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POLICY BRIEF

Transforming Teacher Deployment

Lessons from a matching algorithm tool

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Abbreviations and acronyms

ASC	Annual School Census
LMIC	Low- and middle-income country
MBSSE	Ministry of Basic and Senior Secondary Education
PTR	Pupil-to-teacher ratio
PQTR	Pupil-to-qualified-teacher ratios
TMIS	Teacher management information system
TSC	Teaching Service Commission

Executive summary

Sierra Leone, like many low- and middle-income countries (LMICs), faces persistent challenges in deploying qualified teachers across its schools equitably. In 2024, the Teaching Service Commission (TSC), with support from EdTech Hub, Learning Generation Initiative, and Fab Inc., introduced an innovative matching algorithm in the teacher deployment process. The algorithm aimed to increase transparency and equity by incorporating data on teacher preferences, pupil-to-qualified-teacher ratios (PQTR), and school locations. This system demonstrated that algorithm-supported deployment can increase fairness in teacher placement and promote transparency and efficiency. However, the initiative also exposed governance and data limitations, including inconsistencies in teacher records and tensions between automated decisions and actors accustomed to discretionary control over placements. This brief highlights key findings from the qualitative[1] and quantitative[2] research of the 2024 deployment process undertaken by the Learning Generation Initiative, Fab Inc., and EdTech Hub and provides actionable recommendations to improve the system.

[1] Godwin, K., Cameron, E., Frazer, M., Dube, G., Mackintosh, A., Koutecký, T., Adam, T., & Haßler, B. (2025). *Shifting Power Dynamics in Education Decision-Making: Investigating the role of a matching algorithm to improve teacher deployment in Sierra Leone* [Technical Report]. EdTech Hub. https://doi.org/10.53832/edtechhub.1103. Available at https://docs.edtechhub.org/lib/IRFH43RX. Available under Creative Commons Attribution 4.0 International.

[2] Koutecký, T., Mackintosh, A., Huti, M., Adam, T., Godwin, K., & Frazer, M. (2025). *Data-Driven Teacher Deployment in Sierra Leone: Practicalities and quantitative analysis of using a matching algorithm in the 2024/25 deployment cycle* [Report]. EdTech Hub. https://doi.org/10.53832/edtechhub.1115. Available at https://docs.edtechhub.org/lib/ICRSXHTV. Available under Creative Commons Attribution 4.0 International.

The problem

Teacher salaries constitute the largest share of Sierra Leone's education budget,[3] yet only 40% of teachers are on the government payroll.[4] The average pupil-to-teacher ratio (PTR) in government-approved schools is 47:1, and the PQTR is much higher at 90:1, with significant variation by location. Urban and economically developed districts are within the national PQTR target of 40:1,[5] while districts like Kono, Falaba, and Kambia have PQTRs that are more than double those in the Western Region. There is also higher variation within districts, with the most remote schools having the fewest qualified teachers.[6]

Traditional deployment practices lack transparency and are often subject to local discretion, leading to inefficiencies and inequities in school staffing.

The solution: A tech-enabled deployment approach

In an attempt to address these challenges, the TSC in Sierra Leone has pursued innovative data-driven approaches to teacher management. Among these is the recent development of a teacher management information system (TMIS) as well as the introduction of a digitised Teacher Licensing Exam.

In 2024, the TSC took another significant step by introducing a matching algorithm into their deployment process, designed to improve the transparency, efficiency, and equity of teacher placements across schools.

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[3] Wright, C. (2017). *Teachers and the Teaching Profession in Sierra Leone: A comprehensive situation analysis*. Teaching Service Commission. dthttps://tsc.gov.sl/wp-content/uploads/2020/11/18-448-Sierra-Leone-Teaching-report-web.pdf

[4] UNICEF. (Forthcoming). *Strengthening the System: Investing in Sierra Leone's primary-level teachers for a sustainable future*.

[5] Ministry of Basic and Senior Secondary Education (2022). School Approvals Policy Guidelines.
Sierra Leone Education Sector Plan: Transforming learning for all 2022–2026. https://docs.edtechhub.org/lib/8FE32XB4.

