended usage and to the organization's needs.

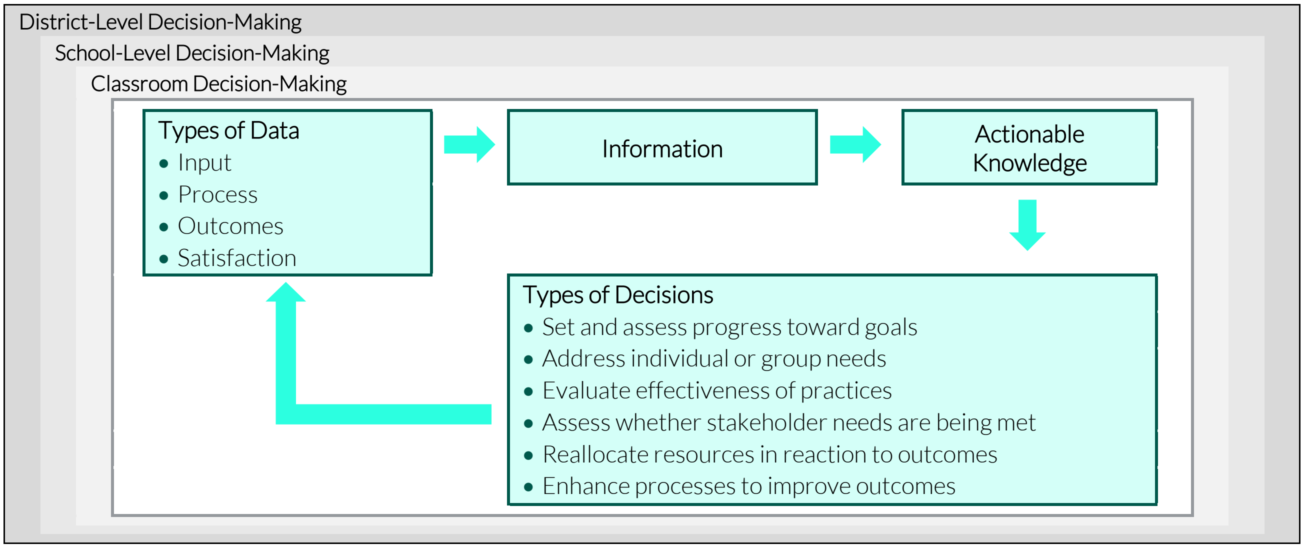
Secure

Data must be trustworthy and safeguarded to ensure privacy and accuracy.

Source: Data Quality Campaign[9]

To support these practices, **principals should establish a robust and iterative framework for data analysis at their school—and ensure that framework aligns with district and state guidance.**[10] This framework should focus on using data to meet strategic goals and make ongoing incremental improvements to student outcomes and school programming.[11] Relatedly, this framework should set out precise procedures to aggregate and examine data in such a way that it produces useful information and actionable knowledge that can inform a variety of decisions (see Figure C).[12] Indeed, such frameworks must move beyond generating, collecting, and sharing data to helping users engage with data in productive ways that influence decision-making and improve outcomes.[13]

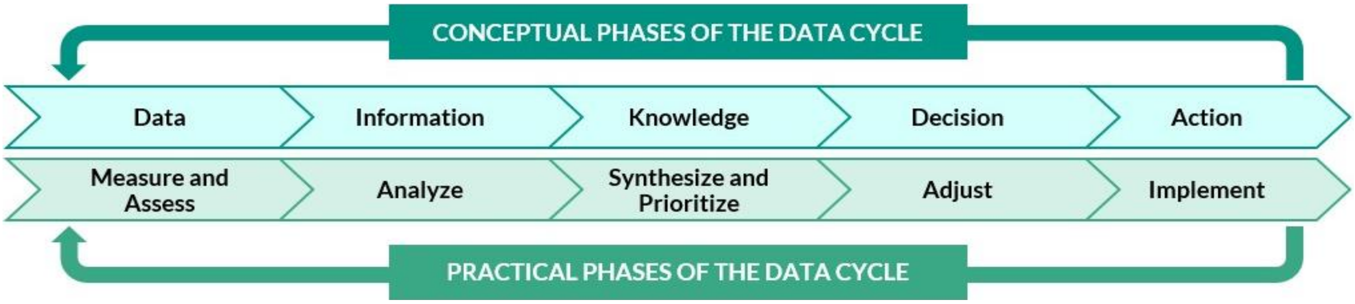
Figure C: Conceptual Framework of Data-Driven Decision Making in Education



