



The Role of EMIS in Improving Equitable Service Delivery in Education: A Case Study from the Gambia

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Abstract. Public services are a core responsibility of governments to its citizens, and their purpose is to ensure that every individual receives the basic services necessary to survive which includes primary health care, basic education, and social security. However, many developing countries struggle to provide these basic services to their citizens due to limited resources and inefficiencies in delivering the services.

The Gambia Ministry of Basic and Secondary Education (MoBSE) is concerned with the trend of resource distribution in the provision of education that is disproportionately benefiting the wealthiest group and is leveraging its Education Management Information system (EMIS), underpinned by digital technologies, to monitor and reverse this trend.

This study employs a case study methodology that dives into the issues affecting education service delivery at the regional level where service providers are closest to the people. Interviews were the primary form of data used in this study in addition to meetings, and observations of regional officers and teachers as secondary sources of data. Thematic content analysis method is used, interviews were transcribed, and coded using inductive strategies.

The paper follows the case of the implementation of a daily teacher attendance system at the school level and the designing of EMIS dashboards targeting sub-national level managers to understand the opportunities presented by digital technologies in the delivery of education at the regional level.

The research discovers that challenges in education service delivery in the Gambian are because of organisational, institutional, capacity, infrastructural and resource challenges. But the one that interests us the most in these interviews and has the potential to illuminate the above challenges, is the lack of access to and capacity to use data—an information challenge. Solving these information challenges is key to improving service delivery in terms of efficiency, effectiveness, and equity. We then discuss challenges infrastructure and policy gaps facing the country and conclude with research limitations.

Keywords: EMIS · Service Delivery · Education · Equity · Gambia

1 Introduction

1.1 Background

Public services are a core responsibility of governments to its citizens, and their purpose is to ensure that every individual receives the basic services necessary to survive which includes primary health care, basic education, and social security. This is perceived to create productive citizens to grow the economy of the country. However, many developing countries struggle to provide these basic services to their citizens due to limited resources, inefficiencies in delivering these services due to poor infrastructure, inadequate planning, and leakages (Besley and Ghatak 2007).

The effects of this government struggles to deliver these services affect the poor, minority groups, and other disadvantaged groups disproportionately as they predominantly depend on public services. These disadvantaged groups are challenged primarily because of poverty barriers, physical barriers including remoteness and infrastructure, and a mismatch between what they need and what is supplied (Ramakrishnan 2013).

Public services are delivered by public servants and can be categorised according to the services they provide. Policies and laws are delivered by politicians and policymakers at the national level, and resources are demanded—from the national budget—and managed by administrators at subnational levels where these providers are closest to the people. Civil servants like teachers and doctors give their time, effort, and skill in addition to the resources provided as input and the policy framework as a guide to effectively deliver the services people desire (Jackson 1993; Khrykov et al. 2023).

Public service delivery is measured by service delivery indicators that seek to spot gaps in service delivery and track progress over time to measure the effectiveness and quality of the services (World Bank 2023). These indicators should be used to hold governments accountable for the failings in service delivery especially when they have a negative impact on disadvantaged populations. This adds to the equity challenges already faced by these groups (Jackson 1993).

MoBSE expresses concern over the current pattern of education-related public spending, which primarily benefits “higher income groups” and exacerbates disparities. This issue was highlighted in the government’s public expenditure review conducted for the education sector and continues to persist (World Bank Group 2017). Moreover, household expenditure on education reveals that the burden of payment disproportionately falls on the poor, leading to higher dropout rates in economically disadvantaged areas. Consequently, the efficiency of the education system is compromised, resulting in a decline in the standard and quality of education. These challenges persisted despite the enactment of free public education policy in the country starting in 2013 (MoBSE 2016). Thus, it is evident that to achieve the goal of equitable, inclusive, and quality education for all as stated in the education policy, government subsidies and interventions must be targeted to ensure equal educational opportunities. To do this, one of the education sector’s priorities is the improvement of its service delivery mechanism, as engraved in its education policy spanning 2016–30. In the same breath, EMIS was accorded “priority status,” aiming to provide valuable insights for planning purposes and informed decision-making.

