WI DE YA, ONE TABLET PER SCHOOL: PROJECT REPORT 2022/23

CGA TECHNOLOGIES

Data-Led Decisions | Transparency | Accountability | Equity

ACKNOWLEDGEMENTS

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Muniru Kawa, Country Coordinator
On behalf of CGA Technologies Sierra Leone, the developers of Wi De Ya

ABOUT THIS DOCUMENT

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GLOSSARY

ACC	Anti-Corruption Commission
AGD	Accountant General's Department of the Ministry of Finance
AMS	Attendance Monitoring System
ASC	Annual School Census
API	Application Programming Interface - the process of interaction between applications
APN	Access Point Network
AY	Academic Year
Basic Education	Primary and Junior Secondary Schooling
Biometrics	Photographs and fingerprints
CGA	CGA Technologies
CSE	Comprehensive Sexuality Education
CCTT	Child Centred Teaching Technique
CWD	Children with Disabilities
CTA	Community Teacher Associations
DD	District Deputy Director
DO	District Officer
EMIS	Education Management Information System
EMIS Dept	EMIS Department, MBSSE
ETSL	Employers of Teachers of Sierra Leone
EU	European Union
FCDO	Foreign, Commonwealth and Development Office (UK Aid)
FEPS	Free Education Project Secretariat
FQSE	Free Quality School Education
GoSL	Government of Sierra Leone
GDP	Gross Domestic Product
GPE	Global Partnership for Education
GSM	Global system for mobile communication
Government-supported Schools	Schools that are financially supported with government subventions, approved schools, with varying ownership
HR	Human Resources
IT	Information Technology
ITO	IT Officer (part of the TSC District staff)
JSS	Junior Secondary School
MBSSE	Ministry of Basic and Senior Secondary Education, Sierra Leone
MDA	Ministries, Departments and Agencies
MDM	Mobile Device Management
MIS	Management Information System
MNO	Mobile Network Operators
MoF	Ministry of Finance
NaCoHT	National Conference of Head Teachers
NASSIT	National Social Security and Insurance Trust
NCPSS	National Conference of Principals of Secondary Schools
NCRA	National Civil Registration Authority
NGO	Non-Governmental Organisation
NIN	National Identification Number
NPSE	National Primary School Examination
OOSC	Out-of-School Children
OTPS	One Tablet per School, activity of the Free Education Project
PBF	Performance-based Financing
PIN	Personal Identification Number
PRSU	Public Sector Reform Unit
PQTR	Pupil-Qualified Teacher Ratio - defined as payroll teachers here
PTR	Pupil-Teacher Ratio - payroll and non-payroll teachers
SDGs	Sustainable Development Goals
SID	School ID
SLEAMS	Sierra Leone Education Attendance Monitoring System
SLTU	Sierra Leone Teachers Union
SMC	School Management Committee
SOPs	Standard Operating Procedures
SQAMR	School Quality Assurance, Management and Resources,MBSSE
SQAO	School Quality Assurance Officer (part of MBSSE District staff)
SSS	Senior Secondary School
STEAM	Science, Technology, English, Agriculture and Mathematics
ToT	Training of Trainers who cascade the training
TPD	Teacher Professional Development
TSC	Teaching Service Commission, Sierra Leone
UNFPA	United Nations Population Fund
WASSCE	West African Senior School Certificate Examination
WG-SS	Washington Group Short Set

1. EXECUTIVE SUMMARY

Sierra Leone has recently undergone a period of rapid transformation in terms of policy and practice regarding access to education in line with the government's priority of human capital development.

Government spending on education in concert with policies targeting access Free Quality School Education (FQSE), Radical Inclusion, Out of School Children (OOSC) Strategy) increased the enrolment by 33.9% between 2018 and 2019 alone for both male and female students upon the introduction of FQSE[1]. This remarkable growth raises the question of whether supply of services in line with spending has been able to meet this increase in demand.

Despite this enrolment influx, hundreds of thousands of children remain out of school[2], and, with only aggregate statistics on those children who are enrolled, there is little way to concretely know whether the same learners are retained in school from year to year or whether aggregate numbers may be masking high rates of attrition and 'turnover'. The resulting knowledge gap means we cannot measure who this newly found third of enrolled learners comprises. We cannot know with any certainty the effectiveness of progressive measures such as the overturning of the ban on pregnant girls attending schools or whether it includes children with disabilities (CWDs) or other marginalised groups, versus who FQSE as an initiative may still be failing to include.

Regarding the teaching workforce, we know already that there are no records on file for 34.5% of payroll teachers[3], and that there are significant inaccuracies between where teachers are posted and where they actually work[4]. We also already had reason to believe that one third of teachers are not on the payroll as are employed by the school community and, without records on them, they are unknown and unregulated or centrally managed[5]. This limits the ability of the Teaching Service Commission (TSC) to manage the workforce in such a way to effectively meet learner demand.

To truly cement education transformation in Sierra Leone and ensure it is radically inclusive for all, as an education sector, we need to understand Sierra Leone's learners: how many there are, where they are located, what their learning requirements are, and why some drop out of school. And we also need to understand the workforce: how many teachers - payroll or otherwise - are working, where they are located and what are their competence and proficiency levels. Once the TSC learns who exactly community-employed non-payroll teachers are, as well as the precise location of payroll teachers, the TSC can shape teaching capacity to learner needs. Only by knowing and managing both in alignment can limited education resources be used efficiently and effectively. Until and unless this information is readily available - and used - efforts to transform education will be limited.

As part of FQSE, CGA Technologies was contracted by the TSC to design, develop and implement a national school-based attendance monitoring system for teachers and learners under the One Tablet Per School (OTPS) initiative. Named Wi De Ya ('*We Are Here*' in Krio) – https://wideya.org/ – the system is used to collect near real-time data on teacher and learner information, as well as their daily attendance. The data is then available on private (disaggregate) and public (aggregate) dashboards for analysis, action and accountability.

1 Graham, H., Kawa, M., Hayward, H. J., Murray, T., Conteh, S., Malyon, S. (2021) 'Out-Of-School Children Study Sierra Leone,' Freetown: Government of Sierra Leone and UNICEF. p. 30.
2 'In 2018, there were an estimated 524,000 children out of school, which represented 22% of children aged six to 18 years.' Government of Sierra Leone (2022) 'Education Sector Plan 2022-2026,' p. 9.
By comparing ASC enrolment data (2021) and World Pop population Fab Inc estimated 360,928 children 12-17 years old were out of school – Mackintosh, A., Ramirez, A., Atherton, P. (2022) 'Estimates of Out of School Girls in Sierra Leone,' Freetown: Fab Inc, p. 18. On file with the author.
3 TSC (2023) Freetown. https://tsctrm.org/ accessed 30 June 2023.
4 31.4% of payroll teachers were reported not to be working at their assigned schools in 2020. Graham et al. (2020) 'SLEAMS Final Technical Report,' Freetown: TSC and CGA Technologies, p. 37.
5 Graham et al. (2020) 'SLEAMS Final Technical Report,' Freetown: TSC and CGA Technologies.

The 300-school rollout phase of Wi De Ya began at the beginning of the third term of the 2022/23 academic year, comprising primary schools across rural and urban chiefdoms in all 16 districts of Sierra Leone. Each participating school received one tablet[6] and, following training, school leaders used the Wi De Ya app on the tablet to record individual teacher and learner data and daily attendance.

A summary of key findings and recommendations from the rollout is provided below. It shows how Wi De Ya has already yielded results in the form of improved teacher attendance, and how the data can be acted on to improve assurance and accountability in the payroll. It also provides new levels of information to help authorities understand the vulnerabilities of learners in primary schools.

In this report, we identify:

1. How the national implementation of Wi De Ya will fill existing data gaps, enabling continuous targeted education improvements tailored to meet demand and individual learner needs.

2. How data collected during the limited rollout of Wi De Ya to 300 primary schools already provides significant actionable opportunities, illustrating the breadth of possibilities provided by Wi De Ya to improve education.

3. Operational considerations, in addition to those already shared, to aid the successful scaling up of the system.

1.1. Potential for Further Application

The government's decision to increase transparency by checking the payroll against reality using Wi De Ya highlights significant opportunities to improve effectiveness of education service delivery through the potential reallocation of resources. Schools with the greatest human resource gaps, or teacher needs, can now be identified before being more effectively managed: school leaders are able to influence the hours teachers work. Teacher quality improves as they work to meet minimum attendance requirements, managed and enforced by an empowered school leader. Savings can be achieved by identifying inactive teachers and removing them from payroll if they no longer teach, or by sanctioning pay, in line with policy, for prolonged unauthorised absenteeism.

The Ministry of Basic and Senior Secondary Education (MBSSE) Education Management Information System (EMIS) Department is building a school master list developed from the Annual School Census (ASC). Wi De Ya starts from the government payroll, and can therefore be used to supplement EMIS data, for example providing profiles of both teachers and learners. Profiles ensure that the MBSSE can understand individual learning needs as required by the *Education Act 2023*[7], which aims to improve learning outcomes in the country by reforming the educational system to be more inclusive, accessible, and based on human rights. There is ongoing discussion within MBSSE to link these profiles to unique identification numbers, which would allow learners to be individually tracked throughout their school career.

Although it has been rolled out to 300 primary schools so far, the Wi De Ya app has been designed to be capable of being used at all levels of formal education including Early Childhood Development (ECD) centres and secondaries. More generally, its capabilities could be applied to other public services, like health.

6 MBSSE loaned the tablets, and CGA Technologies managed them, following the leadership of the TSC. CGA trained TSC and MBSSE staff to use the tablets and deliver training in turn to the schools.
7 GoSL, The Basic and Senior Secondary Education Act 2023 (hereafter Education Act), Part IV, para 20-22. https://mbsse.gov.sl/wp-content/uploads/2023/06/Basic-and-Senior-Secondary-Education-Act-2023-.pdf

1.2. Key Findings

Findings are based on the data collected from the app, which captures daily attendance, verified with biometrics for teachers and without biometrics for learners. The app builds individual profiles for each teacher, payroll and non-payroll, and each learner, within the 300 selected primary schools. If acted upon, the data collected from Wi De Ya already has the potential to improve the education landscape.[8]

1. 51% of payroll teachers are not teaching in their allocated school or are not teaching at all. Without knowing where its teachers are, efforts by the TSC to address teaching gaps through recruitment and teacher deployment are unlikely to achieve the impact desired[9].

2. The net total of payroll teachers found in Wi De Ya schools was only 86% of the number expected, indicating that 14% of payroll primary school teachers are not teaching in any government or government-assisted school.[10]

3. 31% of schools in the payroll system cannot be mapped to MBSSE school data (2022 Annual School Census) due to the use of conflicting school identifiers (SID vs EMIS code). This means that a significant proportion of payroll teacher whereabouts cannot be robustly verified.

4. 43% of active teachers are not on the payroll, including 11% of school leaders. TSC therefore does not know the names, nor can they influence or manage 43% of the teachers. Furthermore, 11% of government schools are led by people unknown to the Ministry, without known qualification, or contact details.[11]

5. The average teacher attendance rate across the project was 72%. This breaks down to 81% for payroll teachers versus 65% for non-payroll teachers. Teacher attendance appears to be affected by payroll status, age, and the day of the week but not affected by gender or rurality of the school.

6. Teacher and learner attendance improved. 96% of school leaders said that teacher attendance and punctuality improved because of Wi De Ya[12] and 90% said that learner attendance improved.

7. The average learner attendance rate across the project was 80%, with 1 in 5 students absent on any given day according to the data collected.

8. Maternal data is linked to a higher rate of absenteeism. A pregnant mother is more than twice as likely to not attend on any given day: there is a 45% absence rate for pregnant learners, while only a 21% rate for those with no maternal status.

9. Internet provision at school can be achieved at reasonable cost. Data cost through the Wi De Ya access point network (APN) averaged 1,600 SLE/month (approximately $76) total across all 440 SIM cards, of which 300 were schools reporting data.

8 Please note limitations of the data as stated in Section 2.5.
9 School leaders' explanations for this varied, such as: an uneven distribution of teachers; a significant proportion of schools that are unapproved and therefore they have no payroll teachers assigned and they are self-transferred; or a preference to live in urban locations.
10 A net total of 1,703 payroll teachers were expected to be found in the 300 schools, however there were only 1,467.
11 Non-payroll teachers serving as volunteers and contributing to learning outcomes may receive a stipend from the school through the subvention or through unofficial community charges at the school.
12 See Conclusion Section of the School Leader Survey at Annex C.

10. School leader reporting is affected by the day, payroll, school size, and tablet quality. More specifically, attendance reporting dropped on Fridays; the payroll status of the school leader affected their attendance; reporting at larger schools is more difficult but widely achieved; and tablet quality improved reporting. School leader reporting is less affected by the number of visits paid to their school by district officers, initial comfort with information technology (IT), and the rurality of the school.

1.3. Key Recommendations

The following recommendations should be enacted in tandem with the next phase of the Wi De Ya implementation to truly realise the benefits and opportunities the system brings. While alternative systems may be available for each individual recommendation, this report evidences how Wi De Ya not only improves workforce and payroll management but can provide data to support evidence-based decision making to strengthen Sierra Leone's education system and achieve the Government's vision.

300-School Data

1. Findings. Enact the recommendations identified in Section 3 and Section 4 that result from the findings of the 300-school rollout of Wi De Ya relating to who learners and teachers are, their attendance, and operations.

Workforce

2. Governance. It is recommended that a Payroll Steering Committee is established with the mandate to review and scrutinise the Accountant General's Department (AGD) monthly payroll reports in relation to attendance data captured from Wi De Ya. Establishing a Payroll Steering Committee allows for proper management, maintaining integrity, and the regular sanitisation and improvement of the education budget. The committee should investigate and take action on payroll irregularities, such as unauthorised leave and transfers, ghost teachers, and teachers with chronic unauthorised absences, and enforce sanctions as per policy. With the fiscal space provided, the TSC can take steps to employ more teachers.

3. School identifiers. Migrate teacher payroll (under AGD) from the old SID school identifier to the new EMIS code, to ensure that teachers can be robustly mapped from payroll onto school datasets. MBSSE needs to finalise and approve a mapping between these identifiers so that AGD can enact the migration. This is critical to allow all education data systems, including Wi De Ya, to perform robust analysis and verification of payroll teacher distribution.

4. Alignment to learner need. Mechanisms and processes should be established within each level of education management to use the learner data provided by Wi De Ya, and/or other potential data sources, to inform and shape the teaching workforce to meet the needs of learners, achieve the Ministry's pupil-qualified teacher ratio (PQTR) standard and ensure improved diversity, equity and inclusion.

5. Non-payroll teachers. Non-payroll teachers need to be known, assessed and regularised. The child protection and accountability risks associated with not knowing who 43% of the teaching workforce are cannot be understated. Wi De Ya provides never-before-known data on individual non-payroll teachers and is the only system that provides the data that enables these risks to be addressed.

Learners

6. Learner transition. Tracking learners as they transition between each education level – primary, junior secondary school (JSS) and senior secondary school (SSS) - will enable the government to identify and address barriers, risks and needs to improve successful transition to the next stage of school. Wi De Ya is capable of tracking learners throughout their school career. To fully realise this ability, Wi De Ya should be implemented across all education levels.

7. Out of School Children. Wi De Ya is able to identify children at risk of dropping out of school. This needs to be linked to support to reengage with school and learning. To achieve this it is recommended either: an OOSC management information system (MIS) is created to register and support OOSC, which is linked to the Wi De Ya Learner MIS system; or, expand Wi De Ya to include OOSC management and monitoring.

8. Individual learner profiles. Leverage Wi De Ya to cement the collection and use of disaggregated learner information to ensure the education system meets learner needs. Profiles mean that students exist in the eyes of the government, and the school can review how teachers and projects affect learning outcomes. Knowing who learners are is the only way to know if Radical Inclusion is being implemented. Linking data to other data (for example exam results from West Africa Examinations Council) will enable impact measurement of projects nationwide.

Operational

9. Systems and training. Technology and hardware will have limited or no impact on improving education without the systems, processes and training. Tablets or other technology should be procured in conjunction with associated systems and training.

2. INTRODUCTION

2.1. Overview of Report Content

Section 2 covers how Wi De Ya works, the different data points it collects, and the limitations of data collected under the first national phase.

In Section 3, we provide an analysis of teacher and learner data collected during the 300 primary school phase and make recommendations for action. Data analysed includes: learner vulnerabilities (maternity status and special needs); the teaching workforce (payroll and non-payroll); learner and teacher attendance, absenteeism and potential payroll and learner subsidy savings. We also provide insight into the opportunities and impact potential of Wi De Ya data when the system is rolled out to all schools collecting year on year daily learner and teacher data.

Section 4 discusses the operational considerations, what has been done, its efficacy and recommendations for the next phase. As well as covering the scope of data collection, this includes recommendations on governance, administration and management, staffing capacity and needs as well as recommendations on technology and hardware and alignment to EMIS and other datasets.

Finally, in Section 5 we make our conclusions and provide guidance on next steps towards implementing a 1500 and 4000 school scale up.

For detailed survey results from the evaluation rather than the analysis of, please see Annex C for School Leaders Feedback, and Annex D for District Staff Feedback. For operational assessments please see the Completion Reports for the 5–, 60– and 300–school phases.[13]

2.2. Project Background

CGA Technologies was contracted by the TSC in partnership with MBSSE to build and roll out Wi De Ya (*We Are Here*) – https://wideya.org/ – a teacher and learner attendance monitoring system (AMS).

The purpose of Wi De Ya is to support learning quality and access under the FQSE programme. Wi De Ya contributes to the Government of Sierra Leone's (GoSL) commitment to develop a system for collecting daily recurring school-level data. Specifically, Wi De Ya aligns with, supports, and fulfils key Government education policies, strategies, and plans, including:

- The Education Act 2023, which states:
  - *94. (1) The regular collection of accurate data and analysis across all levels in the education sector increases the Ministry's ability to make informed decisions and appropriate response actions on long term planning, budgeting and to respond appropriately to crisis situations.*[14]
  - The responsibility of '*collecting, managing and producing accurate and reliable school level data and statistics*'[15] lies with MBSSE, which is required to '*track key performance indicators including teacher and pupil attendance*'.[16]

13 CGA Technologies (2022, 2023) Freetown: TSC. On file with the author and publisher, available on request.
14 GoSL, The Basic and Senior Secondary Education Act, 2023. Part XVI, para 94 (1).
15 Ibid, Part II para 4 (i).
16 Ibid, Part XVI para 94 (2).

- Radical Inclusion Policy 2021, which focuses on the '*the removal of all infrastructural, systemic, policy and practice impediments that limit the learning for any child'* with particular emphasis on *'the inclusion of historically marginalised groups: pregnant girls and parent learners, children with disabilities, children from rural and underserved areas, and children from low-income families.*'[17]

- The 2022-2026 Education Sector Plan, which commits the government to '*Train school leaders in government and government-assisted primary schools on the use of tablets for data collection and reporting (6.9.3).*'

- The 2017 GoSL Payroll Strategy, which recommends the '*use of AMS should be considered, particularly for ministries, departments and agencies (MDAs) or sectors with a lot of out posted personnel and officers working in the regions.'*

Wi De Ya is funded by the Multi Donor Trust Fund (World Bank, Global Partnership for Education (GPE), European Union (EU), Irish Aid, and Foreign, Commonwealth and Development Office (FCDO)) supervised by the Free Education Project Secretariat (FEPS).

What is Wi De Ya?

Wi De Ya is a tablet-based system used to collect previously unknown, accurate, and near real-time data on teacher and learner information, as well as their daily attendance. The data can then be analysed and used by education officials and school administrators for education-related planning and decisions (such as teacher sanctions and incentives, school subsidies, teacher deployment). This data-driven decision-making results in stronger teacher management, enhanced transparency, and accountability in the teaching service, and improving the integrity of the teacher payroll.

The Wi De Ya system consists of:

1. A data collection application for use on tablets (and other mobile devices)
2. A secure cloud-based database used to store and manage data collected
3. A website (https://wideya.org/) with a series of data dashboards that auto-generate analysis and graphs for policymakers, district-level officials, and school leaders.
    a. Public facing dashboards with aggregated information
    b. Private dashboards with individual teacher learner profiles behind authorised log-ins

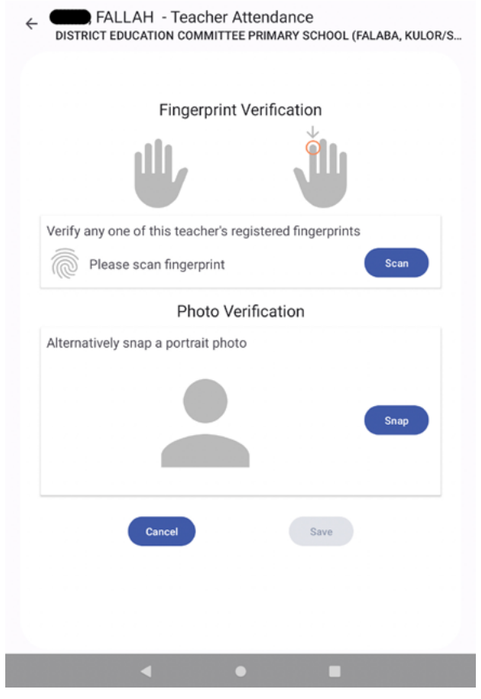
This accessible data allows the TSC, MBSSE, and stakeholders, including government parastatals like the Public Sector Reform Unit (PSRU), to support the Ministry of Finance (MoF) in its task to be fiscally responsible.

Wi De Ya is built upon the 2020 pilot of the Sierra Leone Education Attendance Monitoring System (SLEAMS) for teachers (https://sleams.org), and is integrated with the TSC-managed Teacher Records Management (TRM) system, which stores and manages digitised personnel files linked to the teacher payroll (https://tsctrm.org). Its two active functions include:

- Collecting daily teacher and learner attendance, verified with biometrics for teachers and without biometrics for learners. Figure 1 (below) is a screenshot of a sample fingerprint page for teachers.
    - The majority of schools during the 300-school phase used photographs to verify teacher attendance. 57 schools (30 in Western Area Urban, 18 in Falaba, and 9 in Kono) were issued TSC-owned fingerprint scanners and so verified teacher attendance using fingerprints. These schools were part of the 60-school rollout in December 2022.
    - *Use of* fingerprint scanners is generally preferred by school leaders for the speed and accuracy it provides, and these are expected to be available in the next phase.