Source: RAND Corporation[14]

Any established framework should consider both the organizational conditions necessary to support ongoing analysis of data to drive improvements and inform decision-making, as well as the provision of practices that will promote effective use of data by school leaders, teachers, and other staff.[15] When establishing appropriate organizational conditions, principals can take actions such as advocating for resources to create a user-friendly digital data system, allocating time for staff to examine data with peers, and providing professional development and technical assistance.[16] In terms of effective practices, principals should work with their staff to draft and implement logical procedures that can repeated over multiple iterations and that ask users to evaluate associated outcomes, the root causes of those outcomes and how those outcomes may manifest for different stakeholder groups (e.g., students of different racial and ethnic backgrounds, families of varying income levels).[17] Beginning below, Figure D visualizes both the theoretical and practical aspects of a data cycle and explains the ideal organizational components and strategies to support ongoing and effective data usage.

Figure D: Theory and Practice of Data Cycles and Necessary Conditions for Implementation



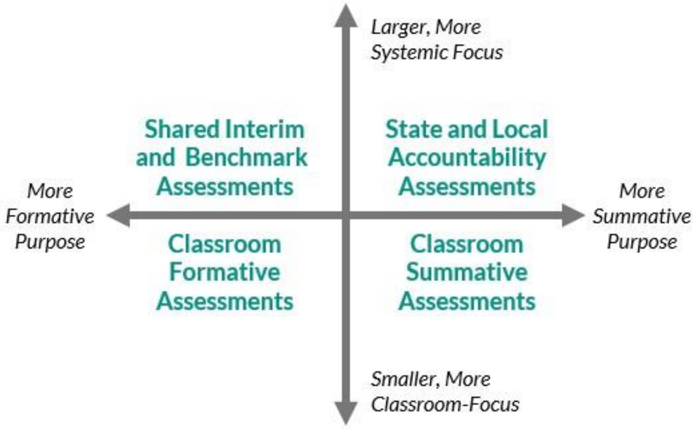
CULTURE	This domain includes the organizational components that build a culture that supports and promotes the use of data to drive decision-making. Components of this domain include: • School Leadership: School leadership cultivates data use by setting transparent expectations about data, providing access to data, modeling good data use, and allowing time and space for staff to engage with data. • Continuous Improvement Mindset: School staff embrace data as a tool when there is a school-wide orientation toward learning, continuous improvement, and collaborative inquiry. • Orientation to Alignment: Schools embrace strategies that support deep collaboration and syncing up actions with shared goals.
INFRASTRUCTURE	This domain includes the organizational components that support data use practices, making sure that teams have access and capacity to use data to improve instruction. Components of this domain include: • High-Quality Data: Data must be relevant, complete, secure, and actionable in order to inform changes to practice • Data Literacy: Educators must be confident in their knowledge and skills of data analysis and interpretation if they are to use data for decision-making purposes. • Data Facilitator: A data facilitator provides staff with access to data, processes to guide reflection, guidance in interpreting results, and accountability to act on the data findings. • Co-Created Goals: Schoolwide goals, co-created among staff, support the data cycle process by helping staff members collectively examine data, identify areas for growth, and agree upon goals.
PRACTICES	This domain includes specific strategies that are critical for ensuring schools are truly engaging in effective data cycles. Components of this domain include: • Reflection Routines: Schools articulate routines to regularly reflect on data in order to make adjustments and appropriately respond to students' needs. Effective reflection routines are: o Frequent and timely; o Occurring at the classroom, grade, and school-wide levels; o Guided by a protocol; o Providing a space and time for dialogue; and o Always action-oriented. • Analytic Practices: These are the actions that teams collectively and collaboratively engage in to examine data. Some key features of effective analytic practices are: o Allowing the data to speak first (i.e., reading the numbers before making interpretations); o Examining the data from multiple perspectives (e.g., schoolwide, individual student); and o Summarizing gaps or patterns in the data. • Feedback Loops: This is the process of sharing data with those who need to see it, ensuring decisions based on data lead directly to improved student outcomes. Effective feedback loops mean that data is shared with: o School staff so that all staff can take ownership in adjusting and improving their work; o Families so that parents and caregivers can understand how their child is performing and how they can work together with the school to support their child's learning; and o Students so that they have prompt and constructive feedback on their performance and can feel empowered to set goals for their learning.