Considering the education sector's recognition of the significance of information and communication technologies (ICTs) in achieving its policy goals and EMIS, entrusted with monitoring the evolving demands of local education policies and fulfilling the data requirements of SDG4, we examine in this research project the following research question:

- What are the challenges and what opportunities does digital EMIS provide decision-makers to improve service delivery in education in the Gambia?

Availability and management of resources, both financial and material, have been found to have a positive relationship with improving service delivery (Hodgson, Farrell, and Connolly 2007). This implies that ensuring equitable distribution of resources ensures schools get just what they need thereby improving the general efficiency of the education system. We focus this research on the management of resources at the regional level to improve education service delivery.

2 Education Information Challenge

2.1 Data Challenge

Education systems have been producing a lot of data that has been underutilised and has had little impact. Two reasons have been given for this: firstly, the data collected is beneficial to policymakers and planners at the national level and does not satisfy the needs of lower-level managers and school administrators (World Bank Group 2018). This is because most education systems have been configured to drive policy formulation and planning for increased enrolment, which was the major objective in the Millennium Development Goals (MDG) period (Benavot and UNESCO 2015; United Nations 2015). This was a time when countries were struggling to ensure children have access to schools with gross enrolment rates generally below 50% in most developing countries.

The second reason is that most of the data that is produced is inaccessible to lower-level managers and school administrators. The lower-level managers are responsible for implementing policy objectives and have the most impact on the everyday activities in the school and consequently the quality of services provided to students. This is why the sustainable development goals (SDGs) call for a shift in the design of the education management information system (EMIS) to address these data challenges (United Nations 2015).

2.2 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)

Cassidy's definition provides the most comprehensive definition of EMIS, which explicates its inputs, functions, and outputs. Education data can be used to monitor progress at individual schools and an entire national education system (Hua and Herstein 2003; Sajjad Ahmad Bhatti and Adnan 2010; Wako 2003). EMIS data is useful for the allocation of education staff, school supplies, and other resources (Chapman 1991; Hua and Herstein 2003; Wako 2003); management strengthening (Chapman 1991); and policy planning and formulation (Hua & Herstein, 2003; Wako, 2003). There is an acknowledgement of the importance of an enhanced education management information system (EMIS) in facilitating data-driven decision-making and the delivery of education services. Considering the growing need to produce high-quality data for monitoring progress towards Sustainable Development Goals (SDGs), we examine the challenges of providing education to the Gambian population and the obstacles and possibilities associated with implementing a digital platform supported EMIS at the regional level.

3 Method

This research project is part of a larger project by the ministry of basic and secondary education in the Gambia to leverage DHIS2, a digital platform, to improve its education management information system.

This first author is a full-time employee of MoBSE under the EMIS unit that is in charge of designing and implementing education information systems for the ministry. This gives the primary author easy access to the field, data sources, a deep understanding of the context, and experience in implementing information systems for education which have all being leveraged in this research. This paper is borne out of the primary author's interactions with teachers and regional officers during the implementation of the EMIS project. The primary author also assumes the position of the embedded researcher, closely following the project as it took shape, attended (and facilitated – in his capacity as MoBSE staff) training sessions and took advantage of opportunities to interview participants and document observations and feedback from the use of the technologies. This embeddedness of the primary author presents drawbacks from positional ambiguities to outright ethical challenges such as influencing participants. However, with his withdrawn nature, the second author provides an outsider's perspective and insights, ensures that primary authors biases are recognised and acknowledged and safeguard the methodological soundness of the research.

This study employs a case study methodology, which allows us to deep dive into the issues affecting education service delivery at the regional level (Walsham 2006, 1995; Yin 2018). This study targeted the service providers at the regional level and the service beneficiaries at the school level to understand the perspective of education service delivery from the regional level. The study participants were chosen based on availability and on the perceived remoteness of the regions and schools they manage. This, we believe, presents unique angles to the delivering and benefiting from services in education.