17 GoSL, 2021, National Policy on Radical Inclusion. Freetown.

Figure 1. *Screenshot of the biometric page on teacher profile*



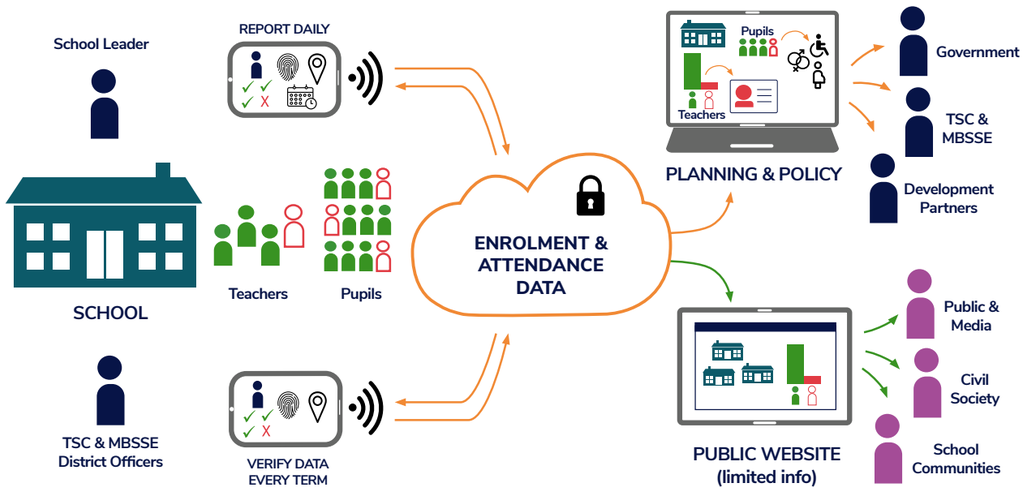
- Building and storing profiles for each learner and teacher (both payroll and non-payroll)

The existing system of using paper records makes aggregation more complex. In contrast, Wi De Ya users can easily view analysis of:

- Who non-payroll teachers are
- The exact number of current learners
- Vulnerabilities: the intensity, distribution, and prevalence of special needs
- Where pregnant learners are
- Dropout rates of all groups, where the technology enables aggregation.

Using this Wi De Ya data, the MoF can pay correct school subsidies and payroll, and potentially reduce operational costs. It can also be used to ascertain the retention and dropout rate of learners and girls.

Figure 2. *Wi De Ya workflow: users and the data*



Wi De Ya Development

There were four distinct phases to the contract phase: inception, pre-piloting, 60 schools, and 300 schools. This report marks the end of the first national phase where Wi De Ya was rolled out to 300 primary schools across the country.

The next phase of the project – rollout to 1500 and then 4000 schools – is yet to be procured. Timely scaleup of Wi De Ya is critical if the government is to meet and monitor its education commitments. For example, Wi De Ya allows reliable monitoring of the Free Education Project intermediate results indicator for the 'share of schools receiving performance-based financing meeting eighty-five percent (85%) attendance rate for teachers and learners.' The target for each is seventy-five percent (75%) of schools achieving it by September 2025.[18]

2.3. Project Data Collection Processes

The first major component of Wi De Ya is data collection. The data collection methodology is decentralised to school leaders with District staff serving as quality assurance officers and trainers.

- To collect information on teachers and learners:
    a. Headteachers complete teacher and learner profiles in the app. For payroll teachers, fields linked to the payroll including Personal Identification Number (PIN), National Identification Number (NIN), National Social Security and Insurance Trust (NASSIT), etc are non-editable.
    b. Assigned District staff monitor the completion and quality of profiles through the Wi De Ya website.

- To collect information on attendance:
    a. Headteachers submit daily learner and teacher attendance into the app–with biometrics for teachers and without biometrics for learners.
    b. The assigned District staff monitor which schools have not submitted and follow up to ensure attendance data is being collected.

The second major component of Wi De Ya is the display of the data. Actionable information is displayed on the dashboard on the Wi De Ya website (https://wideya.org/). This includes any payroll action that can be taken, learner vulnerabilities to follow up on, and attendance trends to inform interventions. The action resulting from Wi De Ya is outside the scope of this project, however, Section 4 addresses the processes and systems that need to be developed within TSC and MBSSE in the next phase to ensure data is analysed and actioned.

2.4. Utilising the Collected Data

The data used in the Section 3 analysis include approximately 3,300 inactive/active teacher and 98,000 learner profiles and attendance data, feedback surveys from 120 school leaders and 63 District staff, 2022 ASC data, and payroll data.

The data points and fields collected have been intentionally selected to match information needs of TSC and MBSSE staff to understand current demand in schools and workforce distribution.

Who the people are is captured on teacher and learner **profiles**. This data enables:

- Tracking movement of teachers and learners between schools over time
    - When Wi De Ya is present at receiving and sending schools then the learner or teacher can be confirmed to have successfully transitioned or confirm a payroll change.
- Establishing accurate learner counts and verification for fairer allocation of school subsidies.
- Verification of teachers with photographs and fingerprints (biometrics).
- Capture reasons why teachers have left schools they are assigned to on the payroll.
- Procedures to continually update the payroll. Wi De Ya data can be used to identify mismatches between teacher payroll and reality as changes occur, enabling:
    - Regulation of unauthorised teacher transfers.
    - Removal of non-working teachers.
    - Acknowledging unpaid staff.

Tracking daily attendance for teachers and learners means the government and supporting actors can:

- Reward consistency of teachers, this can be in the form of recommendation through Community Teachers' Associations (CTAs) and chiefs for community recognition, or through the TSC reward system identified in the Sanctions Framework.[19]
- Sanction teacher absenteeism under the guidelines as laid out in the Sanctions Framework.[20]
- Empower school leaders to control teacher attendance and manage school data.[21]
- Flag and mitigate learner dropouts in tandem with the provisions in the Education Act of 2023, which states that 'a school shall keep an accurate and up-to-date register of pupils enrolled in the school including a record of the name and address of the pupil.'[22]

2.5. Key Limitations

1. Learner special needs assessments are conducted by school leaders who are non-specialists. The assessments are not to be viewed as diagnoses but to guide teachers in developing learning plans or sign posting further action.

2. The teacher and learner profiles have many optional fields. Thus, it becomes unclear whether missing data (such as the learner needs assessment or maternal status) is because the learner does not fall into the indicated category or because the school leader has not yet completed the section in the profile.
    a. We consider this best practice in order to enable school leaders to complete the profiles at their convenience without additional support.

3. All survey data is self-reported by school leaders and District staff. There may exist response bias (those in hard-to-reach areas may have more difficulty accessing the survey) and social-desirability bias (a desire to present oneself as high performing in the job).
    a. Many questions were also based on scales of 1 to 5 where the interpretation may vary based on the individual.

4. The findings are measured without holding all other variables constant. When looking at the difference in absenteeism, for example, we do not know if this is due to the condition itself or also partially explained by another variable. For example, if all learners recorded with dwarfism were also above the age of 10, we are unsure if it is age or dwarfism that is causing a higher absenteeism rate.

5. The sample size for those with other common conditions and maternal status is relatively small to the national population and limited in number. While this limits the inferential power of the results, the findings can guide future research and data collection efforts.

18 Shojo, M. (2022) Disclosable Restructuring Paper - Sierra Leone Free Education Project - P167897. https://documents1.worldbank.org/curated/en/099020009222235371/pdf/P1678970ada33a0c30b47509cedce5924c0.pdf

19 Sierra Leone Gazette Vol. CXLXIII No 64 section 12. 14th September 2022
20 Ibid.
21 Government of Sierra Leone. Education Act 2023. Part XIII, paragraph 87 (1).
22 Ibid.

6. The data only captures children with disabilities that are enrolled in school. It is expected there are many more children with disabilities who have either never been enrolled in school or have dropped out because they do not have the support needed to attend, and / or face stigma. Findings from the National Strategy for Out of School Children in Sierra Leone (2022) show that children with disabilities face stigma and discrimination as they are viewed as less capable to contribute to society and their parents often choose not to send them to school.[23] As Wi De Ya is scaled to all schools, authorities will be able to identify those that drop out or are at risk of dropping out, but more is needed to identify those who have never been enrolled in school.

23 MBSSE, 2022. National Strategy for Out of School Children in Sierra Leone, Sierra-Leane-National-OOSC-Strategy.pdf (mbsse.gov.sl)

3. ANALYSIS OF 300-SCHOOL ROLLOUT DATA

This section discusses the data from the profiles of learners and teachers and correlates it to attendance rates. We then discuss what we can learn from the data on learners and from the data on teachers. In each subsection we discuss findings and then make recommendations that arise from the new information where they relate to existing policy and management.

3.1. Methodology For Analysis of The School Data

The primary schools selected for the 300-school rollout phase of Wi De Ya were purposely selected as a representative sample of rural and urban schools in every district. In each district, chiefdoms are the smallest subdivision with education staff allocated.

In each district, one urban and one rural chiefdom was selected so as to meet the different types of challenges as early as possible in the scaleup, such as large schools and hard to reach areas. The result is a close but not an exact alignment with the average school profile. See Annex B for a school profile comparison.

The system remains live and therefore the data points will change on a daily basis.

Data: Margin for Error

The data may only be applied to the broader population in the broadest of terms, due to the selection bias arising from choosing the largest and most rural schools. We discuss a margin for error that is only applicable where the same selection criteria are used to implement the same process again.

Taking a population size of 82,779 teachers nationally,[24] our sample of 3,348 would give a range of 2.18%, assuming a normal distribution (50% chance of being higher or lower than the mean) and a 99% confidence level. Where our questions focus on a narrower group (for example rural schools) or there is not a normal distribution, the margin for error will increase proportionately and only apply to schools that meet the same criteria. For data points across the entire teaching population, we expect the extrapolated number to be within 2.18% of our estimate 99% of the time. For example, 20.45% of the participating teachers are absent each day, therefore we broadly expect that teacher absenteeism would be between 18.27%-22.63% in 99 cases out of 100 attempts.

On an estimated population size of 2,695,590 learners,[25] our sample of 97,860 learners gives a margin for error of 0.40% on a 99% confidence.

Confidence interval is: $$CI' = \hat{p} \pm z \times \sqrt{\frac{\hat{p}\,(1-\hat{p})}{n'} \times \frac{N - n'}{N - 1}}$$

Where:

- CI = confidence interval is that were estimates made on multiple occasions, in approximately 99% of the cases, the true population parameter would be contained within the margin for error.
- z = z score: The z-score is the number of standard deviations a given proportion is away from the mean. (z score for 99% confidence is 2.58)
- $\hat{p}$ = the population proportion (taken as 50%, which is 0.5)
- n' = the sample size (registered profiles)
- N = the population size (approximate scale of teaching workforce and school learners)

24 MBSSE (2021) 2020 Annual School Census Report. Freetown: Government of Sierra Leone. https://www.dsti.gov.sl/wp-content/uploads/2021/07/ASC-2020-Report.pdf. ASC 2022 data has not been published or made available at time of analysis.

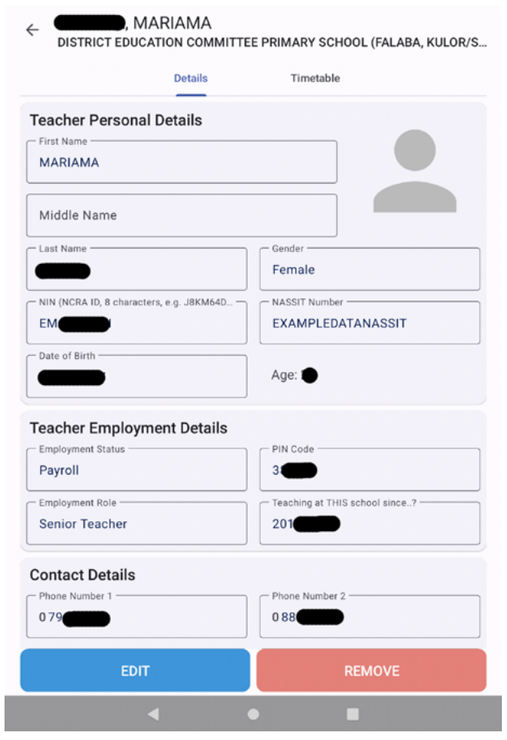
25 Ibid.

3.2. Learner and Teacher Profile Completion Rates

Wi De Ya collected detailed information to the level of individuals of approximately 3,300 teachers and 98,000 learners. The total number of teachers, at time of writing, consists of 2,260 unique payroll teachers, of which 1,467 are active and whose profile data was collected and 793 were not found whose removal reason was recorded, and 1,088 non-payroll teachers. Profile completion percentages are relative to the number of active profiles.

Payroll teacher profiles had key details drawn from the payroll: date of birth and NIN for example. Figure 3 shows a sample payroll teacher profile.

Figure 3. *App screenshot of an example teacher profile*



Non-payroll teacher profiles were created from scratch by the school leader, providing the TSC with detailed information about non-payroll teachers.

Figure 4 and Figure 5 (below) show to what extent profiles were populated. This highlights the extent to which school leaders filled in the information and shows the information that is not readily available to school leaders.

Key Findings

Key learner information is incomplete, with over half the learners missing guardian information and only 36% having admission numbers. The Basic and Senior Secondary Education Act 2023 states that '*a school shall keep an accurate and up-to-date register of pupils enrolled in the school including a record of the name of the pupil, the enrolment data and person who has primary care of the pupil and the address of the pupil.*' The information collected needs to be stored where it is easily accessed at school and local government level. Not having this information is a violation of the law and a significant safeguarding risk. Wi De Ya collects this information and would be able to support the implementation of a guardian information policy. Through Wi De Ya the information is collected once, held centrally and accessible by authorised personnel.[26]

It is unclear whether schools do not have guardian information or if they did not have time to complete the learner profiles. Guardian information enables schools to contact learners' families or follow-up on learners who have poor attendance or high rates of absenteeism, for example. In the case schools do not have the information, it is critical for education officials to follow up with the school leaders to obtain information about the guardians of each of their learners.

Without admission numbers, learners cannot be tracked throughout their school careers. This highlights a lack of quality record keeping for student information at schools.

26 GoSL, Education Act 2023, Part XIII para 87 (1)

Learner needs assessments were conducted for 39,210 learners using the Washington group set of questions. This is a drastic improvement from the status quo, where no learners had been assessed. Having information on learners' needs will help ensure these learners get the support they need and allow resources to be better allocated. Those not assessed were reportedly because school leaders had no information to give them cause to complete the assessment. See Section 3.4.1.1 for analyses on learner special needs.

Of 50,129 female learners, 13,754 (27%) were assessed for their maternal status. School leaders report they did not complete maternal assessments because they are in primary schools and there were no pregnant learners / mothers in their schools. Information on maternal status is critical for understanding the adoption of the law enabling pregnant girls to attend school. See Section 3.4.1.2 for maternal status analyses.

61% of teachers do not have a registered date when they started teaching at their current school. This data is input manually by the school leader for all teachers, both payroll and non-payroll. Capturing this data on Wi De Ya improves information held on non-payroll teachers that can be used to better understand the teaching workforce and potentially support their recruitment onto the payroll. For payroll teachers, it identifies how long they have been working at the school and can be compared to their recruitment records when investigating unauthorised teacher movements.

15% of teachers do not have phone numbers registered. We cannot say whether they do not have phones or whether the information was not completed. For those without phones, there are potential challenges for communication with the teacher and for accessing any system that requires authentication via phone or phone number.

3% of teachers registered email addresses showing the expected result that very few actively use an email account.

The percentage of fingerprint registration is low as only 57 of the 300 participating schools had access to fingerprint readers.

Figures 4 and 5 show the completion rate for each field of interest on learner profiles and teacher profiles across all 300 schools.

Figure 4. *Learner Profile Completion*

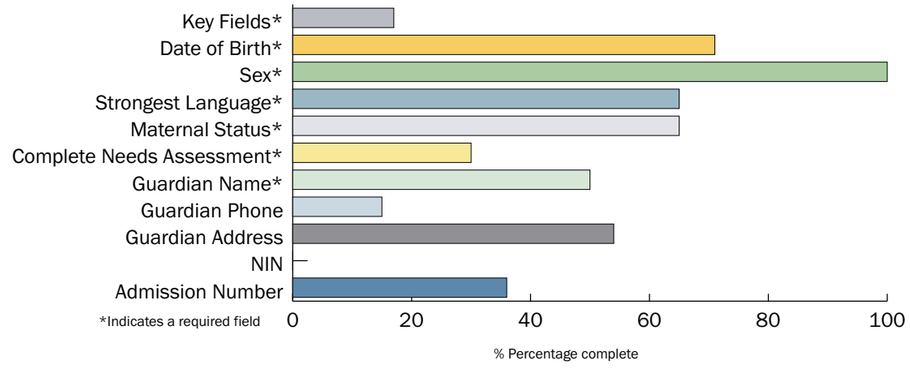
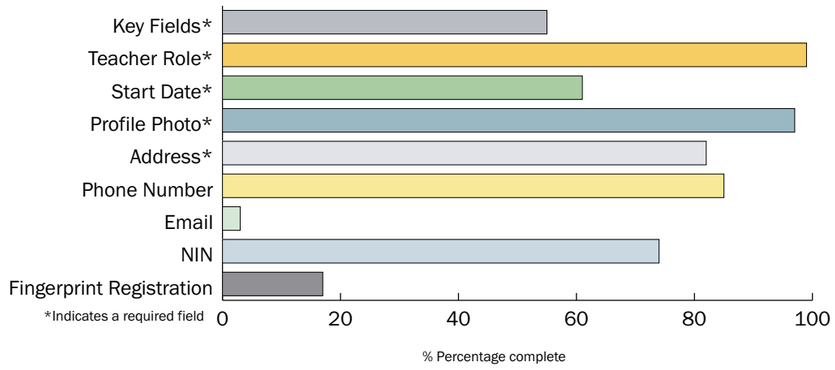


Figure 5. Teacher Profile Completion



MBSSE has not yet issued learners with a learner ID number, as the process for allocating them is in the design phase. Wi De Ya is more than capable of allocating unique learner IDs offline and without conflict during initial offline registration. In order to enrol more learners within schools without conflicts, buckets of numbers could be allocated to user accounts. A compound ID from admission numbers and school IDs had been considered throughout this academic year.[27]

MBSSE is considering an exclusionary option of requiring learners to acquire a NIN first before acquiring a learner ID. If a child is not already known to the government, or does not have a responsible adult to acquire a NIN, they may be excluded from acquiring a learner ID.

Learner and Teacher Profiles: Recommendations

As Wi De Ya is rolled out, direction from the TSC and MBSSE will affect profile completion rates. This guidance will be affected by the usefulness of the data for education staff. School leaders will also have more time to complete profiles when the tablets are with them permanently, meaning that certain information can be collected from home or other relevant source as necessary. District staff will have a role in supporting the teachers to complete this information. Recommendations for learner and teacher profiles are therefore:

1. Enforce the requirement for schools to keep learner records, including name, enrolment data and primary carer details as per the law. The national scaling of Wi De Ya will support these efforts.

2. Admission numbers must be generated during admission in order for schools to track learners through their school career. If national learner IDs are implemented, it is essential that they are non-exclusionary. National learner IDs must not become a barrier to accessing education by compelling children to register with a government body first.
    a. Wi De Ya supports the generation of admission numbers because school leaders have to generate an admission number to find a learner in the following year. Whilst admission numbers are useful at the school level, we understand that there is an appetite for a harmonised system of learner IDs.

3. In order to expand assigning of the NIN, decentralisation of some National Civil Registration Authority (NCRA) operations may enable greater collaboration with local councils to ensure registration of childbirth. In tandem with the National Social Protection Strategy,[28] MDAs should use this data to affect broader child protection issues.
    a. This may go some way to mitigate the exclusionary nature of any learner ID that creates an additional barrier to entry and is rolled out for one time only, without building the ability of schools to generate internally.

27 Detailed notes on implementing a learner ID are on file with the author.
28 Ministry of Social Welfare, 2022, National Social Protection Strategy for Sierra Leone, 2021-2025.

3.3. Comparison to the Annual School Census (ASC)

Subventions to government and government-supported schools are based on the number of learners as reported by school leaders in the ASC. The ASC is conducted one year prior to subsidy payments, therefore the funding schools receive is based on old figures and does not take into account school population growth or shrinkage. These figures are also unverifiable and therefore may result in inaccurate subsidy payments.

Teaching workforce need is calculated based on a) the number and need of learners b) the assigned teachers. Without knowing *current* teacher numbers, the TSC must use last year's ASC to allocate teachers, working to last year's pupil to teacher ratios. We know that 51% of payroll teachers are not teaching at their payroll allocated school (see Section 3.5.1.) so remaining up to date is essential.

The collection of teacher and learner information provides an opportunity to cross-check the data with the ASC. Comparing across both sources will assess the reliability of either data source. Overlapping data that was collected include counts of teachers and learners, the age of teachers, and their respective genders.

Key Findings

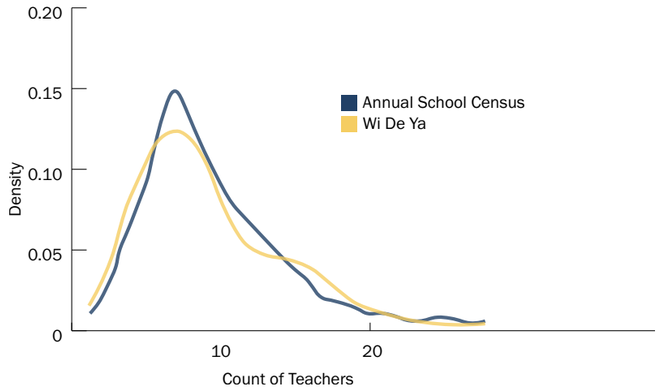
The general **distribution of teacher counts** follows similar trends between the ASC and Wi De Ya data (as shown in Figure 6); however, there are a number of schools with significant differences between the two sources, with Wi De Ya figures in most of these cases indicating schools have increased teachers since ASC 2021-2022 data collection. In three schools the difference between the sources was more than ten, four schools had differences between five and nine (as shown in Table 1).

The reason for this could include differences between the data sources. Wi De Ya reports near real-time data from June 2023, whereas ASC represents the whole 2021-2022 academic year, as reported by school leaders and enumerators. School size could potentially have increased or reduced over the two-year difference in reporting. For example, four schools in Wara Wara Yagala Chiefdom, Koinadugu, have increased teacher numbers to accommodate high learner growth (Tables 1 and 2). In addition, by the nature of their employment, it is expected that non-payroll would be more temporary, and, as reported in Section 3.5.1.1., it is known that half of payroll teachers are not teaching at their assigned school.

The **learner counts** in 2021-2022 ASC data trend higher than learners' counts in 2022-2023 Wi De Ya data (as shown in Figure 7). Table 2 below shows four schools had a difference of more than 300 between figures in the ASC and Wi De Ya, 14 schools had a difference between 200 and 299, and 11 schools had a difference between 100 and 199.

