



IMPLEMENTATION OF DHIS2 FOR EMIS IN ESWATINI: PIN-DRIVEN MODEL

ASSESSMENT REPORT

June 2022

AGG - Core Indicators



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Gross Enrolment and Gross Intake Ratios

GER primary level, in 2019

...

GER in primary level

125.9

GER Lower Secondary level, in 2019

...

GER in Lower Secondary level

99.3

GER Senior secondary level, in 2019

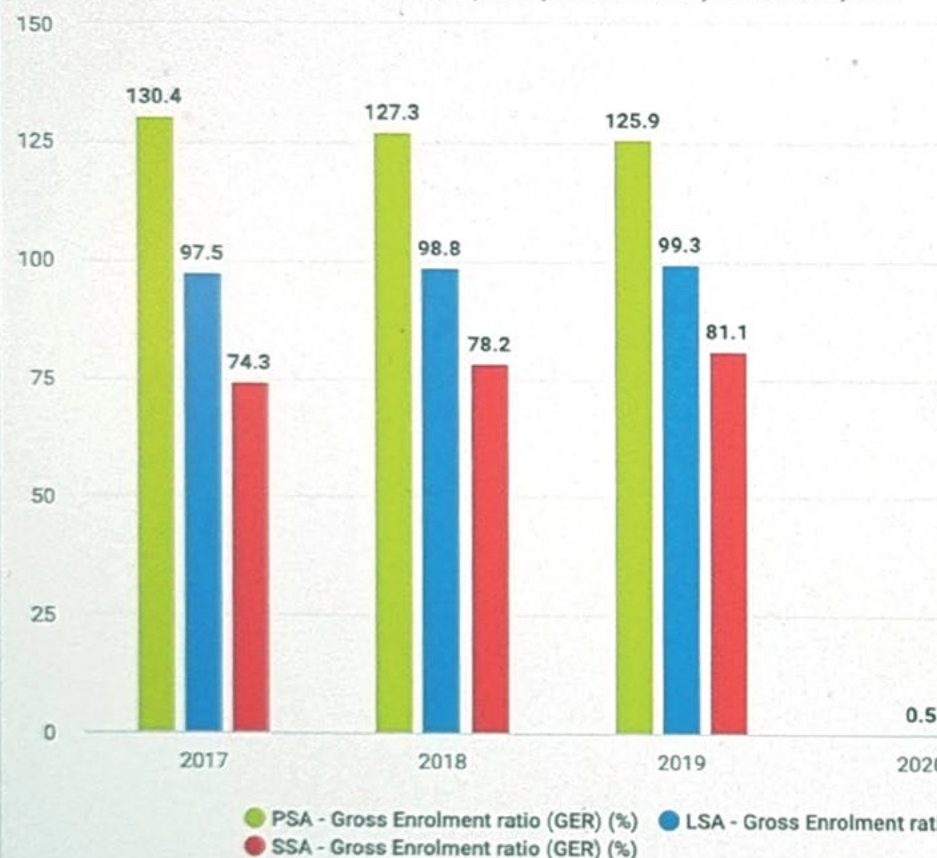
...

GER in Senior Secondary level

81.1

GER in primary and secondary level, last 5 years

GER in primary and secondary level, last 5 years



Pupil teacher ratio

PTR in primary level, 2019

...

PTR primary level by Inkundula, 2019

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ACRONYMS

AEC	Annual Education Census
API	Application Programming Interface
CoP	Community of Practice
DHIS2	District Health Information Software
ECCDE	Early Childhood Care and Development Education
EMIS	Education Management Information System
ESSP	Education Strategic Sector Plan
FPE	Free Primary Education
GPE	Global Partnership for Education
HISP	Health Information Systems Programme
INQABA	Care and Support for Teaching and Learning
ISP	Internet Service Provider
LEG	Local Education Group
MoET	Ministry of Education and Training
MICS-EAGLE	Education Analysis for Global Learning and Equity
MSC	Most Significant Change
NETIP II	National Education and Training Improvement Programme
OVC	Orphans and Vulnerable Children
PIN	Personal Identification Number
REO	Regional Education Office
RSTP	Royal Science and Technology Park
SADC	South African Development Community
SAMS	Student Administration Management System
SWANCEFA	Swaziland Network Campaign for Education for All

INTRODUCTION

Recognizing the role of education and training in socio-economic development, Eswatini has made remarkable undertakings towards providing quality education to all its citizens at all levels through formal and non-formal approaches. The policy goal for the education and training sector paves the vision of an equitable and inclusive education and training system that affords all learners access to free and quality basic education with an opportunity to continue with life-long education and training, so enhancing their personal development and contributing to Eswatini's cultural development, socio-economic growth and global competitiveness.¹

The MoET of Eswatini collects education data from its learning institutions annually through its Education Management Information System (EMIS). This data is used for policy, planning, decision making and overall monitoring and evaluation of the National Education and Training Sector Plan. EMIS operates in accordance with the Statistics Act, 1967 and the National Strategy for the Development of Statistics, and embraces the SADC EMIS Norms and Standards Assessment Framework, 2011. The National Education and Training Policy (2018) solidifies the importance of a functioning EMIS to provide timely, reliable and quality data to inform achievement of policy goals and objectives.

The current EMIS was developed in 2008, and is a centralized access-based, computer system housed in the MoET EMIS unit. Statistical data is collected on the Annual Education Census (AEC) forms from learning institutions and entered manually into the system. This data is analyzed and reports on key education indicators generated and presented in annual statistical year books. This system was not able to capture data to produce a number of indicators in new MoET priority areas such as Early Childhood Care Development Education (ECCDE), Special Needs Education (SEN), Care and Support for Teaching and Learning (INQABA), Sector Response to HIV and AIDS, Nutrition and the overall mandate of the Ministry as directed in the National Education and Training Improvement Programme (NETIP II).

Based on the need to improve efficiency, relevance, timeliness and coverage of data and in response to the sustainable development goal 4 (SDG4) that aims to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all,” the MoET sought to redevelop the EMIS into a demand response and personal identification number (PIN) driven system. It was envisaged that the PIN driven model would support tracking of individual learners and staff, interlink with other government systems and be accessible across all levels of the education system, by the MoET senior management and sub-sectors.

¹ [Eswatini National Education and Training Policy](#) (2018)

OVERVIEW OF THE DHIS2 EMIS PILOT PROJECT

In June 2020, the MoET with funding from UNICEF Eswatini, contracted the University of Oslo in partnership with HISP Uganda to support the review and upgrade of the current EMIS. The overall objective of the pilot was to redevelop/update EMIS into a PIN driven system which supports real-time response to enable efficient and effective budgeting, planning, implementing, monitoring and evaluation of MoET sector programmes.

The system was developed in a collaborative manner and involved the HISP team working with the key MoET and UNICEF staff throughout the entire process to ensure they were well-trained on system customization, use and provision of support to end users. The Covid-19 pandemic with restrictions on international travel necessitated remote initiation of the project. The project started with an online inception meeting where the consulting team shared their understanding of the terms of reference, and demonstrated how the system would be modeled for both the aggregate and individual data collection and analysis. Further clarification on the expected deliverables was provided by the MoET and UNICEF Eswatini team and relevant documentation (EMIS Review report, UNICEF EMIS System Assessment Report, Technical documentation manual for the AEC Application, Indicator Matrix and EMIS data collection instruments) was shared.

The HISP team reviewed the MoET data collection and reporting instruments, the indicator matrix and together with the MoET team, facilitated a participatory revision and update of all the data collection instruments. The revision of these instruments minimized duplication and redundancy in data collected from the different tools and included new data needs to support reporting on the SDG4 indicators.

Following revisions and update of the data collection tools, the HISP team conducted an introductory online training on DHIS2 customization and analysis for the MoET EMIS team. To further facilitate continuous capacity building and knowledge transfer, the MoET were enrolled onto the self-paced online DHIS2 Fundamentals course and continuous remote support was provided by the HISP team. An in-person training facilitated by HISP Uganda was also held in November 2020. These trainings provided the MoET an understanding of the DHIS2 data capture, analysis and presentation functionalities.

The HISP team customized the revised data collection tools into the DHIS2 to allow both aggregate and

individual data capture. In house system testing was performed and a systematic test guide developed to facilitate additional testing and feedback by the MoET EMIS team. Feedback informed bug fixing and finetuning of the system. With ease of international travel restrictions following reduction in reported Covid-19 cases, HISP Uganda and HISP Mozambique teams traveled to Eswatini from September 20th to October 8th, 2021 to deploy the system onto the MoET server, conduct in-person training for MoET, regional and school administrators and kick start the pilot implementation in Manzini region. The MoET EMIS team conducted in-person training on data capture, onsite support supervision and remote support via WhatsApp to the school focal persons.

Following completion of the pilot, there was a need to assess the project implementation, document key lessons learned and recommendations to inform the successful national scale of DHIS2 for EMIS in Eswatini.

ASSESSMENT OBJECTIVES

The overall objective was to assess to what extent the DHIS2 for EMIS pilot project in Eswatini (Manzini Region) has been successful in redeveloping/updating a PIN-driven EMIS to support real-time response for efficient and effective budgeting, planning, implementing, monitoring and evaluation of MoET sector programmes. The specific objectives were to:

- ❶ Assess the Data Management Process
- ❷ Assess the upgrade and development of DHIS2 for EMIS system
- ❸ Review the capacity and skills transfer in the management of the system
- ❹ Assess the pilot implementation
- ❺ Document challenges and lessons learnt
- ❻ Document overall recommendations for scale



ASSESSMENT METHODOLOGY

The methodologies employed included key informant interviews using semi-structured questionnaires as a guide. The team also employed observation techniques to allow trained focal persons to demonstrate their capacity in using the DHIS2-EMIS system and with digital devices in general. To elicit deeper narratives on the process and about practice change, a modified version of most significant change (MSC) technique was used interviewing two participants.