Interviews were the primary form of data used. The first author travelled to the offices of the participants ranging from regional directors (heads of institutions) and principal education officers to other staff in the regions, for data collection. Interviews were also

held at the schools, with the head teachers the targeted participants. Seven in-depth interviews were conducted in total, with an average of 60 min per interview. All the interviews were recorded after receiving consent from the participants and explaining the ethical procedures for recording sessions. Meetings with headteachers, training of regional officers and teachers during the implementation of the platform, and observations of the use of these platforms and their innovations by the regional officers and teachers are other sources of data used in this study (Hennink, Hutter, and Bailey 2020; Walsham 1995; Yin 2018).

Adopting the thematic content analysis method, the interviews were transcribed manually, anonymized, and then coded using inductive strategies. The codes were grouped into categories, which were then arranged into themes. (Hennink et al. 2020; Miles and Huberman 1994; Miles, Huberman, and Saldaña 2013).

4 Case

The Gambia is a geographically small country in sub-Saharan Africa with very few resources and is comparatively poorer than all its neighbouring countries. The Gambia has a decentralised governance structure, with regional administrators responsible for planning, managing, and delivering education services to the population in their region. However, the resources are still centralised at the national level, and the regional administrators must demand and negotiate for resources, sometimes under very competitive conditions.

In early 2019, the ministry of education in the Gambia entered a partnership with the Health Information Systems Programmes Centre from the University of Oslo, Norway (HISP Centre) to support its EMIS strengthening efforts. Among the agreements was the use of DHIS2 as the backbone of the country's EMIS to aid the decentralisation of EMIS to the regional and school levels to fulfil the objectives of the national decentralisation plan. DHIS2 is a widely used platform for health in several African countries and is increasingly adopted in education. The Gambia Ministry of Health has adopted DHIS2 as the backbone for the national health management information system (HMIS) since 2009. HISP West and Central Africa (HISP-WCA), a regional organisation and a partner of HISP-UiO, is responsible for coordinating and supporting implementations. HISPWCA trained the core EMIS staff of the ministry on the DHIS2 platform, from the creation of EMIS forms to the design and sharing of dashboards. As part of the project, they are continually supporting the development of locally relevant innovations on the platform. Using the training of trainers approach, the EMIS staff also conducts step-down training for regional officers and head teachers on the use of the DHIS2 platform as a decision-making tool. The initiatives under the DHIS2 for EMIS project in the Gambia are preceded by advocacy meetings with administrative leaders at each level to get buy-in, followed by capacity-building training during the implementation targeting users and technical staff.

Two initiatives from the project that are relevant to this study are explained below.

4.1 EMIS Dashboard Design

Previously, the pinnacle of the EMIS data collection cycle was the publication of the annual yearbook, which is shared with the wider education stakeholder group through the ministry's website in pdf format. Understandably, this format wasn't ideal as input for further analyses. In addition, the document is bulky and includes many indicators because of its wide audience. Even though the ministry produces Excel tables of the data in addition to the report for more specific requests, it is most suitable to the technical people. Non-technical people send their requests directly to the EMIS unit and is becoming an increasing burden for the statisticians, who can't respond to all requests on time.

Using the DHIS2 platform, the ministry decided to create dashboards that are relevant for both policy monitoring and subnational-level operations. They convened representatives from all regional offices to compile relevant indicators for the sub-national levels in addition to the policy-level indicators in the annual yearbook and to design visualisations and dashboards. These dashboards will be accessible and useful to all the education stakeholder groups.

Since its rolling out in late 2022, several use cases have been reported from all levels, especially the regional levels including.

1. Transitional arrange of students moving from one level to the other in terms of spaces available.
2. School Mapping including catchment area determination.
3. School Profiles including enrolment, resources, infrastructure, and sanitation facilities.

4.2 Daily Attendance System App

With teachers being the single biggest service provider in education, their absences from lessons have more of a consequence for students' performance than any other. As a result, monitoring teacher attendance is crucial to improving the contact time and performance of students in any country. The Gambia is challenged in doing this, as since 2011, many initiatives to monitor attendance have been introduced with little success.

In 2019, leveraging the DHIS2 platform, the ministry, with the support of HISP-WCA, developed a teacher attendance app for schools. This presented school administrators with an easier means to report teacher attendance, which is then instantly aggregated and analysed at the regional level. The teacher attendance system leveraged the ubiquitous nature of smart phones at school levels. An application was designed to support schools quickly record attendance daily and shared via SMS at no cost to the school because of a national infrastructure connecting all the public schools.