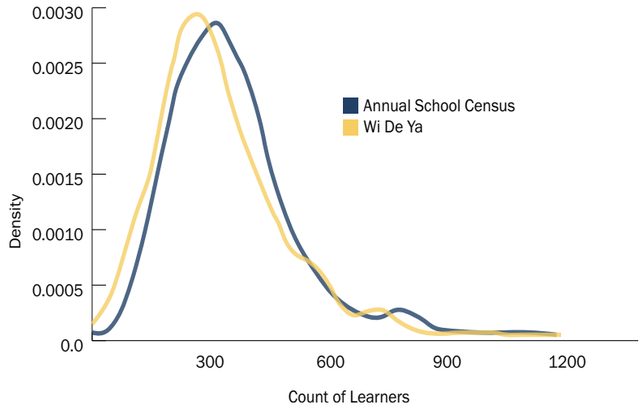
There are a number of potential reasons for this difference, including inaccurate learner counts, a natural decline in student population between the two academic years, or school leaders not completing their learner lists in Wi De Ya. For example, the school leader at Ahmadiyya Muslim Primary School in Pujehun stated that they had not completed all profiles by the end of the academic year (AY) 2022-2023 school year, which accounts for the discrepancy with ASC data. While the Wi De Ya learner lists may not be accurate yet due to limited time to complete profiles, in future iterations any discrepancies with the ASC should be followed up on.

Figure 6. Comparison between the count of teachers in AY 2021-2022 ASC and AY 2022-2023 WDY data for the selected 300 schools.



The distributions are relatively similar.

Figure 7. Comparison between the count of learners in AY 2021-2022 ASC and AY 2022-2023 WDY data for the selected 300 schools.



The ASC trends to be slightly larger than WDY.

Table 1. Highlights schools whose number of teachers deviate drastically from the 2022 ASC count of teachers.

				Payroll		Non-Payroll		Total		Diff. of total
EMIS	School Name	Chiefdom	District	ASC	Wi De Ya	ASC	Wi De Ya	ASC	Wi De Ya	
2201-2-04719	Missionary Church of Africa Primary School	Delemandugu	Falaba	0	2	1	2	1	4	3
2208-2-04830	Missionary Church of Africa Primary School	Mongo	Falaba	1	2	7	2	8	4	4
2310-2-05276	District Education Council Primary School	Wara Wara Yagala	Koinadugu	5	12	1	3	6	15	9
2310-2-05313	Roman Catholic Primary School Senior,	Wara Wara Yagala	Koinadugu	3	9	2	4	5	13	8
2310-2-05332	District Education Committee Primary School	Wara Wara Yagala	Koinadugu	3	9	1	6	4	15	11
2310-2-05334	District Education Council Primary School Junior	Wara Wara Yagala	Koinadugu	1	9	5	3	6	12	6
2407-2-05556	Sierra Leone Muslim Brotherhood Primary School Upper	Kholifa Rowala	Tonkolili	8	18	0	2	8	20	12
4109-2-06844	Tauhid Islamic Primary School	Kakua	Bo	11	5	4	3	15	8	7
4205-2-07331	Islamic Call Society Primary School	Jong	Bonthe	10	14	0	8	10	22	12
4205-2-07359	Roman Catholic Primary School	Jong	Bonthe	3	6	0	1	3	7	4
5205-2-10557	Sammyc's Primary School	East III	Western Area Urban	7	9	2	4	9	13	4

Table 2. Schools whose number of learners deviates drastically from the 2022 ASC count of teachers.

				Count of Learners		
EMIS CODE	School Name	Chiefdom	District	ASC	Wi De Ya	Difference
1208-2-01167	Al-Qudus Islamic Primary School	Lower Bambara	Kenema	320	104	216
1212-2-01292	Kenema District Education Committee Primary School	Nongowa	Kenema	337	129	208
1212-2-01321	Al-Qudus Islamic Primary School	Nongowa	Kenema	346	127	219
1304-2-01541	Waidu Community Primary School	Gbense	Kono	320	81	239
1304-2-01544	Assemblies Of God Church Primary School	Gbense	Kono	234	19	215
1304-2-01553	Holy Ghost Royal Academy Primary School	Gbense	Kono	286	121	165
1312-2-02236	Methodist Community Primary School	Soa	Kono	231	98	133
1312-2-02238	Roman Catholic Primary School	Soa	Kono	194	45	149
1312-2-02240	Sierra Leone Muslim Brotherhood Primary School	Soa	Kono	298	97	201
1312-2-02266	Kankalay Islamic Primary School	Soa	Kono	217	341	124
1312-2-02275	Morial Pentecostal Primary School	Soa	Kono	170	76	94
2102-2-04113	District Education Committee N.B.C. Primary School	Bombali Sebora	Bombali	285	442	157
2102-2-04120	District Education Committee Primary School	Bombali Sebora	Bombali	405	190	215
2107-2-04311	Community Primary School	Magbaimba Ndorwahun	Bombali	120	333	213
2201-2-04719	Missionary Church of Africa Primary School	Delemandugu	Falaba	2	243	241
2208-2-04825	Ansarul Islamic Primary School	Mongo	Falaba	606	283	323
2208-2-04833	Roman Catholic Primary School	Mongo	Falaba	120	289	169
2301-2-04989	Roman Catholic Primary School	Diang	Koinadugu	278	125	153
2301-2-04996	Ansarul Islamic Kondobaia	Diang	Koinadugu	263	115	148
2310-2-05276	District Education Council Primary School	Wara Wara Yagala	Koinadugu	344	588	244
2310-2-05332	District Education Committee Primary School	Wara Wara Yagala	Koinadugu	161	391	230
2310-2-05334	District Education Council Primary School Junior	Wara Wara Yagala	Koinadugu	169	347	178
2419-2-06041	Benevolent Islamic Primary School	Yoni Mamaila	Tonkolili	164	355	191
4109-2-06866	Grace Academy Primary School Sheriff Town	Kakua	Bo	373	106	267
4205-2-07379	New Apostolic Primary School Mowagor	Jong	Bonthe	171	82	89
4408-2-08329	District Education Committee Primary School	Panga	Pujehun	120	294	174
4412-2-08409	Ahmadiyya Muslim Primary School	Soro Gbema	Pujehun	438	160	278
5103-2-08805	Ahmadiyya Muslim Primary School	Waterloo Rural	Western Area Rural	472	114	358
5201-2-09659	D.T Akibo-Betts Municipal Infants Primary School	Central I	Western Area Urban	375	145	230
5202-2-09698	Methodist Buxton Infants Primary School	Central II	Western Area Urban	170	76	94
5205-2-10498	New Hope Primary	East III	Western Area Urban	425	116	309

Comparison to the ASC: Recommendations

Based on the findings, the following is recommended.

1. Short term: All discrepancies between the ASC and Wi De Ya on learner or teacher counts at a school should be followed up by District level staff, starting with those schools with the highest differences (for those schools that confirm they have completed their learner profiles).
   a. Wi De Ya data can be verified by spot checks against individual profiles.
   b. The reason for any discrepancies should also be reported to develop a better understanding of learner and teachers counts and support data collection in both the ASC and Wi De Ya.
2. Long term: Expand the use of Wi De Ya to all schools to enable continuous identification and investigation of discrepancies and improve change management and subvention accountability.

3.4. Learner Analysis

Educational inputs in the form of resources and teachers need to align to and reflect learner numbers and needs. It is not sufficient to know only how many learners there are, it is also essential to know who those learners are and their individual needs. Wi De Ya collects individual learner profiles: phone number, NIN, disabilities, maternal status and reports attendance against each profile. This disaggregated learner data supports schools and education officials to better manage resources and support learners through a greater understanding of the specific learners, where they are, and their needs.

3.4.1. Learner Needs Assessments

Wi De Ya empowers school leaders to conduct individual learner needs assessments and report learner vulnerabilities, specifically pregnancy / maternal status and special educational needs. This is critical information that is otherwise not currently available. The identification and analysis of learner vulnerabilities enables targeted resource allocation to ensure female learners and learners with special needs are supported to stay in school. This disaggregated data also enables the monitoring of Radical Inclusion interventions and their progress against outcomes through the tracking of enrolment and attendance rates of specific groups of learners.

3.4.1.1. Learners with Special Needs

The Wi De Ya app asks school leaders to assess each learner's needs against the Washington Group Short Set (WG-SS). For the WG-SS, teachers on behalf of learners or learners are asked if they experience any difficulty with their vision, hearing, mobility, cognition (remembering and concentrating), self-care, and communication. The response options are 'No difficulty', 'Some difficulty', 'A lot of difficulty', and 'Cannot do at all'. WG-SS descriptions in the app were written in consultation with World Hope International to ensure the language used is culture specific.

Understanding learners with special educational needs '*promotes understanding, reduces prejudice and strengthens social integration*.'[29] There are an estimated 240 million children with disabilities worldwide, according to UNICEF. Many children with special needs often struggle with learning independently, requiring specialised teaching and more structured support. Most of these children are among the most unlikely to attend any kind of school, which denies them the opportunity to have a better life.[30] As special education facilities are unavailable in most communities, those that breach the barriers to school are most times enrolled in mainstream learning environments, and they are vulnerable to bullying and stigmatisation, increasing the risk of dropout.[31]

Learner needs assessments were conducted for 40% of Wi De Ya learners (39,210 out of 97,754). For those not assessed, school leaders reported they had no cause to complete the assessment, believing that learners for whom assessments had not yet been completed had no additional learning needs.

Key Findings

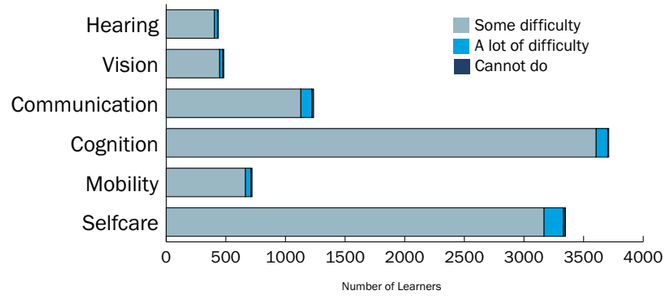
Of the 40% of Wi De Ya learners with a completed learner needs assessment, 9,932 (25.33%) are found to have some form/degree of special need. Of these, 9,412 are found to have some difficulty, and 452 a lot of difficulty.

There are 17 reports of learners with severe difficulties: 8 children cannot hear and 9 children who cannot see. For the 8 children with severe deafness, all are reported to have a lot of difficulty with other functions, including 2 children who cannot communicate, move or care for themselves, relative to other children of their age. There are also 52 children reported to have epilepsy, 6 with dwarfism and 4 with albinism. These figures indicate that, while low in number, children with disabilities are able to access mainstream education when they have the means and support to do so.

Cognition and self-care are the most widely reported special education needs, with 3,711 reported to have cognition needs, and 3,347 reported to have self-care needs. No learner was recorded as having severe cognitive difficulties. Further investigation and clarification are recommended to fully understand high reporting of the number of children with some difficulty in cognition and self-care.

29 UNICEF (2017) Inclusive Education - Including children with disabilities in quality learning: what needs to be done? (unicef.org)
30 Inclusive education | UNICEF
31 https://cgatechnologies.org.uk/projects/study-barriers-access-out-school-children-sierra-leone

Figure 8. *Number of learners with special needs*



Moyamba has the highest reported proportion of disabilities followed by Western Area Urban, Bo, Koinadugu and Pujehun. School leaders in Bombali and Western Area Urban are more likely to report that a child has special needs.

As there are relatively few (0.02%), those with severe learning needs could potentially be individually supported and monitored by District staff, and their schools provided with additional resources needed to ensure accessibility, including linking them to specialist organisations or non-governmental organizations (NGOs) to provide further support.

For schools with children reporting 'some difficulty', District staff could provide training to support school leaders and teachers to develop individual learning plans for each child, with additional monitoring to ensure progress is tracked and changes are identified.

3.4.1.2. Maternal Status

In 2019, the Government of Sierra Leone lifted the ban preventing pregnant girls from attending school. In 2023, this was written into law in the Education Act. Wi De Ya data enables the Government to ensure the law is upheld. It also enables the Ministry and partners to target support to individual learners to increase the likelihood they will stay in school, and to identify trends where additional resources may be needed, for example, to address high rates of adolescent pregnancy.

Of 50,129 female learners, 13,754 (27%) were assessed for their maternal status. School leaders reported they did not complete maternal assessments because there were no pregnant learners /mothers in their school, or they considered their learners too young to assess.

Key Findings

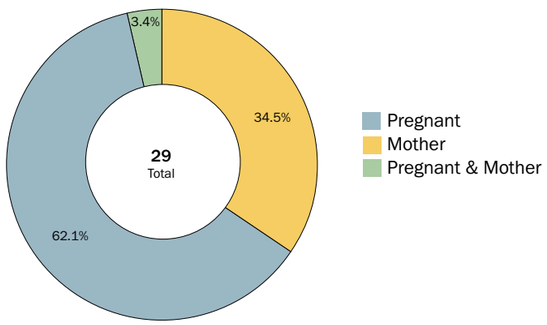
Of 13,754 learners assessed, 29 (0.2%) are reported as a mother and/or pregnant. This indicates that lifting the ban has enabled at least 29 female learners to continue their education where they would otherwise have not, including 11 who have been able to return to school after giving birth (Figure 9).

Given the average age range of pupils in primary schools (6 to 12 years old), low reporting of maternal status in Wi De Ya can be expected. However, among the 2,362 female learners aged 15-19 in Wi De Ya, seven are reported as a mother and/or pregnant. In contrast, UNFPA reports 10% of adolescent girls aged 15-19 years in Sierra Leone have given birth.[32] While these figures cannot be directly compared, as there is bias to the younger end of the group in primary schools, it does suggest underreporting of maternal status in schools

32 UNFPA, 2023. https://www.unfpa.org/data/SL

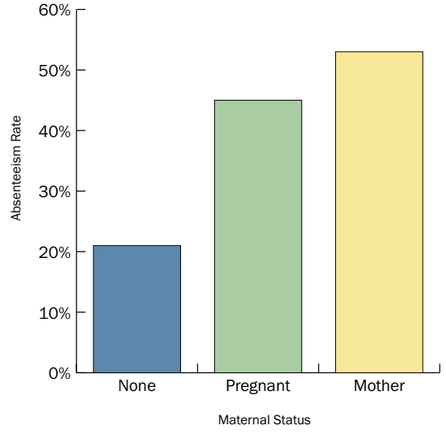
and/or continued exclusion of pregnant girls and parent learners. It also suggests continued stigma and further effort is needed to ensure access and inclusion in education for pregnant girls and mothers.

***Figure 9**. Maternal status*



Among those 29 learners who remain in school, mothers are twice as likely to be absent each day, with 53% attendance on average (Figure 10). This indicates a high risk of drop out and significant learning loss. The data also show these learners are more likely to be older, another factor which increases risk of absenteeism and drop out. These learners have been recommended for follow up by district teams.

***Figure 10**. Absenteeism of learners with maternal status*



In addition to those 29 female learners identified as having maternal status who are in school, since April 2023, 22 learners have been reported as having dropped out due to maternal status, including a number of boys. The reasons for this are unclear and require further investigation. Terminology for maternal and paternal absence / drop out may need to be reconsidered. Either way, this data does illustrate the ability of Wi De Ya to identify potential dropouts for follow up.

Learner Needs Assessments: Recommendations

Based on the findings, the following is recommended.

1. Strengthen the Special Needs Unit at MBSSE by providing specialised staff and resources to conduct regular special needs assessments in schools and monitor learners with special needs. Training should be extended to District staff, school leaders and teachers focusing on the development of individual learning plans and support for learners with special needs. There is also a need to put in place mechanisms to support further monitoring in schools to ensure progress is tracked and any changes are identified. Schools with learners with special needs should be targeted for additional support or resources to ensure accessibility and linked to specialist organisations or NGOs to provide further support and expertise.

2. Develop Standard Operating Procedures (SOPs) for schools and District officials on how to support learners with maternal status to stay in school. SOPs should include guidance on:
   a. Provision of support throughout pregnancy, including guidance, links with local health services and counselling;
   b. How to support them to return to school or into alternative pathways after giving birth. This should include consideration for childcare provision.
   c. Innovative learning options could also be considered, with a hybrid approach of in-classroom learning and remote learning to help maintain progress even with low attendance. See further activities in the National OOSC Study, 2021.[33]

3. Strengthening comprehensive sexual reproductive health education in the National Curriculum Framework and Guidelines for learners. It is recommended that Comprehensive Sexuality Education (CSE) should be enforced as a core subject in the national curriculum, because CSE is a key strategy of the GoSL aimed at reducing the high prevalence of teenage pregnancy and child marriage in the country. This is based on the UNFPA review of the National Curriculum Framework and Guidelines for Basic Education.[34] Instructions in CSE should be inclusive to both girls and boys.

4. School leaders were reluctant to discuss maternal status when follow up calls were made, suggesting stigma and lack of understanding of the purpose in reporting. Messaging around reporting maternal status in Wi De Ya should be reviewed to include its purpose – to support and signpost learners. A national campaign to raise awareness and destigmatise young mothers' enrolment and attendance in schools should also be considered.

3.4.2. Learner Attendance

Learner attendance at school is a necessary condition for learning and other schooling benefits, yet absenteeism is a significant issue for students in many countries.[35] Learner attendance has previously been identified as an area for improvement in Sierra Leone, with only 62% attendance at an unannounced visit.[36] A major objective of the Government of Sierra Leone is to achieve a target of zero out-of-school children.[37] This will only be achievable if individual learner, as opposed to aggregate learner, attendance is recorded, monitored and acted upon.

The ability to identify intermittent and or low attendance, in order to put in place support for the learner to re-engage in full-time education and avoid drop-out, should not be understated. Through recording

33 Graham, H., Kawa, M., Hayward, H. J., Murray, T., Conteh, S., Malyon, S. (2021) 'Out-Of-School Children Study Sierra Leone.' Freetown: Government of Sierra Leone and UNICEF. https://cgatechnologies.org.uk/projects/study-barriers-access-out-school-children-sierra-leone

34 UNFPA Sierra Leone, 2020, Review of the National Curriculum Framework and Guidelines for Basic Education Using the Sexuality Review and Analysis Tool (SERAT).

35 Evans, D. K., Acosta A. M., 2023. How to measure student absenteeism in low- and middle-income countries, Economics of Education Review, V96, https://www.sciencedirect.com/science/article/pii/S0272775723001012

36 https://www.educationpolicydashboard.org/indicator-barchart/sle/52/52

37 In addition to the ministry's stated goals, FEPS aims to achieve 85% learner attendance at 75% of its schools receiving performance-based financing by September 2025.

individual learner attendance, interventions can now be targeted, both at a micro- and macro-level and thereby improve learning outcomes better using limited resources. At the micro-level, individuals can be identified by school leaders and District staff as at risk of drop out and support provided to ensure they continue to engage in education. Perhaps more interesting is how the macro-level data from Wi De Ya can be used to provide support and interventions to improve school attendance, in particular for boys, older primary school children, mothers, as well as those with disabilities.

Key Findings

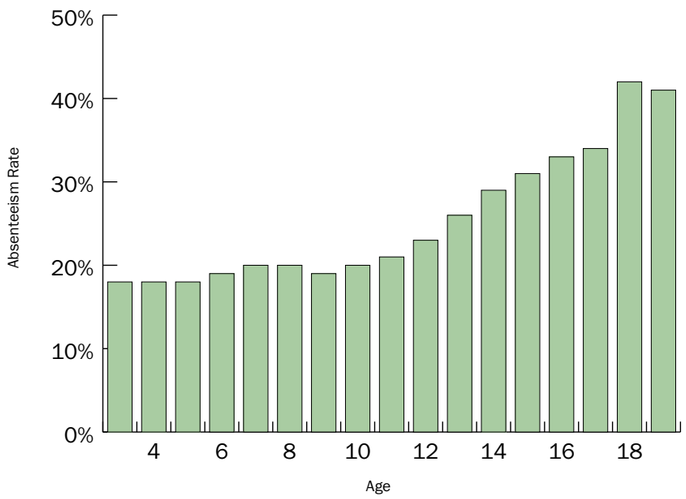
Based on a preliminary learner attendance data, on average, learners from the 300-school rollout are absent approximately 1 in every 5 days, or once a week.

Learner absenteeism increases with age (Figure 11), with older learners increasingly likely to be absent. The significant rise begins after age 12, the age at which most learners take their National Primary School Examinations (NPSE) and transfer to JSS.

Older children may remain in primary school after age 12 for several reasons, such as a delay to their initial enrolment, they failed one or more years from class 1 to 6 or failed their NPSE exams or dropped out of school and re-enrolled after a period of absence. Whatever the reason, children who are several years older than their class group may lack motivation due to '*over-age stigma and the feeling of being behind*' and, those starting school at age 10 '*are more likely to have developed other interests and/or responsibilities, and thus it may be harder to win their interest in and value of education at this stage*.'[38]

As education delivery and outcomes improve, the number of older learners is likely to reduce. However, in the short to medium term older learners may need support to continue learning and progress their education careers. This could include classes specifically for older learners, alternative learning pathways or action to address over-age stigma.

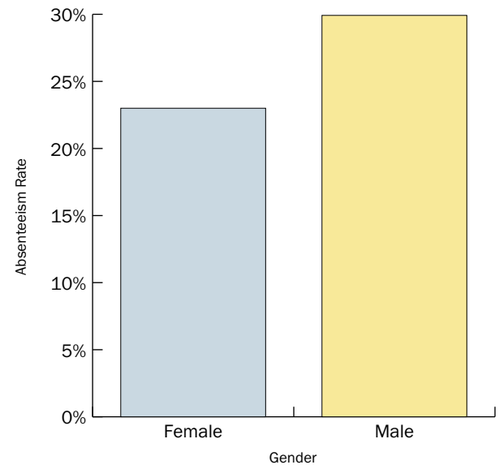
***Figure 11**. Learner absenteeism by age*



38 Graham, H., Kawa, M., Hayward, H. J., Murray, T., Conteh, S., Malyon, S. (2021) 'Out-Of-School Children Study Sierra Leone,' Freetown: Government of Sierra Leone and UNICEF, p. 46.

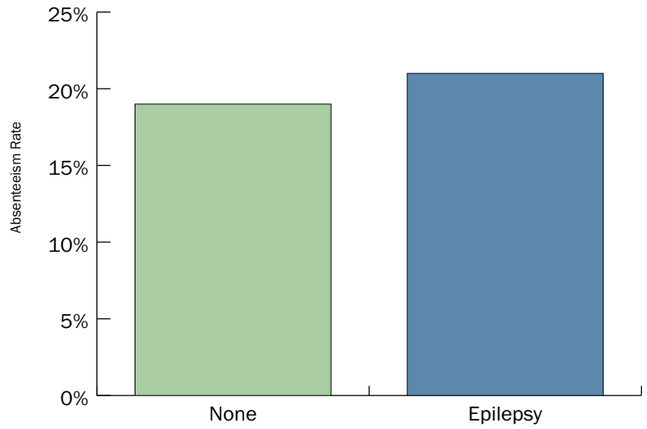
Boys are more likely to be absent than girls, missing 1.5 days per week on average (Figure 12).