Source: Learning for Action[18]

Assessment Procedures to Promote and Measure Learning

Principals should educate their staff on the nature of the data produced by certain assessment types to improve selection, creation, and use of assessments at their school (see Figure E on the following page).[19] Generally speaking, educational assessments in all of their forms produce particular data regarding student performance at a given moment in time that can be used to evaluate students' current knowledge and skills proficiencies and inform decision-making regarding instruction and schoolwide educational programming.[20] Assessment data can measure student performance and track progress toward expected performance, and it can also facilitate evaluation of the effectiveness of a certain program or practice in support of student outcomes.[21] For example, the purpose of formative assessments is to guide instructional practices and educational

Figure E: Four-Quadrant Framework for Describing Assessment Types



Source: Association for Supervision and Curriculum Development[24]

programming to help students achieve goals, whereas summative assessments' purpose is to determine the degree of learning that has occurred relative to certain objectives.[22] Notably, both formative and summative assessments can be given to evaluate outcomes and collect data at different degrees of focus and granularity, ranging from assessments of individual students to whole classes or specific demographics of students to an entire grade level, school, or district.[23]

Importantly, **principals should collaborate with district and school staff to define criteria upon which teachers and other instructional personnel can judge the quality of existing assessments and build new ones** (see Figure F on the next page for sample criteria).[25] Essentially, principals and their collaborators should help stakeholders understand what makes a high-quality assessment—regardless of purpose (e.g., formative, summative) or focus (e.g., classroom, schoolwide)—so that confidence exists in the generated data.[26]

Principals should emphasize the importance of the following when communicating about state- or locally-mandated assessments or when guiding staff in the creation of new assessments:[27]

- **Alignment**: Assessments should address specific curriculum standards or measure performance relative to established indicators which link to the target outcome. In particular, an assessment's cognitive demands should match the cognitive level of associated indicators or curriculum standards. It should also be clear to students completing the assessment and administering staff what skills, knowledge, and outcomes are being measured.
- **Accessibility**: The purpose of and expectations of what the assessment is meant to accomplish should be evident to staff, students, and other stakeholders. In addition, the assessment should be culturally responsive and feature universal design elements, as well as options for modification or accommodation for students with special needs. When possible, allowing students a choice in product or completion procedures—typically for classroom assessments—is an effective practice.
- **Transferability**: Assessments should simulate real-world applications or be relevant to students' lives. Ideally, assessments will require higher-order thinking and synthesis of multiple skills and knowledge strands, which build on prior knowledge and may or may not extend across disciplines.
- **Rigor**: Assessments should challenge students appropriately given their age, ability, and content exposure. Rather than rote recall of facts, assessments should ask students to integrate and apply the skills and knowledge described in several performance indicators or curriculum standards.
- **Scoring and Evaluation Criteria**: Assessments need a set of criteria upon which teachers can measure students' performance relative to the target standards or indicators. Criteria could include rubrics and designation of correct responses. This item is especially important in order to generate valid and reliable data that educators can use to make decisions or evaluate progress.

Alongside effective design principles, **principals should establish supports and provide direction to staff for interpreting and using assessment data to guide decision-making (i.e., assessment *for* learning) or evaluate the performance of students and educational programming (i.e., assessment *of* learning).**[28] Such supports and guidance should articulate the importance of assessment data as a driver of continuous improvement at all levels (e.g., individual student growth, schoolwide performance).[29] Moreover, school leaders should help stakeholders understand the specific purpose of assessments in order to best contextualize the outcomes associated with assessment data.[30]

