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WORKING PAPER

The Future of EMIS

A public financial management perspective

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Abbreviations and acronyms

API	Application programming interface
BMGF	Bill & Melinda Gates Foundation
CPDI	Centre for Peace and Development Initiatives
CRA	Commission for Revenue Allocation (Kenya)
DBR	Design-Based Research
DFID	UK Department for International Development
DHS	Demographic and Health Survey
DHIS	District health management information system
EMIS	Education Management Information System(s)
EWF	Education World Forum
FCDO	UK Foreign, Commonwealth and Development Office
GPE	Global Partnership for Education
ICT	Information communication technology
IMF	International Monetary Fund
LIC	Low-income country
LMIC	Lower- and middle-income country
MELA	Measure Evaluate Learn Adapt
MICS	Multiple Indicator Cluster Survey
OER	Open Educational Resources
OOSC	Out-of-school children
PFM	Public financial management
RBF	Results-based financing
SABER	Systems Approach for Better Education Results (World Bank)
UIS	UNESCO Institute of Statistics
UMIC	Upper-middle-income country

1. Introduction

The 'digital revolution' holds great potential for improving how governments formulate and implement their policies (↑International Monetary Fund, 2017; ↑World Bank, 2016). Perhaps nowhere is this improvement more necessary than in the education sector. Quality education for all is a distant dream, with an estimated 70% of 10-year-olds in low- and middle-income countries unable to read and understand a simple text (↑World Bank, 2022). Many strategies to address this 'learning crisis' require better data (↑Rossiter, 2020) to find out what interventions are working for which children and to make use of pertinent information throughout the education system. For over two decades, governments and their development partners have invested in education management information systems (EMIS) with the intention of improving policymaking and implementation.[1] Yet, despite substantial external and domestic financing, the potential of EMIS often goes unrealised. The influence of EMIS on policymaking and policy implementation frequently appears limited (↑GPE, 2019; ↑van Wyk & Crouch, 2020).[2]

Policymakers in low- and lower-middle-income countries are in a bind: while more complex EMIS designs may make processes more likely to fail following donor exit,[3] simple EMIS designs do not provide enough information to track the effects of reforms and, often, serious shortcomings — most children in school in lower-income countries aren't learning even the basics, and some education systems have got worse at spreading basic literacy as access to education has expanded (↑Pritchett, 2018; ↑Sandefur et al., 2022).[4]

[1] Between 1998 and 2014, 57% of the 415 projects in the World Bank education portfolio included an EMIS component. The cost ranged from USD 1 million to USD 7 million, and from 0.5% to 21% of the total cost of the project (↑Abdul-Hamid et al., 2017). Since then, similar investments have continued as part of hundreds of donor-supported projects, including support for sector responses to Covid-19 (↑Aslam & Rawal, 2021).

[2] Moreover, EMIS are not always maintained by governments after a donor project ends (↑Abdul-Hamid, 2014; ↑Abdul-Hamid et al., 2017; ↑Powell, 2006; ↑USAID, 2016). Even during project implementation, difficulties are apparent: among World Bank EMIS subprojects concluded between 1998 and 2014, 30% were classified as "unsatisfactory" (↑Abdul-Hamid et al., 2017).

[3] Hence, a call for simple systems as an "obligatory first step" in recommendations from ↑Bashir et al. (2018).

[4] Conclusions on learning would likely require linkages to data outside a core EMIS (↑van Wyk & Crouch, 2020). However, grade- and pupil- level data could be useful in discovering where need is greatest and potentially remove bottlenecks to learning.

Reflections on EMIS implementation challenges point to demand and supply issues, with the former being the more important determinant for realising EMIS potential and their ongoing development (↑Abdul-Hamid et al., 2017; ↑GPE, 2019; ↑van Wyk & Crouch, 2020). This paper considers demand and supply for EMIS from a public financial management (PFM) perspective.

Almost every country produces a government budget, and the PFM cycle is one of the main areas where evidence can influence policy and implementation. Moreover, the centrality of effective education systems (not just schooling, but learning) for economic growth and reduced government wastage aligns well with key PFM objectives. Most low- and middle-income countries face a tighter fiscal environment in the early 2020s than in the previous two decades. Further, finance ministries are likely to be supportive of funding for EMIS if the data provided can be demonstrably used to help improve spending efficiency.

In Section 2 of this paper, we note the key points of emphasis and what matters most about an EMIS from a PFM perspective. Section 3 then looks at the demand for EMIS data across different stages of the PFM cycle with reference to different countries, including the original six EdTech Hub focus countries (Bangladesh, Ghana, Kenya, Pakistan, Tanzania, and Sierra Leone). We note that demand for EMIS data is already quite embedded in budget formulation but relatively nascent in the later stages of the PFM cycle — budget approval, budget execution, and budget evaluation.

In Section 4, we look at persistent shortcomings of EMIS on the supply side in terms of the credibility, scope, and interoperability of data. Section 5 proposes three principles for the future development of EMIS to address these shortcomings — subsidiarity, a single source of truth, and openness. Section 6 concludes with recommendations for education ministries, finance ministries, and donors on how to implement our recommendations.

2. What is an EMIS?

There is no universal definition of an EMIS. Defining an EMIS is a tricky proposition. They come in various shapes and forms — even the term EMIS is widely used only in lower-income countries.[5] Although there is a tendency to equate EMIS with the underlying technology, most definitions emphasise the use of a technology implementation within a wider system of people and processes (↑Cassidy, 2006; ↑Hua & Herstein, 2003; ↑UNESCO, 2008; ↑van Wyk & Crouch, 2020; ↑Wako, 2003). Definitions also acknowledge different stages of EMIS development, from basic to more sophisticated, driven by the demand for evidence in policymaking (↑Abdul-Hamid et al., 2017). Nonetheless, technology (including hardware and software, but also routines and techniques) is, of course, a major feature of EMIS,[6] and changing technologies may facilitate new opportunities.

> **"[EMIS] — A system for the collection, integration, processing, maintenance and dissemination of data and information to support decision-making, policy-analysis and formulation, planning, monitoring and management at all levels of an education system. It is a system of people, technology, models, methods, processes, procedures, rules and regulations that function together to provide education leaders, decision-makers and managers at all levels with a comprehensive, integrated set of relevant, reliable, unambiguous and timely data and information to support them in completion of their responsibilities."**
>
> **– ↑Cassidy, 2006**

EMIS technology itself is difficult to pin down. This is unsurprising, given the technology used for an EMIS is a reflection of different country

[5] High-income countries have more idiosyncratic terminology, often hailing from an age before 'management information'.
[6] ↑van Wyk & Crouch (2020) provide an extensive description of the different components that can make up an EMIS.

contexts and levels of capability. Paper-based processes and spreadsheets remain common features of EMIS in some countries. Other countries have developed or procured their own software, often with the assistance of donors.[7] Comprehensive open-source solutions that provide a range of modules are also available.[8] And it is increasingly acknowledged that an EMIS can be built using different components by taking a 'building blocks' approach (↑Adam et al., 2021; ↑Government of Rwanda, 2020; ↑van Wyk & Crouch, 2020).

However, there is consensus on what an EMIS should do. Its primary purpose is to produce education statistics.[9] It does this through three main functions — data collection, data integration, and data distribution. Data collection refers to "the classical administrative counts (such as enrolment, teachers, supplies) created via annual (or periodic) censuses and tallies of school data" (↑van Wyk & Crouch, 2020). To avoid confusion later on, from this point on, we refer to the output of this 'classical' process as the *core EMIS dataset*. Data integration refers to linking this data with data from other systems.[10] Data distribution refers to the provision of services for different users to use the data. User needs can and should be met in a variety of different ways, but generally refer to the way different users access data. For example, some user needs may be met through standard or customised reports or dashboards; others will require the ability to download datasets; developers may need data to be exposed through an API (application programming interface).

Data collection is the most fundamental function. In principle, data integration and distribution can (and potentially should) be done by others, while collection of the *core EMIS dataset* is the primary function of the EMIS team.[11] In this paper, we distinguish between two main types of data collection:

[7] The introduction of EdTech in lower-income countries is often donor-led and is documented in EdTechHub's Rapid Scan series (↑EdTech Hub, 2023) including ↑Tanzania: Groeneveld & Taddese, 2020; ↑McBurnie & Beoku-Betts 2021; ↑Sierra Leone: Mullan & Taddese, 2020).

[8] For example, Open EMIS and DHIS2. See ↑Adam et al. (2021) for further discussion of both.

[9] i.e., statistics on schooling such as enrolment, attendance, dropout, and learning such as grade progression.

[10] One of the most fundamental integration tasks for an EMIS team is integration with population datasets, to allow for the calculation of statistics such as the gross enrolment ratio and net enrolment ratio.

[11] However, it's not strictly necessary for the EMIS team to be under a ministry of education. In Tanzania, for example, it is in the President's Office (↑Dom et al., 2021).

1. **Active data collection** refers to a centralised approach for collecting the *core EMIS dataset* used in most basic EMIS.[12] Higher levels of government[13] request a paper-, app-, or web-based standardised questionnaire to be completed by each school to form a census. In basic EMIS, schools may not be able to access this data to service their own needs subsequently (↑Abdul-Hamid et al., 2017). And in the absence of enforcement or decisive norms at school level and in intermediate layers of government, incentives for accurate and timely data submission can be weak.[14]

2. **Passive data collection** refers to the collection of the *core EMIS dataset* from systems that serve other purposes. These systems include:

    a. School EMIS, which staff use to manage the day-to-day administration of the school. For example, tracking pupil attendance and performance.

    b. Other EdTech, which schools, teachers, and pupils use while teaching and learning, often with the aim of increasing pupils' learning.[15]

How and how well the EMIS delivers these functions matters for PFM. An EMIS may collect a lot of data, but if that data is not credible and timely, it is unlikely to be of much use for budget policymaking and implementation. The core EMIS dataset may be integrated with data from other systems, including PFM systems. However, unless it structures data

[12] For example, the current EMIS in Pakistan's Balochistan province (↑Government of Balochistan, 2022); Sierra Leone's school censuses prior to recent extension (↑McBurnie & Beoku-Betts, 2021), the national system in Liberia prior to recently envisaged extension (↑Irving & Percier, 2019); and attempts in Uganda, which petered out around 2017 (↑Al-Samarrai & Lewis, 2021). However, frequently, all that is left when donor support activities cease is an unverified, delayed, and often incomplete school census and perhaps a yearbook. Uganda is a case in point, although attempts are ongoing to revive an EMIS process.

