Leaders in Teaching Research Note: School leader use of data for school improvement

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Prepared by the Learning Generation Initiative

Key messages

These key messages highlight important points from the summary of research this note provides on school leader use of data. The note draws on studies across a range of contexts and from a variety of methodologies, including academic research, program evaluations and grey literature.

- Providing access to data at the school level is not sufficient for it to be used by school leaders. A few key factors that enable or inhibit data use include whether school leaders acquire the new skills and knowledge required to use data effectively; technical issues, such as the amount of data school leaders are expected to collect; behavioral and relational factors, such as access to peer networks; and support from the middle tier.
- School leaders need to be able to understand different types of data, when they should be collected, what it can tell them, and importantly, what it cannot tell them. They should be able to analyze and interpret data, and then ask the right questions to identify problems or what is working well, and subsequently structure action plans. They also need to know how to empower and train teachers to use student-level data to make their own informed decisions. Evidence shows that leaders might need direct training (as opposed to cascade models) to ensure initial uptake of data use.
- There are many technical issues that impact whether data is used at the school level, ranging from reliable connectivity to the design of the data system. One of the most important factors is ensuring data disseminated at the school level is disaggregated sufficiently for school leader use.
- When data systems are first introduced at school level, hybrid approaches might be needed. This is important for bridging the transition to digitally based systems, given the many technical requirements necessary to implement a robust data system. These include accessible and relevant hardware and software, reliable connectivity, and the capacity of schools to assume the additional burden of digital data collection.
- Data collection can fail or become a simple reporting exercise if a culture of data use is not cultivated – this includes promoting behavioral and relational enablers, such as making sure school leaders understand why data is important and how it can be directly influential for outcomes. Some studies suggest that lack of incentives can contribute to a weak culture of data use as well.
- Promoting participatory data collection processes can help build trust and accountability in the system, ensure school leaders have more time to use data and also facilitate its influence and sense of importance throughout the school. Peer networks have shown to be a promising approach for supporting a culture of data use by facilitating ongoing troubleshooting and shared ideas on use and boosting school leader confidence to use data.
- Middle tier leaders can be important actors in promoting school leader use of data. Evidence shows that districts providing targeted support to school leaders can also improve the impact of data. This can include helping school leaders analyze and interpret school level data and discussing and providing

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specific feedback and problem solving for improvement. Consistent, ongoing support is key – one case study showed that consistent support, even in the form of text messages, was more impactful than one-off in-person check ins.

Introduction

This note is intended to support the Leaders in Teaching (LiT) program by providing a summary of the latest literature on school leaders' use of data in education to inform the program's Lead pillar activities, particularly the leadership capacity development for Regional Education Offices (REOs) and National Education Leadership Institute (NELI) training for Senior High School Heads. The note collates evidence on several key drivers of the use of data by school leaders. It primarily focuses on secondary school leaders in Sub-Saharan Africa but includes strong examples from other contexts and education levels. The note collates evidence on school leader data use to illustrate promising practices and common challenges and concludes by summarizing key messages.

Evidence on the impact of data use by school leaders

Evidence shows that school management - especially the use of data to guide instruction - is a significant determinant of school effectiveness (Fryer, 2019; Kremer et al., 2013). Data at the system level is useful for formulating and implementing policies, measuring progress, and assessing whether policies should be maintained or redeveloped (Segueda et al., 2018). Yet, data at the system level rarely explains challenges in implementation of policies and can hide inequities that exist at lower levels. Data at the school level can help identify these iniquities and gaps and explain impact.

In Argentina, data-driven student performance reports led to a statistically significant increase in foundational learning outcomes, and school leaders who utilized these reports were more likely to monitor teaching quality and encourage parental engagement (De Hoyos et al., 2021). In Brazil, a data-driven improvement training for school leaders led to a 30 percent increase in average test scores in numeracy and literacy (de Barros et al., 2019).