***Figure 12**. Learner absenteeism by gender*



Epilepsy appears to influence attendance slightly. We have not calculated the absenteeism of those with dwarfism and albinism as there are only six and four reports of each respectively. In Figure 13 below, on the day the data was extracted, of those reported to have no special need nor other common condition attend on average 19% of days (the left-hand bar shows the average absenteeism rate of those assessed as having no needs, not those without a needs assessment).

***Figure 13**. Learner absenteeism by common conditions*



Learner Attendance: Recommendations

Based on the findings, the following is recommended.

1. Strengthen support to District staff to monitor, assess and follow up on poor learner attendance with the possibilities of any linkage with child labour, sexual and gender-based violence, child marriage, maternal status, etc. District staff of Ministry of Gender and

Children's Affairs, Ministry of Social Welfare and MBSSE should ensure efficient monitoring is done to investigate reasons for learners' poor attendance if it is a result of sexual and gender-based violence, bullying, vulnerability or maternal status.

2. Review pupil attendance within annual parents' evenings alongside academic performance and welfare. The CTA meetings organised by schools mainly focus on the general welfare of learners, it is important that parents also understand performance.

3. District staff should monitor attendance of those learners with special needs and follow up with parents /guardians and CTAs. The goal of this should be to identify learners whose attendance is intermittent and/ or low and provide support to avoid drop out. Where drop out has already occurred it is essential to engage parents, guardians and community leaders to support the learner to re-engage in education. This should align to recommendations in the OOSC Strategy 2022.

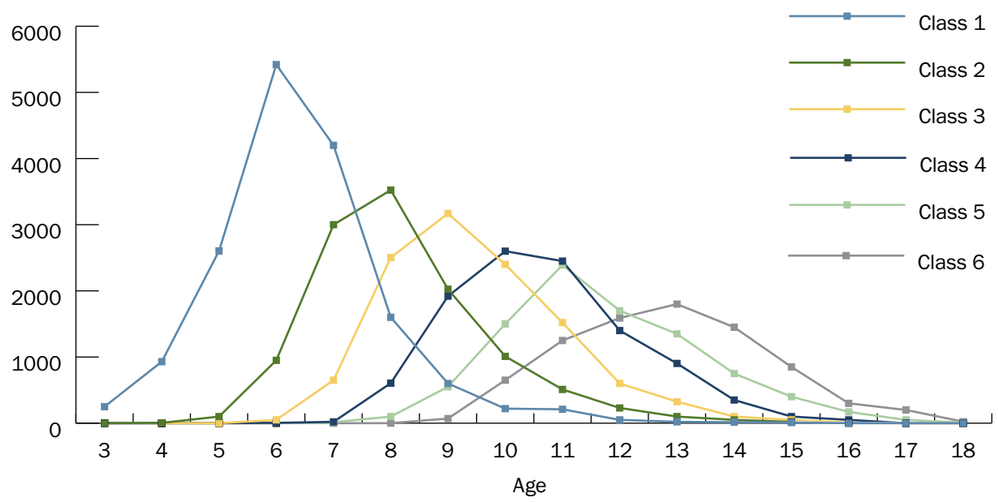
3.4.3. Learner Progression

National scaling and use of Wi De Ya will enable tracking of learner progression as children enter education at pre-school or primary up to completion of senior secondary. Currently, the data provides a snapshot of learner age by class level indicating potential reduction in the number of learners transitioning up through school levels the older they get.

Key Findings

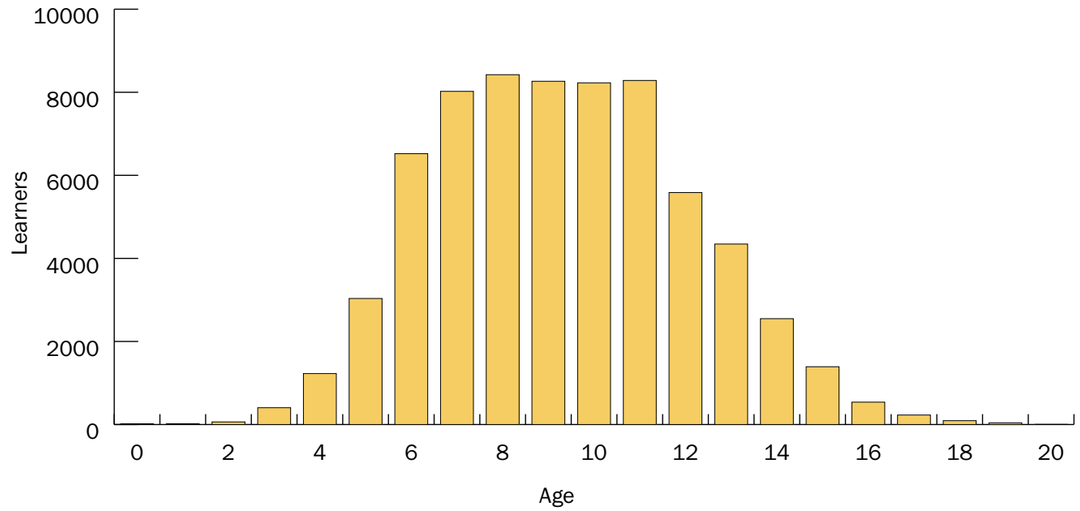
The distribution of learner age widens as class level increases (Figure 14). This could point to lower levels of transition through the upper levels of primary school as the school work increases in difficulty. It could also point to other factors, such as lower attendance resulting in lack of progress or re-enrolment of out of school children.

***Figure 14**. Learner count by age and class*



In contrast, Figure 15 illustrates that learners aged 7 to 11 are relatively constant in number. It should be noted that age for a small number of learners has likely been input incorrectly and should be followed up on.

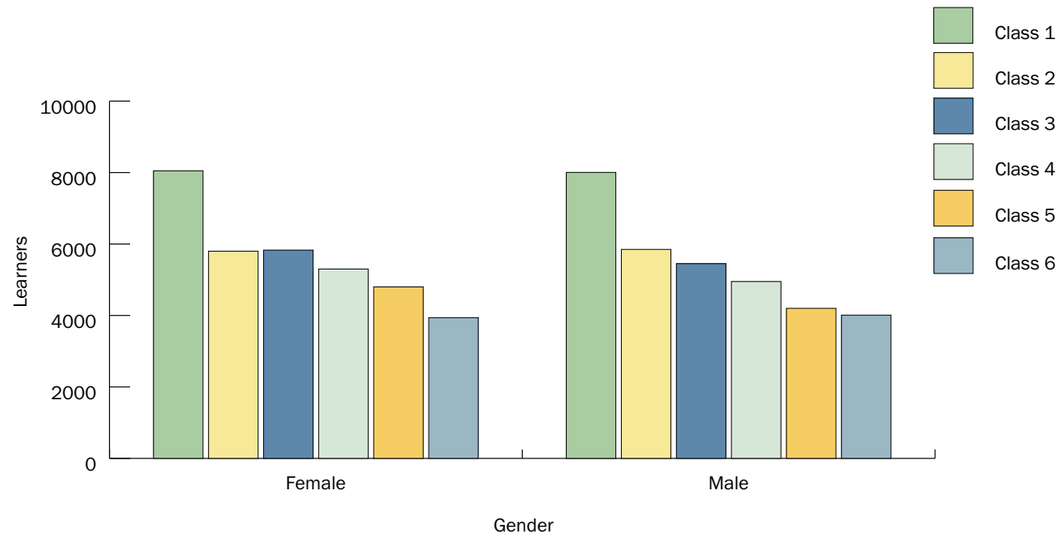
***Figure 15**. Learner count by age only*



Learner enrolment decreases as class level increases (Figure 16), this indicates learners are at a higher risk of drop-out as they transition through primary school. Enrolment rate is much higher in class 1 than the other classes 2-6.

Enrolment of female learners is marginally higher than boys in primary level grades.

***Figure 16**. Learner enrolment by gender and class level*



The priority for school should be teaching learners at the right level, not the right grade,[39] the priority for the Ministry should be ensuring there is appropriate supply to enable those learners to improve their level.

Learner Progression: Recommendations

Based on the findings, the following is recommended.

1. MBSSE should track performance in school against the progression of learners to enable accurate guidance to schools to ensure that learners maximise their opportunity to learn.

3.5. Teacher Workforce Analysis

Sierra Leone is continually working towards teachers (a) trained, qualified and held accountable to the Teacher Code of Conduct,[40] and (b) sufficient in quantity to ensure quality instruction. Policies have been set forth[41] but there are gaps in implementation that Wi De Ya can fill, such as allocation of recruited teachers.

3.5.1. Payroll Teachers

This section covers payroll integrity, movement of payroll teachers, and analysis of payroll teacher attendance.

3.5.1.1. Integrity of the Payroll and Teacher Movement

The Wi De Ya app enables continuous verification of the payroll to ensure it accurately reflects the workforce on the ground, both on who is working and where.

Historically, Sierra Leone has conducted costly one-off censuses or physical staff headcounts every 5-10 years. While these do produce short term gains, they only verify the payroll at a specific point in time, enabling anomalies to accumulate, leaking resources until they are identified and removed in the next census.

In contrast, using near-real-time Wi De Ya data, irregularities can be identified and investigated continuously, ensuring ongoing payroll accuracy. For example, if a payroll teacher leaves the profession this will be highlighted in Wi De Ya data, triggering an investigation and allowing swift removal from the payroll. If a teacher enacts an unauthorised transfer to another school, this will be immediately picked up by Wi De Ya and can be followed up by TSC. The gains and benefits are rapid and sustainable, and in line with the government's commitment to fiscal responsibility.

Anomalies or irregularities identified in the Wi De Ya data include teachers no longer teaching, either because they have left the profession, retired or died, and unauthorised teacher movements, where teachers are not teaching at their payroll-assigned school. This is actioned on the Wi De Ya app by school leaders either removing payroll teachers from their school lists (indicating the reason for removal for

39 Banerjee, A., Andrab, T., Banerji, R., Dynarski, S., Glennerster, R., Grantham-Mcgregor, S., Muralidharan, K., Piper, B., Chanduvi, J. S., Yoshikawa, H.; Ruto, S.; Schmelkes, S. 2023 Cost-effective Approaches to Improve Global Learning - What does Recent Evidence Tell Us are "Smart Buys" for Improving Learning in Low- and Middle-income Countries? Washington, D.C.: World Bank Group https://documents1.worldbank.org/curated/en/099420106132331608/pdf/IDU0977f73d7022b1047770980c0c5a14598eef8.pdf

40 All payroll teachers are required to sign and adhere to the Teacher Code of Conduct. https://tsc.gov.sl/wp-content/uploads/2021/01/Code-of-Conduct-for-Teachers-in-Sierra-Leone.pdf

41 Such as Section 9 of the TSC Act of 2011.

example transfer), or pulling in payroll teachers from elsewhere that are now teaching at their school. It is important for the payroll to accurately reflect teacher counts and location because this will aid in the elimination of payroll anomalies. '*Already teachers constitute the largest group of public sector employees, and teachers' salary continue to be the largest item by far on the country's annual budget. Efforts to reconcile the teachers' salary bill with available budget resources have so far concentrated on cleaning the teacher payroll to eliminate so-called 'ghost teachers' and prevent double pay for teachers working in two-shift schools.*'[42] Knowing the number of teachers in every location will continuously identify of where teachers are needed. The TSC can use this data to deploy or redeploy teachers with relevant qualifications to where they are most needed.

It should be noted that the teacher payroll (under AGD) currently assigns teachers to schools via the outdated School ID or 'SID' school identifier, which is no longer used by MBSSE since it was replaced by the 'EMIS code' school identifier introduced around 2016 for the ASC. Mapping teachers from the payroll onto the MBSSE master list of schools is problematic due to the lack of an accurate and comprehensive mapping from SID to EMIS code. Only 3,202 (69%) of the 4,643 SIDs on the national teacher payroll are found on the latest 2022 Annual School Census, 31% are not. Of those that are found, many appear more than once. Gaps in this mapping result in a significant proportion of teachers whose whereabouts cannot be verified, since their school allocation is ambiguous; and inaccuracies and duplicates in this mapping are likely a contributing factor to the high percentage of teachers not found where expected in this 300-school rollout. A teacher cannot be verified without knowing where they are supposed to be.

Key Findings

The Wi De Ya 300-school phase began with 1,703 payroll teacher profiles pre-loaded onto the Wi De Ya system. These teachers were listed on the payroll as working at one of the 300 schools. Of these, 828 (49%) teachers were found at their payroll allocated school, while 875 (51%) were not. Of these 875 teachers, 82 were found to be teaching elsewhere within the 300 schools. The other 793 were removed entirely from the 300 schools for a variety of reasons (see below).

While 793 teachers were removed entirely, school leaders pulled in a further 557 payroll teachers into the 300 schools. These teachers are assigned elsewhere on the payroll but were reported to actually be working within the 300 schools. This brings the total of unique payroll teachers identified in the 300-school phase to 2,260.

After accounting for the influx of 557 payroll teachers, and outflux of 793 payroll teachers, the final number of active payroll teachers in Wi De Ya was 1,467, which represents 86% of the original 1,703 expected. This result indicates 14% of payroll primary school teachers are potentially not teaching within any government or government-assisted school (either teaching elsewhere or not teaching at all). It is likely that a significant number of the missing teachers are teaching in unapproved community schools (which are not included in the Wi De Ya programme), and that the rest have stopped teaching altogether.

Figure 17 illustrates the distribution of payroll teacher removal reasons reported by school leaders, and includes all payroll teachers who were not found at their initial payroll-assigned school. To assess the payroll implications and the actions to be taken by the Payroll Steering Committee, we have classified these removal reasons into severity categories, indicated by the traffic-light colouring. Table 3 discusses each category in greater detail.

42 Wright, C. 2018, "A Comprehensive Situation Analysis of Teachers and the Teaching Profession in Sierra Leone" 18-448-Sierra-Leone-Teaching-report-web.pdf (tsc.gov.sl)

Figure 17. Payroll teacher removal reason distribution (coloured by severity)

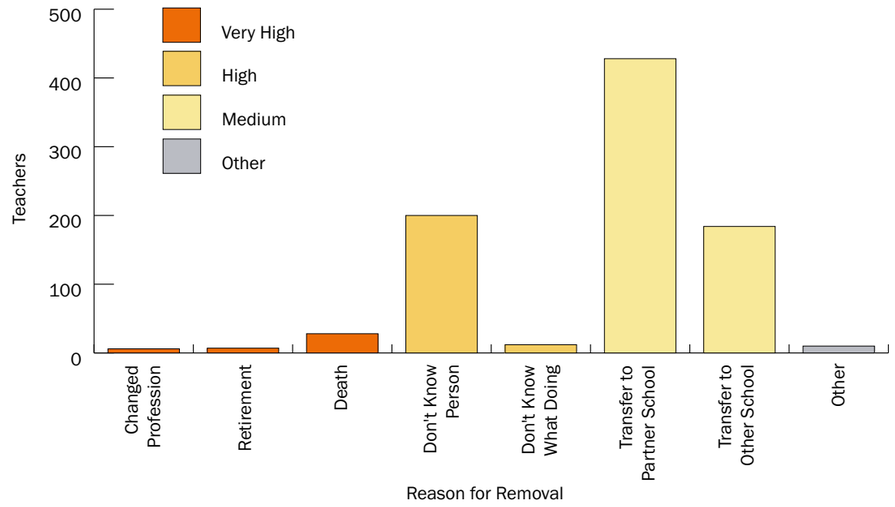


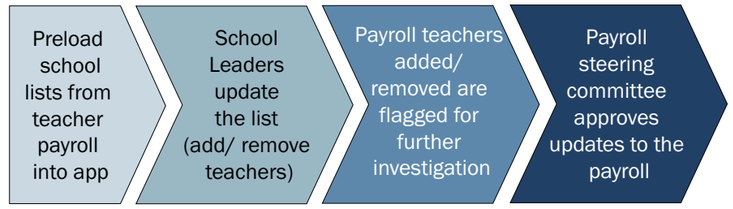
Table 3. Payroll implications/actions following the 300-school rollout data on teacher whereabouts where 51% are not in payroll-assigned schools

Severity	Likely Action	Details	Significance
Very High (highly likely to not be teaching)	Teacher Removal	41 (2.4%) of pre-loaded payroll teachers were removed by a school leader citing the reasons: changed profession, death, or retirement. These teachers' situations need investigation but removal from payroll is likely	Removing these teachers from the payroll will help free up fiscal space on the education budget
High (possibly not teaching as they are unknown to their line manager)	Teacher Investigation	212 (12.4%) of pre-loaded payroll teachers were removed by a school leader citing the reasons: don't know this person, or don't know what this person is doing. These cases are highly suspicious	These teachers either need removing from the payroll, or officially transferring to another school. Payroll savings could also be found here
Medium (probably teaching at another school due to unauthorised transfer)	Review Teacher Movement	612 (35.9%) of pre-loaded payroll teachers were identified as having transferred to another school without approval from TSC. A further 557 teachers were pulled in from non-Wi De Ya schools, meaning a total of 1,169 payroll teachers were identified as having transferred without authorisation	Teachers should be in their assigned schools to ensure teacher-pupil ratios are being achieved and to ensure payroll accuracy for planning and accountability purposes

Of the 875 pre-loaded payroll teachers identified as not teaching within the 300 schools, 41 (2.4%) were reported by school leaders as having either left the profession, retired or died,[43] and yet are receiving a salary. Figure 18 details the proposed process to identify and verify changes to be made on the payroll.

43 This compares to 7.33% on SLEAMS 2020, which had a question set that included teachers who had specified a unique removal response under the "other" category.

Figure 18. Process to identify and verify changes to be made on the payroll.



A list of removable teachers, unapproved teacher transfers, teachers that need further investigation, and teachers liable to attendance sanctions[44] can be viewed at https://wideya.org/teacher-reports (full identifying data only available to permissioned logged-in users).

The 41 (2.4%) teachers who were removed under a 'very high' severity category (death, retirement, changed profession) had a combined net pay of 54,665 SLE/month, which, when extrapolated to the national payroll, could result in savings of approximately 1.2 million SLE/month (equivalent to approximately $57,000/ month). Savings could also result from the other categories of teacher removals, especially those where the teacher was unknown to their school leader, depending upon the outcome of investigations.

3.5.1.2. Sanctionable Absenteeism of Payroll Teachers

When teachers are not in the classroom, students do not learn. Teacher absenteeism has meant that the '*significant investments in supporting teachers to improve learning have not enabled improved learning outcomes*.'[45] Teacher absenteeism also places substantial pressure on the remaining staff to cover the classroom.

The TSC, with the World Bank and FEPS, developed a *Teacher Attendance, Absenteeism and Sanctions Framework*. The framework is part of the 'Collective Agreement Between the Employers of Teachers of Sierra Leone (ETSL) and the Sierra Leone Teachers Union (SLTU) published in the Sierra Leone Gazette on 14 September 2022.[46]

The framework introduced sanctions for unauthorised absences and non-cash incentives to promote good attendance among payroll teachers. It states that any payroll teacher absent from work without written authorisation for six non-consecutive working days in a month will lose one month's salary and could result in dismissal. Without the full implementation of Wi De Ya, the TSC will have no verifiable, reliable or digital source for recording teacher attendance, enacting the sanctions framework or improving teacher attendance.

Wi De Ya improves teacher management by allowing school leaders to decide whether an absence is appropriate for approval or not, and for that decision to have monetary implications for the teacher. This empowerment of school leaders is necessary where on any day a fifth of staff are not in work. The TSC recruits teachers annually, with fiscal space created both from the budget and through retirement, death, or departure from the teaching service.

Following the implementation of the 300-school rollout, 96% of respondents in the school leader survey reported an improvement in teacher attendance or timeliness, therefore the national scale up of Wi De Ya and implementation of the sanctions framework is expected to positively impact teacher attendance.

44 See Section 3.5.1.2. below.
45 O'Sullivan, M. 2022 Teacher absenteeism, improving learning and financial incentives, PROSPECTS, 52, 343-363.
46 The Sierra Leone Gazette (Extraordinary Published by Authority) Vol. CXLXIII 14th September 2022 No. 64.

In addition, Wi De Ya can also be used to monitor progress against performance indicators. As mentioned above, FEPS aims to achieve 75% of 'Performance-based Financing (PBF) schools reaching 85% teacher attendance' by 2025. Wi De Ya data can be used to measure how well those government and government assisted schools included in the PBF programme are progressing.[47]

The TSC can also use the data to understand patterns of absence such as by day, region, school or other factors and implement support and mitigation strategies to address them, further reducing teacher absenteeism.

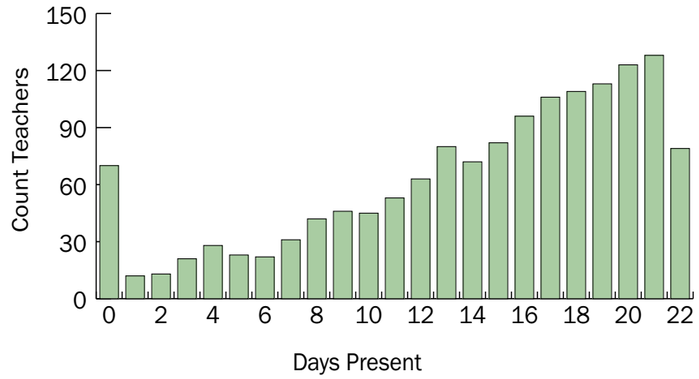
Key Findings

Approximately 20% (1 in 5) of payroll teachers are absent from school each day (see Section 3.5.3.). This compares to 23.7% in SLEAMS 2020.

47 payroll teachers were absent with no valid reason for 6 or more days in May. This is 2.07% of active Wi De Ya payroll teachers. If teacher sanctions are enforced across the payroll, this results in monthly savings of SLE 1.8m or approximately USD 91,000. Four of these teachers were absent for more than 15 days in May.

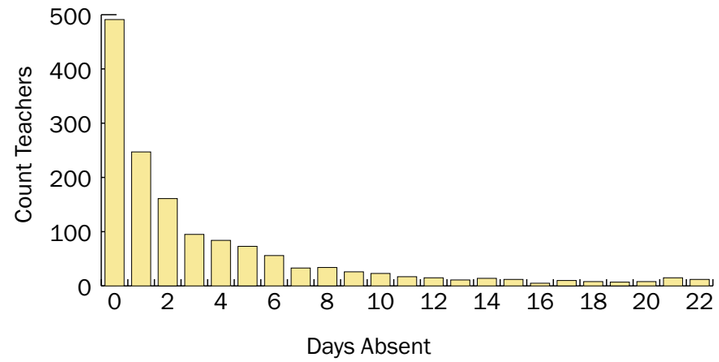
In contrast, 79 payroll teachers had perfect attendance in May, being marked present for 22 out of 22 teaching days (Figure 19). This data can be used to reward teachers as per the sanctions framework. Note that attendance results shown in Figure 19 are affected by lack of reporting as well as absenteeism. This is illustrated in Figure 20, which shows 491 payroll teachers were present for all of the days attendance was recorded on Wi De Ya at their school in May 2023.

