



Mapping the existing Education Management Information System in Sierra Leone

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List of acronyms

ADEA	Association for the Development of Education in Africa
ASC	Annual School Census
DPP	Directorate of Planning and Policy
DSTI	Directorate of Science, Technology and Innovation
EMIS	Education Management Information System
ENSAF	EMIS Norms and Standards Assessment Framework
ESA	Education Sector Analysis
ESP	Education Sector Plan
EU	European Union
FGD	Focus group discussion
GOSL	Government of Sierra Leone
ICT	Information and Communication Technology
IDI	In-depth interview
LMIC	Low-middle income countries
LWL	Leh We Learn
MBSSE	Ministry of Basic and Senior Secondary Education
NCRA	National Civil Registration Authority
NGO	Non-governmental organisation
OPD	Organisations of persons with disabilities
SABER-EMIS	System Approach for Better Education Results - EMIS
SDG	Sustainable Development Goal
SLTU	Sierra Leone Teachers Union
SSL	Statistics Sierra Leone
SWOT	Strengths, opportunities, weaknesses and threats
TSC	Teaching Service Commission
UNESCO	UN Educational Scientific and Cultural Organisation
UNICEF	United Nation Children's Fund
WASH	Water, sanitation and hygiene

Executive summary

Background

Millions of children live with disabilities worldwide and many of them are at risk of being excluded from education, particularly in low- and medium-income countries (LMIC). For children with disabilities enrolled in schools, learning outcomes and completion rates are often lower than those for their peers without disabilities.

The effective delivery of education requires a robust educational database to monitor inputs and processes, and to assess the extent to which equity targets are being met. For this reason, Education Management Information Systems (EMIS) have been established in many LMICs, with varying degrees of effectiveness. EMIS was established in Sierra Leone in 2006 and has mainly been utilised as a repository of education data collected from schools during the Annual School Census (ASC). The inclusion of disability data on EMIS has been limited to a few indicators and specific categories of disability. Since its establishment, Sierra Leone's EMIS has not benefitted from any review to determine its effectiveness and relevance for the education sector. With the government's increased focus on providing free and inclusive education, and the corresponding increase in enrolment rates in schools, the need for greater support to strengthen EMIS cannot be over-emphasised.

This study set out to review the status of EMIS in Sierra Leone (including the ASC) and to assess its current capacity to collect, analyse and disseminate disability data by answering the following research questions:

- a) What are the strengths and weaknesses of the existing EMIS with specific reference to disability inclusion?
- b) How does the Sierra Leone EMIS reflect the World Bank System Approach for Better Education Results (SABER) EMIS framework, and where and in what ways does it converge and diverge from the framework?
- c) What are the key opportunities for strengthening EMIS and making it more disability inclusive?

Methods

The assessment used the System Approach for Better Education Results (SABER) EMIS framework developed by the World Bank, which has been used in many countries to measure the performance of EMIS. SABER-EMIS examines four components of EMIS: the enabling environment, system soundness, data quality and data utilisation. Each component is scored on a four-point scale running from latent to advanced. For the purpose of this study, the SABER-EMIS framework was adapted to reflect a disability lens.

This qualitative study was conducted in Bombali and Karene districts in northern Sierra Leone, where Sightsavers has been implementing an inclusive education project in 45 schools since 2016. Data was also collected in Freetown from officials in the Ministry of Basic and Senior Secondary Education (MBSSE) and other institutions operating in the education sector. This enabled the study team to

document EMIS as it operates in these districts, as well as to understand aspects of the national system and the interactions between these levels.

The study reviewed available documents and collected information from purposively selected respondents through in-depth interviews and focus group discussions (FGDs), which were conducted between September and November 2021. The qualitative data generated from these processes was transcribed and analysed using Nvivo 12. Ethical approval was granted by the Sierra Leone Ethics and Scientific Review Committee.

Results

Annual school census (ASC) - school-based data collection

Strengths	Weaknesses
<ul style="list-style-type: none"> ▪ The ASC generates all the data that goes into EMIS. ▪ ASC is coordinated by MBSSE and undergoes extensive planning by an inter-agency team of Statistics Sierra Leone, the National Civil Registration Authority, the Teaching Service Commission, the Sierra Leone Teachers Union, the UN agencies (UNESCO and UNICEF), the World Bank, the European Union and representatives of NGOs. ▪ Training is provided for supervisors and Quality Assurance Officers (QAOs), who are enumerators, and principals of secondary schools. ▪ Detailed instructions on how to fill the census forms are available. Data quality is ensured through linking a school's EMIS number to a GPS location, and through data verification and headcount by census enumerators. ▪ Data collection has evolved from paper-based forms (except in primary schools) to electronic forms using SurveyCTO. 	<ul style="list-style-type: none"> ▪ Training provided to prepare stakeholders for data collection during ASC is not extended to primary school teachers/headteachers. ▪ At primary school level, data collection is led by headteachers, but excludes class teachers who interact with children on a more regular basis. ▪ The ASC collects limited disability data, focusing on the number of children enrolled and limited categories of disability. ▪ QAOs who collect data have circumvented the quality control measures instituted by MBSSE, largely due to the heavy workload. ▪ Servers have been installed in Freetown and study districts, but these are not synched by any network, making data sharing between districts impossible.

SABER-EMIS policy areas

Policy area 1: Enabling environment This policy area was assessed using five sub-goals and was rated as being at the emerging stage on the SABER-EMIS framework scale.

Strengths	Weaknesses
<ul style="list-style-type: none"> ▪ EMIS was established in 2006 to house education data to be used for strategy development and planning with a unit within the structure of MBSSE. ▪ The role of EMIS is acknowledged in most national policies and strategies as a key management tool for monitoring education interventions and human capital development. ▪ EMIS is partly financed by the government of Sierra Leone. ▪ As a database, EMIS has guidelines for collecting education data. ▪ MBSSE has policies supporting the inclusion and collection of disability data. 	<ul style="list-style-type: none"> ▪ EMIS does not have a national policy and a dedicated budget to support its operation. ▪ At the time of data collection, some EMIS personnel were hired on short-term contracts and paid by either the EU or UNICEF. ▪ The level of understanding of disability among teachers in schools is limited to visible and severe forms of disability. This impacts on the quality of disability data collected during ASC. ▪ Data collection guidelines are not circulated widely enough to enable all teachers, especially those in rural communities, to access them.

Policy area 2: System soundness - System soundness scored latent, which is the lowest grading on the SABER-EMIS framework.

Strengths	Weaknesses
<ul style="list-style-type: none"> ▪ Data collection during ASC has evolved from paper-based census forms to an electronic platform, using SurveyCTO. ▪ Every school in the country has a unique identifier EMIS code linked to the GPS coordinates of the school. This helps in spatial mapping and quality assurance during ASC data collection. ▪ MBSSE has provided servers in Freetown and the districts for storing education data. 	<ul style="list-style-type: none"> ▪ ASC is the only source of data for EMIS. At present, EMIS provides only aggregated-level data; EMIS does not have the capacity to integrate and regularly update individual-level data. ▪ Disability data within EMIS is scarce and limited to a few categories of disability. ▪ There is limited information on factors in the school environment that may create barriers to children with disabilities. ▪ There was no evidence or report of regular maintenance of either the software or hardware of EMIS, which is a key requirement for an effective EMIS. ▪ Servers are not linked up via any network.

Policy area 3: Data quality This policy area was rated emerging after it was assessed using four sub-goals (methodical soundness, accuracy and reliability, quality of disability data and timeliness).

Strengths	Weaknesses
<ul style="list-style-type: none"> ▪ Planning of the ASC is rigorous and MBSSE has instituted several data quality-control measures to ensure the methodological soundness of all components of EMIS. ▪ Training is provided for enumerators, supervisors and principals in junior secondary schools before data collection to ensure high-quality data. ▪ Principals in junior secondary schools involve class teachers in the collection of disability data, which results in more accurate disability data. 	<ul style="list-style-type: none"> ▪ Some quality-control measures instituted by MBSSE are circumvented by enumerators, which affects the quality of data gathered. ▪ Teachers have limited knowledge of disability and focus primarily on collecting data on visible and evident functional difficulties. ▪ Data is collected from schools annually and cannot be updated during the school year, limiting the use of data for planning purposes.

Policy area 4: Data utilisation This policy was rated latent, meaning the utilisation of data produced and utilised by EMIS is basic.

Strengths	Weaknesses
<ul style="list-style-type: none"> ▪ The ASC report is published on the MBSSE website where it can be accessed by the public. ▪ Disability data, including facilities to support children with disabilities, is included in the ASC report. ▪ ASC data can be requested from the District Education Offices or MBSSE. ▪ Data disseminated by EMIS is widely used by NGOs and private entities involved in providing education services. 	<ul style="list-style-type: none"> ▪ Education data is published online and cannot be accessed by people or organisations with limited ICT capacity. ▪ Provision of data from district level can be delayed due to power outages. ▪ Education data is not disseminated in formats accessible to people with disabilities, for example in braille, large print or audio formats.

Implications of the study

The study identified an emergent EMIS, with substantive weaknesses across all domains examined. Furthermore, the inclusion of disability data was found to be limited. The results suggest that the integration of disability data within the EMIS should be preceded by comprehensive measures to strengthen the EMIS itself. There is a need to strengthen EMIS regulations and guidelines, EMIS infrastructure, data verification processes and data utilisation. Integration of disability data within EMIS will only be useful if the system transitions from the provision of aggregate data to individual-level data. Future research should explore the effectiveness of specific strategies to achieve it. As a starting point, the following strategies may be considered to strengthen the EMIS in Sierra Leone.

To improve the enabling environment:

- Develop a normative base, which regulates the operation and maintenance of EMIS at different administrative levels.
- Ensure a sufficient dedicated budget to finance all aspects of EMIS and its support.
- Ensure qualified human resources are deployed on sustainable long-term contracts.
- Make guidelines on how to complete simple ASC forms and make them widely available across the country.
- Develop consistent guidelines and training on how to collect disability data.

To improve system soundness:

- Explore ways of how to collect, maintain and regularly update individual-level data, including data on functional difficulties and other children's characteristics.
- Consider the number of disability data indicators required regularly or periodically to support the planning of inclusive education at different levels.
- Improve internet connectivity at schools and at different administrative levels.
- Link up and improve the inter-operability of district-level servers.
- Increase the capacity for education data storage.
- Ensure regular maintenance of EMIS at different levels.
- Align different systems and processes for collecting educational data, and streamline all data collection through EMIS.

To improve data quality:

- Ensure ASC data verification in difficult-to-reach locations.
- Ensure data enumerators have sufficient time and resources to visit remote schools.
- Ensure quality-control measures are in place and strictly followed.
- Ensure teachers who are in close contact with children are trained and involved in collecting disability data in all schools.

- Develop mechanisms for a regular update of education data throughout the school year.

To improve data utilisation:

- Ensure that the ASC report is available to decision-makers and education stakeholders in an appropriate and accessible format at all levels.
- Ensure that the education data is available to decision-makers and education stakeholders when and where they need it.
- Build the capacity of education stakeholders to understand and regularly use education data.

