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Toward Data-Driven Education Systems: More Data and More Evidence Use

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Abstract

Governments and organizations have generated copious amounts of data and analysis to support education decision-making around the world. While continued investments in education data collection, curation and management are necessary, the ultimate value of evidence is not in its production, but its use. Information does not necessarily translate into better decisions because those who produce education data are often far removed from those who make crucial decisions about education policies, programs, and investments. With limited insight into what evidence decision-makers use and need, the likelihood of non-use and misuse of information is high. There has been surprisingly little systematic research on the types of information education decision-makers in developing countries value most – and why. This paper aims to help the global education community take stock of what information decision-makers use to manage change and measure results. It analyzes data from two surveys of education stakeholders in low- and middle-income countries on their use of data in decision-making.

Introduction: The Role of Information in Education

Today, 650 million children around the globe are at risk of being left behind as they fail to learn basic skills. Inequitable access to education is part of the problem, but even when children are in school, they may not be learning. It is clear that the status quo is not good enough, but what should be done differently? While struggling schools would certainly benefit from better facilities and more teachers, past research underscores that input-oriented solutions are likely insufficient. Many countries that dedicate substantial resources to education still fall short of ensuring that all children are learning. Parents, teachers, policymakers, and school administrators need better tools to diagnose where and why learning gaps exist, and assess what strategies they can employ to turn things around. High-quality data and evidence are essential for both tasks.

Governments and profit and not-for-profit organizations have responded to this challenge by generating copious amounts of data and analysis to support education decision-making around the world. While continued investments in data generation and management are necessary, the ultimate value of evidence is not in its production, but its use. Herein lies one of the biggest challenges of translating information into actionable insights: those who produce education data are often far removed from those who make crucial decisions about education policies, programs, and investments. With limited insight into what evidence decision-makers use and need, the likelihood of non-use and misuse of information are high.

Yet, there has been surprisingly little systematic research on the types of information education decision-makers in developing countries value most – and why. Much of the available evidence on the use of education data in developing countries relies upon small case studies. These qualitative snapshots offer deep insights of use patterns and challenges in a single context, but make it difficult to draw broader conclusions. This paper contributes to this body of knowledge by analyzing the results of two surveys of education policymakers in low- and middle-income countries that asked about their use of data in decision-making. Survey participants include senior- and mid-level government officials, in-country staff of development partner organizations, and domestic civil society leaders, among others (see Appendix for more information). We define information broadly, including raw statistical and administrative data, quantitative and qualitative analysis, learning assessments, and the results of program evaluations.

Our aim is to help the global education community take stock of what information decision-makers use to manage change and measure results. In section 2, we articulate a theory of change that charts the path from information generation to use (i.e., how education systems transition from being data-rich to data-driven). In section 3, we synthesize what past studies reveal about how data have influenced education policy, programs, and practice, paying particular attention to the motivations and incentives that appear to play a role in both the production and use of education data. In section 4, we present the findings from two surveys of education sector decision-makers conducted

in 2017, with the specific aim of identifying what data they use, how they use it, and how data can be more useful for policy decisions. We conclude with some practical recommendations to help those who fund and produce education data to be more responsive to what decision-makers want and need.

From Information to Impact: A Theory of Change

A learning-focused education system must capture accurate, timely, and comparable data that link inputs (e.g., school resources and financing) to outputs (e.g., school enrolment and attendance) and outcomes (e.g., performance assessments and other quality indicators). The UN issued a Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda calling for a "data revolution."[1] The international response to this call appears to be more than mere rhetoric. Open Data Watch (2016) reports an overall rise in global investments in statistical capacity – from $264 million in 2015 to $328 million in 2016.[2] Ultimately, these investments in data creation must be matched by an equal (or greater) emphasis on increasing the use of evidence by decision-makers.

The path from data generation to use, however, is not simple, automatic, or quick. The seemingly straightforward story of information supply, demand, and use is complicated by users' norms (how they prefer to make decisions), relationships (who they know and trust), and capacities (their confidence and capability to turn data into actionable insights). The process of moving from data generation to use and impact on education outcomes must take into account different institutional operating environments (i.e., political context) that incentivize or dampen efforts to make decisions based upon evidence. Figure 1 illustrates the complex chain from data generation to use and impact.

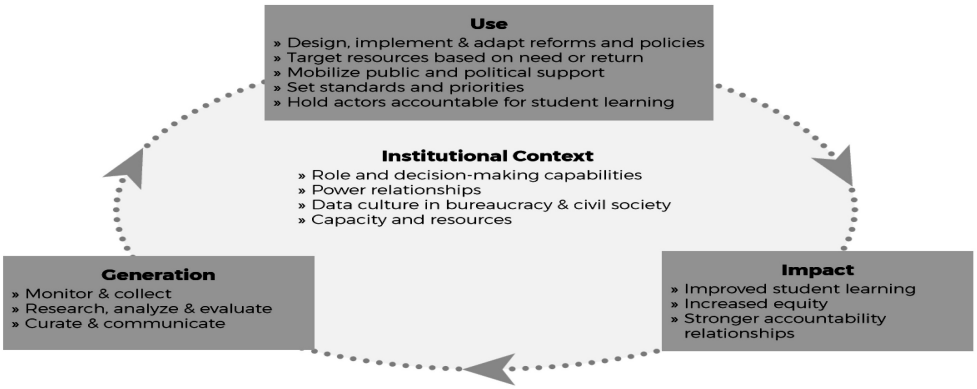
Advances in technology and connectivity have democratized the *generation* of education data, particularly in front-line service delivery contexts such as local schools. Governments at all levels are involved in collecting, verifying, curating, storing, analyzing, and communicating data on education inputs and outcomes. Non-government actors such as researchers in academic institutions, civil society organizations,

[1] Recent landmark reports echo this revolutionary zeal for more and better data in the education sector. For example, the Education Commission's *Learning Generation* report argues that "setting clear priorities and high standards, collecting reliable performance data to track system and student progress, and using data to drive accountability are consistent features of the world's most improved education systems" (Education Commission, 2016, p. 52). The 2016 *Global Education Monitoring* report champions the generation and use of education data, particularly learning metrics, to realize the promise of education for all (UNESCO, 2017). The first World Development Report on education, entitled *Learning to Realize Education's Promise*, reiterates the need to measure learning to catalyze action: "Lack of data on learning means that governments can ignore or obscure the poor quality of education, especially for disadvantaged groups" (World Bank, 2018, p. 91).

[2] Open Data Watch (2016) indicates that donors should increase aid by approximately $350 to $450 million per year to meet the needs for the SDG data improvements and expansions mainly in 77 low-income countries.

international development agencies, and even parents and teachers also generate country-specific data. To move from generation to use, decision-makers must first take notice of available data, interpret it, and link it to the roles that they play in the education system (Coburn, Honig, & Stein, 2009). As part of that process, decision-makers assess whether the data available is fit-for-purpose in that it is of sufficient quality, timeliness, and relevance to generate valuable insights. Only then will they use data to allocate resources, set policies and standards, or make course corrections.

Figure 1. Data and evidence: From generation to use and impact



The ultimate objective of evidence-based policymaking is to fuel progress toward three outcomes: improved student learning, increased equity, and stronger accountability relationships among policymakers, school administrators, teachers, parents, and students. Unfortunately, not all education data are used in these ways. Whether or not policymakers embrace evidence-based practice is largely shaped by their conception of what is valid evidence, their technical capacity to understand available data and analysis, as well as their own "cost-benefit calculus" regarding the effort needed to make decisions based upon evidence rather than other factors.