The COVID pandemic presented a reality check to the attendance system with the abrupt closure of schools. After the reopening of schools, attendance reporting wasn't at the levels expected. Two issues were highlighted: 1) the headteachers didn't see the use of the system for themselves, and 2) there was no monitoring mechanism for attendance reporting at the regional level to support schools that weren't able to report. Another version of the app was released in late 2022, which resolved the above concerns. As a result, the uptake was even bigger than before, as the school administrators are now able to analyse and use the attendance data they are reporting to the regions.

5 Finding

Our analysis shows a myriad of challenges facing the education sector in delivering quality education at the regional level. Based on the service delivery framework, we synthesise the challenges into three areas: identifying education service delivery issues and appropriate beneficiaries of services; planning and delivering services; and monitoring and evaluating the quality of services.

5.1 Challenges in Education Service Delivery

Identifying Issues and Appropriate Beneficiaries

“In School X... enrolment last year compared to this year dropped and the reason is best known to them, but what we can do is to go to them, talk to them, sensitise them so that they can move on “- A Regional Director

Understanding the needs of the schools to effectively react and improve the situation is very important for the regional office. This ensures that they can act quickly, demand resources from the national level, and even be able to forecast to prevent such situations in the future. As this regional director explains, it’s difficult for the regional offices to be aware of the situations unfolding in the schools. And usually, before these situations come to light, they have grown out of control enough to warrant heads turning. These situations usually warrant additional resources to investigate the problem, or, as exemplified in the above quote, blindly intervening without fully understanding the problem.

“... I think two years back, school feeding (was) stopped in this region but thank God towards the (end of) last academic year towards June (it resumed). And some schools, especially the old schools were supplied (when) they (WFP) started it again. 23 new schools that have been established, have been identified and now we are working with them (the schools) to establish food management committees so that they (WFP) have started supplying food to all those schools.” - A Regional Director

The school feeding programme is a collaboration between the Ministry of Education and the World Food Programme (WFP). The goal of the programme is to provide food to children in schools to drive enrolment and attendance by, at least theoretically, targeting poor communities where many can’t afford to send their children to school with lunch money.

However, practically, these school feeding programmes are more blanket in nature, and as a result, funding issues resulted in their current stop-start nature. This is affecting its effectiveness as the children and their parents can no longer rely on it. This is important because household expenditures make up the biggest share of national spending on education.

Regional offices, under the decentralised public administration structure, are responsible for identifying the needs of their schools and negotiating for the provision of the resources they need. Determining what the schools need and who the beneficiaries of each programme should be are the first challenges.

Planning and Delivering Services

“... even this year just now our team went to School B just to stabilise, and they advise that School B is a multi-grade school... they only have two classrooms. And the enrolment given now means School B would need more classrooms because if more children have been enrolled in the school, it means they need more classrooms.” - A Regional Director

When designing and planning interventions, evidence in terms of numbers and scale is important in negotiating resources from the national basket. It's important to note that this basket is the same one all the other regions are dipping their hands into, and it's sometimes the same basket where all programmes of the ministry are resourced from. So, it's not only sufficient to say that you need it more than the other regions, but also that your specific issue will yield more benefit to the sector, or that its impact, if it's not resourced, will outweigh the benefits of its competitors. And for this, timing is important.

Normally, regions and schools need to demand resources before the beginning of the academic year to ensure all the resources are available at the start of the academic year. This is to ensure that effective teaching and learning begin in earnest by reducing the amount of time lost at the beginning of the academic year. However, what the regional director in the above quote shows is that regions can only begin to understand the issues in schools during “stabilisation,” which ironically is meant to ensure all schools are using the resources they are supplied with effectively, and in the event of a gap or surplus in a specific resource, that resource is sourced from or transferred to another school, respectively.

When these issues are identified at the beginning of the school year, it's often too late to plan any intervention, and the children suffer as a result.