The assessment team used an adapted version of the DHIS2 Maturity Profile Model scorecard, which assesses the implementation's maturity in relation to DHIS2 as a solution. While developed with health management information systems in mind, certain categories are valuable across domains. The light touch approach and resulting scorecard can be a process continuously deployed by the MoET to allow time to interpret results and can guide country investments. An assessment debrief workshop was conducted to validate preliminary findings and elicit further considerations and recommendations from participants.

The assessment team included Amuha Monica Grace, a PhD Student at the University of Oslo and also working with HISP Uganda to support DHIS2-EMIS country implementations and Sophia Kousiakis the EMIS Project

Manager from the University of Oslo. Semi-structured interview guides were designed to guide the assessment team during interviews with central, regional and school levels, including partner interviews. The full interview list can be found in Annex 3. For ease of transcribing, some interviews were recorded. In addition, the team conducted short video interviews which will be shared with the global DHIS2 community and other stakeholders.

The team reviewed the data collection instruments, project reports, presentations, meeting minutes and strategy and policy documentation such as the Eswatini Pilot Initiation Report, National Education and Training Sector Plan (2018) and the Global Partnership for Education (GPE) Eligibility report.

ASSESSMENT FINDINGS



📷 Focal teachers at Vulamasango presenting dashboards and data capture to the assessment team.

DATA MANAGEMENT PROCESS

Harmonization of data collection tools

A participatory update and harmonization of data collection tools was carried out during the project implementation period, with the aim of incorporating different programme-specific and SDG4 data needs. The revised tools included the 16th School Day Survey, AEC for Primary and Secondary, Termly Data Collection tool, ECCDE and the Assessment tool for overall effectiveness of the school. The final harmonization and revision process included orientation of school administrators and EMIS focal persons from the 100 pilot schools on the new tools by the HISP and MoET team.

Field testing of data collection tools and an assessment of the system setup needs was conducted in three selected schools at pre-primary, primary and secondary levels, with onsite testing of the revised tools and the system. Recommendations and feedback from the field were reviewed and finally adopted, and this informed

the revision and update of both the paper tools as well as the system. The team went through the process of understanding how data was collected, what the primary data sources were, and how data fed into tools. This was documented in detail in the pilot initiation report.

It is important to note that while at Manzini regional office, old data collection tools had been printed and were ready for distribution to schools that were not part of the pilot. These schools were not oriented on the new data collection tools and data collected on these tools will not be directly captured into the DHIS2-EMIS. Moving forward it is important that schools not part of the pilot are oriented on the new data collection tools to facilitate ease of data capture into the DHIS2-EMIS.

During the assessment debrief workshop, it was noted that the AEC had not been updated to capture learner disabilities based on the Washington/UNICEF Module on Child Functioning. This is important as previous efforts to identify children and adolescents with disabilities

have relied on teachers reporting on whether a student has a “disability” and reporting on specific diagnoses or impairments. Both rely on the teacher’s knowledge of a diagnosis or on having teachers make assumptions about impairments, leading to less valid and reliable data.

The **Washington Group/UNICEF Module on Child Functioning** reflects current thinking around disability and allows production of internationally comparable data on the percentage of children and adolescents aged 2-17 years with functional difficulties in the domains of communication, hearing, vision, learning, mobility and emotions. The purpose is to identify the subpopulation at greater risk or who are experiencing limited participation in an unaccommodating environment.

With DHIS2 there is considerable ease to add new tools as additional indicator tracking needs arise, with additional data elements easily included into the system to begin reporting on the new variables. However, there is a strong need to ensure the introduction of future tools are harmonized and aligned with the primary data sources such as school registers, textbook inventory, and teacher profiles at school level. When moving to a fully digitized EMIS and streamlining the data collection process, a best and unavoidable practice is to ensure availability of paper data collection tools at school level to capture data from the primary data sources prior to entry into the DHIS2-EMIS. This is to ensure that a backup data form exists and is maintained at either school or regional level where the data is captured into the system.

Documentation and mapping of indicators to tools

The MoET team went through a process of mapping and updating key indicators inline with the new MoET and SDG4 priorities into an indicator reference matrix which highlighted the indicator, definition, purpose, education level, data required and data sources per indicator. The indicator matrix was then revised and updated together with the HISP team to include numerators and denominators. The final indicator matrix informed configuration of the key performance indicators into the DHIS2-EMIS.

UPGRADE AND DEVELOPMENT OF DHIS2 FOR EMIS SYSTEM

Learning from the past to inform the future

In February 2018 an exercise was conducted by the MoET and UNICEF Regional Office to identify priority areas for EMIS strengthening in the country. The EMIS System Assessment report found that in terms of the platform, high priority areas to address included: report generation to be automated, data cleaning and quality control checks, data archiving, database optimization, system maintenance and data usage with basic data visualization tools.

In March 2019, UNICEF contracted an independent EMIS consultant to provide technical assistance to the MoET to improve EMIS efficiency, build capacity for the EMIS staff and provide technical documentation of the existing EMIS platform. The aim was to strengthen EMIS at central and regional levels to improve evidence-based education planning and decision making for efficient resource allocation and service delivery. A key recommendation was to conduct a study tour of web-based applications like OpenEMIS, DHIS2, SAMS and compare and contrast with StatEduc and EduTrac.

Taking into account previous recommendations and cognisant of the challenges experienced in years prior, it was critical to ensure recommendations from previous assessments were taken into consideration while designing and configuring the DHIS2-EMIS system.

Therefore, a key feature of the upgraded system was that it is **needs responsive/user-based**. HISP Uganda developed a Requirement Specification Document which outlined a codified reference list of all user and system requirements to guide the process of development, testing and implementation of various stakeholders in the process of developing, testing and implementing DHIS2-EMIS for the MoET. Two modules were developed: 1) A learner/teacher tracker that responds to the **PIN driven model** requirement and 2) An aggregate Module for capturing aggregate data on annual education census form. When configuring the system the HISP team employed an agile methodology with close participation with MoET to ensure that all user requirements are incorporated in the design. This has been of high importance since if the outputs are perceived as important and useful to key actors, they will contribute to the efforts needed to keep the system running and capture reliable data that make the outputs of the system of quality and reliability.

For high quality input and to avoid duplication and redundancy, **harmonized data collection tools** were needed. Harmonized data collection tools have been customized into DHIS-EMIS for web and mobile reporting. **User-friendly presentations** using report visualizations and dashboards for various stakeholder needs were developed. The presentation of the information in the form of charts, maps, tables and single values on the dashboards makes it easily accessible and clear. Dashboards can also be configured to respond to different needs of the various stakeholders. These can also be shared and are accessible at various levels.

“ The system is easy to use and I can navigate easily through the different modules. Before, while using the paper tools, we would have to capture the profile for each learner every year. This was a very tedious and time consuming process, but with this system, I just have to capture the learner profile only once, and in subsequent years I will only capture the new information about this learner.”

Focal Teacher, Vulamasango High School, Manzini

Following the customization of the system and to ensure the desired functionality, the HISP team performed rigorous inhouse testing. A systematic test guide was developed to facilitate testing and feedback by the MoET EMIS team. Additional system testing was carried out while in the field and this feedback informed bug fixing and finetuning of the system. It is important to test the system and perform validations to ensure that trust remains in the data being viewed and interacted with, otherwise this will lead to decreased interest in the system.

With a variety of systems contributing to the education sector, **integration capabilities with existing systems** now allows for cross-sectoral collaborations. The mature API of the DHIS2 will allow exchange of data between different systems, with the ability to import data such as population statistics and examination data for calculation of key indicators.

A **maintenance mechanism** for sustainability has been developed to transition the MoET to ably maintain and support the system post-pilot. This includes updates of software versions, bug fixing and updates to improve system functionality and make the system more user-friendly. These updates will be carried out as and when required by the MoET EMIS technical team based on user feedback. The MoET is encouraged to engage with the broader DHIS2 community of experts for additional support and submit specific use cases and requirements.

Server hosting

As part of the commissioning and ownership of DHIS2-EMIS by the MoET, there was a need to transfer the system from the HISP development environment onto the MoET production server. The development team prepared a detailed server specification document to guide the MoET in preparation of local servers at the Ministry. Recommendations from the document are considered as rules-of-thumb and not exact measures, and detail pros and cons of local environment vs. cloud-based servers and privacy and security as a key consideration. In September 2020, HISP Mozambique (Saudigitus) conducted training on server administration, while combining practical server configuration and deployment of the system. During the visit an onsite assessment of the server environment at the MoET HQ offices was conducted, and recommendations were made to make it more suitable for hosting DHIS2. The MoET was advised on server requirements and exploring options such as installing the server with the Government Computer Services, or a cloud-based server for temporary use.

Government Computer Services is now centered at Royal Science and Technology Park (RSTP), where all ICT services for government are now housed in the national data centre. RSTP, while still in the transition phase, has the mandate to provide hosting services for the whole-of-government and the private sector. To explore a sustainable hosting environment moving forward, the assessment team interviewed the National Data Centre Head and a consultant to better understand the mandate of the RSTP, and scope requirements for hosting, server capacity, HR capacity, troubleshooting routines and support on offer to the MoET.

“ We appreciate that for new initiatives like this pilot, there is dialogue at an early stage to assess the resources needed and capabilities of RSTP so that we can advise on support provision to ensure downstream users are able to access the system.”

Sibusiso Gama, National Data Centre Head of RSTP

Given the capacity, infrastructure and security set up of the national data centre, the assessment team believes that this is a positive move to ensure reliable hosting of the solution including support and maintenance of the system. However, there will be cost implications, which should be factored into a costed work plan. This would include the hosting environment, human resources with a contact person assigned to support the MoET directly. Next steps agreed include sharing the server specifications requirement document and a formal request for the host environment with RSTP to guide costing and system deployment.