***Figure 19**. Payroll teachers' distribution of days present in May 2023*



47 The indicator is unclear as to whether it refers only to payroll teachers or to both payroll and non-payroll teachers.

***Figure 20**. Payroll teachers' distribution of days absent in May 2023*



A deeper analysis of payroll and non-payroll attendance can be found in Section 3.5.3.

Payroll Teacher Movements and Sanctions: Recommendations

Based on the findings, the following is recommended.

1. Establish the Payroll Steering Committee (see Key Recommendations).

2. School EMIS codes: migrate the entire education sector to use EMIS code as the official School ID, most importantly the teacher payroll (which is currently tied to the old 'SID' identifier) so that teachers can be robustly mapped to schools.

3. District officers should investigate those teachers reported by school leaders as having left the profession, retired or died. These teachers can potentially be removed from the government payroll under the instruction of the Payroll Steering Committee.

4. The TSC should also investigate those teachers reported as not teaching at their payroll-assigned schools. Given that more than half of all teachers potentially fall into this bracket and the potential impact on teaching quality of any action to rectify this, it is recommended that the TSC agree a policy with teaching unions on how historic and future incidents of unauthorised teacher movements will be managed and sanctioned.

5. The rules and processes for teachers to apply for transfer to another school are already in place in the Human Resource (HR) Manual.[48] Yet, our findings indicate they are not being used. It is recommended the TSC implement transfer rules and ensure teachers are aware of how to seek authorisation for transfer and the consequences for unapproved transfer, in line with the above recommendation. A compromise on reporting will have to be made with the Mission schools' education secretaries who move teachers between their schools regularly.

6. Under its recruitment policies, the TSC may wish to consider recruiting and deploying teachers in schools close to their homes or consider offering accommodation to teachers posted far from their homes. This will likely increase retention rates in rural areas and reduce unauthorised movements.

48 TSC, 2020, Human Resource Manual for Teachers and School Leaders in Sierra Leone https://hrmanual.tsc.gov.sl/books/27-transfer/page/rules-transfer

7. Develop and implement a Rural Retention Strategy. Address the education equity issues by increasing the percentage of qualified and payroll teachers in rural and underserved districts. TSC could work with unions and teachers to develop non-monetary incentives, such as accommodation.

8. While the Sanctions Framework is yet to be implemented, it is recommended that District officers follow up with those teachers identified as persistently absent. Bringing the TSC's knowledge of their absenteeism to their attention is likely to have a positive impact on their attendance.

9. The TSC may wish to consider implementing the Sanctions Framework in part among the 300 schools currently using Wi De Ya, whereby teachers with unauthorised absences of more than three or more non-consecutive days in one month receive a verbal or written warning. Their attendance can then be monitored to measure the effectiveness of managing unauthorised absence.

10. The TSC should undertake an information campaign in collaboration with the teacher unions to sensitise all teachers of the Teacher Attendance, Absenteeism and Sanctions Framework, including incentives for good attendance, and the rules and processes laid out in the HR Manual.

11. Incentives to encourage good teacher attendance could include: public recognition for those teachers with good attendance, such as an attendance award as part of the National Best Teachers Award; communities publicly recognising teachers with relatively good attendance at the end of school terms; and recommending attendance reports are announced in the media and reported to TSC for compiling towards national awards. The use of acknowledgement and rewards for teachers with excellent attendance has been found to be an effective tool in reducing absenteeism.[49]

3.5.2. Non-Payroll Teachers

Non-payroll teachers make up a significant proportion of the teaching workforce; yet no records exist detailing how many there are, who or where they are, or if they are qualified. From the 300-school rollout, we identified that non-payroll teachers are more likely to be absent, including higher rates of unauthorised absences, and are less likely to fulfil their responsibilities in schools, including the implementation of Wi De Ya assigned to them by TSC. This highlights a lack of management power over non-payroll teachers and the resulting need to reduce the reliance on volunteers.

Furthermore, information about non-payroll teachers at an individual level is different to knowing about them at an aggregate level. The education achievement and safeguarding risks associated with not knowing about these individuals cannot be understated. However, the education system should make these non-payroll teachers feel included because, whilst they may present risks, they are also an untapped resource for MBSSE and TSC.

Wi De Ya supports understanding more about non-payroll teachers as individuals and reduces the potential risks, because for the first time they are now in a government system. Having information about non-payroll teachers, as individuals, means that they can be assigned, managed, moved and recruited.

49 Knoster, K. C. (2016) Strategies for addressing student and teacher absenteeism: A literature review. Washington, DC: US Department of Education, North Central Comprehensive Centre.

The unwanted result of recruiting non-payroll teachers is, once they are recruited and deployed in schools, there is evidence that some transfer without authorisation to another school, thus leaving the schools they were assigned to understaffed. For instance, a PIN teacher in Gbinti Junior Secondary School in Gbinti, Karene district was previously a non-payroll teacher, teaching a Science, Technology, English, Agriculture and Mathematics (STEAM) subject and contributing to learning outcomes. He transferred to Freetown without authorisation shortly after he became a payroll teacher. This is an irregularity for the payroll steering committee to investigate and place sanction on the individual.

Prevalence of Non-Payroll Teachers

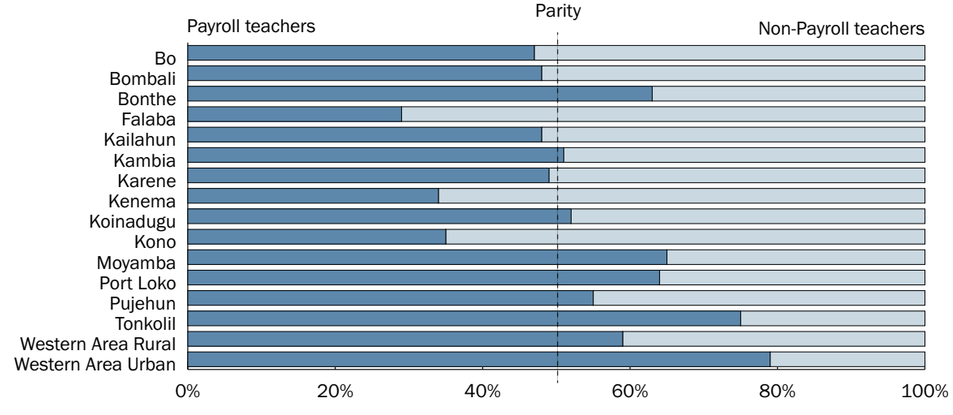
For the first time, non-payroll teachers are being systematically identified and recorded using Wi De Ya. Knowing who and where they are enables authorities to identify and, ideally, fill gaps in provision through data-driven reform and planning initiatives that work towards building a teaching workforce that is fully trained and qualified and held accountable to the same teacher code of conduct.

Key Findings

Non-payroll teachers make up 43% of active teachers in the 300 Wi De Ya schools, amounting to 1,088 individuals overall. This compares to 29% in SLEAMS 2020, which included all school levels. '*The rapid expansion of schooling in the country has meant that large scale recruitment of unqualified persons is being used to meet the need for teachers to serve the system. Primary schools have many more pupils than JSS and SSS, so there are invariably more teachers at primary level'*.[50]

Shown in Figure 21, the ratio of payroll to non-payroll teachers varies across districts: Western Area Urban has the lowest proportion of non-payroll teachers while Kono, Kenema, and Falaba have the highest. This highlights a need to recruit more payroll teachers in underserved districts where staffing gaps are predominantly filled by non-payroll teachers, as well as the potential need for retention incentives to encourage teachers to remain in these high-need districts. In this way, the education sector could draw lessons from health where a rural retention strategy exists.[51]

***Figure 21**. Ratio of payroll to non-payroll teachers by district*



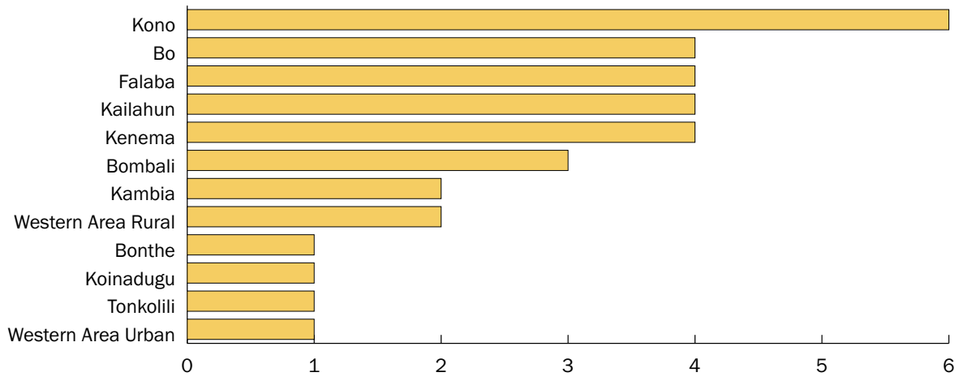
50 Wright, C. 2018, 'A Comprehensive Situation Analysis of Teachers and the Teaching Profession in Sierra Leone' 18-448-Sierra-Leone-Teaching-report-web.pdf (tsc.gov.sl)

51 Government of Sierra Leone, Action Plan to Increase Rural Retention 2019-2029, Ministry of Health and Sanitation. See chapter 4: Hard to Retain (H-to-R) Survey Findings. Pages 27 & 28.

A total of 33 (11%) of participating schools have a non-payroll school leader. The breakdown by district is displayed in Figure 22. This is a concern for several reasons: it limits the TSC's ability to manage the school leader and, therefore, the school; the TSC holds no personnel record of these school leaders and thus there is no centralised knowledge of their qualifications; and non-payroll school leaders are likely to have less perceived or formal authority to manage payroll teachers within the school and, therefore, the school itself. In Wi De Ya, schools with a payroll school leader are more likely to submit attendance reports on any given day than schools with a non-payroll school leader.

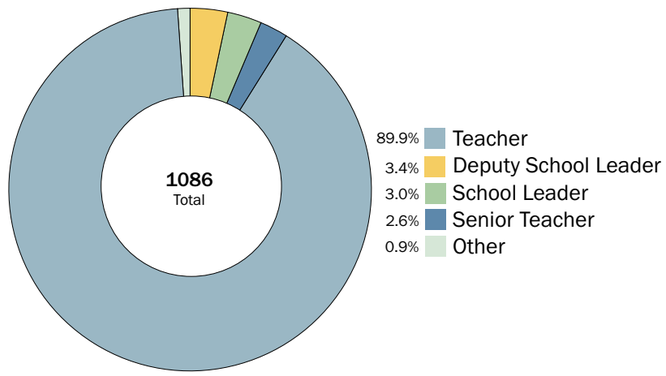
The higher rates of nonpayroll teachers in rural districts is possibly due to those areas having fewer payroll teachers available creating greater need.

Figure 22. *Schools with non-payroll school leader, count by district*



Approximately 9% of non-payroll teachers hold senior teaching positions (Figure 23). It should be a high priority to get these teachers onto the payroll if they meet minimum qualification requirements. This would exclude any non-payroll teachers aged over 60 years and not eligible for recruitment.

Figure 23. *Teacher Roles of Non-Payroll Teachers*



It will take time to build a sufficient supply of qualified teachers and reallocate enough budget almost double the current number of teachers on the payroll. As a result, interim measures to strengthen management, incentivisation and accountability of non-payroll teachers remain an important requirement.

Non-Payroll Teachers: Recommendations

The findings illustrate how little the TSC currently knows about how many non-payroll teachers there are, who is teaching where and what (if any) qualifications they have. This significantly impacts on their ability to effectively manage 43% of the workforce. Wi De Ya provides, for the first time, an accurate picture of non-payroll teachers, along with the gaps and opportunities for the TSC to use this data to improve teacher and school management. The risks associated with having such a large percentage of teachers not accountable to and within the government's management cannot be understated. The distribution of non-payroll teachers – with there being a higher percentage in rural and underserved districts – raises issues about the equity of education provided for children in these districts.

Based on the findings, the following are recommended.

1. Urgently review those schools with non-payroll school leaders and senior teachers and take action to identify other schools across the country with non-payroll heads.

2. Review policy on teacher recruitment and set attendance criteria for the recruitment of non-payroll teachers onto the payroll. This will serve as an incentive for non-payroll teachers to have good attendance.

3. There should be a teacher portal including non-payroll teachers to track their academic qualifications and licences. This will incentivise the work of the payroll and create consciousness among non-payroll teachers that they are monitored for possible recruitment into the payroll

4. Review policy to recruit non-payroll school leaders into the payroll to allow accountability of government resources and give high priority to qualified non-payroll teachers to be recruited into the payroll, eliminating the current significant percentage of school leaders who are non-payroll.

3.5.3. Teacher Attendance and Absenteeism

If teachers are not in class, learning outcomes cannot and will not improve. Teacher absenteeism also leads to inefficiency in educational spending, for example, recent studies[52] have shown that countries in Western and Central Africa are losing about 1.5 percent of Gross Domestic Product (GDP) annually due to teacher absenteeism. Teachers attending lessons and spending quality time on tasks is a critical prerequisite to learning. It is important to track the daily attendance in order to reward consistency of teachers.

As mentioned in Section 3.5.1.2., the TSC in collaboration with the World Bank and FEPS have developed a Teacher Attendance, Absenteeism and Sanctions Framework, which introduced sanctions for unauthorised absences and non-cash incentives to promote good attendance among payroll teachers. Accurate monitoring and efficient reporting of teacher absences and effective sanctioning of frequently absent teachers are essential for improving school and classroom attendance and for increasing time on task.[53]

52 UNICEF, Time to Teach: Getting teachers back to the classroom in West and Central Africa, 2021.
53 Time to Teach Teacher attendance and time on task in Eastern and Southern Africa (2020), UNICEF-Time-to-Teach-Report-2020.pdf

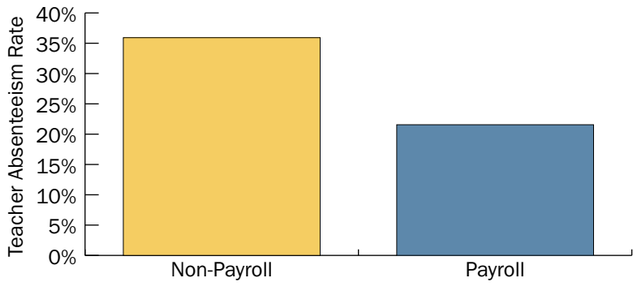
Key Findings

As identified in Section 3.5.1.2., approximately 20% (1 in 5) of payroll teachers are absent from school each day.[54] When non-payroll teachers are included, teacher absenteeism rises to around 28%, or nearly 3 in 10 teachers are absent from school each day.

This is because approximately 35% of non-payroll teachers are absent each day, compared to SLEAMS 2020 findings of 32.8%, which is around 14% more than payroll teachers. 129 non-payroll teachers were absent with no valid reason for 6 or more days for the month of May. This includes 36 teachers who were absent for more than 15 days.

Lower non-payroll teacher attendance is expected as they have less incentive to attend. It also highlights the need for more management power if they are to remain responsible for teaching children. More management can be achieved through moving towards ensuring all teachers in classrooms are trained, qualified, and on the payroll, and/or linking attendance monitoring through Wi De Ya with future employment prospects.

***Figure 24**. Teacher Absenteeism by Employment Status*



High absenteeism among non-payroll teachers severely impacts overall teacher attendance rates in participating schools. Just 3 in 10 (30%) reached an average 85% attendance rate for all teachers. If non-payroll teachers are excluded, this rises to 54% of schools reaching an average 85% attendance rate. If the FEPS' goal for 75% of schools to reach an 85% teacher attendance rate by 2025 includes non-payroll teachers, is to be achieved incentives should be identified and swiftly deployed.

As neither payroll nor non-payroll teacher attendance rates meet national standards, there is a need to develop effective interventions to improve attendance across the board. Specific interventions for payroll teachers are identified in Section 3.4.1.3 above.

Patterns of teacher absenteeism can be used to guide these interventions.

3.5.3.1. Teacher Absenteeism by District

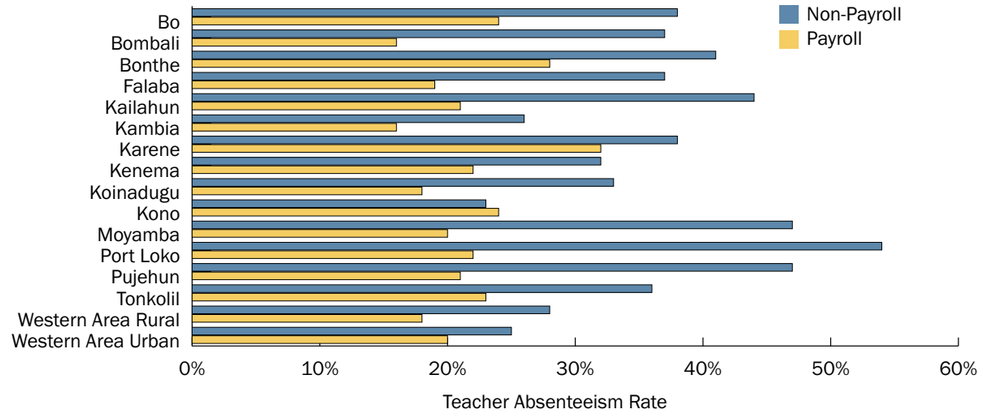
Teacher absenteeism varies significantly across districts (Figure 25). For payroll teachers, Karene has the most severe absenteeism while Kambia has the best. As already highlighted, implementation of Wi De Ya and the sanctions framework will reduce absenteeism among payroll teachers. Wi De Ya data can also be used to target districts, chiefdoms and schools where further investigation and / or action is required.

The tendency for non-payroll teachers to have higher absenteeism rates holds true across all districts, with Port Loko breaching 50%+ absenteeism. Kono is the exception, where the absenteeism rates match payroll teachers. Priority for interventions should be given to districts with higher rates of absenteeism.

54 At the time Figure 24 was recorded, this figure was 21.56% absent each day.

There are best practices that can be identified through looking at how Kono manages its non-payroll teachers, where absenteeism is low but where they are highest in numbers (Section 3.5.2.1), and contrasting with Port Loko, where non-payroll absenteeism is high. These best practices could then be used to guide interventions to districts with more severe absenteeism among their non-payroll teachers. The same can be done for payroll teachers.

***Figure 25**. Teacher absenteeism by districts*

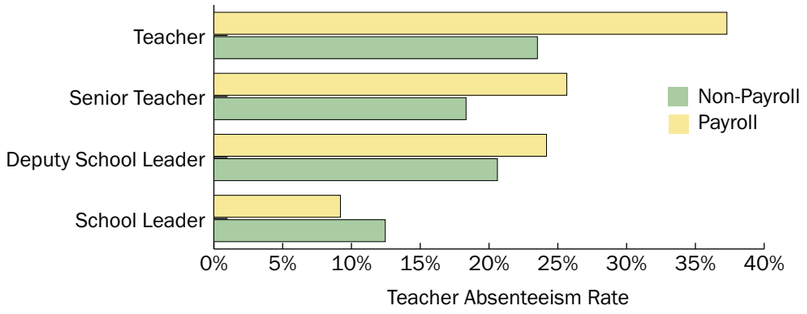


3.5.3.2. Teacher Absenteeism by Role

While we cannot rely on the low absenteeism rates for school leaders (as they cannot submit attendance if they were absent), in Figure 26, we still see discrepancies between the attendance rates between regular teachers and senior teachers/deputy school leaders. If the target is to achieve the greatest impact on attendance rates interventions should target non-payroll regular teachers to make the largest impact on attendance rates. This difference is less prominent when only looking at payroll teachers.

This further reinforces the lack of incentive and management power school leaders and educational institutions hold over non-payroll teachers and the need to shift away from a reliance on non-payroll teachers.

***Figure 26**. Teacher absenteeism across teacher roles*



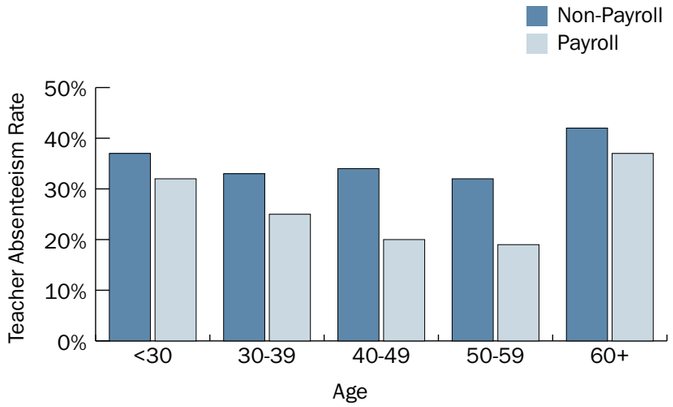
3.5.3.3. Teacher Absenteeism by Age

Figure 27 shows absenteeism among payroll and non-payroll teachers by age.

For payroll teachers, those under 40 years old are absent more frequently than teachers between 40 and 60 years old. Further analysis of the reasons younger payroll teachers are more frequently absent with authorisation is shown below in Section 3.5.3.5.

Non-payroll teachers appear to have relatively constant attendance rates across the ages, with the exception of those aged 60+, which may be because they are retired and have returned by necessity for community stipends or are staying in the communities and deem it invariably necessary to fill in the vacancies that exist ad hoc.

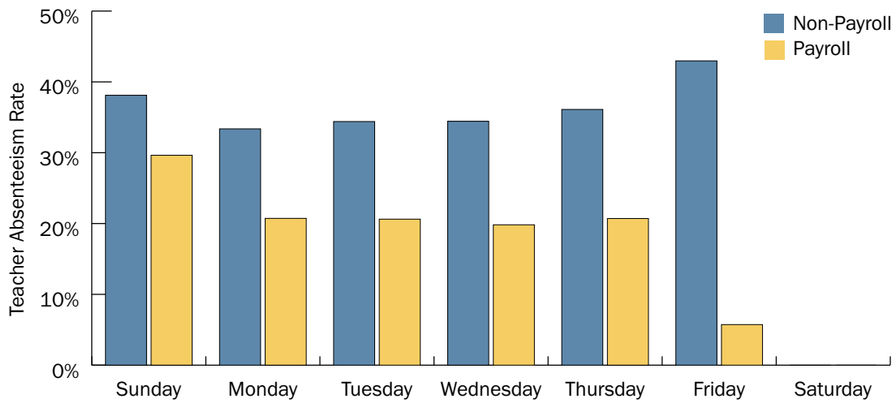
Figure 27. *Teacher absenteeism by age*



3.5.3.4. Teacher Absenteeism by Day of the Week

Teacher absenteeism is more prevalent on Sundays (for Islamic schools that are open) and Fridays relative to the middle of the week (Figure 28). This suggests a need to support and incentivise teachers to be in school on Sundays and Fridays. This is something that can be targeted by the TSC to increase teaching hours.