“what we were using maybe during our trekking with a motorbike maybe for example if it is School A to School B if I'm to depart I just set the mileage from School A to School B when I reach at School B I read the mileage if it was from 110 now it is 120 I'll for that yes it is 10 kilometres” - Regional officer

This planning officer at the region narrates the methods they apply to measure one of the criteria to establish schools. Distance, catchment area, and feeder schools are some of

the primary criteria for establishing schools in communities. Physically riding a motorcycle to establish distance between locations is time-consuming, resource-inefficient, and risky for the personnel involved.

Monitoring and Evaluating the Quality of Services

“This ... monitoring is continuous, whether at the beginning or at the middle of the term. We are always monitoring because, when I came in, I found that they have not been monitoring for a while. The advice I did was I dispatched the vehicles to go to all the schools to ensure that they monitored they know what is happening so that that information can help us to intervene.” - Regional Director

After the service is delivered, it is important to track the usage and management of these resources. This ensures the school administrators are accountable for the resources supplied to minimise loss due to negligence, misappropriation, or malpractice. It is also important to measure the effectiveness of the resource in relation to other indicators, e.g., teacher attendance or student performance, and in terms of efficiency and fairness. Monitoring, currently in the Gambian context, is resource-intensive, time-consuming, and mainly for gathering information for the regions, with little or no support at the school level.

5.2 Information Challenge

These service delivery challenges identified are because of organisational, institutional, capacity, infrastructural and resource challenges. But the one that interests us the most in these interviews and has the potential to illuminate the above challenges, is the lack of access to and capacity to use data—an information challenge. For all these challenges in the educational service delivery chain, the lack of access to or ability to use data is implicitly embedded.

Identifying Issues and Appropriate Beneficiaries

On how these intervention criteria are determined, one regional director replied:

“... they use that criterium where schools with good gardens and farms to select some schools. at most, some of these (selected) schools’ communities ... are in a rural settlement” - A regional director

The lack of information leaves the regional offices at the mercy of the philanthropists and other project partners, as they are unable to negotiate or direct the interventions without information. As shown in the quote above, some of these criteria set by partners are not always necessarily aligned with the goals of regional offices.

If the goal of the school feeding program is to increase participation of children in schools, there are better indicators to determine that than schools with gardens and

farms. Chances are these schools are in farming communities that can provide for their children meals most days in the year.

For school feeding, a lack of reliable information for planning results in blanket interventions, which lead to sustainability issues due to the low resources available. As a result, the interventions are intermittent, which nullifies the impact and progress they make. It also reduces the trust and confidence of people in the programme. This is also a case of misplaced priorities, targeting “old” schools instead of schools in “poor” communities.

Limited information on why these schools’ enrolment dropped leads to intervention without planning, blind interventions, which are not efficient in terms of resources and time. Triangulation of already available EMIS data could have pointed to reasons for the drop (e.g., classrooms), which could have saved resources and time by focusing on solving the problem.

Planning and Delivering Services

“We are not involved in the selection, but they will do their own survey, the SAFMU together with world food programme and they would identify... madrassas are involved. I think we will need to be part of the team; they have the focal point for school feeding, and if we are part of the team, it will be helpful because certain communities (that we know of) would need school feeding more than others.” – A regional director

Exclusion of regional and school administrators from the school selection process disempowers them. Organisations planning and intervening alone can conflict with the interests of the regional offices, which are the institutions responsible for increasing and maintaining enrolment in schools. The inclusion criteria for the beneficiaries might be counterproductive to increasing and retaining children in school, e.g., “existence of a school garden and/or farm, kitchen, and stores”. Even though all these are likely to be found in rural areas, it is not sufficient as a proxy to target poor communities, which is the whole point of school feedings. The communities that can’t afford to send their kids to school with lunch money, low enrolment and retention rates could provide better proxy indicators for school feeding, even though poverty is not the only major barrier to accessing education in the country.

Monitoring and Evaluating the Quality of Services

Lack of access to information increases monitoring costs, which could be more strategic and efficient with information systems to inform decisions, and the cluster monitors can go back to supporting teachers’ pedagogy instead of collecting information.