Background

Disability inclusive education

An estimated 240 million children live with disabilities worldwide, many of whom are at risk of being excluded from education (1-3). In some low- and middle-income countries (LMICs), as many as one in two children with disabilities are not in school (4). For children with disabilities enrolled in education, school completion rates and learning outcomes are often poorer than those for children without disabilities (4-6). The consequences of educational exclusion are considerable and long lasting, with a devastating impact on children's health, economic wellbeing and social participation in adulthood.

The importance of securing access to education for children with disabilities is reflected in the Sustainable Development Goal for education (SDG 4), which aims to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” (7). Furthermore, Article 24 of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) calls for state parties to ensure that “...children with disabilities are not excluded from free and compulsory primary education, or from secondary education, on the basis of disability” (8, 9). Target 4.5 of the global indicator framework for the SDGs sets the ambitious goal of achieving equal access to all levels of education for vulnerable groups, including children with disabilities (7). To achieve these aspirations, approaches to inclusive education must be reflected in national policies, which should be developed in close collaboration with teachers, parents, organisations of persons with disabilities (OPDs) and children with disabilities. The capacity of the education system to identify children with disabilities and to recognise their individual learning needs is central to the concept of inclusive education. It is the first critical step in national and local planning, resource allocation, curriculum development and teacher training (10).

To make inclusion a reality, education systems need adequate and accurate data and effective tools to monitor the equity of access, participation and attainment for children, especially those with disabilities, from different backgrounds, characteristics and geographies. Lack of credible and timely data on children with disabilities has been identified as a barrier to inclusive education, and this gap has contributed to the inability of LMICs to adequately address disability-related inequalities in the education sector (11). In most LMICs, data management in the education sector using EMIS is very limited (12). Few collect data on children's family backgrounds or record their individual functional or developmental difficulties. Where this data is collected, it is often done using inconsistent tools, or stored in formats that cannot be easily used by education stakeholders for planning and budgeting purposes (4). This contributes to millions of children with disabilities being uncounted and excluded from education. The absence of adequate and reliable data in most LMICs makes it difficult for governments and their partners to fully understand the problem of educational exclusion, which further undermines national decision-making, resource allocation and planning. In a stock-take exercise conducted by the Global

Partnership for Education (GPE), which reviewed how countries prioritise inclusive education and children with disabilities in their Education Sector Plans (ESPs), it was found that only 24 out of 51 ESPs referred to children with disabilities (13). Common challenges associated with limited data on disability include inconsistent uses of the term ‘disability’, incomparable tools to assess disability status, derogatory and stigmatising language used in relation to disability and inadequate mechanisms to protect the anonymity and confidentiality of data collected (14).

Childhood disability in Sierra Leone

In Sierra Leone, childhood disability is an important issue at both community and national level, thus making it a key policy consideration for the government. The Multiple Indicator Cluster Survey (MICS) conducted in Sierra Leone in 2017 found that as many as 23% of children aged 5-17 years had at least one functional difficulty. The most common difficulty identified was managing emotions, including signs of severe anxiety, and experiencing depression on a daily basis, which affect 13% and 9% of children respectively. The findings further show that many of these children are attending school, but their needs are rarely recognised and addressed in classroom settings. Prevalence of sensory disabilities, such as vision and hearing impairments, were found to be relatively low (0.2%) but up to 50% of these children were reported to be out of school, largely due to the lack of assistive technologies such as low vision devices and hearing aids (15). The 2021 annual school census reported that 41,544 children with disabilities were enrolled in schools in the country, representing about 1.5% of the total enrolment; 52.7% of these children were boys and 47.3% girls (16).

An independent assessment of the situation of out-of-school children in Sierra Leone found that disability was a major factor keeping children out of school, especially in low-income families, rural areas and urban slums, and in communities affected by conflict and displacement. The assessment further noted that children with physical disabilities of limbs were more likely to go to school than children with sensory impairments. Low rates of school participation by children with disabilities were linked to the fact that most schools were not accessible and teachers were ill-equipped to provide the necessary support to children with disabilities in their classrooms (17).

The government of Sierra Leone has introduced several measures to address disability as a barrier to basic education. In 2011, the government approved the Disability Act, which recognised the right and privileges of people with disabilities by providing free access to tertiary education and medical facilities, and making discrimination against people with disabilities a criminal offence (18). The 2018-2020 ESP mandated that schools should strive to increase accessibility by making new and existing buildings disability friendly, with ramps, railings and sanitation facilities for children with disabilities (19).

In 2021, the Ministry of Basic and Senior Secondary Education (MBSSE) launched the National Policy on Radical Inclusion in Schools, which aims at “the intentional

inclusion of persons directly or indirectly excluded (from education) due to actions or inactions by individuals, society or institutions”. The excluded persons referred to in the policy include girls - including those who are or have been pregnant - parent learners, children with disabilities, children from low-income families and children from rural and under-served areas. The goal of the policy is to create an inclusive environment for all children, support vulnerable learners, involve families and communities and enable a strong policy environment for implementation. For disability specifically, the policy focuses on training teachers in special needs education, a review of existing policies and comprehensive medical screening for learners with disabilities (20). Monitoring the implementation and impact of these policies requires timely and reliable data on educational participation and learning; the data should be disaggregated by learners’ potential characteristics of disadvantage and be managed in a central warehouse such as the MBSSE Education Management Information System (EMIS).

Study rationale and research questions

With the government’s increased focus on providing free and inclusive education for all, and the corresponding increase in enrolment in schools, the need for greater support to strengthen EMIS cannot be over-emphasised. The current ESP articulates plans to strengthen EMIS; however, since its establishment, no in-depth studies have been conducted to review the current status of EMIS and there is no documented evidence that it has even been assessed with regards to its capacity to monitor education inputs and indicators.

We set out to review the status of EMIS in Sierra Leone and to assess its current capacity to collect, analyse and use disability data. The study focused on answering the following research questions:

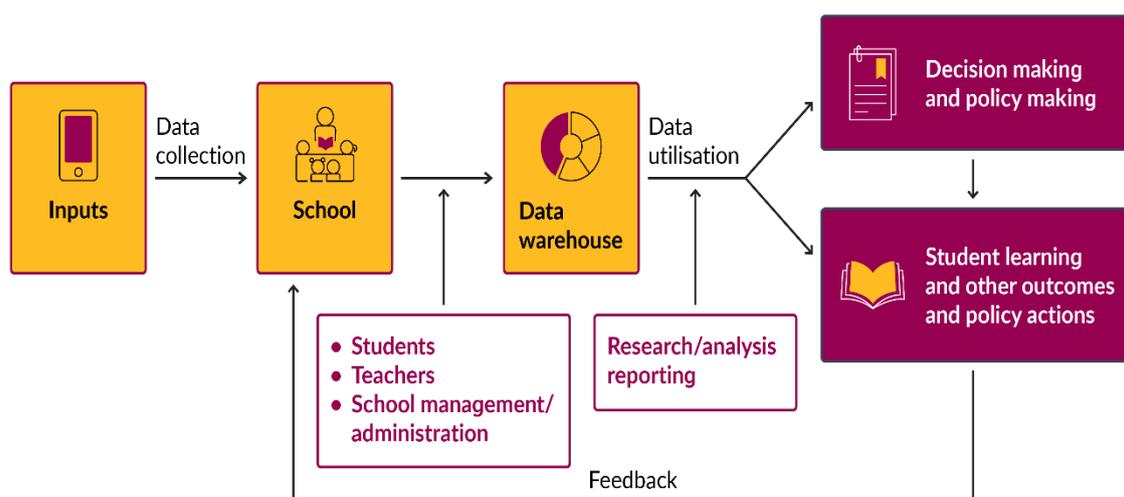
- a) What are the strengths and weaknesses of the existing EMIS with specific reference to disability inclusion?
- b) How does the Sierra Leone EMIS reflect the World Bank System Approach for Better Education Results (SABER) EMIS framework, and where and in what ways does it converge and diverge from the framework?
- c) What are the key opportunities for strengthening EMIS and making it more disability inclusive?

The study was funded and implemented by Sightsavers, an international non-governmental organisation, which works to eliminate avoidable blindness and promote the equality of opportunities for people with disabilities in Sub-Saharan Africa and Asia.

Theoretical framework

This study drew on the World Bank System Approach for Better Education Results (SABER) EMIS framework. The framework describes an effective EMIS as one with a fully functioning information cycle that goes beyond annual data collection to serve the needs of a range of education stakeholders, informing them about the effect of education policies and helping them to make decisions and changes, where necessary. The system monitors inputs into education and helps to assess the quality of learning and policies to inform decision makers on progress made in achieving education performance indicators. Information generated is also fed back into the cycle to improve the teaching and learning process, data collection and the operation of EMIS itself. The framework has been used in several countries to measure the effectiveness of EMIS (21, 22). The figure below depicts the cyclical nature of data collection and its use in EMIS.

EMIS information cycle



Source: Abdul-Hamid, 2014

The SABER-EMIS framework describes four areas that need to work together to achieve better educational outcomes for all children: a) enabling environment b) system soundness c) data quality and d) data utilisation (23). In each of these areas, there are policy domains (sub-areas or sub-goals) that need to be in place for a functional and effective EMIS. These policy domains are explained below for greater clarity.

- i. **Enabling environment** This domain lays the foundation for an effective EMIS and refers to the laws/policies, structures, resources and culture surrounding

data collection, analysis and utilisation. In essence, the enabling environment defines the context in which EMIS exists and operates.

- ii. **System soundness** This refers to the processes, structures and integration capabilities that make EMIS effective. Education data is often sourced from different institutions, but must be integrated into one national education database, which is EMIS. Despite this integration, EMIS must provide dashboards to indicate contributions from various institutions and must further show progress in meeting education targets and indicators.
- iii. **Data quality** This refers to the mechanisms required to collect, store, produce and utilise data in an accurate, secure and timely manner. Data quality also ensures that data is accurate and addresses specific and emerging needs in the education sector in a timely manner.
- iv. **Data utilisation** This ensures that stakeholders in the education sector (teachers, parents, planners, policy makers etc) use information from EMIS to make decisions that will improve the delivery of education (21, 24).

For this study, the SABER-EMIS framework was adapted to reflect a disability lens as shown in the table below.