The likelihood that data are effectively used in the decision-making process is highly influenced by the extent to which data availability is accompanied by an institution-wide culture of open communication (or information sharing), appreciation of data, and accountability for results. In promoting a culture of evidence-based decision-making, leaders must ensure that staff at all levels not only have access to relevant data, but that the information they create feeds into the decisions of others. A strategy for data generation and use must reflect the differences in the perspectives and roles of various stakeholders. There are instances when local concerns are not reflected in national priorities or standards. For example, school-level mechanisms to monitor teacher performance may not connect to up-stream decisions about compensation and in-service training.

A Growing Store of Data and Evidence

There is no question that education information is becoming more abundant—but is it being used by those making consequential decisions about where to devote scarce resources and how to design programs in order to maximize student learning? Collecting, processing, and communicating data requires substantial resources, which makes it essential to ensure these data are indeed accessible and valuable to key decision-makers. In this section, we assess the current state of investments in data generation, particularly efforts to strengthen education management and information systems (EMIS), large-scale student assessments, and impact evaluations of policies and programs. We also review the existing evidence on whether and how education sector decision-makers use these information sources.

Education Management Information Systems

The EMIS in education ministries across countries typically produces data that could be of tremendous value for the design, implementation, and monitoring of education programs. It centrally organizes information from multiple levels of the education system, collecting and managing critical data points such as student enrollments, number of teachers, and class size. Schools or local governments usually report these data on a periodic basis, using standard forms and guidelines from the central education ministry. Countries are increasingly adopting web-based dissemination of EMIS data, which is making education systems more open and transparent.

Unfortunately, in many countries the EMIS is not fully functional, which inhibits effective monitoring of education policies and programs (Abdul-Hamid, Saraogi & Mintz, 2017). In particular, education administrators must tackle several challenges, ranging from data quality to leadership and capacity, before these EMIS are 'fit-for-purpose' (Table 1). A number of case studies illustrate these challenges in practice. For instance, Ghana, often cited as a regional leader for its data capabilities, still faces major constraints of duplicative data systems, limited quality assurance procedures, and over-reliance on paper-based and manual data entry processes (Spratt et al., 2011).

Learning Assessments

Participation in international, regional, and citizen-led learning assessments has grown over the past two decades in low- and middle-income countries (Table 2). In 2015, 72 countries participated in the Program for International Student Assessment (PISA), up from 42 in 2001, with an additional 7 countries involved in PISA for Development (Lockheed, 2015). Similarly, participation in the Trends in International Mathematics and Science Study (TIMSS) increased from 26 to 51 countries for the 4^{th}-grade test between 2003 and 2015 (Provasnik, et al., 2016). Regional initiatives on student assessments for

Table 1. Challenges for Education Management and Information Systems

		Number of EMIS activities
Data challenges	Lack of data utilization for decision making	4
	Untimely production & dissemination of data	8
	Lack of reliable & quality data	8
System challenges	MIS not functional due to technical problems	6
	System capacity issues	13
Operational challenges	Lack of training for data usage	2
	Coordination issues	3
	Funding issues	3
	Long-term sustainability	5
	MIS not implemented	6
	Implementation delays	6
Leadership challenges	Leadership changes	2
	Lack of data culture	2
	Lack of clear vision & support	6

Note: EMIS = Education Management Information System
Source: Abdul-Hamid, Saraogi & Mintz (2017)

countries in Africa and in Latin America and the Caribbean have also increased their coverage. More countries are also implementing their own large-scale national learning assessments. According to the UNESCO Institute of Statistics (UIS) Learning Assessment Capacity Index, governments in 127 of 235 countries (54 percent) conducted a national student assessment between the years of 2010 and 2015.

Sponsors of student learning assessments emphasize their value for policymaking and agenda setting, but the evidence of such use is scarce and uneven. Open data on student performance has been a boon to researchers seeking to explain differences in education outcomes at regional and international levels, but the link between assessment results and educational reforms in countries is tenuous at best (Kellaghan, 2009).

International assessments appear to have greatest visibility in higher income countries. Countries like Germany and Norway have responded to the release of their PISA results with a revision of curriculum standards (Breakspear, 2012) and the introduction of a national quality assessment system (Baird et al., 2011), respectively. However, the challenge of translating awareness of international assessments into action seems more acute in middle- and low-income countries. In Colombia, Indonesia, Jordan, and Turkey, the release of PISA and TIMSS results has been associated with a subsequent uptick in discussion of education reform (Lockheed, 2015). However, it is unclear whether this heightened awareness has provoked real action. Similarly, while citizen-led learning assessments in India, Pakistan, and a few African countries have increased

Table 2. Types of large-scale assessments of student learning

National and sub-national learning assessments	National and sub-national learning assessments regularly track and assess whether students are mastering the national curriculum, in which areas students are stronger or weaker, whether certain population groups are lagging behind and by how much, and which factors are associated with better student achievement. Assessments are census-based or capture representative samples of students across countries or provinces.
International and regional learning assessments	Examples of international assessments include the Program for International Student Assessment (PISA), Trends in International Mathematics and Science Study (TIMSS), and Progress in International Reading Literacy Study (PIRLS). Regional assessments include the Southern and Eastern Africa Consortium for Monitoring Education Quality (SACMEQ), the Programme for the Analysis of Education Systems (PASEC) in francophone West and Central Africa, and the Latin American Laboratory for Assessment of the Quality of Education (LLECE).
Citizen-led learning assessments	Citizen-led assessments measure learning outcomes for children both in and out of school. Such assessments, led by civil society organizations such as the ASER Center in India and Uwezo in East Africa, involve parents and community stakeholders to yield learning metrics on both access and quality of education systems. Citizen-led assessments are of particular importance in settings where official assessments are of questionable quality.

Source: Adapted from the *World Development Report* (World Bank, 2018).

public awareness of poor learning levels, they have not necessarily spurred concrete and sustained action to improve the quality of teaching (R4D, 2015).

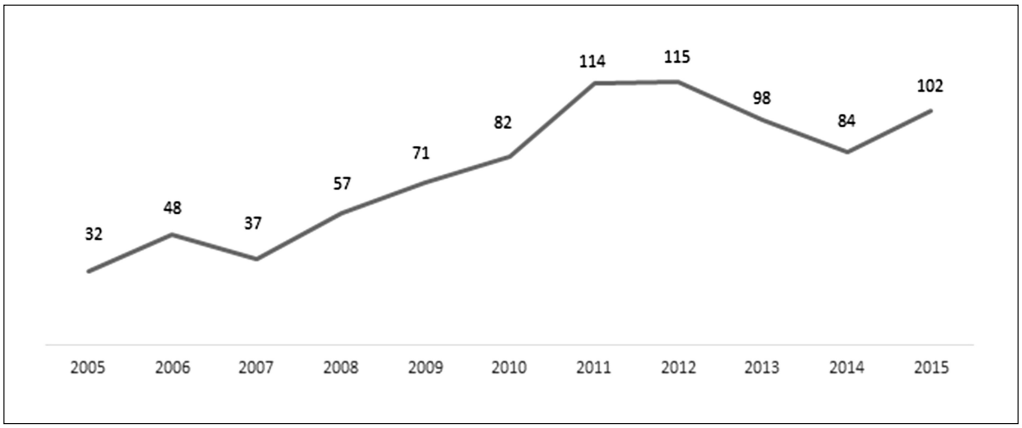
In contrast, governments' national learning assessments have had more traction with policymakers in developing countries, but the evidence on the nature and intensity of their use is mixed. On the one hand, these national assessment systems are thought to be relatively more relevant than international assessments in designing pedagogical reforms (Clarke, 2012). In Jordan and Uruguay, for example, the national assessment results were used to help teachers improve their teaching (Obeidat & Dawani, 2014; Ravela, 2005). Other research, however, indicate that these assessment data are used primarily to support countries' monitoring and evaluation systems, curriculum reform, and the allocation of school inputs, and less for the design of teacher policies (Clarke, 2012).