Figure 28. *Teacher absenteeism by day of week*



3.5.3.5. Teacher Absenteeism by Reason

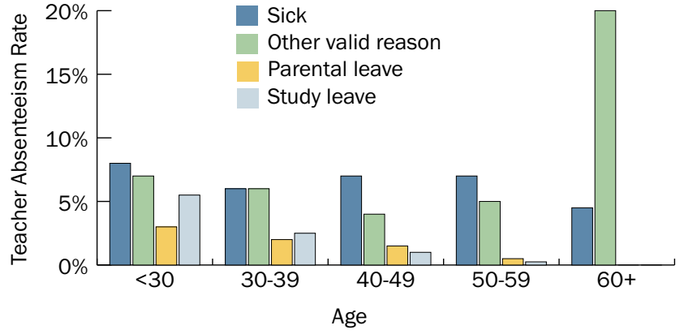
Table 4. *Summary of the factors that do or do not appear to influence teacher attendance.*

Teacher Attendance Varies Across…	Teacher Attendance is Constant Across…
• District • Teacher role • Age • Day of week	• Gender • Urban vs. rural district

Figure 29 dives deeper into reasons of absences among payroll teachers. Younger payroll teachers are reported to be taking absences due to parental and study leave more frequently than older teachers. More investigation should be conducted on younger teachers being reported as 'sick' at the same rates as older teachers who are expected to have more health complications.

Requiring justification for absence or enforcing the sanctions for sick leave, as stated in TSC's HR Manual[55] and the Collective Agreement as mentioned above, may motivate younger teachers to improve their attendance.

Figure 29*. Teacher absenteeism by age and reason (payroll only)*

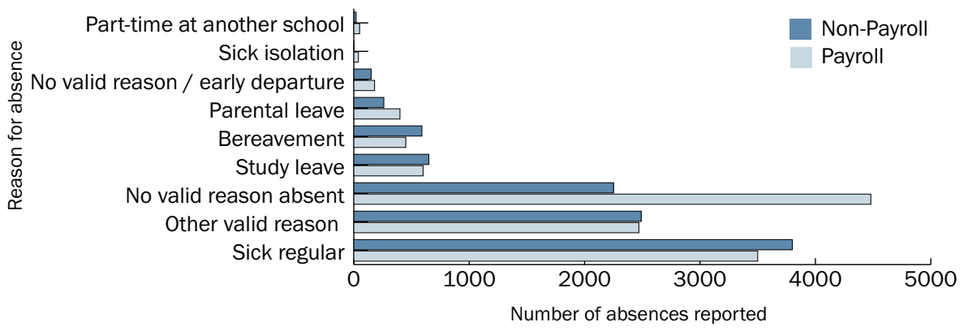


The most commonly cited reason for absence is sick leave (Figure 30). Precedence is set in the HR Manual and the Collective Agreement between TSC on sick leave, including the requirement to report sickness absence to their Department Head within 48 hours or risk being regarded as absent without leave, and producing a medical certificate after a period of illness. Enforcing these requirements is likely to reduce any potential false reports and will increase teaching time.

The second most commonly cited reason is 'other valid reason.' This calls for further investigation as the use of 'other valid reason' was expected to be used sparingly given the range of other options available. It is possible school leaders are using this option instead of unapproved absences to protect their teachers from attendance sanctions.

55 Human Resource Manual for Teachers and School Leaders in Sierra Leone, August 2020, Sierra Leone Teaching Service Commission.

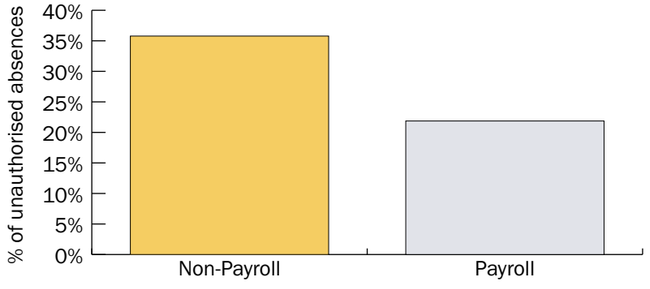
Figure 30. Reasons for teacher absence



3.5.3.6. Unauthorised Teacher Absence

As shown in Figure 31, non-payroll teachers tend to have higher rates of unauthorised absences relative to payroll teachers, emphasising the difficulty in managing non-payroll teachers. Payroll teachers sought authorisation in 78% of cases. See Figure 24 for teacher absenteeism rates.

Figure 31. Percent of absences that are unauthorised across employment roles



Teacher Absenteeism: Recommendations

The findings and data on teacher absenteeism illustrate the importance of Wi De Ya's data, in particular, implementing the Teacher Attendance, Absenteeism and Sanctions Framework. The cost of teacher absenteeism is significant and negatively impacts upon education budgets, available resources and learning outcomes. Opportunities to address and reduce teacher absenteeism should be of the highest priority.

Based on the findings, the following are recommended.

Payroll teachers:

1. As sickness is the most commonly cited reason for absence, consideration should be given to investing in teacher health. For example, piloting schemes among Wi De Ya schools for teachers to have an annual no-cost health assessment at government recommended health facilities. The effectiveness of schemes could be measured against Wi De Ya data moving forward.

Non-payroll teachers:

2. Ensuring a recruitment pipeline enables young teachers to join the payroll in order to reduce the number of older non-payroll teachers as the report shows that teachers at 60+ years of age have higher rates of absenteeism compared to teachers below 60 years of age.

3.5.4. Pupil to "Qualified" Teacher Ratio[56]

The prevalence of non-payroll teachers highlights an insufficient supply of trained and qualified teachers to schools. As the supply of teachers is largely determined by the ratio of teachers to students, Wi De Ya school lists of teachers and learners can help inform which schools need more payroll teachers.

Pupil-Qualified Teacher Ratio (PQTR) is defined here as the number of learners per payroll teacher. PQTR has been used as payroll teachers are in the whole qualified and PQTR is an accessible term. It should be noted that payroll and qualification are not an exact overlap, which makes our PQTR rate a likely maximum possible qualified ratio.

- The minimum educational qualification for a payroll teacher at primary school level is a Teaching Certificate. Some non-payroll teachers also hold these qualifications.
- MBSSE has set a primary school standard PQTR of 1:45-50.
- Untrained and unqualified teachers are those who lack both formal training and the necessary credentials to be considered professionally competent. They make up a large portion of the junior grades of the payroll due to the shortage of qualified teachers according to the scanned records on tsctrm.org.

3.5.4.1. Current State of PQTRs in Sierra Leone

For the purpose of understanding the ground truth and comparing it to the payroll, we define PQTR as above and exclude those teachers who fall outside of the control of the TSC, non-payroll teachers for whom we have no record of qualification.

There was a 13.8% increase in the number of payroll and non-payroll teachers recorded in the ASC, the corresponding increase was 7% growth in learners, year on year.[57] FQSE brought hundreds of thousands of new learners into the system since introduction in 2018, without corresponding growth in the payroll, and therefore teacher distribution is critical.[58]

Key Findings

The PQTR average across all 300 schools is 1:74, however the ratio of payroll teachers to learners varies greatly by district (Figure 33). Tonkolili and Western Area districts meet the Ministry's standard of PQTR (as defined above). All other districts do not, with about half of all districts having over 100 pupils per each payroll teacher. This makes effective learning impossible.

Having over 50 pupils in a class where each lesson is expected to last for a maximum of 45 minutes hinders the implementation of the Child Centred Teaching Technique (CCTT), as recommended by MBSSE in the new basic education curriculum for Sierra Leone.[59]

56 In this report we refer to learners rather than pupils as the Wi De Ya app and processes are agnostic to the level of education facility. In this section we use 'pupil' and 'qualified' loosely because of the generally accepted use of the terms in the context of PQTR.
57 MBSSE, 2023, ASC 2022
58 https://tsctrm.org/
59 New Basic Education Curriculum for Sierra Leone (2020), '6. Home Econs Syllabuses' (mbsse.gov.sl)

Variations of PQTR are more extreme when looking at school level data. The PQTR at 92 schools (30.66%) is at least double the Ministry's standard, with 11.66% of schools having a PQTR of 1:200 or more.

Example: School with High PQTR
At Roman Catholic Primary School (Bombali, Magbaima Ndowahun, Hunduwa) the pupil qualified teacher ratio is 444 learners per 1 payroll teacher. While there are five additional non-payroll teachers at this specific school, there is no assurance on whether these non-payroll teachers are qualified.

A list of Wi De Ya schools with PQTRs of over 200 can be found in Annex A. Many of these schools have one payroll teacher and multiple non-payroll teachers to fill in the staffing gaps. These schools should be prioritised for recruitment of new teachers.

Figure 32. *Pupil to payroll teacher ratios across 300 selected schools*

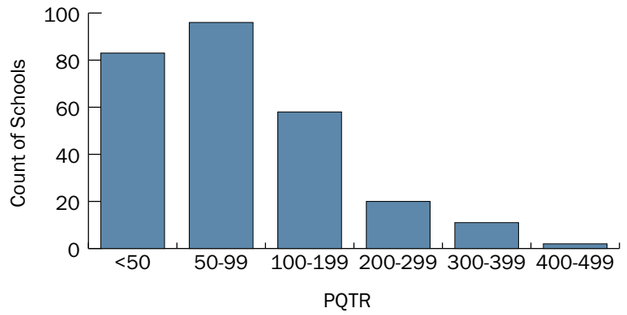
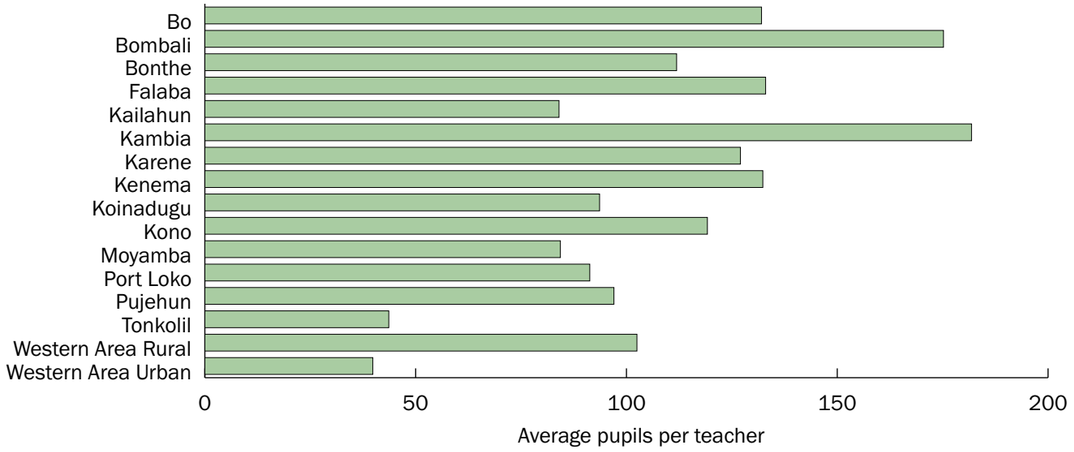


Figure 33. *Pupil to payroll teacher ratios across districts*



3.5.4.2. Untrained and Unqualified Teachers Fill in the Gaps

The staffing gaps made apparent by PQTR are filled by non-payroll teachers recruited directly by schools from their communities. This is illustrated through the Pupil Teacher Ratio (PTR). The PTR is defined as the number of learners for each teacher, payroll and non-payroll teachers. These teachers are more likely not to have the proper training and qualifications. These teachers are also more likely to be absent (see Section 3.5.3.).

Key Findings

Figure 34 shows that while there is some variation in PTR, it remains within the range of 27 to 65 learners per teacher across the districts and only Kambia, with a PTR of 1:65, and Bonthe, with a PTR of 1:53, do not meet the Ministry standard.

Figure 35 shows that as there are fewer payroll teachers assigned per pupil, the community hires more non-payroll teachers to fill the gap. From the other side, the reliance on members of the community to teach is expected to dwindle as payroll teachers are recruited.

Figure 34. *Average PTR over districts*

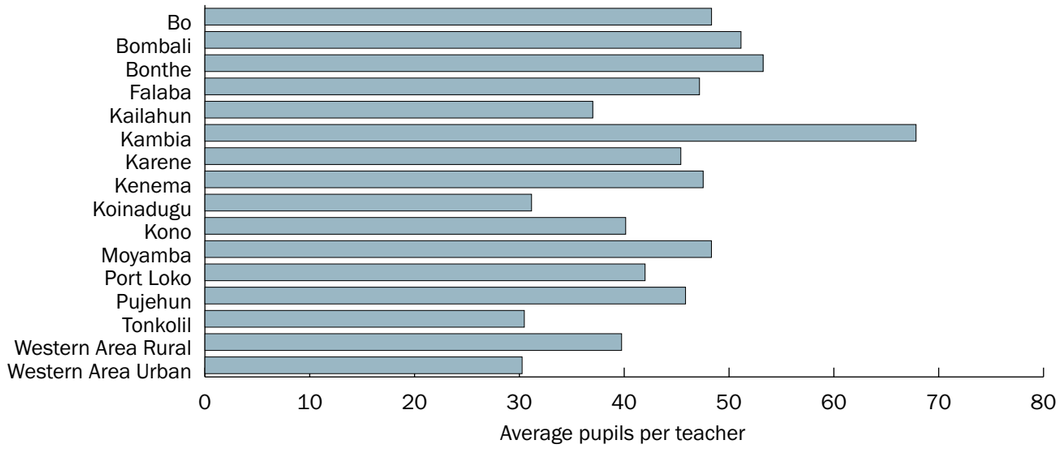
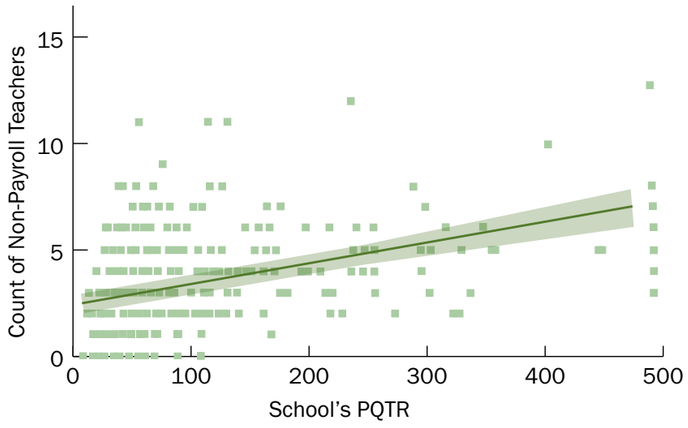


Figure 35. *Relationship between PQTR and number of non-payroll teachers*



PQTR: Recommendations

The gains in access to education have resulted in demand not being met by a supply of suitably trained and qualified teachers. The Wi De Ya data shines a light on the detail and presents potential solutions to address and improve PQTR, the opportunity and risks of unqualified non-payroll teachers and the PTR.

Based on the findings, the following is recommended.

1. Use Wi De Ya data to assess the demand for payroll teachers across all districts by comparing PQTR against PTR. This learning can be applied to TSC funding requests to the government to support the recruitment of teachers to reduce PQTR. It should also be applied to subsequent recruitment activity, prioritising the recruitment of teachers to schools and districts with the highest PQTR and PTR.

2. TSC and NGOs periodically conduct in-service training for untrained and unqualified teachers already on the payroll in communities, where they are needed to ensure all payroll teachers are trained and qualified. When TMIS is in operation, it will identify and target unqualified payroll teachers for training.

3.5.4.3. Teacher Gender Ratios and Teacher Age

Evidence suggests that female teachers may increase girls' test scores and their likelihood of staying in school, heighten their aspirations, and lower their likelihood of being subject to violence.[60] As such, the inclusion of women in the teaching workforce is critical.

Key Findings

There are more female teachers in primary schools than across all school levels, however there are still disproportionately more male than female teachers. 39% of teachers (payroll and non-payroll) in primary schools are female. The ratio is relatively similar between non-payroll (37% female) and payroll (40% female). This compares to the current teacher payroll of 27% female, 73% male teachers (36,500 tsctrm.org/) across all school levels.

The ratio varies greatly between districts (Figure 36), with the teaching workforce in Western Area Urban being 65% female while Kono's is just 18% female.

Interestingly, 55 participating schools (14%) do not have any female teachers, neither payroll nor non-payroll (Figure 37), resulting in 4,723 girls having no female teachers. Increasing the number of female teachers is one way to get more girls into school, and to keep them there, especially in parts of the world where cultural barriers make it difficult to send girls to school. Girls who report having positive female role models in school are more likely to stay in school.[61] Studies conducted in rural India show that students taught by teachers of the same gender performed 0.04 standard deviation better than students taught by a teacher of a different gender.[62]

60 Le Nestour, A. & Moscoviz, L. (2020) *Six Things You Should Know about Female Teachers*. https://www.cgdev.org/blog/six-things-you-should-know-about-female-teachers#:~:text=Evidence%20suggests%20that%20female%20teachers,of%20being%20subject%20to%20violence.

61 *The importance of female teachers for girls' education* | Blog | Global Partnership for Education

62 Rawal, Shenila, and Geeta Kingdon. 2010. *Akin to My Teacher: Does Caste, Religious, or Gender Distance Between Student and Teacher Matter? Some Evidence from India.* Department of Quantitative Social Science Working Paper 10-18. London: Institute of Education of University of London.

Figure 36. *Proportion of female teachers across districts*

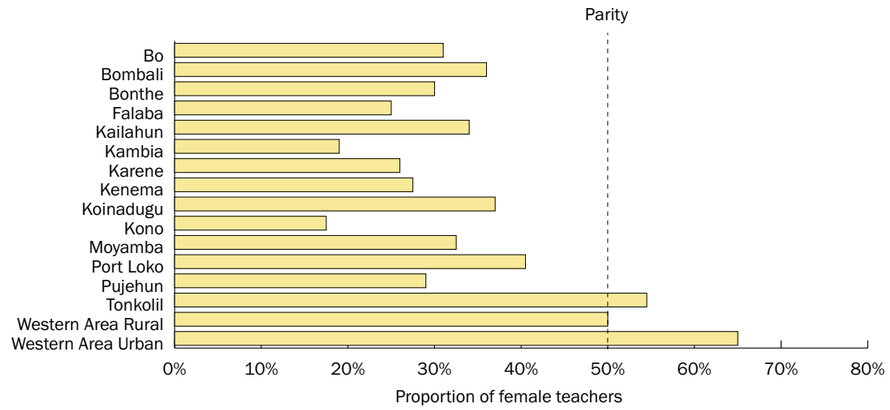
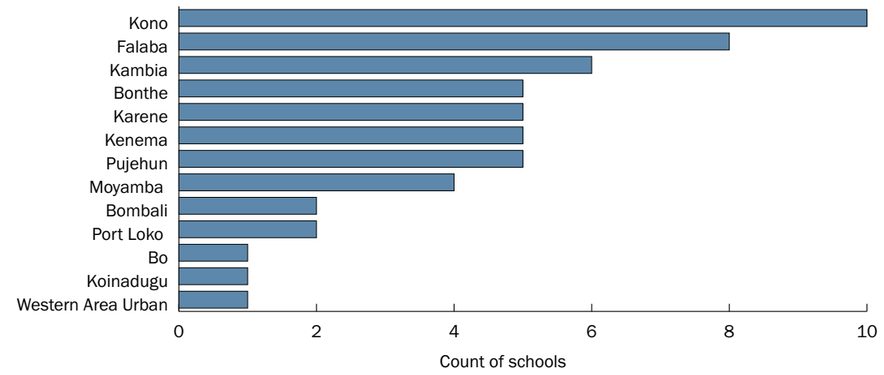


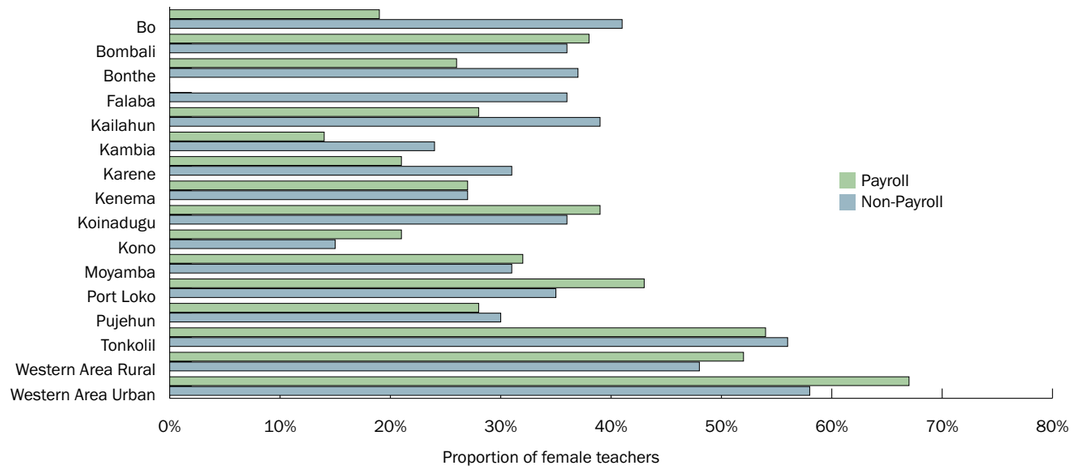
Figure 37. *Count of schools without female teachers*



When comparing the ratio of female:male teachers by payroll and non-payroll, (Figure 38) Western Area Urban and Tonkolili are the only districts with more female payroll and non-payroll teachers than male teachers. All 18 Wi De Ya schools in Falaba do not have a single female payroll teacher. One explanation could be the rurality of the schools. Safety, more conservative values, or the difficulty to take a job far away from their family might explain why women are less likely to teach in rural areas. But this means girls in rural areas are less likely to have a female teacher, when they could benefit the most from being in contact with a qualified working woman.[63]

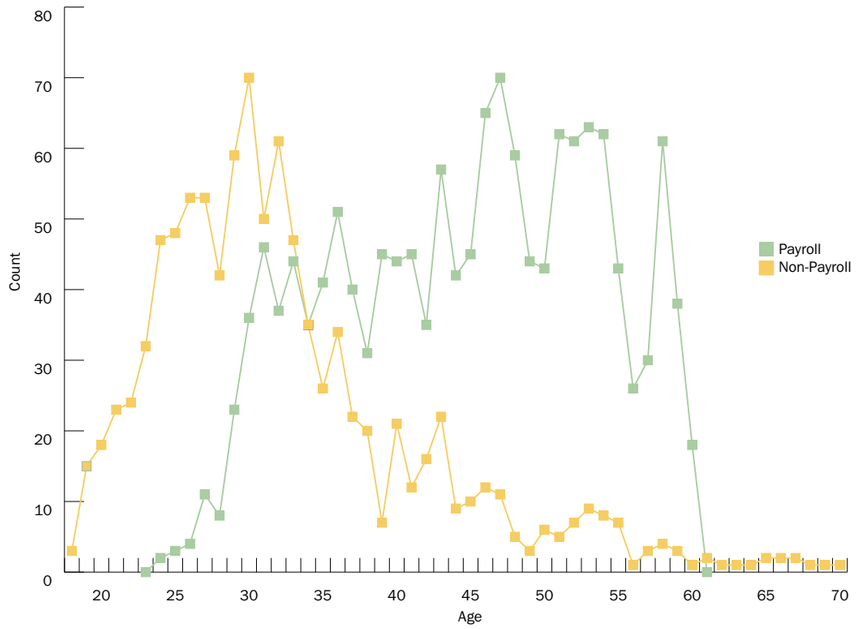
63 Le Nestour, A. & Moscoviz, L. (2020) *Six Things You Should Know about Female Teachers*. https://www.cgdev.org/blog/six-things-you-should-know-about-female-teachers#:~:text=Evidence%20suggests%20that%20female%20teachers,of%20being%20subject%20to%20violence.