Table 1: Adapted SABER-EMIS framework

Policy domain and sub-goals	Questions to be explored
<p>Enabling environment</p> <ul style="list-style-type: none"> ▪ Legal framework/policy guidelines ▪ Policy on inclusive education and gathering disability data ▪ Dedicated budget ▪ Human resources ▪ Understanding disability data collection at school level 	<ol style="list-style-type: none"> 1. What policies are in place to guide the operation of EMIS? 2. Is there a dedicated budget for the operation of EMIS? 3. Is there adequate infrastructure to support EMIS? 4. Are there skilled and experienced people to manage EMIS at all levels? <p>Disability lens questions</p> <ol style="list-style-type: none"> 1. What policies or declarations exist to support the inclusion of children with disabilities in the education system and the collection of data on disability and education? 2. Are there adequate skills/experiences at school level to collect data on disability?
<p>System soundness</p> <ul style="list-style-type: none"> ▪ Data architecture ▪ Data coverage ▪ Data on learners with disability and the learning environment ▪ Serviceability of the system 	<ol style="list-style-type: none"> 1. How effective are the processes for managing EMIS? 2. How sound is the data management infrastructure? 3. What maintenance strategies are in place to prevent interruptions in EMIS operation? <p>Disability lens questions</p> <ol style="list-style-type: none"> 1. What questions exist in the school census form to collect data on a) learners with disabilities b)

	supportive environment for learners with disabilities and c) the preparedness of teachers and other school staff to support learners with disabilities?
<p>Data quality</p> <ul style="list-style-type: none"> ▪ Methodological soundness ▪ Accuracy and reliability ▪ Quality of disability data ▪ Timeliness 	<p>1. What is the quality of data, including data on disability that goes into EMIS?</p> <p>Disability lens questions</p> <p>2. Is the disability data produced sufficient and of sufficiently high quality to be used by policy makers for planning?</p>
<p>Data utilisation</p> <ul style="list-style-type: none"> ▪ Data-driven culture ▪ Openness ▪ Operational use ▪ Accessibility ▪ Effectiveness in disseminating findings 	<p>1. Who are the users of EMIS?</p> <p>Disability lens questions</p> <p>1. Is data on disability in the education sector made available publicly?</p> <p>2. What forums exist for the dissemination of data on disability?</p>

Source: Adapted from Abdul-Hamid, 2014

Methodology

Study design and settings

This study used a predominantly qualitative design and included a documentary review, focus group discussions (FGDs) and in-depth interviews (IDIs). Data was collected in Freetown from MBSSE officials and institutions supporting EMIS, and in Bombali and Karene districts in northern Sierra Leone. These districts were selected because Sightsavers has been implementing an inclusive education project in 45 schools there since 2016. The project presently supports more than 1,000 learners with and without disabilities, as well as 360 teachers who have been trained in special-needs education to enhance the learning experiences of children with disabilities in mainstream schools. The pre-existence of strong connections with state and local institutions in the districts supported the timely collection of high-quality data.

Sampling and recruitment of study participants

In Bombali and Karene districts, four schools (two per district) were randomly selected out of the 45 schools supported by Sightsavers; and 24 teachers (six per school) were then randomly selected to participate in FGDs. In addition, two Deputy Directors of Education, two EMIS Information and Communication Technology (ICT) Officers and two Quality Assurance Officers (QAO) were invited to participate in IDIs.

At the MBSSE headquarters, senior and mid-level officials involved in special-needs education, policy formulation and data management were invited to participate in IDIs and FGDs. Various bi- and multi-lateral partners, as well as Statistics Sierra Leone (SSL), were also invited to participate.

Data collection and tools

The topic guides used in data collection were developed based on a scoping literature review and informal discussions with government officials. The interviews and FGDs asked participants about the annual school census (ASC), stakeholders in the school census, knowledge of EMIS and disability data. Data collection took place between September and November 2021, as follows.

- i. **Documentary review** A detailed review of the literature focused on disability and inclusive data in education, annual school census, the operation of EMIS and its role in the education sector.
- ii. **In-depth interviews** A total of 13 IDIs were conducted with 10 MBSSE officials, two multilateral organisations (the World Bank and the European Commission) and one official from SSL. Representatives of UNESCO, UNICEF and the Directorate of Science, Technology and Innovation (DSTI) of Sierra Leone were also invited but declined the invitation and provided no reason for their refusal. Study instruments used are attached in Appendices 1-4.
- iii. **Focus group discussions** 30 respondents participated in FGDs (24 teachers and six MBSSE personnel). The topic guide used in FGDs is attached in Appendix 5. The MBSSE officials were asked to assess the strengths, weaknesses, opportunities and threats (SWOT analysis) of the current EMIS following a guide attached in Appendix 6.

Data analysis

Data from the IDIs and FGDs were transcribed and analysed thematically using Nvivo 12 software. Results of the SWOT analysis were summarised in a matrix attached in Appendices 7-8.

Literature describes several ways to rate the performance and effectiveness of EMIS. In this study, we adopted the rubric used by the World Bank during the review of EMIS in Samoa in 2015. The rubric used a four-level scale (latent, emerging, established and advanced) to assess the extent to which policy intent and implementation are achieved (25). Data collected during the IDIs and FGDs was used to decide the rubric scores, as described in Table 2.

Table 2: SABER-EMIS scoring system

Score/rating	Characteristics
4 (Advanced)	Comprehensive enabling environment, processes, structure, data management, utilisation and integration in place, with intelligent analytics
3 (Established)	Enabling environment, processes, structure, data management and utilisation in place with some integration
2 (Emerging)	Basic enabling environment, processes, structure, data management and utilisation

1 (Latent)

Limited enabling environment, processes, structure, data management and utilisation

Source : Mintz, Saraogi & Abdul-Hamid 2015

In calculating performance scores, the research team allocated a weighting of 25% to each of the four policy domains. The score for each sub-goal in each policy domain was given based on the evidence provided by the respondents. To calculate the domain score, an average of scores given to sub-goals was calculated. The scoring guide was as follows: latent (1-25%), emerging (26-50%), established (51-75%) and advanced (76-100%).

Ethical considerations

Approval to conduct this study was secured at several levels. We received an administrative approval from MBSSE (March 21 2021) to conduct the study within the education sector, and this enabled us to engage staff at the Ministry and the project schools. We also secured an approval from the Sierra Leone Ethics and Scientific Review Committee (July 21 2021), the institution responsible for reviewing and approving all research activities in the country. In addition, we consulted and obtained the consent of the District Education Offices in Bombali and Karene districts to allow us access to schools. The study team acquired informed consents from all participants of the study.

Limitations

This study was limited to EMIS used by MBSSE and excluded other education databases in the country. For example, the Education Datahub of DSTI is also funded by the government and employs more advanced techniques to analyse and present the same annual school census data. However, it operates as a separate entity in the Office of the President. Towards the end of 2021, another education database, the Executive Management Information System (also known as EMIS), was established as a collaborative project between MBSSE and the Ministry of Technical and Higher Education. This database is not covered by this study either. This study was conducted in Bombali and Karene districts, interviewing teachers in the schools that have been supported by Sightsavers for a number of years. Teachers in these schools, therefore, may have higher levels of disability awareness and may not be representative of other schools in Sierra Leone.

Findings

This section of the report first provides a narrative overview outlining findings on the background and current functioning of EMIS and the conduct of the annual school census. It then presents the results of the SABER assessment of EMIS.

EMIS development

Before the establishment of EMIS in Sierra Leone, education data was stored in different places and was uncoordinated, making it difficult to use for nationwide planning. EMIS was established in 2006 with support from UNESCO, with the aim to house education data in a central warehouse where it could be easily accessed and used by the government and its partners to monitor and improve the performance of the education sector (26). The EMIS Unit established under the then Ministry of Education coordinated the first annual school census (ASC) conducted in 2007, covering about 98% of schools in the country, although the accuracy of the data collected was questioned and challenged by several stakeholders (26).

In essence, EMIS was established to store and disseminate education data for the purpose of planning and decision making. At the time of this study, however, EMIS included primarily data collected through ASC (27) and in many ways, was equated to ASC (28). As such, EMIS largely plays a role in processing and presenting ASC data and provides a platform for users to access education-related statistics. It provides data for comparative purposes on school enrolment trends over the years and is used by the government to plan and allocate financial resources and recruit teachers to meet the growing enrolment of learners and expansion of schools at all levels. Every school in the country now has a unique EMIS number for easy identification and data management (16). The 2020 ASC collected data from 11,168 schools across four levels of education (pre-primary, primary, junior and senior secondary schools) on 2.6 million learners. The primary school level alone accounts for 64.1% of schools and 66.7% of learners (16).

The 2017 and 2018 ASCs reported some disability data on the number of children with disabilities enrolled in schools, disaggregated by sex and by class. In these two years, the census form also solicited data on ramps and railings available in schools, and how water, sanitation and hygiene (WASH) facilities were adapted to make them disability friendly. Data was also collected on the availability of educational materials and assistive devices such as braille books, audio and visual aids. In 2019, however, the disability section of the school census form was changed to collect only two disability-related indicators, namely the number of children with disabilities enrolled and the suitability of school toilets for use by people with disabilities.

EMIS in national policies and strategies

EMIS is recognised in several policy documents as a strategic management and monitoring tool in the education sector. The Medium-Term National Development Plan (2019-2023) refers to education as a key priority for sustainable development and focuses on free quality school education as a means of attaining the principles of inclusion and leaving no one behind. The plan identified the national EMIS as a tool for monitoring progress in all aspects of the education system (29). The current ESP aims to achieve three key objectives: improved education service delivery, improved integrity of the education sector and improved learning across all levels. The policy includes proposals for strengthening EMIS with operational policies and a dedicated budget to transform it into a one-stop-shop for packaging and disseminating education data (19). The National Policy on Radical Inclusion in School - grounded in the rights and entitlements of children outlined in the 1991 Constitution of Sierra Leone, the 2004 Education Act and the 2011 Disability Act - affirms the right of people with disabilities to free education and requires the collection and management of disaggregated and inclusive data to monitor indicators, such as enrolment and learning for different types of learners (20).

The Sierra Leone National Innovation and Digital Strategy (2019-2029) also refers to the use of artificial intelligence and technology to better understand teacher and student determinants of learning outcomes and to “inform the prioritisation of education interventions at all levels” (30).

EMIS legal framework, policies, budget and human resources

Study participants noted that currently there is no policy on the operation of EMIS. They further explained that the process to formulate a national policy had been initiated but is yet to be completed. At the time of the study, the EMIS Norms and Standards Assessment Framework (ENSAF), developed by the Association for the Development of Education in Africa (ADEA) was used as the guiding policy for EMIS.

It was further explained that the Ministry had published two documents to guide data collection and to ensure methodological soundness during the school census. The Directorate of Planning and Policy (DPP) published the Data Dictionary of Education: Concepts and Terms, which serves as a guide and reference for compiling education data during the school census (31). The second document (unpublished) is a step-by-step guide on how to fill in the ASC form. Study participants pointed out that although these documents were useful reference materials, they had not been widely circulated to schools, particularly to teachers in rural communities.

With regards to a dedicated budget, one of the study participants explained that there is “some amount within the budget of the Directorate of Planning and Policy” and there is also “support from partners.” The inputs of the government to EMIS were not detailed during the interviews, but study participants noted that EMIS was dependent financially on key donor agencies (the World Bank, EU, UNICEF), which is not sustainable for the operation of a national education database. Participants believed that dedicated funding from the government was - no matter how small - the best way to sustain the operation of EMIS.

It was also pointed out that key personnel supporting EMIS at present were contracted on a short-term basis and paid by either the EU or UNICEF. It was further revealed that the EU had recently extended the existing employment contracts for staff by six months. There is a donor expectation that staff will be transferred to the government payroll; however, at the time of the study, there was no evidence that this was happening in practice.

With regards to disability and inclusive education, the government has formulated several relevant policies. The Disability Act of 2011, for instance, sets out provisions for people with disabilities and makes any form of discrimination against them a criminal offence. The current ESP mandates that schools enrol children with disabilities, and further stipulates that school buildings are restructured to make them easily accessible for people with disabilities. The National Policy on Radical Inclusion in Schools further supports inclusive education, based on the principle of “leave no one behind”.