[13] Typically, the central government, but in large countries (for example, Pakistan and one province in South Africa), this is managed at the subnational level.

[14] On the other hand, incentives to persist with this approach are relatively strong within higher levels of government due to the rents associated with carrying out large-scale data collection operations (↑Samb et al., 2020; ↑Vian & Sabin, 2012).

[15] For a list of EdTech interventions that have the potential to be used for this purpose, see ↑Moss (2020). For some consideration of how these might be applied in practice, see Section 5.6 of ↑van Wyk & Crouch (2020) and ↑Government of Rwanda (2022). The potential benefits include data generation at low marginal cost — i.e., no census is required. Moreover, headcount data is linked with student outcomes and indicators of teacher effort and capability by default.

based on the administrative classifications used in these systems,[16] its value is reduced. Finally, data collection and data integration are of little use unless users can access the data with minimal friction and in formats that meet their needs.

New technologies have expanded the possibilities for collecting a core EMIS dataset, but have downsides.[17] Without willing and trained school staff and systems to meet the costs of connectivity, new survey collection technology may not remove the need for school visits to collect EMIS information. Secure maintenance and adaptation of digital technologies to meet evolving needs require substantial domestic capability after external support ceases. Relying on other EdTech as a source of passive EMIS data collection shifts the risk of non-sustainability to a different team in a ministry of education — but it does not remove the risk.

[16] For example, it uses the same list of subnational governments (provinces, districts, etc.) that are used for the budget.
[17] See ↑Bapna et al. (2021) who discuss a 'systems approach' to EdTech.

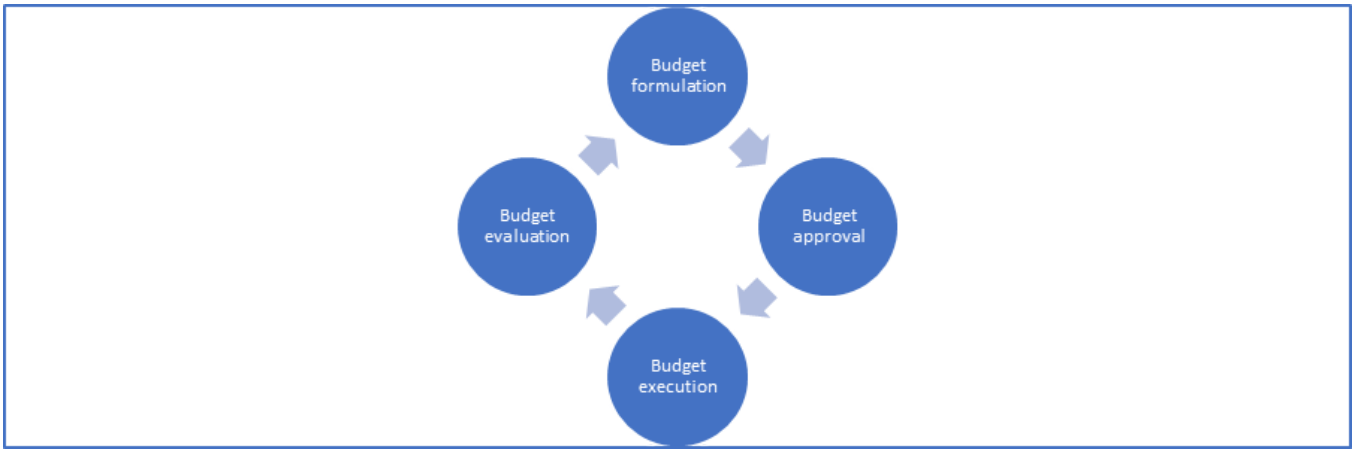
3. The demand for data

PFM refers to

> *"the way governments manage public resources (both revenue and expenditure) and the immediate and medium-to-long-term impact of such resources on the economy or society. As such, PFM has to do with both process (how governments manage) and results (short, medium, and long-term implications of financial flows)"* (↑Andrews et al., 2014: p. 2).

More recently, there have been calls for a more "open" system that "interacts more fluently with all aspects of public policy — namely, government policy choices, government actions (especially service delivery), and development results" (↑Hedger et al., 2020a: p. iv).

Figure 1. *Simplified PFM cycle.*



With this in mind, this section explores the demand for EMIS data at various points in the PFM cycle (see Figure 1 above). PFM follows a familiar cycle in most countries. There are four broad stages — budget formulation, budget approval, budget execution, and budget evaluation — which overlap with one another.[18] Overall, we note that:

1. The demand for EMIS data is already quite embedded in processes for budget formulation, but mostly relates to improving access rather than alleviating constraints to learning (Section 3.1).

[18] I.e., the budget for the next fiscal year is being prepared as the current budget is being executed, and the previous budget is being evaluated.

2. The demand for EMIS data in processes related to budget approval (Section 3.2), budget execution (Section 3.3), and budget evaluation (Section 3.4) is still quite nascent but with potential to grow.

3.1. Budget formulation

Budget formulation is where government policies are translated into financial plans. This often involves two steps — a policy-oriented strategic phase, followed by a more mechanical budget preparation phase (↑Long & Welham, 2016). Throughout this budget process, the finance ministry manages negotiations with spending entities,[19] reconciling spending needs with available resources. EMIS data can play an important role in these negotiations, both in terms of costing policies and allocating resources.[20]

Headcount data from the *core EMIS dataset* are often sufficient for costing policies related to access to education during budget formulation. Many governments have *minimum service delivery standards* for what they will spend on a year of schooling. For example, for recurrent spending, these can include maximum pupil-to-teacher ratios and per-learner *capitation grants*.[21] For capital spending, these can include ratios of pupils to schools and classrooms.[22] The basic costing of other functions such as inspection, assessment, teacher training, and procurement of instructional materials such as textbooks is also largely driven by headcount numbers.

Using policy costings to inform allocations to the education sector during the strategic phase of the budget requires engaging with national funding mechanisms. These vary across countries: education is often decentralised, with subnational governments responsible for provision, particularly for basic education. This means that intergovernmental fiscal transfers are often a major source of funding for

[19] I.e., ministries, departments, and agencies.
[20] Among the 11 countries for which Systems Approach for Better Education Results (SABER) EMIS survey data is available, seven indicated that they use EMIS data for budgeting (↑World Bank, 2022).
[21] A minimum amount of funding per pupil and often per school to cover various school operating costs, often sent directly to the school. The unit of analysis can be important: early grades and pre-exam grades often have far larger class sizes than other grades in the same school. School-level analysis fails to reflect this.
[22] This indicator and others need to be considered alongside other factors (including incentives for maintenance and alternative delivery mechanisms) as well as relative costs of different types of investment which differ across countries and within them. For example, rural and urban areas can differ significantly in costs (↑Bertoni et al., 2020).

the sector, alongside subnationally raised revenues in some countries. Annex 1 describes how vertical allocations are made for nine countries, including the original six EdTech Hub focus countries. Legally prescribed vertical allocations to subnational governments are an important determinant for funding for the education sector in countries including Brazil, Ghana, Kenya, Pakistan, and South Africa.

Allocating resources across spending entities requires administrative disaggregation of the *core EMIS dataset* that can be joined up with data from other sources. Many governments use data-driven methodologies such as allocation formulae to determine the distribution of resources across subnational governments and schools. Annex 2 lists education data that are commonly used for the horizontal allocation of resources. Again, this is often headcount data. The degree of discretion afforded to local governments to allocate resources also varies across countries. Centrally determined capitation grants are the most common feature across these countries. Annex 3 provides details of allocation methodologies for the original six EdTech Hub countries, as well as Brazil, South Africa, Scotland, and Uganda. These allocation methodologies require linking the core EMIS dataset to datasets from other sources. For example, Sierra Leone's education block grant uses enrolment and population data. Uganda's development grant includes indicators based on enrolment, population, and land area.[23]

Allocations that target alleviating the constraints to learning require a more detailed *core EMIS dataset*. Data on enrolment by grade (and ideally by learner) allow for allocation formulae that reward schools and local governments for sustaining progression and transition at 'pain points'.[24] Some allocation formulae provide additional amounts for pupils from deprived socio-economic backgrounds or pupils with special needs.[25] Data on the qualifications, experience, and performance of teachers may

[23] In South Africa and Scotland, schools and local authorities work to reallocate resources from the centre by identifying disadvantaged students and schools, while central agencies' identification of disadvantage is calculated for larger areas.
[24] Examples of funding formulas that penalise dropout include Colombia and subnational Brazil (↑Bertoni et al., 2020; ↑Lautharte et al., 2021; ↑Loureiro et al., 2020). In the past, Uganda and Ethiopia paid primary schools more for children in later grades (↑Kayabwe & Elior, 2014; ↑Kelil et al., 2014). Poorly designed incentives for schools and local governments can also exacerbate dropout, as was the case in Tanzania (↑Cilliers et al., 2019).
[25] For example, in Uganda (↑Al-Samarrai & Lewis, 2021). A formula providing top-ups to schools with pupils with special needs in Tanzania was proposed but not implemented (↑Shukia, 2020). Additional capitation grants for children with special needs (both mainstreamed and in specialised schools) have been in place in Kenya for at least a decade (↑Githinji, 2021; ↑Government of Kenya, 2023; ↑Mwangi, 2013).

be a factor in determining how they are deployed across and within subnational governments.[26] However, this may be located in a distinct personnel management system. Also, data on school characteristics may be used to top up capitation grants.[27]

Allocations that use data on performance to target constraints to learning require links to datasets beyond the *core EMIS dataset*. Targeting lower-performing schools and local governments or incentivising better performance requires data outside of the school census. For example, data on student performance on standardised assessments are held by exam boards.[28] Countries may also use assessments of local government performance to incentivise improvements in their management of education.[29]

More recent EMIS projects aim to look 'beyond headcounts' (↑UNESCO, 2021). Such projects have often pursued 'real-time' designs, taking advantage of new data collection technologies, which have the potential to be more cost-effective, more useful for decisions and help to link money to results (↑Nicolai & Hassler, 2020; ↑Sharma et al., 2021). However, ambitious designs require greater efforts from data producers and managers and can resemble 'best practice' solutions with little regard to context (↑GPE and Education Data Solutions Roundtable, 2019).