Figure 38. % of payroll and non-payroll female teachers per district



Non-payroll teachers tend to be younger than payroll teachers, reducing in number as they get older, while the number of payroll teachers increases. School leavers or college graduates with no training often seek temporary employment, even as community teachers (often with some remuneration), whilst awaiting opportunities for further studies or employment in their preferred field.[64] As indicated on the graph below (Figure 39), payroll teachers drop off when they reach the statutory age for retirement, while a small number of non-payroll teachers continue teaching beyond age 60. It may also be the case that payroll teachers continue to teach at schools after retirement, contracted within their communities.

Figure 39. Age distribution of teachers by payroll status



64 18-448-Sierra-Leone-Teaching-report-web.pdf (tsc.gov.sl)

Teacher Gender Ratios and Age: Recommendations

The learning outcome benefits are clear when girls are taught by a female teacher.[65] The Wi Di Ya data identifies disparities between the percentage of female teachers in different districts and clear opportunities to address these, which is another way education equity issues for learners, and particular girls, in rural and underserved communities can be addressed.

Based on the findings, the following are recommended.

1. Implement distance learning programs (mobile outreach) for non-payroll female teachers living in rural areas to meet at least the minimum requirement for recruitment.
2. Prioritise female teachers at schools where there are fewest female teachers for rural retention incentives and scholarships to support the development of potential role models and support to female learners.
3. Review policy on teacher recruitment to ensure increased opportunity is given to recently qualified teachers (to avoid losing them from the workforce), and female teachers in order to address gender disparities.

65 Shahidul, S. M., & Zehadul Karim, A. H. M. (2015) Factors Contributing to School Dropout Among the Girls: A Review of Literature, European Journal of Research and Reflection in Educational Sciences 3(2) p. 28. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=bf140ac013257c0f8a14d223466aaaff260e9567

4. OPERATIONAL LEARNINGS: Considerations for Implementing Education Data Collection

This section covers operational learning, considerations and recommendations for the national scale up of Wi De Ya and are additional to those detailed in previous reports.

These operational recommendations are specifically derived from feedback surveys from school leaders and District staff and an evaluation of operational variations that were observed to impact school leader performance during the rollout.

School leader performance is measured through:
1. Daily submission of learner and teacher daily attendance report

2. Completion of key fields in teacher and learner profiles (example of key fields include special needs assessments, guardian contact)

For further learning, considerations and recommendations for the national scale up of Wi De Ya derived from app development, hardware selection, training and other activities please see implementation reports (see Section 2).

4.1. Methodology to Evaluate Operational Changes Impact on Reporting Rates

The effects of the operational variations on likelihood of daily attendance report being submitted or profiles being fully completed was calculated using a logistic regression using the formula:

$$log(\frac{P}{(1-P)}) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots$$

The left-hand side represents the log of the likelihood that a school leader submits a report on a given day and/or completes a learner profile. Taking the exponential of both sides results in:

$$\frac{P}{(1-P)} = exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots)$$

where $exp(\beta$ esents the odds ratio of the corresponding variable. In other words, how much higher are the odds of a school leader submitting an attendance report and/or completing a learner profile given the input variable.

4.2. Attendance Report Submission Findings

Statistically significant effects of the variables of interest are included in the table below.

Table 5. Effects of operational variables on attendance report submissions

Operational Variables	Statistically significant effects on the likelihood of				Comment
	Learner Attendance Reporting	Teacher Attendance Reporting	Learner Profile Completion	Teacher Profile Completion	
School Leader Engagement					
Two teachers trained	Negative	Negative	Null	Positive	The reporting period of summer term was insufficient time to see school leaders depart a school. This result is more likely a reflection of the distributed responsibility, and we expect an inversion of this correlation after more time.
Primary user: not school leader	Negative	Negative	Positive	Positive	School leaders were more likely to report attendance but less likely to dedicate time to profile completion, than when delegating
School leader on payroll	Positive	Positive	Positive	Null	
Sunday submission	Negative	Negative	N/A	N/A	Schools open on Sundays have reduced compliance on those days.
Friday submission	Negative	Null	N/A	N/A	Fewer learner reports are submitted on Fridays
District Staff					
School visit frequency	Negative	Negative	Negative	Positive	The District staff visits were greater in areas with low reporting rates, this may have been as an effort to compensate.
Supports at least 3 hours per day	Positive	Positive	Positive	Null	Additional support increased report rates.
School Stats					
> 500 learners	Negative	Negative	Negative	Negative	Larger schools had lower reporting.
Pupil teacher ratio	Null	Null	Positive	Positive	PTR appears to have null effect on reporting, and a marginally positive effect on profile completion.
Hardware Considerations					
Faulty battery	Negative	Null	Positive	Null	Less tablet life means less opportunity to submit reports. It is not clear why there is a weakly positive correlation with profile completion.

Operational Variables	Statistically significant effects on the likelihood of				Comment
	Learner Attendance Reporting	Teacher Attendance Reporting	Learner Profile Completion	Teacher Profile Completion	
Faulty charger	Null	Null	Negative	Positive	This was only weakly correlated as mini-USB chargers are readily replaced.
Travels more than 2 miles to charge	Null	Null	Negative	Negative	Null effect in schools, but for completion of profiles (more likely to be completed out of hours) charging distance had a negative effect.
Medium or strong signal	Positive	Null	Positive	Null	

4.3. Training One vs Two Teachers per School

The school leader plus one additional teacher were trained for all schools in the 300-rollout phase of Wi De Ya with the exception of those in Falaba and Western Area Urban, where just one school leader was trained per school. The advantage of training one person is the reduced rollout cost. But this also risks reducing resilience, such as the school leader not being familiar with IT, no alternative trained staff when the school leader is absent, and less resilience to changes in school leadership.

However, once controlling for factors such as remoteness, District staff engagement, day of week, and size of school, we find no evidence that training the school leader plus another person in the school increases attendance reporting rates. In other words, Falaba is seen to have around average learner attendance reporting rates while Western Area Urban has especially low likelihood of learner attendance reporting, but these lower reporting rates are likely caused by other factors that are not related to how many school leaders were trained.

Breaking down the reporting rates by chiefdom, we see that those with only one trained school leader have both low and high reporting rates, with the urban districts (West I in Western Area Urban; Mongo in Falaba) more likely to submit reports than the rural districts (East III, Central I, and Central II in Western Area Urban; Delmandugu in Falaba). In other words, training more school leaders per school did not have a positive effect on reporting rates during this short rollout.

Figure 40. *Learner reporting rates by chiefdom*

In fact, with all other variables controlled for, it appears that training more people per school decreases the likelihood of report submissions. The reasoning why is unclear, but one possible explanation is a lack of ownership of the responsibility. It is important to keep in mind this effect is pre-maturely measured due to a short reporting period not being able to capture factors such as a shift in school leadership. It is currently unknown exactly how often school leaders change. In the future, Wi De Ya data will provide insights and information on how often school leaders move, leave, retire or die which will help inform and refine training approaches. However, until that data is available, for resilience purposes, it is still recommended to train two people per school including the school leaders.

4.4. Guidance and Incentives for School Leaders

School leaders are the key individuals responsible for submitting data consistently and accurately into the system, with the exception of Falaba and Western Area Urban where either a school leader or teacher was trained. Operationally, considerations need to be made on the guidance provided to school leaders and how to incentivise them to submit reports, especially in cases where a school has a non-payroll school leader.

As per Table 5 in Section 4.2, **delegating responsibilities to any other teacher** is detrimental to attendance reporting but beneficial for profile completion. This may suggest guidance for the next phase is to split responsibilities, encouraging school leaders to take ownership of entering daily attendance while another teacher with more capacity during the day assists in completing learner and teacher profiles.

11% of the school leaders in the 300 schools are not on the payroll and when the **school leader is not on the payroll**, the likelihood of submitting daily attendance and completing profiles decreases. It was observed that schools with a payroll school leader are more likely to submit attendance reports on any given day than schools with a non-payroll school leader. This is likely reflective of the general ability of non-payroll staff to conduct their responsibilities without reliable pay (see also the higher absenteeism of those not on the payroll, Section 3.5.3.).

4.5. District Staff Strategy to Provide Support

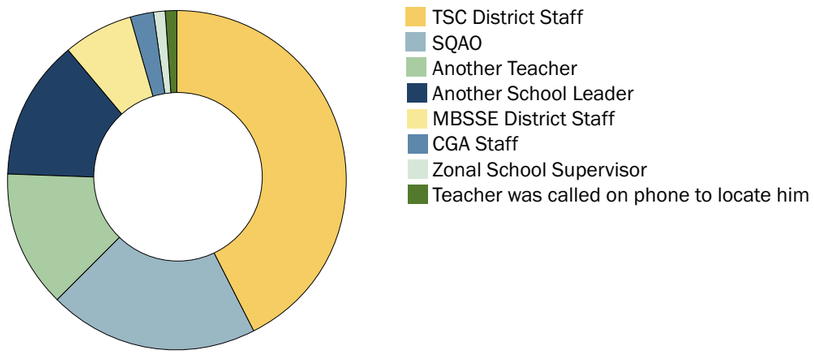
Regarding time consumption, schools were more likely to submit attendance reports and complete their profiles when their chiefdom's respective School Quality Assurance Officer (SQAO) or Information Technology officer (ITO) spent at least three hours supporting Wi De Ya per day. With this standard in mind for 9 schools per chiefdom, it is important to consider the increase in workload that will result when all primary schools in each chiefdom are participating and how many staff is necessary to provide effective support.

Feedback from the school leader survey shows that the preferred mode of communication is split relatively evenly between phone calls, WhatsApp, and school visits (Annex C).

Worse school leader performance on learner profile completion, learner and teacher attendance reporting correlated with more District staff visits to schools. It is likely that District staff visited only schools that are struggling. Nonetheless, the data does not show a need to increase the amount of school visits made beyond visiting those unable to report for remedial training. We did not dictate any school visits but provided fuel money to SQAOs when their chiefdoms had 100% reports.

District level staff model
During Wi De Ya, the deputy directors of both TSC and MBSSE were responsible to oversee all schools within their district ensuring that school leaders perform their duties. Without the support of District staff, school leaders would have found it very difficult to understand and use Wi De Ya. Over 80% of school leaders contacted District staff as first support to Wi De Ya (Figure 41).

Figure 41. *School leader survey: First contact for support*



All 16 TSC District Deputy Directors (DDs) and the 16 MBSSE DDs will be required to continue to play key roles. They will be expected to give overall oversight through unannounced visits to other District staff and teachers once per week to ensure Wi De Ya is effectively used.

TSC DDs were in charge of coordinating school leader training in their districts. They were also responsible for receiving reports from schools and sending reports to TSC headquarters on Wi De Ya activities; we would expect this to continue.

MBSSE DDs ensure that the SQAOs monitor, supervise and support teachers and school leaders in their districts and ensure that school leaders are using the devices in a timely manner, assure no collusion with non-compliant teachers and are liaising with district offices to mitigate unwarranted and disruptive issues.

All ITOs in each district have a role to play in Wi De Ya. They have demonstrated how useful and helpful they are on the frontline - troubleshooting, resolving issues and ensuring adequate technical support is given to teachers and school leaders using Wi De Ya.

SQAO, and / or School Supervisors where available, are frontline staff supporting the schools for MBSSE. They are based within chiefdoms and generally are expected to visit two or three schools within their chiefdom every day. Through the Director of School Quality Assurance, Management and Resource (SQAMR), they provide professional advice to the Minister and Chief Education Officer and support the implementation of educational policies, strategies, and programmes through effective coordination, monitoring, and supervision of schools. During the Wi De Ya rollout, SQAOs provided the training and first layer of support to school leaders – either in-person or remotely, ensuring school leaders were able to use the tablet and the app. They should ensure that the user policy relating to the devices are followed appropriately. They should demonstrate a high degree of probity, devoid of misappropriation, abuse and high ethical standards. They should also be proactive to discern, identify and employ problem-solving approaches in a rapid response manner. SQAOs were the second most contacted District staff for support to school leaders (Figure 41).

Total number of staff required
- There must be buy-in and oversight from both the TSC and MBSSE who are responsible for the different key components of a school, namely the teachers and learners. Both must benefit from the accountability and information, therefore training for the district teams on the system is essential.
- A total of 208 SQAOs representing the 208 chiefdoms and zones with technical support from the 16 ITOs are required for the training and technical support to school leaders as a minimum.

4.6. Importance of Battery Life

In the feedback survey, the school leaders indicated that 70.8% of the MBSSE tablets provided for the 300-school rollout were reported to have issues with charging and battery life (Annex C for details).

Faulty batteries negatively impact school leaders' likelihood of submitting learner attendance. The same effect does not apply to teacher attendance, possibly because teacher attendance is submitted at the beginning of the day while learner attendance is submitted at the end of the day.

Unexpectedly, there is a positive correlation between users who report faulty batteries and the completion rate on learner profiles. A possible explanation is that users who are completing more profiles are more likely to report battery issues. This is a limitation of self-reported data.

This highlights the need for good quality tablets and testing tablet batteries prior to deployment. For tablet hardware specifications, see Annex E.

4.7. Charging Accessibility

In the feedback survey, school leaders reported the distance they had to travel to charge their tablet: 76% under a mile, and 14% over two miles. When school leaders need to travel more than two miles, there is a negative impact on their likelihood of completing learner and teacher profiles. It is likely school leaders who needed to travel more than two miles prioritised recording attendance over completing profiles to reduce how often they had to charge the tablet.

These findings highlight the necessity of solar power banks and chargers to high priority schools, in particular those that must travel furthest to charge their tablets. Procurement of the solar power banks has a budgetary implication, however from the feedback received, it is recommended to provide high priority schools with power banks.

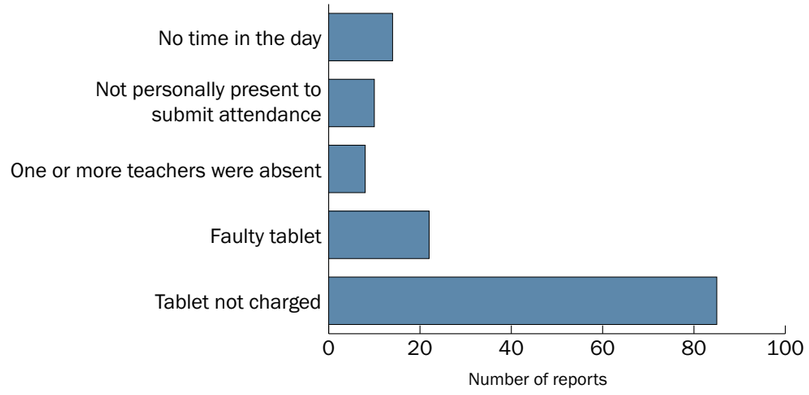
4.8. Hardware

Hardware refers to the physical components of an electronic device. In this case, hardware includes the tablet, tablet battery, tablet charger, Sim card and fingerprint reader. These components work together to enable the functioning and operation of the tablet for reporting. This report evaluates the quality of the tablet used for attendance monitoring in remote areas of the selected 300 schools, highlighting the limitations and potential impact on the attendance monitoring process. Remote communities are more likely to face challenges using the tablets than urban communities due to poor infrastructures and basic amenities. For example, poor Global System for Mobile communication (GSM) signal and limited charging facilities. A tablet which can serve remote communities would be considered a good tablet.

The tablet's specifications had limitations that affected its performance and reliability. The critical shortcomings were:

- Hardware limitations: The tablet lacked processing power, storage capacity, and RAM, resulting in slow performance and system crashes. This compromised efficiency and real-time data entry, leading to incomplete attendance records. 70% of the respondents stated that they were unable to send daily attendance reports because their tablets were not charged (Figure 42).

Figure 42. *School leader survey: Most common reasons for not submitting daily attendance reports*



- Fragile build and durability concerns: the tablet was prone to physical damage without a screen protector or pouch. In the survey conducted at both districts and school levels, a significant majority of attendees during the training requested the cases or screen protection materials be provided. This impacted productivity and diverted resources from educational tasks.
- Limited connectivity options: The tablet had limited connectivity because of weak antenna, making it difficult to receive strong signals and establish a stable internet connection for real-time data synchronisation. This resulted in potential delays in generating attendance reports and hindered timely decision-making.

To address these issues, it is recommended to provide high-quality tablets with better antennas for improved signal reception, enhanced battery life, and charging options such as power banks and solar chargers. Additionally, protective cases and screen protectors should be provided to ensure durability in challenging environments. Improved connectivity options should be considered to facilitate real-time data synchronisation and timely attendance reporting.

See Annex E for the minimum device specifications for Wi De Ya.

Procurement of the solar power banks has a budgetary implication, however from the feedback received (Annex C), it is recommended to provide high priority, low resource schools with power banks.

4.9. Internet Services and Data for Tablets

A novel approach was taken for this project in terms of provision of internet connectivity (data) for the tablets, by establishment of an APN (access point network) with Orange SL for the project SIM cards. Wi De Ya APN data cost across May, June and July averaged 1,600 SLE/month (approximately $76/month) across all 440 SIM cards (of which 300 were schools reporting regular data). This is equivalent to 107GB/month in total, or 350MB/month/school.

Internet services via APN
An agreement was reached with Orange SL to set up an APN at standard commercial rates, which at the time of the project was 15 SLE/GB. The APN can be configured to whitelist specific web domains/

subdomains, for example wideya.org.[66] End users (primarily school leaders in this case) can use the whitelisted services for free at the point of use, with no top-up or data bundle required.

All APN data usage is collated and centralised for post-paid payment as a single monthly bill for the project with Orange HQ.

A hard cap of 3GB/month was placed on each SIM card as a safety net for unexpected costs.

The APN was established with TSC as the named client, with CGA Technologies as the interfacing partner. It is worth noting that this APN could be expanded to include other projects (by including additional web domains in the whitelist), but only if the billing is paid by the same entity, since the data usage cannot necessarily be disaggregated between different projects.

Benefits of APN use
There are several favourable aspects to this Orange post-paid APN arrangement compared to a standard model of pre-paid monthly data bundles:

- Flexibility and savings: one only pays for the exact amount of data that is actually used, compared to prepaid bundles where all unused data is wasted at the end of the month. APN is also more flexible to accommodate occasional spikes in usage.
- Traffic control: one can set the list of web domains that are whitelisted, meaning that there is no wastage on other websites or video streaming.
- Easier to manage: no need to manually top up a large quantity of phone numbers at the start of every month. This way everything just keeps rolling with all management centralised.
- Automatically accommodates the stop/start nature of the annual school calendar: If no data is used for a particular month, then no cost is due whatsoever. This is excellent for holiday periods etc, with no manual intervention required when holidays start/end.

Mobile network operator (MNO) selection
A key reason why Orange was selected over Africell is that Orange's APN allows flexible amounts of data usage, where payment is post-paid and calculated depending upon actual data usage, whereas Africell's APN (at the time of scoping) required pre-payment of a fixed amount of data per SIM card.

Orange was also the logical choice when it comes to network coverage. Only two MNOs in Sierra Leone have nationwide coverage in both rural and urban areas: Orange and Africell. Over 95% of the 300 schools have an Orange SL network in their community (or in the closest community with a network). Only one school reported having access to only the Africell network in its community, and all remaining 299 schools are using Orange SL network to access the internet for Wi De Ya use. 60% of the 300 schools have at least 3G network, and only 12% of the schools are without GSM signal.

4.10. Stakeholder Engagement

The TSC, MBSSE and CGA Technologies engaged key national and donor stakeholders in-person and virtually during the implementation of Wi De Ya. Draft findings were reported broadly to education stakeholders before completion of the report and the report is to be briefed to an open audience webinar. The purpose was to share information on each phase of the rollout, including preliminary findings and lessons learnt. Through these engagements, stakeholders provided critical and constructive feedback. This process was completed after each of the four phases with a broader group for each presentation, which helped shape each following phase.

66 The whitelisted domains were: Wi De Ya system domains; TSC & MBSSE websites; Google domains necessary for Android operating system to function correctly (APIs for checking date/time, connectivity, etc): mtalk.google.com, *.googleapis.com, *.gstatic.com, *.android.com

Stakeholder engagement is an integral part of the successful implementation of Wi De Ya, ensuring that different areas of the ministry and education sector have an ability to critique and utilise the data. It is essential to continue engaging with them as we move towards implementing Wi De Ya nationally.

4.11. National Rollout Recommendations

Lessons learnt from the current phase will help inform a successful rollout across Sierra Leone. The Wi De Ya initiative and gains made should be maintained and sustained rather than dissipating. The cost to scale Wi De Ya is greatly outweighed by the value it brings. Already the system has identified significant leakages and wastage, which, without the nationwide scaling of Wi De Ya, will continue to flow and grow, negatively impacting the government's ability to build human capital development. For example, there is evidence that most of the teachers identified by Wi De Ya as dead or having left the profession are still, even many years on, receiving a salary (see Section 3.5.1.2.). The education budget makes up a huge proportion of government expenditure. Wi De Ya instituted in all schools will support probity in public financial management and productive learning outcomes in schools.