Program evaluation and other research

Policymakers and practitioners have access to a larger body of research than ever before about the determinants of increased learning and equity within education systems. While school-level administrative data from a country's EMIS and student learning assessments can support real-time monitoring, program evaluations help assess what is (or is not) working and why. Collectively, these studies pinpoint reforms, investments, and community initiatives that have made a quantifiable difference in learning outcomes. This should, in theory, provide decision-makers with the lessons they need to inform program selection, design and implementation.

Impact evaluations alone have increased three-fold since 2005 (Figure 2), while meta-reviews distil insights from hundreds or thousands of published studies to further clarify what works to improve student learning.[3] Table 3 draws upon data from the International Initiative for Impact Evaluation (3ie), which tracks how policymakers and other stakeholders use their evaluation studies. While not limited to the education sector, the data shows that impact evaluations are influencing decision-making across sectors, particularly with regard to informing course corrections, as well as discussion and design of policies and programs.

Figure 2. Growth of impact evaluations in education



Source: 3ie Impact Evaluation Repository. http://www.3ieimpact.org/en/evidence/impact-evaluation

[3] Murnane & Ganimian (2014); Andrabi, Das, & Khwaja. 2014; Krishnaratne, White, & Carpenter (2013); Conn (2014); Blimpo & Evans (2011); McEwan (2015); Snilstveit, et al. (2016); Evans & Popova (2016); Glewwe & Muralidharan (2015); Kremer, Brannen, & Glennerster (2013).

Table 3. Use of 3ie-funded impact evaluations and systematic reviews

	Percent
Take successful programs to scale	8.2
Close programs that do not work	3.1
Change policy or program design	27.8
Inform design of other programs	23.7
Inform discussion of policies & programs	25.8
Inform global policy discussions	11.3
Improve culture of evaluation use & strengthen enabling environment	0.0
Total	100.0

Notes: There was a total of 120 uses of the studies as of September 2017. The table gives the frequency distribution across types of usage, so the percentage shares sum up to 100. These percentages are not about the probability of use.

Data source: Executive Director's Report to the Eighteenth Meeting of the 3ie Board of Commissioners, London, 7 November 2017.

Nonetheless, two reviews by the Global Partnership for Education (GPE) suggest that research and analysis have limited influence on the education sector plans of the countries it supports. According to Bernard & de Chaisemartin (2015), only 18 of 42 country plans used an education sector analysis to inform their policies and even fewer cited rigorous analysis to identify root causes of performance challenges or determine sector priorities, even when the information was readily available. Similarly, an earlier assessment of 46 sector plans and joint sector reviews found that these documents rarely discussed learning outcomes or cited empirical evidence (e.g., education production functions, randomized trials, meta-analyses, surveys) in articulating their approach to improving learning outcomes (GPE, 2012).

The apparent disconnect between evaluations and forward-looking planning warrants further scrutiny. While we will probe this question in greater depth in the next section using the survey results, here we will make three observations. First, education decision-makers will only use evaluation data that is relevant to them. This might be easier said than done. The 3ie repository is a case in point: over half of the 855 impact evaluations in the education-sector pertain to just 10 countries. Education stakeholders interested in other geographic areas are out of luck. Second, evaluation studies tend to be funder-driven, and thus may not cover the specific programs or topics of interest to a broader set of education stakeholders. Finally, published evaluation studies typically focus on programs that have shown some impact, but education decision-makers are interested in learning not only from program successes, but also their failures to avoid common pitfalls.

Beyond evaluation studies that focus on specific policies or programs, other initiatives, such as the Research on Improving Systems of Education (RISE) program and the World Bank's Systems Approach to Better Education Results (SABER), aim

to produce a rich body of analytical work that could improve our understanding of the underpinnings of progress in education outcomes in developing countries. SABER, in particular, offers system-level diagnostics on the state of education in developing countries. The diagnostic toolkit enables educators and policymakers to assess education policies and practices in light of global standards and best practices. There is some indication that SABER diagnostics are being used to influence country reforms and dialogue with development agencies.[4] For example, one case study documents the steps that Jordan has taken (based upon background information from SABER) to strengthen its student assessment systems through linking student assessments with teacher training and support, as well as disseminating assessment results (Obeidat & Dawani, 2014).

In the next section, we analyze the results of two surveys of national-level decision-makers and influencers involved in setting and informing education policy across public, private, and civil society spheres in low- and middle-income countries. When data advocates promote evidence-based decisions in education systems, they rarely specify who are the intended users, for what purpose, and what kinds of data are needed. The implicit assumption is: by everyone, for everything, and any data. However, the reality is more sobering. There is little indication that decision-makers are using education data and analysis systematically to inform their policies or decisions.

Identifying Data Needs: What Do Education Decision-Makers Want?

To move from data generation to policy impact, it is clear that we need better intelligence on the barriers to evidence use and the types of information that decision-makers want. In 2017, AidData fielded two surveys of national-level policymakers and practitioners in low- and middle-income countries who shared their experiences of how they source and use data in their work, as well as what would be most helpful to them in the future. Here we analyze these novel datasets to answer three key questions: what data are in demand, by whom, and why? The three top-line findings are:

- Education decision-makers seldom view evidence as the decisive factor when weighing the merits of policy decisions, but it does appear to play a supporting role.
- Education decision-makers consume data from various sources and of different types in their work, with demand outstripping supply when it comes to program evaluation data.
- Education decision-makers want data to be timely, actionable, disaggregated, and locally relevant. To this end, they prioritize strengthening their countries' EMIS.

Before discussing these findings in greater detail, we provide a brief background of the survey data.[5]

[4] See country briefs in the program website: http://saber.worldbank.org/index.cfm?indx=6&sub=5.

Survey data collection

AidData's *2017 Listening to Leaders (LtL) Survey* was sent via email to policymakers and practitioners knowledgeable about, or directly involved in, development policy initiatives at any point between 2010 and 2015 in 126 low- and middle-income countries. Of the 47,000 people who received an invitation, 3,500 (7.4 percent) participated in the survey. Their insights shed light on the broader picture of data use and whether and how the education sector is different from other social sectors.

AidData and the Brookings Institution then fielded a follow-up survey targeting 2,000 education decision-makers in 126 countries. Approximately 180 leaders from 78 countries responded to the *2017 Education Snap Poll*, which provides a unique opportunity to examine the various roles that education stakeholders perform and their specific data needs. Respondents to the two surveys included representatives from five stakeholder groups: government officials, development partner organizations, civil society groups and NGOs, private sector, and independent experts.[6]

Most respondents to the education poll have roles that support policymakers who make decisions related to these domains. Some also make final decisions or advocate for a particular course of action. In interpreting the results, it is important to recognize that the focus in both surveys is very much on national-level decision-makers. As such, these data give insight into what some user groups care about, but not the needs and concerns of other groups (e.g., parents, teachers, school-level administrators, local officials).

Snap poll respondents reported on the types of decisions they make in the education sector and the role information plays – among other factors – in that process. Government officials, for example, may allocate resources, determine quality standards,[7] and hold school administrators accountable for meeting national targets.[8] Civil society leaders may advocate for more effective government-run schools or administer their own programs that are subject to national standards.

Using the survey responses, we can gain insight into the extent to which data or analysis is a driver of these common education sector decisions in practice. Specifically, we asked participants in the *2017 Education Snap Poll* about the role of information versus other factors in driving ten common education decisions, adapted from the OECD's

[5] We point the reader to the full study which is available online on the Brookings Institution website (Custer et al., 2018).