However, access to data systems is often a challenge for school leaders in low- and middle-income countries (LMICs). Although there are increasing investments in education management information systems (EMIS), much of the data that is available to school leaders is in a format that does not always meet their needs (Crouch, 2019; van Wyk & Crouch, 2020). Even when data is readily available in relevant formats, school leaders face many other challenges in using data for improvement.

Overview of data for decision-making at school level

Generally, the type of data that is most impactful for school leaders is school-level data, which can be further categorized into three levels: student, teacher, and school. At the student level, data is generally collected on enrollment, attendance, gender and inclusion, and learning progress and performance. At the teacher level, data includes qualifications, experience, gender, payroll status, access to professional development, and evaluations. School-level data typically focuses on facilities and resource access, overarching improvement and comparative indicators with nearby schools (Crouch, 2019). A recent Global School Leaders survey (across India, Indonesia,

Kenya and Malaysia) found that school leaders who said they collected different types of school-wide data (e.g., attendance and multiple types of assessments) were more likely to use said data in decision-making than those who only collected one type of data (Priya & Sampat, 2021).

Data at the school level can be used to influence a wide range of decisions, such as where to target resources for teacher support or tracking learner progress and identifying those falling behind. The Global School Leaders survey asked school leaders about the types of decisions they use data for and found that school leaders mainly use student data for remediation, grouping, or informing parents of their child's progress (over 70 percent of school leaders). However, only 25 percent of school leaders used data to incentivize teachers and less than 20 percent said they used data to make curriculum changes (Priya & Sampat, 2021). Beyond teaching and learning purposes, 68% of school leaders reported using data for self- or teacher evaluation and 59% reported using data to set school-level targets (Priya & Sampat, 2021).

Different tools can support data collection, analysis, and dissemination/visualization, and sometimes all three. Typical tools that are used to support data collection and use at school level include classroom observation templates, formative assessments, school profiles or report cards, dashboards, school improvement plans, and phones, tablets or laptops with pre-loaded apps or software. The South African School Administration and Management System and Data Must Speak examples below illustrate how different data systems can operate at school level.

The South African School Administration and Management System (SA-SAMS) platform collects student-level and school-level data that is migrated up to middle and top levels of the system. The SA-SAMS has been iterated on over the past 15 years and is now outsourced to a national IT provider, but it remains free of charge for schools to use. It operates as the sole education data collection tool to avoid any reporting duplication and assists schools with more general data administration and reporting requirements. Training on the program for teachers, school leaders, and district leaders operates at the provincial level and is overseen by the Department of Basic Education. At any time, schools can access information on their student body at the individual and school levels as well as see how their school is doing compared to neighboring schools. Since the information also flows upward, it helps standardize data so that it can be comparable across different levels including the district, regional, and national levels (Department of Basic Education Republic of South Africa, n.d.). Because it captures student-level data it can support school leaders and teachers to assess which students are struggling in certain subjects and provide remedial support as needed. However, in a recent review of the education technology landscape in South Africa, only 52 percent of surveyed school leaders said they use learning performance data when making decisions (Michael & Susan Dell Foundation et al., 2019). While this does not only apply to the SA-SAMS program, it does indicate that access to relevant data and edtech into schools alone is not enough to promote data use by school leaders (Michael & Susan Dell Foundation et al., 2019).

UNICEF Innocenti's Data Must Speak (DMS) program works in several LMICs to develop school profile cards. Typically, the profile cards are designed with the help of community members, parents, teachers, and school leaders, and data is collected by the school leaders. The profile cards include text, numbers, and illustrations to convey key messages so that they remain accessible to all communities, regardless of literacy or language barriers. In Zambia, the DMS school profile includes information on students – learning outcomes disaggregated by subjects, enrollment, repetition, and dropout rates disaggregated by gender, and inclusion and vulnerable children's data; teachers – qualifications and gender; and the school – class sizes, facilities, and resource access. It also includes a summary section with school-specific areas for improvement. The Zambia DMS program also has

community, district, and province-level profile cards to allow comparisons within and across schools in different areas. Since data is collected yearly, these profile cards also serve to show how schools, at these different levels, are progressing from one year to the next (UNICEF, n.d.). As a result of the cards, some primary schools are now offering catch-up classes for students who are behind, and parents are more engaged in their children's education. In the DMS program in Togo, the school cards are also being used to develop school improvement plans and district work plans (UNICEF, n.d.).

