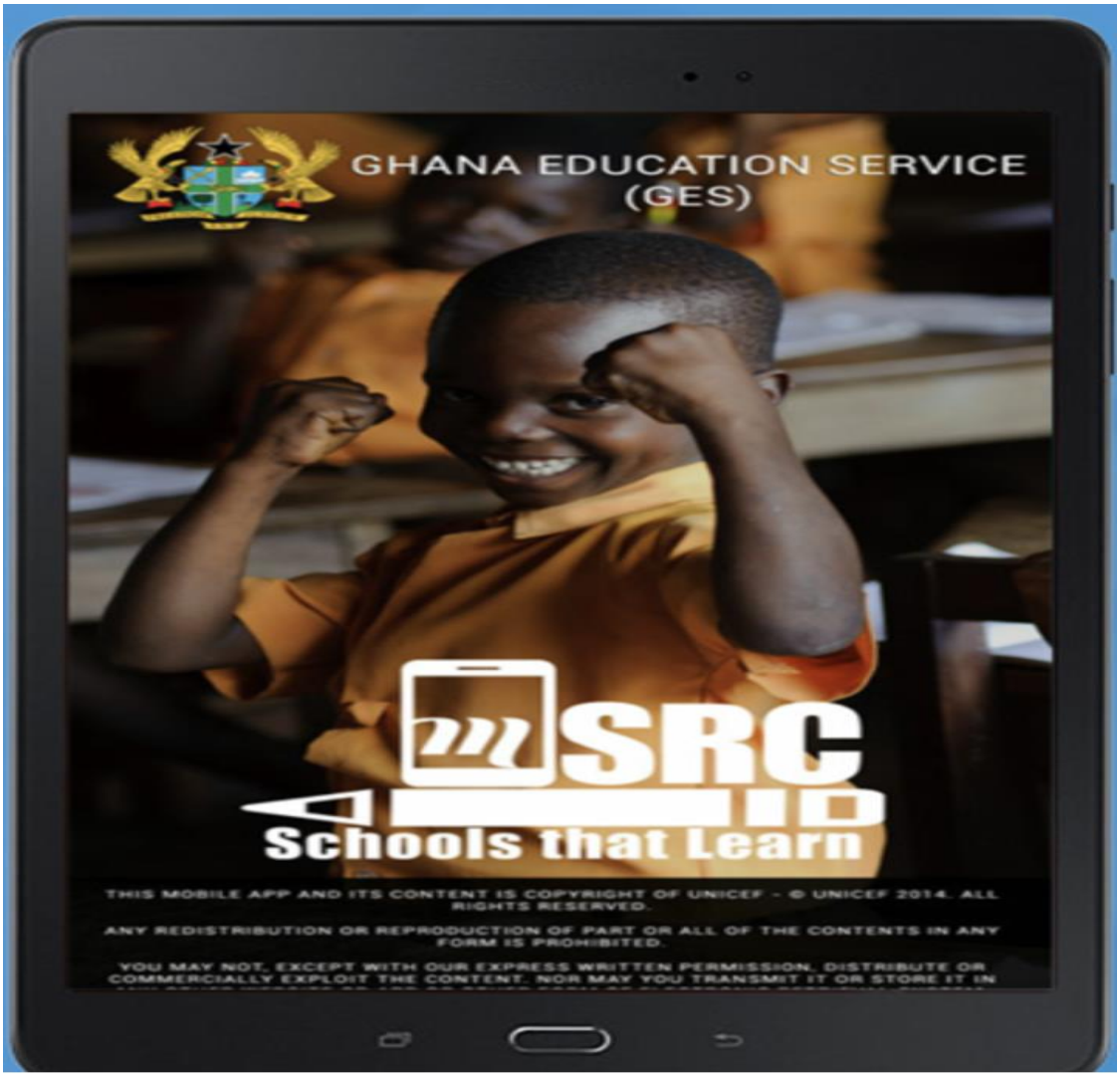
FINAL REPORT: OPERATIONAL RESEARCH ON USE OF MOBILE SCHOOL REPORT CARD (mSRC) AS A MANAGEMENT TOOL



Abdul-Gafaru Abdulai, Collins Nunyonameh and Adam Salifu

NOVEMBER 2018

EXECUTIVE SUMMARY

In 2014, the Ghana Education Service (GES), with support from UNICEF, commissioned the development of an Android-based mobile phone application, *the Mobile School Report Card (mSRC)* with the aim of addressing the observed weaknesses associated with the paper-based School Report Card (pSRC), which was developed in 2011 to help capture relevant information relating to the teaching and learning environment in basic schools. Implementation of the mSRC began in 2015 in three districts and expanded progressively to 20 districts covering 1,880 schools by the end of March 2018. Studies commissioned to evaluate the effectiveness of the mSRC program highlighted its relative capacity in producing more reliable, quick, and up-to-date school-level data on key education indicators, triggering interest among key actors regarding further expansion of the program to new districts.

To prepare the grounds for this expansion, this research was commissioned by UNICEF to examine the functionality of not only the mSRC app and web-based platform, but also the extent to which data generated from the mSRC is being used in decision-making processes within the education management structure. Other objectives of the study were to explore opportunities for leveraging the mSRC data to promote community participation and social accountability in education management; and explore options for linking the mSRC data to other data systems within the GES.

To address the above objectives, two rounds of data collection were undertaken during the second and third terms of the 2017/2018 academic year and was undertaken in a total of 7 districts from across 6 regions. In in each term, data was gathered from well over 200 respondents, head teachers, circuit supervisors, as well as PTA/SMC members and executives, among others. To ensure sufficient depth, data was gathered through a combination of key informant interviews, focus group discussions (FGDs), survey (questionnaires) and direct observation.

Summary of Findings

Functionality of the mSRC

The study shows that the mSRC application meets all the technical standards specified for it and remains currently very stable with no reports of bugs, although users of the application identified a number of important additions and iterations that must be incorporated into the app to enhance its functionality. Similarly, the mSRC dashboard appears to be very functional in its basic task of recording submissions. However, its analytic capacity remains extremely limited, although substantial revisions aimed at addressing this problem were being made at the time of completing this report.

Over 92% of users across all the 7 districts consider themselves as having fully mastered the mSRC app. However, a few important issues still need attention. Among others, newly posted head teachers are struggling with the usage of the app; most head teachers still struggle to handle the

registration of newly recruited/transferred teachers; and users still struggle to retrieve enrollment records for previous weeks.

Checks on the dashboard over the second and third terms generally show acceptable levels of data submissions across all districts, although the study shows that submission rates were better in the third term than the second. Nonetheless, timeliness of submissions still remains a serious challenge. There are currently no major unresolved or unresolvable quality issues, which implies that the data can be safely relied on for policy decisions at any level of education administration.

Use of mSRC data for decision-making at educational levels

Overall, the data currently captured under the mSRC is deemed adequate for the range of administrative decisions taken at the various levels. Much of the use of the mSRC data currently focuses on school monitoring; educational repository for validating data from other sources such as the EMIS; a tool for resource management such as distribution of textbooks and school furniture; and reporting purposes such as the preparation of district annual reports. However, there is very little use of mSRC data in official policy making, planning or monitoring at the regional and national levels.

Community knowledge, access to and use of the mSRC data

The study found a surprising lack of understanding of the mSRC among teachers and community members in almost all the schools and communities visited. While most PTA/SMC members interviewed were generally aware of the existence of the mSRC, they had extremely limited understanding of its goals, details of data submitted, and potential uses of the data. On the positive side, however, PTA/SMCs and other community actors expressed their interest and eagerness to be provided the mSRC data.

Linking the mSRC data to other data systems within the GES

The only substantive data source available at the GES besides the mSRC is the EMIS. Although there is significant overlaps in the data collected under mSRC and the EMIS systems, the data in EMIS appear to be much more comprehensive than those covered by mSRC. Currently, EMIS covers both private and public schools at the basic and secondary levels; data is collected annually, and coverage is national. In contrast, mSRC covers only public basic schools; data is collected weekly and termly; and coverage is limited to 20 pilot districts. The mSRC has been described by several respondents as focusing on short-term, routine education management and monitoring tasks; while EMIS is for national level strategic policy planning of the wider education sector.

Findings from the study showed the merger of the EMIS and mSRC is technically feasible, as the capacity required to ensure the effective integration of these two systems does exist. Both the mSRC and EMIS systems currently share the same IT infrastructure, personnel, and office space especially at the regional and district levels. However, political acceptance among national level actors remains a key constraint that need to be tackled if the EMIS and mSRC databases are to be successfully merged.

Recommendations

The study's key recommendations are summarized below under the various headings:

Improving the functionality and mastery of the app among data entry users

- Future reviews should target the suggested variables that are currently missing in the app.
- A retraining of users, particularly those in the recently added mSRC districts (such as Upper West Akyem, Ga East and Tolon) should be undertaken to deepen user's understanding and mastery of the app.
- Given the depth of changes undertaken on the app and web platform, it is further recommended that all users be retrained to enable them master the new app and dashboard features.
- Consider the development of video tutorials that completely captures all the major processes and manipulations required to master the app. These videos may be made available on the internet (YouTube) or in any format that may be easily available to all users across districts.
- Again, it may be useful to compile a list of common mSRC data entry/retrieval challenges [(or frequently asked questions (FAQs)] and offer step-by-step guide to resolving them.

Improving data submission rates

- Complement the monitoring efforts of district coordinators by providing internet data. Presently, there are significant and legitimate fears that without such support, things may slide back to 'normal'.
- Given the need for strong managerial commitment to ensuring better submission rates, it is also recommended that due consideration is given to the mSRC in any efforts to reshuffle (top) officials across districts.

Improving data Quality

- It is proposed that sufficient attention be paid to explaining each mSRC indicator during each training session.
- Clear plans for training of newly appointed HTs should be instituted and incorporated into the human resource management structures in each district so as to provide continuous training to new head teachers in each mSRC district**.**

Improving availability and strength of Technical support

- It is recommended that the whatsapp platform created by the technical support team be moved to the web or incorporated in the mSRC (dashboard) system and appropriately organized by headings to make searching for specific solutions possible in the future. If

possible, the whatsapp discussions should be archived or organized into specific topics/themes for easy retrieval in the future.

- It is suggested that specific efforts should be made in the transitional arrangements to ensure that the appropriate levels of capacity will be acquired by the GES support team (or available to them) prior to the formal exit of Techmerge from the program.
- The GES must further restructure the technical support team to include as many District Coordinators as possible, ensuring that the team has at least two members in each region.

Improving availability of mSRC Logistics

- Going forward, it may be useful to make alternative repair arrangements that focus on reducing both costs and wait times for users.
- For district coordinators, it is recommended that sufficient budgetary commitments be made to providing internet data to them in support of the mSRC.
- It may be important to explore options of using part of the capitation grant in support of mSRC data purchases

Improving the use of msrc data

- Much more has to be done to encourage the use of the mSRC in the preparation of SPIPs and C4D efforts.

List of Abbreviations and Acronyms

AD	Assistant Director
BECE	Basic Education Certificate Examination
C4D	Communication for Development
CSs	Circuit Supervisors
DDE	District Director of Education
DEOs	District Educations Offices
FAQs	Frequently Asked Questions
FCUBE	Free Compulsory Universal Basic Education
FGDs	Focus Group Discussions
EMIS	Education Management Information System
GES	Ghana Education Service
HR	Human Resource
HTs	Head Teachers
KEEA	Komenda-Edina-Eguafo-Abire District
MoE	Ministry of Education
MSRC	Mobile School Report Card
NGOs	Non-Governmental Organisations
PPME	Policy Planning Monitoring and Evaluation
PSRC	Paper-based School Report Card
PTA	Parent Teacher Association
SMC	School Management Committee
SPAM	School Performance Appraisal Meeting
SPIP	School Performance Improvement Plan
SRC	School Report Card
SPSS	Statistical Package for the Social Sciences
TOR	Terms of Reference
UNICEF	United Nations Children's Fund

Table of Contents

1. INTRODUCTION

In 2011, the Ghana Education Service (GES) introduced the School Report Card (SRC) to systematically capture relevant information relating to the teaching and learning environment in basic schools. Although the SRC has been useful, its inadequacies have also been apparent, especially with regards to generating relevant information in a *timely* manner. In 2014, the GES, with support from UNICEF, commissioned the development of an Android-based mobile phone application, *the Mobile School Report Card (mSRC)* with the aim of addressing the observed weaknesses associated with the paper-based School Report Card (pSRC). Pilot implementation of the mSRC began in 2015 in three districts and expanded progressively to 20 districts covering 1,880 schools by the end of March 2018. Evidence gathered from two major follow-up studies on the pilot program highlighted the relative effectiveness of the mSRC in producing more reliable, quick, and up-to-date school-level data on key education indicators, triggering interest among key actors regarding further expansion of the program to new districts.

To prepare the grounds for this expansion, UNICEF launched a new operational research aimed at generating a more robust empirical evidence on the potential and/or effectiveness of the mSRC as a management tool. The research, at a broader level, sought to:

- evaluate the state of progress of program implementation, including an understanding of the functionality of the mSRC app and web-based platform;
- identify the challenges (if any) associated with the generation and utilization of mSRC data; examine the extent to which data generated from the mSRC is being used in decision-making processes within the education management structure;
- explore opportunities for leveraging the mSRC data to promote community participation and social accountability in education management; andexplore options for linking the mSRC data to other data systems within the GES.

To address these objectives, two rounds of data collection were undertaken during the second and third terms of the 2017/2018 academic year. A separate summary report was produced after each round of fieldwork. This final report presents the overall findings of the study. It incorporates and synthesizes findings from the two previous summary reports, highlighting both observed changes and continuities across the two data collection periods.

The rest of the report is structured as follows; the next section presents the study's methodology, providing detailed explanations of how districts and schools were selected, and how the data for the study was gathered and analyzed. Thereafter, the report presents the major findings of the study along the four (4) broad objectives highlighted above, before turning to draw conclusions.