Real-time data is rarely necessary for budgeting, but timely data is. Budgets are produced annually. Nevertheless, the analysis that underpins budgeting can be a 'permanent activity' (↑Long & Welham, 2016). Forecasts of revenues and expenditures are constantly being updated and revised. Alignment of data collection with key moments in the budget process is necessary if it is to be used to inform resource allocations. In higher-income settings, the education census is carried out more frequently. For example, in England, it is conducted three times per year (↑UK Government, 2022), while in South Africa, the national government consolidates some EMIS data up to four times per year. Common agreement on which datasets are 'correct' is essential for budget allocation

[26] Among the 11 countries for which SABER EMIS survey data is available, five indicated that they use EMIS data for staff planning (↑World Bank, 2022). Shifting public servants across locations according to performance has been studied in Sierra Leone (↑McBurnie et al., 2021), Uganda (ongoing; ↑Cohen et al., 2022), and Pakistan (↑Khan et al., 2021).
[27] See ↑Ross et al. (1999) for a(n old) review.
[28] Linking student performance to provider pecuniary incentives is controversial: for a review of multiple failed examples to sustain programming in Ghana, see ↑Williams, (2020).
[29] Examples include Brazil, Tanzania, and Uganda (↑Al-Samarrai & Lewis, 2021; ↑Di Maro et al., 2021).

negotiations to take place around policies rather than on the basis of competing versions of facts.

In the absence of timely data, budgeting resorts to incrementalism and the inefficient allocation of resources. Budgeting is inherently incremental (↑Schick, 1998). Negotiations often use the previous year's budget as a starting point. An absence of up-to-date, reliable data on spending needs may contribute to declines in funding in real per capita terms over time.[30] Allocating resources without good data may leave inequities unaddressed and increasing over time. Some systems may struggle to add schools during the budget implementation process due to PFM rigidities, which makes annual coordination important (↑Long et al., 2021), while others use EMIS data and processes to help anticipate in-year changes (↑Fab Inc, 2021).

3.2. Budget approval

The budget document that is presented to the legislature for approval varies in its level of detail across countries. Most countries provide breakdowns of the budget according to administrative[31] and economic[32] classifications, which are used as input-based controls for the execution of the budget. More governments are now also including programme segments in their budgets to reflect the purpose of spending,[33] and linking these to indicators for the outputs and outcomes they are expected to produce. Often referred to as *performance budgeting*, these reforms aim to provide decision-makers, including the legislature, as well as wider civil society, with further information on the budget. Among low- and

[30] For example, funding often falls as a result of population growth without funding growth. New data appears to help: ↑Best et al. (2013) conclude that there is an influence of learning assessments on allocation decisions, including in 13 cases on formula allocation. Ineffective domestic articulation and low elite visibility of education needs may contribute to financial neglect: Uganda is a case in point. Here the government presided over dramatic declines in real per-student spending in the late 2000s and early 2010s (↑Al-Samarrai & Lewis, 2021; ↑Long et al.,2021) as in Tanzania (↑Dom et al., 2021), and many other countries during the current inflationary period.

[31] I.e., ministries, departments, and agencies, and by level of government depending on the federal structure. See ↑International Budget Partnership (2022).

[32] Typical categories include recurrent expenditures (salaries and wages; goods and services and; transfers and subsidies) and capital expenditures.

[33] For example, in the education sector it is common to have programmes for pre-primary, primary, secondary, and tertiary education with further sub-programmes beneath these. Many systems (e.g., in Pakistan, South Africa, England and Egypt) run combined-level schools, which need careful delineation if programme budgeting is to be meaningful for some types of analysis. Pre-primary education is particularly difficult because provision often 'borrows' resources from primary school sites.

middle-income unitary countries,[34] Kenya stands out for detailed linkage of performance information combined with timely, high-quality performance review of evolving enrolment and unit costs (↑Government of Kenya, 2023).

Budget information oriented towards education quality is nascent at best. For example, delineations for critical programmes, including in-service teacher training, are difficult or impossible to find in most budget proposals. Measures of education quality from outside of the EMIS, such as learning assessments, are often difficult to compare (small changes year-to-year matter to politicians but may not be statistically significant (see discussion on Tanzania in ↑Dom et al., 2021). Learning assessments might be irregularly funded by donors and can be difficult for governments to implement at a useful quality on a regular basis.[35] As learning assessments are usually sample-based, they might be difficult to link to system performance in a way that is salient for decision-makers (↑Crawfurd et al., 2021).

Deciding on what indicators to use requires balancing the costs and benefits of performance information. The history of performance-based budgeting in higher-income contexts is unremarkable (↑Moynihan & Beazley, 2016). Governments have struggled to balance the information needs of decision-makers with the administrative burden of compiling and presenting that information. A good sector annual review might be difficult to produce in line with the budget cycle due to the timing of the school year, due to poor donor alignment with country systems, or due to thinly spread planning and reporting resources. The extent to which the EMIS dataset, which contains data on outputs related to access, can be easily linked to other datasets on outputs and outcomes related to learning constraints is a determinant of the administrative burdens involved.

More could be done to understand the information needs of the legislature, particularly the relevant legislative education committees.[36] Performance budgeting often fails to meet the needs of decision-makers, overloading them with information they don't understand, don't want, and

[34] At least, among Anglophone countries.
[35] Punjab in Pakistan and Western Cape provinces in South Africa are notable exceptions. Here, the provincial governments have persistently supported learning assessments. As in richer countries, high-stakes examinations are often not a reliable measure of quality (see, for example, ↑Rossiter et al., (2021).
[36] ↑International Budget Partnership (2022) provides information on which countries had a *de facto* parliamentary budget review in 2019/20. ↑Coppedge, M. et al. (2023) also provide perception-based indicators of this role.

don't use (↑Moynihan & Beazley, 2016). However, outside of the rigidities of performance budgeting, there may be ways to use EMIS data to provide more timely and relevant information to the legislature that links spending and performance by responding intelligently to their user needs.

3.3. Budget execution

Budget execution is "the set of processes through which governments deliver on the promises and proposals included in the budget" (↑Andrews et al., 2014: p. 4). Two main problems stand out around budget execution in the education sector in lower-income countries — unreliable fund flows and misaligned incentives.[37] Data from EMIS has been brought to bear on both.

Centralised data on schools and enrolment that is linked to the treasury system is useful for combating leakages in the flow of funds. Public expenditure tracking surveys (PETS) and audits have shown that funds and other in-kind resources budgeted for schools do not always reach them,[38] while teachers are sometimes paid late, not in full, or not at all. Some governments[39] have responded with new processes for transferring resources directly to schools.[40] This requires a ready linkage between the EMIS and the treasury system, which is often a computerised financial management information system (FMIS). Similarly, EMIS data may be useful in the centralised procurement and distribution of teaching materials such as textbooks.[41] In systems where local governments remain part of the distribution channel, EMIS data remain a good check against ghost schools and students and in ensuring that schools are not being short-changed.

Results-based financing (RBF) is heavily reliant on a highly functional EMIS. In many contexts, the focus of the education sector is shifting from access to quality. In response, donors offer a variety of results-based financing instruments to governments in low- and middle-income countries to incentivise unblocking obstacles to learning, including teacher

[37] These are also prominent problems in other service delivery sectors, where funds released are not used for their intended purpose.
[38] For example, a survey of 250 Ugandan schools found that they received just 13% of their capitation grant on average and that most schools received nothing (↑Reinikka & Svensson, 2004). In Pakistan, only a quarter of surveyed government schools report receiving grants in 2021, a decline from 40% in 2020 ↑ASER (2022).
[39] Including Tanzania, Rwanda, and Uganda.
[40] Often referred to as direct facility financing or straight-through transfers, since they are ringfenced away from subnational government reallocation.
[41] Which in Tanzania and South Africa are informed by data from the EMIS.

attendance and teaching, student attendance, school management, curriculum alignment, and resource allocation.[42] Some governments have integrated results with financing to some extent, notably Brazil (↑Mello et al., 2021). Results-based arrangements range from withholding a portion of financing if enrolment, attendance, or other targets are not achieved in a certain period to an elaborate range of payouts for governments, households, teachers, and schools. These payouts improve a pre-agreed set of input, efficiency, output, impact, and outcome measures. RBF programmes provide "rewards after the credible verification of an achieved result." To be successfully implemented, "a functioning EMIS is needed for all monitoring and evaluation efforts, which are the key feature of RBF operations" (↑Lee & Medina, 2019: p. 50). New EdTech, if carefully implemented, opens up new opportunities for cross-checking the integrity of results and rewarding better practices. However, attaching rewards to indicators might undermine EMIS credibility by creating incentives to misreport.

The use of RBF in budget execution places greater reliance on higher-frequency EMIS data. Releases and payments for RBF are usually made quarterly, if not more frequently. Integrating EMIS data into budget execution processes can therefore create demands for higher frequency EMIS data.