[6] Given the relatively small sample size for the education poll, we primarily draw insights regarding the survey respondents overall, though in some cases we mention differences among stakeholder groups.

[7] Depending on the level of autonomy granted by the central government, sub-national governments are able to plan and execute action plans pertaining to education targets, monitor schools, and allocate financing based on local needs.

[8] School administrators supervise teachers, implement school budgets, and report on student enrollment and progression. It should be noted that while these front-line implementers are an important group of education data users, or survey results are primarily capturing use patterns of national-level leaders.

Education Sector at a Glance (2012). We further categorized these decisions into four decision-making domains: (1) organization of instruction; (2) personnel management; (3) resource management; and (4) planning and structures (Table 4).

Table 4. Education decisions included in the *2017 Education Snap Poll*, by domain

Organization of instruction	Designing and implementing support activities for students Testing, assessing, and/or credentialing students
Personnel management	Hiring and deploying teachers or principals Developing careers and assessing performance of teachers and/or principals Determining compensation for teachers/principals
Resource management	Budgeting and allocating financial resources for education Ensuring provision of school inputs
Planning and structures	Designing and defining programs of study and course content Creating or closing/abolishing schools or grades Planning and developing strategies

Data source: Decision-making domains adapted from *OECD Education at a Glance* (OECD, 2012)

Leveraging responses from the 2017 *LtL Survey*, we can also pinpoint the primary purposes for which decision-makers and influencers use education data or analysis in their work. Survey respondents could identify several possible use cases, including: program design, program implementation, advocacy and agenda-setting, capacity building and technical assistance, monitoring and evaluation, research and analysis, or external communications.

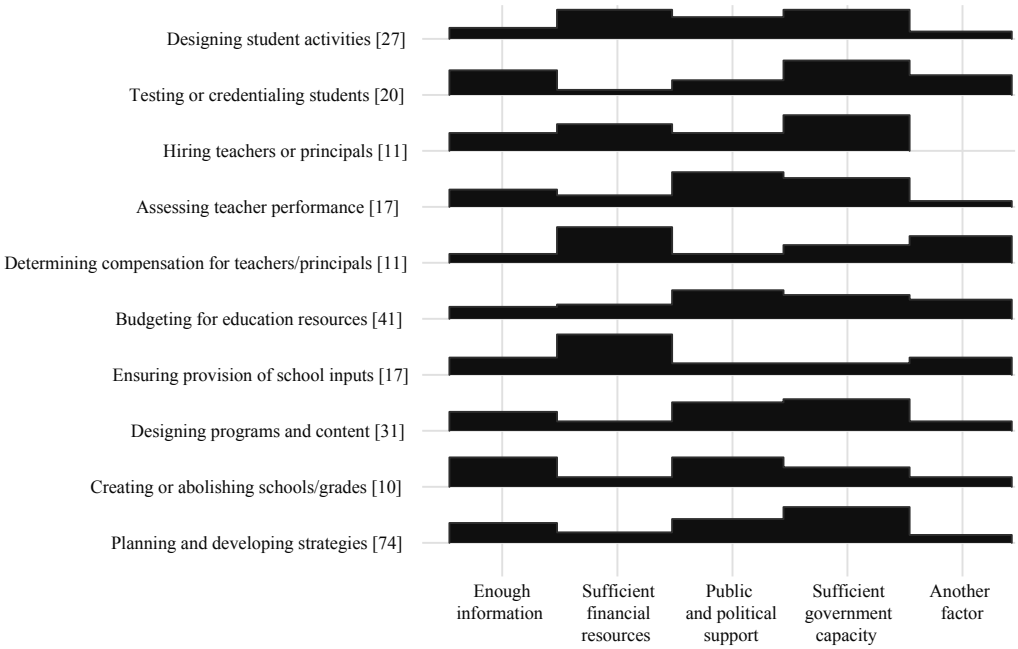
Findings from Two Surveys

Finding 1: Having enough information is seldom the decisive factor in making most education decisions; instead, decision-makers point to having sufficient government capacity.

Policymakers and practitioners in the *2017 Education Snap Poll* identified sufficient government capacity to implement [policy or programmatic] changes as the decisive factor in making or influencing most decisions in the education sector.[9] Comparatively, leaders view having sufficient information as less consequential in how decisions are made than technical capacity, financing, and political support (Figure 3). Leaders place

a somewhat higher premium on having enough information when it comes to decisions such as creating or abolishing schools or grades, and to testing, assessing or credentialing students.[10] One possible explanation could be that leaders feel that they need stronger justification (via an evidence base) for these decisions as they could become easily politicized. Teachers or parents may strongly disagree with a school closure, for example, and mobilize dissenting voices.

Figure 3. What is the most important factor influencing decisions in education activities?



Notes: Of the ten activities listed on the left side of this figure, each respondent first selected the activities that s/he was involved in, and then the most important factor influencing the decisions pertaining to each activity selected. For each activity, the distribution of responses is visualized from left to right. The total number of responses for each activity is noted in parentheses.
Data source: *2017 Education Snap Poll*

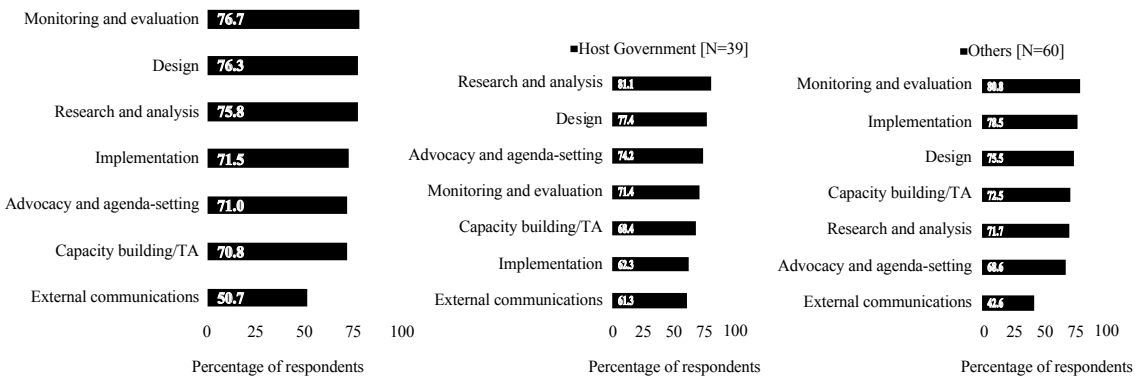
[9] Respondents first selected all the activities they were personally involved with and then identified the most important factor in making or influencing those decisions. See Figure 3 for the response options. While respondents could have interpreted "sufficient government capacity" in a number of ways, we think it reasonable to interpret this as capacity to implement programs or policies.
[10] This result is based on a rather small number of responses, and therefore should be interpreted with caution, especially in generalizing the findings to the education sector as a whole.

This does not necessarily mean that these decision-makers view this as the ideal situation, merely the status quo. There could be a mutually reinforcing relationship between government capacity and the perceived importance of information in decision-making. Shortage of staff in national statistical organizations and ministries and limited capacity for using and analyzing data have been reported to be among the most critical constraints to data use in Honduras, Timor-Leste and Senegal (Custer & Sethi, 2017). That said, these results are consistent with prior studies, such as that by Bruns & Schneider (2016), which show that political considerations have stymied education reforms in several Latin American countries, even when empirical evidence justifies reforms.

Finding 2: Education decision-makers employ evidence in a supporting role throughout the policymaking process, for both retrospective assessment and forward-looking activities.