CAPACITY BUILDING AND SKILLS TRANSFER IN MANAGEMENT OF SYSTEM

Capacity gaps for the shift

For effective implementation and support of the national scale, it is important that there are adequate and well trained human resources across all levels of the education sector. Currently, the central level EMIS staff consist of an EMIS Manager, IT, Statistician, M&E / SWAP Coordinator, Data Administrator, Data Capturer Supervisor and 10 data capturers. To support national scale, there is a need for additional system administrators to provide technical support and maintenance of the system. With more access and use of the data by various MoET sub-sectors and partners, Statisticians/System Analysts will be required to support data analysis, and respond to additional reporting needs.

The data capturers have been confined to the central level due to the access-based system in place, which could only be accessed centrally. Data capturers have played a key role in the pilot and have been close to understanding the challenges and needs of the pilot schools. This means they are an invaluable resource and can act as a feedback loop to elicit lessons learned from the pilot and inform planning for national scale. It

is important that the data capturers are deployed to the regional level and their roles re-defined to regional EMIS data officers to support data management, analysis and presentation which promotes data use at regional and school level. The assessment team feels that this would go a long way to empower and to improve motivation within the team.

At regional level, there are approximately 50 staff (REO, deputy REO, 20 school inspectors, and programme specific officers e.g guidance and counseling, special needs, nutrition, HIV etc). Trainings on specific sub-sector data needs, assessment modules for inspectors, data quality and validation will promote data use at regional level and allow monitoring and evaluation of key sub-sector indicators and provision of targeted support supervision.

At school level, IT savvy focal point teachers have been identified, and whose job descriptions consist mainly of teaching responsibilities. While High Schools are privileged to have the option to select ICT teachers who double-hat as data focal points, those from Primary Schools and below don't have ICT as a subject. This means they need to rely on teachers who are either IT savvy or show an interest and passion in technology. While this provides an excellent opportunity for skills development, it also means that training needs to factor in basic orientation around internet and computer/ device skills that may come as second nature to others.



Training and mentorship

The central level EMIS team has capacity to provide technical support to sub-national and school levels. The team was able to undertake the self-paced online DHIS2 Fundamentals and Events programme course to understand the basics of the DHIS2 system. In addition, the HISP team had further built the capacity of the central level team through both online and in-person training. The assessment team found that a vibrant WhatsApp group (composed of central level, regional level and school focal persons), had been established to provide technical support to schools during the pilot implementation.

Another WhatsApp group made up of the MoET EMIS team and the HISP Uganda team had been established to provide remote support during the pilot implementation. Aggregate and Tracker end user manuals and training materials, and system design documents, have been developed to support training and continuous knowledge transfer. While providing remote support and maintenance, a mentorship model was adopted where the HISP team would go through a guided step-by-step process (using screen share) to resolve the issues together with the MoET team. This has empowered the MoET to later perform the desired system changes and provide end user support without the need for the HISP team.

Regional and school focal persons have been orientated and trained on data capture. The regional inspectors together with headteachers from the pilot schools had been given an orientation during the kick-start of the

pilot and later trained by the central level EMIS team. Peer-to-peer mentorship was demonstrated at school level. At Salesian High School, the headteacher and computer teacher who had been trained were able to mentor the deputy headteacher and secretary who had already entered 90% of the data into the DHIS2-EMIS by the time of the assessment visit. Training for the most part was seen as valuable, though there were requests for refresher training. Some focal points from rural schools reported lack of laptops or devices and internet to fully participate in the practical training. Inequitable access to devices and internet in such instances was a demotivation for some teachers assigned as data focal points:

One data focal point and teacher shared that she had not been provided any devices and did not have her own personal device to bring to the training. That meant that she attended a full day's worth of practical training, but was not able to interact on-the-go due to not having a laptop. After the training she described being able to borrow someone else's laptop to input data by herself during the night.

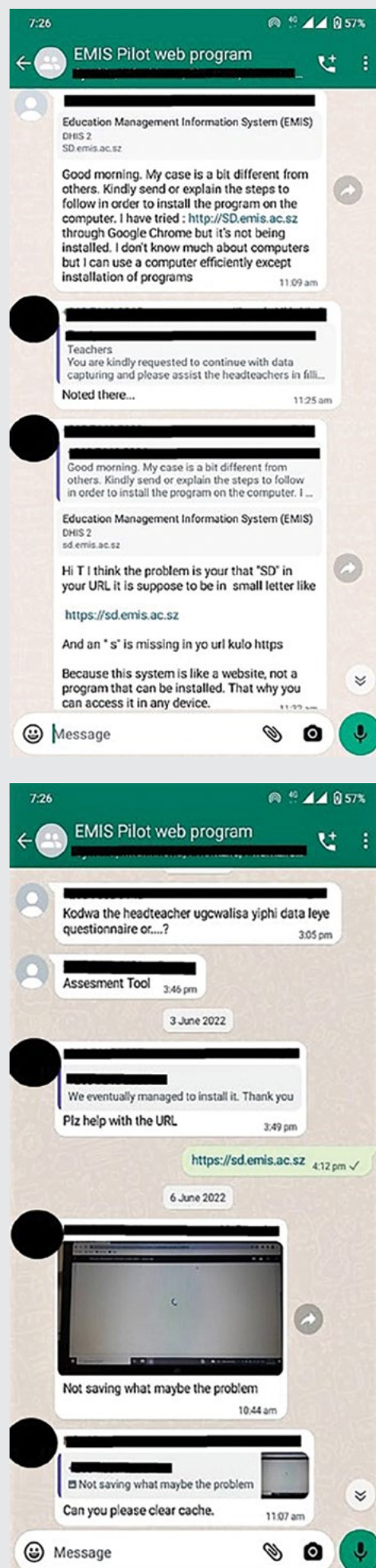
This of course had an effect on how she was able to continue engaging in the pilot and even affected her motivation when seeing the engagement on the WhatsApp group. She saw teachers asking questions and other teachers providing suggestions – *"...but I felt left out, as there was nothing I could contribute to."* – **Focal Teacher, Mhlabubovu Primary, Manzini**

The inspectors trained at regional level, were able to provide technical support to the pilot schools on how to use the system when contacted by the schools, however, there was no proactive follow up of the schools by the regional team. During the data capture process at school level, the focal persons were able to identify some discrepancies between the data collection tools and the system (e.g missing subjects, physical address, OVCs). These issues were communicated to the central level team through the WhatsApp platform, addressed and updated in the system accordingly.

Training on DHIS2 installation and server management was conducted by HISP Mozambique, which consisted of an introduction to Linux Ubuntu Basics, installing DHIS using virtual servers and access to DHIS2 on each computer. The training was practical and orientated to the local context, with positive feedback from the sessions. Key improvements from participants were that practice is necessary and more sessions would be appreciated.

The DHIS2 Community of Practice (CoP) is an online communication forum where anyone can connect to the DHIS2 community. It has over 3,500 members and consists of people with an interest in DHIS2, developers and implementers of the software, HISP employees, partners, donors, NGOs and Ministries. Developers and implementers are very active in this space and give real-time feedback and support to issues that might arise - which is a key factor of DHIS2 being a digital public good. At the time of reporting 5 users from the Eswatini MoET were identified in the CoP platform and 1 case study story post,² shared by HISP Uganda. There is an opportunity to leverage this engagement with the CoP to create links and relationships for long term technical support, learning, experience sharing and advocacy.

² [Piloting of DHIS2 or management of individual and aggregate education data in the Kingdom of Eswatini](#) (November, 2021)



PILOT IMPLEMENTATION

Stakeholder engagement and buy in

MoET

Buy-in and ownership of DHIS2-EMIS was seen across all levels of the MoET from central, regional to school level, despite the challenges experienced in terms of devices and internet connectivity. The assessment debrief workshop which took a sector-wide approach, presented an opportunity to share preliminary assessment findings, implementation experience and discuss the way forward. The workshop was fully represented by the MoET senior management, sub-sector programme officers, regional teams, school heads and focal persons, education development partners and civil society organizations. The Principal Secretary, indicated high hopes in the system which would go a long way in informing the disbursement of

school grants based on learner enrolment by PINs. High interest in the system capabilities was also noted by various departments such as Guidance and Counseling, Nutrition, FPE Unit.

For both regional and school levels, high levels of engagement were noted. At regional level, there was buy-in from the regional education officers, various programme officers and inspectors. At school level, head teachers and focal points showed a high level of engagement, interest and buy-in was evidenced by the progress of data capture amidst the challenges experienced. However, the amount of additional work pressure placed on the school focal persons to capture individual learner and teacher data into the system cannot be underestimated. While planning for national scale, there is a need for consideration for data capture volunteers at school level.

MINISTRY OF EDUCATION SENIOR MANAGEMENT EMBRACE DHIS2 FOR EDUCATION INITIATIVE

MoET buy-in to DHIS2 for Education

DHIS2 for Education presents a viable solution to address the data challenges from the over fifteen year old paper-based EMIS system that the Ministry of Education and Training (MoET) has been using, since its inception in 2006. During the Pilot Debrief workshop, the MoET senior management demonstrated full buy-in to the DHIS2 for Education initiative, which sets a very good tone for DHIS2 for Education in Eswatini. The senior management buy-in provides a solid foundation for expansion of the system to cover all schools / the entire education sector in the country. The expectation for success is very high at all levels of the MoET hierarchy, including civil society, development partners and the schools. The interest demonstrated by Principal Secretary and entire MoET senior management on DHIS2 as a solution of choice during the pilot debrief was a clear indication of the pilot having achieved its goal in proving DHIS2 for Education to be a **Public Good** data solution. The EMIS pilot has demonstrated the potential of the DHIS2 system to address data issues including timeliness, ease of analysis and reporting, individual tracking of the learner through the system and interoperability with other data systems.