Annual school census: structures and processes

The first ASC was conducted in 2007 and data collection was carried out using paper-based census forms until 2018, when the use of an electronic or digital data collection system was introduced. The school census is funded by the government, with support from the World Bank, EU, UNESCO and UNICEF, although other institutions have provided various forms of support over the years. Key stakeholders include Statistics Sierra Leone (SSL), which helps to plan and validate data, and the National Civil Registration Authority (NCRA), the government arm responsible for vital statistics and national identity. Other stakeholders include local councils, development partners and non-governmental organisations (NGOs).

ASC is conducted once a year, with the purpose of providing data on schools, student enrolment and the status of teachers in the country. Key data includes the number of schools and the number of children enrolled, including learners with disabilities, information on teachers (numbers, qualification/experience, status of employment etc), the state of the physical school infrastructure, information on whether the school is disability friendly and the availability of WASH facilities.

Data collected during ASC is processed and presented via EMIS and is used for planning, policy formulation and resource allocation. Data can be accessed through the EMIS database in Freetown and in the districts.

Study participants pointed out that the ASC is a significant achievement of the education system, as it generates data on every school in the country. It was also noted that collecting data from all schools is a major effort, considering that many schools are located in remote and hard-to-reach areas.

Study participants further explained that the ASC is a major event in the calendar of MBSSE and involves detailed planning and engagement of various stakeholders. It is highly structured and follows pre-defined processes, as described below.

Planning and designing the census

Planning for ASC is initiated by the Director of Planning and Policy Directorate in MBSSE who, in consultation with the Minister and Chief Education Officer, brings together other directors and senior members of staff to introduce the census, proposed timelines and expected roles and responsibilities.

Further meetings are conducted with development partners (especially UNESCO, World Bank, EU and UNICEF) and other key stakeholders like SSL, NCRA, the Teaching Service Commission (TSC) and Sierra Leone Teachers Union (SLTU). Other stakeholders, especially NGOs, working in the education sector and disability are also consulted at this stage to express their views on what they want to see in the census form. As consultations and meetings progress, planning sessions become more technical and committees are formed to focus on methodology, data collection tools, updating the school master list, human resource requirements and budgets.

One of the key tasks of the technical committee is to review the census form to add new data areas based on emerging issues in the education sector. Once the relevant changes are agreed, the census form is finalised. The approved version of the form is inputted into SurveyCTO (the mobile data collection platform used for electronic data collection) and uploaded into tablets ready for data collection.

Training is an important component of the planning phase. Once the methods of data collection and the census form are agreed, a training of trainers is conducted at national level; trainees in turn provide training for census enumerators, supervisors and principals of junior secondary schools at district level. Training is one of the steps in the quality assurance process, as it prepares enumerators to collect data, which is complete, accurate and reliable.

There are provisions in the school census form to capture disability data, including the number of learners disaggregated by sex, grade and type of disability. However, teachers' understanding of how to collect disability data varies. Teachers can relatively easily identify visual, speech, hearing and mobility impairments, but identifying other, less evident impairments can pose a challenge. In 2020, the Minister of MBSSE suggested that the categories of disability in the census form be

expanded to include kyphosis, little people/dwarfism and albinism, but this has not yet been actioned.

Study participants also explained that the census forms initially collected data on the number of classrooms rather than the number of buildings in the school, which limited the use of data from an accessibility point of view. The head of the Special Needs Unit in MBSSE advocated for changing it, and the current form makes provisions for the number of buildings (19).

Data collection in schools

The ASC uses two approaches to collecting data in schools. In the first approach, census forms are distributed to the heads of nursery and primary schools two weeks before the census, with detailed instructions on how to complete the form. Later, Quality Assurance Officers (QAOs) who serve as enumerators visit each school to verify data collected and to ensure all sections have been filled in correctly. To ensure accuracy of enrolment figures in schools, QAOs are required to conduct a headcount in each class to ensure the correct figure has been entered. After satisfactory verification, data in the census form is transferred into the electronic form in the presence of the headteacher.

This process was described by study stakeholders as ideal and preferred by MBSSE and partners. In practice, however, it did not always happen as designed. For example, some study respondents said that QAOs performed verification and headcounts in schools which were easily accessible; while schools in hard-to-reach areas often could not implement these important quality-control mechanisms. In such areas, enumerators arranged with the teachers in their clusters to bring their completed forms to a centrally located school, where data was entered into the tablets. In some remote locations, enumerators arranged with the teachers to send their completed forms to the District Education Office where information was entered electronically by EMIS ICT officers. Study stakeholders argued that QAOs working in remote areas adopted these approaches to cut down on travel time and to complete the census within the agreed timeframe.

The second approach to ASC data collection is used in junior secondary schools. In this approach, school principals complete ASC forms and enter information directly into tablets provided for every junior secondary school in the country. This study did not cover ASC data collection in senior secondary schools.

The process used by MBSSE and partners to plan for data collection during ASC was regarded by study stakeholders as sound, as it involves planners, statisticians, data analysts, ICT personnel and specialists in the fields of education and data management. However, it was noted that despite the sound planning, enumerators and supervisors were often overwhelmed and experienced multiple challenges, which affected the quality of data collected. For instance, despite the support and guidelines provided, heads of schools - especially those at primary level - found it difficult to complete the forms without assistance. QAOs interviewed pointed out that when they visited schools for verification, they found that the forms were incomplete

and they had to complete the forms together with the headteachers, which in turn affected their own targets and timelines.

It was further noted that education planners introduced several quality-assurance checks in the data collection process. Firstly, every school has been assigned an EMIS code/number, which is linked to the school GPS coordinates; and the software was designed to open only when the GPS location was captured on the tablet to ensure that enumerators/QAOs were physically present in the school. Secondly, the numbers reported by the headteachers are expected to be verified by a headcount, as explained above. Also, during data collection, IT officers working in the central warehouse monitor all census forms uploaded into the system, watching for inconsistencies and incomplete forms. For every anomaly identified, the concerned enumerator and supervisor are contacted immediately to address the issue, even if it means going back to the school.

This study, however, found that the quality assurance checks were often bypassed, particularly for schools in remote locations with difficult terrain or other circumstances which prevented enumerators from accessing the schools. Enumerators handle these challenges in two ways. Firstly, headmasters are invited to a central location from where the data on their school is entered electronically. In other cases, headteachers are asked to send their forms to the DEO, where it is entered electronically. In both cases, enumerators are not able to verify the quality of data entered into the system. As a result, the data on school enrolment may be inflated, as higher numbers of enrolled students attract more funding, school feeding support and other educational supplies from the government, as well as more incentives paid through performance-based schemes by development partners.

Furthermore, study participants pointed out that the quality of data entered can be affected by the significant workload of QAOs during the ASC. They often must cover a very large number of schools scattered across large geographical areas, which affects the time they can dedicate to the process of verification and quality control.

It was also explained that census forms were primarily completed by headteachers at primary school level, reflecting their own knowledge and opinion; other teachers working in the schools usually do not participate in the census and their opinion is not reflected in the data.

Poor internet connectivity also contributes to the challenges faced by QAOs, who require strong connectivity to upload the census forms, which is not possible in most rural communities. As a result, they have to travel to other areas to upload data, which slows down the data collection process and increases their travel costs.

The timeliness of data collected and stored in EMIS was questioned by some study participants. It was explained that the publication of data collected during the ASC often takes 4-5 months. Considering the rapid changes taking place in the education sector, including increasing enrolment numbers, data collected from schools quickly becomes outdated. Additionally, MBSSE does not collect real-time data to capture and reflect any changes that take place throughout the year, which can create difficulties for planning and decision making.

It was further explained that data on disability collected in schools is entered in specific sections of the census form, and we identified two approaches to collecting disability data. In primary schools, data on disability is entered by the headteacher, with minimal input from class teachers, although these teachers interact with children more than the headteacher. The disability status of a child is usually determined by the headteacher based on their personal experience and understanding of disability. In junior secondary schools, other teachers support the principal in collecting disability data. Class teachers are brought together in a meeting where they present disability data from their classes. Every presentation is discussed and verified before the data is submitted to the principal and entered for the entire school. It was thought that due to the involvement of other teachers, disability data collected in junior secondary schools was more accurate, compared to that from primary schools. At all levels, however, only data on known and visible types of disability in given categories is entered in the census form.

Within schools receiving support from Sightsavers, certain teachers known as Inclusion Champions - who have been trained by Sightsavers in special needs education - keep records of children with disabilities in schools, and these records are updated periodically. Sometimes this data is used to update the census or when requested by other development partners.

Data processing

Study participants explained that data collected from schools was uploaded directly into the EMIS server at district level, from where it was transferred to the central data warehouse. It is then exported into Microsoft Excel for data analysis and dissemination.

The study confirmed the availability of the servers in Freetown, Bombali and Karene districts (as well as other districts in the country). However, at the time of the study, these servers were not linked up via any network and therefore not communicating with one another. This status of the servers and the fact that they are not linked up was noted as a major weakness of EMIS by MBSSE officials. Ministry officials participating in the study said that plans to connect the servers in a network were underway but until then, education data were stored only at district level.

EMIS ICT Officers also noted that although the data was expected to be stored on Cloud, the space acquired by MBSSE was limited, which posed challenges in uploading and storing the data, especially during the school census. As a result, data was often stored on laptops, tablets and external drives, making it vulnerable to corruption, loss or theft. The question of maintenance of the district servers was also raised, as there was no system in place for routine maintenance.

Dissemination and utilisation of data

This is the final stage in processing data generated by ASC. The first thing that happens at this stage is the production and formal launch of the ASC report, which presents data collection methods, findings and challenges encountered during the census. The report, with summarised data, is published on the MBSSE website where it can be accessed by the public. Few hard copies are made for key stakeholders in the education sector. Although access to the internet is improving in Sierra Leone, few people can afford the costs and many lack the required ICT skills to access the report online. The bulk of data generated in schools is stored on servers at district level, where the public can access it by making a request to either the Data Analyst in Freetown or the Deputy Director of Education in the district. Education data can also be accessed by contacting EMIS Situations Rooms located in all districts, via a toll-free number. Discussions with EMIS ICT Officers at district level indicated that requests for education data came mostly from NGOs and individuals operating in the sector.

Disability data in the ASC reports for the period 2015-2020 appears to be brief and no more than one page, which includes tabular presentation of the data on the enrolment of children with disabilities by sex and by class, categories of disability among school children by district/local council, the accessibility of WASH facilities and the availability of ramps and railings.

Additional challenges related to EMIS

The process of decentralisation is a major challenge facing EMIS. For example, interview respondents explained that the functions and management of basic and secondary education had been devolved to district councils. EMIS, however, remains heavily centralised, which means that the data collected at the school level had to be collated in a single designated data warehouse, which is time consuming, not cost effective and could cause data losses during the data transfer. This happened during the 2020 annual school census, when data losses were reported by ministry officials (16, 32).