The majority of education sector decision-makers (over 70 percent) that report using data or analysis do so fairly consistently throughout the policymaking process (see Figure 4, left). This appears to reinforce the earlier finding that evidence can play a supporting role, even when it is not the major driver of education decisions. When analyzing the results of the *2017 LtL Survey* across all sectors, Masaki et al. (2017) observed that on average, "leaders use evidence more to conduct retrospective assessments of past performance than to inform future policy and programs." However, decision-makers in the education sector are more likely to use data and analysis for forward-looking purposes, such as design and

Figure 4. For what purposes do education decision-makers use information?



Notes: The figure on the left shows the percentage of respondents in the education sector who use evidence for different purposes (n=99, respectively). Percentages do not add up to 100 because respondents were able to select all applicable response options. The figure on the right disaggregates the results into two cohorts: government officials and other stakeholder groups in the education sector.

Data source: *2017 Listening to Leaders Survey*

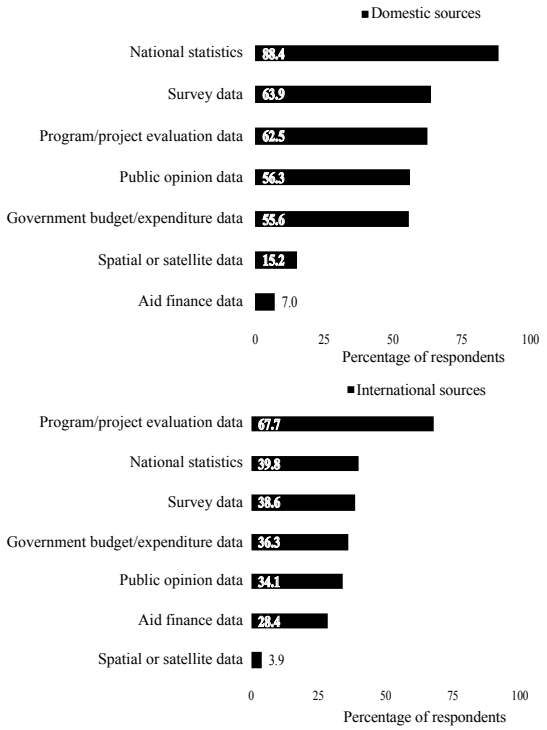
implementation of policies or programs.

Nonetheless, education decision-makers are not monolithic and we see important distinctions between stakeholder groups in how they report using information in their work. Interestingly, in light of their oversight of vast public sector education programs, government officials were less likely than other stakeholder groups to use data and analysis for program implementation or monitoring and evaluation (Figure 4, right panel). This finding may partly reflect the composition of the survey, which includes national-level officials, rather than local government representatives or school administrators.

Finding 3: Education decision-makers most often use national statistics from domestic sources and program evaluation data from international sources for their work.

Which types of information do education sector policymakers and practitioners use in their work – and from which sources? Responses to the 2017 *LtL Survey* indicate that among domestic sources of information, decision-makers overwhelmingly relied on

Figure 5. What types of data do education decision-makers use?



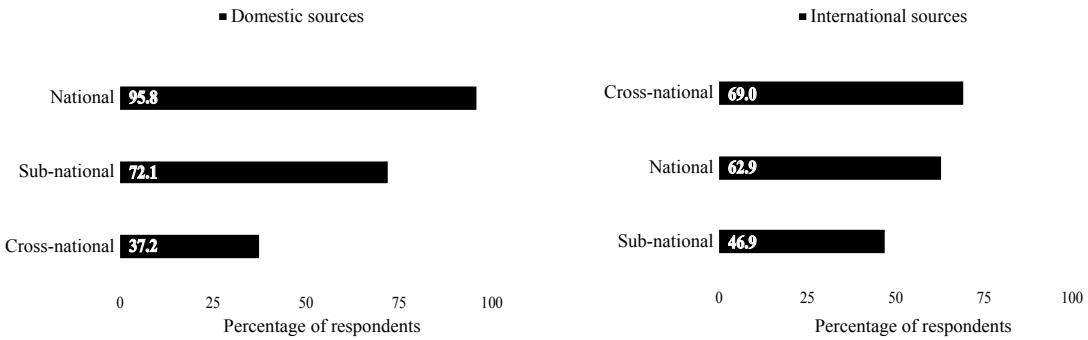
Notes: This figure shows the percentage of education respondents who use each type of data. 32 (or 35) respondents answered questions about the types of data produced by domestic (or international) sources.

Data source: *2017 Listening to Leaders Survey*

national statistics. Of the information produced by international organizations, education stakeholders were most likely to use program or project evaluation data (Figure 5). Nearly 90 percent of education decision-makers reported using national statistics to support their work, compared with 64 percent who use program evaluation data or survey data. The outsized use of national statistics among education decision-makers could reflect the sector's reliance on routine administrative data, such as enrollments and school infrastructure available through the country's EMIS.[11]

Since world leaders adopted the *World Declaration on Education for All* in 1990, there has been a strong recognition that leaving no one behind means shining a light on inequalities not only between, but also within countries. So, how does this affect use of data by education sector policymakers? When it comes to domestically produced data, the preponderance of leaders uses information disaggregated at the national- (96 percent) or sub-national (72 percent) levels (Figure 6).[12] Since our respondents are primarily national-level leaders based in capital cities, the use of sub-national data is likely less pronounced than it would be among local-level leaders.

Figure 6. How granular is the information being used by education decision-makers?



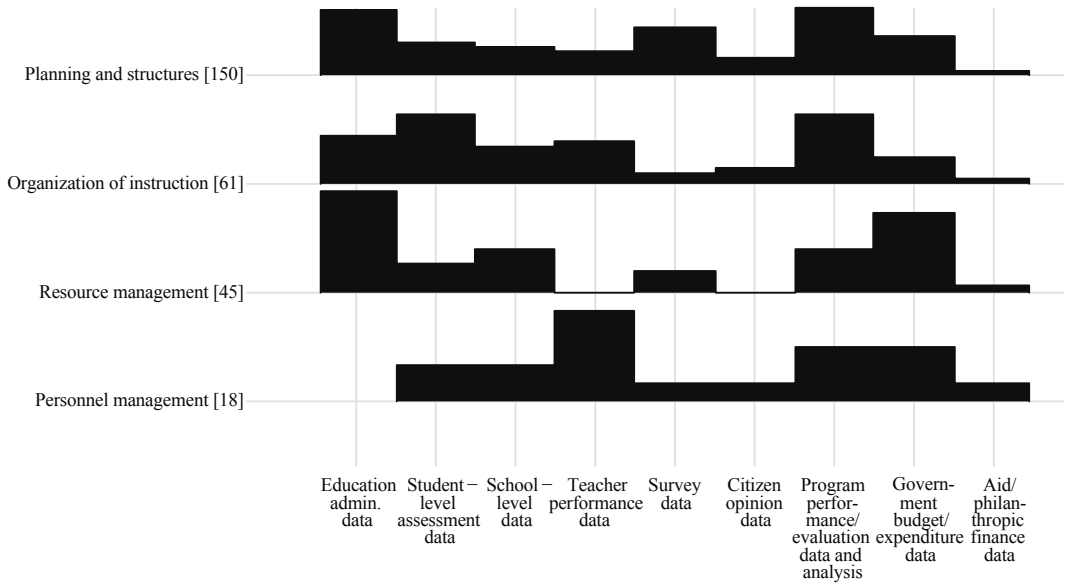
Notes: This figure shows the percentage of education respondents who used information at varying levels of geographical granularity. 37 (or 45) respondents answered questions on the granularity of domestic (or international) information.
Data source: *2017 Listening to Leaders Survey*

[11] The high use of national statistics points to the salience of data for the country in question. This may include statistics such as dropout rates for primary school students by district or municipality, the number of schools with secondary education in each village, or pupil-teacher ratios in urban vs. rural areas. The information itself may be at any administrative level, but pertains to the state of affairs for the country in question.
[12] A similar use pattern is found in the health and governance sectors. Within the sub-national category, respondents mostly used provincial data (65%) and district-level information (44%).