[6] UNICEF. (Forthcoming). *Strengthening the System: Investing in Sierra Leone's primary-level teachers for a sustainable future*.

Using data from the TMIS and the Annual School Census (ASC), the TSC aimed to place 2,000 newly licensed teachers on the government payroll using this algorithm.

The teacher deployment algorithm matches teachers with schools by applying a set of pre-determined rules and conditions. Priority is given to schools with the greatest need, as determined by their PQTR. Specifically, schools with few or no payroll teachers relative to enrolment are considered the most marginalised and are prioritised. The algorithm takes into account both specific school values, such as teacher qualification and school level, as well as teachers' preferences. It then generates a recommended allocation of teachers aimed at improving equitable access to qualified, licensed, and payroll–supported teachers, especially in the most remote and underserved areas.

Due to both data limitations (e.g., missing service years, unlinked teacher and school datasets) and shortages of licensed teachers in certain areas, some criteria (such as the school-level quota and distance from preferred school) were adjusted. The algorithm also incorporated additional considerations, including safeguards for religious preference and gender-based ‘tie-breaks’.

Limitations

The qualitative and quantitative research on the deployment process (see Executive summary) had various limitations. First, the quantitative analysis was constrained by the absence of a post-deployment dataset, which limited the ability to assess final deployment outcomes. Additionally, no single dataset included both school-level information and teacher licensing status data, and there was no robust, unique teacher identifier to connect the different datasets. As a result, the analysis had to rely on two separate sources: the matching algorithm data, which used the 2023/24 Annual School Census (ASC) school-level input file, and the Teacher Management Information System (TMIS), which provided teacher-level data, including teachers’ licensing status.

Second, the limited number of teachers who passed the licensing exam — along with the TSC’s requirement that only licensed teachers be added to the payroll — reduced the potential impact of the matching algorithm in the 2024 deployment, as it had less influence over teacher selection than it would have with a larger pool of eligible candidates.

Third, the qualitative data collection was carried out in January 2025, when the TSC had not yet completed the deployment process and not all teachers had received their official posting notifications. Consequently, the teachers participating in the study had not assumed their new roles, which led them to speak more about the deployment process than the deployment outcomes. Responses collected during this period are therefore likely to reflect expectations and perceptions, rather than realities, and should be interpreted with this limitation in mind.

Key findings

The implementation of the algorithm-based teacher deployment in 2024 marked a significant shift towards a more data-driven, transparent process. While the new approach demonstrated clear benefits — including improved fairness, accountability, and transparency — it also revealed important challenges related to data quality, governance, and communication. These findings from both the qualitative and the quantitative research offer valuable lessons to inform the future refinement of the system.

- **Increased transparency:** The algorithm introduced a transparent, rule-based approach to teacher deployment, which reduced ambiguity and provided justification for the deployment decisions. However, a majority of the stakeholders interviewed were not fully informed about how this new system worked.
- **Reduced political interference and corruption:** According to several officials, the new system has led to a decline in preferential treatment and corruption in the deployment process.
- **Teacher preferences largely respected:** Most teachers were placed in or near their preferred schools, especially in the earlier stages of deployment. However, some were deployed to schools in different districts from those they preferred.
- **Limited capacity to manage new technology:** Both teachers and TSC officials faced challenges in adapting to the new technology. Many teachers struggled with digital literacy, resulting in high failure rates during the tablet-based licensing exams. Although a short instructional video was shared via WhatsApp to support them, not enough teachers passed the exam, resulting in two additional exam rounds. On the administrative side, TSC staff reported gaps in the training provided on using the algorithm, raising concerns about

internal capacity and overreliance on external technical partners for system management and sustainability.