Importance of buy-in

The buy-in is very significant in ensuring sustainability of the DHIS2 for Education initiative. This means the government will provide budgeting to support the initiative. It also means it will be easier for UNICEF and other development partners to mobilize resources to support the DHIS2 initiative for Education, as a priority for the government of Eswatini. Mobilizing support will be more feasible for an initiative that is fully embraced, prioritized and led by the government.

DHIS2-EMIS coordinators input

The DHIS2 coordinators have been very instrumental in achieving this milestone (MoET DHIS2 buy-in). The project was implemented at the most challenging time of the COVID-19 global pandemic, with limited travel permissible. The coordinators were innovative and provided the support virtually, with some in-country missions when the situation allowed. This called for passion and patience for the assignment which the Uganda HISP team demonstrated with exception. Their high expertise and great engagement skills with the EMIS team ensured the success witnessed during the pilot.

Victor Nkambule, Education Specialist, UNICEF Eswatini



📷 Assessment debrief workshop, attended by the Principal Secretary and all executive members of the MOET, schools, regional offices and partners.

“ This system will help us know exactly how many students we have and where they are. Different departments such as special needs and school feeding will also tap into the system to know how many children need support and how many bags of food need to be delivered. This system will help us remain relevant as a Ministry of Education in this day and age.”

Mr. Bhekithemba Gama, Principal Secretary,
Ministry of Education and Training

Intra- and inter-ministerial synergies

The PIN driven system creates opportunities for inter- and intra-ministerial collaboration to further enhance use of the system. Different sub-sectors in MoET such as Guidance and Counseling, Free-Primary Education Unit, Special Needs noted the potential of the system to provide real-time data for programming and reporting.

Cross-sectoral collaborations are now more likely, given that the PIN is used across different sectors such Home Affairs, Education, Health, and Finance. This creates opportunities for resource sharing, joint planning and implementation of cross-cutting interventions. There is a need to ensure that the various MoET sub-sectors and ministries are introduced to the system's capabilities and discussions are held on customized dashboards for key stakeholders' needs.

Pin-driven model

With support from UNICEF, The FPE unit together with Home Affairs had undertaken an exercise of validating learner PINs in all schools, identifying challenges with obtaining learner PINs and supporting learners to obtain their PINs. During this exercise, learners were provided temporary PINs valid for only one year within which the learners were required to obtain their permanent PINs. Some of the factors preventing learners from obtaining PINs include: Parents/Mothers have no PINs/birth certificates, no registered marriage certificate for parents in customary marriage, children abandoned by their mothers, double-dipping by families living along the South African border.

A Memorandum of Understanding between MoET and Home Affairs exists and ensures that the different ministries work collaboratively to ensure all learners obtain their PINs. Schools are prohibited from enrolling learners without PINs but rather should link them to the Office of the Prime Ministry and Home Affairs to acquire their PINs. It is anticipated that the DHIS2-EMIS system will ease the identification of learners with no PINs and linkage of these learners to relevant ministries to obtain them. This will ensure that no child is excluded from obtaining free primary education and is in line with the SDG4 goal for inclusive education for all. - FPE Unit, MoET



Development partners

Partnerships will remain vital for national scale. UNICEF Eswatini has been a key driver of support for the pilot implementation. To support planning for national scale, UNICEF's role will continue in the form of advocacy for joint resource mobilization, exploring strategic partnerships with interest to engage and supporting the development of a costed work plan to be used as an advocacy tool.

“ I want to congratulate the Ministry of Education for adopting a system that will provide a solution to the long standing data issues in the education sector, particularly in terms of data timeliness.”

Nathalie Daries, Chief of Chief Adolescent, Protection, Learning and Development Section, UNICEF Eswatini

In May 2022, the World Bank approved a 27M USD loan, with matched funding of 5M USD from the GPE. The project supports Eswatini's human capital development agenda by aligning with the country's National Strategic Development Plan (2018/19 - 2022/23) and the new Education Strategic Sector Plan (2022-2034), which has a strong focus on improving learning levels, access to and completion of education, strengthening teacher

management and development and building resilience of the education sector to respond to future crises. Importantly for the national scale up of the DHIS2-EMIS, it will also strengthen the management of the education sector through better data collection, analysis and dissemination to build a stronger culture around accountability for results.³

There is a key interest in linking systems across sectors from education development partners, with digital systems being one of the core areas of focus for the World Bank in Eswatini. Improved targeting, resource planning and allocation through the use of reliable, timely and clear to understand data will be critical to ensuring that no child or young person is left behind.

“ We currently know that 70% of the children that should be getting the grant aren't receiving it, which is an issue of targeting. We need to know who the vulnerable children are, where they are residing.”

GPE supports partner countries in setting up or enhancing their EMIS to provide systematic and quality data for tracking changes, and timely reporting of essential information for education planning, management and policy dialogue. The GPE Results Framework measures progress towards these objectives.

³ May 2022, [World Bank Approves 27 Million to Strengthen Eswatini's Early Childhood and Basic Education Systems](#)

With Eswatini newly becoming a GPE partner country, this poses additional opportunities for securing dedicated funding for EMIS strengthening in the country.

Civil society

The Swaziland Network Campaign for Education for All (SWANCEFA) is an NGO established in 2007 acting as a national education coalition campaigning for Swazis' rights to quality and inclusive education for all. Their mandate includes identifying gaps in the education system and pushing for policy change to correct those imbalances.

The EMIS unit is an important department for civil society and a coalition such as SWANCEFA, particularly around understanding the situation for girls' access to education, learners with disabilities and their ability to thrive within the learning environment and children and adolescents being out-of-school due to financial constraints. Being the coordinating agent of the new GPE grant, which includes system strengthening, this poses an excellent opportunity to ensure the EMIS unit and SWANCEFA develop a plan for ensuring that data strengthening and data use is prioritized in the local education group with actors such as civil society, private sector, development partners, government, parents including groups such as those with disabilities, women and youth representatives.

SWANCEFA is in a position to share research, studies and conduct policy consultations with community members including traditional leaders and parents, to ensure everyone is involved in the education process. The data from the system can be used to inform these processes and advocate at community level. Particularly the termly tool will give more timely and granular information without having to wait until the end of the year for the AEC report.

“ You might see community members rejecting a policy on allowing pregnant learners to attend school. If you are a civil society member, you can discuss how we can make this possible and why it is important. But we are not the government, we are not the duty bearers of such a policy. We are then able to invite the relevant MoET department in to support discussions with community members...Together we saw over 100 learners taken back to classes by their parents themselves.”

Thulani Lushaba, Programmes Officer, SWANCEFA

Embracing change

The EMIS/HISP Uganda assignment seemed like an ambitious undertaking “my thoughts at the beginning of the assignment”.... (Providing a system that would be PIN driven and give timely data while providing already calculated indicators). The team delivered and went even beyond. The customization of the system to suit the Swazi education needs was done with ease while the EMIS team kept on consulting with other stakeholders and updating and inputting more data needs. When the end product was presented, with the legacy data inputted which were displayed by the dashboard app, all fell into place. As a statistician, presenting data in the simplest, understandable way is always a challenge, so having the DHIS2 dashboard app showing the country map with basic and most used indicators was awesome. Presentation of the system apps which included the termly monitoring tool, tracker app and dashboard app to the education stakeholders (UNESCO, UNICEF, Guidance unit, Nutrition unit, WFP, SWANCEFA) in November 2021 just proved that as a sector we were capable and ready to make the necessary change in ensuring that monitoring of programmes is effectively done.

What is significant for me about the whole exercise is the eagerness of the stakeholders, which includes school and ministry personnel and other education stakeholders to start using the DHIS2 for Education as their monitoring tool.

Training was key in understanding the capabilities of the DHIS2. It equipped the team with the understanding of the whole system and how it would respond to every stakeholder's data needs such that we know if you are orientating politicians on the system, what will capture their attention is presenting the basic education information in maps or user-friendly bar graphs.

Nelsiwe Dlamini,
Statistician EMIS Unit, MoET Eswatini

Infrastructure

Hardware and internet connectivity

Access to DHIS2-EMIS requires reliable internet connectivity and functional desktops or laptops for online web-access or Chromebooks or tablets for Android access and offline data capture. The assessment team discovered that during the pilot, laptops were the primary gadgets used to capture data into the system, and thus could not be used for offline data capture. In addition, the laptops and internet were only available for the central level data capturers, with no gadgets or internet provided to schools to facilitate the data capture process at that level. At regional level, the regional education team indicated the availability of computers and internet which would ease accessibility and use of the DHIS2-EMIS system.

During the assessment, most of the schools visited indicated unreliable internet connectivity, especially from the country's local service provider (Eswatini Mobile), while MTN remains prohibitively expensive. In some high schools such as Vulamasango and Mjinggo High School, very weak internet signals, causing prolonged delay in accessing the system, was witnessed first hand during the visit. The use of personal internet for data entry at school level was the most predominant manner to capture data into the system.

School closures around the world as a result of Covid-19, saw Ministries of Education working with mobile operators, telecom providers and ISPs to increase access to digital resources. Options that can continue to be leveraged are: zero-rating, bandwidth shaping, lifting of data caps, unbanning VOIP, tapping Universal Service Funds, distribution of devices in communities and public hotspots.⁴

Legal and Policy Framework

The Education and Training Sector is driven by Eswatini's 1997 National Development Strategy, Vision 2022 and connects to UN 2030 Agenda for Sustainable Development including education (Goal 4), gender equality (Goal 5) and protection from violence (Goal 16), the African Union's Agenda 2063, and the SADC Revised Regional Indicative Strategic Development Plan 2015-2020.

The EMIS operates in accordance with the Statistics Act, 1967, the National Development Plan and embraces the SADC EMIS Norms and Standards Assessment Framework, 2011. The Education Sector Strategic Plan (ESSP) 2022-2034 has been finalized with support from UNICEF and includes EMIS priorities such as committing to strengthen the management of the education sector through better data collection, analysis and dissemination and build a stronger culture of accountability for results. The enabling legal and policy framework, will facilitate alignment of resources and partners to support implementation of EMIS related activities in the new ESSP.