3. METHODOLOGY

3.1 Field Work and Selection of study units

Fieldwork for this research covered the second and third terms of the 2017/2018 basic school academic year, and was undertaken in a total of 7 districts from across 6 regions. As summarized in Table 1, district selection was based on two main criteria: longevity of being an mSRC implementing district (i.e. early entrants versus late entrants); and regional balance (i.e. southern

sector versus northern sector). These balances were deemed important in giving a better perspective of progress in program implementation across different settings.

Table 1. Districts, Schools, Circuits and Respondents (Second Term)

Districts	Rationale	Circuits	Schools	Respondents					
				HTs	CSs	District Officers	PTA/ SMC	NGOs	Teachers
North Dayi	new mSRC district; rural	4	12	12	6	3	8	-	10
Kwahu Afram Plains North	Old mSRC district; rural	5	12	12	3	2	8	1	16
Upper West Akyem	New, rural	5	12	12	4	2	6	1	4
KEEA	Old mSRC district; urban	5	9	9	3	2	6	-	20
Ga East	new mSRC district; urban	3	10	10	2	2	5	-	20
Savelugu-Nantong	Old mSRC district; peri-urban	6	8	8	2	2	7	-	19
Tolon	new mSRC district; rural	2	10	10	2	2	8	-	5
Total		**30**	**73**	**73**	**22**	**15**	**48**	**2**	**94**

Source: Fieldwork, 2018

Within districts, concerted efforts were made to ensure a good rural-urban balance in the choice of both circuits and schools. In the first round of field work (second term), the study covered a total of 30 circuits and 73 schools, yielding a total of 254 respondents (at the district level); 2 respondents at the regional level; and 3 respondents at the national level. The second field work (third term) covered a total of 21 circuits and 67 schools, yielding a total of 234 respondents at the district level. Two (2) respondents each were also interviewed at the national and regional levels. Tables 1 and 2 provide the breakdown of the respondents for the second and third terms respectively.

Table 2. Districts, Schools, Circuits and Respondents (3rd Term)

Districts	Rationale	Circuits	Schools			Respondents			
				HTs	CSs	District Officers	PTA/ SMC	NGOs	Teachers
North Dayi	new mSRC district; rural	3	9	9	2	3	8	-	15
Kwahu Afram Plains North	Old mSRC district; rural	3	9	9	3	2	9	1	16
Upper West Akyem	New, rural	4	10	10	1	2	6	-	10
KEEA	Old mSRC district; urban	3	10	10	3	2	6	-	28
Ga East	new mSRC district; urban	3	10	10	3	2	5	-	11
Savelugu-Nantong	Old mSRC district; peri-urban	3	10	10	2	2	8	-	7
Tolon	new mSRC district; rural	2	9	9	2	2	8	-	11
Total		**21**	**67**	**67**	**16**	**15**	**49**	**1**	**91**

Source: Field work 2018

To maximize reach and enable some minimal level of progress tracking, a combination of new and old respondents (those who had participated in the first-round study) were selected in the second round of field work (third term). Thus, during the third term, about a half of the respondents engaged during the second term were dropped and a new set of respondents added. This approach made it possible for the research team to track changes or progress in program implementation (by engaging the same respondents over time), validate the study's findings (by engaging newer respondents). In this context, the new respondents served as basis for further robustness check for the study's findings.

3.2 Data collection and analysis

Both primary and secondary data were collected for this study in both rounds of the field work. Integration of both types of data was considered critical in meeting the objectives of the study.

Primary Data: To ensure sufficient depth, a number of primary data collection strategies were deployed, each reinforcing the other and aimed at corroborating evidence. These comprised individual interviews, focus group discussions (FGDs), survey (questionnaires) and direct observation of the data entry and retrieval processes within the mSRC system. Data from the school level actors (HTs, ordinary teachers and CSs) were collected through surveys, interviews and

observations. In most instances, the surveys were preceded by brief interviews that mostly focused on understanding the challenges faced by users. Where considered necessary, the surveys were also followed up with interviews, allowing respondents (individually and collectively, as the case may be) to explain in more detail particular answers highlighted in the questionnaires.

Where necessary, the research team also observed data entry and retrieval procedures deployed by HTs and CSs in order to understand more thoroughly specific challenges highlighted by them concerning the functionality of the mSRC system. Primary data from national, regional, district and community actors (PTA/SMCs/NGOs) were collected mainly through a combination of individual interviews, focus group discussions, and direct observation. At the district, regional and national levels, the team had the chance to further clarify specific issues highlighted during the interviews through direct observation of processes within the mSRC platforms. Focus Group Discussion was the primary data collection tool deployed for community actors (mostly PTAs, SMCs and Assembly Members). These group discussions provided community participants the opportunity for further reflection and clarifications on issues raised (by other participants), towards generating deeper insights on each question posed.

Secondary Data: In terms of secondary data, the study relied on reports of past studies on the mSRC implementation (especially the mSRC monitoring and costing reports); the 'Technical Functionality Checklist' for the mSRC application as well as broad literature connected with information-based education management systems and documents on EMIS in Ghana.

Data Analysis: The qualitative data (interviews) were thematically analyzed focusing on dominant themes arising from the interview data. In doing this, specific attention was paid to responses to key questions dealing directly with the substance of the stated objectives for the study. The quantitative data (from the survey) was analyzed with the SPSS statistical software.

3.3 Quality control measures in data collection

Adequate steps were taken to safeguard the data collection process to ensure the validity and reliability of the findings and conclusions drawn from this study. Three key quality control mechanisms were employed. First, triangulation, which remains an important quality control technique in research, was employed in gathering data. . Using four different research instruments (questionnaires, interviews, focus group discussions and observations) did not only help in collecting detailed data to address the research objectives, but also provided the opportunity to confirm (or otherwise) data collected with the different instruments. Second, to ensure that there was best fit between the research objectives and data collection instruments, the data collection instruments were subjected to rigorous review by before the start of actual data collection. Once approved, the data collected instruments were pilot-tested in the Greater Accra and Volta regions, ultimately helping the research team to adjust and refine the instruments before actual data collection. Finally, to ensure that the highest quality data was collected, three senior researchers who have worked on similar projects (including research on the mSRC) directly collected all the data for this operational research.

3.4 Ethical Considerations

Given the wide range of participants in this project, the first ethical principle upheld by the research team was to ensure the confidentiality and anonymity of all respondents. This was done by reporting and presenting data in ways that make it virtually impossible to associate any finding or statement to a particular respondent. The research team members' understanding of the local context in the 7 districts studied helped to ensure that data collection processes were sensitive to local cultural and social norms. In working with the schools, the team ensured that both teachers and pupils did not feel uncomfortable with the presence of its members (data collectors). Indeed, extreme care was taken (including collecting the data outside school hours) to additionally ensure that data collection activities did not disrupt school activities In order to uphold the ethical principles of informed consent and voluntary participation, the research team not only clearly explained the project to all respondents, but also their consents were sought before commencing data collection.

4. RESULTS AND DISCUSSIONS

The findings are presented based on the four main objectives of the study: Functionality of the mSRC application and web platforms; Access to and use of mSRC data for decision making; Engagement of community level actors with the management of schools; and the feasibility of linking the mSRC data with other data sources within the education sector.

4.1 Functionality of the mSRC platforms: App and Dashboard

The study focused on three core issues: i) establishing whether or not the app complies with the key technical functionality requirements defined for it; ii) identifying functionality challenges faced by users, if any; and iii) receiving suggestions on how the app could be further enhanced to improve its efficiency at data capture and retrieval. In order to provide a more comprehensive picture of the interaction between users and the app, the study also assessed the current state of users' mastery of the mSRC software; the current levels of data submissions; the state of the quality of information within the system; the state of technical support available; as well as the current state of mSRC logistics and challenges associated with each of the above. Each of these issues is elaborated below.

4.1.1 Functionality of the mSRC systems (app and web platforms)

mSRC app: The study confirms that the mSRC application meets all the technical standards specified for it (see Appendix 1), and remains currently very stable with no reports of bugs. However, interviews with users reveal a number of important additions and iterations that must be incorporated into the app to enhance its functionality. These are categorized into four main issues and presented in Table 3 below:

Table 3: Proposals for reviewing mSRC app

Editing and access	**Data quality management**	**Reporting and analysis**	**Comprehensiveness of data**
- Modify app to allow HTs to correct errors in a limited set of data, rather than resubmission of a whole section -Allow HTs to have access to the dashboard and see data on their Circuit, district and schools -Modify app to enable it load pictures directly from picture gallery on the android device	-Modify app to allow for submitted data to be temporarily stored locally to facilitate resending in case data does not hit the dashboard. This will drastically reduce the burden of resubmission -Modify app to ensure the recovery of wrongly deleted data e.g. deleting the records of a teacher. -Modify app to make it **impossible** to select wrong school terms, weeks, or year - Modify feedback mechanism so that it can indicate status of data submissions – indicating whether submitted data hits the dashboard or not -Modify app to show date and time of last data submitted	-Modify app to show termly reports under 'summary analytics' -Modify app to make it easy to compare two or more schools and circuits on specific indicators -Modify app to make it possible to report on the regularity of CS visits to each school -Modify app so that summary analytics at each school can be converted and saved as PDF or EXCEL for easy sharing and/or printing -Modify app so that HTs can view all of their submitted data in a summarized form on one page on their tablets -Modify app to report average scores of students on each subject and disaggregate the scores by gender (i.e. boys versus girls) for easy tracking of progress in teacher performance -Modify app to enable reporting on the state of school infrastructure and equipment	-Modify app to provide a more complete list of all the different types of "leaves" any HT may grant a teacher -Modify app to permit users to record punctuality of teachers – early, late, absent -Modify app to allow HTs to record multiple subjects for teachers teaching multiple subjects -Modify app to cover and report on the number of exercises given and number of units covered **for all subjects taught** in the school -Modify app to enable it load pictures directly from picture gallery on the android device

The research team was informed by some respondents from Techmerge that some of the above proposed modifications have already been incorporated into the app. However, going forward, it will be important for UNICEF and the GES to undertake a systematic review of the current state of the app in order to ensure the incorporation of all outstanding suggestions into the app. This is especially important because at the time of final data collection for this research, the said updates/new additions into the app had not yet gone live, making it impossible for the research team to verify the extent of the reported modifications.

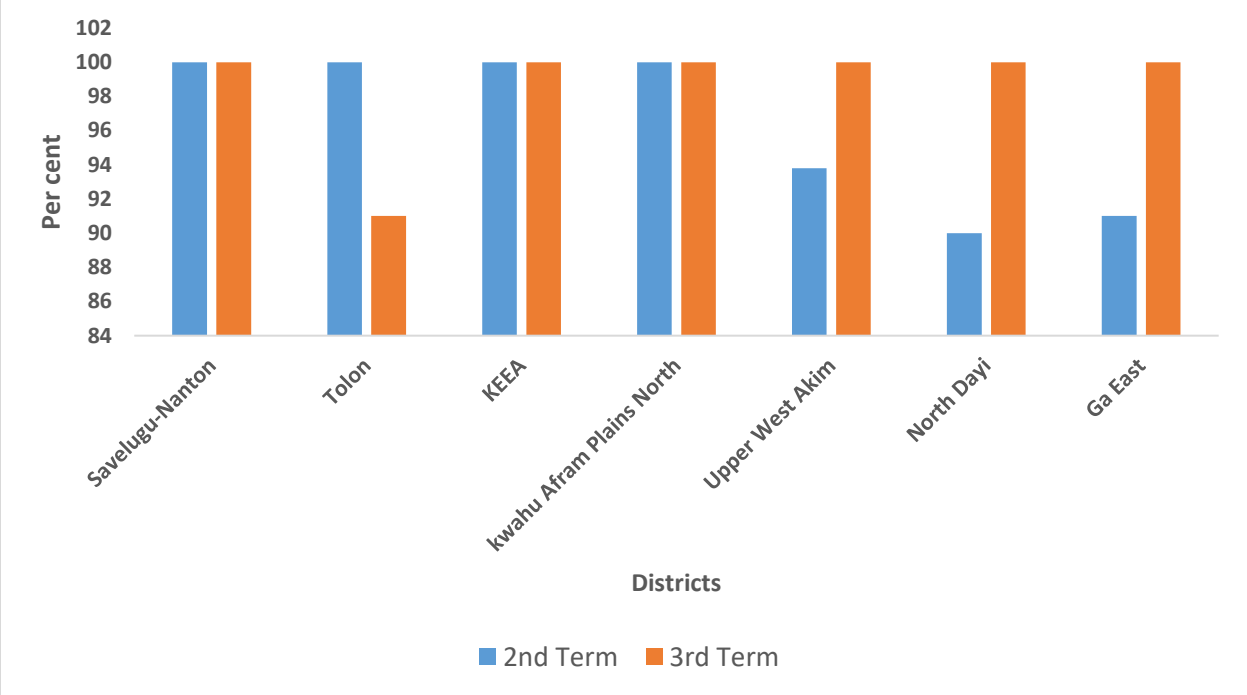
mSRC Dashboard: In general, and as with the application, the mSRC dashboard appears to be very functional in its basic task of recording submissions. It is generally stable and without any major glitches or bugs. Its major weakness, as was discovered during the second and third term field visits, related to the extremely limited analytic capacity of the system. However, the team was again informed that some revisions had been made on the dashboard analytics in the course

of this study, although the team was unable to verify this directly. Again, it will be important for UNICEF and the GES to take a close look at the current state of the dashboard in order to ensure its modifications in line with the *feasible* recommendations contained in this report.

4.1.2 Mastery of mSRC system among data entry users

By mastery, the study focused on ascertaining whether or not users possessed the essential know-how required to successfully operate all aspects of the application and/or dashboard. On that score, the study shows that quite a substantial majority – on average 96% and 92% in the second and third terms respectively – of users across all the 7 districts consider themselves as having fully mastered the application[1].