Enabling factors and barriers to school leader data use

As previously noted, even when data is readily available in relevant formats, school leaders face many other challenges in using data for improvement. Lack of adequate training and development opportunities for school leaders to learn to use data is consistently highlighted in the literature as one of the primary barriers to effective data use (Gummer, 2021). However, evidence on the types of school leadership practices that contribute to sustaining data use – and thus the training needed to support those – is limited (Poekert et al., 2020; Prenger et al., 2022; Talebizadeh et al., 2021). Recognizing that many factors contribute to sustainable and effective data use, this section explores a few of the most salient enabling factors and barriers that school leaders face when being introduced to and using data for decision making. These include the knowledge, skills and training required of school leaders to use data; technical issues; behavioral and relational issues affecting a culture of data use; and middle tier support for school-level data use.

Knowledge, skills and training required for school leader use of data

Many education systems struggle to translate evidence into effective action at the school level. Without the specific knowledge and skills to use data, evidence can be superficially collected and accessed but not leveraged for meaningful change (McBurnie et al., 2021; UNESCO IIEP, 2020). School leaders need to understand which types of data are relevant for responsive decision making and when they should be collected. They need skills to analyze and interpret data and the ability to ask the right questions to ensure that data can shape school improvements (Gustaffson-Wright, Osborne & Aggarwal, 2022). In high-income contexts, strong school leaders are articulate at analyzing data to identify problems and structure action plans. They can empower and train teachers on how to use student-level data to make their own informed decisions on how to better support teaching and learning (Gates Foundation, 2017). A study focused on how school leaders could build effective data teams emphasizes five primary skills: vision and goal setting, providing individual support, encouraging intellectual stimulation, creating a climate around data use, and using peer networks (Schildkamp et al., 2019). School leaders need robust and targeted training to acquire the knowledge and skills necessary for effective data use. The Escuela al Centro program in Mexico and Jovem de Futuro program in Brazil provide two examples of strong school leader training on data use.

In Mexico, the Government's 2015-2018 Escuela al Centro program was designed to strengthen school autonomy and improve the principal's managerial capacity. A primary component of the program was the use of collecting and using data to monitor student's numeracy and literacy skills as well as feedback for teachers on instruction and pedagogy. School leaders were split into two groups, those who received training via a cascade model and those school leaders who received direct training from the professional trainers. The program was implemented via two evidence-based tools which were developed by the professional trainers - a student assessment and a Stallings classroom observation tool for teacher feedback. In total, the training averaged about 80 hours, or 40 hours for each tool. However, the training was not mandatory. Only one percent of those in the cascade model

completed the training on both tools and around 22 percent in the direct training program completed both. Likely because of the direct link to professional trainers, and higher attendance in the training, those in the direct training group showed greater use of both data-driven planning and more frequent measuring, supported by the two tools. As a result, those in the direct training improved schools' managerial capacities relative to the other group (by 0.13 standard deviations); however, this did not translate into any impact on student test scores, or other student outcomes (Romero et al., 2022).

The Instituto Unibanco's Jovem de Futuro (JdF) three-year training program in Brazil helps school and district leaders align goals and use data for school improvement planning (Instituto Unibanco, n.d). The program includes almost 70 hours of training for regional and district leaders, and 48 hours and 120 distant hours for school leaders and pedagogical coordinators, all at the secondary school level. Training is led by professionals from the Instituto Unibanco and focuses on how to increase student learning and graduation rates, set performance targets, specifically for math and Portuguese, and develop school action plans. School leaders learn how to collect data and use the government's education management platform to house their data (Vinha et al., 2020) as well as how to optimize the system via cell phone access to reduce connectivity issues. Recent programmatic evidence points to improved student learning, equating to a 30 percent increase in the amount that students learn on average, and student test score increases in math and Portuguese (0.12 and 0.09 standard deviations). Furthermore, the program was considered low-cost at about 5 percent of public expenditures per student (de Barros et al., 2019). At the end of one cycle, several school leaders cited increased confidence in their use of evidence and data for planning, monitoring, and evaluating school action plans, and felt supported by their peers through in-person and online exchange opportunities, where they could learn how to problem solve and share school leadership challenges (Vinha et al., 2020).