Finding 4: Education decision-makers consider administrative data and program evaluations most essential, and want more of the latter, signaling a gap between need and supply.

To what extent does the data that leaders want vary depending upon the nature of their work? We assess which types of data decision-makers deemed most essential in each of the ten common education activity areas we examined previously. Figure 7 provides a breakdown of how decision-makers rated the most (and least) essential data types by education activities. We also asked survey respondents about their wish list – what types of information would they want more of? The top-line results are summarized in Table 5.

Figure 7. What types of data are most essential for education decision-makers?



Notes: The number of responses in each decision-domain are reported in parentheses. For each decision-domain, the distribution of responses among various types of data is visualized from left to right.
Data source: *2017 Education Snap Poll*

As shown in Figure 7, decision-makers responsible for allocating and managing resources place a premium on administrative data (e.g., number of schools, teachers, students) and government budget and expenditure data (e.g., school-level budgets, expenditure per student). For those working on personnel management, teacher performance data are most valuable to hire and compensate staff. Meanwhile, leaders tasked with overseeing instructional matters deem program evaluation data and student-level assessment data essential.

There were several categories of data that decision-makers wished were more readily available to support their work.[13] In Table 5, we juxtaposed what data leaders wished for with the data they deemed most essential for their work in each of the four decision-domains. Data types that were both deemed as essential to leaders' work and also high on their wish lists represent attractive investment opportunities for data producers to increase their impact in response to user demand. We identified four such opportunities: (1) program performance and evaluation data; (2) budget and expenditure data; (3) student-level assessment data; and (4) teacher performance data.

Table 5. Data needs in the education sector, by decision-making domain

	Essential but not high on wish list (Met need)	Essential and high on wish list (Unmet need)	Not essential but on wish list	Neither essential nor on wish list
Decision domain	(1)	(2)	(3)	(4)
Planning and structures	Education administrative data	Program evaluation data	Citizen opinion data	Aid and/or philanthropic finance data
Organization of instruction	-	Student-level assessment data	School level data	Aid and philanthropic finance data; survey data
Resource management	Education administrative data	Government budget and expenditure data	-	Teacher performance data
Personnel management	-	Teacher performance data	Education administrative data	Aid and/or philanthropic finance data

Data source: *2017 Education Snap Poll*

The desire for more evaluation data is striking in relation to the earlier supply-side discussion in Section 2. While there has been a steady uptick in the last two decades, gaps clearly remain in the geographic diversity of the existing studies and in sharing and disseminating the findings of existing evaluations with decision-makers in low- and middle-income countries. This valuable data is seen as being in short supply. Civil society organizations report that the results of programs that have not worked are not made public due to reputational risk, hindering future learning from such failures (Custer & Sethi, 2017). Meanwhile, the limited ability of policymakers to interpret evaluation data is also a serious barrier in using research to inform policy (Callen et al., 2017)

[13] It should be noted that 18 percent reported having access to the information they need.

Silos and fragmentation may be a common theme across the three remaining data investment opportunities. Above, we foreshadowed that the use of student learning assessments was likely hampered by the lack of interoperability. Host government officials wish for education administrative data; however, since the government itself often collects such data, this suggests that the root issue may be lack of access, rather than availability. Government ministries are often reluctant to share information and instead retain competing, proprietary systems. These access issues are compounded for data users outside of the government that seek greater access to teacher performance data (prioritized by CSO leaders) and government budget and expenditure data (prioritized by development partners).

It is worth noting that citizen opinion data, while not deemed as essential, is another category of data that appears to be in relatively short supply relative to demand. While only 12 percent of respondents consider such data essential to their work, 26 percent wish more of such data existed. One possible explanation of this high interest is that policymakers value citizen opinion data as a barometer of political support for education reforms.

Finding 5: Education decision-makers value domestic data that reflect local context and point to policy actions; and improving the timeliness and accessibility of information will make it more helpful.

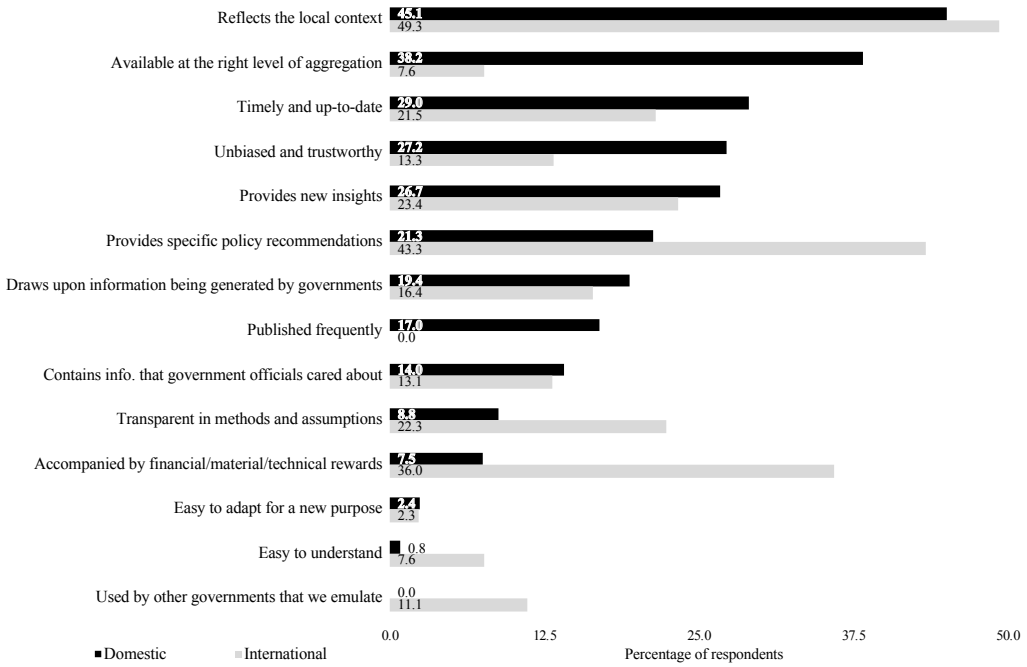
We asked respondents about the attributes of information that make it helpful for their work, broken down by source of information (Figure 8). Data from both domestic and international sources were deemed most helpful when they provide information that reflects the local context. Additionally, education decision-makers rated information from international sources as most helpful because it provides policy recommendations (43 percent) likely informed by cross-national experience and is accompanied by critical financial, material or technical support (36 percent). The latter suggests that respondents may draw a connection between the use of data produced by certain organizations with the financial or technical support these organizations provide to them or their government.[14] Leaders viewed domestic data as helpful when it was available at the right level of aggregation, as well as being timely, trustworthy, and insightful.

In the 2017 *Education Snap Poll*, we went a step further to ask education decision-makers the three most important improvements that producers could undertake to improve their data. Overall, survey responses suggest that improving the timeliness and accessibility of available data matter most to end users (Figure 9).[15] Over half of the

[14] For instance, respondents using the World Bank's data to improve their performance on certain development indicators may view this as a way to signal their commitment to reforms and thus be more likely to receive financial or technical assistance from the Bank.