Study participants further noted that decentralising EMIS would involve transferring some functions around data management to the districts and, if possible, to schools. This could bring positive results, as local stakeholders are the key decision-makers for education and should be in control of their data. Some participants, however, cautioned that decentralised processes could lead to data fragmentation. To prevent this from happening, data should be integrated at central level to facilitate data sharing, coordination, comparisons and strategic decisions for the entire country (33, 34).

Some study participants also spoke about additional education data collected in real-time, but this was done largely within individual projects supported by development partners and using different data collection platforms. For example, QAOs said that they were required to collect data using tablets and a software called Tangerine, as

part of the performance-based financing scheme under the Let's Learn project funded by the UK AID and implemented by Mott MacDonald. UNICEF collected similar data but used another data collection platform, EduTrac. Both projects collected data on pupil attendance, teacher presence and the use of lesson plans. All data was uploaded into servers operated by Mott MacDonald and UNICEF, and was used for the purpose of paying performance incentives to the participating schools.

Furthermore, a parallel database - Education Data Hub - is maintained by the Directorate of Science, Technology and Innovation, which sits within the Office of the President. Like EMIS, the primary source of data for Education Data Hub is the ASC. The Education Data Hub is, however, able to process, package and present data in a more innovative and user-friendly way compared to the outputs produced by EMIS. Study participants argued that the superior performance of the Education Data Hub could be due to the level of political and financial support this system receives. The current Education Sector Plan aims to strengthen EMIS and transform it into a one-stop-shop for processing and disseminating education data. However, at the time of the study, the plans and timeframes for implementing this strategy were unclear.

SABER-EMIS assessment

The assessment of EMIS followed the structure of the World Bank SABER-EMIS framework and included four broad categories: enabling environment (policy area 1); system soundness (policy area 2); data quality (policy area 3); and data utilisation (policy area 4). Each policy area was further broken down into several sub-goals, which are described in the sections below. The scores in each category were assigned by the study team based on the data gathered and analysed. The overall scores assigned for each policy area of the SABER-EMIS framework are shown in Table 3 and more detailed scores by policy sub-goals are shown in Annexe 8.

Table 3: Summary of EMIS scores by SABER policy area

SABER-EMIS policy area	Scores			
	1 (Latent)	2 (Emerging)	3 (Established)	4 (Advanced)
Enabling environment		35%		
System soundness	25%			
Data quality		37.8%		
Data utilisation	25%			

Below, we summarise the key strengths and weaknesses of each policy domain of the EMIS framework, which helps to explain the score.

Policy area 1: Enabling environment

The enabling environment of EMIS was assessed based on the five sub-goals in the table below and scored 35% overall, indicating that this policy area is at the emerging stage.

Table 4: Enabling environment – sub-goals assessed

Sub-goals	Legal framework/policy guiding EMIS operation
	Policies on inclusive education and gathering disability data
	Dedicated budget
	Human resources
	Understanding of disability and disability data collection guidelines at school level

The strengths and weaknesses of this policy area are discussed below.

Key strengths

1. **Establishment of EMIS** EMIS was established in 2006 with the aim to house education data in a central warehouse where it could be easily accessed by the government and its partners to monitor and improve the performance of the education sector. EMIS is a platform for collecting and presenting ASC data.
2. **EMIS as a unit** The EMIS unit is established under the Directorate of Planning and Policy in MBSSE. It is therefore an established body in the overall structure of MBSSE.
3. **Recognition and acceptance** EMIS is recognised in several policy documents, including the Medium-Term National Development Plan, the Education Sector Policy, the Radical Inclusion Policy and the National Innovation and Digital Strategy. These policy documents perceive EMIS as a key management tool for monitoring education objectives and outcomes.
4. **Financing the operation of EMIS** There are some resources to support EMIS within the budget of the Directorate of Planning and Policy and through the support of the development partners.
5. **Inclusion in education** Equity and inclusion in education is recognised in several legal and policy frameworks, including the 1991 Constitution of Sierra Leone, the 2004 Education Act and the Disability Act of 2011.
6. **Guidelines for data collection** The Directorate of Planning and Policy published a document called Data Dictionary of Education: Concepts and Terms, which serves as a guide and reference for compiling education data during the school census which is available on the MBSSE website. There is also an unpublished step-by-step guide on how to fill in the ASC form.
7. **Regional EMIS policy** In the absence of a national policy for operating EMIS, MBSSE uses the EMIS Norms and Standards Assessment Framework (ENSAF) as the guiding policy for EMIS. ENSAF was developed by the Association for the Development of Education in Africa (ADEA) to guide the establishment and management of education databases in Africa.

Key weaknesses

1. **Lack of national policy** - The operation of EMIS in Sierra Leone is not guided by a national policy, although the process for developing one has been initiated.
2. **Lack of financial resources** - No dedicated budget has been set aside to finance the operations of EMIS, although MBSSE officials informed us that the system is funded from the budget of the Directorate for Planning and Policy. Resources allocated by the government to EMIS are not sufficient and the system is dependent financially on key donor agencies, which is often short-term and unsustainable.
3. **Unsustainable human resources** - The key personnel supporting EMIS are contracted on a short-term basis and paid by the development donors. There is donor expectation that staff will be transferred to the government payroll but

at the time of the study, there was no evidence that it was happening in practice.

4. **Limited understanding of disability at school level** - Disability data collected in schools is limited to certain categories of impairments and the number of children with disabilities disaggregated by sex. We found that the understanding of how to assess disability varied across teachers and schools, and the types of disability recorded were limited to visible and most evident impairments. The assessment of disability was based primarily on the opinion of the headteachers in primary schools and class teachers in secondary schools. There was no evidence that this process was standardised in any way.
5. **Limited availability of guidelines for data collection** Although the key guiding documents on how to conduct the ASC have been issued, they have not been widely circulated to schools, particularly those in rural communities. Many head teachers therefore find it difficult to complete the ASC form independently.

Policy area 2: System soundness

System soundness scored 25%, demonstrating that this aspect of EMIS is still at the basic level of evolution. The four sub-goals in Table 5 were used for scoring.

Table 5: System soundness – sub-goals assessed

Sub-goals	Data architecture
	Data coverage
	Data on learners with disabilities and supporting environment
	Periodic maintenance of the system

Key strengths

1. **Data architecture** EMIS has evolved from paper-based data collection to a digital platform, using tablets/smartphones supported by SurveyCTO. SurveyCTO can collect data offline, which can be uploaded into a designated server when the tablet/smartphone is connected to the internet (27). The software has the capacity to monitor inconsistencies and the quality of incoming data, and can alert administrators to suspicious and incomplete data collection forms. Additionally, it has an in-built system for cleaning data in preparation for data analysis. Once data is cleaned, it can be exported into either Stata or Microsoft Excel for data analysis and visualisation (35, 36).
2. **Unique EMIS code** Every school in the country has a unique identifier EMIS number, which is connected to a school's GPS coordinates. This arrangement

facilitates spatial mapping of all schools in the country and eliminates double counting of schools with the same or similar names.

3. **Disability data in annual school census** ASC is performed annually at all levels of education, has a high level of coverage and provides comparable data on school enrolment. The census collects some disability data - largely the number of children with disabilities enrolled in schools disaggregated by sex, class and type of impairment. Periodically, school accessibility data is also collected on ramps, railings, WASH facilities, educational materials and assistive devices.
4. **Availability of servers** - Data collected during the ASC is uploaded directly into the EMIS server at district level from where it is transferred to the central data warehouse and exported into Microsoft Excel for analysis and dissemination. The study confirmed the availability of servers in Freetown and the study districts, and probably all districts in the country.

Key weaknesses

1. **Lack of capacity to collect and update individual-level data** - The ASC is the only source of data that gets into EMIS, and data is presented in aggregated format. It takes on average four to five months to publish the ASC results; EMIS at present does not have the capacity to collect and store individual-level data or get updates in real time throughout the academic year.
2. **Limited data on children with disability** - Data on learners with disability in EMIS is limited to a few categories of impairments and is provided in the aggregated format. There is no data on individual child characteristics or their family background, which makes it difficult to understand the diversity of this group of learners and the intersectionality of disability with other characteristics (age, socio-economic status, parents' background etc). This summarised format of the disability data does not provide detailed information to enable schools to plan adequately for the teaching and learning of children with disabilities.
3. **Poor internet connectivity** - Poor connectivity and the inability to regularly upload the data collected increases the workloads and costs of census enumerators, who have to travel to other locations to upload the data and thus, slow down the ASC.
4. **Servers not linked up** - At the time of the study, district servers were not linked up via any network and therefore not communicating with one another. MBSSE has plans to connect the servers via a network but until then, most of the education data collected from schools is stored in individual districts.
5. **Limited capacity for storing data** - Space on the Cloud acquired by MBSSE to store census data is limited. As a result, data is often stored on laptops or tablets making it vulnerable to data corruption, loss or theft.
6. **Lack of regulations for maintenance of EMIS** - Although routine maintenance of the EMIS system is performed, the study did not find any evidence of the maintenance policy, guidelines, schedules or reports.
7. **Parallel education databases** There are parallel platforms for real-time data collection in the education system, including the UK AID-funded software Tangerine, the UNICEF-funded data collection platform Edutrak and the Education Data Hub maintained by the Directorate of Science, Technology

and Innovation in the Office of the President. These parallel systems and processes lead to data fragmentation, duplications and inefficiencies.

Policy area 3: Data quality

This policy area scored 37.8% using four sub-goals listed in Table 6.

Table 6: Data quality - sub-goals assessed

Sub-goals	Methodological soundness
	Accuracy and reliability
	Quality of disability data
	Timeliness

Key strengths

- 1. Rigorous planning for ASC** Planning for ASC is led by the Director of Planning and Policy Directorate in MBSSE, who consults with the Minister and Chief Education Officer and brings together other directors and senior members of staff. The planning process is methodologically rigorous and sound, and involves many education and data experts, including Statistics Sierra Leone, the National Civil Registration Authority, local councils, development partners and NGOs operating in the education sector.
- 2. Methodological soundness** The Ministry has published two documents to guide data collection with a view to ensuring methodological soundness and collection of quality data. The DPP published the Data Dictionary of Education: Concepts and Terms to serve as a guide and reference point for compiling education data. There is also an unpublished document of a step-by-step guide on how to complete the school census form.
- 3. Periodic review of the ASC form** The ASC form is reviewed annually to add new data areas based on emerging issues in the education sector.
- 4. Training for data collection** Enumerator and supervisor training is an important component of the planning phase, which is part of the quality assurance process.
- 5. Data on accessibility** The ASC form collects disability data, and in some past school censuses there were provisions for collecting data on the accessibility of different school buildings.
- 6. Consultation with class teachers** In junior secondary schools, principals involve classroom teachers in collecting disability data. This involves class teachers presenting disability data from their classes, which is discussed and agreed. Agreed data is then submitted to the principal, who compiles for the whole school. This level of consultation in junior secondary schools improves the completeness and accuracy of the disability data.
- 7. Quality control checks** A number of quality assurance checks have been built in the data collection process. These include: a) every school has an EMIS code, a unique identifier linked to the school's GPS coordinates, with software that opens up only when the GPS location is captured on the tablet; b) the numbers reported by the headteachers are expected to be verified by a

headcount during the QAOs' verification visits to the schools; and c) during data collection, technicians and IT officers working in the central warehouse monitor all census forms uploaded into the system. For every anomaly identified, the enumerator and supervisor concerned are contacted immediately to rectify any mistake identified.