This growing mastery of the app is further demonstrated in the low numbers of people who reported requiring technical assistance in operating it. For example, over 80% of respondents across all the districts (based on both second and third term data) very rarely ask for assistance in operating the app. In other words, just about 20% of the users often asked for assistance in the course of data entry; even in cases where assistance is sought, this is often in relation to operating the android device itself rather than with the mSRC app per se.



[1] Except the Tolon District that recorded a marginal decline in the number of who are comfortable in using the app, all the other new districts studied reported 100% comfort in the use of the app. The decline recorded in the Tolon District may be attributed partly due to our selection approach of respondents during the second round of fieldwork. As the Tolon District witness mass transfer of teachers and head teachers during the course of 2017/2018 academic year, it is our view that the new Head teachers we included in the second round of fieldwork had little knowledge in the use of the app.

Figure 1. Are you now comfortable using the mSRC app?

Source: Fieldwork, 2018

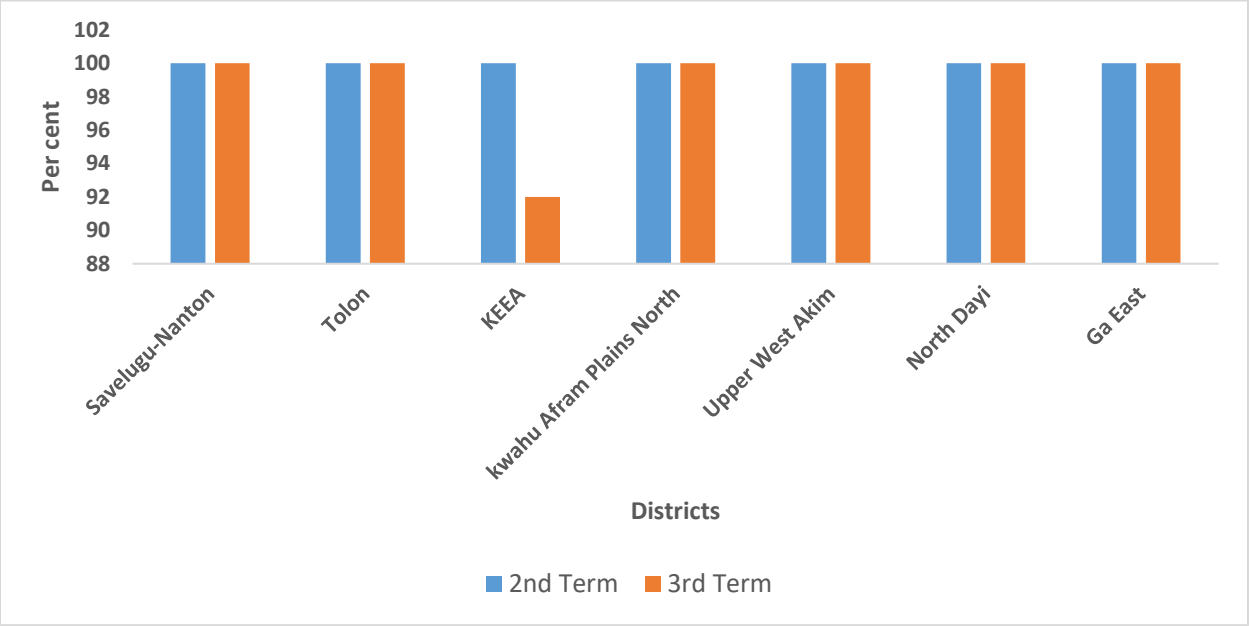


Figure 2. User perceptions about the user-friendliness of mSRC app: Do you consider mSRC app user-friendly?

Source: Fieldwork, 2018

Users across all the districts[2] have consistently rated the application as very user-friendly (see Figure 2). Overall, success in mastery of the app can be attributed partly to the long experience users have gained in using it, and partly to the perceived user-friendliness of the mSRC app itself. On average, the newest mSRC districts were in their first year of use of the app; the oldest districts were in their third year. As shown in Figure 1, all respondents in the Savelugu-Nanton, KEEA and Kwahu Afram Plains North, which were the first pilot districts to be enrolled on to the program, indicated they were comfortable using the mSRC app across the two rounds of data collection. Except the Tolon District, Figure 1 further suggests improvement in the mastery of the mSRC system from term two to term three in all districts.

Similar to the app, the study shows very high rates of mastery of the dashboard among dashboard administrators in the districts surveyed, especially in the old districts of Savelugu-Nanton, KEEA and Kwahu Afram Plains North.

In spite of the seeming success, interviews and direct observation of data entry processes by most users (including those who consider themselves as having mastered the application) show three important gaps that require urgent attention: :

[2] The situation in KEEA is difficult to explain especially looking at the huge gap in the results between the second and third terms; but it may be attributable to methodological questions of respondent selection.

i. **New head teachers are struggling with the app:** While training was offered to all HTs prior to the launch of the program in each district, there is no structured program in place to train newly-appointed head teachers or those on transfers from non-mSRC implementing districts, who are invariably tasked with taking over data submission responsibilities in their new schools. This has put some HTs in stressful situations as they continue to rely on assistance from their colleagues or district offices to complete the data submissions.

ii. **Management of new/transferred teacher registration is a challenge for most HTs:** While most respondents appear to have mastered all the key features of the app that support routine data submissions, many users have not yet mastered how to handle changes in teacher registration records as may be necessitated by staff transfers or reshuffles. There is a tendency among HTs to re-register all new teachers – even those who may have been registered already under another mSRC district. This challenge appears fairly widespread among both HTs and dashboard administrators in almost all districts, creating significant complications in teacher records within the system. In many districts such as Savelugu-Nanton, for example, it was fairly common to hear HTs complain about (and list as challenges they are currently facing with the app) their inability to add new teachers or to remove those on transfers out of their school. The result has been a duplication of teachers in the system and the creation of multiple records for the same teacher – under different IDs. As could be expected, however, the duplication of teacher records means that mSRC statistics on number of teachers available in the districts is likely to be compromised, as the number of teachers often recorded in the system exceed the number of teachers actually available in each district.

iii. **Retrieval of previous week's enrollment record not yet broadly mastered by users:** Data on enrollment tends to be fairly stable for most schools within a school term period. In order to reduce the burden of repeatedly entering such records on weekly basis, the app has been designed to enable users (where there is no change in enrollment records) to simply retrieve and resend enrollment records of the past week instead of performing fresh entries. Many of the users interviewed were either not aware of this feature in the app or were yet to master it, leading to needless frustrations for some HTs.

In view of the above and given that roughly about 7% of respondents indicated that they have not yet mastered the use of the app, ***it is recommended that a retraining of users particularly those in the recently added districts (such as Upper West Akyem, Ga East and Tolon) be undertaken***. Again, given the depth of changes undertaken recently on the app and web platform, ***it is further recommended that all users be retrained to ensure mastery of the new app and dashboard features.*** In the long term, and in order to reduce the cost of training new users, ***it may be important to consider the development of video tutorials that completely capture all the major processes and manipulations required to master the app. These videos may be made available on the internet (YouTube) or in any format that may be easily available to all users across districts. Again, it may be useful to compile a list of common mSRC data entry/retrieval challenges [(or frequently asked questions (FAQs)] and offer step-by-step guide to resolving them*.**

4.1.3 Current levels of data submission

Checks on the dashboard over the second and third terms generally show acceptable levels of data submissions across all districts, although the situation is expectedly better in some districts than in others. For example, data submissions was fairly better in the KEEA district as compared to the Tolon District. Overall, the study shows that submission rates were better in the 3rd term than was the case in the second term. Improvements in data submissions were particularly noticeable in the Ga East, Tolon, Savelugu-Nanton and North Dayi districts. Upper West Akim appeared to be the only exception, recording no visible improvements in data submission rates over time. The improved submission rates recorded in the third term could be attributed to the targeted emphasis placed on the issue at the June 2018 mSRC review workshop in Kumasi, and the consequent relatively robust monitoring regime implemented by most district coordinators.

Notwithstanding the relative improvement in submission rates, timeliness of submissions still remains a serious challenge. Quite a lot of CSs and the district officers interviewed decried the inability of many HTs to submit their data by the weekly schedule. Four main factors explain why most users fail to make their submissions weekly: lack of logistics, poor user attitude, lax monitoring, and inadequate leadership commitment to program at the district offices. Each of these is elaborated as follows:

Logistics: Poor internet connectivity in most of the districts means that many HTs have to accumulate their data in hopes of making their submissions when they move to areas of better internet connectivity (mostly the district capitals). As shown in Tables 4 and 5, more than half of the HTs surveyed reported that internet connectivity was extremely slow in their communities.

Table 3. What is the situation with internet where you live (second term)?

Response	Frequency	Percent
There is no internet where I live but I manage to make submissions from other locations	8	9.1
Internet connectivity is very slow; so I am not able to make my submissions regularly	9	10.2
Internet connectivity is very slow; but I am still able to make my submissions regularly	49	55.7
Internet connectivity is good so I am able to send data regularly	19	21.6
Internet connectivity is sometimes slow but I never fail to submit my mSRC data regularly	3	3.4
Total	**88**	**100**

- **Source: Fieldwork, 2018**

In fact, only about 21% reported good internet connectivity where they live; and just about a fraction of users (14%) have stable internet at their work places. This means delayed

submission can be reasonably expected to be a major challenge of the program well into the future. And without strenuous monitoring, the situation can get even worse. ***Going forward, it may be important to complement the monitoring efforts of district coordinators by providing internet data***, as there are legitimate fears that without such support, things may slide back to 'normal'. The point here is that short of any immediate improvement in connectivity, monitoring will be the ultimate solution to the challenge of low submissions. Without 'strenuous' monitoring, many will use the low connectivity – a legitimate challenge – to abandon their responsibility of making the submissions. Because submissions are better where the monitoring is stronger, more support for monitoring may be the short and medium term solution to the low connectivity-induced low submissions.

- **Poor attitudes/indifference on the part of some HTs**: The study shows that poor attitudes to the program may be another cause of late data submission among users. As was evident in the field visits, some head teachers (even in relatively better internet network areas) simply refuse to make weekly submissions despite repeated warnings and even sanctions. Some district officials shared stories about how some HTs take advantage of even their political party leanings to resist 'coercion' towards making their weekly mSRC submissions.

Table 4. What is the situation with internet where you work (second term)?

Response	Frequency	Percent
There is no internet where I work but I manage to make submissions from other locations	7	8.6
Internet connectivity is very slow; so I am not able to make my submissions regularly	8	9.9
Internet connectivity is very slow; but I am still able to make my submissions regularly	55	67.9
I do not have problem with internet connectivity	11	13.6
Total	**81**	**100**

Source: Fieldwork 2018

- **Lax monitoring**: Late submissions persist partly also because of lax monitoring caused, to some extent, by lack of resources to provide the logistical basis to CSs and district mSRC coordinators for the monitoring. As the third term data shows, improvements in the monitoring coupled with a robust feedback system (with constant reminders sent to HTs who have not submitted to do so) can go a long way to improve the weekly submission rates.

- **Inadequate commitment to mSRC among district leadership**: Interviews revealed that there may be inadequate commitments from some district directors to the program. While some of the blame may go to the individual directors involved, the institutional arrangements for effecting changes in leadership across the mSRC districts is also to blame. Given the newness of the program and the key role of top leadership in ensuring its success, more conscious efforts should be made to formally bring on board all directors, especially those from non-mSRC districts moving into mSRC districts. It may also be important that due consideration is given to the mSRC in any efforts to reshuffle (top) officials across districts.

Notwithstanding the above, checks on the dashboard show that the submissions for each school term tend to be made before (or at least by) the beginning of a new school term. This in practice means that past school terms tend to record more complete submissions (with very minimal data gaps) than current school terms (See Figures 3 and 4 below for comparison).