Data Access and Privacy Policy

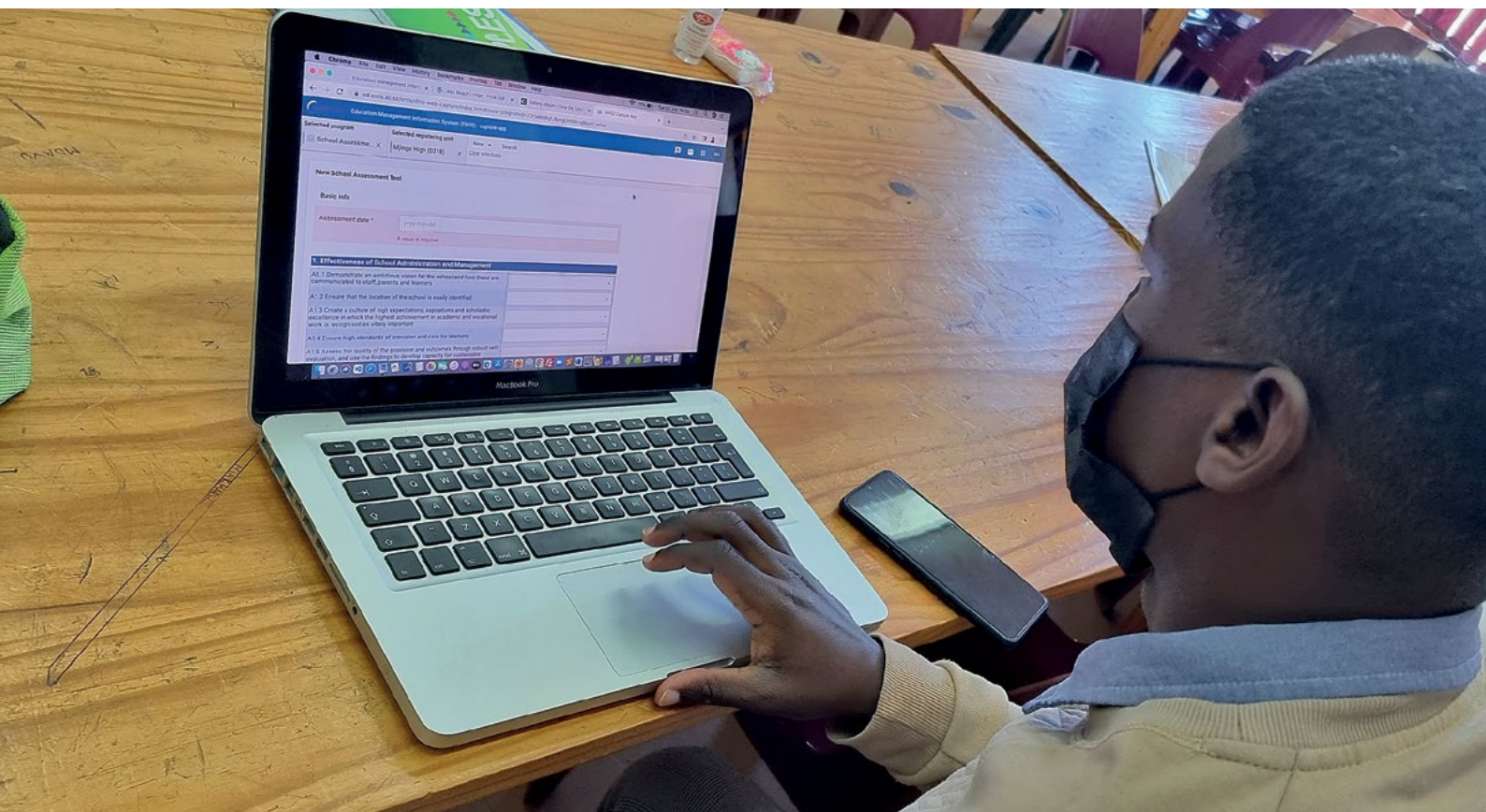
As the country adopts a PIN driven EMIS system, it is critical that guidelines on data access and privacy exist to guide the sharing and exchange of individual level data with various stakeholders and across sectors. During the assessment, the Ministry of Home Affairs indicated that a data access and privacy policy is established that governs sharing of birth registry data as well as exchange of this data with other systems. A Data Protection Bill⁵ exists, which is going through a parliamentary process. In addition, the MoET is guided by the SADC Model Law on Data Protection,⁶ which includes quality of data, general rules on the processing of personal data (sensitive and non-sensitive) as well as rights of the data subject.

In addition, there is a need to harness the flexibility of DHIS2-EMIS to control access to data captured in the system; securing data transmission from data entry point to central servers using Secure Socket Layer (SSL) encryption, restricting direct access to authorized users only and tracking access to data and the system in the audit trail.

⁴ [How Ministries of Education work with mobile operators, telecom providers, ISPs and others to increase access to digital resources during Covid-19 driven school closures](#), World Bank (April, 2020)

⁵ [Eswatini: Data Protection Overview](#), OneTrust Data Guidance (July, 2021)

⁶ [SADC Model Law on Data Protection](#)



📷 A Focal Teacher at Mjinggo High School uses his own mobile device and data to hotspot for data capture.

Data Use Opportunities

Although the pilot had focused more on capacity building and capture of data into the DHIS2-EMIS, there were opportunities for empowerment and use of DHIS2-EMIS data for improved programming and reporting across all levels of the education sector. The system has been configured with dashboards displaying key education indicators in visualizations such as charts, maps and pivot tables. All the legacy data from the access system has been imported into the DHIS2-EMIS to allow trend analysis and visualization of the indicators. To enhance use of data by the various stakeholders, the ability to configure different dashboards to respond to specific user needs will need to be leveraged upon.

Data analysis, presentation and use trainings are an opportunity to empower multidisciplinary teams such as EMIS data managers, data officers, Planners, Inspectors, and programme specific officers (Guidance and Counseling, Special Needs, Nutrition, HIV etc) and partners to create, interpret and use their user specific dashboards.

At the **central level**, the MoET EMIS unit envisions the use of DHIS2-EMIS to provide real time data for evidence based programming, monitoring and reporting on the education sector. The FPE Unit, sees the opportunity to use data from DHIS2-EMIS to inform allocation of school grants, procurement and distribution of scholastic materials for learners accessing free primary education in government aided schools.

“... The process for claiming for grants is tedious and is in tranches. For every claim the regional education officer needs to enter the names one by one into an excel sheet and manually verify the data with the Accounts Department before submitting to the Ministry of Finance for processing. Schools would batter learners to get more claims, but with the DHIS2-EMIS system, we will enter all learners in the country at once and be able to track them by their PIN and avoid scenarios of having children not claimed for in schools, having children claimed for twice....We shall also be able to monitor the progress of these learners as they go through the education system.”

Vusi Simelane, Acting Chief of Free Primary Education Unit, MoET.

At the **regional level**, the team noted that with the previous EMIS system, the EMIS report was always delayed by more than a year. However, with the DHIS2-EMIS system, the office of the REO together with the various programme specific teams would use the system to provide real time data on key education indicators which would enable them to provide targeted support supervision, follow up and monitoring of schools.

“ We were promised that with the DHIS2-EMIS, at a click of a button, we would know in this Inkhundla, how many children, how many teachers, and how many toilets there are. So we are eager to get this information to help us do our work better....for example a week ago, there was a need to compile information to inform the cabinet on how many teachers are needed. We had to get the information piece meal from schools. But if this system was there, it would provide evidence-based information to inform cabinet decisions on hiring of additional teachers.”

School Inspector, Manzini region

At **school level**, the DHIS2-EMIS system was seen as an empowerment tool; enabling schools to move away from being data collectors to using the data to improve provision of education services at their level.

“ With this electronic system, we shall be able to maintain historical data for all learners and use it [the data] in the future to provide evidence on learner information even after they have left school.”

Head Teacher, Salesian High School.

Moving forward, it will be important to explore routine meetings that could be enhanced by having conversations around the data being produced. An example was given that after the 16th School Day data has been analyzed, how could teams encourage the regional level and schools to use that data within the dialogue.



DATA USE STORY

Ekuthuleni Primary School, Manzini *No longer data collectors, but data users*

Ekuthuleni is a rural primary school located 51km from the Manzini city centre with approximately 400 learners. The headmistress Mrs T. J. Mkhonta who had recently been transferred to the school was very grateful for the efforts and progress in the pilot achieved by the previous head teacher and the two focal teachers, Mr. Comfort and Ms Nozipho who had been trained on the DHIS2-EMIS. Amidst internet challenges, the team has been able to enter all the aggregate data on the AEC form and capture profiles for 300 learners into the system.

Before the DHIS2-EMIS system, every year, we used to fill those very long forms for learners and staff, but it was very hard to analyze or even use our data at school level. But with this system it will be very easy. For example, on the learner profiles, we usually record the distance the learner travels from home to school. Every morning, most of the learners travel a long distance to school on foot and by the time they reach school they are very tired, hungry and cannot concentrate in class. So with

our data in the system, we are able to know how many of our learners travel long distances every day to school, and now we prepare for them sour porridge for breakfast before they attend the first lesson.

Also we are now able to analyze the data in line with the 7 pillars of the INQABA (1. Protection and Safety, 2. Psychosocial Support, 3. Food Security, 4. Health, 5. Water, Sanitation and Hygiene, 6. HIV and AIDS, Gender and Life Skills, 7. Quality Teaching and Learning) and plan accordingly for our learners. We don't just plan anyhow, but we use our data for planning. For example, for the safety of the children, we have a first aid kit. From the system we can easily know how many learners are orphans and are able to offer targeted support to them. When I find a learner misbehaving, I am able to quickly retrieve data on this learner, and sometimes you find that this learner is a double orphan and could be misbehaving because of frustration back at home. We then conduct adhoc interviews with these learners during break times to enable us better understand the problems, and we really take it to heart to help them.