Key weaknesses

1. **Issues with accuracy and reliability of data** Data quality-control measures instituted by MBSSE are often bypassed by enumerators. Verification of data and physical headcounts, for instance, are often limited to schools that can be easily reached by QAOs. For schools in remote locations that are not easily accessible, enumerators rely on information given to them in the census forms, which are either collected via telephone or sent via other teachers to the District Education Office, where data is transferred to tablets.
2. **Limited understanding of disability** Teachers' understanding of how to collect disability data varies. The assessment in primary school is based on the knowledge and understanding of disability by headteachers and limited consultations with other teachers. In addition, the census form is designed to collect limited data on disability; mainly, the number of categories of impairments (as listed in the ASC form) which focus primarily on visible and most evident types of impairments. Furthermore, there is no evidence of any standardised process in collecting disability data.
3. **Work overload** Census enumerators and supervisors are often overwhelmed and experience heavy workloads, and have to travel to a large number of schools over a limited period of time. Accessing schools in distant and remote locations is often difficult, and at times impossible. As a result, QAOs modify the agreed data collection process, omit the data verification procedures and rely entirely on data provided by the school.
4. **Bypassing quality control mechanisms** The established quality assurance checks are often bypassed, particularly for schools in remote locations with difficult terrain or other circumstances which prevent enumerators from accessing schools for the purpose of data verification.
5. **Issues with timeliness of ASC findings** Data collected during the ASC often takes four to five months to get published. Considering the rapid changes taking place in the education sector, including increasing enrolment numbers, data collected from schools gets quickly outdated. In all the schools where FGDs were conducted, respondents provided information that large number of pupils get enrolled in schools after the census has been completed. While these increases are captured at school level, they are not reflected in enrolment figures at district or national levels, which affects the quality and accuracy of education data.
6. **Lack of consultation in collecting disability data** In primary schools, data on disability is collected based on the knowledge and opinion of the headteacher, who has less interaction with children than classroom teachers. Considering that primary schools account for more 60 per cent of schools in

the country, this approach makes data on disability less complete and accurate.

Policy area 4: Data utilisation

Data utilisation was assessed based on sub-goals (Table 7 below) and scored 25% or latent on the SABER-EMIS framework.

Table 7: Data utilisation - sub-goals assessed

Sub-goals	Data driven culture in MBSSE
	Openness
	Operational use
	Accessibility
	Effectiveness in disseminating findings

Key strengths

- 1. Access to the ASC report** - The report based on the ASC data is published on the MBSSE website, where it can be accessed by the public and education sector stakeholders.
- 2. Access to district-level data** - Data generated from schools and stored on servers at district level can be accessed by the public and stakeholders by making a request to either the Data Analyst in Freetown or the Deputy Director of Education in the district, or by contacting EMIS Situations Rooms located in all districts, via a toll-free number.
- 3. Information on facilities in schools** - Disability data presented in the ASC report includes data on the enrolment of children with disabilities by sex, grade, district and type of impairment, as well as the accessibility of WASH facilities and the availability of ramps and railings (in some years).

Key weaknesses

- 1. Limited access to the ASC report** - The ASC report is published on the MBSSE website, with circulation of hard copies limited to MBSSE officials and key partners operating in the education sector. Considering the limited access to the internet and low ICT skills in Sierra Leone, the number of people and organisations that can access the census report is limited (37).
- 2. Limitations in using data for planning purposes** - As MBSSE does not collect real-time data to capture and reflect any changes that take place throughout the academic year, the data available is neither timely nor accurate for the purpose of planning and decision making.
- 3. Limited use of disability data** - The disability section in the ASC report is limited to one page and only a few indicators.

4. **Availability of data and decision-making processes are not synchronised** - Basic and senior secondary education in Sierra Leone has been devolved to the local councils, but EMIS is heavily centralised and the data across schools is primarily available in a single warehouse limiting the use of data by local stakeholders.
5. **Insufficient demand for education data** - Discussion with EMIS ICT Officers indicated that requests for detailed education data comes mostly from NGOs and individuals providing education services, and that requests from policy makers were minimal.

Discussion and conclusions

This study set out to review the performance of EMIS in Sierra Leone and to establish the extent to which disability data is included in the database.

The study revealed that overall, EMIS in Sierra Leone is at the emerging stage of development and while it is a major government priority, there are several weaknesses within the system that need to be addressed in order to maximise its overall performance and effectiveness. System weaknesses have been identified across all four domains of the SABER-EMIS framework: enabling environment, system soundness, data quality and data utilisation.

There is a strong policy environment supporting the development of EMIS in Sierra Leone; the system has been in place for over 15 years and is an important national platform for collecting and presenting education data from the entire country. EMIS collects data from all schools at pre-primary, primary, junior secondary and senior secondary levels and is updated annually through the Annual School Census (ASC). At present, however, EMIS effectively equates to the ASC; it presents data on the indicators included in the census form and only in the aggregated format. EMIS does not contain any individual student data. The system allows for monitoring trends in school enrolment over time, but publication of ASC findings can take four to five months, meaning data collated at central level can quickly become outdated. No changes which occurred in schools throughout the academic year can be reflected in EMIS in real time.

The ASC follows a rigorous process and involves a large number of stakeholders, including those at senior level. ASC enumerators and supervisors are trained annually. There are rigorous quality assurance checks and data verification built into the ASC; however, these checks are not always implemented, particularly in remote areas and schools which are difficult to reach. There are deviations from the rigorous census methodology in these situations, when census enumerators cannot travel to schools, have heavy workloads or are pressed for time to complete the census.

The ASC form is updated annually in response to emerging issues in the education sector and there are guidelines on conducting the ASC and completing the census forms. However, these are not circulated widely within districts and are not always available in rural areas and schools in remote locations.

Disability data collected during the ASC is limited to a few indicators and only the most visible types of impairments. There is limited understanding of disability and how to assess it at school level, and thus the process of data collection varies greatly. Disability data exists primarily in the aggregate format, limiting its use for planning and monitoring purposes.

Any integration of disability data within EMIS will only be possible if the overall EMIS system is significantly strengthened. The system should be strengthened across all dimensions of the SABER-EMIS framework.

To improve the enabling environment:

- Develop a normative base, which regulates the operation and maintenance of EMIS at different administrative levels.
- Ensure a sufficient dedicated budget to finance all aspects of EMIS and its support.
- Ensure qualified human resources are deployed on sustainable long-term contracts.
- Make guidelines on how to complete ASC forms simple and make them widely available across the country.
- Develop consistent guidelines and training on how to collect disability data.

To improve system soundness:

- Explore ways of how to collect, maintain and regularly update individual-level data, including data on functional difficulties and other children's characteristics.
- Consider the number of disability data indicators required regularly or periodically to support the planning of inclusive education at different levels.
- Improve internet connectivity at schools and at different administrative levels.
- Link up and improve the inter-operability of district-level servers.
- Increase the capacity for education data storage.
- Ensure regular maintenance of EMIS at different levels.
- Align different systems and processes for collecting educational data, and streamline all data collection through EMIS.

To improve data quality:

- Ensure ASC data verification in difficult-to-reach locations, and ensure data enumerators have sufficient time and resources to visit remote schools.
- Ensure quality-control measures are in place and strictly followed.
- Ensure teachers who are in close contact with children are trained and involved in collecting disability data in all schools.
- Develop mechanisms for a regular update of education data throughout the school year.

To improve data utilisation:

- Ensure that the ASC report is available to decision makers and education stakeholders in an appropriate and accessible format at all levels.
- Make sure that education data is available to decision makers and education stakeholders when and where they need it.
- Build the capacity of education stakeholders to understand and regularly use education data.

Appendices

Appendix 1: IDI guideline for senior officials of MBSSE

Background to EMIS

- What do you think prompted the establishment of EMIS?
- From your experience, how do think EMIS is achieving the purpose for which it was established?

Disability data on EMIS

- Please describe the process involved in collecting and processing data on disability.
- How is the quality of data on disability monitored and assured?
- What processes does data on disability go through before inclusion on EMIS?

Annual school census (ASC)

- What is the purpose/objective(s) of ASC?
- Who are the major stakeholders in ASC and what are their responsibilities/roles?
- What preparations are made to make ASC effective?
- What are the main stages in ASC and what happens at each stage?
- How is data on disability collected during ASC?
- As a stakeholder in ASC, how do you ensure that data is of high quality?
- How do you ensure that data on disability is also of high quality?
- What do you think the government is doing to ensure that data on disability is included in education statistics?
- Based on your experience, what challenges have you encountered during ASC?
- How do you think these challenges can be addressed?

SABER-EMIS Policy area 1: Enabling environment

- Tell me about the policies that regulate the existence and operation of EMIS?
- Please tell me about the policies/guidelines that regulate the inclusion of data on disability on EMIS.
- How are these policies/guidelines (on the inclusion of data on disability) monitored?
- How is the operation of EMIS funded?
- Please describe your role in the operation of EMIS.
- How do you think EMIS is contributing to education in Sierra Leone?
- What types/mix of personnel are required to effectively operate EMIS?
- How does the public access and retrieve data from EMIS?

SABER-EMIS Policy area 2: System soundness

- Tell me something about the hardware and software components of EMIS?
- How are the above components of EMIS acquired?
- Please describe the existing procedures for the periodic maintenance and upgrades of EMIS?
- What provisions have been made for people with disabilities to access data on EMIS?
- Based on your experience, how has EMIS evolved over the years?

SABER-EMIS Policy area 3: Data quality

- What are the major sources of data presented on EMIS?
- Please describe the effectiveness of EMIS during peak periods of data flow.
- How is data processed and scrutinised for quality before being inputted into EMIS?
- Specifically, how is data on disability scrutinised for quality before inclusion on EMIS?
- How is data quality on EMIS maintained until it gets to users?
- How do you monitor/measure user satisfaction?

SABER-EMIS Policy area 4: Data utilisation

- How does EMIS affect your work in MBSSE?
- How do you think EMIS is contributing to decision making/policy formulation in MBSSE?

Emerging issues

- Which other institutions operate education databases in Sierra Leone?
- What is the relationship/linkage between MBSSE and these education databases?

Appendix 2: IDI guideline for ICT Officers and Quality Assurance Officers

Background to EMIS

- What do you think prompted the establishment of EMIS?
- From your experience, how do you think EMIS is achieving the purpose for which it was established?

Disability data on EMIS

- Please describe the process involved in collecting and processing data on disability.
- How is the quality of data on disability monitored and assured?
- What processes does data on disability go through before inclusion on EMIS?
- To what extent is data on disability disaggregated on EMIS?

Annual school census (ASC)

- Who are the major stakeholders in ASC and what are their responsibilities/roles?
- Please describe your role during ASC.
- As a stakeholder in ASC, how do you ensure that data is of high quality?
- As a stakeholder in ASC, how do you ensure that data on disability is of high quality?
- Based on your experience, what challenges have you encountered during ASC?
- How do you think these challenges can be addressed?