[15] The snap poll respondents were only asked to suggest improvements to sources of information that they deemed as being helpful in their work.

Figure 8. What makes sources of data and analysis helpful to education decision-makers?



Notes: The figure reports the percentage of respondents who cited each factor as a reason for why they rated certain information sources as particularly helpful. This figure is based on 32 (or 34) respondents who answered a question on what makes information from a given domestic (or international) organization particularly helpful. Respondents could select up to three reasons.
Data source: *2017 Listening to Leaders Survey*

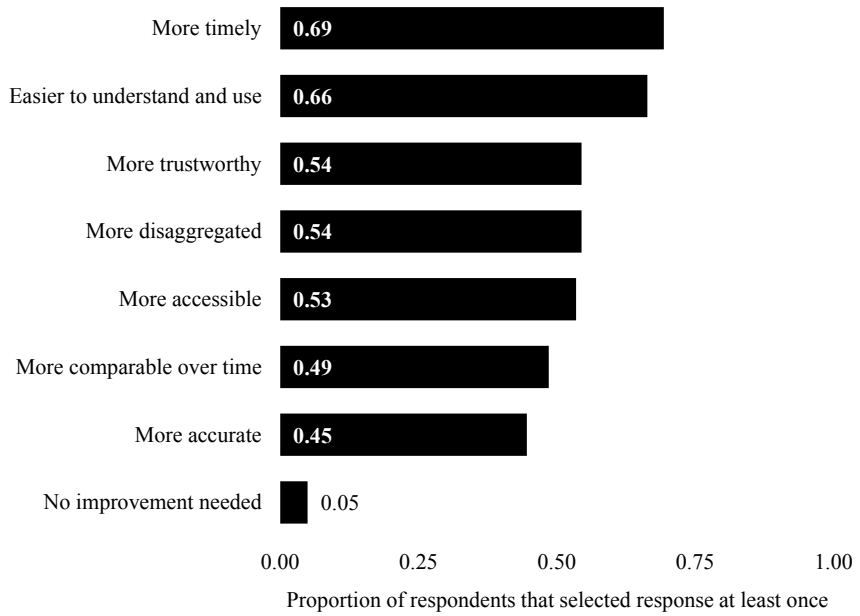
decision-makers surveyed also identified efforts to improve data disaggregation, accuracy, and trustworthiness as desirable.

Despite broader transparency commitments[16] in many low- and middle-income countries, much government data is still proprietary or hidden behind paywalls (Custer & Sethi, 2017). Survey respondents would like data from the national government, in particular, to be more accessible and disaggregated. The dual emphasis here on accessibility of more granular data may indicate an untapped opportunity: while reported use of subnational data lags behind national-level data, this may reflect a dearth of disaggregated information, rather than muted interest.[17]

When it comes to data produced by local governments, organizations, and schools,

[16] The lack of Freedom of Information Laws is an additional constraint in many countries, though its existence does not necessarily guarantee freely accessible information.
[17] Data from development partners additionally lacked comparability over time .

Figure 9. What improvements can make information more helpful to education decision-makers?



Notes: Respondents could select up to three improvements for each data source.
Data source: 2017 *Education Snap Poll*

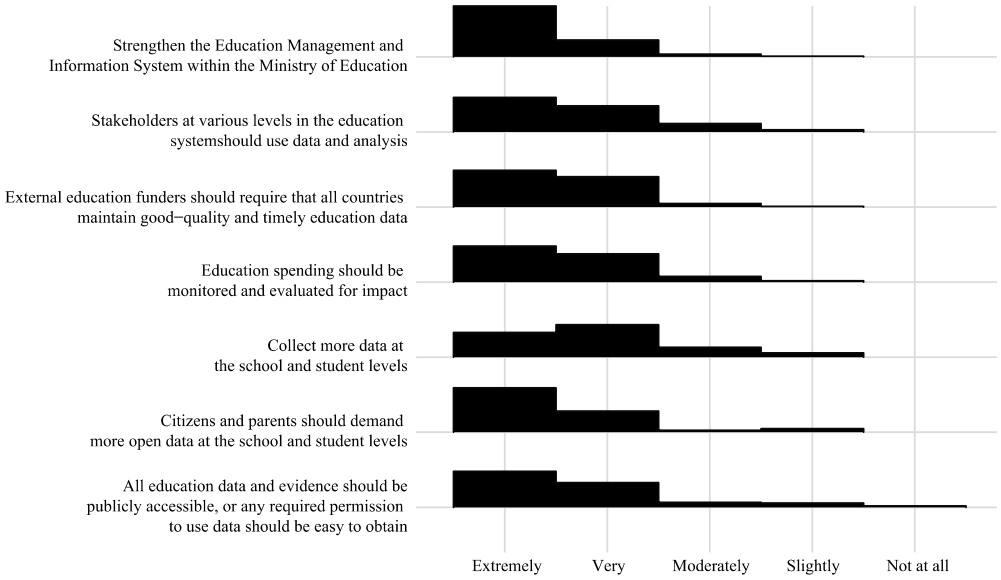
decision-makers place greater emphasis on improving timeliness. These data may be used to inform decisions at the school- or municipality level which require the data to be much more timely, compared to national government data, which may be used more for long-range planning, analysis of historical trends and the effectiveness of past policies.

Finding 6: Decision-makers strongly support strengthening their countries' EMIS to bolster their education data ecosystem.

Beyond identifying general areas of improvement for education data, respondents to the 2017 *Education Snap Poll* also ranked a list of more specific solutions. Respondents were largely in agreement with the seven solutions proposed, rating all of them as "extremely important", on average (Figure 10). The recommendation to strengthen the EMIS within the Ministry of Education resonated with the highest number of respondents. In this respect, there is a nice symmetry between the call to strengthen the country-owned EMIS that arose from the survey of the literature in section 2 and the favored solution of education decision-makers in section 3. To realize this solution in practice, domestic leaders and their development partners will need to address several common EMIS

shortcomings we discussed at length earlier in this paper, namely: fragmentation of data collection activities across ministries, unclear protocols for sharing and disseminating data openly, lack of funding, poor coordination among international funders, and a nascent or deficient statistical culture (UNESCO, 2016).

Figure 10. Which solutions are the most important to enhance the value of data in education?



Notes: All respondents were presented with the same list of possible solutions and could rank each as “extremely important”, “very important”, “moderately important”, “slightly important” or “not at all important”.
Data source: 2017 *Education Snap Poll*

Concluding Remarks

Developing countries face multiple challenges in improving their education system’s ability to meet ambitious goals related to access, quality, and equity. Limited resources, as well as poor or missing information on various dimensions of the system, hampers progress. Increasing the availability and use of data and evidence is a critical arena for leadership and management in the education sector. The call for more and better data has been heard—and while investment in education data lags behind some other sectors, it has increased and improved substantially. However, a data-driven system is not just about generating data. It is also about increased appreciation for and use of evidence.

Several factors impede data use. Decision-makers and other stakeholders may not know what data are available if producers do not invest enough in sharing or disseminating this information widely, if at all. The data that is readily supplied may not be relevant to the decisions and issues at hand, available at the time it is needed, or in a form that can be accessed, understood, and applied. Moreover, political interests and low implementation capacity can undermine the willingness and ability of actors to use evidence to make data-informed decisions.

This article has focused on the use of data in the education sector—by whom, for what specific roles and decisions, and what type and sources of evidence. We drew insights from two novel surveys of decision-makers in 126 developing countries and a broader literature review to examine the current state of evidence use in the education sector and pinpoint how data producers can be more responsive to the needs of their end users. To conclude, we highlight several takeaways from this research that funders and data producers should heed to achieve the vision of education systems that are not merely data-rich, but data-driven.