Moving forward, we need to be supported with laptops and the internet so that we can use our data to the fullest. That is currently the limiting step. We can also use laptops and the internet to support our learning.

During lessons, we can show the learners short videos that enhance their learning. It is much easier to teach when the learners have visualized what they have learnt. Previously we were having debates, we would use our personal laptop and internet to show the learners how to debate, this builds their confidence.

Also with the internet, the teachers are able to search for additional information to improve the teaching content, and we can use it to easily communicate to the Ministry. We can also use the laptops and internet to

prepare our lesson plans and forward for approval. We want to improve and go to another level and we are not afraid of the inspectors, but their supervision should be informed by our data.

With this new EMIS system, we shall no longer be data collectors but data users, technology will enable us to fly to greater heights and enable our learners to compete with those in the town schools.

Real time and timely data in terms of advocacy has the potential for considerable impact. Data use by **civil society** can be leveraged by the sharing and dissemination of best practices and audience-tailored data snapshots, which is a key area of interest and strength for SWANCEFA. According to the Digital 2022: Eswatini Report⁷ there were around 407,000 social media users in Eswatini by January 2022, with Kepios analysis revealing that users increased by around 16% between 2021 and 2022. Given that SWANCEFA is a key partner with Education Out Loud, there is an excellent opportunity to turn the now easily digestible and visually appealing dashboards into bitesize advocacy stories that can be shared and discussed amongst civil society and with community members on topics that are key to improving the quality of education.

“ The Annual Education Census was always very late, which means that when you are programming, you’re dealing with data that is 2 years behind. During Covid, we’ve only seen a few small snapshots of data reports from partners. The biggest achievement of this pilot will be the availability of data.”

Thulani Lushaba, Programme Officer, SWANCEFA

Between **partners**, the DHIS2-EMIS system creates an opportunity for improved cross project and sectoral collaborations. Having a strong EMIS will also allow opportunities to explore the MICS-EMIS data link, combining household survey results and EMIS data for more granular analysis on specific focus areas of interest. The assessment found that a pilot is already ongoing and teams are exploring which data would be key to see in the MICS database to be linked to EMIS, as survey data will provide rich data on children and their family background and key indicators on wellbeing. These linkages will allow for better understanding of foundational learning and its relationship to school resources, the correlation between resources and access, programmes and outcomes as well as the relationship between cross-sectoral issues as well as understanding access to remote learning at household level.

⁷ [Digital 2022: Eswatini](#) (February 2022)



📷 Mr. Bhekithemba Gama, Principal Secretary MoET opens the evaluation debrief workshop.

CHALLENGES AND LESSONS LEARNT

- The global Covid-19 pandemic and civil unrest in Eswatini delayed the kickstart of the pilot thus slowing down the pilot implementation. However, remote support was an excellent option, and the HISP team continued to provide this remote support until travel restrictions were eased.
- The 100 pilot schools were not provided with devices and internet. Most of the laptops found at the schools were old models with very slow operating systems making it difficult, frustrating and time consuming to capture data at school level.
- Throughout the pilot internet connectivity has been a critical challenge affecting training, causing delays and sometimes failure of participants to follow step-by-step with the facilitator due to delays in system response. This was also experienced at school level, where in some cases there was no internet at all and trainers had to improvise with personal mobile internet for demonstration of the system and data capture. In some instances, the focal persons or the head teachers had to buy their own internet to be able to capture data in the system. Some schools like Vulamasango Primary and High, had WIFI accessibility, however, the connectivity was very weak and could not allow for uninterrupted data capture.
- Since all the schools were using laptops and not tablets or Chromebooks, they could not capture data in the Tracker module while offline. Whereas the system has the capability to work offline, the offline version for Tracker Capture is functional while using either tablets or Chromebooks.
- The pilot was conducted during the examination period when the school focal persons were expected to capture data in the system in addition to their responsibilities in administering examinations, severely increasing the workload placed on focal points.
- There is an upfront investment to ensure all learners and teachers are in the system, placing an additional time and work burden on focal teachers. Volunteer or short term hired staff as data entrants would have supported the bulk data entry.

KEY RECOMMENDATIONS TO SUPPORT SCALE UP

SUGGESTED IMMEDIATE STEPS

- MoET to develop a costed work plan proposal for national scale to solicit support for the roll-out of DHIS2-EMIS. HISP to share a country implementation framework to guide the development of the proposal.
- MoET should review the EMIS budget in light of the costs and resources needed to support the scale of DHIS2-EMIS as most activities have been funded/ supported by UNICEF Eswatini to date. It is important to strike while the iron is still hot, as any time lag will compromise progress made thus far.
- UNICEF to engage other educational development partners to jointly fund the national scale of the DHIS2-EMIS.
- With the new ESSP there should be key activities detailed for EMIS strengthening. Partner efforts should be aligned to support implementation of the EMIS priorities highlighted in the ESSP. Explore Basket funding for EMIS priorities through the LEG.
- Submit the Server Specification and Requirement Document and the Formal Request letter to RSTP for system hosting.
- Conduct a remote technology mapping of schools to understand their spread of devices, access to the internet, but also the effectiveness and cost of that internet.
- The Special Needs section in the data collection tools and the system should be updated in line with the Washington/UNICEF module. This can be done within the 6 months maintenance and support period with HISP Uganda.
- University of Oslo and HISP Uganda to explore formal accreditation of the DHIS2 course that has been attended by the EMIS team with a view to use it to upscale the profile of the data capturers and all EMIS personnel. This course could also be extended to some regional inspectors.
- EMIS to conduct a self-evaluation to better inform the development of this process, some key attributes which the officers experienced during the pilot. Discuss the findings and recommendations of this report with all members of the EMIS unit, particularly

with stakeholders who have played a critical role in the pilot. Consider a debrief to reflect on lessons learned together with data capturers, focal points and any other stakeholders identified within the report.

- Engage in the UNICEF MICS-EAGLE – case study exploring the linkage of household survey data with routine EMIS data. This is a unique opportunity for both learning and advocacy.

ADEQUATE AND TRAINED HUMAN RESOURCES

- **National level:** System administrators, analysts/ statisticians. Consider refreshers on certain technical modules while moving into training such as “Data Analytics”, “Design for Data Use” and “Data Use”.
 - Second a Data Manager to the RSTP as an EMIS/ MoET focal person.
- **Regional level:** Review terms of reference and structure of the EMIS for sustainability purposes and avail additional opportunities for them to improve their skills.
 - There is a need to decentralize the EMIS officers/ data capturers from the central level to regional level so that they can provide technical support to the various teams at regional level as well at schools.
 - Update the job descriptions of the EMIS data capturers to fit the new developments.
- **School level:** Focal teachers should have some form of incentive. For e.g monthly data bundles to ease own personal use and expense.
 - Strong consideration on orienting more senior staff members on the system, to ensure that the knowledge is not centered at the focal teacher level alone.
 - Develop a mechanism for tracking trained focal teachers who have moved schools, and train additional staff including non-IT focal teachers.
- **Multi-disciplinary teams** in the different MoET sub-sectors e.g. Guidance and Counseling, HIV, Special Needs, Nutrition etc. and Partners should be trained and empowered to use the system to respond to their user specific needs.

CAPACITY BUILDING AND KNOWLEDGE TRANSFER

- Deploy a cascade capacity building model through national ToTs, regional trainings, school-level trainings.
- Provide training especially understanding the key dashboards to senior managers.
- Focus on refresher training as well as targeted training modules on data entry and validation, data analysis, presentation and use for central, regional and school levels.
- The various teams at regional level (REO, inspectors, programme specific focal persons) will need to be trained on data analysis and use to be able to use EMIS data to inform resource allocation as well as targeted support supervision, follow up and monitoring of schools.
- Participation in online and in person DHIS2 Academies for continued capacity strengthening, including the regional DHIS2 for Education Academy in 2023.
- Leverage the wider ecosystem of support, by actively engaging the online Community of Practice, which serves as a an experience sharing and technical support hub without cost for technical assistance.
- Establish a local community of practice with existing DHIS2 technical capacity in health interventions (e.g. with the CDC supported DHIS2 implementation for HIV and TB Programme Performance Monitoring at GeorgeTown University, UNICEF) and any others that may arise.

HARDWARE AND SOFTWARE INFRASTRUCTURE

- Secure funds for laptops, Chromebooks, tablets to ensure personal devices are not used. Chromebooks and tablets allow use of the system's capability to work offline, particularly for the offline version of Tracker Capture. Consider Chromebooks or tablets for schools with limited internet connectivity during national scale.
- Important to look at lessons learned from ongoing health implementations where internet connectivity was pivotal to system introductions and see how to strengthen resource sharing for ongoing health and education implementation in need of connectivity.
- Take advantage and negotiate with mobile operators, telecom providers and ISPs to increase access to digital resources. Explore partnerships with RSTP and MTN national office to negotiate certain aspects e.g. hosting, and provision of data (MTN) at reduced rates and zero-rating. Leverage a united front by negotiating in tandem with the health sector for joint resource mobilization and resource sharing.
- Infrastructure/computer upgrade for the key EMIS staff such as EMIS Manager, IT and Statistician.

DATA CAPTURE AND MANAGEMENT

- Decentralization and empowerment of EMIS data capturers, with re-defining of their roles to focus on data quality, use and presentation and regional and school levels.
- Orientate all schools on the new data collection tools.
- Decentralize printing of data collection tools to regional or school level.
- Consider volunteers or short term hire to support initial data collection and capture at school level.
- Hire vehicles suitable for varying terrain for both central and regional level EMIS teams, to support field activities such as data quality audits and support supervision.
- EMIS team to continue providing mentorship and support supervision to schools, ensuring that less tech savvy focal persons aren't left behind.
- Champions from the region and pilot schools to support trainings and experience sharing in other schools.