Technical issues that inhibit school leader data use

One of the primary technical issues inhibiting school leader data use is the design of data systems. Data systems are often designed by governments solely to collect information from schools without any feedback mechanisms in place (Crouch, 2019). In many LMICs, data collection normally flows upward, and school leaders often never see the data again once they have submitted it. This one-directional data flow inhibits school-led, bottom-up initiatives to enact positive change. When data is disseminated to schools, key variables are typically aggregated at the national or regional level, and sometimes district level, removing the ability for school leaders to unpack how their schools are performing in comparison to peers and address crucial gaps (Crouch, 2019).

Beyond the design of data systems, issues with consistent and reliable connectivity, hardware and software sustainability and ease of user interface can contribute to school leaders' level of engagement with data. Transitions from paper-based to digital systems can be particularly difficult. These issues, alongside formal data processes, affect the frequency and quality of how data is collected, analyzed, accessed, and used at the school level. Establishing and maintaining a robust and useful data system requires technical inputs and maintenance and substantial human, infrastructural, and financial resources. Additionally, the amount of data that governments expect school leaders to collect is often burdensome. Many countries conduct annual school censuses which can be a massive burden for them (Pettersson et al., 2017). A study across 21 LMICs found annual school censuses can be up to 38 pages, or 1,000 variables (Center for Global Development, 2022). The time it takes to collect and check this amount of data can oftentimes lead to credibility issues. The following case study from Sierra Leone illustrates how several of these technical issues impacts data use by school leaders.

In the One Tablet Per School program in Sierra Leone[1], school leaders were to receive a tablet to collect and use data on students (e.g., attendance, enrollment, and gender) and teachers (e.g., attendance, payroll status, qualifications). Before starting the program, the government launched a prototype of the data management tool to better understand how school leaders engage with tablet-based data management. Specifically, there was no pre-training or guidance for the prototype. Over five weeks with the tablets, school leaders engaged in WhatsApp-based surveys, interviews, and focus groups. To streamline the process and the amount of time it took to input data into the tablets, many school leaders combined paper-based forms with the tablets. As a result, some school leaders developed standardized templates for paper-based data collection, such as attendance. This enabled school leaders to collect more data by delegating collection responsibilities to others, such as deputy leaders or teachers. These elements were formally recommended after the conclusion of the program, with additional suggestions on how to guide school leaders to collect data via this dual form and how to delegate responsibilities.[2]

Nevertheless, many school leaders struggled to correctly use the tablets and submit the forms, with many inadvertently submitting duplicates, logging information on incorrect forms, or being inconsistent with submissions. Some school leaders struggled with connectivity. School leaders receive mobile data for school related work from district officers but procuring airtime and receiving credit often took extended periods of time, delaying submission of timely data. Other school leaders mentioned hardware issues and tablet malfunctioning which inhibited them from properly using the data collection app (McBurnie et al., 2021).

At the end of the program, school leaders mentioned seeing value in data collection, particularly when it came to making management decisions. Notably, the study found that school leaders applied data to inform a package of interventions— rather than a single course of action. Armed with accessible data, school leaders could provide warning messages for absenteeism, facilitate goal setting during departmental meetings and shape incentives for school participation. However, overall take-up was low. Only 30 percent of school leaders used the tablets most days and 40 percent never used the tablets, suggesting that school leaders' motivation to gather and use data is largely dependent on factors other than data accessibility (McBurnie et al., 2021) but that technical issues do play a significant role.