6 Discussion

How digital technology can help resolve these information challenges in education? Our analysis shows the information challenges can be synthesised into four broad areas according to Cassidy’s description of the purpose of a well-functioning EMIS. Using

the two initiatives from the case studies above, we show how the introduction of digital technology has improved the planning and delivery of educational services at the regional level in the Gambia.

6.1 Resolving the Information Challenges

Collecting Data

The school is the primary source of data for many activities and programmes in education. Despite this, data is still collected from schools in paper forms, and this goes for all forms of data collection at the school level, from the annual school census to teacher attendance and appraisal. This places a lot of burden on the teachers, who, in addition to preparing for lessons, marking attendance, and grading results, must also collate this information on a termly, monthly, weekly, and even daily basis for reporting to the regional and national stakeholders. This steals teacher contact time from students and affects the yearly instructional hours target and the quality of teaching and learning. Collecting data this way extends the processing time, as data needs to be entered, cleaned, and verified before analysis can be done.

With Digital EMIS

“(Updating the charts and graphs in schools) every year sometimes every term because you have the monitoring schedule that every term you need to change it you have also the teachers profile the staff profile which is very huge but if you have these things it is easily if you have if you have the system” - A regional officer

The attendance app at the school level provides data quality tools in the form of validation and completeness checks of the data, automatically aggregates the data based on the period specified by the users. But above all, it provides instant analysis for school level users. Education systems generally do not send feedback to schools, where most of the data is generated.

At the regional level, the internet-based web dashboards with preconfigured analytics provide instant analysis of the data received from schools. This greatly improved the processing of the data; there is less focus now on aggregating and managing data quality and more on interpreting, acting on, and sharing the data with partners and stakeholders. These dashboards also allow for remote monitoring through continuous updates as data is reported and monitoring progress using trend analysis.

Accessing Data

Because of the separate data collections and analyses for individual programmes and activities, these systems exist in silos with different data management and storage formats. And since no one can collect all the data, accessing and sharing it is very difficult. Sometimes, even within the same office, the data is only accessible to the data managers, and everyone else must place a request for data, which the officers will fulfil at their own pace. The same is seen with the routine EMIS school census at the school level, as

the data processing and dissemination are centralised at the ministry level. The school census is the most comprehensive dataset about the school, which the regional officers need when planning, distributing, or managing resources in schools. Traditionally, it has been difficult to access and use the data shared in the pdf report, as a result, many regions revert to collecting the data again from the schools to make use of it, wasting time and duplicating effort.

With Digital EMIS

“When you need data you need not to call Banjul, EMIS Headquarters and say I need the enrolment of this (school), go straight to the dashboard click where you want to the organisational (list) and you filter the school that you need the enrolment you can have everything there even the number of physical facilities ranging from toilets number of utilities that are present whether they are using electricity or solar, or the number of water points, whether it is a borehole, open well, or handpump, you can, and there you can make a decision, and the number of quarters that are using solar or the number of water points whether it is a borehole open well or handpump you can and there you can make decision and the number of quarters that are available” - A regional officer

This quote from the regional officer nicely underscores the change witnessed at the regional level in terms of accessing EMIS data. At the school level, while it is possible to access the data in the same way as at the regional level, infrastructure is the biggest obstacle at present.

Using Data

In addition to having limited access to the data, only a few people at the regional offices and schools could independently analyse and synthesise the data to be able to make decisions from it. At the school level, there is no facility/opportunity for the school administrators to utilise the data they are reporting to regional and national stakeholders. Firstly, the data collected targets the needs of the stakeholders, and secondly, usually there is limited feedback to schools, or when there is, it comes too late to address the needs of the school.

With Digital EMIS

“the directors and this thing they are yet to be given their password but I think work is in progress but nonetheless we normally have any problem that comes in we just come here in the hall project it and use the dashboard either I use my password or Ida use her password then we what we whatever we want to do we do it and advise the director rightly yeah” - A regional officer

While the daily teacher attendance application at the school level has instant analysis to motivate school administrators to get into the habit of using data in their daily routines,

the bigger impact is witnessed at the regional level. Whereas before, data was accessible to only a few individuals on private computers, these EMIS dashboards have allowed for collaboration between the regional officers and the directors in decision making. This builds the capacity of the officers, who could be used to strengthen their capacity for using data for decision making at the school level.