Data needs from the EMIS will inevitably change as countries attempt reforms, including PFM reforms. Developing capable professionals inside government, who can adapt interventions initially supported by donors to better fit how they end up being used, should be a priority for EdTech practitioners. If this isn't feasible, EdTech implementations and any PFM reforms they support are necessarily short-term.

3.4. Budget evaluation

Following the end of the fiscal year, performance is evaluated in various ways. The government produces financial statements which are scrutinised by auditors, and some supreme audit institutions also carry out *value-for-money audits* (↑Andrews et al., 2014). *Spending reviews* are also becoming increasingly common (↑Doherty & Sayegh, 2022). The overarching purpose of these evaluations and others is to improve how resources are allocated and used in future budget cycles.

[42] ↑Lee & Medina (2019) provide a comprehensive overview of results-based financing in education. ↑Dom et al. (2021) examine government experiences of results-based financing in education in three countries: Mozambique, Nepal, and Tanzania.

For EMIS data to be useful in budget evaluation (and similarly for other budget stages), it should be easy to access and link to other sources of data. At a basic level, integrating EMIS data with expenditure data allows for wider understanding of imbalances in spending that are not aligned with strategic priorities. For example, spending reviews in Bangladesh (↑Bhatta et al., 2019), Ghana (↑Government of Ghana, 2018), and Tanzania (↑Dom et al., 2021) raise concerns about increasing imbalances in per capita spending on primary education compared to secondary and tertiary education, not just in terms of allocative efficiency, but also regressivity. ↑Walter (2020) links imbalances in teacher allocation with decreased aggregate learning, using EMIS data from 91 countries.

EMIS data is also useful for more disaggregated analysis of where resources are deployed. Generating policy, operational, and management insights into removing binding constraints on learning[43] requires more disaggregated data — on individual pupils, teachers, and classes — and more extensive linkages to datasets from systems for assessment, learning, inspection, human resource management, and payroll (↑Hua & Herstein, 2003; ↑Rossiter, 2020).

> **"Ensuring learning and schooling for all is complex, and cannot be achieved without a dramatic change in the way we combine and use data. Linked data allow us to examine things like equity in resource allocation, including key dimensions such as teacher quality, or identify relatively high-performing districts and schools and test relationships between school inspection and student achievement."**
>
> **Jack Rossiter, 2020**

Using EMIS data to produce evidence within established PFM processes improves the chances of uptake. Policymakers often treat

[43] Steps governments can take to alleviate learning constraints that are related to the budget might include ensuring financial resources get to the right school reliably and addressing other bottlenecks to a coherent education offer, such as misguided or unclear information about what the resources are for (↑Pritchett, 2015). Such steps could include, fairer teacher allocation across stages, grades, and geographies; ensuring extra teaching support for very large classes (at some level, classes may be too large to deploy effective pedagogical techniques); improving resource levels and management for critical programmes such as early years' education, teacher and learner materials, basic classroom materials; and (more ambitiously) assessing whether in-service teacher training is effective.

externally generated and particularly sample-based data differently from analysis produced using their own administrative data (↑Brookings, 2018; ↑Crawfurd et al., 2021). Moreover, national and local evidence is important as there are few generalisable interventions that governments can use to tackle learning constraints reliably across different contexts and education providers (↑Evans & Popova, 2016; ↑Kerwin & Thornton, 2021; ↑Vivalt, 2020). Where governments lack the capability to generate some types of insights, opening up this data to others, such as academics, might produce evidence with some potential to inform policy in lower-income contexts (↑Rossiter, 2020). Furthermore, finance ministries are likely to be more aligned with 'paying for quality' than many ministries of education due to closer alignment with government-wide expenditure efficiency goals.

4. The supply of data

The discussion in the previous sections highlights various points throughout the PFM cycle where there is strong demand for EMIS data. However, this demand comes with three main requirements:

- Firstly, to be useful, the data needs to be credible;
- Secondly, the scope of data collection needs to be broad enough to include consideration of constraints to learning as well as access;
- Thirdly, it needs to be relatively easy to access and link the EMIS data to other sources of data.

In this section, we describe some of the persistent shortcomings of EMIS on the supply side to meet these requirements.

4.1. Credibility

The use of EMIS data in budget formulation presents a problem for its credibility. By linking resource allocation to headcounts, the PFM system can generate incentives for local governments and headteachers to inflate numbers to attract more funding. Comparing EMIS data with household survey data from the same period, ↑Sandefur & Glassman (2015) concluded that reported enrolment in low-income countries (LICs) was inflated by official sources; capitation grants could incentivise this. Analysis conducted for this study confirms that increases in and levels of primary gross enrolment remain inflated in administrative data for LICs, and primary out-of-school rates for LICs are underestimated by administrative data (see Table 1 below).

Nevertheless, the median absolute difference in primary gross enrolment ratios is nine percentage points. Ghost pupils, teachers, and schools remain a problem even in relatively high-functioning education systems, including Kenya's (↑Muchunguh, 2021). Twenty-two DHS-surveyed countries had at least three percentage points higher administrative enrolment rates than survey-estimated primary gross attendance rates — including Ghana, Malawi, Pakistan, and Sierra Leone.

These differences are meaningful. Recently, globally reported EMIS gross enrolment counts (*levels*) demonstrate (on aggregate) undercoverage in the administrative data in many countries. For the most recent DHS estimates for 49 countries, UIS-collected EMIS observations for the same

year suggest the EMIS data undercount 23 million children in primary school (net). The net result stems from undercounting in a few large countries. Differences in reported primary repeater rates are often substantial and affect countries across income levels.

Table 1. *Comparing primary gross enrolment ratios, out-of-school rates, and repetition rates between administrative data and household surveys.*

	Household surveys	Administrative data
Increase in primary education gross enrolment ratios (mean)		
LICs	3.9 p.p.	7.8 p.p.
LMICs	2.3 p.p.	-1.1 p.p.
UMICs	-2.2 p.p.	-2.5 p.p.
Primary gross enrolment and attendance ratios (mean)		
LICs	99%	107%
LMICs	102%	107%
UMICs	104%	101%
Primary out-of-school rate (mean)		
LICs	27%	17%
LMICs	9%	12%
UMICs	3%	5%
Primary grade repeater shares (median)		
LICs	13.0%	9.9%
LMICs	3.3%	1.8%
UMICs	2.9%	0.5%

p.p.= percentage points. Sources: DHS via Statcompiler (gross primary attendance rate), UIS (administrative data and school-age populations (↑USAID, no date)); ↑UNESCO (2023) (out-of-school rates), UNICEF MICS data various years (calculated repeater shares from 27 countries) (↑UNICEF, 2022). Notes: Change in primary enrolment is between periods where data is available in both DHS and UIS from 1999 until 2019 using 67 pairs. Gross enrolment/attendance measures are from DHS and UIS (latest measure for 49 countries, up to two UIS adjacent years are used where UIS data is missing). Repetition rates are taken from UIS administrative and MICS survey data for the same year between 2015 and 2022 (27 countries). Each country has equal weight. Population estimates may differ between measures, but this is unlikely to account for large differences.

Data credibility problems are particularly pertinent for centralised data collection. Completing the education census can represent a significant administrative burden for head teachers and teachers (↑Ombui, 2013; ↑Pettersson et al., 2017). A sample of school census questionnaires in 21 lower-income countries shows that the length varies from one page to 38 pages, with some governments asking schools for almost 1,000 data points ↑Center for Global Development (2022). Some of these questions could be asked less frequently or not at all.[44]

These exercises often offer schools little in return, given they are subsequently unable to access and use the data they report. Centralised data collection, which imposes heavy burdens on head teachers and offers little in return, is more likely to be treated as an exercise in compliance than with genuine engagement (↑Eddy-Spicer et al., 2016).[45]

Verification mechanisms to ensure data credibility can be expensive. Performance-based financing programs (see Section 3.3 above) use verification mechanisms to ensure the credibility of the data. "Cleaning" school returns to address anomalies is also a feature of many donor-funded programmes. However, questions remain as to whether these may be too costly (financially, technically, or politically) to mainstream into government operations (↑Lee & Medina, 2019). Expanding the scope of data collection and improving its interoperability may offer more viable (as well as complimentary) alternatives to improving the credibility of EMIS data (see Sections 4.2 and 4.3 below). Changing the mode of data collection towards a school-facing approach may somewhat address the incentives for accurate reporting.

4.2. Scope

Shifting the PFM system from one that supports schooling, to one that supports both access and alleviating learning constraints, requires more disaggregated data collection. The data required to formulate,

[44] Examples: (1) frequently requesting information on whether large infrastructure exists or not in a system that doesn't fund much improvement or expect much non-state intervention could be one area for reducing questionnaire length; (2) if teachers are identified in the data, pre-service qualifications will not change much over time; and (3) if there is a large and persistent problem with the accuracy of repetition and dropout data, and no plausible remedy, then perhaps EMIS designers should stop asking schools about repeaters and leavers, and rely on household surveys instead.

[45] Recently in Uganda, recorded grade repetition rates have been shown to be underreported in light of the incentive for headteachers to report 'correct' behaviour to authorities for a quieter life secured by telling administrators what they want to hear (↑Weatherholt et al., 2019).

implement, and evaluate budget policies that help address the learning crisis go "beyond headcounts" (↑GPE and Education Data Solutions Roundtable, 2019). For more informed decision-making processes, analysts need data about what is happening at the level of the individual student, teacher, and in schools. This is essential if they are to better understand the reasons behind major issues including low levels of basic skills, grade repetition and dropout and consider potential remedies to them.

However, very few EMIS can track individual student performance. Tracking pupils over time requires a system with pupil identification. This is not a common functionality in implemented EMIS, particularly in lower-income countries. Of the 11 countries that have had SABER EMIS assessments, only in the USA were "teachers able to track pupil performance in various subjects / classes", while only the US, Fiji, and Romania were able to follow pupils between levels of education (↑World Bank, 2022).