Behavioral and relational factors affecting a culture of data use

Creating a culture of data use is incredibly important when setting up data systems at school level. In addition to the specific skills and knowledge school leaders need, as well as technical requirements, a culture of data use relies on behavioral and relational enablers. School leaders often do not prioritize the use of data, as they do not understand how it can directly influence outcomes and do not have support to do so. Some studies suggest that lack of incentives can contribute to a weak culture of data use as well. Peer networks are showing promising results for persuading school leaders that data can create real influence in their schools and provide the support needed for ongoing troubleshooting and sharing ideas. Another issue in creating a culture of data use is shifting the perspective that data collection and use is merely a box ticking exercise and simply one more responsibility

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[1] Developed in collaboration with the Ministry of Basic and Senior Secondary Education and the Teaching Service Commission based on pilots led by the UKAID-funded Leh Wi Lan program.
[2] For a dual collection system, the EdTech Hub recommended templates, guidance on how to report device issues, collecting teacher registration data before the start of term, and government support to identify key indicators to collect in alignment with the Annual School Census. For delegation, recommendations included central knowledge training sessions, guidance notes on how to delegate responsibilities, and clear conversations on who collected what. District officials should support schools throughout the year to clarify concerns, share information, and encourage timely data submission. Spot checks by district officials should also occur occasionally for accuracy checks (McBurnie et al., 2021).

the school leader must manage. While data systems should be designed with school capacity in mind, distributing responsibilities amongst other stakeholders in a participatory data collection process can help build trust and accountability in the system, ensure school leaders have more time to use data and also facilitate its influence and sense of importance throughout the school (Childress et al., 2020).

In Madhya Pradesh, India, the government introduced a school improvement program, the MP School Quality Assurance program, which was composed of three components, the foundation of which was a school rating card that examined seven domains: mentoring, management, teacher practice and pedagogy, student support, school management committees and interactions with parents, academic outcomes, and personal and social outcomes. Schools were rated on these domains by an external evaluator, such as a retired school leader, which ultimately informed school-specific recommendations for improvement. The other two program components included the development of a school improvement plan and regular school assessments by the external evaluator. The assessments were shared via an online platform in user-friendly formats for school leaders and administrative staff. The intervention increased the amount of school-level reporting, but there was no impact on learning outcomes. Despite the program's emphasis on political buy-in, there was no emphasis on local buy-in. Even though school leaders and teachers participated in the program, i.e. completed the work, they did not see how the program was supposed to lead to greater accountability or influence pedagogy. The authors conclude that lack of incentives, such as performance-based pay or sanctions, also contributed to the lack of use by school leaders (Muralidharan & Singh, 2020).

In Rwanda, the Building Learning Foundations program focused on developing a cadre of excellent leaders of learning at all levels of the system. One of the primary outcomes of the program was increasing school leaders' belief in the invaluable role that data use has for school improvement. All leaders in the program were required to participate in peer learning communities (PLC) which were initially developed to support the use of data in schools. As a result of these community groups, school leaders felt more empowered to work with data and even requested to work with other school leaders at nearby schools to collaboratively draft strategic plans. One specific way the PLCs encouraged school leaders to use data was to refocus data collection on all levels rather than just examination levels, meaning they got a more holistic understanding of student performance and school level progress. District Education Officers saw improvement in planning quality increase at schools and identified many head teachers as expressing more confidence in their implementation of activities (Tournier et al., 2023).

Middle tier support for use of data at school level

In successful cases of education reform, those at the middle-tier (district and regional leaders) provide both 'high support' and 'high accountability', which is often underpinned by evidence and data on student and teacher performance (Childress et al., 2020). Middle-tier leaders can use data to support school leaders by providing local benchmarks and performance metrics alongside wider school improvement strategies but can also help school leaders directly interpret data and identify issues. Consistent, ongoing support from the middle tier has also shown to be a key enabler to school leader data use. A LMIC systematic review on school assessment and monitoring associates "desirable school level outcomes" with consistent support to school leaders on transparent data and information sharing, and consequentially associates "undesirable school level outcomes" with little data usage and lack of assessment interpretation (Eddy-Spicer et al., 2019).