Figure 3. Screenshot of 2017/2018 1st Term Submissions in Upper West Akim

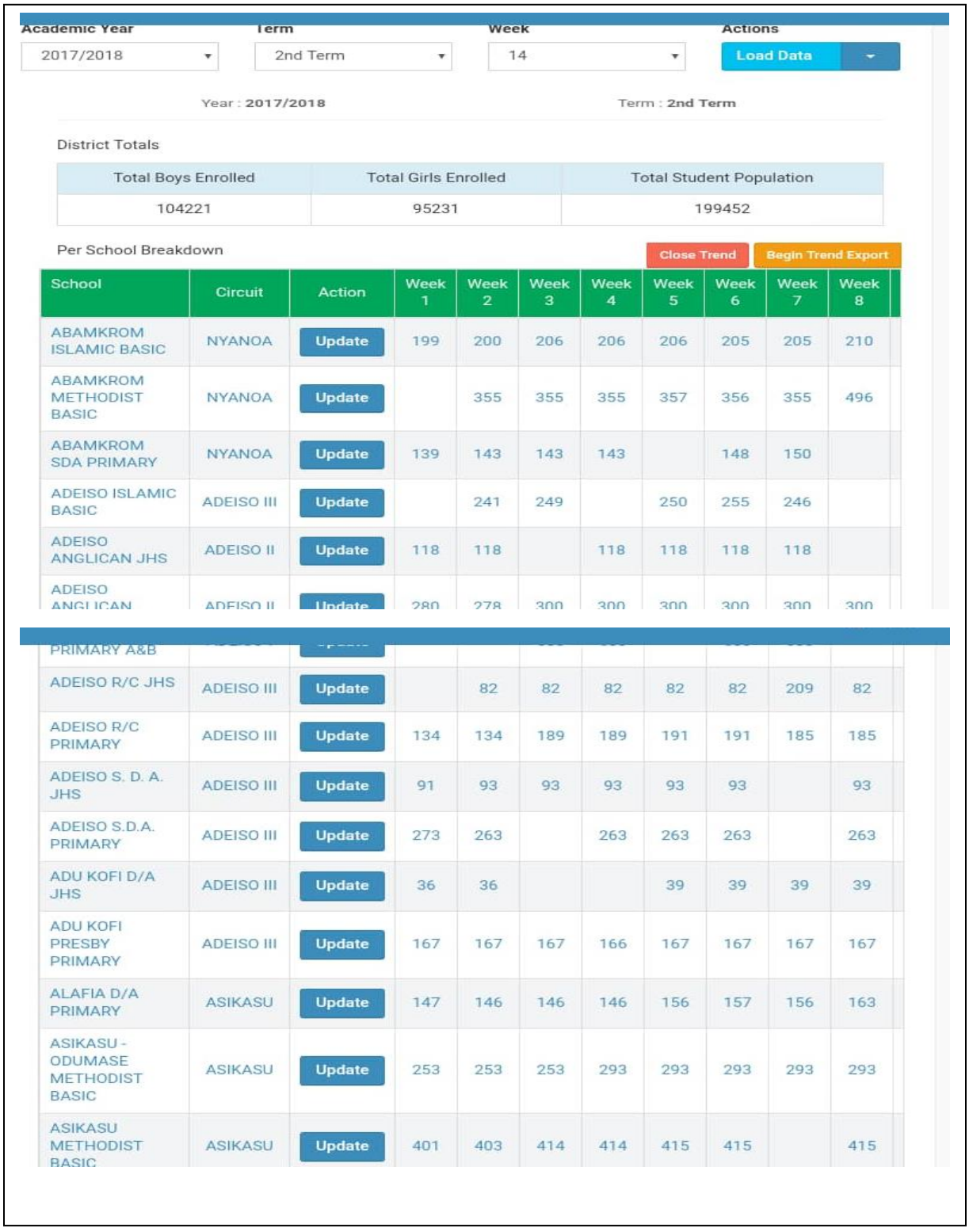


Figure 4: Enrollment Records for 2017/2018 2nd Term in Upper West Akim

In other words, while one may be disappointed when looking at submissions for a current school term, the disappointment may fade when attention is refocused on the submissions for a previous term. But this feat does not happen without strenuous efforts by the District Education Offices (DEOs). Many DEOs are pursuing aggressive, fairly coercive measures (including salary freezes, freezes on release of capitation grant etc.) to ensure that missing submissions for the past term are received before the start of the next school term. Without such efforts, it is very likely that the rate of submissions would have been much worse and this would in turn affect the appeal and utility to make real-time decisions.

4.1.4 Quality of the data submissions

Generally, quality of the data will depend on four main factors: (i) the amount of care exercised in data entry by users; (ii) the quality of the oversight mechanisms in place; (iii) the in-built checks in the app; the (iv) editing capabilities of the application itself. Figure 5 shows that the quality of mSRC data, as with most datasets, is far from being perfect with more than a third of the data entry users in both the second and third terms having cause to suspect errors in the data they submit. Overall, however, and as have been confirmed in interviews with district, regional and national officials, there are currently no major unresolved or unresolvable quality issues with the mSRC data. This means almost all mSRC data can be safely relied on for policy decisions at any level of education administration.

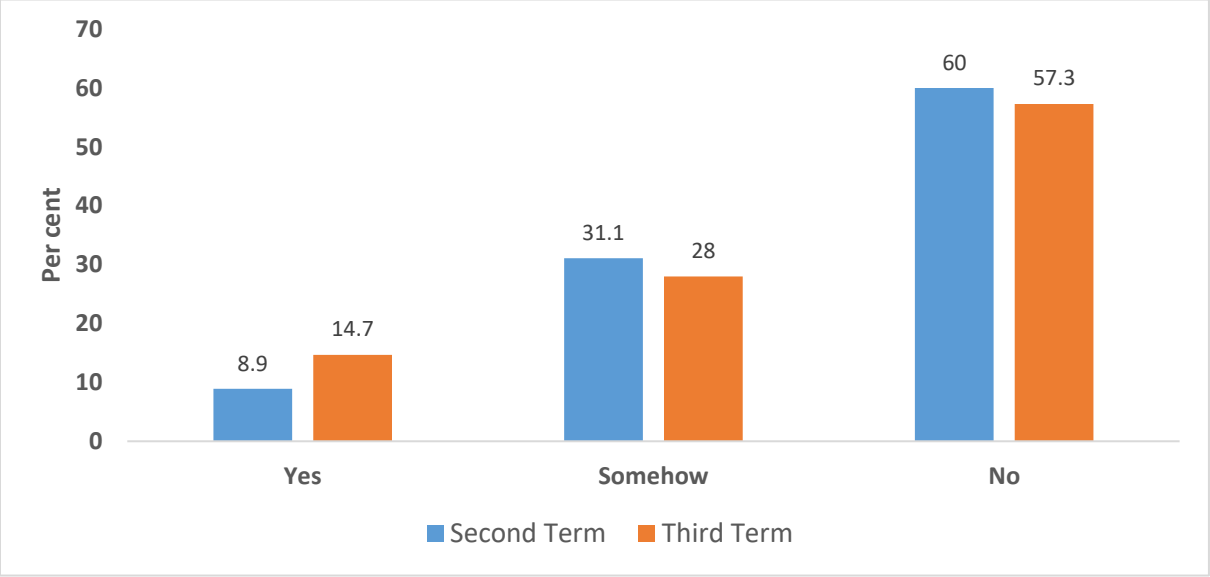


Figure 5. Do you have cause to suspect that there may be errors in your data submissions?

Source: Fieldwork, 2018

This achievement is attributable to strength of the four main quality factors mentioned above, which are elaborated further below. First, the study shows that the in-built checks designed to protect the integrity of the data appear to be working fairly well. For example, the app is able to identify possible ranges for particular indicators, permitting outliers to be flagged automatically. The study shows, for example, that the app is able to fairly easily detect errors in the computation of attendance figures (both for teachers and pupils). *However, the app currently appears to be able to flag ONLY overages (excesses); it is less successful in flagging 'shortages'; that is, where the number entered is less than what is expected*. For example, one would expect attendance for 10 students over two weeks (10 school days) to be 100. The app is able to automatically flag 102 as wrong; while accepting 98 as correct. **One way to correct this is to have the app use the number of school days (school was in session) and the number of students to automatically generate the attendance record rather than having the users perform that calculation.** It is hoped that the ongoing iterations of the app would help address this lapse.

Second, the data editing function in the app was also found to be working well. Before the most recent review of the app, only District Officials were given the right to edit data within the system. District dashboard administrators exercise this editing function through a 'delete and resubmit' option, which is in fact the only option open for editing errors within the mSRC system. An edit may be initiated by the entry user (by a phone call to the administrator when an error is detected after submitting the data) or by the dashboard administrator (on detection of a visible error during his routine dashboard checks). Once an error is established, the administrator would delete the section of data that has the errors and then ask the user (HT) to resubmit the deleted section with the correct entries. In terms of ensuring the quality of the data, the research team found that this editing 'system' appears to be working fairly well. **However, many users expressed their disagreement or displeasure with the current arrangement, preferring, instead, to be given some (limited) editing rights.** The research team is aware that this lapse was considered in the recent review of the application.

Third, the team further observed that the present quality oversight system exercised by CSs and dashboard administrators over HTs, towards ensuring high quality of the data submitted, appears to be working fine. In the present system, CSs and dashboard administrators are required to review submissions and call attention to any errors or gaps within the submitted data.

As shown in Figure 6, CSs and dashboard administrators exercise that responsibility fairly efficiently, providing reminders and the opportunity to edit errors and to fill data gaps. This activity has gained renewed strength in the third term, especially. Finally, the research team's interaction and observation of data entry users show that they are exercising considerable amount of care in order to minimize errors when entering data. As expected, many of the users indicated that the number of errors they make lessen as they gain more experience in the use of the application.

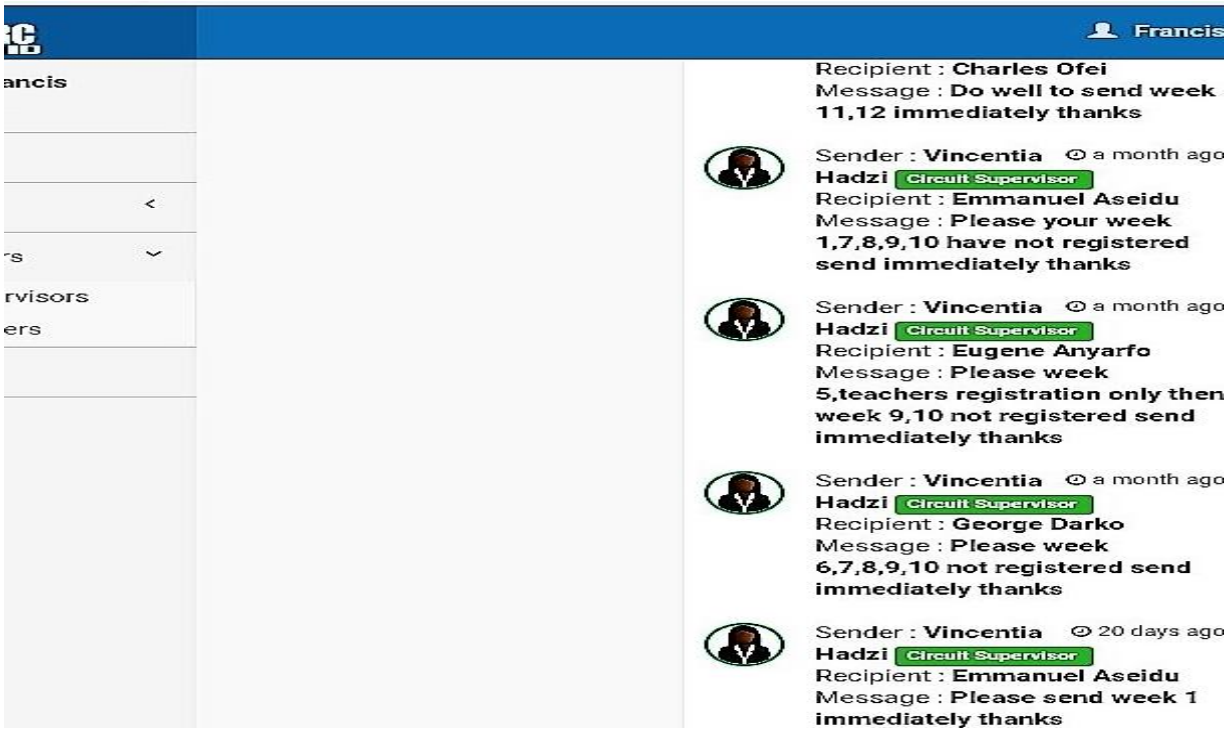


Figure 6. Screenshot of instructions issued by the dashboard administrator to selected HTs

Some outstanding data quality concerns

Notwithstanding the impressive success in terms of data quality in the mSRC, there are still a few issues that need to be addressed:

- ***There are still significant duplications of teacher records in the mSRC system:*** This is one of the key challenges in terms of the quality of mSRC data. As noted earlier, lack of clear understanding of how to manage teacher movements (transfers, retirements, death) within the mSRC system has resulted in re-registration of teachers (who are already in the system), doing so by manipulating the teacher registration numbers for such teachers. At the present moment, teacher statistics within the mSRC system may be compromised, as the numbers in the system is likely to exceed the reality on the ground. It is anticipated, however, that with a little extra training, this challenge can be effectively eradicated.

- ***There are still significant data gaps in the system:*** It was observed that significant data gaps still exist in the system, ultimately undermining quality and timeliness of the mSRC data. Checks from the dashboard show submissions in which data on one or more indicators may be missing from submissions for particular weeks. E.g. a submission may have all sections, except, 'teacher attendance', or 'enrollment' not hitting the dashboard. This is generally understood to be the result of two things: i) unreliable internet connectivity across the mSRC implementing districts; and (ii) the fact that the mSRC is currently operating in

what is described as “minimal cost model” instead of an “optimal cost model”. The attention of the research team was drawn to the fact that the technical implications of each model has been fully explained to the GES. The latter model would not only improve user experience and remove some of the challenges of data gaps; it would also require more investments in IT infrastructure. As the third term data shows, however, there appears to be fairly significant decline in data gaps in many of the districts, most notably in North Dayi, as monitoring intensified and feedback became more consistent and quick.

- ***Some users are confusing enrollment with attendance:*** In what appears to be an exceptional case, the research team found that some users are not very clear in their mind about what constitutes enrollment. There were situations where some HTs appear to be confusing attendance with enrollment, leading to recording of wild swings in weekly enrollment figures as shown in Figure 7.