Going beyond headcounts implies devolving the collection of data to the school level. Top-down efforts to track pupils are often not feasible, and so many countries that track individual pupils have school-managed EMIS. These systems are used to manage the school's operations: for example, recording student attendance and performance. They also provide accountability to proximate stakeholders: for example, to parents, school boards, and local government education departments.

Expanding the scope and changing the mode of collection helps to address other issues. Beyond providing more disaggregated data for analysts, expanding the scope and regularity of data collection and devolving greater responsibility to schools has several potential benefits for how EMIS data interacts with the PFM system.

1. Firstly, regular data on individual pupils is more time-consuming to manipulate, even more so if it is linked to other administrative systems.

2. Secondly, a by-product of school-level EMIS is that it reduces the administrative burden of supplying local governments and the central government with headcount numbers.[46]

[46] While there is undoubtedly an administrative burden associated with managing a school-level EMIS, the burden of completing census questionnaires is greatly reduced, and there are potentially much greater returns to the school's management having access to this data. Moreover, the digitalisation of record keeping at the school level may reduce existing administrative burdens, and a schools-first approach may allow teething

3. Thirdly, there is greater potential for using real-time data when required. At a minimum, the reduced administrative burden can allow for more timely data to be supplied for key decision points in the budget process. Funds can be released according to changing circumstances or perhaps aspects of performance during budget execution.

4. Finally, while new technology implies new costs, open-source solutions are widely available, and a school-level EMIS could reduce the cost and rent-seeking behaviour associated with carrying out the census using questionnaires.

Shifting to fully passive data collection would not be possible in many contexts. A fully passive EMIS, where the census data is extracted from "high-EdTech" tools such as biometrics, pupils' and teachers' computers as described in 2b in Section 2, relies on a step change in the availability of high-quality digital interventions and prerequisites. These require electricity, connectivity, or at the very least, intermittent access to upload facilities, all of which are not necessarily available in most low- and many middle-income contexts, particularly in rural schools. It relies chiefly on the sustained adoption of learning-focused ICT tools, which are costly to deploy and maintain at scale. Frontline workers may resist, be unable to access funds to maintain the tools, or just find it difficult to use them.[47]

4.3. Interoperability

Administrative systems often duplicate data, which can impact the coherence of PFM processes. A mapping of the data ecosystem in Sierra Leone shows multiple entities handle data on teachers, enrolment, payroll, and lesson observation. The proliferation is partly related to the perceived need to verify data from other sources, and there is no mechanism to ensure data is shared between them (↑McBurnie & Beoku-Betts, 2021). Uganda also has different systems for handling teacher data that are not linked.[48] Education census questionnaires often ask for data on teachers, funding, and exam results that are available from other information

problems to work themselves out locally rather than as part of an often antagonistic, centrally driven project.

[47] For example, see ↑Banerjee et al. (2008).

[48] A teacher management information system (TMIS) managed by the education ministry duplicates some of the purposes of the integrated personnel and payroll system (IPPS) managed by the public service ministry. However, the former also includes data on qualified teachers outside the government system.

systems.[49] As well as increasing administrative burdens, this duplication can result in discrepancies between 'official' sources of data and multiple versions of the 'truth', which provide a poor basis for budget negotiations.

This siloed mentality can also lead to institutions not using data they should be using in PFM processes. For example, in Egypt, the General Authority for Educational Buildings uses a separate information system to identify the needs of schools. This helps result in schools which are "built in places where existing population densities do not require them, and crowded schools are left as they are" (↑Sobhy, 2019).[50]

Donors sometimes contribute to interoperability issues by reinforcing silos. In Sierra Leone, EMIS components have been funded by separate donors using distinct technologies (↑Mullan & Taddese, 2020). A study in Kenya and South Africa concluded that the incentives for donors, government agencies, and ICT professionals to perpetuate digital fragmentation are often influential (↑Walker, 2016).[51]

The inability to exchange data is a problem for PFM processes which are reliant on joined-up datasets. Policy costings and allocation formula (Section 3.1), and budget evaluation methodologies (Section 3.4) all require linking datasets from different government systems. Direct facility financing and results-based financing (Section 3.3) requires data exchange between the EMIS, budget systems, and treasury systems. Common problems encountered include:

1. Accessing data from different administrative systems[52]
2. Mapping data from different datasets onto one another[53]
3. Different lists for the same thing in different systems.[54]

[49] I.e., from human resource management and / or payroll information systems, the financial management information system, and the information system of the exam board, respectively.
[50] Pakistan exemplifies similar behaviour (↑Kakar et al., 2022; ↑RISE, 2023).
[51] Contracts and payments may be attached to information-gathering exercises, or even to the procurement and training required for new EMIS systems.
[52] Data in administrative systems is sometimes sensitive, particularly data related to individuals. For example, individual students in education systems, or teachers in human resources (HR) and payroll systems. Obtaining access may be time-consuming or simply impossible.
[53] The databases and architecture of some administrative systems can be large and complex, requiring specialist knowledge to extract data in the formats required. For example, financial and HR administrative systems.
[54] For example, without a shared list of local governments across administrative systems, it is difficult to match the data required in allocation formulae. Unless an exam board records a student's school in the same way it is recorded in the EMIS it is difficult to match them to identify correlations between provision and learning constraints. Delays in the

These interoperability issues reduce the timeliness of data, making it less useful for PFM processes, and making EMIS less sustainable. Interoperability issues mean that in practice, data needs to be cleaned, reformatted, matched etc. The time for subsequent analysis is reduced and its timeliness in PFM processes is compromised. Often, responsibility and the skills required for ensuring interoperability (i.e., data cleaning, matching etc.) lie within external project teams implementing systems. As these projects come to a conclusion, it is difficult for governments to sustain this function. Moreover, the same issues tend to recur annually, making it more likely that data will be ignored in PFM processes over time. This may go some way towards explaining why EMIS commonly fall into disrepair once a donor project ends.

flow of funds can occur where the list of schools in the EMIS cannot be easily reconciled with the list of schools in the treasury system.

5. The future of EMIS

Based on the discussion in the previous sections, this section considers some of the principles that future versions of EMIS might aspire towards, to ensure they can respond to the demands of the PFM system.

As well as addressing some of the persistent shortcomings in the supply of data from EMIS to the PFM system, combined, these principles can enable a 'building blocks'[55] approach to EMIS development that allows it to evolve and interact more fluently with the demands of the budget process.

While some of these principles seem obvious, they represent a step change from current practices in many low, lower-middle, and more prosperous countries. National and local government officials make decisions on most education financing. Greater understanding of the principles EMIS should rest on, might help enable governments to tackle persistent inefficiencies and unlock the potential of education financing.

5.1. A subsidiarity principle for data collection

The central government should only actively collect data from schools if schools are unable to do so themselves.[56] Otherwise, they should passively collect data from school-level EMIS (or potentially other EdTech). Similarly, EMIS should not duplicate the collection of data collected through other administrative systems across government.

> **"EMIS should not try to encompass all possible forms of data collection processes, as this can easily become unmanageable and risks overloading staff. EMIS simply cannot be the one-stop shop for all the data collection processes required in the education sector; i.e. it cannot be everything to everyone."**
>
> **Chris van Wyk and Louis Crouch, 2020**

School level data can empower school staff to improve learning outcomes (↑McBurnie et al., 2022). Devolved responsibility for data collection also

[55] See ↑Adam et al., (2021).

[56] Among the reasons that schools in lower-income countries may be unable to manage a school EMIS are lack of internet and electricity (↑Bashir et al., 2018). School access to electricity in LICs has barely changed since 2015 (↑UNESCO, 2022). The education sector hasn't had a solar push to the same extent as health (↑GAVI, 2018).

brings EMIS closer to the production of data in real time. While real-time data may not be necessary for PFM processes, it has benefits over other modes of data collection in terms of its timeliness and, potentially, credibility.

5.2. A 'single source of truth' principle

EMIS should be built on reliable lists of information, known as 'registers' in recent digital literature. For example, the same list of schools, with the same coding structure and a harmonised set of aggregation and review / cleaning and mastering practices, should be used across the various systems used for collecting headcount data, managing examinations, carrying out school inspections, and supplying teaching materials.[57]

> **"A lot of data (not all of it, but a lot of it) should exist as reliable lists of information: registers. A register is a single source of truth. It's the only source of information about its subject matter."**
>
> **– Tom Loosemore, 2019**

Moreover, EMIS should use the registers for canonical lists that are maintained by other parts of government. For example, governments should use a single authoritative list of subnational governments and staffing structures that are also used in the budget, treasury, and payroll systems. The systems used for generating unique identifiers should be robust to changes in subnational administrative categories.

Not only would this go a long way towards making it easier to link datasets necessary for PFM processes, it could also contribute to early detection of any anomalies impacting the credibility of data.

5.3. An openness principle

Users of data shouldn't have to understand the intricacies of administrative systems or need to make multiple requests to access the data they need. Data should ideally be exposed (securely) through APIs based on open standards.

[57] It is worth noting that ↑Hua & Herstein (2003) made the same points almost two decades ago.

> **"Open standards mean that different teams can be confident that they are speaking the same language, and the designers of public facing services can build on top of reliable, predictable data."**
>
> **– Richard Pope, 2019: p. 20**

Security should be built into the design of these APIs. For example, for the education sector, appropriate aggregation and anonymisation of data can provide much of the security needed to address privacy concerns.

However, APIs are not for everyone. They primarily meet the needs of developers building digital services on top of an EMIS, for example, reporting tools and dashboards. Other users are likely to require easier-to-use tools that they can customise to their own needs. For example, downloads in formats they are accustomed to using, such as spreadsheets.