In the Indian state of Haryana, an assessment dashboard was developed to track student learning. It looks at performance levels in different subjects and marks learning outcomes and particular concepts in areas where

students struggle. The data is generated monthly through standardized assessment tests. After each exam, teachers input the data and then once every two months, an official government representative will conduct random inspections based on a standardized monitoring framework. The data also allows for school, community, and district comparisons. Additionally, schools receive pedagogical resources and mentors from the district who develop remedial plans for struggling students. Five years since the start of the program, grade-level competence in Math and Hindi doubled from 40 percent to 88 percent (Wangchuk, 2019).

The Big Results Now program in Tanzania, a flagship reform led by the Ministry of Education, focused on top-down accountability measures which included the collection of school ranking data on the primary school leaving examinations (PSLE). Schools were ranked based on their previous year's PSLE test scores, which were then shared at both the national and district levels. Data was collected by District Education Officers (DEOs) who shared the school assessment information via an online portal to school leaders. The DEOs then held meetings with school leaders to discuss how they could improve their ranking. In some districts, DEOs held trainings for school leaders on remedial and exam preparation. Results from the program found that, on the whole, schools at the bottom of the rankings increased their average PSLE scores each year, likely due to added top-down pressure to improve (Cilliers et al., 2021).

Conclusion

Data use at the school level can be a significant determinant of school effectiveness (Fryer, 2019; Kremer et al., 2013). This note looked at a few of the important enablers and inhibitors to school leader data use identified in the latest research, including the skills knowledge and training required for school leaders, technical issues, behavioral and relational factors, and middle tier support. Key takeaways include:

- School leaders need to be able to analyze and interpret data, and then ask the right questions to identify problems or what is working well, and subsequently structure action plans. They also need to know how to empower and train teachers to use student-level data to make their own informed decisions.
  Evidence shows that leaders might need direct training (as opposed to cascade models) to ensure initial uptake of data use.
- There are many technical issues that impact whether data is used at the school level. One of the most important factors is ensuring data disseminated at the school level is disaggregated sufficiently for school leader use.
- When data systems are first introduced at school level, hybrid approaches might be needed. This is important for bridging the transition to digitally based systems, given the many technical requirements necessary to implement a robust data system. These include accessible and relevant hardware and software, reliable connectivity, and the capacity of schools to assume the additional burden of data collection.
- Data collection can fail or become a simple reporting exercise if a culture of data use is not cultivated – this includes making sure school leaders understand why data is important and how it can be directly influential for outcomes. Some studies suggest that lack of incentives can contribute to a weak culture of data use as well.
- Promoting participatory data collection processes can help build trust and accountability in the system, ensure school leaders have more time to use data and facilitate its influence and sense of importance throughout the school. Peer networks have shown to be a promising approach for supporting a culture of

data use by facilitating ongoing troubleshooting and shared ideas on use and boosting school leader confidence to use data.

- Middle tier leaders can be important actors in promoting school leader use of data. This can include helping school leaders analyze and interpret school level data and discussing and providing specific feedback and problem solving for improvement. Consistent, ongoing support is key – one case study showed that consistent support, even in the form of text messages, was more impactful than one-off in-person check ins.

Recommendations for Leaders in Teaching

The Leaders in Teaching program could consider several of the key messages from this note in implementing the use of School Improvement Plans and the leadership coaching component for regional education offices, including: making sure data is sufficiently disaggregated for school leaders to use to develop, monitor and adapt school improvement plans; training other leaders and staff in schools to support with data collection; providing sufficient professional development to regional and district staff so that they have the skills and knowledge to support school leaders to use data and show them how it can directly influence decision-making at the school level; using the Professional Learning Communities to discuss issues with data usage and provide additional support and training for using data effectively.

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