4.11.1. Governance Set Up Required

1. Establish and sit the payroll steering committee monthly.
    a. It is envisioned that a governance structure, such as the payroll steering committee, be established comprising government agencies with functional responsibilities relating to fiscal probity, accountability, and auditing: for instance, TSC as the employing authority (Secretary, Director Teacher Management and payroll manager, and the internal auditor), AGD, and Anti-Corruption Commission (ACC).
    b. The committee should meet monthly and before the deadline for submission of payroll changes and amendments to AGD the next month.
    c. Their mandate is to review payroll queries generated from data captured on Wi De Ya, for instance, on death, absenteeism, irregular and unauthorised transfers, leave and so on and act upon them.
    d. The committee should approve lists of teachers to be removed or sanctioned, for the payroll manager to take action.
    e. This committee then is implementing the sanctions framework and in turn works with section 12 of the Sierra Leone Gazette Vol CXLXIII No. 64 of September 2022.

2. As per MBSSE's National Policy for Radical Inclusion Implementation Plan and its Out of School Children (OOSC) Strategy (both 2022), the Radical Inclusion Committee and its OOSC sub-committee should sit regularly and consider the list of learners that have stopped attending school, for referrals to District staff for signposting to alternatives such as non-formal education.
    a. Top management with overarching and supervisory responsibilities should be instituted to manage the implementation of the Radical Inclusion Committee and the OOSC sub-committee.
    b. The overarching body should conduct regular presentations of data and analysis to partners.
    c. The committees should work in collaboration with local council education committees for implementing by-laws, protecting and preserving rights of vulnerable children including CWDs.

4.11.2. Data Use

1. Develop processes at each level – school, district and national – for school leaders, district teams and national teams to ensure Wi De Ya data is analysed and actioned and embedded into ways of working.
    a. Using data dashboards on the app at the school level, school leaders should discuss with class teachers any individuals flagged as having special needs. The in-app dashboards can support this.

2. Coordination of the education system must be robust: the ministry should coordinate partners with broad mandates, not to build the same system as each have different purposes, but to complement one another to build a resilient system.

4.11.3. Wi De Ya Next Steps

1. Hold virtual meetings with donor partners and in-person meetings with national stakeholders to give them updates on data coming in from the field. Their inputs are recommended for continued success. Schedule further engagement for review termly, as such engagement can be helpful in identifying any concerns that need to be addressed or good practices that can be replicated. Engagement also ensures that the different stakeholders have the ability to critique and utilise the data.

2. Potential data points to be added
    a. Duplicating learners for the next year
    b. Non-payroll:
        i. When they started teaching at their schools, qualifications, experience, proficiencies, character and discipline records
        ii. Transfer to different schools, to start building a teaching record.

    c. Payroll teachers' profiles: qualifications, years of experience, proficiencies, character and discipline records.

3. For upcoming phases larger than 300 schools, it will become critical to explore Mobile Device Management (MDM) solutions (for example via Android Enterprise) in order to ensure consistent and efficient management of a fleet of thousands of tablets, since it would allow centralised administration of tablet configuration and updates.[67]
    a. Though care should be taken to not preclude the future possibility of a 'bring your own device' approach, since this is a useful fallback option to maintain in case there is ever a shortage of government tablets.

4. Tablet internet services (data) should continue to be provisioned through the Orange APN approach that was successfully used in this 300-school phase, since it is economical and effortless. It is recommended GoSL establish a permanent budget line for the monthly costs of school tablet data. The successful new approach of establishing an APN network makes this relatively affordable (see Section 4.9).

67 https://www.android.com/intl/en_uk/enterprise/management/

5. CONCLUSION

Wi De Ya enables the government of Sierra Leone to change thousands of lives. It provides the data which supports and cements the transformation of education in Sierra Leone. The change comes from using the needs and distribution of learners to assign teachers and deploy resources to where they are required most.

Whilst the initial setup costs which may appear expensive, there is value for money over time. The teacher data shows which teachers are not teaching, and therefore do not need to be paid. The excess funds can then be used for paying non-payroll teachers, school supplies and other education enhancements.

Cleaning the payroll of just those who are almost certainly not teaching is likely to result in at least 1.2 million SLE (57,000 USD) every month. It is likely nearly five times this can also be removed pending investigation, with the proportionate monthly savings. If teacher sanctions are enforced across the payroll, our results indicate initial monthly savings would be 1.8 million SLE (91,000 USD), which would be expected to decline rapidly as teaching time in the classroom increases.[68] This money can be reinvested in people actually teaching in the schools.

Teacher management is negatively affected because 51% of each school's payroll teachers are not in their assigned school. An immediate priority should be given to reviewing the 11% of non-payroll teachers, already identified through Wi De Ya, who are school leaders of government and government assisted schools, unbeknownst to MBSSE.

Having a mechanism through which teacher absenteeism can be addressed not only has fiscal benefits, it has a positive impact on improving learning outcomes.[69] [70] [71]

Wi De Ya provides information about individual learners and their needs that was previously unknown: how many there are, where they are located, what their learning requirements are, and who is more likely to drop out of school. This information is invaluable in ensuring resources are more effectively and appropriately allocated.

With the number of learners increasing by 7% in one year,[72] [73] it is even more important that we know who the learners are, can follow their progression through the education system and identify those who have dropped out or are not engaged in education and learning. Wi De Ya also improves attendance, with 90% of school leaders reporting that learner attendance had improved since reporting on the app began. All of which will not only improve access to education but also improve learning outcomes which are essential to meet the aspirations of the Sustainable Development Goals (SDGs).

Tablets alone are not the answer. Procurement of tablets will have limited or no impact on improving the education and learning outcomes unless there is a system which is used to gather data in order to facilitate action.[74]

68 See Section 3.5.1.
69 O'Sullivan, M. 2022 Teacher absenteeism, improving learning and financial incentives, PROSPECTS, 52, 343-363.
70 UNICEF https://www.unicef-irc.org/article/2072-new-study-unveils-challenges-affecting-teacher-absenteeism-in-sub-saharan-africa.html
71 UNICEF, Time to Teach: Getting teachers back to the classroom in West and Central Africa, 2021
72 In 2021, enrolment was recorded at 3,131,440 and in 2022; enrolment figure was recorded at 3,343,470. EMIS Department, 2023. 2022 Annual Schools Census Report. Freetown: MBSSE.
73 This compares to a population growth of around 2% for the last few years. World Bank, 2023, https://data.worldbank.org/indicator/SP.POP.GROW?locations=SL
74 Banerjee, A., Andrab, T., Banerji, R., Dynarski, S., Glennerster, R., Grantham-Mcgregor, S., Muralidharan, K., Piper, B., Chanduvi, J. S., Yoshikawa, H.; Ruto, S.; Schmelkes, S. 2023 Cost-effective Approaches to Improve Global Learning - What does Recent Evidence Tell Us are "Smart Buys" for Improving Learning in Low- and Middle-income Countries? Washington, D.C.: World Bank Group https://documents1.worldbank.org/curat-

'*Innovations will likely only work if teachers and school leaders see their value, if resources are in place to maintain the systems, and if the systems are actually used*'.[75] With 89% of users, including school leaders, reporting that they want to continue using Wi De Ya to record and monitor teacher and learner attendance, it is evident that they value and use the system.

Wi De Ya has evidenced that it is an effective system at 'collecting, managing and producing accurate and reliable school level data and statistics' including 'tracking teacher and pupil attendance'. This functionality provides a wealth of data that schools, the TSC and MBSSE use to facilitate action for effective planning, management and transformation of education in Sierra Leone. In order to support and fulfil key government education policies, strategies, and plans to ensure the education system is radically inclusive for all.

It is essential that the rollout of Wi De Ya continues in Sierra Leone so that the full benefits and opportunities outlined are realised.

ed/en/099420106132331608/pdf/IDU0977f73d7022b1047770980c0c5a14598eef8.pdf

75 Evans, David K. 2021. Education Technology for Effective Teachers. World Bank, Washington, DC. http://hdl.handle.net/10986/35079

Annexes

A. Schools with a PQTR over 200

B. School sample comparison report

The following annexes are available separately. Please contact CGA Technologies at: enquiries@cgatechnologies.org,uk.

C. School leader survey results

D. District staff survey results

E. Wi De Ya minimum device specifications

F. Wi De Ya Android App User Manual - see separate document.

Annex A. Schools with a 'PQTR' over 200

School Name	Chiefdom	District	Count Payroll	Count Non-Payroll	Count Learners	PQTR
Roman Catholic Primary School	Magbaimba Ndorwahun	Bombali	1	5	444	444.0
District Education Committee N.B.C. Primary School	Bombali Sebora	Bombali	1	5	442	442.0
Sham Sierra Islamic Primary School	Waterloo Rural	Western Area Rural	1	10	401	401.0
Kambia District Council Primary School	Samu	Kambia	1	5	362	362.0
United Academy Primary School	Magbema	Kambia	1	5	361	361.0
Africa Muslim Agency Primary School	Magbaimba Ndorwahun	Bombali	1	6	348	348.0
Kankalay Islamic Primary School	Soa	Kono	1	3	341	341.0
District Education Committee Primary School	Boama	Bo	1	6	329	329.0
King Fahad Islamic Primary School	Dibia	Karene	1	5	327	327.0
Mercy Academy Primary School	Magbema	Kambia	3	12	966	322.0
District Education Committee Primary School	Bum	Bonthe	1	2	319	319.0
National Isalimic Primary School	Soro Gbema	Pujehun	1	2	314	314.0
Roman Catholic Primary School	Diang	Koinadugu	1	5	306	306.0
Sierra Leone Muslim Brotherhood Primary School	Bum	Bonthe	1	3	306	306.0
United Methodist Church Primary School	Kakua	Bo	1	5	300	300.0
Sierra Leone Muslim Brotherhood Primary School	Lokomasama	Port Loko	1	4	290	290.0
District Education Committee Primary School	Magbaimba Ndorwahun	Bombali	1	7	289	289.0
Roman Catholic Primary School	Mongo	Falaba	1	2	289	289.0
Sella Community Modal Primary School	Sella Limba	Karene	1	8	284	284.0
Sierra Leone Muslim Brotherhood Primary School	Bum	Bonthe	1	3	274	274.0
Baptist Model Primary School	York Rural	Western Area Rural	1	6	258	258.0
Ansarul Islamic Primary School	Magbaimba Ndorwahun	Bombali	1	4	254	254.0
Evangelical Model Priimary School	Ribbi	Moyamba	1	4	246	246.0
Kambia District Council Primary School	Samu	Kambia	3	5	725	241.7
Roman Catholic Primary School	Dibia	Karene	1	2	238	238.0
Holy Ghost Royal Academy Primary School	Gbense	Kono	1	6	237	237.0
Wesleyan Church of Sierra Leone Primary School	Magbaimba Ndorwahun	Bombali	2	4	472	236.0

School Name	Chiefdom	District	Count Payroll	Count Non-Payroll	Count Learners	PQTR
Methodist Primary School	Kpeje Bongre	Kailahun	1	5	235	235.0
United Methodist Church Primary School	Lower Bambara	Kenema	3	5	680	226.7
District Education Committee Primary School	Dibia	Karene	1	2	224	224.0
Evangelical Model Priimary School	Lower Bambara	Kenema	2	6	441	220.5
Missionary Church of Africa Primary School	Delemandugu	Falaba	1	3	215	215.0
Kankaylay Islamic Primary School	Lokomasama	Port Loko	1	3	212	212.0
Koyima Primary School	Soa	Kono	1	4	209	209.0
Community Primary School	Magbema	Kambia	2	6	403	201.5

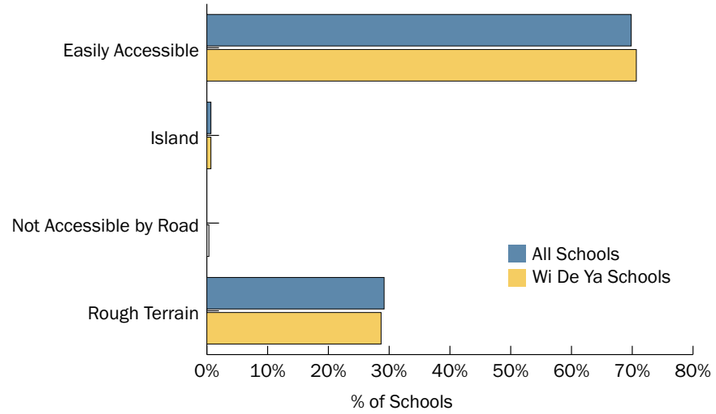
Annex B. Wi De Ya Schools as a Sample of the General Populations of School

This analysis is based on the 2021 ASC data. This is an updated version of similar data presented in the 300-school rollout report.

B.1. How generalisable is the data from Wi De Ya to Sierra Leone schools?

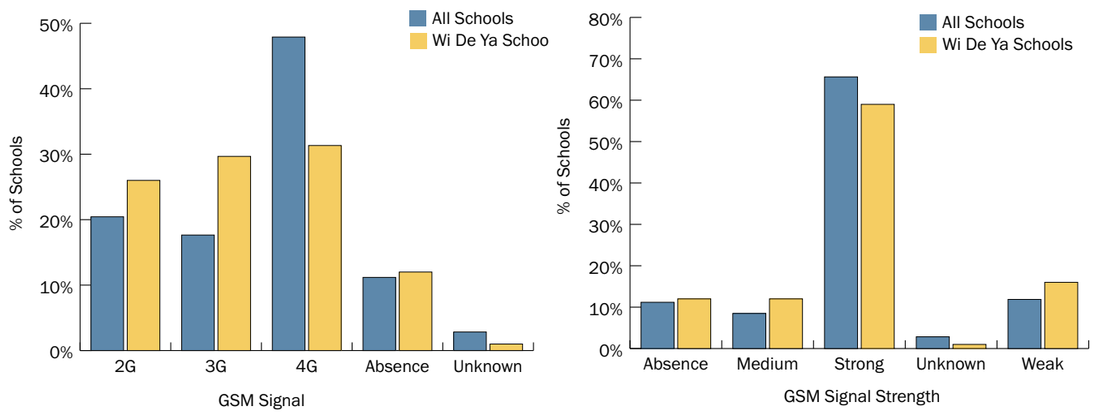
B.1.1. Remoteness

Schools selected for Wi De Ya reflect the “remoteness” classification as defined by the 2021 ASC of all schools participating in the census.



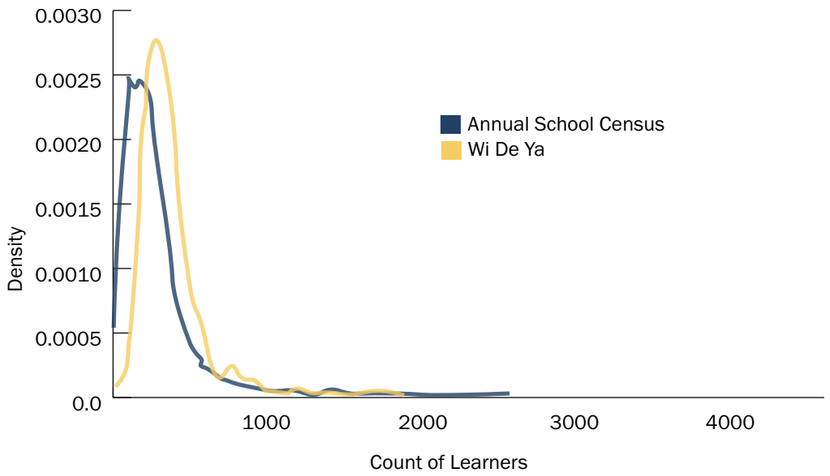
B.1.2. GSM signal

Schools selected for Wi De Ya had a higher proportion of schools with a lower level of GSM signal than all schools in Sierra Leone. This implies that the network challenges during the next phase should not be worse than the network challenges faced during the 300-school rollout.



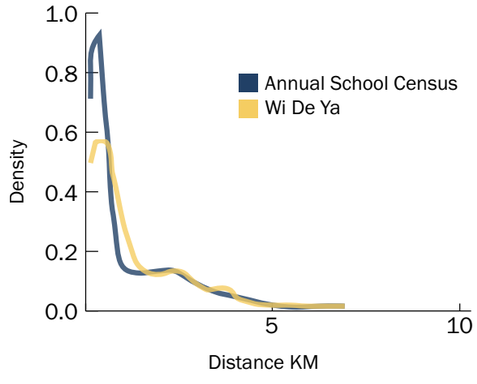
B.1.3. Learner distribution

The distribution of schools selected for Wi De Ya skewed to have more medium size or larger schools than the general population of schools in Sierra Leone. This implies the concerns about workload for entering learner profiles should not exceed the workload faced in the 300-school rollout.



B.1.4. Distance to school

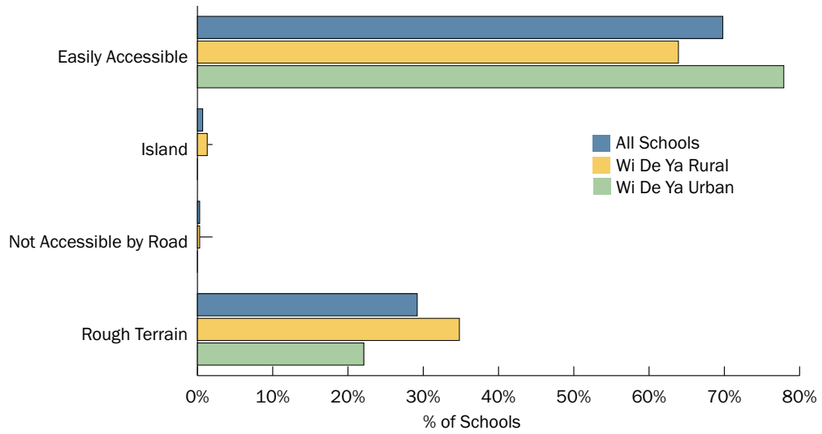
The distribution of the distance to the closest same level school is not the same between all schools and schools selected for Wi De Ya. If the distance to the closest same level school affects learner absenteeism, this indicates the aggregate absenteeism rates presented in Wi De Ya for learners will not accurately represent the national absenteeism rate.



B.2. What constitutes a ‘rural’ school, an ‘urban’ school, and the average school?

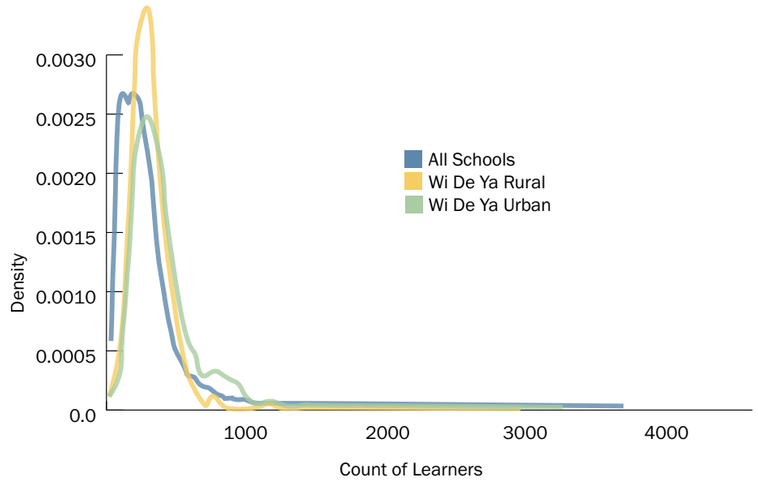
B.2.1. Remoteness

Rural schools selected for Wi De Ya generally are less accessible and have rougher terrains than the average school in Sierra Leone and schools in the selected urban chiefdoms.



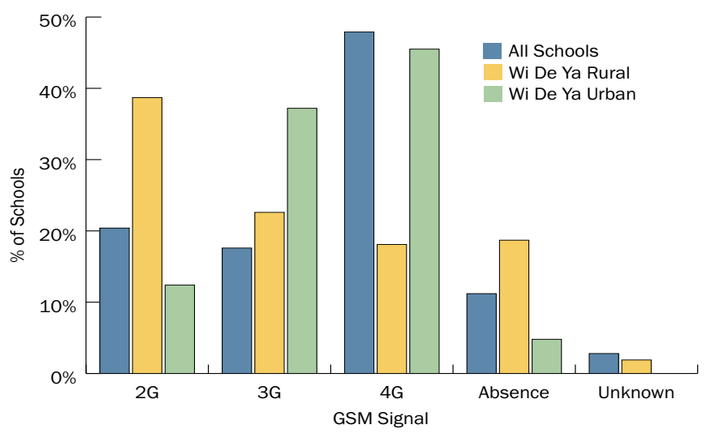
B.2.2. Distribution of learners

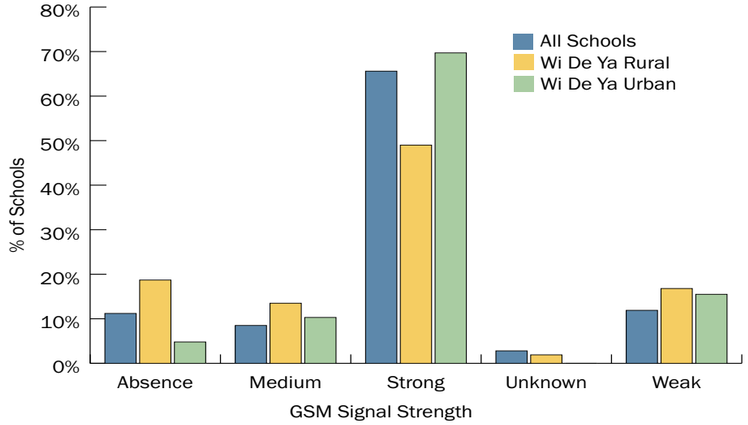
Selected rural schools skew more mid-sized and selected urban schools skew more mid to larger size relative to the average school. This implies that workload for urban schools during admission season may be heavier than the workload for rural schools.



B.2.3. GSM signal

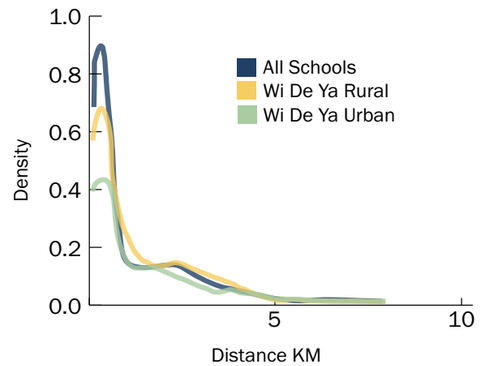
GSM signals range from 2G to 4G. 64% of all schools have at least 3G access. Selected rural schools have poorer connection than the average school, with only 40% of schools having 3G or 4G signal. On the other hand, urban schools have stronger connections than the average school, with 82% of selected urban schools having at least 3G access.





B.2.4. Distance to school

The distribution of all schools tends to be closer in distance to a same level school than selected urban schools. The distribution for selected rural schools indicates rural schools are further from other schools of the same level than urban schools and the average school in Sierra Leone.



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