Innovation

It must be said that this new property of innovation only exists in digital systems, as EMIS in principle can be underpinned by any technology. This presents huge opportunities for the ministry, regional offices, and schools to explore and improve the delivery of education.

“Since you guys are very good at designing apps to monitor us and our teachers' attendances, why not design apps to help us get our payslips. This is one of the biggest reasons why teachers are absent from school. As a teacher, I cannot stop any teacher from resolving their issues if they have problems with their salaries.” - A head teacher in school

This is an acknowledgement from a head teacher of the potential of this new EMIS, underpinned by a digital platform, to create innovations to address issues in the education system. In reference to this, they cite the issue of teacher salary transfer and access to payslips as a major factor affecting teacher accreditation and reference the capacity this digital EMIS has in resolving these issues. Teachers collect these documents for themselves at the regional offices, which could be as far away as 100 miles with no regular transportation means, especially for rural schools. And this is in addition to trekking at least a couple of miles to the highway in remote communities.

6.2 Improving Service Delivery

In this case, we have discovered three areas where the use of digital EMIS has improved service delivery.

Equity

“the issue surrounding the posting of female teachers to such communities to serve as a role model ... they are encouraging MRC Holland to construct staff quarters. Also encourage female teachers to take up postings. ... communities really will be sensitised even by physically seeing female teachers will encourage them to send their girl child to school.” - A regional director

Examples have been shared of how when planners use data to inform their decision-making and interventions, it builds trust and confidence in partners to contribute to achieving the goals of education. Discovering gaps in female teacher postings in rural

schools led to an investigation and enticed partners to support programmes that, in this case, have a reverberating effect in terms of equity.

Effectiveness

“the cash transfer was a really very good intervention by MoBSE given to marabouts so that they allow their children to go to school Or even if they are in the daaras a teacher is appointed to take them for classes” - A regional director

Knowing the problem before intervening increases the chances of success for intervention programmes. Upon realising that the areas with the lowest school enrolment rates are where faith-based schools (daaras) are dominant, the ministry supplied teachers to these schools and supported them through cash transfers in exchange for including mainstream subjects in their curriculum. This is both effective and efficient, as opposed to building white elephants that no one would use and starting an enrolment war.

Efficiency

Across the educational service delivery chain, less time is spent now on collecting, processing, and analysing data. Many of these tasks are automated, requiring minimal input from users, and coupled with increased access to data, officers can now focus on planning action. However, the biggest wins are in terms of monitoring at the regional level as well as teaching and learning at the school level. Cluster monitors can revert to focusing on monitoring schools progress towards education performance targets and providing support to schools. Teachers can now spend less time compiling reports and analysing data to adequately prepare for lessons. Both cases have direct consequences for improving students' performance.

7 Conclusion

This paper focuses only on the use of digital technology for service delivery at the regional level. Our methodology focused on the rural regions, as they generally perform poorly on many education performance indicators. This is not to say that the urban regions are not facing any challenges, but that understanding the service delivery challenges in rural areas, where conditions are at their most extreme, can help us devise strategies to help them catch up with other regions. In addition, all outcomes and innovations are openly shared with everyone.

We have discovered that digital technologies in education have the potential to improve service delivery in the sector in terms of equity, efficiency, and effectiveness. Despite the importance of the availability and use of information in planning, delivering, and monitoring educational services, the sector is faced with many challenges that need to be addressed for effective service delivery in education. This includes too few resources available to act on the issues identified, poor ICT infrastructure that includes heavy reliance on officers and staff's personal resources, which has ethical implications, and institutional issues that could nullify the effect of any information system. These

need to be addressed to realise the opportunities presented by digital technologies in improving service delivery in other poor developing countries with low resources.

In addition, there is a big increase in demand for data in the education sector, which unfortunately is also a result of the increased capacity of digital technology to process larger amounts of data. This has the risk of increasing the burden on teachers and needs to be explored further to understand how this could be avoided. Despite the important role digital technologies are playing in education, the teacher's most important task is still to provide teaching and learning.

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