6. Recommendations

Implementing the principles highlighted above in Section 5 goes beyond what an education ministry (or EMIS team) can do on its own. Finance ministries that want to support a PFM system that contributes to unlocking learning gains, and not just access, have a role to play in digital transformation. Donors are also likely to have a continuing role to play, both in terms of funding and knowledge dissemination. Our recommendations are therefore structured towards these three main actors.

To put EMIS on a more sustainable footing, education ministries (or EMIS teams) should leverage existing and potential demand for data, including:

1. **Leveraging demand from the PFM system** — improving the relationship between the demand and supply of data can make EMIS more viable after donor support ends, and drive further refinements. Steps the education ministry should consider include:

    a. **Meeting current user needs** — current demands are often more established for budget formulation than for other stages. To be more useful for policy costings and allocation methodologies, the *core EMIS dataset* must be interoperable with other government datasets, i.e., they must use the same registers.

    b. **Maintaining an active dialogue on future user needs** — demands around other stages of the budget cycle are emergent. As a primary customer for the data, budget managers should be involved in discussions of EMIS reforms early and often.

    c. **Weigh up the costs and benefits** — future EMIS development should be cognisant of changing policy priorities in the education sector in the country in question, and collect data appropriate to informing those policies. However, careful choices are likely to be necessary, weighing up the usefulness of data against the administrative burden and evolving priorities. Ideally, EMIS should be built in such a way as to allow flexibility in terms of the scope and ways data can be collected while maintaining at least some core coverage.

   d. **Avoid duplication —** ideally, data collected via other government systems should not be collected by an EMIS. A notable exception is where it may be required for verification purposes: for example, whether or not teachers on payroll are in post at the right school.

2. **Leverage demand from schools** — school-facing data systems that fulfil genuine school-level demands, and allow passive collection of data for higher levels of government, are preferable to top down 'active' data collection in terms of timeliness, credibility, and the scope of data that can be collected. Steps an education ministry should consider include:

   a. **Asynchronous onboarding** — schools that can manage their own data should be encouraged to do so; when designing financial allocations, efforts should be made not to disadvantage schools who cannot do so.

   b. **Creating feedback loops** — for schools that cannot manage their own data collection, services should be built that allow them to use the data that is actively collected. This should be a minimum standard, not a 'nice-to-have'.

   c. **Improving verification** — spot checks to ensure data collected are correct, are costly. Integration with school inspection systems and non-state actors should be considered where appropriate.

   d. **Promoting the use of data** — for example, supporting easy comparisons with neighbouring, (attainably) better-performing, and similarly resourced schools.

To support the efforts of the education ministry (or EMIS team) the finance ministry and / or donors should **support a 'whole of government' approach**. An education ministry alone cannot ensure that other parts of government follow *single source of truth* and openness principles. A finance ministry and / or donors may have more appropriate carrots and sticks to ensure these principles are adhered to. Steps they should consider include:

1. **Supporting the establishment of a central digital team** — central digital teams can coordinate digital transformation across government, including ensuring there is appropriate governance of

registers in place and defining what good looks like in terms of open standards.

2. **Funding teams over projects** — modern approaches to digital transformation — such as a 'building blocks' approach — require governments and funders to rebalance their spending away from capital-intensive donor-driven spending on comprehensive solutions. Instead, they must build and durably fund government capability to manage and adapt different components, with donors assisting within a government programme.

A final word of caution. While this paper has focused on EMIS and our recommendations on how finance ministries can support their sustainability, governments should also take care to encourage the use of sample-based and non-state options for information gathering and policymaking. Costs can be lower than through government-run EMIS activities and objectives such as accuracy and quality are often better aligned with non-state incentives, than the incentives of government officials.

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Annex 1 Vertical resource allocation

Country	How resources are allocated between levels of government
Bangladesh	Spending on education is set by the central government (↑Bhatta et al., 2019). Spending on primary and secondary education is largely deconcentrated rather than decentralised (↑Nixon et al., 2018), with a significant share of non-state delivery.
Brazil	There are several streams of education funding (↑Mello et al., 2021). Brazil makes a regularly revised constitutional commitment to the level, allocation criteria and share of the federal contribution towards a major education fund. The federal government contributes revenues alongside municipalities and states into a shared fund, and provides an additional basic grant for education. States and municipalities have an overlapping mandate on upper secondary education. Municipalities provide the earlier stages. Unlike the other countries in this table, municipal- and state-raised revenues are each roughly as large as federal revenues. Similarly to Pakistan, Brazil has a non-reduction clause for some education financing streams in its constitution. Brazil faces significant challenges due to the lack of flexibility in terms of its public expenditures year-to-year, which follows from arguable overuse of the constitution to determine budget allocations (↑Economist, 2020) which are procyclical (↑Mello et al., 2021).

Country	How resources are allocated between levels of government
Ghana	The central government and the oil fund are the main source of education funding. The District Assemblies Common Fund, some of which is spent on education construction (↕Williams, 2017), gets a set percentage of national revenue. Capitation grants to schools are set and sent by the central government (↑World Bank, 2017). The national budget sets allocations for each school.
Kenya	Constitutional floor (a share of total revenues) for the equitable share, which covers several services, including pre-primary education. Primary and secondary education is deconcentrated rather than decentralised. Capitation grants to schools are set by and sent from the central government.
Pakistan	Under the constitution, a fiscal commission recommends a share of federal revenues to be allocated to states, which provide pre-tertiary education. The share to states cannot be reduced during the award period (which varies, currently 13 years). The president has a veto on the share for other purposes, but in reality a modest amount is deducted. The central government provides tertiary and some non-formal education. Provinces distribute resources among districts and set formulae for schools in some provinces.
UK	Negotiated, but with substantial central government influence over the overall vertical allocation. In recent years, England has decided to pass more resources directly to schools and not via local councils.

Country	How resources are allocated between levels of government
Sierra Leone	The Local Government Act 2004 *de jure* protects local government grants for education with the proviso that resources must rise in line with inflation. Councils have the mandate to provide education up to the lower secondary level. Capitation grants to schools are listed in the national government budget.
South Africa	"Cooperative" government model. A large, pro-poor multi-sector grant, the "equitable share", forms the basis of the cooperative model. Education is an area of "shared competence", where the provinces lead delivery for pre-tertiary education. De facto, the National Treasury and civil service unions reportedly play the two most influential roles over budget allocation to the sector (↑Levy et al., 2018). Below provinces, municipalities receive multi-sector funding from the central government and discretionary resources from provinces, a small share of which is spent on early childhood development (ECD) construction (↑World Bank, 2023). Under the constitution, functions cannot be assigned to subnational governments without equitable financing. However, recent years have seen substantial nationally determined teacher salary increases, which arguably have not been fully funded by the national government (↑Spaull et al., 2020).

Country	How resources are allocated between levels of government
Tanzania	Increasingly centralised decisions, with almost total fiscal discretion at the centre (↑Tidemand, 2018)and unreliable grant execution (↑Tilley et al., 2014). Local governments deliver pre-tertiary education. Capitation grants to schools are set and sent by the central government Ministry of Finance, with the oversight of the President's Office. In recent years, the share of the education budget has increased for secondary and post-secondary, where access has expanded, and also for tertiary, while decreasing for primary (↑Dom et al., 2021).
Uganda	Central government discretion de facto, de jure expenditure decentralisation but few vertical legal protections for spending, none of which apply to education grants. Minimum capitation grants to schools are set by the central government (↑Long et al., 2021) but sent by local governments with an elaborate validation or "warrant" procedure overseen at the Ministry of Finance. In recent years, the government has increased the share of the sector budget to tertiary and halved the share of GDP to education overall (↑Al-Samarrai & Lewis, 2021).

Annex 2 EMIS data in horizontal resource allocation

Data	Requirement for horizontal allocation decisions
Enrolment	Specific amounts per student are a common component of most funding formulae. Funds transferred to schools are often referred to as capitation grants due to this per capita criterion.
Schools	Specific amounts per school are also a common component of capitation grants. The pupil-to-school ratio may be a factor in determining capital expenditure allocations for school construction.
Enrolment by grade	Specific amounts per student can be higher for higher grades or exam years. Funding formulae may reward schools more for sustaining enrolment at progression and transition 'pain points'.
Teachers	The teacher count is the main factor in determining salary expenditure allocations. The on-payroll student–teacher ratio might also play a role in determining allocations for additional and school-employed staff.
School characteristics	Specific amounts per school for capitation grants are often higher if the school is in a remote location. Pupil deprivation identified at the school or community level can also lead to additional awards.

Data	Requirement for horizontal allocation decisions
	The pupil-to-classroom ratio (or other measures of a school's endowment or physical infrastructure and its condition) may be a factor in determining capital expenditure allocations for classroom construction (or rehabilitation).
Enrolment by student characteristics	Additional amounts may be allocated for pupils from deprived socio-economic backgrounds and for pupils with special needs.
Teacher characteristics	Information on the qualifications, experience, and performance of teachers may be a factor in determining how they are deployed across and within subnational governments.
Performance data, including learning assessments (high- and low-stakes)	Based on learning assessments and examinations, governments may award more or fewer resources to subnational governments with better assessed results. It is possible to adjust awards for learning gains based on assessment scores prior to and during the school stage (↑Elks, 2016).

Annex 3 Variables used for horizontal resource allocation

In the table below, the first level of grants, from national to subnational governments, is the only level shown, except where subnational delegation is particularly extensive (i.e., for Brazil and Pakistan).