- **Breakdowns in communication:** District Directors, who serve as the primary link between the central level and schools and teachers, were not fully informed about how the new deployment process worked, contributing to confusion and miscommunication. This lack of information also extended to school leaders and teachers, many of whom were similarly not familiar with, or how, this new system worked.
- **More equitable distribution:** Setting caps on the number of teachers per school and targeting schools based on pupil-to-qualified-teacher ratios helped promote fairer allocation across regions. More teachers were added to schools with poor PQTRs.
- **More highly qualified teachers** were selected in the 2024/25 deployment than in the existing payroll workforce, with 10% more having a Higher Teaching Certificate (HTC) or higher qualifications.
- **A slightly lower share of female teachers** was selected in the 2024/25 deployment than in the existing payroll workforce.
- **A slightly higher share of teachers** was selected in more remote schools than in those where the existing payroll workforce is located.
- **A higher share of teachers** was selected in disadvantaged districts relative to the existing payroll workforce.
- **Data limitations affected accuracy:** Missing variables like service years and inconsistent unique identifiers limited the system's precision.
- **Power dynamics emerged:** The shift to centralised, automated decision-making reduced discretionary control at the local level, leading to resistance from some stakeholders.
- **Willingness to embrace the system:** Despite early challenges, stakeholders increasingly appreciated the transparency and objectivity of the algorithm-based approach.

Implications for future use

The pilot revealed that preference-matching deployment is both feasible and valuable in the context of Sierra Leone. It promotes fairness and

streamlines the allocation of teachers. However, the success of such a system depends on the availability and use of high-quality data, clearly defined governance roles, and effective stakeholder engagement. It also requires recognising teacher deployment as an end-to-end process that combines both technological tools and human responsibilities, each playing a critical role in ensuring decisions are trusted and effectively implemented.

Policy recommendations

To build on the successes of this deployment and address the challenges identified, the actions listed below are recommended. These involve collaborative responsibilities across key education actors, including the **Ministry of Basic and Senior Secondary Education (MBSSE)**, the **Teaching Service Commission (TSC)**, and **District Directors.** Implementation of these measures will help strengthen the system, improve stakeholder engagement and buy-in, and support long-term sustainability.

- **Continue to use the matching algorithm for future deployment:** The benefits demonstrated in improving allocations and promoting fairness justify the continued use for future deployment.
- **Strengthen stakeholder communication:** Clearly communicate how teacher deployment decisions are made, including the overall process, placement outcomes, and any trade-offs between goals like increasing female teacher representation and staffing remote schools. Regular updates to key stakeholders — such as District Directors, the teachers' union, and parliamentarians — will help foster transparency, trust, and shared understanding.
- **Strengthen district-level engagement in deployment decisions:** Draw on district directors' local knowledge by involving them in reviewing and validating algorithm output prior to the final teacher placement.
- **Improve planning and coordination:** Apply lessons learnt from this initial implementation to better coordinate activities and timelines across all stages of the next deployment cycle.
- **Enhance teacher data systems:** Link the TMIS and the ASC using unique identifiers (including for teachers not yet on the government payroll) to improve data accuracy.

- **Test varying simulations of the algorithm criteria**: Ensure the balance in trade-offs between different criteria settings to ensure it is achieving the intended aims before deciding upon the final selection.
- **Clarify governance and roles:** Define the responsibilities and decision-making authority of all actors involved to reduce friction between centralised algorithmic processes and local-level discretion.
- **Conduct orientation sessions**: Organise orientation sessions for school leaders and teachers to improve understanding of the deployment system and foster greater buy-in.
- **Ensure sustainability through capacity building:** Strengthen the capacity of TSC technical staff to manage and maintain the deployment system independently beyond the life of the project.
- **Help teachers prepare for the licensing exam:** Offer practice tests and hands-on training to help familiarise teachers with the tablets and boost their confidence in using them during the exam.
- **Ensure closer alignment between the licensing process and deployment planning**: This is critical to ensure that sufficient numbers of qualified teachers are available where they are most needed, particularly across districts and school levels with staffing shortages.
- **Establish frequent stakeholder** engagement and adaptation to evolving priorities and challenges.

Conclusion

Data-driven teacher deployment offers a powerful opportunity to address long-standing inequities in Sierra Leone's education system. The 2024 deployment has shown that with the right tools, systems, and processes, the government can make teacher allocation more transparent, efficient, and equitable. As the system is scaled, continued investment in data infrastructure, capacity building, and inclusive governance will be key to its long-term success.