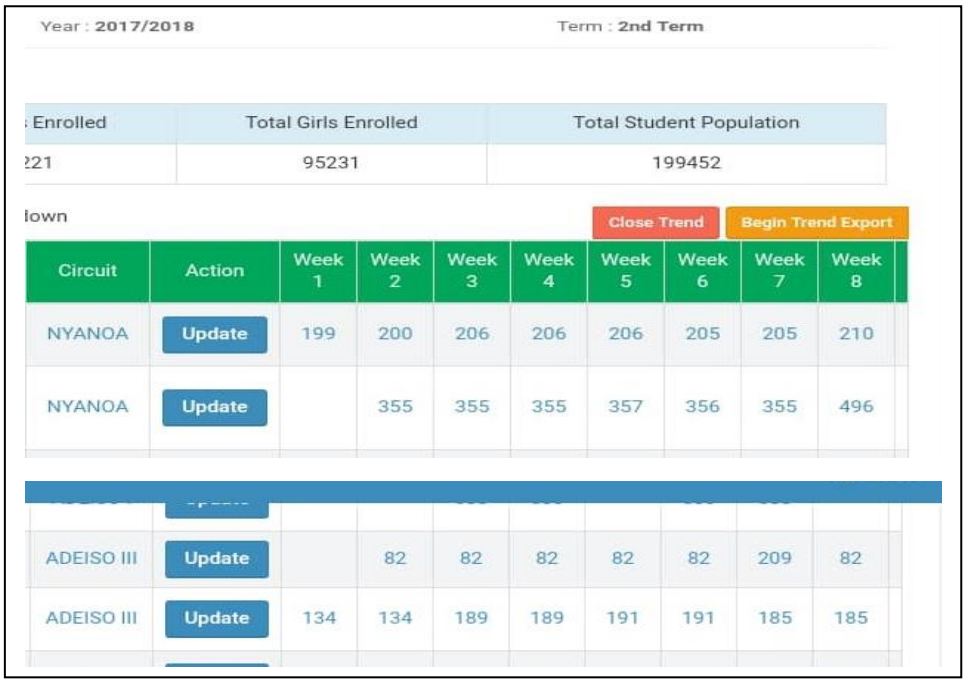


Figure 7 Screenshot of enrollment records showing wild swings between week 7 and 8

This anomaly is attributable to weaknesses in the user training provided or the lack of it. It is ***therefore proposed that sufficient attention is paid to explaining each indicator during each training session. One useful option is to provide HTs with definitions of indictors being captured in the mSRC. It is also important that clear plans for training of newly appointed HTs be instituted and incorporated into the human resource management structures in each district,*** to avoid this sort of incidents.

4.1.5 Technical Support

On this issue, the study examined two things: availability and quality of technical support system; and efficiency of technical support as measured in terms of response rates to support requests.

4.1.5.1 Availability and Strength of technical support

In contrast to findings in the second term, the third term data reveals quite significant improvement in both the availability and strength of technical support available to users. In response to recommendations from the initial second term report, GES reconstituted (and trained) its technical support team, increasing the size from three to five – two at the headquarters and three in other regions. The technical team is supported by the app developers, Techmerge as and when their services are required. The GES has also taken active steps to improve the responsiveness of the technical team to support requests from the districts. These efforts include the creation of a whatsapp platform consisting of all members of the technical team as well as district mSRC coordinators from across the mSRC regions, effectively minimizing any gap that previously existed between the support team and users. As reported in the third term report, Dashboard administrators interviewed spoke very highly of the responsiveness on the whatsapp platform, which appears to be creating database of solutions to 'common mSRC technical problems'. This is a potentially useful resource for future dashboard administrators. **However, given the inherent limitation of whatsapp, including the fact that new users do not have access to foregone discussions and solutions that may have been offered on the platform, it is recommended that this platform be moved to the web or incorporated in the mSRC (dashboard) system and appropriately organized by headings to make searching for specific solutions possible in the future. If possible, the whatsapp discussions should be archived or organized into specific topics/themes for easy retrieval in the future. A database of Frequently Asked Questions (FAQ) may also be compiled and published on the dashboard.**

At the level of data entry users, there appears to be more activity on the whatsapp platforms in some of the districts, notably Ga East, KEEA and North Dayi. District coordinators (especially in North Dayi and KEEA) appear to be gaining more confidence in resolving common technical challenges reported, and appear to be responding faster to complaints. This is considered encouraging and further efforts should be explored to sustain the momentum as well as trigger the districts that appear to be lagging behind to follow suit.

4.1.5.2 Quality of Technical Support System

The study shows that the GES technical team does not yet have the capacity to resolve all technical challenges related to the mSRC. This has been fairly demonstrated in its inability to resolve challenges identified in North Dayi[3] in the second term and many of the new mSRC Districts. **It is suggested that specific efforts be made in the transitional arrangements to ensure that the appropriate levels of capacity will be acquired by the support team (or available to them) prior to the formal exit of Techmerge from the program.** Importantly, and in the interest of

[3] As captured in the second term report, there were deep, system-wrecking problems in North Dayi that proved to be above the ability of the GES technical team to resolve. The challenge was eventually addressed by Techmerge. The third term report highlighted significant progress in that district following the resolution of the problem.

effective cost management, the **GES must consider further restructuring the technical support team to include as many District Coordinators as possible, ensuring that the team has <u>at least</u> two members in each region.** This proposal is important in the sense that the district coordinators remain by far the most important source of technical support for most users (see Table 6). And given plans for further expansion to other regions, such restructuring may be the more efficient and sustainable option of technical support for the mSRC program implementation in the long term.

Table 6. Respondents' judgments about the most important source of technical support on mSRC (Second term)

Districts	**Response (%)**		
	District Office	**Colleague HT/Teacher**	**TechMerge**
Savelugu-Nanton	100	0	0
Tolon	81.8	18.2	0
KEEA	75	25	0
kwahu Afran Plains North	100	0	0
Upper West Akim	92.9	7.1	0
North Dayi	81.3	12.5	6.3
Ga East	81.8	9.1	9.1

Source: Fieldwork, 2018

4.1.6 Logistics

<u>Android devices</u>: As noted earlier, the two rounds of field work found that the android devices generally remain fully functional in all the districts. Table 7 (based on third term data) shows that less than 12% of the HTs and CS surveyed had any technical issues with their android devices. In terms of repair arrangements field interviews revealed that users who have issues with the tablets are often directed to hand over their devices to district mSRC officers for onward transmission to the GES head office. The emerging trend, however, is that devices routed through the district office to the head office for repairs (as may have been instructed) are never returned back to the users, depriving them access to the device over prolonged periods. This is serving as a disincentive to others who may have problems with their devices to make reports to the district office. **Going forward, it may be useful to make alternative repair arrangements that focus on reducing both costs and waiting times for users.** This will be particularly important as the program is expanding into new districts, which will increase the demands for repairs.

Table 7. What is the current condition of your android device? (Third Term)

Response	Frequency	Percent
Android device is fully functional; no problem	70	87.5
Android device is lost	1	1.3
Android device has some problems, but I am still using it for my submissions	6	7.5
Android device is damaged; not functional at all	3	3.8
Total	**80**	**100**

Source: Fieldwork 2018

Internet data: There is a growing uneasiness among a lot of data entry users about buying their own internet bundles for the mSRC data submissions. As shown in Table 8, over 40% of respondents indicated that they presently buy their own internet credit, but are unwilling to continue to do so forever. The situation appears to be the same at some district offices where, in spite of the increasing demands on dashboard administrators for quicker, more consistent feedback to data entry users, most administrators continue to buy their own internet bundles in support of the mSRC program. This seems to point to a lack of sufficient managerial commitment to the program at the district level. To an extent, this is dampening the zeal (among some dashboard administrators) required to "whip" data entry users towards improving their submission rates. ***For district coordinators, it is recommended that sufficient budgetary commitments be made to providing internet data to them in support of the mSRC***.

At the level of HTs, as the program expands into new districts and regions, **it may be important to explore options of using part of the capitation grant in support of mSRC data purchases**. Indeed, and as shown in Table 8, some school HTs are already using the capitation grant to buy credit for internet. Again, there are already indications that some users have been encouraged by their Regional Officials to use or to incorporate the mSRC in their school budgets under the Capitation Grant Scheme. It is however not clear that everyone is aware of this possibility. It may thus be important to ensure that this information is shared with all users across the districts, if the decision is officially taken to bring the mSRC under the Capitation Grant Scheme.

Table 5.What arrangement exist to help you deal with internet cost?

Response	Frequency	Percent
I have been buying my own credit so far, but I cannot continue to do this definitely	35	43.2
I buy my own credit and I have no problem doing this well into the future	27	33.3
I use part of the school's capitation grant to buy internet bundle for my phone	12	14.8
Part of my school's PTA due are set aside for purchasing internet bundles for my phone	7	8.6
Total	**81**	**100**

Source: Fieldwork 2018

4.2 Access to and use of mSRC data for decision making

In evaluating the extent to which mSRC data is being currently used, the research team first evaluated users' perception about the adequacy of the data vis-à-vis the range of decisions that are often taken at all the levels of the educational administrative structure, particularly at the school, community and district levels. Second, the team evaluated the depth of analysis currently available in the mSRC and the ease of retrieval of data from the system; and finally, the team evaluated the extent of use of current data, itemizing the range of decisions and the specific data used by different actors at the different levels of the education administrative structures.

4.2.1 Adequacy of mSRC data for decision-making

As shown in Figure 8, based on data from both the second and third terms, there is a huge agreement among respondents that the data currently captured under the mSRC is adequate for the range of administrative decisions taken at the various levels.

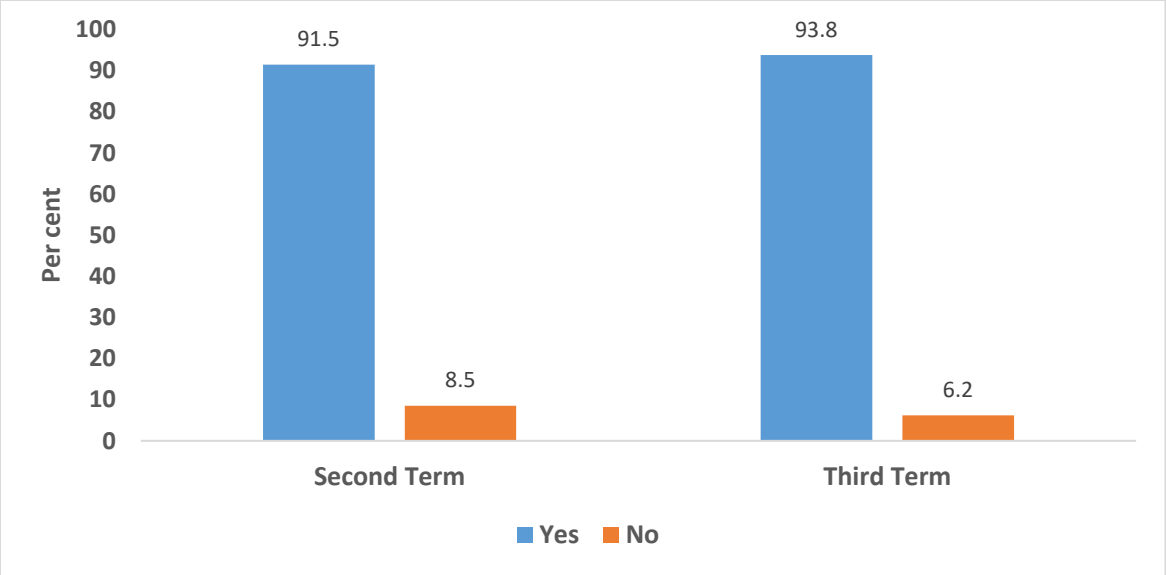


Figure 8. Do you consider the information currently captured in the mSRC adequate?

Source: Fieldwork, 2018

Nevertheless, a number of useful additional variables/indicators were suggested by respondents, all with the aim of improving the comprehensiveness and effectiveness of the app. These are listed below:

- Bio-data of teachers (at least date of birth)
- Details on brilliant but needy children in the school
- Number of parents' visits to the school in each week
- Promptness of the submission of lesson notes by teachers
- Actual time of arrival and departure of teachers to and from school
- Performance of students on all subjects besides the current three: English, Math., Ghanaian language
- The indicator 'number of exercises' should include home works.

As stated earlier, the research team is aware that a number of these may have been already incorporated in the recent review of the application following the mSRC review workshop held in Kumasi in June 2018. **Where this is not the case, it will be important for future reviews to consider incorporating the variables that are currently missing in the app.**

4.2.2 Depth of analysis currently available in the mSRC system and ease of data retrieval

The initial second term report revealed significant shortcomings in the analytical power of the mSRC system, particularly the dashboard. As captured in that report, the system was only able to provide summaries on a very limited number of indicators (mostly teacher attendance, pupil attendance, and enrollment) at only the school and circuit levels. There was also not much analytics available at the district, regional and national levels. The only analytics available at the district and regional levels were the number of schools, number of teachers, number of circuits, and number

of Head teachers. As covered in the third term report, however, there have been deep and far-reaching improvements in the analytics in the dashboard as has been informally reported by a number of users since the end of the data collection processes for this study.

4.2.3 Extent of use of mSRC data

Table 9 shows specific uses of the mSRC data at school, circuit, district, regional and national levels. At the school and circuit levels, much of the use of the mSRC data currently focuses on school monitoring, which is the very essence of the mSRC data. Beyond school monitoring, mSRC data is generally also used in three other different ways: first, as (educational data) repository for validating data from other sources such as the EMIS; second, as a tool for resource management such as distribution of textbooks and school furniture; and third, for reporting purposes such as the preparation of district annual reports.

Use of the mSRC at the national and regional levels appear fairly muted. This means that there is very little use of mSRC data in official policy making, planning or monitoring at the regional and national levels. For now, it appears that the mSRC data is only serving as a repository, occasionally used to compare and validate data originating from other sources. This study attributes this situation to three factors. First, there appears to be an explicit policy in the Ministry of Education (MoE) favoring the use of EMIS over all other data sources, including the mSRC. Second, the current levels of analytics available in the mSRC system (dashboard) makes it less appealing as a data source at both levels. Third, only 20 out of the 216 districts are currently implementing the mSRC with an average of 2 district per each region. This means the bulk of data for regional and national levels planning must come from elsewhere other than the mSRC.