***Grant*, *subgrant*,** variable name	**Source, system**	**Frequency where known**
Bangladesh[58]		
Note on all sector funding: Services in Bangladesh are largely deconcentrated for education, rather than relying on fiscal decentralisation. A small share of schools are funded by subnational governments (↑Bhatta et al., 2019). Resource distribution has improved at the subnational level (↑Bhatta et al., 2019). No data is available on formula-based shares to deconcentrated units. ↑Steer et al. (2014) outline possible reforms to introduce formulas, but this desk review is unable to confirm their implementation. A 2018 Public Expenditure Review documented improvements in equity, but not the allocation mechanism.		
Brazil[59]		
Note: In Brazil, Ceará State incentivises a balanced approach to achievement against the indicators by often multiplying rather than solely adding formula components, as is typical, and included several Grade 5 assessment thresholds to mitigate strategic exclusion. So if a municipality does well on X it also must also do well on Y to maximise its resources. Other formulae provide classic base per learner funding.		
Ceará state distribution to municipalities		
State literacy and numeracy rates for fifth graders: municipal average share of children exceeding thresholds, and year-to-year change. The formula includes the share of students below-threshold, partially and satisfactorily literate/numerate. A similar formula is based on municipal *average* test scores, also mediated by thresholds to encourage fairness.	Independent think tank calculations using state-run assessment	Bi-annual learning assessment (second round assessed, first round is advisory / diagnostic).
Candidature rate for the fifth-grade assessments		School census
Capitation grants to schools		
Awards to teachers and schools with best performance, partly conditional on knowledge exchange with, and support to, the lowest-performing schools.	–	–
Federal schools receive resources for meals from the national government	National EMIS [assumed]	Annual [assumed]
Ghana[60]		
The District Assemblies Common Fund		
Number of health facilities Health professionals / population Pupil-to-qualified teacher ratio Number of schools	Not listed Not listed Not listed Not listed Not listed	- - - - -

[58] *Sources for Bangladesh:* ↑Steer et al. (2014);↑Nixon et al. (2018); ↑Bhatta et al. (2019).
[59] *Sources for Brazil:* ↑Evans & Loureiro (2020); ↑Loureiro & Cruz (2020); ↑Loureiro et al. (2020); ↑World Bank (2020); ↑Lautharte et al. (2021); ↑Mello et al. (2021); ↑da Silva et al. (2022)
[60] *Sources for Ghana:* ↑Osei (2017); ↑World Bank (2017); ↑Parliament of Ghana (2020); ↑Ministry of Finance (2021)

***Grant*, *subgrant*,** variable name	**Source, system**	**Frequency where known**
Share of the population with access to clean drinking water Tarred road coverage Per local government amount Service pressure factor	 Not listed Not listed Opaque	 – – –
Oil fund transfers		
Ad hoc: around one-third of the allocation used to fund recurrent and capital costs for the education sector (↑Ministry of Finance, 2021). It was not possible to discern an allocation formula from this document review, other than for the capitation grant element for senior high schools.		
Kenya[61]		
County equitable share *Note:* Counties fund pre-primary education. In general, the use of indexes without a working sheet or a confirmation of whether the Commission for Revenue Allocation's (CRA) recommendations are actually applied, makes it difficult to check whether allocation practices are followed or not. Included below are parliamentary and committee recommendations on what the formula indicators should be, rather than the indicators themselves.		
Ad hoc: 2019/20 allocation used as a minimum per county and as the basis for half of the 2020/21 equitable share.	2019/20 budget	–
Population	Census	Every ten years
Health index (Committee recommendation: "health facility gap", three years average outpatient visits to level 2 and 3 facilities; in-patient visits to levels 4 and 5)	*Opaque*	–
Agricultural index (Committee recommendation: number of rural households based on 2019 census)	*Opaque*	–
Urban services (Committee recommendation: urban household count based on census)	*Opaque*	–
Per county amount	*Opaque*	–
Land Area (CRA and report recommendation: square root of land area. Committee also mentions a rurality measure based on the location of the headquarters, but it is unclear as to how this interacts with the other measure.	*Opaque*	If county boundaries are redrawn
Rural access index (CRA report recommended: proportion of rural population that can access an all-weather road within two kilometres)	*Opaque*	
Poverty (Committee-recommended: headcount from household survey)	*Opaque*	Irregular, Committee cites 2014/15
Fiscal effort index (CRA report recommended: change in ratio of own revenues to revenue expenditures)	*Opaque*	Annual [assumed]
Prudence index (CRA report recommended. Based on producing a county audit report, County executive score, county assembly score, county government performance score: a threshold assessment of whether processes and committees are in place. Committee recommendations may differ from CRA, correspondence unclear).	*Opaque*	Annual [assumed]
Capitation grants		
Per learner	EMIS [assumed]	Annual [assumed]
Per learner with special needs	EMIS [assumed]	Annual [assumed]

[61] *Sources for Kenya:* ↑Parliament of Kenya (2020); ↑World Bank (2020); ↑Government of Kenya, (2019).

***Grant*, *subgrant*,** variable name	**Source, system**	**Frequency where known**
Pakistan[62]		
Provincial share, for several sectors		
Population	Census [assumed]	Censuses conducted in 2017 and 1998.
Poverty	Household survey [assumed]	Conducted in 2019/20
Revenue collection / generation	–	–
Inverse population density	Census [assumed]	Censuses conducted in 2017 and 1998.
District share, within provinces		
Details not found. A recent Public Expenditure and Financial Accountability assessment (2017) for Balochistan Province pointed out the existence of legislation on formula-based transfers to districts, but the committee to do so was not constituted. Other provinces have provincial distribution through sector-specific grants to districts (including Punjab).	–	–
Capitation grants to schools		
Ad hoc: secondary schools and clusters of schools (Balochistan). Enrolment-based (including in Punjab) with "population density, school-going age population, poverty rates, girls' middle enrolment rate and percentage of out-of-school children" (↑CPDI, 2018).	School Information System, Pakistan Social and Living Standards Measurement (PSLM) surveys, Punjab's projection of the census.	Censuses conducted in 2017 and 1998. PSLM almost annually. Government of Punjab likely to produce projections. SIS annually or more often.
Ad hoc presidential top-ups to provinces		
Ad hoc, but applies to a poorer, more rural province (Balochistan) in the latest round for one year.	–	–
Scotland[63]		
All annually updated. Survey-based (household surveys) plus population-related administrative data (commuters and tourists from two administrative sources over the last three years) unless stated. Census data tends to be augmented with vital statistics, commuter figures and tourism figures for some population aggregates; this may occur annually. *Census delayed due to Covid-19 by one year in 2022.*		
General revenue grant *(education-related components only for reasons of space)*		
Population	Census plus vital statistics plus tourism figures plus commuter figures	Annual
Net commuters		Annual

[62] *Sources for Pakistan:* ↑Government of Pakistan (1973); ↑Government of Pakistan (2020); ↑World Bank (2018); ↑CPDI (2018); ↑Government of Balochistan (2021).

[63] *Sources for Scotland*: ↑Scottish Government (2021);↑Scottish Government (2022).

***Grant*, *subgrant*,** variable name	**Source, system**	**Frequency where known**
Tourists	International Passenger Survey and Great Britain Tourism Survey (intra-UK and international counts, average of three pre-Covid-19 years)	Annual
Sports weighted population	Annual household survey	Annual
Net pupils	Universities (assumed)	Annual
Standardised mortality ratio	Combination of census and administrative updates on deaths	
Nursery school teaching staff		Annual
Population aged 3 and 4 years	Combination of census and administrative updates on deaths and births	Annual
Pre-school education		
Population aged 3 years	Combination of census and administrative updates on deaths and births	Annual
Provision for 4-year-olds [assumed enrolment based]	Early learning and childcare census	Annual
Population aged 3, 4 years	Combination of census and administrative updates on deaths and births	Annual
Population aged 3, 4 years in settlements of less than 1,000 if that share is more than 15%	Combination of census and administrative updates on deaths and births	Annual
Childcare strategy		
Population aged 0–14 years	Combination of census and administrative updates on deaths and births	Annual

***Grant*, *subgrant*,** variable name	**Source, system**	**Frequency where known**
Community and residential care (normalised share of 0–15-year-olds living in one-parent family plus low-income dependents normalised share) index scaled by 0–14-year-old population		Every ten years (share of one-parent); other surveys are annual or more-than annual (employment)
Estimated Population 0–14 Living in settlements of less than 1,000	Combination of census and administrative updates on deaths and births	Annual
Sure start		
Estimated population 0–3 years living in settlements of less than 1,000	Combination of census and administrative updates on deaths and births	Annual
Population Aged 0–3 years		Annual
Community & Residential Care Index x Population aged 0–14	Various	Every ten years (share of one-parent); others annual
Primary School Teaching Staff		
Primary school pupils	National EMIS collated at local authority level	Annual
Pupils in small schools "enrolment less than 70 [...] in settlements in Scottish Government urban /rural classifications 5 and 6"	National EMIS collated at local authority level	Annual
Secondary School Teaching Staff		
Secondary school pupils	National EMIS collated at local authority level	Annual
Island	–	Annual
Special education		
Population aged 2–19 years	Combination of census and administrative updates on deaths and births	Annual
Teachers for ethnic minorities		
Number of pupils who are from ethnic minorities	National EMIS collated at local authority level	Annual
Teacher pensions		
Straight passthrough from central government based on national pensions agency estimates	–	Annual
Education deprivation		
Primary Schools — Weighted Free Meal Registration	National EMIS collated at local authority level	Annual

***Grant*, *subgrant*,** variable name	**Source, system**	**Frequency where known**
Secondary Schools — Weighted Free Meal Registration	National EMIS collated at local authority level	Annual
School clothing grant		
Children in low-income families	Annual household survey	Annual
School hostels		
Pupils in hostels	National EMIS collated at local authority level	Annual
School security		
Number of pupils	National EMIS collated at local authority level	Annual
Number of schools	National EMIS collated at local authority level	Annual
School meals		
Pre-school pupils	Early Learning and Childcare census collated at local authority level and submitted on Procxed, an online system to help councils with data validation.	Annual
P1–P3 primary	National EMIS collated at local authority level	Annual
P4–P7 in low-income families	EMIS and household survey	Annual
P4–P7 not in low-income families	National EMIS collated at local authority level	Annual
Secondary school, free school meals taken	National EMIS collated at local authority level	Annual
Secondary school, paid for school meals taken	National EMIS collated at local authority level	Annual
Special School (P1–P3 equivalent)	National EMIS collated at local authority level	Annual
Special School and in low-income families	EMIS and household survey	Annual
Special School, other	National EMIS collated at local authority level	Annual
School transport		
Population aged 5–15 years	Combination of census and	Annual