Education data investments that focus on strengthening country-level systems to collect, manage, and share information will pay off in terms of better data and more data use. Domestic and international funders of education data should prioritize bolstering country systems in five respects: (1) increasing the trustworthiness and dissemination of EMIS data; (2) improving the efficacy of existing national learning assessments and expanding coverage to additional countries and secondary education; (3) investing in standardized data collection protocols and use at the subnational level; (4) doubling down on the production and dissemination of evaluation data to fill an unmet need; and (5) helping data producers better customize their offerings to respond to specific use cases and users. We discuss these five aspects in more detail below.

Shortcomings in the quality of education data—inaccuracies, uneven coverage, closed data, and delays in availability—erode trust in information and eventually discourage use. However, deficiencies of specific datasets are likely symptomatic of a larger problem: weaknesses in the education information management systems at the country level. EMIS data sources tend to be fragmented across duplicative information systems within the same ministry, or worse, across several ministries in charge of different sub-sectors. Meanwhile, in many countries, the EMIS does not have clearly established protocols for sharing data so this information remains hidden from view – not easily visible or accessible to education decision-makers. In some cases, political interests capture data systems, reducing public trust in the integrity of data that is published. In the absence of transparent quality assurance methods and third-party verification, end users may view EMIS data as prone to errors, either intentional or unintentional.

Systematic national learning assessments are a clear asset in education systems that aim to improve student learning, but these tools are still relatively nascent in developing countries and at the secondary level. Between 2010-2015, just over one-half of developing countries carried out national learning assessments of language and mathematics in the

early grades and even fewer do so at the lower secondary education level. In addition to increasing the number of countries with national assessments, a big task at hand for funders and producers of education data is to strengthen those assessments that exist and ensure they are being used. For example, Jordan's education system illustrates a long-term commitment to using student assessments to drive significant curriculum and other reforms. As noted above, when Jordan fell in the rankings of international student assessments, the government did not "shoot the messenger"; rather, it sought to improve its own assessment system so it could have a better way of measuring and tracking student learning, and it continues to benchmark its students' performance against other countries (Obeidat & Dawani, 2014).

While country-level systems like EMIS are important, funders and producers of education data should not overlook the importance of strengthening capacity for data collection management beyond the capital and down to the local level. Decision-makers report using national-level data most often, but also indicate a desire for more disaggregated or local data, particularly for information provided by the national government and development partners. It is important that subnational data – often collected, reported and entered into digital systems by local government officials, educators or implementing partners – are reliable and trusted by all decision-makers and stakeholders. This quality assurance can be achieved in three ways. First, governments and development partners should invest in building the capacity of these local actors to be active consumers of the data they collect. When data collectors become users, the quality of information is likely to improve because they have an ownership stake in ensuring data is fit-for-purpose. Second, government ministries at the national level need to ensure that local officials, educators, and implementing partners adopt standardized collection and quality assurance protocols to ensure the data produced is accurate and credible. Third, national and local level education data users should work together to prioritize a short-list of the most important data fields to reduce the burden of data collection.

Education decision-makers reported program and project evaluation data to be the most essential to their work, used most often, and most desired. This type of information seems to be highly valuable but in short supply. The gap may lie in two areas. First, impact evaluations in education are heavily concentrated in a few countries and a few topics. Second, gaps in coverage aside, policymakers' ability to interpret the evidence and link it to policy decisions may be limited. To overcome these gaps, funders and producers of education data should double down in expanding the coverage of program evaluations, as well as increasing the visibility and usability of this high-value data. Organizations that fund and produce evaluations should work with education decision-makers at national and subnational levels to identify priority programs or projects for new evaluations. Development partners that are investing in the capacity of national statistical systems may also want to turn their attention to upskilling staff within the education ministry or education organizations to conduct their own rigorous program/project evaluations. Finally, producers of evaluation data should invest in communicating the results of their

research in ways that various stakeholders can easily understand, paying careful attention to highlighting the generalizability of findings, any caveats decision-makers should be aware of, and how the findings from the research can be useful in programmatic and policy decisions. To the extent possible, researchers should involve policymakers in the design and execution of impact evaluations to increase their salience and relevance.

Decision-makers want different types of information, depending on the nature of their work. They have a host of met and unmet data needs, and those data needs differ depending on the decision. For example, decision-makers who focus on planning and structures say they would benefit from program evaluation data, while those whose primary work relates to instructional matters report wanting more student-level assessment data, and those who are responsible for resource management want better government budget and expenditure data. This reflects the importance for education data producers to customize their dissemination approaches to reach specific target audiences. This could be an opportunity for domestic and international funders of education data to come alongside producers to help them develop more focused dissemination strategies and share best practices to maximize use.

Producers of education data and evidence often lament that their information is underutilized. Yet, there has historically been little attention paid to systematically examining whether that is indeed the case and, if so, why. In this article, we have attempted to partly close this gap by asking the target audiences of these data – decision-makers in government agencies, non-governmental organizations, and development partners – what information they currently use and what they want from education data producers in future. While this preliminary work has illuminated several important findings and recommendations for funders and producers of education data to bolster use, we have merely scratched the surface and additional research is warranted. If the ultimate value of data is not in its production, but its use, then funders and producers should make it a priority to understand what information decision-makers want, how to reduce barriers for users to access data, and measure changes in use by different target audiences and of various data products over time.

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Appendix

Table A1. Respondents in *2017 LtL Survey* and *2017 Education Snap Poll*, By stakeholder group

Survey	2017 Education Snap Poll	2017 Listening to Leaders Survey		
Stakeholder Group	Full Sample of Respondents	Members of the Sampling Frame	Full Sample of Respondents	Sample of Education Sector Respondents
Host government	76 (42.5%)	27,990 (47.9%)	1,473 (45.8%)	63 (40.4%)
Development partner	75 (41.9%)	14,502 (24.8%)	516 (16.1%)	19 (12.2%)
CSO/NGO	16 (8.9%)	7,063 (12.1%)	701 (21.8%)	45 (28.8%)
Private sector	1 (0.6%)	1,949 (3.3%)	179 (5.6%)	6 (3.8%)
Country Experts	11 (6.2%)	6,881 (11.8%)	345 (10.7%)	23 (14.7%)
Total	179	58,385	3,214	156

Notes: The reported number of respondents for the *2017 Listening to Leaders* Survey (LtL) includes only those respondents who indicated working as part of one of the five stakeholder groups listed above. All those who indicated working for none of those groups (*N*=89) were excluded from our analysis.

Table A2. Respondents in *2017 LtL Survey* and *2017 Education Snap Poll*, By region

Survey	2017 Education Snap Poll	2017 Listening to Leaders Survey		
World Bank Region Classification	Full Sample of Respondents	Members of the Sampling Frame	Full Sample of Respondents	Sample of Education Sector Respondents
East Asia and Pacific	44 (24.6%)	8,713 (14.9%)	474 (14.8%)	26 (16.7%)
Europe and Central Asia	34 (19.0%)	10,247 (17.6%)	674 (21.0%)	32 (20.5%)
Latin America and the Caribbean	13 (7.3%)	8,010 (13.7%)	424 (13.2%)	19 (12.2%)
Middle East and North Africa	14 (7.8%)	5,767 (9.9%)	251 (7.8%)	12 (7.7%)
South Asia	19 (10.6%)	5,427 (9.3%)	341 (10.6%)	17 (10.9%)
Sub-Saharan Africa	55 (30.7%)	20,221 (34.6%)	1,050 (32.7%)	50 (32.1%)
Total	179	58,385	3,214	156

Notes: Numbers in each column add to 100%.