Again, while the study shows that almost every piece of information is used at some point (especially at the district and school levels), the most frequently used data appear to be the following five (5):

- Teacher attendance;
- Pupil attendance;
- Number of exercises given and marked;
- Lesson note submissions; and
- School enrollment

Table 9. Disaggregation of the various uses of mSRC data at different levels of educational management

Level	Broad categories of use of data	Specific instances of use of data
School/Circuit	Monitoring	To know attendance rate of both pupil and teachers To discuss with teachers their work output To check punctuality and regularity of teachers; To check teachers output of work; To check the regularity of the pupils to school To devise strategies to improve teacher regularity and performance To talk to the head teacher to monitor the number of exercises given to the pupils by the teachers As basis to discipline deviant teachers. E.g. all teachers who had less than 75% attendance were cautioned in some districts As basis to set firm timelines for early submission of lesson notes To officially report deviant teachers to the District Office for sanctions when necessary To educate community members on the importance of sending their wards to school towards boosting enrollment To reward teachers who were most regular and punctual throughout the term We use the mSRC data to confirm reports from field officers - CSs
	Reporting	Used the information to make a report to DDE Pictures were taken to report anything from the school to the directorate

		Reported enrollment figures at PTA meeting
	Resource Management	Use the data to request for additional teachers Use the data to know the number of textbooks to request Use the data for procurement of materials from the DEO stores Use the data to declare vacancies to HR to post teachers to schools
	Planning	Use the information for SPAM meeting
District Level	Monitoring of schools	To draw attention of the Director to exceptional cases on the dashboard To put CSs on their toes to intensify schools monitoring Consistent low attendance and enrollment reported for quick management intervention AD supervision uses the information to visit the schools or ask the CSs to check on specific schools Used the data to support disciplinary actions We use the data to ensure compliance with key policy guidelines such as the minimum teacher workload. We use the data to help identify challenges in the school
	Data Repository	We often use the data to supply all actors (internal/external, e.g. District Assembly) with the required educational data on the district

		We use the data to validate data from other sources such as those from EMIS or school feeding program, capitation program, etc.
	Planning	We used the data for District SPAM preparations
	Resource management	We use the mSRC data to evaluate requests (by schools) for facilities or resources such as textbooks and furniture to schools To perform staff rationalization – postings and transfers
Regional/National	Information Repository	We use the system to generate all kinds of data for other users (internal and external) who may request for specific data e.g. NGOs, PPME, etc. Used data from the system to validate data from other sources such as EMIS

Source: Fieldwork, 2018

mSRC data, Communication for development (C4D) and SPIPs: While there is some evidence to suggest that the mSRC is being used in the preparation of SPIPs at the school levels, there is some ambiguity in the data obtained on the issue (see Figure 9). For example, except in the Upper West Akim District, the second term data was definitively emphatic on the dominant use of mSRC data in preparation of SPIPs but the third term data shows significant decline in the use of the mSRC data for SPIP preparation. This story remains true for all districts in relation to the use of the data for communication for development (C4D) efforts, as shown in Figure 10. This ambiguity may have resulted from methodological choices made in the data collection, particularly with regards to the inclusion of significant number of new respondents different from the original set of respondents (see methodology section). Regardless of the sources of the ambiguity, it is clear that **much more has to be done to encourage the use of the mSRC in the preparation of SPIPs and C4D efforts.** North Dayi, Upper West Akim and other new districts in the program must be particularly targeted given the consistency of relatively low use of mSRC data in SPIP, reported over the two academic terms covered in this study.

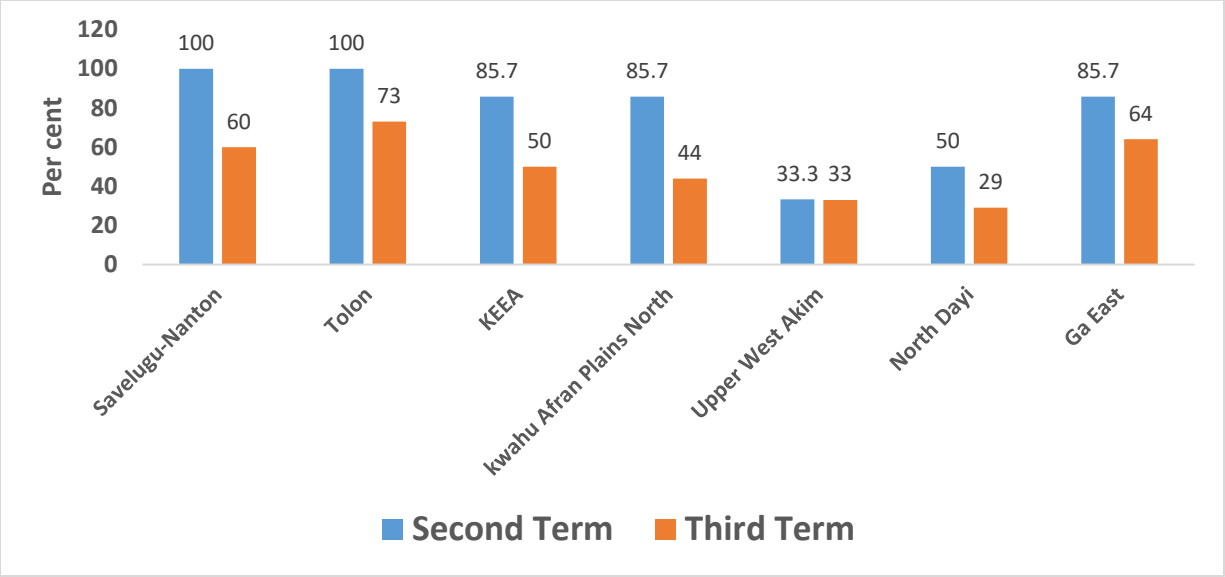


Figure 9.Use of mSRC data in SPIP preparation by District

Source: Fieldwork 2018

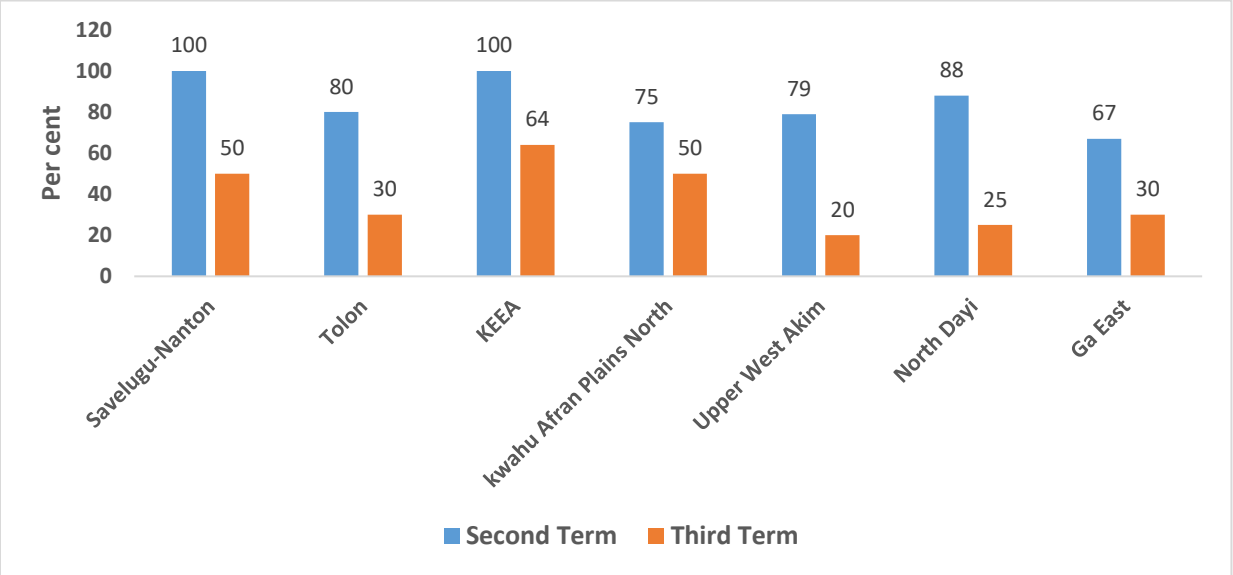


Figure 10. Use of mSRC data in communication for development efforts by District

Source: Fieldwork 2018

4.3 Using mSRC to Promote Accountability in Education Management

The focus of the study on this theme was first, to understand the extent of current community access to and use of the mSRC data in the performance of their education management oversight functions; and second, to evaluate opportunities to enhance community use of the data in promoting or deepening accountability in school management at the local level.

4.3.1 Current community knowledge, access to and use of the mSRC data

The research team found a surprising lack of understanding of the system among teachers and community members in almost all the schools and communities visited. While most teachers and the PTA/SMC members interviewed were generally aware of the existence of the mSRC, their understanding of the system; that is, its goals, details of data submitted, and potential uses of the data, is substantially superficial. On the part of teachers, the team found that although many claimed that it has positively impacted their work rate, most appear to view the mSRC quite very negatively, seeing it primarily as a tool for policing and potentially punishing absentee teachers in particular. Some teachers even fear that a head teacher may intentionally fabricate data to put particular teachers 'into trouble'. This highlights the need ***to bring teachers fully onboard the implementation of the mSRC program*** through sensitizations at school and district levels. NGO actors interviewed showed no knowledge of the mSRC; most heard about it for the first time from the researchers in this study.

In terms of access, currently, neither teachers nor community actors have any access to summaries or reports of submissions on their schools. This means that the only person with access to the mSRC data/report at the school level is the HT. Where there is any sharing of information, this may be based on a case-by-case basis, particularly during 'crisis situations'. Put another way, there is no structured system of sharing the mSRC data with either teachers or community members. This situation is attributable to two reasons. First, most head teachers are not aware of the responsibility of sharing their reports/summary analytics with their teachers or PTAs/SMCs. Second, the current configuration of the summary analytics does not lend itself easily to sharing, either by way of printing or saving the summaries in a more easily sharable format. This is particularly the cases as Head Teachers have access to only the app and not the web-based dashboard. Nonetheless, it was observed in the Tolon District that teachers' attendance data was printed and shared during SPAMs (See Figure 11).

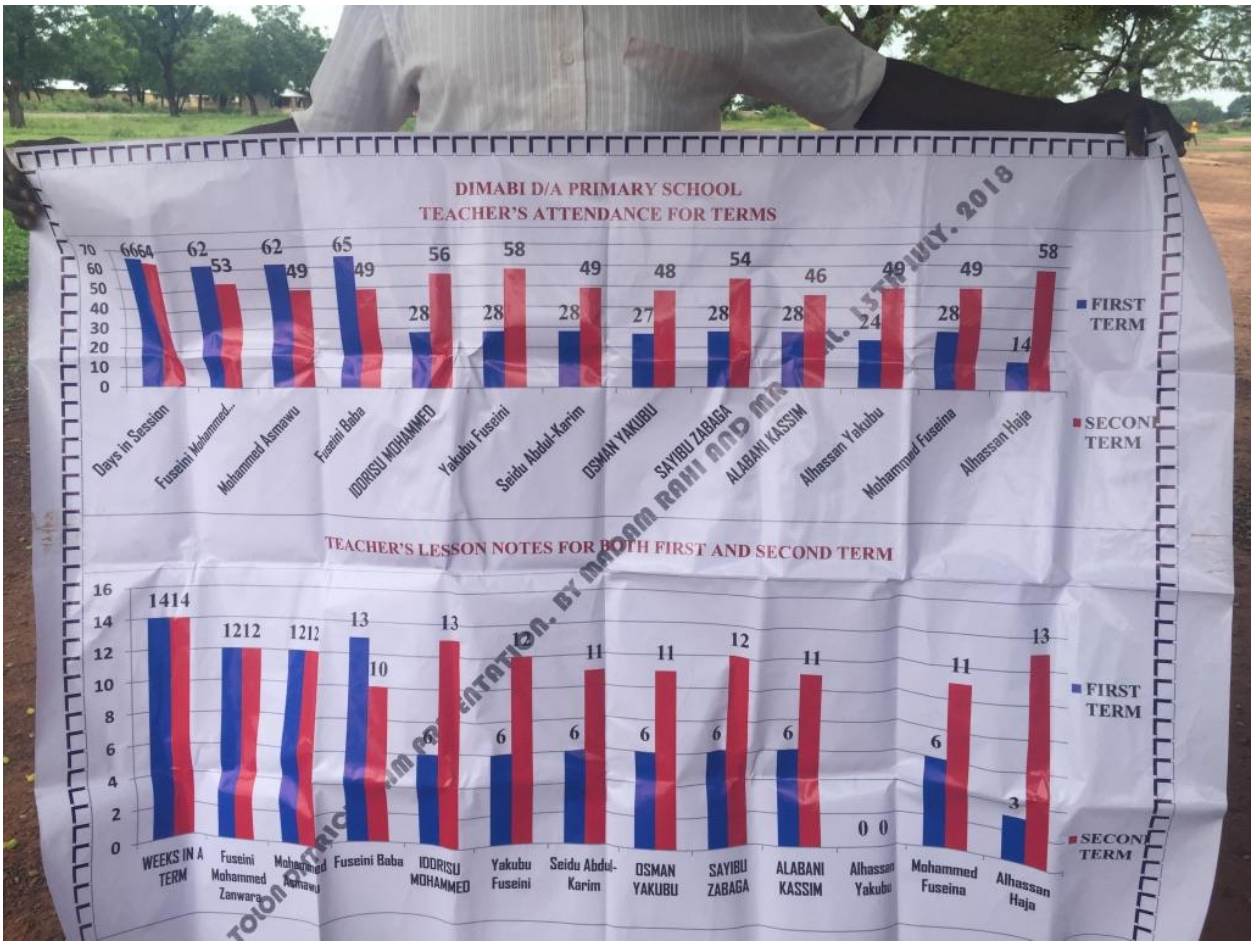


Figure 11. Teacher attendance for 2017/2018 academic year, Dimabi D/A Primary School, Tolon District.

In addressing these lapses, ***it is proposed that the data sharing responsibility of HTs be made an integral part of the user training workshops***. It is further ***proposed that options be found in the mSRC app to facilitate sharing of school level or even circuit level summaries. An option may be to enable conversion of the summary analytics into PDF formats to aid sharing and printing***, where necessary. Another option may be ***to give HTs access to the dashboard so they can print summary analytics on their school.*** Giving them access to the dashboard may also provide them with the opportunity to compare the performance of their schools to others in the circuit and district. Yet again, another option may be to require the District Offices to generate and share with each school termly or monthly reports (soft copy or hard copy) on the schools.