***Grant*, *subgrant*,** variable name	**Source, system**	**Frequency where known**
	administrative updates on deaths and births	
Pupil Dispersion ("This is a measure of the degree to which the population of an authority is spread across its area in relation to (main) settlements. Main settlements are defined for this purpose generally as being those of 7,000 [inhabitants] or more. The dispersion indicator is then calculated as the sum of the distances for the [pupil-age population] outside those main settlements to travel to the nearest main settlement."	National EMIS collated at local authority level plus census	Annual
Residual Further Education		
Population aged 17 years and above	Combination of census and administrative updates on deaths and births	Annual
National language education		
Count of pupils taught the language [unclear]	National EMIS collated at local authority level	Annual
Adult Literacy and Numeracy		
bottom fifth Very remote, Adults qualified below National Vocational Qualification level 2, Population on less than living wage	Household surveys for some indicators, administrative data for others	Mostly annually, some dependent on household survey frequency
Teacher Remoteness & Distant Islands Allowances		
Ad hoc. Based on costs.	-	Annual
Ringfenced and formerly ringfenced grants (formerly = grants where ringfencing abandoned in 2007/08)		
These grants are hidden for reasons of space. See sources.		
***Capitation grants in Scotland vary at the local authority level*[64].**		
South Africa[65]		
Provincial equitable share		
Note: Annually calculated shares for the equitable share, informed by most recent data, are phased in over the three-year Medium Term Expenditure Framework period by one-third each year. For a large census-related adjustment, ad hoc allocations were applied to top up four provinces.		
School going population	StatsSA, assumed annually updated due to vital statistics collection	Annual

[64] Some high-income countries, such as the Republic of Ireland, use nationally determined minimum grants.

[65] *Sources for RSA*: ↑Hall & Giese (2009); ↑Government of the Republic of South Africa (2020); ↑Government of the Republic of South Africa (2022); ↑National Treasury of the Republic of South Africa (2022).

***Grant*, *subgrant*,** variable name	**Source, system**	**Frequency where known**
Public ordinary school enrolment	National EMIS	Quarterly [not clear if quarterly updates feed to the budget, assume not]
Income-based poverty	Household surveys, possibly via an adjustment mechanism	Annual
Per province amount	-	-
GDP	GDP estimates from StatsSA	Quarterly (assume annual amount used)
Population	Annually updated StatsSA estimates	Annual
Hospital outputs	DHIS (two years average pre-Covid-19)	Annual
Total Fertility Rate, Premature mortality, Sparsity, Multiple deprivation index (education, asset poverty, housing quality)	2016 Community Survey, vital statistics, StatsSA population estimates, 2018 government employees medical scheme as proxy for resource use, household survey 2019 medical insurance coverage	2022. last updated 2010.
Earmarked (conditional) grants		
Education infrastructure grant		
Ad hoc based on historical allocations	–	–
ECD conditional grant infrastructure component		
"Standard amount" for each province, based on historical levels of enrolment (↑Government of the Republic of South Africa, 2022)	–	–
Ad hoc. "The number of ECD centres assessed in each province that meet the criteria for the maintenance/upgrading conditional registration package" (↑Government of the Republic of South Africa, 2022)	–	Annual [assumed]
ECD conditional grant subsidy component		
Actual number of children targeted in two previous years.	Provincial submissions. Data used is not published for verification.	Not updated every year.

***Grant*, *subgrant*,** variable name	**Source, system**	**Frequency where known**
National school nutrition programme		
National poverty distribution table share for a historical year. Provinces (such as Western Cape) use efficiency savings to fund meals targeted at the student level by school leaders in 'richer' schools to less-well-off learners).	Based on household surveys not specified and an adjustment function to reduce shocks at the province level. These data are used to construct a National Poverty Distribution Table, which appears to be unpublished. School leaders use their own knowledge supported by proof of social safety net receipt by learner households (including in Western Cape).	The national poverty distribution table is not updated every year. The share of learners in low-quintile schools has increased.
Maths, science and technology grant		
Ad hoc based on six criteria: (1) Q1–3 schools (2) "Provinces may include schools in quintiles 4 and 5, as per provincial needs. The approval of the transferring officer (provided the average learner performance in all subjects including mathematics, science, and technology is at a level below 60 per cent at Grade 12) (3) Primary schools will be supported as feeder schools to secondary schools participating in the grant based on the provincial needs analysis in line with the outputs of the grant. (4) At least 30 learners are enrolled for each grade in mathematics and science subjects at a general education and training, and further education and training (FET) band, and 15 learners are enrolled for technology subjects in further education and training band (5) agricultural schools, technical schools including pilot schools for vocationally oriented curriculum (6) pilot schools for coding and robotics curriculum (↑Government of the Republic of South Africa, 2022: p. 229).	Province-supplied listing, not published.	Annual
HIV and AIDS (life skills education) programme grant		
School-going population	StatsSA, assumed annually updated due to vital statistics collection	Annual

***Grant*, *subgrant*,** variable name	**Source, system**	**Frequency where known**
Public ordinary school enrolment	National EMIS	Annual. Quarterly updates are published by DBE
Learners with profound intellectual disabilities grant		
Unclear but "Allocations consider the number of special care centres, children with severe or profound intellectual disabilities (CSPID) in special care centres, schools that have enrolled learners referred from care centres per province as well as the urban and rural nature of each province"	Administrative data, possibly national EMIS	Annual
School infrastructure backlogs grant — indirect, ad hoc		
Ad hoc sequencing		Annual
Capitation grants from provincial share		
Pupils conditional on quintile of school (based on the area in which the school is located, although the provinces have some discretion)	Based on household surveys not specified and an adjustment function to reduce shocks at the province level, used to construct a National Poverty Distribution Table. Q4–Q5 schools (in the 'richest' 40% of wards) receive no capitation grant.	
Ad hoc	Provinces can elect to increase capitation support to any school and (re)order the schools by quintile.	
Sierra Leone[66]		
Block education grant		
Total enrolment	EMIS	Based on how often the school census can be completed. Most recent census was 2019
Per council amount	-	
School-going age	Census (assumed)	Censuses have been infrequent due to Ebola and

[66] *Sources for Sierra Leone:* ↑Mullan & Taddese (2020); ↑McBurnie & Beoku-Betts (2021); ↑Government of Sierra Leone (2022).

***Grant*, *subgrant*,** variable name	**Source, system**	**Frequency where known**
		other national realities
Capitation grants, specific line in national budget estimates		
Per learner	EMIS	Most recent was 2019.
Mainland Tanzania[67]		
Funds to Local Govts including sector block, non-wage		
Ad hoc. Some attempts were made to use formulas in previous years.	–	–
Capitation grants		
Pupil count	National EMIS, the president's office	Annual
Uganda[68]		
Formula variables for education sector-specific grants		
Staff		
Ad hoc	Ministry of Public Service	Integrated Personnel and Payroll System
Non-wage grants to Local Governments		
Enrolment in public schools	Collected by Ministry of Education and Sports and Ministry of Finance Planning and Economic Development specifically for the budget, using the online transfer management system. One to three times annually.	
Land area	Statistical office	On boundary revisions. Usually annual.
Islands	Statistical office	On boundary revisions.
Per local government amount	Statistical office	On boundary revisions.
Number of schools	Collected by Ministry of of Education and Sports and Ministry of Finance Planning and Economic Development specifically for the budget, using the online transfer management system. One to three times annually.	Annual, in-year deviations when schools added/closed

[67] *Sources for Tanzania:* ↑Tilley et al. (2014); ↑Tidemand (2018); ↑Government of Tanzania (2020); ↑Dom et al. (2021).
[68] Sources for Uganda: ↑Government of Uganda (2023); ↑Long et al. (2021); ↑Al-Samarrai & Lewis (2021).

***Grant*, *subgrant*,** variable name	**Source, system**	**Frequency where known**
Development		
Land Area	Statistical office	On boundary revisions. Usually annual
Urban Population	Statistical office, Census projections	On boundary revisions. Usually annual
Island Dummy	Statistical office	On boundary revisions
Fixed Allocation per local government		
Inverted weighted primary exam scores *(worse gets more)*	Irregularly collected from the exam board	Ad hoc
Inverted weighted secondary exam scores *(worse gets more)*	Irregularly collected from the exam board	Ad hoc
Population of Primary and Secondary School Age (including refugees)	Statistical office and UNHCR	Annual
Population in Hard-to-Reach / Hard-to-Stay Areas (including refugees)	Statistical office and UNHCR, Hard to reach indicator is from the Ministry of Public Service	The hard-to-reach indicator is updated from time to time
Inverse Gross Enrolment (Including refugees) *(lower enrolment ratio Local Governments get more)*	Denominator collected by Ministry of Education and Sports and Ministry of Finance Planning and Economic Development specifically for the budget, numerator from statistical office, using the online transfer management system	Annual
Local government performance assessment	Assessed by the Office of the Prime Minister. Consists of over 30 weighted metrics on the conduct of the district education office.	Annual
Pensions (all sectors)		
straight passthrough from central government	LGs supply information to national government	Annual
Capitation minimums to schools (paid via local governments)		
Enrolment		Annual

***Grant*, *subgrant*,** variable name	**Source, system**	**Frequency where known**
Per school fixed grant	Collected by Ministry of Education and Sports and Ministry of Finance Planning and Economic Development specifically for the budget using the online transfer management system	Annual, in-year deviations when schools added/closed
Special needs enrolment		Annual
Ad hoc — local governments can elect to top up the capitation grants, and in richer municipalities this can occur.	–	–