ADOPT A DATA IN ACTION CAMPAIGN

- Information produced should be communicated and made available to different stakeholders. Identify different data needs at various levels and configure dynamic dashboards with various programme specific indicators. Display data on SMART Screens for the MoET leadership.
- Identify key routine meetings at regional and school level where data should be interpreted, discussed and used e.g. after 16th School Day data collection and analysis.
- Document data use cases at school, regional and central level and ensure these are shared through meetings, presentations, newsletters, social media.
- Develop short blogs for sharing with SWANCEFA, UNICEF, GPE, World Bank and the University of Oslo to showcase data use cases, successes and lessons learnt.

LEVERAGE INTER-AND INTRA-MINISTERIAL COLLABORATION

- Ensure the various MoET sub-sectors and Ministries are introduced to the system's capabilities and discussions are held on customized dashboards for stakeholders' needs.
- Make use and explore interoperability capabilities of the system for e.g. with population statistics, household surveys (e.g. MICs), Home Affairs, Ministry of Finance.
- Explore lessons learned and cross-sector collaboration opportunities with the health sector.

SUSTAINABILITY

- In the long term explore the inclusion of a data management module and introduction to basic education indicators into the teacher training curriculum in partnership with education institutions.
- Explore long term capacity building partnerships with the University of Eswatini or other Education Training Institutions for future EMIS workforce strengthening.
- Continuous empowerment of various central and regional level and programme specific teams to use the system at their level.
- Continuous engagement and lobbying of additional funding from Education Development Partners, GPE to support long term DHIS2-EMIS implementation.
- Consideration of continuous use of DHIS2 maturity assessment to guide country investments .
- Ensure guidelines/SOPs on data exchange, protection and privacy are in place and used.

APPENDICES

Annex 1: **TERMS OF REFERENCE**

Review and Upgrading of the EMIS system (digitalization of the EMIS)

Travel dates: 6–12 June 2022

Background

The MoET of Eswatini collects education data from its institutions annually through its Education Management Information System (EMIS). This data is used for policy, planning, decision making and overall monitoring and evaluation of the National Education and Training Sector Plan. The aim of the EMIS unit is to improve efficiency, relevance, timeliness and coverage of data and seek an automated, real-time system that provides real-time information that responds to the needs of the MoET.

The current EMIS system was developed in 2008, and since its establishment new information needs have arisen and need to be incorporated in the system. However, the system was not able to capture data to produce a number of indicators in new MoET priority areas such as Early Childhood Development Education (ECDE), Special Needs Education (SEN), Care and Support for Teaching and Learning (INQABA), Sector Response to HIV and AIDS, Nutrition and the overall mandate of the Ministry as directed in the National Education and Training Improvement Programme (NETIP II).

In order to incorporate these new information requirements there was a need to upgrade and update the current EMIS system so that data could be captured near real-time and ensure that the records are Personal Identification Number (PIN) driven. It was expected that the new system be divided into functional modules that cover all areas and levels of the education system (pupils / schools / regional and central levels). An active connection be installed connecting the national office, key senior management, the regions and schools.

The MoET with funding from UNICEF-Eswatini, contracted the University of Oslo in Partnership with HISP Uganda to support the review and upgrade of the current EMIS. The pilot project was tasked to review the sector, develop new data collecting tools, incorporate SDG 4 indicators and thus develop a new system to capture and analyze data. It was critical to ensure the development of the system was PIN driven. By the use of PIN, it is envisaged that the EMIS and the sub-sectors track individual pupils to ensure holistic support to learners. The long term aim is for EMIS to interlink with other Government systems such as Birth Registrations to track intake rates at primary levels. Critically, the EMIS is expected to support the monitoring, evaluation process, where the implementing sectors are expected to learn and innovate based on the results of the intervention.

Context

Recognising the role of education and training in socio-economic development, the country has made remarkable undertakings towards providing quality education to all its citizens at all levels through formal and non-formal approaches. The policy goal for the education and training sector paves the vision of an equitable and inclusive education and training system that affords all learners access to free and compulsory basic education and senior secondary education of high quality, followed by the opportunity to continue with life-long education and training, so enhancing their personal development and contributing to Eswatini's cultural development, socio-economic growth and global competitiveness".⁸

The Education and Training Sector Plan is driven by Eswatini's 1997 National Development Strategy and its Vision 2022 and connects to UN 2030 Agenda for Sustainable Development including education (Goal 4), gender equality (Goal 5) and protection from violence (Goal 16), the African Union's Agenda 2063, the SADC Revised Regional Indicative Strategic Development Plan 2015–2020 and the SADC Industrialisation Strategy and Roadmap 2015–2063. EMIS operates in accordance with the Statistics Act, 1967 and the National Strategy for the Development of Statistics and embraces the SADC EMIS Norms and Standards Assessment Framework 2011.

⁸ [Eswatini Education Sector Plan](#) (2018)

The Sector Plan solidifies the importance of a functioning EMIS in order to monitor and evaluate the impact of the sector's programmes and projects and to collaborate with EMIS in establishing a reliable database for planning, budgeting and prioritization of schools to benefit in the short-, medium- to long-term capital programme.

The entire education and training sector relies on EMIS for data, management information and analysis regarding demand, supply, performance and outcomes of education and training. EMIS is central to the MoET's capacity to monitor, review, evaluate and report.

Assessment Objectives:

The overall objective is to assess to what extent the DHIS2 for EMIS pilot project in Eswatini (Manzini Region) has been successful in redeveloping/updating a PIN-driven EMIS to support real-time response for efficient and effective budgeting, planning, implementing, monitoring and evaluation of MoET sector programmes.

❶ Assess the Data Management Process

- a) Have the existing data collecting tools been reviewed and updated to collect the raw data required for additional information requests?
- b) Has there been clear documentation and mapping of the EMIS indicators to the data collection tools
- c) Was an understanding acquired of the EMIS data collection processes and a mapping of how it works. This includes: structures involved at different levels, how they are organized, capacity gaps for this shift
- d) Has a determination been made on how data will be made available, particularly in real time, including sensitive data (examination, assessment data, financial data) that may require specific controls and authorization

❷ Assess the upgrade and development of DHIS2 for EMIS system

- a) How the recommendations from the EMIS assessment were taken into consideration while configuring the DHIS2-EMIS system
- b) How the DHIS2 for EMIS system was designed and configured as per the specific user requirements - refer to Inception report
- c) Assess how the system testing was conducted and required adjustments documented and acted upon
- d) Assess documentation of the entire system development and deployment process (include system hosting & server set-up)

❸ Review the capacity and skills transfer in the management of the system

- a) Assess the capacity of the MoET team to sustainably use, maintain and support end users of the system
- b) Assess the capacity of the regional and school level teams to capture and use data from the DHIS2-EMIS system
- c) Assess Continuous capacity building and support provided by the regional HISP groups (HISP Uganda, HISP Mozambique) and DHIS2 community

❹ Assess the pilot implementation

- a) Capacity of the school level teams to capture data in the system (training, dedicated data staff)
- b) Ease of data capture; system bugs, feedback and support
- c) Infrastructure set up; availability of computers, laptops, internet
- d) Opportunities for enhanced data visualization and use at MoET, Regional and School level

❺ Document challenges and lessons learned

- a) Assess future interoperability plans, specifically data linkages and progress

❻ Develop overall recommendations for scale

- a) Plans for scale up and partner engagement

Proposed methodologies:

The methodologies employed will include key informant interviews and focus group discussions using semi-structured questionnaires as a guide. To elicit deeper narratives on the process and about practice change, a modified version of most significant change (MSC) technique will be deployed for at least 2 key informant interviews. MSC is a method of participatory monitoring

and review that collects and analyzes accounts of change, to learn about what changes are most valued by individuals, groups and why. Light adapted version of DHIS2 Maturity Profile Model scorecard which assesses the implementation's maturity in relation to DHIS2 as a solution. Short video documentary for advocacy purposes.

Delivery dates		Milestones	Details
May/June		• Preparatory meetings • Desk review • Review data from training sessions conducted (teacher feedback examples) • Prep tools • Sign off on ToR for field trip	Preparation/development phase
Monday 6 June	7 PM	Arrival and late planning meeting	Assessment Team (AT)
Tuesday 7 June	9 - 10 AM	Debrief Meeting at MoET	AT, MoET
	10 AM - 1 PM	Visit to pilot schools • Urban school with all the infrastructure • Rural school with no infrastructure	AT, MoET
	1 - 2 PM	Lunch Break	
	2 - 5 PM	• Meeting with the Regional Education officers • Focus Group Discussion with school administrators • Video recording interviews	AT, MoET
Wednesday 8 June	9 - 12 PM	Meeting with MoET central level team • EMIS manager • Statistician • System administrator Video recording interviews	AT, MoET
	12 - 1 PM	Meeting with Home Affairs, Birth Registration	AT
	1 - 2 PM	Lunch Break	
	2 - 5 PM	Meeting with UNICEF and other education partners (World Bank, World Vision, WFP, RSTP)	MoET, UNICEF, AT
Thursday 9 June	9 - 1 PM	• Video recording interviews • Any other Interviews	AT
	1 - 2 PM	Lunch Break	
	2 - 5 PM	• Prepare for assessment debrief	AT
Friday 10 June	9 - 1 PM	End of Project and Assessment debrief / workshop	AT, MoET, Partners
Saturday 11 June		Findings sensemaking, report writing	AT
Sunday 12 June	9 AM	Departure	
22 June		First draft report submitted	AT
22 - 24 June		MoET and UNICEF review report	MoET, UNICEF
24 - 28 June		Finalize report	AT
28 June		Submission of report	AT
30 June		Project close	

Annex 2:

LIST OF PERSONS INTERVIEWED

No.	Name	Designation	Organization/Office
1	Bheki Gama	Principal Secretary	MoET PS Office
2	Jabulani Shabalala	EMIS Manager	MoET PS Office
3	Mr Nkabinde Reuben	Manzini inspector	Manzini REO
4	Phindile Dlamini	Deputy Regional Office	Manzini REO
5	Phiwayinkosi Sukati	EMIS Focal Teacher	Mjingo High School
6	Khumalo	Deputy head teacher	Mjingo High School
7	Petros Horton	Principal	Salesian High School
8	Mbali Mavimbela	School Secretary - EMIS Focal Person	Salesian High School
9	Themba Tfwala	ICT Teacher - EMIS Focal Person	Salesian High School
10	Vusi Simelane	Acting Chief Free Primary Education	MoET FPE
11	Thabsile Dlamini	Schools Inspector	MoET FPE
12	Nkululeko Gwebu	Principal Planning Officer	MoET Planning Dept
13	Andile Dlamini	Birth and registration officer	Home Affairs Ministry
14	Sibusiso Gama	National Data Centre Head	RSTP
15	Sean Morgan	Consultant	RSTP
16	Victor Nkambule	Education Specialist	UNICEF
17	Nathalie Daries	Chief of Adolescent, Protection, Learning and Development programme	UNICEF
18	Nelsiwe Dlamini	M&E Officer - Education	UNICEF
19	Nelson Isidoro	M&E Officer - Health	UNICEF
20	Tengetile Tsabedze	Health Specialist	World Bank
21	Thulani Lushaba	Programmes Officer	SWANCEFA
22	Phindile Sibandze	EMIS Focal Teacher	Mhlabubovu Primary
23	Mrs Nkambule	Head Teacher	Mhlabubovu Primary
24	Nozipho Shongwe	EMIS Focal Teacher	Ekuthuleni Primary
25	Comfort Dlamini	EMIS Focal Teacher	Ekuthuleni Primary
26	Mrs. T. J. Mkhonta	Head Teacher	Ekuthuleni Primary
27	Nondumiso Vilakati	Deputy Head Teacher Primary	Vulamasango Primary
28	Thami Dlamini	Focal Teacher Primary	Vulamasango Primary
29	Ms Zwane	Deputy High	Vulamasango High
30	Mfanukhona Dlamini	Focal Teacher High	Vulamasango High
31	Edwin Simelane	Programme Coordinator	UNESCO
32	Dumsile Nxumalo	Senior Guidance Officer	MoET - Guidance
33	Mfanukhona Nkambule	IT Administrator	MoET - EMIS
34	EMIS Data capturers	Data Capturers	MoET - EMIS

Annex 3:

WORKSHOP AGENDA AND ATTENDANCE LIST

Ministry of Education EMIS Upgrade Evaluation of Pilot

MANTENGA - 10 JUNE 2022

09:00-09:10	Registration	ALL
09:10-09:30	Welcome Remarks	Principal Secretary
09:30-09:45	Remarks from UNICEF	UNICEF
09:45-10:15	Overview of the systems upgrade	EMIS Manager
10:15-10:30	Health Break	
10:30-11:00	About DHIS2 for Education	Consultant
11:00-11:30	Pilot exercise feedback	EMIS
11:30-12:30	Evaluation feedback	Consultant
12:30-13:00	Plenary	ALL
13:00-13:10	Closure	

No.	Name	Designation	Organization/Office
1	Jabulani Shabalala	EMIS Manager	MoET
2	Thulani Lushaba	Programme Officer	SWANCEFA
3	Victor Nkambule	Education Specialist	UNICEF
4	Richard Sukati	Head Teacher	Mphembekati PS
5	Tafadzwa Murwiwa	M&E Officer	CANGO
6	Thamie Dlamini	REO	Lubombo
7	Sibongile Khumalo-Zwane	REO	Shiselweni
8	Phiwankosi Sukati	Focal Teacher	Mjinga High School
9	Nelsiwe Dlamini	EMIS Statistician	MoET
10	Thobile L. Gamedze	SI - Nutrition	MoET
11	Dudu Hlophe	SI ECCDE	MoET
12	Thabsile Dlamini	FPE Inspector	MoET
13	Cebsile P Nxumalo	SI SEN	MoET
14	Vusi Simelane	Acting Chief Inspector Primary	MoET
15	Gwebu Nkululeko	Principal Planning Officer	MoET
16	Nathalie Daries	Chief of Section	UNICEF
17	Phumzile Nxumalo	EMIS Data Administrator	MoET
18	Sophia Kousiakos	EMIS Project Manager	University of Oslo
19	Mfanukhona Nkambule	EMIS IT Officer	MoET
20	Sibusiso Christie	EMIS Data Capturer	MoET
21	Dhmisile Mashuku- Nxumalo	Inspector - ETGPS	MoET
22	Constance T. Vilakati	Under Secretary Admin	MoET
23	Phumzile Holphe	Secretary General	UNESCO
24	Vilakati Nondumiso	Deputy Principal	Vulamasango High
25	Ntshangase Nosmilo	Principal	Vulamasango High
26	Nhlengetfwa Lungelo	Under Secretary -Schools	MoET
27	Bhekithemba V. Gama	Principal Secretary - MoET	MoET
28	Dr. Ntombenhle Dlamini	Director of Education	MoET
29	Dinoe Dlamini	Communications Officer	UNESCO
30	Petros Horton	Principal	Salesian High
31	Nozipho Shongwe	Focal Teacher	Ekuthuleni Primary
32	Phindile Sibandze	Focal Teacher	Mhlabubovu Primary
33	Rueben Nkabinde	Inspector-REO	Manzini
34	Trusty Simelane	Supervisor - EMIS Data Capturer	MoET
35	Amuha Monica Grace	DHIS2-EMIS Researcher	HISP Uganda

Annex 4:

COMMUNIQUE FROM DHIS2 FOR EDUCATION ACADEMY IN BANJUL, APRIL 2022

WE, the country representatives, and partners who are members of DHIS2 for Education present at the DHIS2 Academy held at the Kalimba Hotel, The Gambia, from 25th to 29th April 2022.

RECOGNIZING the importance of data in promoting evidence-based decision making in policy, planning, monitoring and assessment;

NOTING the need to have a strong Education Management Information System (EMIS) under Ministries of Education to facilitate the provision of quality education data to inform the implementation of Education Sector Plans and strategies;

AWARE of ongoing EMIS initiatives at the global, continental, and national levels aimed at strengthening the management and use of data for decision making and meeting set commitments and frameworks;

OBSERVING the successes of using DHIS2 in the health sector, noting promising development in the education sector and the need to use these experiences in the education sector;

RECOGNIZING the critical role of regional institutions like the African Union Commission in facilitating adoption of the DHIS2 by education ministries;

NOW HEREBY COMMIT to make every effort to collectively take forward and facilitate the implementation of the following through our plans and programmes:

① National EMIS harmonization process

- a) Promote participatory harmonization process with the educational sector in the government on data collection tools, indicators, and data needs for the implementation of the SDG 4, the AU-CESA 16-25 and regional and national plans
- b) Initiate a harmonization process with the partners to align their reporting needs into the government system
- c) Development and alignment of the national policies and standards
- d) Develop a resource mobilization plan

② Capacity building

- a) Institutionalize capacity building at all levels and promote the DHIS2 academy model to include education use case on each level
- b) Encourage universities and other training institutions to use digital government tools to teach students and deploy them to the field
- c) Undertake Training of Trainers to facilitate cascaded training to sub-national levels
- d) Conduct blended training using existing Regional Centers of Excellence
- e) Develop shared global, continental, regional and national resources for everyone to use

③ Develop and package appropriate messages to put forward the case for using DHIS2 for EMIS

- a) The platform is flexible and can easily be customized to user needs.
- b) Provide granularity in data analysis, from national, subnational down to the school level
- c) Empower local stakeholders and community by enhancing data use
- d) Supported by a strong ecosystem of practitioners

④ Addressing the missing data

- a) Utilizing DHIS2 for EMIS to fill the gap of missing data at every level from global, national, subnational, and school and community level through strengthening collection and data transportation processes
- b) Learn from the 20 years of experience of DHIS2 in the health sector to avoid the same failures (leapfrog)

⑤ Leveraging cross sector linkages

- a) Develop a more robust understanding of social sector challenges
- b) Support triangulation of data collected by different actors
- c) Promote efficient use of available resources through sharing and clustering
- d) Strengthen the DHIS2 Academy community of practice and create national community of practices

MADE this 29th Day of April 2022 and endorsed by 113 participants:

MINISTRIES OF EDUCATION

Ministry of Basic and Secondary Education MoBSE, The Gambia 70 participants from 7 regional directorates, 14 HQ directorates

Ministry of Higher Education Research and Technology MoHERST, The Gambia

Immigration Department, The Gambia

Gambia Teachers Union, The Gambia

West African Examination Council, The Gambia

Bureau of Statistics, The Gambia

Ministry of Health, The Gambia

University of The Gambia

Ministry of Education, Benue State (Nigeria)

Ministry of Education and Training, Eswatini

Ministry of Education and Human Development, Mozambique

Ministry of National Education, Senegal

Ministry of Basic and Senior Secondary Education, Sierra Leone

Ministry of Education, Sri Lanka

Ministry of Education and Sports, Uganda

PARTNERS

Pan-African Institute of Education
for Development, AU-IPED

Association for the Development
of Education in Africa, ADEA

Global Partnership for Education, GPE

Norwegian Agency for Development Cooperation, Norad

UNESCO, Dakar

UNESCO, The Gambia

UNICEF, The Gambia

UNICEF, Eswatini

UNICEF HQ

NGOs

UATAF Mozambique

Save the Children Uganda,

Save the Children – Waliku,

Catholic Relief Services,

PMI/VECTORLINK,

HISP Centre, University of Oslo

HISP Nigeria

HISP Uganda

HISP West and Central Africa

HISP Mozambique (Saudigitus)

HISP Sri Lanka

Annex 5:
SHARED PRODUCTS