4.3.2 Opportunities to enhance community access to and use of mSRC data in promoting accountability

The focus here was to evaluate potential acceptance and use of the mSRC data among the various community members such as PTA/SMCs and NGOs; to explore options for sharing the mSRC

data with these actors towards strengthening community oversight of school administration at both the community and district levels.

Generally, (after elaborate explanation of the mSRC to them, sometimes with assistance of the district mSRC administrators) the team found very enthusiastic embrace of the mSRC among the teachers, PTA/SMCs and NGO actors. The NGO actors as well as community members expressed their eagerness to be provided the mSRC data. To the NGOs, not only will the mSRC data help them be more effective in their education oversight activities, it can also potentially help them in targeting specific education-related interventions in their jurisdictions. On the part of the PTA/SMC members, it was found that many of them have fairly efficient alternative ways of accessing data on their schools (for example through school visits and observations, inspection of relevant school records, interview of students/teachers/HTs; parents' reports, and formal/informal reports by HTs). They were nevertheless still eager to be provided the mSRC data as they believed it would enhance their oversight of school administration in their communities.

In view of the above, the following sets of actions are recommended:

- Provide key community actors such as PTA/SMC chairs some form of (restricted) access to the dashboard;
- Require HTs to share summary analytics. This could be much easier if the system can permit the conversion of the analytics into PDF document for printing and even electronic sharing) with all relevant stakeholders of their schools;
- Task each HT to educate their PTA/SMC members, teachers and relevant NGOs within their jurisdiction on the mSRC – its goals, details submitted and potential uses. The District Offices must explore options for lending support to the education efforts by the HTs;

4.4 Linking mSRC to other existing sources of data within the educational sector

Here, the study focused on two main issues. First, it sought to identify the main, alternative data sources existing at the GES, evaluating the extent of complementarity or overlaps between these various data sources and the mSRC. Second, it analyzed the political space for merging the mSRC with those systems, measuring not only users' response to potential merger of the mSRC with existing systems, but also on identifying potential political conflicts that need to be addressed in making such a merger possible.

4.4.1 Current data sources in GES and extent of complementarity

The study reveals that the only substantive data source available at the GES besides the mSRC is the EMIS. EMIS began in 1997, and was designed to provide data for monitoring progress under the Free Compulsory Universal Basic Education (FCUBE) Program. It has since 2002 undergone significant enhancements, becoming the main tool for strategic policy planning, budgeting and even results monitoring within the education sector in Ghana. Data for EMIS comes from a census of all basic, secondary and post-secondary educational institutions (both private and public) in Ghana. Although data collection for the EMIS has been manually done over several years, significant efforts have gone into computerizing or digitizing data collection under the EMIS, with the EMIS software having undergone pilot testing in three districts.

Overlaps/complementarities between EMIS and mSRC: While the study shows very significant overlaps in the data collected under mSRC and the EMIS systems, the data in EMIS appear to be much more comprehensive than those covered by mSRC. There are also significant differences between the two systems in various ways, including the units of analysis covered, the frequency of data collection, and geographic coverage. Currently, EMIS covers both private and public schools at the basic and secondary levels; data is collected annually, and coverage is national. In contrast, mSRC covers only public basic schools; data is collected weekly and termly; and coverage is limited to 20 pilot districts (see Table 8). These differences (especially in terms of frequency of data collection and geographic coverage) are to some extent the result of the differences in the underlying objectives of both systems. mSRC has been described by several respondents as focusing on short-term, routine education management and monitoring tasks; while EMIS is for national level strategic policy planning of the wider education sector.

Table 8. Comparison of mSRC and EMIS

Data collection Systems	EMIS	mSRC
Key indicators	1. School identification 2. School infrastructure 3. Enrollment by age, class, sex 4. Pupils and teacher textbook 5. Pupils attendance and movement 6. Teacher periods & subjects taught 7. Teacher profile 8. Teacher movement 9. School profile and organization 10. School management 11. School building 12. Characteristics of school's materials and equipment 13. Non-teaching staff information 14. Primary one first-time enrollment 15. Pupils and teacher information 16. School finance 17. Academic qualifications of teachers 18. Professional qualifications of staff 19. Ranks of teachers 20. Management unit of school	1. School identification 2. School facilities 3. Enrollment by class 4. Textbooks per child 5. Pupil attendance 6. Teacher subjects taught 7. Teacher profile 8. Teacher attendance 9. Teacher punctuality 10. Teacher output of work 11. Number of exercises given and marked 12. Lesson notes submission 13. Submission of scheme of work 14. Classroom management 15. Lesson plan submission 16. Student performance by subject 17. Special enrollment 18. Special student attendance 19.

	21.	
Frequency of data collection	Annual	Weekly and termly
Coverage	National (census); basic, secondary and post-secondary schools; public and private and public schools	Pilot districts; public basic schools
Some key analytics	Enrollment ratios Share of girls in school Percentage of trained teachers Pupil-teacher ratio Pupil-trained teacher ratio Pupil-classroom ratio Seating and writing places Gender parity index Pupil- core textbook ratio Percentage of schools with electricity Percentage of pupils in private schools Percentage of schools with electricity Percentage of schools with toilets Percentage of schools with urinals Percentage of schools with classrooms Percentage of schools needing repairs Enrollment rate Completion rate Transition rate Gross admission rate Net admission rate Gross enrollment rate Net enrollment rate Percentage of schools with drinking water District BECE pass rate	Enrollment Student performance by subject Teacher attendance by week Pupil attendance by week Class performance by specific subjects
Mode of data collection	Manual (currently moving towards computerization*)	Computerized

Source: Fieldwork, 2018

In terms of management structure, EMIS has a very elaborate management structure (See Figure 12), compared with the relatively skeletal management structure of the mSRC. The mSRC management structure (at this point) consists of a skeletal staff at the national office, with assistance from regional and district planning/statistical officers, and data entry users (HTs and CSs).

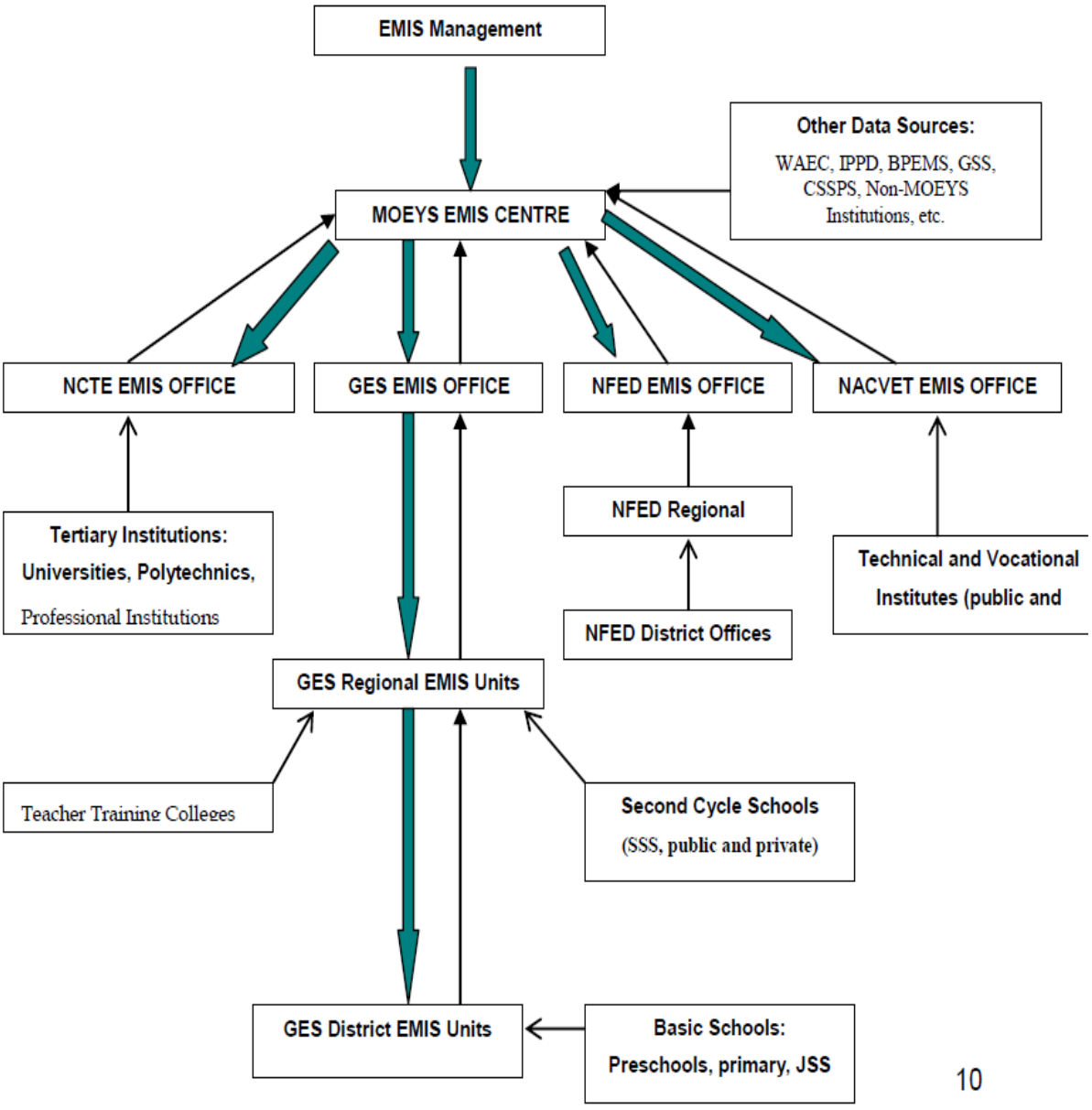


Figure 12. EMIS Management Structure in Ghana

Source: Cambridge Education (2006)[4]

[4] Cambridge Education (2006). *Education Management Information System: A Short Case Study of Ghana.* Working Paper No.4. Retrieved from

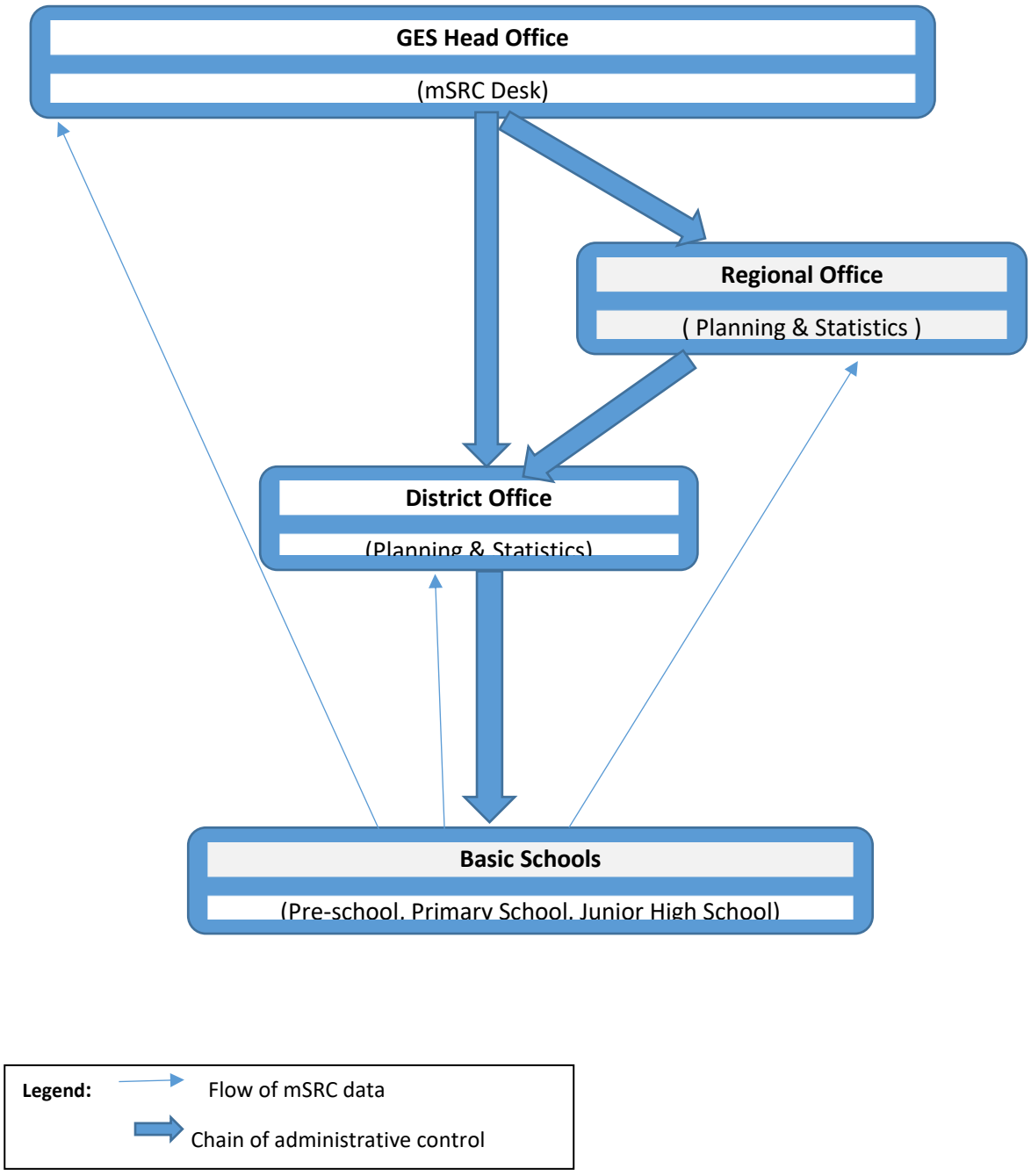


Figure 13. mSRC organizational structure

http://documents.worldbank.org/curated/en/133081468031776923/Education-management-information-system-a-short-case-study-of-Ghana. Accessed June 20, 2018.