Figure F: Classroom Assessment Domains and Standards

	Standard	Explanation
Foundations	Assessment Purpose	Classroom assessment practices should have a clear purpose that supports teaching and learning.
	Learning Expectations	Learning expectations should form the foundation for aligning classroom assessment practices with appropriate instruction and learning opportunities for each student.
	Assessment Design	The types and methods of classroom assessment should clearly allow students to demonstrate their learning.
	Student Engagement in Assessment	Students should be meaningfully engaged in the assessment process and use of the assessment evidence to enhance their learning.
	Assessment Preparation	Adequate teacher and student preparation in terms of resources, time, and learning opportunities should be part of classroom assessment practices.
	Informed Students and Families	The purposes and uses of classroom assessment should be communicated to students and, when appropriate, parents and guardians.
Use	Analysis of Student Performance	The methods for analyzing evidence of student learning should be appropriate for the assessment purpose and practice.
	Effective Feedback	Classroom assessment practices should provide timely and useful feedback to improve student learning.
	Instructional Follow-Up	Analysis of student performance should inform instructional planning and next steps to support ongoing student learning.
	Grades and Summary Comments	Summative grades and comments should reflect student achievement of the learning expectations.
	Reporting	Assessment reports should be based on a sufficient body of evidence and provide a summary of a student's learning in a clear, timely, accurate, and useful manner.
Quality	Cultural and Linguistic Diversity	Classroom assessment practices should be responsive to and respectful of the cultural and linguistic diversity of students and their communities.
	Exceptionality and Special Education	Classroom assessment practices should be appropriately differentiated to meet the specific educational needs of all students.
	Unbiased and Fair Assessment	Classroom assessment practices and subsequent decisions should be free from all factors unrelated to the intended purposes of the assessment.
	Reliability and Validity	Classroom assessment practices should provide consistent, dependable, and appropriate information that supports sound interpretations and decisions about each student's knowledge and skills.
	Reflection	Classroom assessment practices should be monitored and revised to improve their overall quality.

Source: National Council on Measurement in Education and Joint Committee on Standards for Educational Evaluation[31]

Supplemental Resources

The following resources provide additional information on effective strategies and procedures for principals to promote impactful data analysis and assessment practices at their schools beyond that already included in this info-brief.

Figure G: Resources on Data Analysis and Assessment

Resource	Publisher	Shortened URL	QR Code
	Data Analysis		
A Framework for Effective Data Use in Schools[32]	Learning for Action	https://qrgo.page.link/vr7CH	
Closing the Gap: Turning Data Into Action, Professional Development Toolkit[33]	American Association of School Administrators, Consortium for School Networking, and Gartner	https://qrgo.page.link/P3hjt	

RESOURCE	PUBLISHER	SHORTENED URL	QR CODE
How School District Leaders Can Support the Use of Data to Improve Teaching and Learning[34]	ACT	https://qrgo.page.link/4pT4F	
Implementing Data-Informed Decision Making in Schools—Teacher Access, Supports, and Use[35]	Office of Planning, Evaluation, and Policy Development, U.S. Department of Education	https://qrgo.page.link/gyhsb	
Reducing Barriers to Educator Data Use[36]	ACT	https://qrgo.page.link/nMrJF	
Use of Education Data at the Local Level: From Accountability to Instructional Improvement[37]	Office of Planning, Evaluation, and Policy Development, U.S. Department of Education	https://qrgo.page.link/nEpXi	
Using Data to Improve Schools: What's Working[38]	American Association of School Administrators	https://qrgo.page.link/bBjrX	
Assessment			
Aligning Curriculum, Assessment, and Instruction[39]	Measurement Incorporated	https://qrgo.page.link/q36SA	
Criteria for High-Quality Assessment[40]	Multiple	https://qrgo.page.link/rYK4c	
Early Childhood Education: Using Student Achievement Data to Support Instructional Decision Making[41]	National Association of Elementary School Principals	https://qrgo.page.link/V99bN	
Guide to the Assessment Design Decisions Framework[42]	Australian Government Office for Learning and Teaching	https://qrgo.page.link/Hx9zN	
How to Make Decisions with Different Kinds of Student Assessment Data: Chapter 1. An Introduction to Different Kinds of Data[43]	Association for Supervision and Curriculum	https://qrgo.page.link/UQVun	
Summative Assessment: Design Guide[44]	Great Schools Partnership	https://qrgo.page.link/kbFvK	
Using Student Assessment Data to Support Decision-Making[45]	Center on Standards and Assessment Implementation	https://qrgo.page.link/xa7K2	

Source: QR Code Generator[46]

Endnotes

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