SABER-EMIS Policy area 1: Enabling environment

- Tell me about the policies that regulate the operation of EMIS?
- What policies regulate the inclusion of data on disability on EMIS?
- Please describe your role in the operation of EMIS.
- What types/mix of personnel are required to effectively operate EMIS?
- How does the public access and retrieve data from EMIS?

SABER-EMIS Policy area 2: System soundness

- From a technical perspective, please describe the hardware and software components of EMIS?
- How are the hardware and software components of EMIS acquired?
- Please describe the existing procedures for the periodic maintenance and upgrades of EMIS.
- Please describe the EMIS defence system against malicious attacks?
- From a technical perspective, how has EMIS evolved over the years?
- How is data protection and confidentiality ensured on EMIS?
- What provisions have been made for people with disabilities to access data on EMIS?

SABER-EMIS Policy area 3: Data quality

- What are the major sources of data presented on EMIS?
- Please describe the effectiveness of EMIS during peak periods of data flow.
- How is data processed and scrutinised for quality before being inputted into EMIS?
- How would you describe the quality of data produced by EMIS?
- How would you describe the quality of data on disability produced by EMIS?
- How is data quality on EMIS maintained until it gets to users?

SABER-EMIS Policy area 4: Data utilisation

- How does EMIS affect your work in MBSSE?
- How is EMIS contributing to decision making/policy formulation in MBSSE?
- How is access (and data retrieval) to EMIS regulated and monitored?
- How do you measure user satisfaction?
- Who are the major users of EMIS?

Emerging issues

- Based on the advancement in ICT, how has EMIS evolved over the years?

Appendix 3: IDI guideline for development partners

Support to MBSSE

1. Please describe the type(s) of support your institution has given to MBSSE over the past few years.
 - Annual School Census
 - EMIS: HR (funding staff), hardware (laptops, tablets), software (Survey CTO, etc)
2. What do you see as your achievements over the years?
3. Looking back on your involvement, what opportunities exist for MBSSE to fund (and sustain) these interventions without external support?

Accessing EMIS

4. How do you get data for planning your education projects?
5. Have you ever used data from EMIS for decision making and planning?
6. If yes, what was your experience?
7. If no, why not?
8. How can the quality of data produced by EMIS be improved?
9. What are the strengths and weaknesses of EMIS?
10. How can the strengths be maximised, and weaknesses minimised?
11. What recommendations do you have for improving the effectiveness/ performance of EMIS?
12. Apart from EMIS, where else do you get data for planning your education projects?

Appendix 4: IDI guideline for competing databases

Collaboration with MBSSE

- Please describe your collaboration with MBSSE in the past.
- How would you describe the achievements of this collaboration?
- Looking back on your involvement, what opportunities exist for MBSSE to undertake the above areas of collaboration without external support?

Accessing EMIS

- How would you describe education data management/EMIS in MBSSE?
- How often do you retrieve data from EMIS for decision making and planning?
- Please describe the nature and quality of data on disability on EMIS.
- Please describe your experience in visiting and retrieving data from EMIS.
- What do you think are the strengths and weaknesses of EMIS?
- Based on your experience, how can the quality of data on EMIS be improved?
- How would you describe the quality of data on disability on EMIS?
- Based on your experience, what additional data would you like to see on EMIS?
- Apart from EMIS, where else do you get data on education and disability?

Appendix 5: FGD guideline for teachers

Annual School Census (ASC)

- Please tell me about the importance of ASC and its contribution to education in the country.
- How is data on disability included in the ASC?
- Who do you think are the major stakeholders in ASC?
- Please describe your role in ASCs in past years.
- Looking back on your involvement, how were you prepared to effectively participate in ASC?
- Please describe the main stages involved in ASC.
- Please describe the process of data collection.
- Please describe how you have ensured that the data you have handled was of high quality.
- How have you also ensured that data collected on disability was of high quality?
- Looking back on your involvement in ASC, what challenges have you encountered?
- Please describe how you addressed those challenges.
- After completion of ASC, how do you receive feedback from MBSSE?

Data on disability

- How would you describe disability data?
- How is disability data collected during ASC?
- Why do you think it is necessary to collect data on disability during ASC?
- How did you ensure that data collected on disability was of high quality?

Education Management Information System (EMIS)

How would you describe EMIS in MBSSE?

Appendix 6: SWOT analysis discussion guideline

SWOT analysis of EMIS

SWOT is a situation analysis tool used for the identification and critical evaluation/analysis of organisational strengths, weaknesses, opportunities and threats. The tool is simple to apply and findings from it can be used for decision making for policy and planning (48). The SWOT framework has been applied in order to benchmark and even evaluate the effectiveness of EMIS (21).

Aim To improve/increase the understanding of EMIS through a thorough analysis of the existing situation. Specific objectives include the following:

- Critically analyse the strengths and weaknesses of EMIS and how these impact the effective operation of EMIS.
- Critically analyse the opportunities and threats and how these affect the effective operation of EMIS.

Guideline

- Strengths and weaknesses are internal factors and **can be controlled by MBSSE**.
- Opportunities and threats are external; **MBSSE has little or no control over them**.

Analysis will be done with reference to the following areas of EMIS: a) enabling environment, b) system soundness, c) data quality and d) data utilisation.

Guidelines for open discussion

Strengths (help the achievement of desired goals)	Weaknesses (prevent achievement of desired goals)
<ul style="list-style-type: none"> ▪ What is EMIS good at? ▪ What does EMIS do well? ▪ How do we measure what EMIS does well? ▪ How do people outside MBSSE measure what EMIS does well? ▪ What can be done to improve and preserve/sustain the strength of EMIS? 	<ul style="list-style-type: none"> ▪ What barriers limit the effectiveness of EMIS? (policy, human, financial, technological etc) ▪ How do outsiders perceive the weakness of EMIS? ▪ What can be done to remove weaknesses or minimise their impact on the effectiveness of EMIS?
Opportunities (trends outside MBSSE that could be used to improve the operation of EMIS)	Threats (obstacles outside MBSSE that could limit the effectiveness of EMIS)
	<ul style="list-style-type: none"> ▪ What makes EMIS look ineffective? (Competing education data databases)

- | | |
|--|---|
| <ul style="list-style-type: none">▪ What is out there that MBSSE can use to improve the effectiveness of EMIS?▪ How can these opportunities be transformed into strengths for EMIS? | <ul style="list-style-type: none">▪ What are competing education databases doing better than EMIS?▪ What can be done to minimise the impact of threats on the effectiveness of EMIS? |
|--|---|

Process Discussions will be recorded and transcribed.

Participants Eight (includes six MBSSE staff working directly with EMIS, Eric Musa and Steven Kaindaneh).

Appendix 7: SWOT analysis of EMIS - outcome of discussions

Strengths

1. **Tablets/smartphones provided in senior secondary schools** Principals in all senior secondary schools around the country have been provided with tablets/smartphones with Survey CTO software installed. Principals were trained to use the tablet and software to enable them to collect and upload data on their own schools during the Annual School Census.
2. **Servers have been provided in all districts** Servers have been installed in all District Education Offices, although these are not connected by any network to communicate/speak to each other and enable MBSSE staff across the country access education data in all districts. In the absence of wide area connectivity, servers are used to store district-level education data.
3. **Strong collaboration with competing education databases** There is a good working relationship between EMIS and competing databases, such as the education datahub of DSTI and LWL/Mott MacDonald (Tangerine) and UNICEF (Edutrac). Despite the relationship, Education Datahub, Tangerine and Edutrac operate independently of MBSSE EMIS.

Weaknesses

1. **Absence of an EMIS policy and budget** Institutional policies provide the legal framework and guidelines for an entity to exist and operate. EMIS presently does not have an operating policy, which is one of the requirements that makes EMIS effective. Additionally, there is no budget dedicated solely to the operation of EMIS. According to the SABER-EMIS framework, both a policy and a budget are required to make EMIS Sierra Leone comparable to that of other countries.
2. **Dormant servers** Servers have been installed in all districts to support the EMIS infrastructure, but they are not operational.
3. **Frequent power outages** Electricity power outages are common in Freetown and the districts. Power inconsistencies render the servers and other equipment installed to support the operation of EMIS ineffective. In some districts, Mott MacDonald installed generators to support the data collection activities of its project Leh we Learn (LWL). LWL will be phasing out in March 2022, and there are already issues with the running and maintenance of these generators after the project is phased out.
4. **Low bandwidth internet connectivity** Internet connectivity was raised by many respondents as a challenge affecting data upload during the Annual School Census. Low bandwidth does not only affect the uploading and processing of data, but it also affects the dissemination of products from EMIS.
5. **Security and maintenance of tablets/smartphones** The security and maintenance of tablets was raised by headteachers and MBSSE personnel. Tablets are attractive

	<p>items in Sierra Leone, and are often targeted by petty criminals. Recipients are extra vigilant to protect what they describe as ‘government property’.</p> <p>6. Poor IT skills among headteachers Most headteachers in secondary schools who received tablets have limited IT skills to operate them effectively. During data collection, we discovered that headteachers with limited skills have partnered with one of the teachers who operates the tablet well. However, challenges arise when something is required and the skilled teacher is not around. Overall, those who received the tablet are not the ones actually using it.</p>
<p>Opportunities</p> <ol style="list-style-type: none"> 1. Education databases within MBSSE Rich education databases exist within the various arms of MBSSE. For instance, the Sierra Leone Teachers Union (SLTU), Teaching Service Commission (TSC) and the Ministry of Technical and Higher Education maintain the records of teachers (in the areas of qualification and training) and assessments for higher learning. This data can be exported into EMIS to build a comprehensive education database which can be accessed on a single platform. 2. Education databases outside MBSSE Other institutions in the country operate well-established databases on education. These include the Directorate of Science, Technology and Innovation (DSTI), Statistics Sierra Leone and the West African Examination Council. EMIS can reach an agreement with these institutions to create links where data from these competing databases can be accessed easily within EMIS. 	<p>Threats</p> <ol style="list-style-type: none"> 1. Security of data Most of the data managed under EMIS is stored in personal computers and external hard drives where it can be easily accessed and tampered with. 2. Sustainability of funding EMIS is heavily dependent on external/donor funding and benefits very little from government budgetary allocations. Any attempts by donors to withdraw or minimise funding to EMIS will impact on the operation of EMIS for some time. 3. Human resource concerns This threat is directly related to the funding issue discussed above. Most, if not all, EMIS technical staff and those in situations rooms across the country are on short-term contracts and paid by donors. During data collection, some MBSSE staff expressed concerns about job insecurity, and this could dampen their morale and performance. If for any reason donors withdraw funding, the departure of affected staff will cause major disruptions in the operation of EMIS.