4.4.2 Merger of mSRC and EMIS

Merger is understood to mean the integration of the mSRC and EMIS data collection systems in to one, holistic data management system that fully satisfies the disparate objectives of both systems in the education management space in Ghana. There are two main issues worth highlighting here: the technical *feasibility* of the merger; and the political acceptance or *desirability* of the merger. Both elements need to be positive in order for a successful merger of the mSRC and EMIS datasets/systems. The two issues are discussed briefly below.

4.4.2.1 Technical feasibility

At the technical level, two issues that readily confront a merger attempt are first, the availability of the technical capacity to seamlessly integrate the indicators from both systems into one system, taking into account the overlaps and the divergences in indicators; and second the availability of the supporting infrastructure and personnel to operate the merged system. From discussions with key actors on the issue, the research team is convinced that merger of the EMIS and mSRC is technically feasible. This assertion is made on two main grounds. First, the capacity required to ensure the effective integration of these two systems does exist. Second, both systems currently share the same IT infrastructure, personnel, and office space especially at the regional and district levels. Both also depend on the HT for data generation. A merger (that does not undermine the underlying objectives of each system) has the potential of offering significant cost savings, ultimately.

4.4.2.2 Political desirability and acceptance of merger

Political acceptance remains a key determinant of success in any efforts to merge the EMIS and mSRC. Interviewees and survey respondents at the regional, district, and school levels reveal an enthusiastic embrace of the idea of merging both information systems. Most actors at these levels believe the merger will make their work easier and reduce the workload. As shown in Figure 13, an *average* of 83.4% of HTs and CSs favored a merger of the EMIS and mSRC, with a slightly higher favorable response during the second (87.1%) than the third term (79.7%).

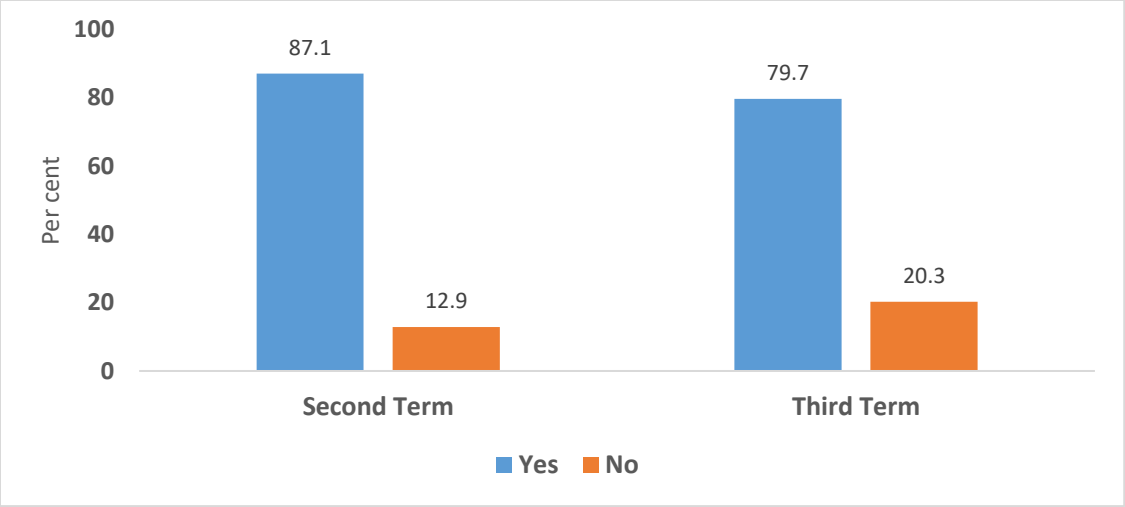


Figure 12. Is it desirable to merge mSRC and EMIS?

Source: Fieldwork, 2018

The picture at the national level is a little more complicated. While the research team observed some amount of openness to the merger, it also observed that strong internal politics within the GES and MoE in connection to both programs can pose serious challenges in the operationalization of the merger. It is important to state, for example, that beyond everything else they may represent, both the EMIS and mSRC are also tools for resource mobilization and control by individuals within the MoE/GES. As one respondent candidly described the internal politics within the Ministry, 'Everybody is creating an empire', ostensibly to become emperors. Both systems currently appear to have their emperors, and any hint of loss of empire is likely to trigger suspicion and tension.

There are already signs of suspicion between the mSRC and the EMIS teams, with the EMIS team perceived to be ostensibly trying to make the mSRC irrelevant by 'secretly' incorporating key mSRC indicators into the EMIS survey. It is fair to speculate that such feelings persist because even though discussions about the merger of the two systems appear to be advancing fairly rapidly, there are no structured engagement between the EMIS and mSRC teams that could foster collective thinking and consensus building around the merger. ***It is hereby proposed that in going forward, conscious and deliberate efforts be made to bring the two teams together in discussions on the subject in a way that fosters trust and consensus building around the merger and associated issues***. It is absolutely important to ensure that no losers are created as a result of the merger.

4.4.2.3 Merger options

Based on the research team's interactions with key actors connected to both systems, two merger options are proposed to inform ongoing discussions.

Option 1: Choose either EMIS or mSRC as a base platform and integrate indicators

This option offers the opportunity to select either the EMIS or the mSRC as the base platform on which the indicators can be integrated. This option may work by simply 'importing' missing indicators from the other system into the chosen platform. While it may look attractive, this option has the potential complexity related to the determination of the appropriate frequency of data collection under the merged system, since the mSRC data tend to be required at shorter intervals than the EMIS data.

Option 2: Develop an independent master platform that hosts and links both EMIS and mSRC data

This option envisages the development of a new 'overarching' or master platform that not only hosts both systems but creates the necessary inter-linkages in data across both platforms. This system will make the EMIS and mSRC operate as separate but inseparable systems, allowing different data collection frequency regimes to be developed for each system. For example, in this, mSRC data may still be collected at the weekly intervals while the EMIS data can be programmed to be collected at longer intervals within particular periods or windows. The two systems would be expected to be closely interlinked so that all relevant mSRC data that need to be collected under EMIS will be automatically pulled from the mSRC system, thereby requiring users to only provide data that is not already in the mSRC system. This can be a more useful option that poses the least risk to the achievement of the underlying objectives of both systems.

The key recommendations emanating from the above analysis are summarized in Box 1 below.

BOX 1: SUMMARY OF KEY RECOMMENDATIONS

Improving the functionality and mastery of the app among data entry users

- Future reviews should target the suggested variables that are currently missing in the app.
- A retraining of users, particularly those in the recently added mSRC districts (such as Upper West Akyem, Ga East and Tolon) should be undertaken to deepen user's understanding and mastery of the app.
- Given the depth of changes undertaken on the app and web platform, it is further recommended that all users be retrained to enable them master the new app and dashboard features.
- Consider the development of video tutorials that completely captures all the major processes and manipulations required to master the app. These videos may be made available on the internet (YouTube) or in any format that may be easily available to all users across districts.
- Again, it may be useful to compile a list of common mSRC data entry/retrieval challenges [(or frequently asked questions (FAQs)] and offer step-by-step guide to resolving them.

Improving data submission rates

- Complement the monitoring efforts of district coordinators by providing internet data. Presently, there are significant and legitimate fears that without such support, things may slide back to 'normal'.
- Given the need for strong managerial commitment to ensuring better submission rates, it is also recommended that due consideration is given to the mSRC in any efforts to reshuffle (top) officials across districts.

Improving data Quality

- It is proposed that sufficient attention be paid to explaining each mSRC indicator during each training session.

- Clear plans for training of newly appointed HTs should be instituted and incorporated into the human resource management structures in each district so as to provide continuous training to new head teachers in each mSRC district.

Improving availability and strength of Technical support

- It is recommended that the whatsapp platform created by the technical support team be moved to the web or incorporated in the mSRC (dashboard) system and appropriately organized by headings to make searching for specific solutions possible in the future. If possible, the whatsapp discussions should be archived or organized into specific topics/themes for easy retrieval in the future.
- It is suggested that specific efforts should be made in the transitional arrangements to ensure that the appropriate levels of capacity will be acquired by the GES support team (or available to them) prior to the formal exit of Techmerge from the program.
- The GES must further restructure the technical support team to include as many District Coordinators as possible, ensuring that the team has at least two members in each region.

Improving availability of mSRC Logistics

- Going forward, it may be useful to make alternative repair arrangements that focus on reducing both costs and wait times for users.
- For district coordinators, it is recommended that sufficient budgetary commitments be made to providing internet data to them in support of the mSRC.
- It may be important to explore options of using part of the capitation grant in support of mSRC data purchases

Improving the use of msrc data

- Much more has to be done to encourage the use of the mSRC in the preparation of SPIPs and C4D efforts.

Promoting accountability through enhanced use of mSRC data

- Efforts must be made to bring teachers fully onboard the implementation of the mSRC program
- The data sharing responsibility of HTs should be made an integral part of the user training workshops.
- Explore options in the mSRC app to facilitate sharing of school level or even circuit level summaries. An option may to enable conversion of the summary analytics into PDF formats to aid sharing and printing, where necessary. Another option may be to give HTs access to the dashboard so they can print summary analytics on their school.
- Provide key community actors such as PTA/SMC chairs (restricted) access to the dashboard;
- Require HTs to share summary analytics (this could be much easier if the system can permit the conversion of the analytics into PDF document for printing and even electronic sharing) with all relevant stakeholders of their schools;
- Task each HT to educate their PTA/SMC members, teachers and relevant NGOs within their jurisdiction on the mSRC – its goals, details submitted and potential uses. The District Offices must explore options for lending support to the education efforts by the HTs;

Creating a stable political environment for merging mSRC and EMIS

- Conscious and deliberate efforts must be made to bring the EMIS and mSRC teams together in discussions on the subject in a way that fosters trust and consensus building around the merger and associated issues.

5. CONCLUSION

The study provides a compelling evidence that the mSRC pilot program is proceeding well so far. It highlights a number of the challenges currently existing and offers a number of recommendations that, if taken, can further enhance the program. What is important at this point is the fact that the program is on track and that there are no unresolvable problems identified. Indeed, a number of the problems identified are already in the process of being addressed. The retraining of users in North Dayi, the strengthening of the technical support system, increased monitoring, and the revision of the application and web platforms are useful examples in this regard.

On the important question of use of the data, there is ample evidence to indicate that the mSRC data is being used particularly at the district and school levels, where it matters more in terms of its underlying objective of education monitoring. It is anticipated that further iterations of the app, the ongoing improvements in the analytics of the web platform as well as the proposed expansion of the program will further boost use of the mSRC data at all the levels of education management. A further thinking needs to go on around how to make the mSRC data available to the general public in a manner that boosts community participation in education management. As highlighted in the third term report, however, serious thoughts need to be given the possibility of putting the mSRC data on the web in order to make it more accessible and enhance prospects for its utilization in decision-making.

Appendix I:

Technical functionality checklist for mSRC app and system

	Issue	Yes	No	Comments
	Primary Data Entry			
1	Does app provide metrics on reliability, completeness and accuracy of data entry?		X	NOT SEEN DURING STUDY
2	Does app permit verification by Circuit Supervisors of data entered by Head teachers?	X		
3	Does system allow super users to compose new forms with new indicators to be pushed to data entry users on mobile devices?	X		
4	Are the data entered in the system geo-referenced?	X		
5	Do all user dashboards in the system provide map functionality, allowing users to display reports on a map?	X		
6	Does system allow for specification of reporting intervals for each user role?	X		
7	If yes above, does system permit reminders to be sent to individual mobile data entry devices or data entry person's personal mobile phone via text message) at specified intervals	X		BUT THIS IS NOT DONE AUTOMATICALLY
	Secondary data entry through crowd sourcing			
8	Are community members provided with a mode to interact with the app?		X	THIS IS STILL BEING CONSIDERED
9	Does system enable community members (students, parents) to request a summary report from the system?		X	STILL BEING CONSIDERED
	Automated data quality control, analysis and reporting			
10	Does system identify possible ranges for each indicator and permits outliers to be flagged automatically?	X		IT IS ABLE TO CHECK ONLY 'EXCESSES' SO FAR. IT IS HOPED THAT THE MOST RECENT REVIEW OF THE APP WOULD HAVE ADDRESSED THAT GAP
11	Does system permit data editing by a data editor who can edit the data visible to him/her based on the role, or delete records and request for re-entry by user who originally entered the data?	X		
12	Does system provide user performance metrics on timeliness and completeness of reporting, and accuracy (log if someone's data sets have to be quality edited frequently)?	X		

13	Does system provide role based access to summary statistics (standard visual analytics by indicator) and case-by-case reports on android mobile device and website as weekly, monthly, quarterly and yearly summaries rankings (HT/CS/District/Regional/Crowd sourced data) ?	X		TO SOME EXTENT
14	Are dashboard data in the system exportable as PDF reports?	X		
15	Are all data in the system exportable as MS Excel and CSV files and customizable indicator by indicator?	X		
	Customization of Android mobile devices – restricted use; data security			
16	Does system provide programming restrictions and pre-configuration of data entry devices to bar the running of other unapproved apps (ensuring that only the approved data entry app can be run on these devices?		X	CONSIDERED NOT DESIRABLE BY MAIN ACTORS
17	Does system provide reasonably robust protocols assuring the security of the data to prevent unauthorized access?	X		
	Documentation			
18	Is there an intuitive manual provided to guide users through data entry and use of all aspects of the system (dashboards, analytics, data export, user administration)?	X		
	General			
19	Are there any bugs in app?		X	NOT ONE OBSERVED DURING STUDY
20	Are there any failures in the functioning of the app?	X		THE FAILURES WERE DETAILED IN THE REPORTS INCLUDING THE FINAL REPORT.