Appendix 8: Detailed score by policy area and sub-goal

Table 9: Detailed score by policy area and sub-goal

Policy area 1: Enabling environment (35%) - Emerging					
Sub-goal	Present status on EMIS	Score (%)			
		Latent	Emerging	Established	Advanced
1. Legal framework/guiding policy for EMIS operation	<p>EMIS is named as a government priority in a number of policy documents, but there is no formal policy on EMIS operationalisation. EMIS Norms and Standards Assessment Framework (ENSAF) is used as the guiding policy.</p> <p>There are two guiding documents to conduct ASC, but they are not widely circulated and often not available in rural and remote schools.</p>	25			
2. Policies on inclusive education and gathering disability data	Inclusive education is named as a priority in a number of legal and policy frameworks, including the radical inclusion policy.		50		
3. Dedicated budget	There are resources to conduct ASC and support EMIS from the government and development partners, but the resources are thought to be insufficient; EMIS is	25			

	dependent on funding from external sources, which is often short-term and unsustainable.				
4. Skilled and experienced human resources	<ul style="list-style-type: none"> ▪ There is an EMIS coordination unit in MBSSE. ▪ Experienced EMIS staff are available in all locations. ▪ EMIS staff (excluding Deputy Director EMIS) are on short-term contracts paid by international donors. 		50		
5. Understanding of disability and data collection guidelines at school level	<ul style="list-style-type: none"> ▪ There is no standardised approach to identify or assess disability across schools. ▪ Recorded disabilities are limited to visible and severe types of impairments included in the ASC form. ▪ At primary school level, data on disability is collected based on an assessment of the headteacher and are considered subjective. 	25			

Policy area 2: System soundness (25%) - Latent

Sub-goal	Present status on EMIS	Score (%)			
		Latent	Emerging	Established	Advanced
1. Data architecture	<ul style="list-style-type: none"> ▪ Data collected via Survey CTO. ▪ Data exported and analysed via MS Excel. ▪ Data servers are not linked up. ▪ Data is partly stored on the Cloud due to the limited space available; the use of hard drives as alternatives leads to data corruption and loss. 	25			
2. Data coverage	<ul style="list-style-type: none"> ▪ ASC is the only source of data for EMIS; no real-time data. ▪ ASC report high summarised and published on MBSSE website. 	25			
3. Collects data on learners with disabilities and supporting environment	<ul style="list-style-type: none"> ▪ ASC collects limited disability data. 	25			
4. Serviceability	No maintenance policy	25			

Policy area 3: Data quality (37.8%) - Emerging

Sub-goal	Present status on EMIS	Score (%)			
		Latent	Emerging	Established	Advanced
1. Methodological soundness	<ul style="list-style-type: none"> Quality controls instituted include GPS location control and back-door checks instituted, but these are often bypassed. MBSSE has a data dictionary that guides data collection, but this is not widely circulated. School enrolment to be verified via a headcount but not extended to schools in remote locations. 			75	
2. Accuracy and reliability	<ul style="list-style-type: none"> School enrolment figures are inflated to attract higher subsidy and performance-based funds. Schools in remote locations not well covered by census. 	25			
3. Quality of disability data	<ul style="list-style-type: none"> Limited skills for the identification of certain disabilities. Data on disability on EMIS is limited to a number of children with disabilities, categories of disability and sex. No data on assessments and progression for children with disabilities. 	25			

	<ul style="list-style-type: none"> Collection of disability is subjective, especially in primary schools. 				
4. Timeliness	<ul style="list-style-type: none"> EMIS relies on annual school census alone for raw data. No real-time data collected, so timeliness is questioned. 	25			

Policy area 4: Data utilisation (25%) - Latent

Sub-goal	Present status on EMIS	Score (%)			
		Latent	Emerging	Established	Advanced
1. Data driven culture in MBSSE	<ul style="list-style-type: none"> Limited use of data in MBSSE Due to limited access, few people use available education data. 	25			
2. Openness	<ul style="list-style-type: none"> Only the ASC report, with highly summarised data, is available to the public. Detailed data at district level is accessed by request, with significant delays. 	25			
3. Accessibility	<ul style="list-style-type: none"> Detailed data at district level is accessed by request, with significant delays. No specific packaging of data for people with disabilities. 	25			
4. Effectiveness in disseminating findings	<ul style="list-style-type: none"> Apart from the ASC report, data is not packaged and disseminated in other forms. 	25			

References

1. Groce NE, Trani J. Millennium development goals and persons with disabilities. *Lancet*. 2009; 374(9704):1800-1.
2. World Health Organisation. *World Report on Disability*. World Report on Disability 2011. Geneva: World Health Organisation; 2011.
3. UNICEF. *Seen, counted, included: Using data to shed light on the well-being of children with disabilities*. New York; 2021.
4. UNESCO Institute for Statistics. *Education and disability: analysis of data from 49 countries*; 2018.
5. Kuper H, Monteath-van Dok A, Wing K, Danquah L, Evans J, Zuurmond M, et al. The impact of disability on the lives of children; cross-sectional data including 8,900 children with disabilities and 898,834 children without disabilities across 30 countries. *PLoS One*. 2014;9(9):e107300.
6. Mizunoya S, Mitra S, Yamasaki I. Disability and school attendance in 15 low- and middle-income countries; 2018. 388-403 p.
7. UN General Assembly. *Sustainable development goals. SDGs), Transforming our world*; 2015; 2030.
8. Srivastava M, De Boer A, Pijl SJ. Inclusive education in developing countries: A closer look at its implementation in the last 10 years. *Educational Review*. 2015; 67(2):179-95.
9. UN Committee on the Rights of Persons with Disabilities (CRPD). *General comment No. 4, Article 24: Right to inclusive education*; 2016.
10. Husein Abdul-Hamid. *Data for Learning: Building a Smart Education Data System*. Washington DC: World Bank; 2017.
11. UNESCO. *Global Education Monitoring Report 2020: Inclusion and Education: All means All*. Paris, France UNESCO; 2020.
12. UNESCO Institute for Statistics. *The Use of UIS Data and Education Management Information Systems to Monitor Inclusive Education*; 2019.
13. Banham L, Papakosta E. *Disability and Inclusive Education: A Stocktake of Education Sector Plans and GPE-Funded Grants*. Washington DC; 2018. Contract No.: Working Paper No 3.
14. UNESCO. *The Use of UIS Data and Education Management Information Systems to Monitor Inclusive Education*. Quebec, Canada: UNSECO UNESCO Institute for Statistics; 2019.
15. Statistics Sierra Leone. *Sierra Leone Multiple Indicator Cluster Survey 2017, Survey Findings Report*. Freetown, Sierra Leone: Statistics Sierra Leone; 2018.
16. MBSSE. *2020 Annual School Census Report*. Freetown, New England Ville: Ministry of Basic and Secondary School Education; 2021.
17. Laryea-Adjei G. *The Out-of-School Children Initiative (OOSCI): Formative evaluation* UNICEF New York; 2018.
18. GOSL. *The Persons with Disability Act, 2011*. Freetown: Government Printing Press; 2011.
19. MEST. *Education Sector Plan 2018-2020*. New England Ville, Freetown: Ministry of Education, Science and Technology; 2018.
20. MBSSE. *National Policy on Radical Inclusion in Schools*. New England Ville, Freetown: Ministry of Basic and Secondary School Education; 2021.
21. Abdul-Hamid H. *What matters most for education management information systems: A framework paper*. Washington, DC: World Bank; 2014.

22. Costin C, Dar A, Benveniste L, Abdul-Hamid H. SABER - Education Management Information System: Data collection instrument. Washington DC: The World Bank Group; 2014.
23. Abdul-Hamid H. What matters most for education management information systems: A framework paper; 2014.
24. Mintz S, Saraogi N. Samoa: Education Management Information System - SABER Country Report 2015; 2015.
25. Mints S, Saraogi N, Abdul-Hamid H. Education Management Information Systems: SABER Country Report 2015. Washington DC: World Bank; 2015.
26. Hamminger L. The power of data: enhancing transparency in the education sector in Sierra Leone. Bergen, Norway: U4Brief; 2008.
27. Mothobi O, Gillwald A. ICT HH and Business Survey Field Manual; 2018.
28. UNICEF. Sierra Leone Country Report - Sierra Leone MICS Survey 2017. New York, USA: UNICEF; 2021.
29. GOSL. Sierra Leone's Medium-Term National Development Plan (2019-2023): Education for Development - Volume 1. New England Ville: Government Printing Press; 2019.
30. GOSL. Sierra Leone National Innovation & Digital Strategy (2019-2029). Freetown: Government Printing Press; 2019.
31. MBSSE. Education Information Standards Annual School Census Data Dictionary of Education - Concepts and Terms. nd.
32. Bodo S. Education Management Information System Peer Review Mission: The Gambia EMIS Peer Review based on the ECOWAS Norms and Standards Assessment Framework. Abidjan, Ivory Coast; 2018.
33. Hua H, Herstein, J Education Management Information System (EMIS): Integrated Data and Information Systems and Their Implications In Educational Management. Annual Conference of Comparative and International Education Society New Orleans, LA USA Harvard University; 2003.
34. Winkler D, Herstein J. Information Use and Decentralized Education. Washington, DC: EQUIP; 2005.
35. Aqil A, Hozumi D, Lippeveld T. Performance of Routine Information Management System (PRISM) - Using Survey CTO to Collect and Enter PRISM Assessment Data. Chapel Hill: University of North Carolina; 2018.
36. Training on Survey CTO [Internet]. 2021 [cited 18/4/2022]. Available from: file:///C:/Users/skaindaneh/Downloads/TrainingonSurveyCTO.pdf.
37. DSTI. <https://www.dstigovsl/sierra-leone-joins-giga-toward-digitization-for-all/> [Internet]. Media D, editor: DSTI; 2021.
38. Powell M, Trucano M. Rethinking Education Management Information Systems: Lessons from and Options for Less Developed Countries. InfoDev; 2006.
39. DeStefano J. Information for Education Policy, Planning, and Management: Summary of the Data Capacity Assessments Conducted in the Philippines, Ghana, and Mozambique. Research Triangle Park: RTI International; 2011.
40. Abdul-Hamid H, Saraogi N, Mintz S. Lessons Learned from World Bank Education Management Information System Operations - Portfolio Review, 1998-2014. Washington DC; 2017.
41. McBurnie C. Navigating the 'Data Revolution': A Case Study on the One Tablet Per School Programme in Sierra Leone; 2021.
42. van Wyk C, Crouch L. EMIS Guidelines for Data Management and Functionality in Education Management Information Systems (EMIS). Montreal, Quebec: UNESCO; 2020. Contract No.: Quality Education 4.

43. Agasisti T, Bowers A. Data Analytics and Decision-Making in Education: Towards the Educational Data Scientist as a Key Actor in Schools and Higher Education Institutions; 2018.
44. Custer S, King E, Atinc T, Read L, Sethi T. Towards data-driven education systems - Insights into using information to measure results and manage change. Brookings; 2018.
45. Sprunt B, Marella M, Sharma U. Disability disaggregation of Education Management Information Systems (EMIS) in the Pacific: a review of system capacity. Knowledge Management for Development Journal; 2016; 11:41-68.
46. UNICEF. Guide for Including Disability in Education Management Information Systems; 2016.
47. Abdul-Hamid H. Data for Learning: Building a Smart Education Data System. Washington DC World Bank; 2017.
48. Humphrey A. SWOT Analysis for Management Consulting. United States: SRI International; 2005.

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